



**STATE OF CONNECTICUT
DEPARTMENT OF ENERGY AND ENVIRONMENTAL
PROTECTION**

Daniel C. Esty
Commissioner

Bureau of Natural Resources
Marine Fisheries Division
www.ct.gov/deep/fishing

**A STUDY OF MARINE RECREATIONAL
FISHERIES IN CONNECTICUT**



Federal Aid in Sport Fish Restoration
F-54-R-32 Annual Performance Report
March 1, 2012 – February 28, 2013



State of Connecticut
Department of Energy and Environmental Protection
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Federal Aid in Sport Fish Restoration
F-54-R-32
Annual Performance Report

Project Title: *A Study of Marine Recreational Fisheries in Connecticut*

Period Covered: March 1, 2012 - February 28, 2013

Job Title

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Job 1: Marine Angler Survey Part 1: Marine Recreational Fishery Statistics survey Part 2: Volunteer Angler Survey	Roderick E. MacLeod
Job 2: Marine Finfish Survey Part 1: Long Island Sound Trawl Survey Part 2: Estuarine Seine Survey	Kurt F. Gottschall Deborah J. Pacileo David R. Molnar
Job 3: Inshore Survey	Jacqueline M. Benway
Job 4: Studies in Conservation Engineering	Inactive
Job 5: Cooperative Interagency Resource Monitoring	Matthew J. Lyman Katie O'Brien-Clayton
Job 6: Public Outreach	David R. Molnar
Job 7: Marine Fisheries GIS	Deborah J. Pacileo



Approved by:

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Cover: Old Saybrook Lighthouse.

EXECUTIVE SUMMARY

Project: A Study of Marine Recreational Fisheries in Connecticut

Federal Aid Project: F54R-31 (Federal Aid in Sport Fish Restoration)

Annual Progress Report: March 1, 2012 – February 28, 2013

Purpose of the Project

The purpose of this project is to collect information needed for management of the marine recreational fishery. This information includes angler participation, effort, catch, and harvest; the relative abundance of finfish and specific population parameters for important selected species, water quality and habitat parameters, and assessment of fishery related issues such as hook and release mortality. The project also includes an outreach component to inform the public, and increase understanding and support for management programs and regulations.

The project is comprised of seven jobs: 1) Marine Angler Survey, Part 1: Marine Recreational Fishery Statistics Survey, and Part 2: Volunteer Angler Survey, 2) Marine Finfish Survey, Part 1: Long Island Sound Trawl Survey, and Part 2: Estuarine Seine Survey, 3) Inshore Survey, 4) Fishing Gear Studies (Inactive), 5) Cooperative Interagency Resource Monitoring, 6) Public Outreach, and 7) Marine Fisheries GIS. Job 4 has been inactive since 2000.

Information on marine angler activity is collected from intercept interviews conducted by DEEP Marine Fisheries staff and through a telephone survey conducted by a National Marine Fisheries Service contractor as part of the coastwide Marine Recreational Fisheries Statistics Survey (MRFSS). The relative abundance of 40 species and more detailed population information on selected finfish and invertebrates are obtained from an annual Long Island Sound Trawl Survey. The relative abundance of young-of-year winter flounder and nearshore finfish species is obtained from fall seine sampling conducted at eight sites. Fishing gear and fishing practices are evaluated by conducting studies of hook and release mortality rates and through sampling catches of commercial fishing vessels taking species of recreational interest. Marine habitat is monitored and evaluated monthly through cooperative interagency sampling of water quality parameters (temperature, salinity, dissolved oxygen) at 20 to 25 fixed sites throughout the Sound. Public outreach is performed through speaking engagements at schools, with civic organizations and fishing clubs as well as through displays in the Marine Headquarters lobby. Marine Program displays and staffing at various fishing shows also is conducted under public outreach. Project staff also keep the Fisheries Advisory Council informed on project activities and frequent media contacts provide broad newspaper coverage of project activities and findings.

JOB 1: MARINE ANGLER SURVEY
PART 1: MARINE RECREATIONAL FISHERY STATISTICS SURVEY

OBJECTIVES (Summary)

To estimate the number of marine anglers, fishing trips, fish caught, and the number and weight of fish harvested.

KEY FINDINGS:

- Marine recreational fishery statistics estimates are continuously updated over time. Estimates of participants, trip effort, and catch can be queried by region, sub-region, and state by visiting the National Oceanic and Atmospheric Administration (NOAA Fisheries/National Marine Fisheries Service/Marine Recreational Information Program (MRIP) web site at <http://www.st.nmfs.noaa.gov/st1/recreational/queries/>.

For this reason, this report will not include MRIP statistics. However, intercept survey work completed by Connecticut is available in the Results and Discussion section of this report.

CONCLUSIONS:

- Coastwide fishery management plans are resulting in increases in several fish populations and good catches of many primary recreational species.

RECOMMENDATIONS:

- Continue to obtain catch and harvest information and angler participation rates in order to monitor the status of the recreational fishery.

**JOB 1: MARINE ANGLER SURVEY
PART 2: VOLUNTEER ANGLER SURVEY**

OBJECTIVES (Summary)

To characterize the size composition of both kept and released fish observed by volunteer anglers.

KEY FINDINGS:

- A total of 51 anglers participated in the survey and made 1,194 trips in 2012. Volunteers including anglers involved in a fishing party made a total of 2,297 trips. With multiple species taken per trip anglers reported 887 trips targeting bluefish, 1,580 trips for striped bass, 561 trips for summer flounder, 29 trips for winter flounder, 161 trips for scup, 189 trips for tautog, and 60 trips for black sea bass.
- Volunteer anglers measured 1,507 bluefish measuring > 12 inches in length, 1,437 striped bass, 1,292 summer flounder, 61 winter flounder, 1,192 scup, 893 tautog and 603 black sea bass. Collecting length measurements on released fish provides valuable data not available through the Marine Recreational Information Program except for the headboat at sea sampling survey.

CONCLUSIONS:

- Volunteer anglers provide a tremendous amount of data on the size and catch composition of popular recreational species in Connecticut, supplying several stock assessments with scarce length information on released fish.

RECOMMENDATIONS:

- Maintain the Volunteer Angler Survey as an effective means of characterizing angler behavior and particularly in collecting length data on released fish that are not available from the Marine Recreational Information Program.

JOB 2 PART 1: LONG ISLAND SOUND TRAWL SURVEY (LISTS)

OBJECTIVES (Summary)

- Provide an annual index of numbers and biomass per standard tow for 40 common species and age specific indices of abundance for scup, tautog, winter flounder, and summer flounder, and recruitment indices for bluefish (age 0) and weakfish (age 0).
- Provide annual totals counts for all finfish species taken, total biomass for all finfish and invertebrate species taken, as well as, a species list for all species caught in LIS Trawl Survey sampling.

KEY FINDINGS:

- Fifty-seven finfish species, totaling 159,770 fish, and forty types of invertebrates (or taxa) including 9,767 long-fined squid and 349 lobsters were collected in 200 tows in 2012.
- The total fish species count (57) is average for the previous 29-year average of 57.6 species per year (1984-2011). The Long Island Sound Trawl Survey has collected one hundred and three (103) finfish species since 1984 with one new species; pinfish (*Lagodon rhomboids*) observed in 2012.
- Springtime adult scup abundance remains high relative to 1984-1999 levels; the 2012 spring index of age 2+ fish was the fifth highest in the time-series at 65.37 fish/tow. Although the fall scup index is usually the preferred index of abundance from the trawl survey, even the springtime scup indices have been above the time-series average for six of the past ten years. Scup also topped the spring catch both by number and biomass this year. The fall index of age 2+ was also higher than average.
- The 2012 spring survey saw several species (seven finfish) that were at record high levels of abundance; black sea bass, clearnose skate, Atlantic menhaden, northern kingfish, striped searobin, weakfish, and whiting were all at record high levels. Of the species where the spring index is the preferred index of abundance for the trawl survey, an additional three species had indices above the time-series mean; fourspot flounder, northern sea robin, and winter skate.
- During the fall survey, six species had record high indices of abundance, black sea bass, clearnose skate, hogchoker, northern kingfish, northern searobin and striped searobin. Conversely, two species had record low indices of abundance, Atlantic herring and blueback herring. Of the species where the fall index is the preferred index, an additional nine (9) species had indices above the time-series mean; butterfish, hickory shad, scup, smooth dogfish, spot, summer flounder, spotted hake, rough scad, and weakfish.
- Although the striped bass abundance in spring 2012 fell below the mean for the third time in the past 18 years, the current index of 0.43 fish per tow remains well above the average for the first eight years of the time series.
- Summer flounder (fluke) abundance, in both spring and fall, has generally been increasing for the past fifteen (15) years. index for spring 2011 (3.85 fish per tow) is more than triple the time-series average. The fall index of abundance has historically been viewed as the preferred index of abundance from the trawl survey, however, fluke are now just as abundant in the

spring survey.

- A few species of recreational importance were at relatively high abundances in 2012. In fact, black sea bass indices of abundance were at record high levels for both spring and fall 2012. Spot, a popular recreational species further south along the east Coast, was at very high abundance in the fall 2012 survey; the second highest in the time-series behind the peak in 2008. Hickory shad abundance in the fall 2012 survey was the third highest in the time-series. Adult weakfish (age 1+) were also relatively abundant for anglers in 2012; the spring LIS Trawl Survey index was the highest for the spring time-series and second highest for the fall time-series.
- Tautog and winter flounder springtime abundance has remained low for the past fifteen or more years despite restrictive management measures.
- Relative indices of abundance (geometric mean number per tow) of American lobster were at record low levels for both spring and fall surveys in 2012. This continues the decreasing trend begun in the late 1990's. Current springtime abundance (0.97 lobsters/tow) has seen more than a 95% drop since the peak abundance of 18.52 lobsters per tow in 1998. Fall lobster abundance (0.29 lobsters/tow) has fallen more than 98% since the high of 19.6 lobsters/tow observed in 1997.

CONCLUSIONS:

- The abundance of some recreationally important species in Long Island Sound remains moderate to high including scup, striped bass, summer flounder and black sea bass. However, some recreational species like winter flounder and tautog have gone through a protracted period of declining abundance and this is cause for concern. Additionally, several species not typically targeted by recreational fishermen have undergone changes in abundance in trawl survey catches that may indicate shifts in species assemblages within Long Island Sound associated with broad scale increasing temperature trends in the northwest Atlantic.

JOB 2 PART 2: ESTUARINE SEINE SURVEY

OBJECTIVES (summary)

- To provide an annual index of recruitment for young-of-year winter flounder and all finfish and crab species taken.

KEY FINDINGS:

- The 2012 annual index of recruitment for young-of-year winter flounder (0.3 fish/haul) ranked the lowest out of 25 annual indices.
- Mean catch of all finfish (153 fish/haul) ranked ninth highest out of 25 annual indices and was slightly above the series average of 147 fish/haul (Figure 2.2). Geometric means were calculated for 22 species commonly captured since the survey began in 1988 (Table 2.1).
- An index of forage abundance was generated using the catch of four of the most common forage species caught: Atlantic silversides, striped killifish, mummichog, and sheepshead minnow. The index for 2012 (60 forage fish/haul) was the eighth lowest of the 25-year series, and well below the time series average of 98 forage fish/haul.

CONCLUSIONS:

- Another decrease in abundance of the winter flounder young of year index for 2012, followed by fairly low indices since 2000 and the absence of a strong year class since 1996 (relatively high in 2004) is not expected to change the disappointing short term outlook for the stock.
- The inshore forage fish abundance index primarily reflects the abundance of Atlantic silversides, followed by striped killifish, mummichog and sheepshead minnow, the dominant forage species taken in the survey.

RECOMMENDATIONS:

- Continue to monitor young-of-year winter flounder and inshore forage species abundance through the September seine survey. In 2013 the seven original seine sites (all sites except Milford) will be sampled in June, July, and August as well as September. These catch data will be compared to catches made in the same summer months in 1988-1990.

JOB 3: INSHORE SURVEY

OBJECTIVES (Summary)

- Provide information on the adult American shad spawning population: length, age structure and sex ratio.
- Provide annual indices of relative abundance for juvenile shad, juvenile blueback herring and common nearshore marine species.

KEY FINDINGS:

- The 2012 adult American shad run experienced an increase of 50% at the Holyoke Lift; This is the second time the lift count has surpassed 200,000 shad since 2003 and is the highest number of fish passed since 1992. The sex ratio indicates that the majority of the fish lifted are males (62%).
- The age structure in 2012 for adult American shad is consistent with recent years. Age structure for males ranged from ages 3-7 and ages 4-7 for females. The majority of female fish were 5 years old (56%) as well as the majority of male fish (43%). The percentage of repeat spawners continues to be low with 5% for females and 3% for males.
- The 2012 CT River seine survey completed 88 seine hauls. Nearly 29,000 fish comprised of 33 different species or taxonomic groups were collected.
- The 2012 CT River juvenile shad index (3.0) ranks as the 5th lowest value in the 35 year time series and is half of the long term average (6.0) CPUE.
- The 2012 juvenile blueback herring index value (2.2) ranks as the 3rd lowest value in the 35 year time series and well below (9.6) the long term average CPUE.
- The Thames River seine survey completed 40 seine hauls. Catches were comprised of 32 different species or taxonomic groups. The 2012 Atlantic menhaden juvenile index in the Thames River (3.5) ranked as 7th lowest in the 15 year time series.

CONCLUSIONS:

- Abundance of Adult shad appears to have increased substantially, but juvenile production remains below average. Age structure for adults is comparable to recent years, as is the repeat spawning rate.
- Relative abundance indices for both *Alosa* below average in the Connecticut River for 2012.

RECOMMENDATIONS:

- Continue to monitor the Connecticut and Thames Rivers to maintain the long term time series on juvenile American shad and blueback herring. Adult age structure and juvenile indices contribute to alosine stock assessments as well as a management plan under ASMFC that monitors sustainability of the American shad fishery.

JOB 4 FISHING GEAR SELECTIVITY – INACTIVE THIS SEGMENT

JOB 5: COOPERATIVE INTERAGENCY RESOURCE MONITORING

OBJECTIVES

- Provide monthly monitoring of water quality parameters important in the development of summer hypoxia in Long Island Sound including temperature, salinity, and dissolved oxygen.
- Provide indicators of hypoxia impacts on living resources.

KEY FINDINGS:

- Hypoxia first developed on or about July 10, 2012, and persisted for 63 days ending on or about September 10, 2012.
- Severe hypoxia (<2.0 mg/l dissolved oxygen) affected 66.7 mi² (172.75 km²) of the Sound in 2012.
- Hypoxia (<=3.5 mg/l dissolved oxygen) extended over a maximum area of 288.5 mi² (747.2 km²) during 2012.
- The Biomass Area-Day Depletion Index (BADD) index for 2012 was the fourth lowest at about 4,608 area-days (average=6,753). The BADD index is a gross measure of seasonal habitat loss associated with hypoxia.

CONCLUSIONS:

- Hypoxia was more widespread in 2012, than has been observed in the Sound since 2003.

RECOMMENDATIONS:

- Continue conducting the water quality monitoring program to provide information needed to evaluate the effectiveness of measures to reduce nutrient loading to LIS and the impact of water quality improvements on marine life.

JOB 6: PUBLIC OUTREACH

OBJECTIVES

- Increase public awareness among anglers and the general public that information provided through this project contributes to state and federal efforts to enhance recreational fisheries conservation and that the majority of marine fisheries research and monitoring activities in Connecticut are funded through the Federal Aid in Sportfish Restoration Program.

KEY FINDINGS:

- Excluding the BIG E event, a total of 22,691 outdoor and environmental writers, marine anglers and boaters, marina operators, fishing tackle retailers, Fisheries Advisory Council (FAC) members, students, and members of the general public attended outreach events. The importance of research and monitoring to good fisheries management was incorporated into the programs.
- Total attendance at two engagements with sportsmen clubs and other recreational environmental clubs was 101 (Table 6.2). The audience was encouraged to become actively involved in the fishery management process by attending public hearings and FAC meetings. Notices of public hearings were sent to hundreds of tackle shops and various media outlets including the DEEP website (www.ct.gov/deep/fishing).
- Total attendance at two career day events with Connecticut high schools was 223 (Table 6.2). The students were encouraged to become actively involved in fisheries biology and management.

CONCLUSIONS:

- Large numbers of anglers and members of the general public are provided information about Marine Fisheries programs through participation in outdoor fishing & hunting shows, Science and Career Days, public speaking engagements and displays at the Marine Fisheries Office.

RECOMMENDATIONS:

- Continue outreach efforts.

JOB 7 MARINE FISHERIES GIS

OBJECTIVES:

- Provide GIS-compatible, or GIS-ready, data sets and geo-referenced layers of data collected through other Jobs of this Project that are sanctioned by the Marine Fisheries Division.
- Provide maps and geospatial analyses of Marine Fisheries Division data or other information relevant to managing living marine resources in Long Island Sound.

KEY FINDINGS:

- An interactive web map was created and published on the Agency website to promote shore-based angling sites with special regulations aimed at improving the shore angling experience (<http://www.depdata.ct.gov/maps/marinefish/fishmap.htm>).
- Over 1,000 GIS data layers were catalogued in the first year of this job.
- A spatial analysis of CT DEEP data was conducted to assist the Agency with Endangered Species Management.
- A tutorial was created to allow staff without GIS on their computers to get the maximum benefit from PDF maps with active data layers using the free Adobe Reader.
- A map of recreational catch and harvest data for ASMFC partners was used in the coastwide management of recreationally important summer flounder stock.
- A PDF map with active layers was created for the spring 2012 LIS Trawl Survey catch of a new invasive alga, *Heterosiphonia japonica*, which was shared with CT OLISP and Sea Grant.
- Using a spatial statistics tool called “Hot Spot Analysis,” a time-series of maps was created to assist with a ASMFC Technical Committee stock analysis relating to the location of egg-bearing lobsters caught in the LIS Trawl survey.

CONCLUSIONS:

- The implementation of a job focused on developing GIS at Marine Fisheries Division allowed staff to benefit from spatial depiction and analyses for a variety of Agency and Project related goals.
- Providing maps for the Agency website is an effective way of providing angling related information to the public.

RECOMMENDATIONS:

- Continue to assist Marine Fisheries Division projects that support sport fish restoration goals through the use of GIS data and software.