Final Performance Report

Date Generated: March 10, 2014

BMP_Marine Fisheries Survey

SAP/PO Number# SAMPLE1009
Mod Number- 0-BASE

Table of Contents

Grant Performance Snapshot

Grant Snapshot #SAMPLE1009 - BMP_Marine Fisheries Survey

[View Grant Details] [top]

Grant SAP/PO Number	SAMPLE1009
Grant Mod Number	0-BASE
Start Date	January 1, 2012
End Date	December 31, 2012

Grant Funds Allocated to Actions

Action	Action Category	Est. WSFR Fed Cost	Est. WSFR Non-Fed Match	Est. Total Amount
Winter Flounder Year-Class Strength	Data Collection and Analysis	$6,000	$2,000	$8,000
Fishery Resource Assessment, Coastal Massachusetts	Data Collection and Analysis	$294,000	$98,000	$392,000
	Totals	$300,000	$100,000	$400,000

Project Statement Performance #60010695 - BMP_Marine Fisheries Survey - MA 2012 (F12AF00099, F-56-R-22)

[View Statement Details] [top]

Project Name	BMP_Marine Fisheries Survey [View Project Details]

SMART Objectives - Purpose/Targets

Purpose/Target ID - Job 2

Purpose/Target Description	Assessment of winter flounder year-class strength

Indirectly Benefited Species

Scientific Name	Common Name	Status
Pseudopleuronectes americanus	winter flounder, rough flounder, lemon sole, Georges Bank flounder, blackback	

Objectives

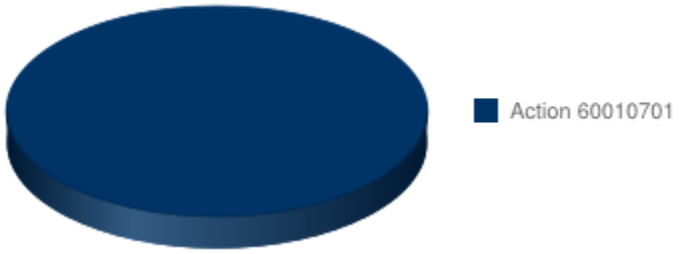
Objective ID - 2

Objective Name	Winter Flounder Year-Class Strength
Objective Statement	To assess year class strength by monitoring abundance of shore zone young-of-the-year winter flounder.

Custom Quantitative Indicators

Desired Future Value	Base Value	Output	Deadline
49	0	Number of seine hauls	December 30, 2012

% of Desired Output Reported by Action

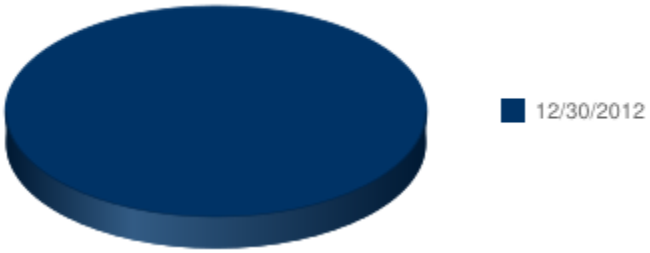


Addressing Actions

Action # 60010701 - Winter Flounder Year-Class Strength

[View Action Details]

% of Desired Output by Date



Date Reported	Reported Value	Output	% of Desired Output
December 30, 2012	49	Number of seine hauls	100%

Results	The total number of seine hauls made in the six Nantucket Sound estuaries on the south side of Cape Cod was 49. Survey temperature monitors were successfully replaced and downloaded in 2012. A comparison of 2007 - 2012 estuarine temperatures during the February through June egg deposition and larval development season reveals that fewer days were spent at the lowest end of the temperature range in 2012 (Figure 8). A closer look at February winter minimum temperatures demonstrates that nearly all February 2012 daily mean temperatures were above the February 2007 – 2012 median, and the February 2012 median was more than 2 C greater than the 2007 – 2011 median (Figure 9).		
Totals	49	Number of seine hauls	100%

Appendix A: Grant Details

Grant Details #SAMPLE1009 - BMP_Marine Fisheries Survey

[top]

Grant SAP/PO Number	SAMPLE1009
Grant Mod Number	0-BASE
Recipient State	Massachusetts
Start Date	January 1, 2012
End Date	December 31, 2012

Grant Programs

Program	Est. WSFR Fed Cost	Est. WSFR Non-Fed Match
Sport Fish Restoration (Marine)	$300,000	$100,000
Totals	$300,000	$100,000

Grantors	U.S. Fish and Wildlife Service
Agency Grantees	Massachusetts Department of Fish and Game

Appendix B: Project Statement Details

Project Snapshot #60010693 - BMP_Marine Fisheries Survey

[View Project Details] [top]

Primary Agency	Massachusetts Department of Fish and Game
Start Date	December 31, 2010
End Date	December 30, 2015
Project Categories	Conservation/Management

Project Statement Details #60010695 - BMP_Marine Fisheries Survey - MA 2012 (F12AF00099 F-56-R-22)

[top]

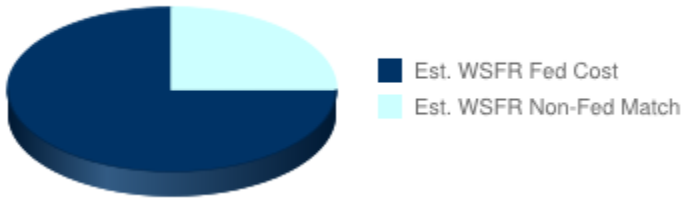
Properties

Is Revision?	No
Grant Programs	Sport Fish Restoration (Marine)

Project Statement Cost Breakdown

Estimated WSFR Federal Cost:	$300,000
Estimated WSFR Non-Federal Match:	$100,000
Total Estimated Cost:	$400,000

Cost Breakdown Graph



Need Statement

In 1978, the Massachusetts Division of Marine Fisheries, MarineFisheries, began a program to monitor abundance of finfish, which are of major importance to recreational and commercial fishermen of
Massachusetts. The cornerstone of this effort is a semiannual coastwide bottom trawl survey, which has
continued for 33 consecutive years. A secondary ongoing investigation is a summer seine survey (35 years) to measure relative year-class strength of winter flounder.

Because the assessment program has exceeded Division expectations in providing comprehensive resource abundance information for its management decisions, the program continues to be an agency
priority. Long-term monitoring of abundance and distribution of fishery resources using a consistent standardized protocol is of high importance to resource managers. The primary sampling gear used on
the Massachusetts survey has been of the same design for the entire 33-year timeseries and the same
research vessel has been used since 1981. While fishery dependent data may be difficult to interpret over
time due to technological advances that commercial fishermen have used to great affect, the consistency
of the Massachusetts survey allows for comparisons in fishery independent catch observations over time.
This is one of the longest running inshore trawl surveys in the United States and with each additional year's observation, the data record adds to its value.

The Massachusetts survey complements the far- ranging NMFS trawl survey. The designed
station density is approximately 1 station per 19 square-nautical-miles which is a much higher level o coverage than offshore surveys, and with a more maneuverable vessel, the Massachusetts survey is able to
sample in areas, (ex. Nantucket Sound and Buzzard's Bay), which are not practical for larger-scale surveys with offshore vessels. The MADMF trawl survey contributes fishery independent indices of

abundance for assessing the population dynamics of many coastal fish stocks. The Massachusetts survey
indices have proven reliable as indicators of population status for many fish stocks, and as such, have been synthesized into region-wide stock assessments. Ultimately, the stock assessment results advise managers within the state or regional fisheries management organizations on how best to manage fishery
resources.

Besides monitoring trends in abundance of mature and juvenile fishes over time, the survey monitors the
geographic distribution of fish resources and documents habitat usage within Massachusetts's territorial
waters. This type of data resource is of importance when inshore alteration projects are proposed within
the bounds of waters under Massachusetts jurisdiction. MADMF inshore survey data is considered in weighing the merits vs. potential impacts of habitat alterations. In addition, the survey data has been used
to evaluate the conservation benefits of local fishery closures.

Approach

For research and management initiatives, it is imperative that project members maintain the integrity of trawl survey and estuarine seine survey operations. By virtue of a continuous and consistent
sampling strategy and measurement methods, updated biological records become more valuable, and
additional advantages will accrue. The core elements of survey design and sampling gear will remain consistent. The project will be performed in parts as follows:

Action #1: Fishery Resource Assessment, Coastal Massachusetts:

The daytime survey of Massachusetts inshore territorial waters is conducted in 3-week time spans during the months of May and September. Sampling periods approximately coincide with the inshore availability of either adult or their pre-exploitable progeny. The survey utilizes a stratified random sampling design consisting of 23 sampling strata based on six depth zones (< 30', 31-60', 61-90', 91-120', 120-180', and > 180') and five geographic regions (Massachusetts Bay north to the Merrimac River, Cape Cod Bay, waters south and east of Cape Cod and Nantucket, Nantucket Sound, and Vineyard Sound/ Buzzards Bay). A total of 101 stations are allocated to strata, in approximate proportion to each stratum's area; a minimum of two stations are assigned to each stratum to provide estimates of variance. Tow locations within each stratum are randomly chosen. An alternate tow site in the same stratum is selected if concentrations of fixed gear or untowable bottom are expected. About 94 stations per survey are completed in approximately 17 days; sampling intensity is one station every 19 square nautical miles.

Trawl survey sampling is conducted using a Division of Marine Fisheries 3/4, North Atlantic type, two seam "whiting" trawl (39' headrope/ 51' footrope). The trawl is equipped with a fine mesh cod end liner, rubber disc (3.5"), chain sweep, wooden trawl doors (6' X 40" X 325

lbs) and 10 fathom legs. At each station, the standard tow is 20 minutes at an average speed of 2.5 kts with a 3:1 scope. Vessel services are provided by the Northeast Fisheries Science Center, NOAA R/V GLORIA MICHELLE (65' LOA, 355 hp); this vessel has been chartered since 1982.

The catch from each tow is manually sorted, and weights, numbers, and lengthfrequencies are recorded on a standard trawl log by species. Large catches, which are impractical to completely process are subsampled by weight or volume and expanded to represent the entire sample. Routine collections and observations include scale/otolith samples/, sex, and maturity stage. Gross external pathology is routinely noted for a suite of species.

A variety of environmental observations and hydrographic data are recorded at each station. Surface and bottom water temperatures and surface salinity are recorded with a marine water quality instrument. Water samples are routinely taken for agency bacteriological testing.

Data processing begins at-sea with the recording of trawl log information. Historically, during and after cruise completion, trawl logs were coded for computer processing in the office and then data entry was completed through the cooperation of Northeast Fisheries Science Center. Cruise data files continue to be processed by project personnel using audit programs to eliminate errors. Corrected data files are then run through the NMFS SURVAN program to produce stratified mean catch/tow in weight and numbers and catch number at length. The files are input to report quality tables and figures are produced. The relative abundance indices generated are used to examine trends in stock abundance.

Beginning in spring 2010 project staff installed and began using an on-board data collection known as the Fisheries Scientific Computer System (FSCS). FSCS is a digital data acquisition system designed by NOAA's Office of Aviation and Marine Operations (OMAO) and the Northeast Fisheries Science Center (NEFSC) to collect all critical fishery-independent data aboard fisheries research vessels. For the previous 32 years, DMF survey staff wrote on paper trawl logs. Now FSCS records all the station and catch data and has the capacity to catalog far more. In addition to recording catch and biological information (species, weights, lengths, gender, and maturity), navigational data as well as outputs from many compatible sampling gear and environmental sensors are recorded as continuous streaming data and/or logged as event snapshots. FSCS can be programmed to guide sampling staff in prioritizing sampling efforts and has the capacity to identify errors and inconsistencies as data is being entered.

With FSCS, data entry is completed aboard the research vessel, replacing the lengthy post-cruise processes of coding trawl logs and subsequent data entry. After just the first trial season, data quality coming off the research vessel has already been substantially improved and data audits and uploads to master data tables have been expedited. Two independent FSCS fish sampling stations have been set up on deck. All electronic sampling hardware aboard the R/V Gloria Michelle has been plugged into hard-wired communications to dedicated computers secured below deck. Modifications to the deck sampling stations to accommodate FSCS sampling equipment have been completed. Each station now consists of an electronic measuring board, digital caliper, electronic scale, rugged touch-screen display, label printer, barcode reader, speaker, and a dedicated PC. The recording process on a noisy deck is no longer reliant on lengths and weights called out by sampling staff and recorded with a pencil. Instead catch

information is automatically recorded on the dedicated computers as sampling staff operate the electronic scales and measuring boards.

The NEFSC had already moved on to FSCS for all of their fishery survey applications. As a result the expertise in data management procedures specific to survey data collected on trawl logs had atrophied, as had the support of our 'legacy database'. FSCS had been used successfully on NOAA survey vessels since 2001 and NEFSC staff has been there to support the DMF survey as we fully transition to FSCS.

Action #2: Winter flounder year-class strength

In order to effectively manage a resource and its fishery, it is desirable to assess spawning success and recruitment. Quantitative beach seining is a feasible sampling technique for young-of-the-year (YOY) winter flounder within areas of low tidal amplitude and smooth, sandy bottoms. These conditions occur in Cape Cod's southern estuaries (i.e., encompassing a fraction of the winter flounder's Southern New England stock unit range). A time series of YOY indices provides an additional, complementary index to trawl survey information and catch trends. Summer flounder (age 0) catches from the seine survey are also routinely utilized by assessment Working Groups as indices of recruitment.

Coincidental with the period of greatest availability of YOY winter flounder in intertidal and shallow subtidal zones, seining is conducted on the top half of the diurnal tidal cycle from mid-June through mid-July. Forty-nine fixed sites or stations are proportionately allocated by each estuary's littoral perimeter. For analytical purposes, each estuary is considered a stratum. The six estuaries seined are: Great Pond, Cotuit Bay, Waquoit Bay-Eel Pond, Lewis Bay, Bass River, and Stage Harbor. Stations are selected subjectively with consideration for efficient seining (i.e., smooth sediment bottom generally devoid of attached vegetation) and historic availability of 0-group flounder.

A 21' (6 m) straight seine of ¼" (6.5 mm) nylon mesh, equipped with weighted lead line to minimize escapement, is set and hauled perpendicular to shore from a depth of 3 to 4'. The three hauls made at every station are sufficiently separated along the beach so as not to scare fish from the path of adjacent hauls. To enumerate 0-group winter flounder (and other species') density (# YOY per square meter), each haul is quantified to area swept by maintaining a taut spreader rope (5.5 m) and measuring seining distance.

Statistical analysis of the seine data employs stratification techniques; each estuary is considered a stratum, and the three hauls at each station are treated as one sample. A stratified mean density index and confidence limits are derived from standard and modified formulae for mean and variance.

Expected Results

Prior to survey data availability, there were significant gaps in knowledge of state fishery resources making it difficult to identify resource problems and determine needed conservation steps. The project has provided MarineFisheries and its Commission with timely information needed to fulfill research and management responsibilities. Summarized over time, survey information has identified species-specific spawning areas, and concentrations of juvenile fish; resolved user group conflicts

between competing groups of fishermen; recommended for or against locations for dredge spoil sites and other environmental alteration projects; determined incidence of fish disease and hepatic neoplasia resulting from chronic contaminant exposure; and, facilitated the monitoring of inshore waters for bacteria and various contaminant levels in edible fish and lobster tissues. MADMF survey data has been used extensively in assessing distribution of fisheries resources in Massachusetts coastal waters to develop the Massachusetts Oceans Management Plan which will guide management of competing uses in Massachusetts territorial waters. Continuance of the program will foster similar benefits in the future. There is no doubt that Massachusetts survey data has advanced assessment capabilities for many Mid-Atlantic and Gulf of Maine fish stocks. Massachusetts trawl survey indices have been used in analytical stock assessments for winter flounder, summer flounder, cod, tautog, black sea bass, scup, bluefish, yellowtail flounder, lobster, and many more. In some cases, the Massachusetts index and age samples are the primary source of fisheries independent data, while in other cases they complement other state or regional surveys. Massachusetts trawl data is featured in a series of Essential Fisheries Habitat documents for many of the inshore species. These thorough reviews of available data linking habitat preferences by location, depth and temperature highlight the importance of the Massachusetts inshore survey. The survey is identifying important spawning and nursery habitats within Massachusetts territorial waters.Prior to survey data availability, there were significant gaps in knowledge of state fishery
resources making it difficult to identify resource problems and determine needed conservation steps The
project has provided MarineFisheries and its Commission with timely information needed to fulfill research and management responsibilities. Summarized over time, survey information has identified species-specific spawning areas, and concentrations of juvenile fish; resolved user group conflicts between competing groups of fishermen; recommended for or against locations for dredge spoil sites and
other environmental alteration projects; determined incidence of fish disease and hepatic neoplasia resulting from chronic contaminant exposure; and, facilitated the monitoring of inshore waters for bacteria and various contaminant levels in edible fish and lobster tissues. MADMF survey data has been
used extensively in assessing distribution of fisheries resources in Massachusetts coastal waters to develop the Massachusetts Oceans Management Plan which will guide management of competing uses in
Massachusetts territorial waters. Continuance of the program will foster similar benefits in the future.

There is no doubt that Massachusetts survey data has advanced assessment capabilities for many Mid-Atlantic and Gulf of Maine fish stocks. Massachusetts trawl survey indices have been used in analytical stock assessments for winter flounder, summer flounder, cod, tautog, black sea bass, scup, bluefish, yellowtail flounder, lobster, and many more. In some cases, the Massachusetts index and age
samples are the primary source of fisheries independent data, while in other cases they complement other
state or regional surveys. Massachusetts trawl data is featured in a series of Essential Fisheries Habitat
documents for many of the inshore species. These thorough reviews of available data linking habitat preferences by location, depth and temperature highlight the importance of the Massachusetts inshore

survey. The survey is identifying important spawning and nursery habitats within Massachusetts territorial waters.

SMART Objectives - Needs/Threats

1 - Need to update existing information

Need/Threat Level	3
Level 2 Need/Threat	Resource Information Collection Needs
Level 1 Need/Threat	Resource Management Needs
Description	Need for relative abundance information of recreationally important finfish species for management decisions.

Objectives

Objective ID - 1

Objective Name	Relative Abundance Indices of Marine Recreational Fishes
Objective Statement	To determine relative abundance indices for marine recreational fishes based on catch per unit effort from a bottom trawl survey in coastal waters of Massachusetts.

Custom Quantitative Indicators

Desired Future Value	Base Value	Output	Deadline
202	0	Number of trawl tows	December 30, 2012

SMART Objectives - Purpose/Targets

Purpose/Target ID - Job 2

Purpose/Target Description	Assessment of winter flounder year-class strength

Indirectly Benefited Species

Scientific Name	Common Name	Status
Pseudopleuronectes americanus	winter flounder, rough flounder, lemon sole, Georges Bank flounder, blackback	

Objectives

Objective ID - 2

Objective Name	Winter Flounder Year-Class Strength
Objective Statement	To assess year class strength by monitoring abundance of shore zone young-of-the-year winter flounder.

Custom Quantitative Indicators

Desired Future Value	Base Value	Output	Deadline
49	0	Number of seine hauls	December 30, 2012

Appendix C: Project Details

Project Details #60010693 - BMP_Marine Fisheries Survey

[top]

Properties

Status	Active
Primary Agency	Massachusetts Department of Fish and Game
Start Date	December 31, 2010
End Date	December 30, 2015
Is Project Sensitive?	No
Project Categories	Conservation/Management
Action Categories	Data Collection and Analysis

Project Description

There are two components to this project that provide relative abundance information important for marine fish stock assessment and fisheries management in Massachusetts. One is a bottom trawl survey of inshore territorial waters done in May and September of each year. Adult finfish are the focus of this trawl survey that has been conducted for 33 consecutive years. The second component of the project is a seine survey within the southern estuaries of Cape Cod from mid-June to mid-July that targets young-of-the-year winter flounder.

Location Details

Is Statewide Project?	No
Acres	2,091,265.68

States	Congressional Districts	Counties
Rhode Island	Congressional District 1,	Newport County,
	Congressional District 10, Congressional District 4, Congressional District 6,	Barnstable County, Bristol County, Dukes County, Essex County,

Massachusetts	Congressional District 7, Congressional District 8, Congressional District 9,	Nantucket County, Norfolk County, Plymouth County, Suffolk County,

Action Summaries

Action # 60010697 - Fishery Resource Assessment, Coastal Massachusetts

[View Action Details]

Start Date	December 31, 2011
End Date	December 30, 2012
Action Category	Data Collection and Analysis
Action Strategy	Research, survey or monitoring - fish and wildlife populations

Action # 60010701 - Winter Flounder Year-Class Strength

[View Action Details]

Start Date	December 31, 2011
End Date	December 30, 2012
Action Category	Data Collection and Analysis
Action Strategy	Research, survey or monitoring - fish and wildlife populations

---

Appendix D: Action Details

Action Details #60010697 - Fishery Resource Assessment, Coastal Massachusetts

[top]

Properties

Project Name	BMP_Marine Fisheries Survey [View Project Details]
Status	Completed
Start Date	December 31, 2011
End Date	December 30, 2012

Action Category	Data Collection and Analysis

Action Strategy

Strategy	Measured Output	Output Unit
Research, survey or monitoring - fish and wildlife populations	1	Projects

Activities	Abundance determination, Age, size and sex structure

Document Attachments

Trawl Historical Catch per Unit Effort by Finfish Species

[Download]

File Name	ASMFC_INDICES_2.pdf
Author	Jeremy King
Uploaded Date	February 11, 2014

2012 Marine FisheriesSurvey Report

[Download]

File Name	F12AF00099_F56R22_2012_Annual_Rpt.pdf
Author	Massachusets Division of Marine Fisheries
Uploaded Date	January 2, 2014

Action Details #60010701 - Winter Flounder Year-Class Strength

[top]

Properties

Project Name	BMP_Marine Fisheries Survey [View Project Details]
Status	Completed
Start Date	December 31, 2011
End Date	December 30, 2012
Action Category	Data Collection and Analysis

Action Strategy

Strategy	Measured Output	Output Unit
Research, survey or monitoring - fish and wildlife populations	1	Projects

Activities	Abundance determination

Current Habitat

Habitat Level 1	RIVERINE
Habitat Level 2	Estuary

Directly Benefited Species

Scientific Name	Common Name	Status
Pseudopleuronectes americanus	winter flounder, rough flounder, lemon sole, Georges Bank flounder, blackback	

Document Attachments

2012 Winter Flounder Results

[Download]

File Name	F12AF00099_F56R22_2012_Annual_Rpt.pdf
Author	Massachusetts Division of Marine Fisheries
Uploaded Date	January 2, 2014