Inventory of NMFS Fishery-Independent Surveys and Observations

Phase 1: A One-year Snapshot Database

Summary Report

NOAA FISHERIES

OFFICE OF SCIENCE & TECHNOLOGY

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1. PURPOSE AND AUDIENCE

This document explains how the project "Inventory of NMFS Fishery-Independent Surveys and Observations Phase 1: A One-year Snapshot Database" was conducted and summarizes the results. The intended audience of this document is the S&T Office Director, the Science Board, the inventory working group, NOAA IOOS Program Office, and Ocean.US.

2. BACKGROUND

This inventory project was initiated upon the request from the Ocean.US - the National Office for Integrated and Sustained Ocean Observations, which is responsible for the national coordination of the development of an Integrated Ocean Observing System (IOOS)[1]. In May 2007, the Ocean.US published a national report entitled: *the USA Contribution to the Global Ocean Observing System* in response to a United Nations Directive request for compiling a national inventory of ocean observations among the Intergovernmental Oceanographic Commission (IOC)'s Member States[2]. As a very important contributor of US ocean observations, NOAA National Marine Fisheries Service (NMFS) conducts comprehensive surveys (e.g., living marine resource, ecosystem, and protected resource surveys and habitat assessments) in all of the eight large marine ecosystems (LME) within the U.S. EEZ, including the Northeast U.S. Continental Shelf, Southeast U.S. Continental Shelf, Caribbean Sea, Gulf of Mexico, California Current, Gulf of Alaska, Eastern Bering Sea, and the Insular Pacific Islands. However, these NMFS holdings were grossly under-represented in the Ocean.US (2007) report.

1. http://www.ocean.us/ocean_us_mission
2. The United States of America's Contributions to the Global Ocean Observing System 2007.

To address this shortcoming, the NMFS Office of Science and Technology was charged to develop a complete inventory that characterizes the existing NMFS surveys and observations at the Science Board meeting in September 2007. There was consensus that such an inventory would be useful when describing NMFS observation capabilities and capacities to meet the management needs or to answer data requests from NOAA senior management and outside entities (e.g., OMB, Ocean.US, IOC, and Congress), and for use in the Planning, Programming, Budgeting, and Execution System (PPBES) process.

3. OBJECTIVES

The purpose of the project is to identify the NMFS observations, have the right information at the right place, and make the survey information readily accessible by the interested parties. The specific objectives are:

- Establish a prototype database that can provide accurate and efficient description of NMFS observation capabilities;

- Contribute to the S&T data management plan and develop tools to facilitate collaboration among the NMFS Headquarters, Science Centers and Regional Offices;

- Address issues involving NMFS observations that come up through the PPBES process, as well as issues that originate from elsewhere within NOAA, DOC, and OMB; from Congress; and from constituents outside government;

- Provide the NOAA IOOS Program Office with a one-year snapshot of NMFS fishery-independent surveys, including survey characteristics, locations, and parameters (physical, chemical, and biological) measured; and

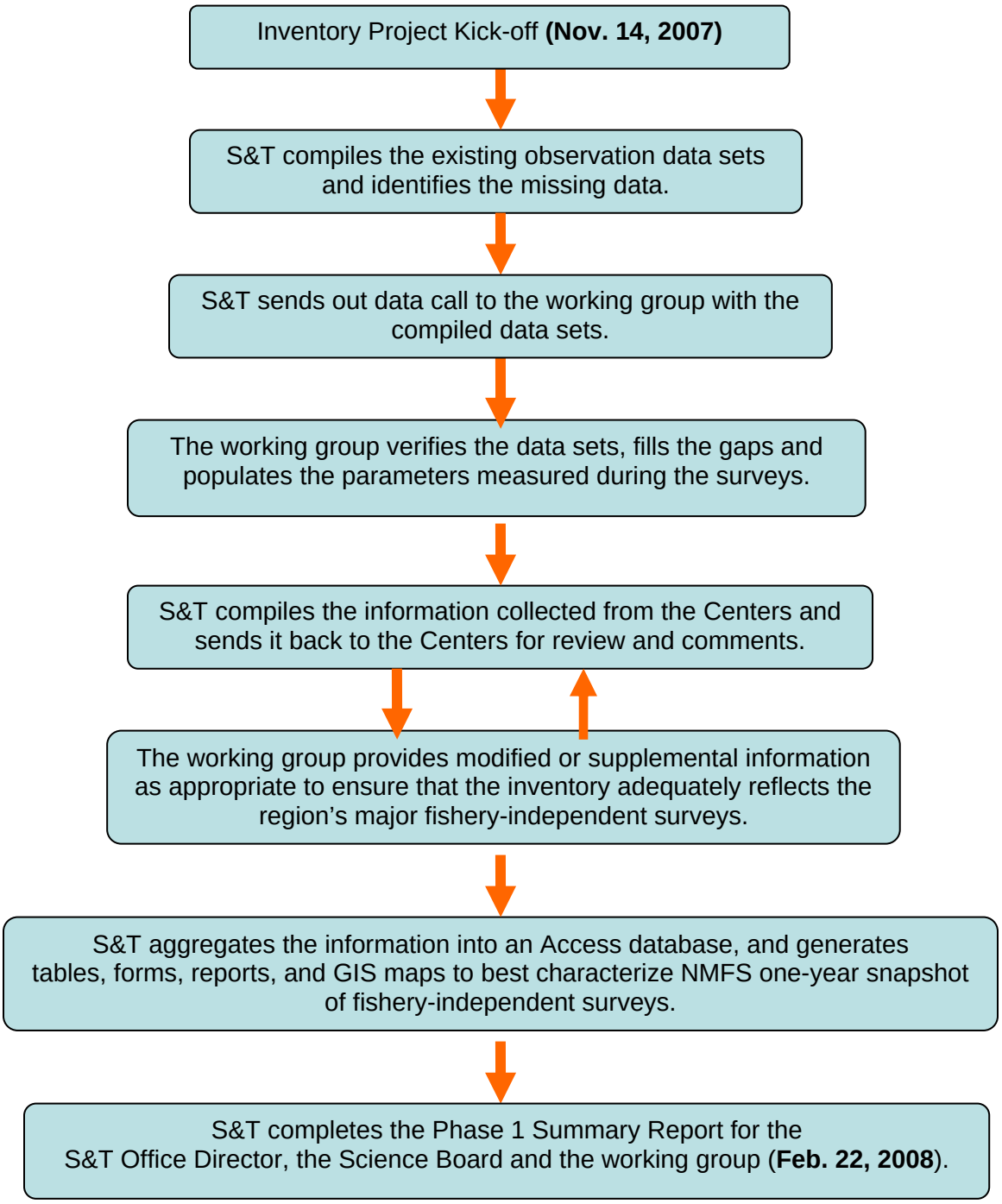
- Provide the NMFS survey information to Ocean.US/IOC for their 2008 national report.

4. PROJECT INITIALIZATION

The existing 2002-2003 NMFS survey data sets (Ocean Ecology Observing System) and GIS maps compiled previously by S&T staff (David Detlor and Tim Haverland) were used as a foundation to construct the NMFS Observation Database and the one-year snapshot of NMFS fishery-independent surveys.

A working group, made up of S&T staff and contacts from each of the Centers (Appendix I), was established in November 2007. The working group was responsible to: 1) initiate more detailed planning; 2) identify major gaps in the existing dataset; 3) provide the data to fill the gaps; and 4) provide recommendations for the long-term phase.

5. PROCEDURE


Inventory Project Kick-off **(Nov. 14, 2007)**
S&T compiles the existing observation data sets and identifies the missing data.
S&T sends out data call to the working group with the compiled data sets.
The working group verifies the data sets, fills the gaps and populates the parameters measured during the surveys.
S&T compiles the information collected from the Centers and sends it back to the Centers for review and comments.
The working group provides modified or supplemental information as appropriate to ensure that the inventory adequately reflects the region's major fishery-independent surveys.
S&T aggregates the information into an Access database, and generates tables, forms, reports, and GIS maps to best characterize NMFS one-year snapshot of fishery-independent surveys.
S&T completes the Phase 1 Summary Report for the S&T Office Director, the Science Board and the working group (**Feb. 22, 2008**).

6. PRODUCTS

- Access database of NMFS fishery-independent survey activities and stations (Fig. 1). Most of the surveys took place in the 2002 or 2003 field seasons. Some Alaska surveys occurred during 2005-2006. Each survey is represented only once.

The database contains inventories (i.e. Survey Inventory and Station Inventory) that characterize the existing, one-year specific fishery-independent surveys. The inventories represent the region's principal surveys, such as living marine resource surveys, ecosystem surveys, protected resource surveys, habitat assessment surveys, etc. Each survey is described in detail with information of applicable FMP(s), targeted stocks, effort /time required for study (e.g., DAS), parameter measured, etc. There is also a one-stop shop form for entering new data, where the station information is added on the survey characteristics as a subform for each survey. Users can browse through surveys by clicking on the "Next Survey" button.

- Table that characterizes the number of stations by survey within each NMFS region (Table 1)

This is the report showing 52 surveys, with 8263 stations and 599 tracks, conducted by the six NMFS Centers. For example, the Antarctic Marine Living Resources Program is represented by the SWFSC with 246 stations for 2002. The southeast marine mammal cruises is represented by the SEFSC with 46 tracks in the Golf of Mexico and 28 tracks in

the South Atlantic for 2002. Information for the other marine mammal surveys will be collected during the next phase of the project.

Note: The report only covers fishery- independent data. By comparison, the original ST data set contains over 7300 records for fishery-dependent data during 2002-2003. A truly complete inventory would need NMFS fishery-dependent data probably through the Fisheries Information System.

- Table that characterizes the number of stations for each parameter measured (Table 2)

This table contains the number of stations in each NMFS region that measured the parameters identified for this one-year snapshot. The parameters covered here include the IOOS core physical variables (i.e. seawater temperature, salinity, currents, water/sea level, and ocean color), the Ocean.US principle biological parameters (chlorophyll, recruitment, LMR assessment, faunal associations, protected species monitoring, etc.), and geo-chemical variables (dissolved oxygen, dissolved nutrients, bathymetry, water quality, etc.).

- Glossary for terms used in the Inventory (Appendix II)

The definitions in this table came from three sources: 1) Ocean.US; 2) Ocean Ecology Observing System data call previously conducted by S&T; and 3) internet. These definitions are intended to provide a common understanding of the information requested and standardize the formats of metadata and data.

- GIS maps that show the survey stations in different regions (Fig. 2 - 8)

The GIS maps give the geographic view of the locations for surveys collected during this phase. It is the first step toward the long-term Google-earth type of map. Eventually, users would be able to find the related survey information by clicking those locations on a web-based map.

7. NEXT STEPS

During Phase 1, the working group made significant progress in identifying and updating the existing NMFS surveys and observations. The database established is fundamentally important for the long-term inventory project.

The next step will focus on assessing NMFS data and management challenges, developing a mechanism for updating the inventory, and establishing data management policy and procedures.

A more comprehensive inventory will be developed to include the information for NMFS historical, current and future survey activities. The information will be plotted on a web-based interface (e.g., Google-Earth map), and readily accessible to the public. The working group will be continuously engaged in the development and implementation of the project.

The following questions are to be addressed by the working group in the Inventory Phase 2. Recommendations will be made to the Science Board by April 30, 2008.

- What data/information should be included in a NMFS inventory?
- How to categorize NMFS surveys?
- How to portray historical data and metadata?
- How to relate the fishery-independent data collected in this project to the Fishery Information System (FIS), which characterizes the fishery-dependent data?
- How to standardize the data and metadata?
- Should the regional observation data and information be centralized/archived at HQ?
- What should the policies be for allowing access to NMFS data including the confidential data?
- What are additional applications for an inventory?

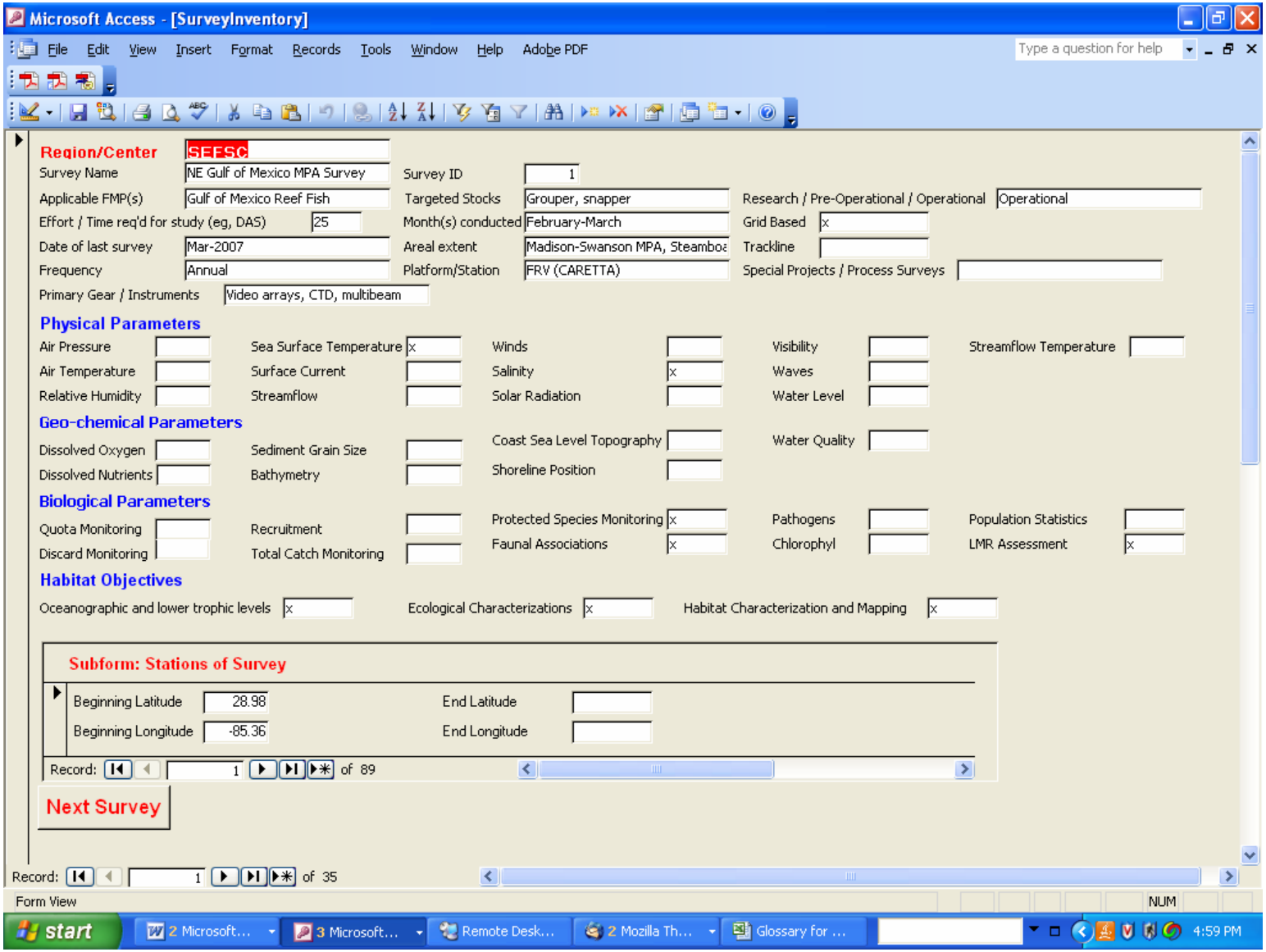


Fig. 1. One-stop shop of NMFS survey characteristics, parameters measured and station locations.

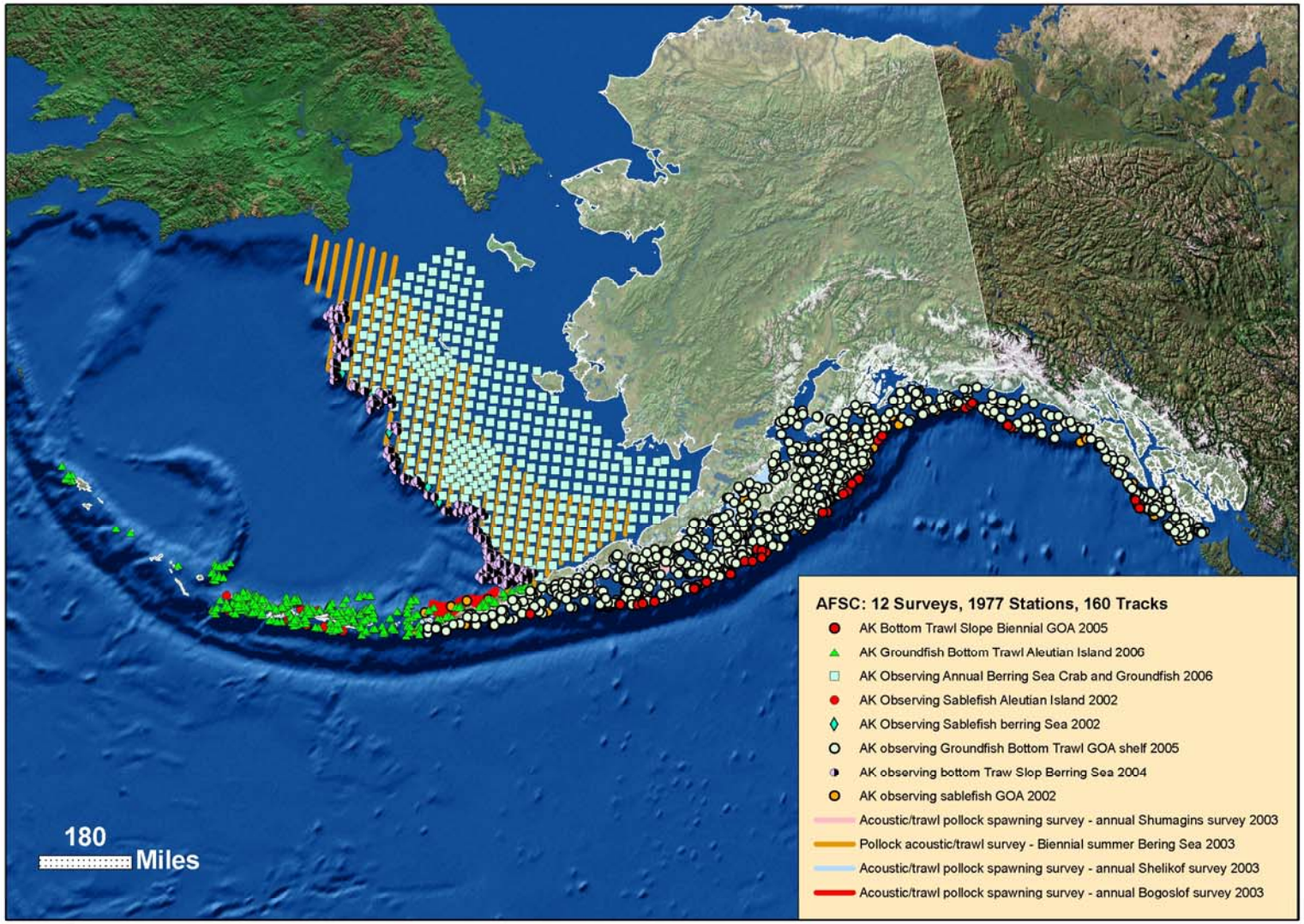


Fig. 2. GIS map showing fishery-independent survey stations conducted by the AFSC.

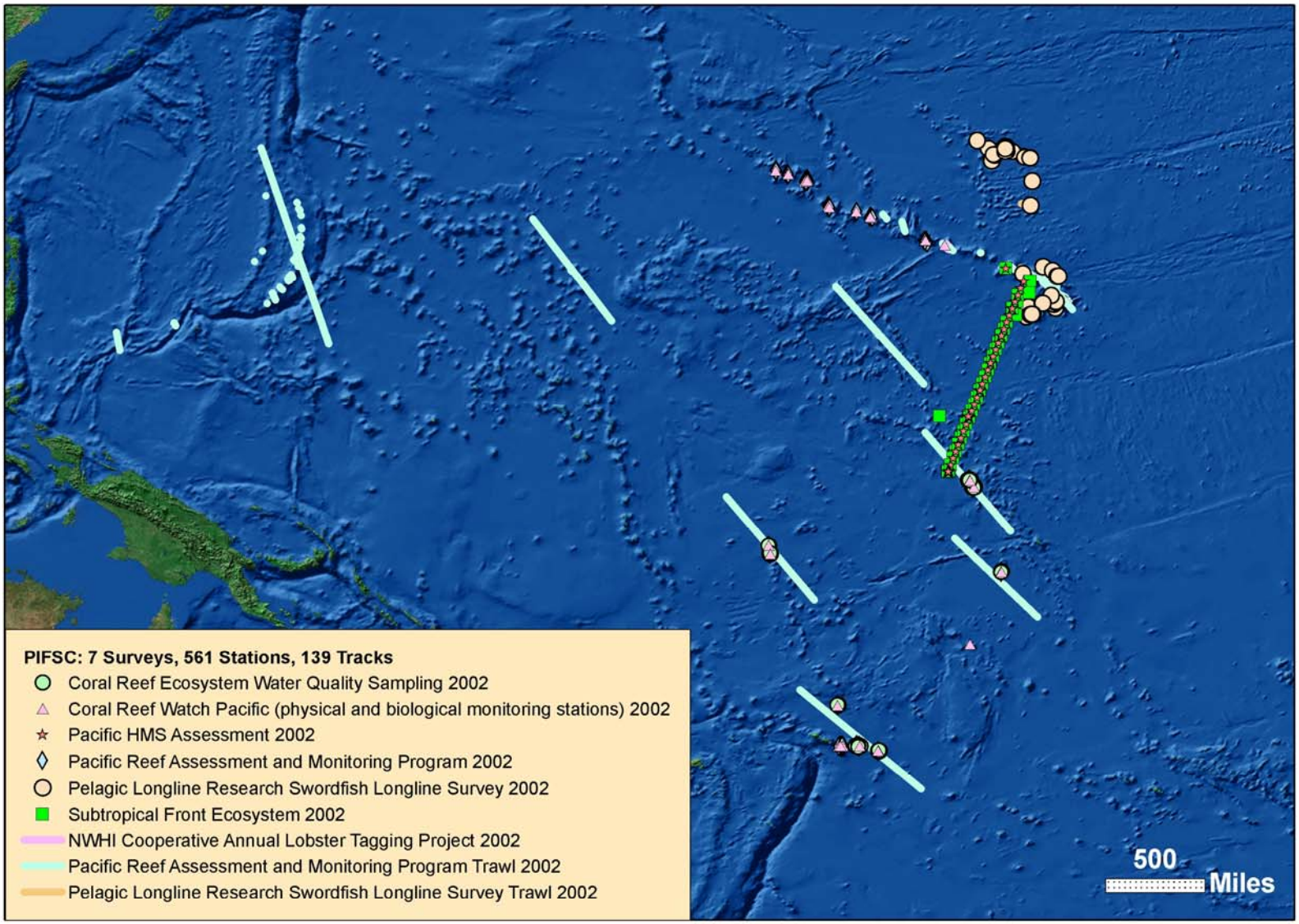


Fig. 3. GIS map showing fishery-independent survey stations conducted by the PIFSC.

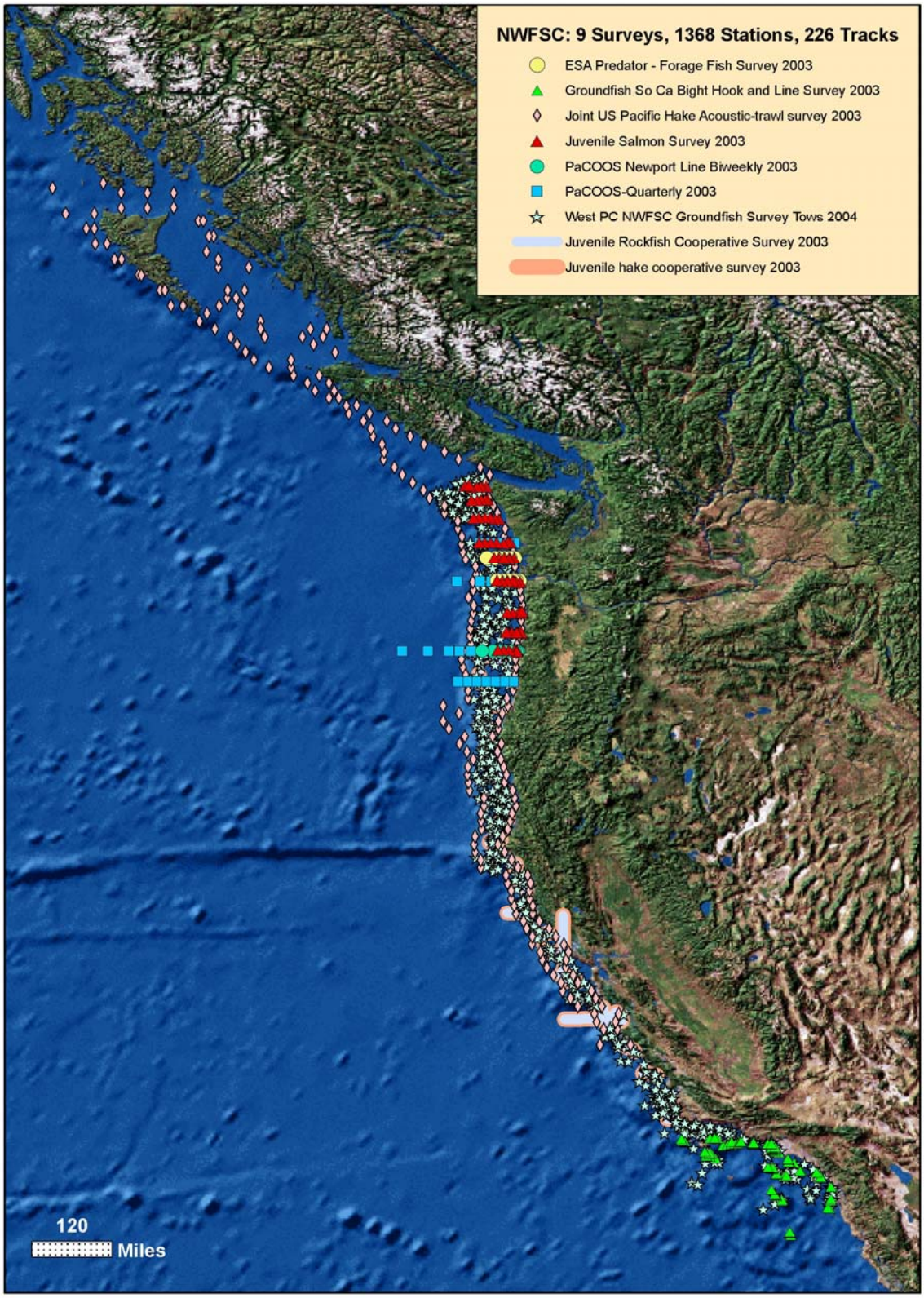


Fig. 4. GIS map showing fishery-independent survey stations conducted by the NWFSC.

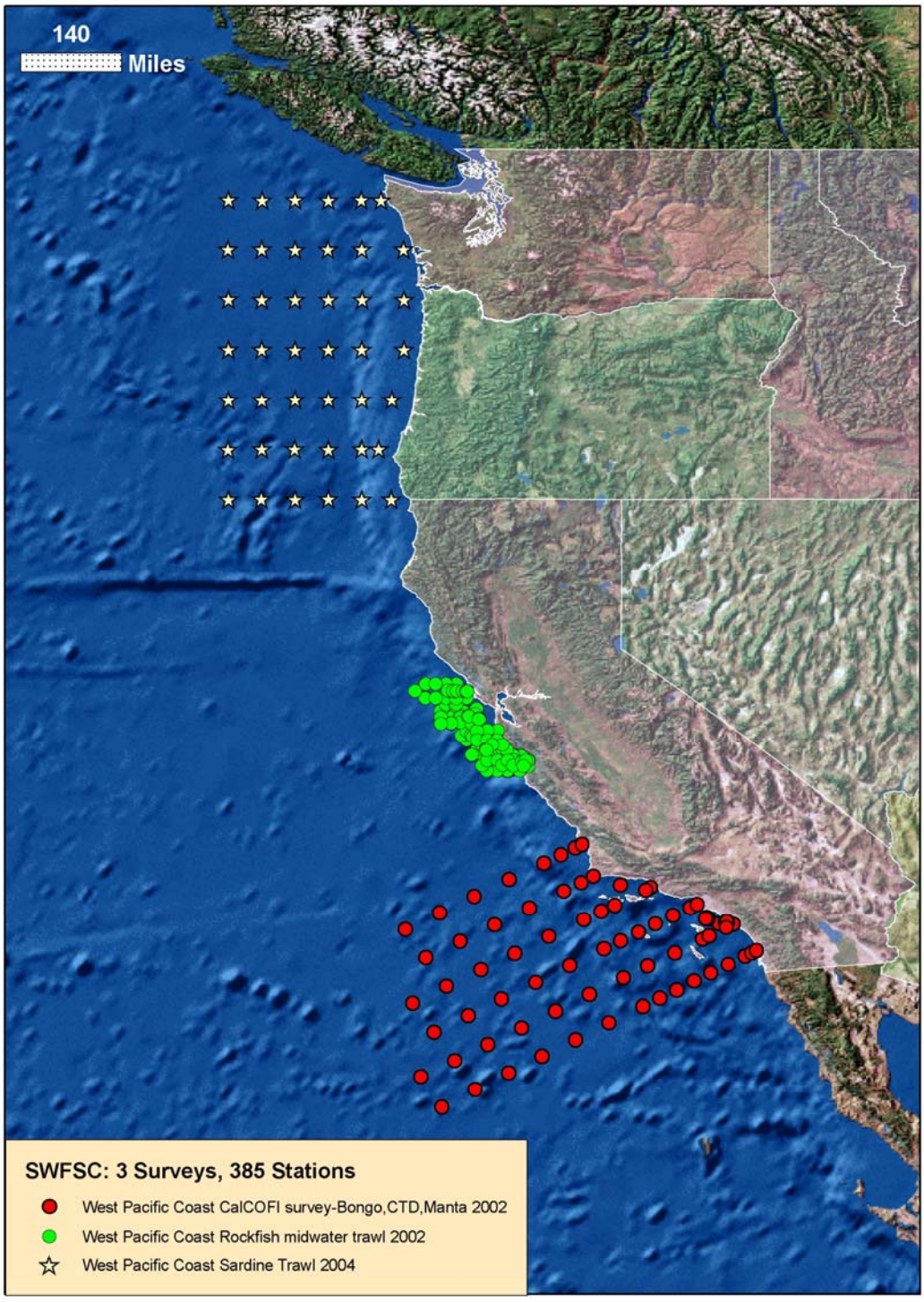


Fig. 5. GIS map showing fishery-independent survey stations conducted by the SWFSC on the West Coast.

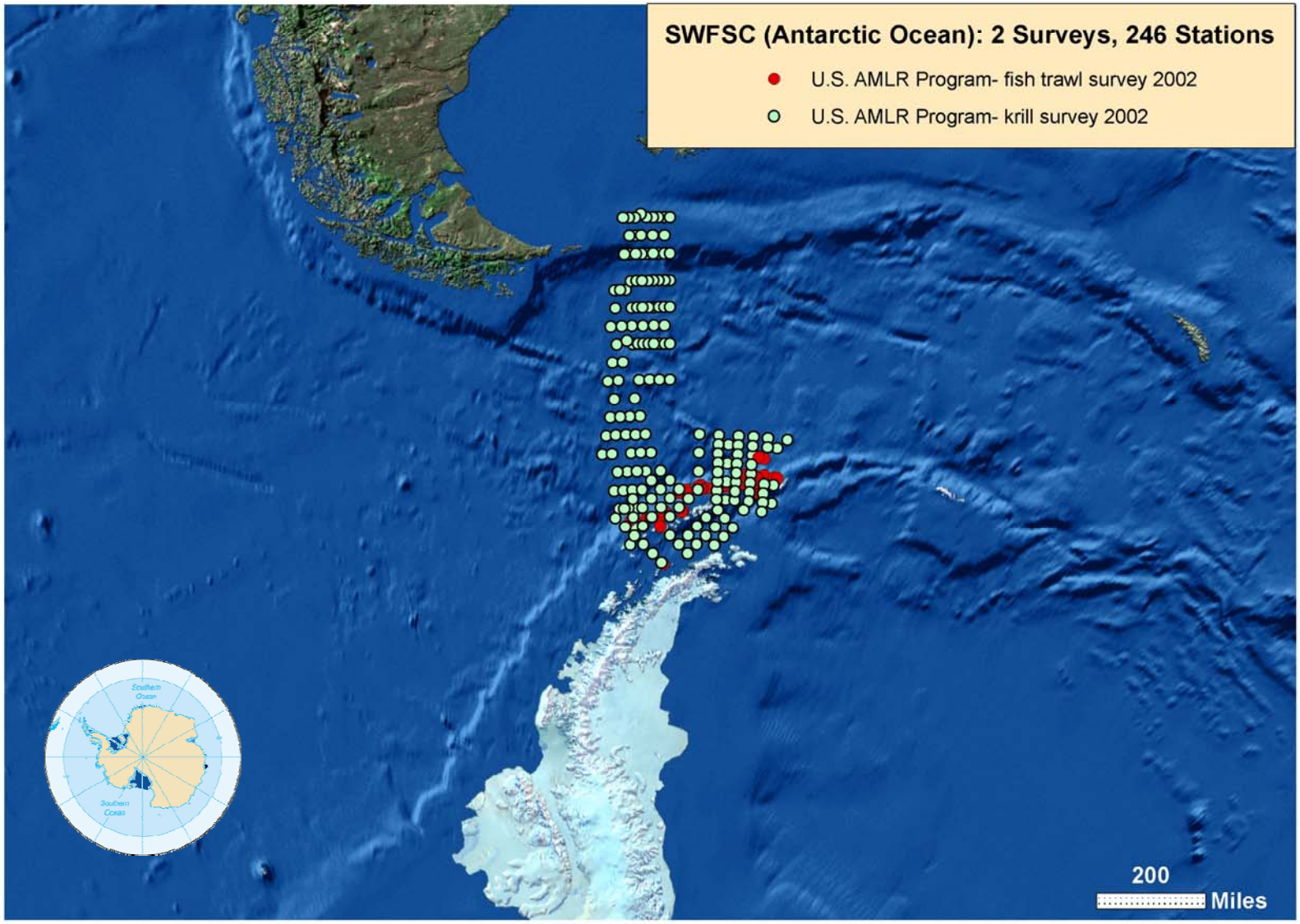


Fig. 6. GIS map showing fishery-independent survey stations conducted by the SWFSC in the Antarctic Ocean.

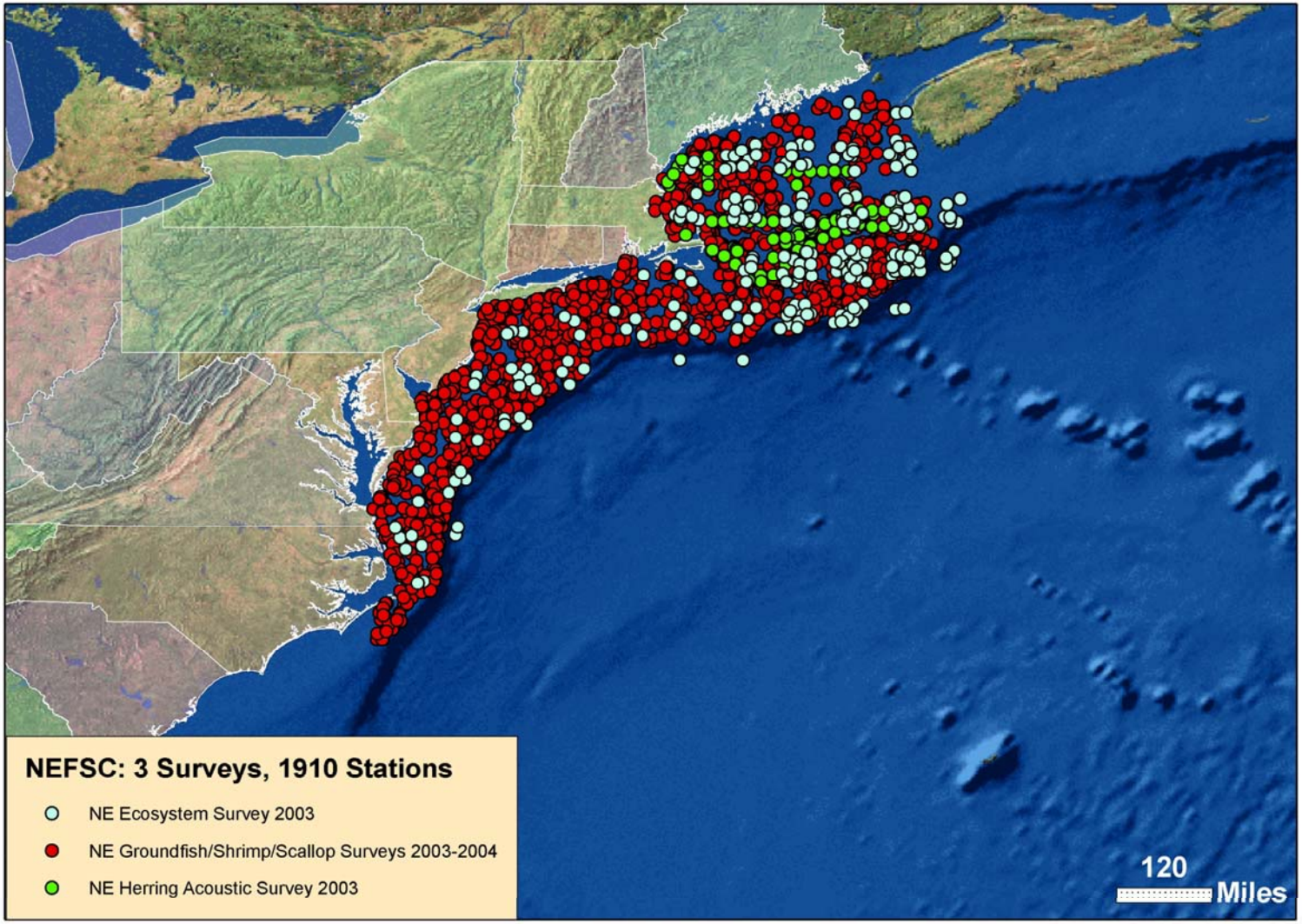


Fig. 7. GIS map showing fishery-independent survey stations conducted by the NEFSC.

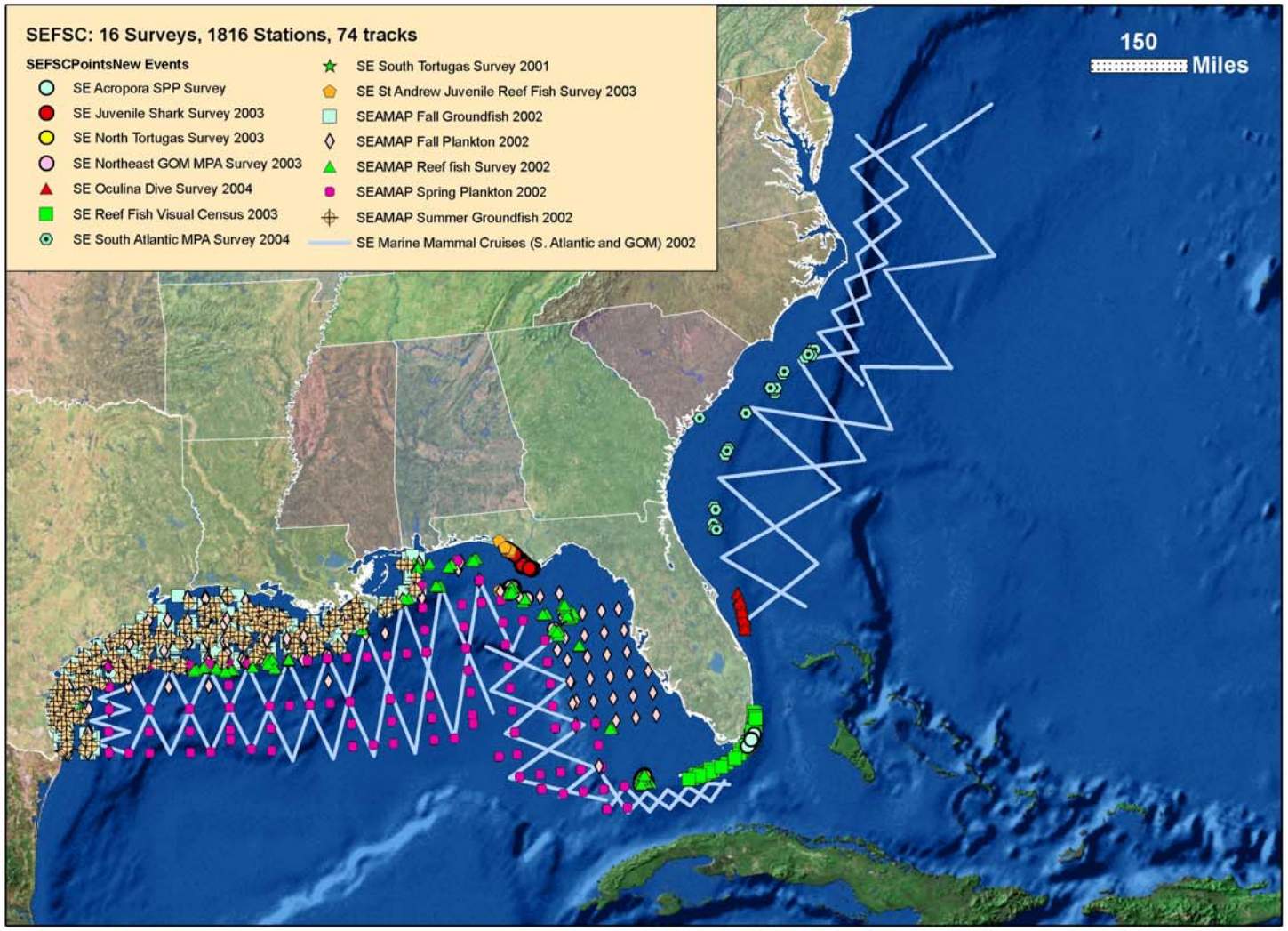


Fig. 8. GIS map showing fishery-independent survey stations conducted by the SEFSC.

Table 1. Number of stations by survey and by center.

Region/Center	Survey Name	Year	Stations
AFSC	AK Bottom Trawl Slope Biennial GOA	2005	37
	AK Groundfish Bottom Trawl Aleutian Island	2006	375
	AK Observing Annual Bering Sea Crab & Groundfish Bottom Trawl Survey	2006	405
	AK Observing Bottom Trawl Slope Bering Sea	2004	231
	AK Observing Bottom Trawl Survey - GOA Shelf	2005	826
	AK Observing Sablefish Aleutian Island	2002	12
	AK Observing Sablefish Berring Sea	2002	13
	AK Observing Sablefish GOA	2002	78
	Pollock Acoustic/Trawl Survey - Biennial Summer Bering Sea	2003	40 (tracks)
	Acoustic/Trawl Pollock Spawning Survey - Annual Bogoslof Survey	2003	36 (tracks)
	Acoustic/Trawl Pollock Spawning Survey - Annual Shelikof Survey	2003	28 (tracks)
	Acoustic/Trawl Pollock Spawning Survey - Annual Shumagins Survey	2003	56 (tracks)
	Number of Surveys for AFSC		***12***
	Number of Stations for AFSC		***1977***
	Number of Tracks for AFSC		***160***
NEFSC	NE Herring Hydroacoustic Survey	2003	198
	NE Bottom Trawl Survey (Groundfish, Shrimp, Scallop)	2003-2004	1374
	NE Ecosystem Survey	2002-2003	338
	Number of Surveys for NEFSC		***3***
	Number of Stations for NEFSC		***1910***
NWFSC	West Pacific Coast Groundfish Survey	2004	600
	ESA Predator-Prey Study	2003	12
	Groundfish So Ca Bight Hook and Line	2003	115
	Joint US Canada Pacific Hake Acoustic/Trawl Survey	2003	230
	Juvenile Salmon Distribution, Growth and Survival	2003	59
	PaCOOS Newport Line Biweekly	2003	208
	PaCOOS Quarterly	2003	144
	Juvenile Pacific Hake Cooperative Survey	2003	113 (tracks)
	Juvenile Rockfish Cooperative Survey	2003	113 (tracks)
	Number of Surveys for NWFSC		***9***
	Number of Stations for NWFSC		***1368***
	Number of Tracks for NWFSC		***226***
PIFSC	Coral Reef Ecosystem Water Quality Sampling	2002	70
	Coral Reef Watch Pacific (Physical and Biological Monitoring Stations)	2002	40
	Pacific HMS Assessment	2002	110
	Subtropical Front Ecosystem	2002	110
	Pacific RAMP (Pacific Reef Assessment and Monitoring Program)	2002	173

Region/Center	Survey Name	Year	Stations
	Pelagic Longline Research Swordfish Longline Survey	2002	58
	Pacific RAMP (Pacific Reef Assessment and Monitoring Program) trawl	2002	68 (tracks)
	Pelagic Longline Research Swordfish Longline Survey Trawl	2002	29(tracks)
	NWHI Cooperative Annual Lobster Tagging Project	2002	42(tracks)
	Number of Surveys for PIFSC		***7***
	Number of Stations for PIFSC		***561***
	Number of Tracks for PIFSC		***139***
SEFSC	Acropora Spp. Survey		8
	Juvenile Shark Abundance Survey	2003	145
	NE Gulf of Mexico MPA Survey	2003	89
	North Tortugas Survey	2003	9
	Oculina HAPC	2004	42
	Reef fish Visual Census (RVC) Survey	2003	243
	South Tortugas Survey	2001	13
	St. Andrew Bay Juvenile Reef Fish Survey	2003	20
	U.S. South Atlantic MPA Survey	2004	88
	SEAMAP Fall Bottom Fish Survey	2002	241
	SEAMAP Fall Plankton	2002	144
	SEAMAP Reef Fish Survey	2002	376
	SEAMAP Spring Plankton	2002	167
	SEAMAP Summer Groundfish Survey	2002	231
	SE Marine Mammal Cruises (Gulf of Mexico)	2004	46 (Tracks)
	SE Marine Mammal Cruises (South Atlantic)	2004	28 (Tracks)
	Number of Surveys for SEFSC		***16***
	Number of Stations for SEFSC		***1816***
	Number of Tracks for SEFSC		***74***
SWFSC	Antarctic Marine Living Resources Program/AMLR –Fish Trawl Survey	2003	68
	AMLR - Krill Survey	2003	178
	CalCOFI	2002	77
	Juvenile Rockfish (Midwater Trawl)	2002	266
	West Pacific Coast Sardine Trawl	2004	42
	Number of Surveys for SWFSC		***5***
	Number of Stations for SWFSC		***632***
Grand Total	***Number of Surveys***		***52***
	Number of Stations		***8263***
	Number of Tracks		***599***

Table 2. Number of stations and tracks by parameter.

Region/Center	Survey Name	Recruitment	LMR Assessment	Oceanographic and lower trophic Level	Ecological Characterizations	Faunal Associations	Habitat Characterization	Total Catch Monitoring	Discard Monitoring	Protected Species Monitoring	Quota Monitoring	Air Pressure	Air Temperature	Relative Humidity	Sea Surface Temperature	Surface Current	Streamflow	Streamflow Temperature	Salinity	Solar Radiation	Visibility	Water Level	Waves	Winds	Dissolved Oxygen	Dissolved Nutrients	Sediment Grain Size	Bathymetry	Shoreline Position	Coast Sea Level Topography	Water Quality	Chlorophyl	Pathogens
AFSC	Acoustic/trawl pollock spawning survey - Annual Bogoslof Survey	0	36	0	36	36	0	0	0	0	0	36	36	36	36	0	0	0	36	0	36	0	36	36	0	0	0	0	0	0	0	0	0
AFSC	Acoustic/trawl pollock spawning survey - Annual Shelikof Survey	0	28	0	28	28	0	0	0	0	0	28	28	28	28	0	0	0	28	0	28	0	28	28	0	0	0	0	0	0	0	0	0
AFSC	Acoustic/trawl pollock spawning survey - Annual Shumagins Survey	0	56	0	56	56	0	0	0	0	0	56	56	56	56	0	0	0	56	0	56	0	56	56	0	0	0	0	0	0	0	0	0
AFSC	AK Bottom Trawl Slope Biennial GOA	37	37	0	37	37	0	0	0	0	0	0	0	0	37	0	0	0	0	0	0	0	37	37	0	0	0	0	0	0	0	0	0
AFSC	AK Groundfish bottom trawl Aleutian Island	375	375	0	375	375	0	0	0	0	0	0	0	0	375	0	0	0	0	0	0	0	375	375	0	0	0	0	0	0	0	0	0
AFSC	AK Observing Annual Bering Sea crab & groundfish bottom trawl survey	405	405	0	405	405	0	0	0	0	0	0	0	0	405	0	0	0	0	0	0	0	405	405	0	0	0	0	0	0	0	0	0
AFSC	AK observing bottom trawl slope Bering Sea	231	231	0	231	231	0	0	0	0	0	0	0	0	231	0	0	0	0	0	0	0	231	231	0	0	0	0	0	0	0	0	0
AFSC	AK Observing bottom trawl survey - GOA Shelf	826	826	0	826	826	0	0	0	0	0	0	0	0	826	0	0	0	0	0	0	0	826	826	0	0	0	0	0	0	0	0	0
AFSC	AK Observing Sablefish Aleutian Island	0	12	0	12	12	0	0	0	0	0	0	0	0	12	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AFSC	AK Observing Sablefish Berring Sea	0	13	0	13	13	0	0	0	0	0	0	0	0	13	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AFSC	AK observing sablefish GOA	0	78	0	78	78	0	0	0	0	0	0	0	0	78	0	0	0	78	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AFSC	Pollock acoustic/trawl survey - Biennial Summer Bering Sea	40	40	0	40	40	0	0	0	0	0	40	40	40	40	0	0	0	40	0	40	0	40	40	0	0	0	0	0	0	0	0	0
NEFSC	NE Herring Hydroacoustic Survey	198	198	198	198	198	198	0	0	0	0	198	198	0	198	0	0	0	198	198	198	0	198	198	198	0	0	198	0	0	0	198	0
NEFSC	NE Bottom Trawl Survey (Groundfish, Shrimp, Scallop)	1374	1374	1374	1374	1374	0	0	0	0	0	1374	1374	0	1374	0	0	0	1374	1374	1374	0	1374	1374	1374	0	0	1374	0	0	0	1374	0
NEFSC	NE Ecosystem Survey	0	0	338	338	338	0	0	0	0	0	338	338	0	338	0	0	0	338	338	338	0	338	338	338	0	0	338	0	0	0	338	0
NWFSC	ESA Predator-Prey Study	0	12	12	12	12	12	0	0	12	0	0	0	0	12	0	0	0	12	0	0	0	0	0	12	0	0	12	0	0	0	0	0
NWFSC	Groundfish So Ca Bight Hook and Line	115	115	0	115	115	115	0	0	0	0	0	0	0	115	0	0	0	0	0	0	0	115	115	0	0	0	115	0	0	0	0	0
NWFSC	Joint US Canada Pacific Hake Acoustic / Trawl Survey	230	230	230	230	230	230	0	0	0	0	230	230	230	230	230	0	0	0	0	230	0	230	230	0	0	0	0	0	0	0	0	0
NWFSC	Juvenile Pacific Hake Cooperative Survey	113	113	113	113	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NWFSC	Juvenile Rockfish Cooperative Survey	113	113	113	113	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NWFSC	Juvenile Salmon Distribution, Growth and Survival	59	59	59	59	59	59	0	0	59	0	0	0	0	59	0	0	0	59	0	0	0	0	0	59	59	0	59	0	0	0	0	59
NWFSC	PaCOOS Newport Line Biweekly	208	0	208	208	208	208	0	0	0	0	0	0	0	208	0	0	0	208	0	0	0	0	0	0	0	0	208	0	0	0	0	0
NWFSC	Pacoos-Quarterly	144	0	144	144	144	144	0	0	0	0	0	0	0	144	0	0	0	144	0	0	0	0	0	144	0	0	144	0	0	0	0	0
NWFSC	West PC Groundfish Survey	600	600	600	600	600	600	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PIFSC	Coral Reef Ecosystem water quality sampling	0	0	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	0	0	0	0	0	0	70	0	0	0	0	70	70	0
PIFSC	Coral Reef Watch Pacific (physical and biological monitoring stations)	0	0	40	0	0	0	0	0	0	0	40	40	0	40	40	0	0	40	40	0	0	40	40	0	0	0	0	0	0	0	0	0
PIFSC	NWHI Cooperative Annual Lobster Tagging Project	42	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PIFSC	Pacific HMS assessment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PIFSC	Pacific RAMP (Pacific Reef Assessment and Monitoring Program)	241	0	0	241	241	0	0	0	241	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PIFSC	Pelagic Longline Research Swordfish Longline Survey	0	87	87	87	0	87	87	87	87	0	87	87	87	87	87	0	0	87	0	87	0	87	87	87	87	0	87	0	0	0	0	0
PIFSC	Subtropical front ecosystem	0	0	110	110	110	110	0	0	0	0	0	0	0	110	0	0	0	110	0	0	0	0	0	110	110	0	0	0	0	0	110	0
SEFSC	Acropora spp. survey	8	8	0	8	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SEFSC	Juvenile shark abundance survey	145	145	145	145	145	0	0	0	0	0	0	0	0	145	0	0	0	145	0	145	0	0	0	145	0	0	0	0	0	0	0	0
SEFSC	NE Gulf of Mexico MPA Survey	0	89	89	89	89	89	0	0	89	0	0	0	0	89	0	0	0	89	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SEFSC	North Tortugas Survey	9	9	0	0	0	9	0	0	0	0	0	0	0	9	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SEFSC	Oculina HAPC	42	42	42	42	42	42	0	0	42	0	0	0	0	42	0	0	0	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SEFSC	Reef fish Visual Census (RVC) Survey	243	243	0	243	243	243	0	0	243	0	0	0	0	243	0	0	0	0	0	243	0	0	0	0	0	0	0	0	0	0	0	0
SEFSC	SEAMAP Fall Bottom Fish Survey	241	241	0	0	0	0	241	241	0	0	241	241	241	241	241	0	0	241	0	0	0	241	241	241	0	0	0	0	0	0	241	0
SEFSC	SEAMAP Fall Plankton	144	144	0	0	0	0	0	0	0	0	144	144	144	144	144	0	0	144	0	0	0	144	144	144	0	0	0	0	0	0	144	0
SEFSC	SEAMAP Reef Fish Survey	376	376	0	0	0	376	0	0	0	0	376	376	376	376	376	0	0	376	0	0	0	376	376	376	0	0	0	0	0	0	376	0
SEFSC	SEAMAP Spring Plankton	167	167	0	0	0	0	0	0	0	0	167	167	167	167	167	0	0	167	0	0	0	167	167	167	0	0	0	0	0	0	167	0
SEFSC	SEAMAP Summer Groundfish Survey	231	231	0	0	0	0	231	231	0	0	231	231	231	231	231	0	0	231	0	0	0	231	231	231	0	0	0	0	0	0	231	0
SEFSC	SE Marine Mammal Cruises (Gulf)	46	46	0	0	0	0	46	46	0	0	0	0	0	46	0	0	0	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SEFSC	SE Marine Mammal Cruises (S Atlantic)	28	28	0	0	0	0	0	0	0	0	0	0	0	28	0	0	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SEFSC	South Tortugas Survey	13	13	0	0	0	13	0	0	0	0	0	0	0	13	0	0	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SEFSC	St. Andrew Bay Juvenile Reef Fish Survey	20	20	20	20	20	0	0	0	0	0	0	0	0	20	0	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SEFSC	U.S. South Atlantic MPA Survey	0	88	88	88	88	88	0	0	88	0	0	0	0	88	0	0	0	88	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SWFSC	Antarctic Marine Living Resources Program/AMLR -Krill Survey	178	178	178	178	178	178	178	0	178	0	178	178	178	178	178	0	0	178	0	178	178	178	178	178	0	0	178	0	0	0	178	0
SWFSC	AMLR -Fish Trawl Survey	68	68	68	68	68	68	68	0	68	0	68	68	68	68	68	0	0	68	0	68	68	68	68	68	0	0	68	0	0	0	68	0
SWFSC	CalCOFI	0	77	77	77	77	77	0	0	0	0	77	77	77	77	77	0	0	77	0	77	0	77	77	77	77	0	77	0	0	0	77	0
SWFSC	Juvenile rockfish (midwater trawl)	266	266	266	266	266	0	0	0	0	0	0	266	266	266	266	0	0	266	0	266	0	266	266	0	0	0	0	0	0	0	0	0
SWFSC	West PC Sardine Trawl	42	42	42	42	42	42	0	0	0	0	0	0	0	42	0	0	0	42	0	0	0	0	0	42	0	0	0	0	0	0	42	0
	Total Number of Stations	7618	7601	4711	7345	7024	2988	851	605	1115	0	3909	4175	2225	7565	2105	0	0	5173	1950	3364	246	6164	6164	3991	403	0	2858	0	0	70	3614	59

Appendix I. Inventory working group

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Appendix II. Glossary for terms used in the inventory

Term	Definition
Air Pressure	Barometric pressure measured by barometers (mmHg).
Air Temperature	The temperature indicated by a thermometer placed in an instrument shelter above ground (ºC).
Areal extent	Coordinates and/or landmarks.
Bathymetry	Depth and relief of water basins (m).
Chlorophyl	Any of a group of green pigments found in photosynthetic organisms. There are four naturally occurring forms: chl-a, chl-b, chl-c, chl-d.
Coast Sea Level Topography	General configuration of a coastal ocean surface, including its relief and the relative position of features.
Discard Monitoring	Monitoring of released or returned fish to the sea, dead or alive, whether or not such fish are brought fully on board a fishing vessel.
Dissolved Nutrients	Dissolved inorganic nitrogen (ammonium, nitrate, nitrite), dissolved inorganic reactive phosphate and dissolved silicate in sea water per unit mass of water (mg/L or ppm).
Dissolved Oxygen	Amount of oxygen that is dissolved in sea water per unit mass of water (mg/L or ppm).
Effort / Time req'd for study	Days at sea per year for surveys.
Ecological Characterizations	Characteristics of non-target species in the ecosystem.
Frequency	How often the survey is conducted.
Grid Based	Grid square coordinates of targeted stations.
Habitat Characterization and Mapping	Mapping and high resolution bathymetry of marine habitat.
LMR Assessment	Abundance, distribution, and life history activities of certain living marine resources.
Locations	Latitude and longitude.
Pathogens	Agents that cause disease, especially living microorganisms such as bacterium or fungus. This is not a variable or quantity that can be measured in itself. For aquatic systems this usually refers to waterborne pathogens which include HABs and fecal indicators (the pathogens themselves usually are not measured directly).
Phenomena observed	Major biological, physical, chemical, and meteorological

	data collected (e.g., temperature, salinity, stock ID, weight, sex, morphimetrics, stomach weight/content, etc.).
Platform/Station	General type of platform station (e.g., FRV, Oceanographic RV, Charter trawler, longliner) .
Primary Gear / Instruments	Major data gathering systems, including trawl, longline, CTD, multibeam, etc.
Protected Species Monitoring	Monitoring of any species which is protected by either the Endangered Species Act (ESA) or the Marine Mammal Protection Act (MMPA), and under the jurisdiction of NMFS
Quota Monitoring	Monitoring of a specified numerical harvest objective, the attainment of which causes closure of the fishery for that species or species group.
Recruitment	Amount of fish added to the exploitable stock each year due to growth and/or migration into the fishing area. This term is also used in referring to the number of fish from a year class reaching a certain age.
Relative Humidity	Ratio of the actual vapor pressure of the air to the saturation vapor pressure (%).
Research / Pre-Operational / Operational	Developmental phase of each survey/activity. Research Projects: Research and development of observational platforms, sensors, protocols, data management and communications, and analytical (e.g., models and algorithms) techniques. Pre-Operational Projects: Research projects that show promise as potential elements of an operational system that are ready for proof-of-concept demonstrations. Successful data and results can be integrated into operational products. Operational System: Routine and sustained provision of data and products in forms and at rates specified by user groups.
Salinity	Total mass of salts dissolved in seawater per unit mass of water (ppt).
Sea Surface Temperature	Temperature of the water film at the sea surface (ºC).
Sediment Grain Size	Measurement of substrate type in the sediment. The classification depends on the size of particles.
Shoreline Position	Wet/dry interface on the beach, the furthest point of wave run-up - and is recorded by tracing the wetline immediately after the turn of the high tide utilizing an all Terrain Vehicle (ATV) equipped with a post-processed kinematical Global Positioning System (GPS).
Solar Radiation	Total electromagnetic radiation emitted by the Sun; usually includes photosynthetically active radiation (PAR).

Special Projects / Process Surveys	Surveys that use special instruments, including ichthyoplankton samplers; tagging; physical, chemical and biological oceanography; bottom-typing; diver, manned and autonomous submersibles, ROVs, along tracklines, or synoptic with transient or recurring biophysical phenomena. In this category, survey vessels also provide essential transportation and logistical support for remotely-based field parties on a seasonal or year-round basis.
Streamflow	Flow of water in streams, rivers, and other channels (m^3/sec).
Streamflow Temperature	Temperature of the water in streams, rivers and other channels (ºC).
Surface Current	Steady flow of surface ocean water in a prevailing speed (m^3/sec) and direction.
Targeted Stocks	Primary stocks which are targeted during a survey/assessment.
Total Catch Monitoring	Monitoring of landed catch plus discards. Units include weight and number of fish caught.
Trackline	Routes that the survey goes by, usually in a linear fashion across rows or columns in the grid field.
Visibility	Greatest distance in the water that prominent objects can be seen and identified by unaided, normal eyes (m).
Water Level	Level of the ocean's surface (especially that halfway between mean high and low tide); or the level of the surface of a body of water measured by a water gauge (m).
Water Quality	The chemical, physical, and biological characteristics of water in respect to its suitability for a particular purpose. This is a collective term for many types of measurements. Indicators include dissolved oxygen, turbidity, chlorophyll-a concentration, HABs, and fecal coliform concentration, etc.
Waves	Height of surface waves in certain height, period/frequency, and direction occurring in the upper layer of the ocean (m).
Winds	Flow of air in certain speed and direction.