W00234

NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY

DESCRIPTIVE REPORT

Type of Survey	**Hydrographic Multibeam Survey**
Project No.	**OPR-OSD-AHB-12**
Registry No.	**W00234**

LOCALITY

State	**Puerto Rico**
General Locality	**Vieques Island**
Sub-locality	**2NM W of Point Cava**

2007

Ancillary data collected during Project NF-07-07-SEAS

LIBRARY & ARCHIVES

DATE

NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY No
HYDROGRAPHIC TITLE SHEET		**W00234**

State	Puerto Rico
General Locality	Vieques Island
Sub Locality	2NM W of Point Cava
Scale	1:10,000
Date of Survey	28 April 2007 – 28 April 2007
Instructions Dated	N/A
Project No.	OSD-AHB-12
Vessel	*NOAA Ship Nancy Foster*
Chief of Party	Ancillary data collected during Project NF-07-SEAS
Surveyed by	NOAA Ship Nancy Foster personnel
Soundings by echosounder	Kongsburg-Simrad EM 1002 MultiBeam system
Verification by	***Atlantic Hydrographic Branch***
Soundings in	Meters
Soundings at	MLLW

REMARKS:		
	Times:	All times are recorded in UTC
	UTM Zone:	Zone 20 North
	Purpose:	The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts.

Outside source survey W00234 was submitted without a formal report. The following NOAA Ship Nancy Foster Cruise Plan was included as the body of the Descriptive Report and contains pertinent information for this survey.

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Revisions and Red notes were generated during office processing. The processing branch concurs with all information and recommendations in the DR unless otherwise noted. Page numbering may be interrupted or non-sequential. All pertinent records for this survey, including the Descriptive Report, are archived at the National Geophysical Data Center (NGDC) and can be retrieved via http://www.ngdc.noaa.gov/.

CRUISE INSTRUCTIONS: NOAA SHIP NANCY FOSTER

Cruise Title: **Calibration of seagrass injury and disturbance recovery models and fishery habitat utilization in southeastern Puerto Rico and Vieques Island**

Cruise Number: NF-07-07-SEAS

Period of Cruise: DEP: 4/27/07 from San Juan, Puerto Rico and transit to southeastern Puerto Rico and Vieques Island and return to San Juan, Puerto Rico 5/06/07

Submitted by

Dr. David Johnson
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Date_____

Dr. W. Judson Kenworthy
Research Team Leader.
CCFHR, NCCOS, NOS, NOAA
101 Pivers Island Road
Beaufort, NC 28516

Date_____

Approved by:

Captain Emily B. Christman
Commanding Officer
Atlantic Marine and Aviation Operations Center

Date_____

II. CRUISE OVERVIEW

A. Summary of Objectives

1. Sample seagrass injury and disturbance sites established at Naval Station Roosevelt Roads (NSRR).

2. Quantitatively sample fish communities associated with bank-shelf and mangrove habitats around Vieques Island, Puerto Rico to determine resource value as nursery and adult fishery habitats.

3. Conduct benthic habitat surveys of Puerto Ferro, Puerto Mosquito, Ensenada Honda, and on the south and northeast coasts of Vieques confirm existing habitat maps and resource values.

4. Conduct hydro-acoustic surveys using scientific grade, split-beam sonar, within three study regions around the island of Vieques to estimate fish biomass adjacent to the reef habitat during the day, at dusk and during the night.

5. Conduct multibeam surveys simultaneously with hydro-acoustic surveys.

B. Operating Area.

Southeastern Puerto Rico in former NSRR at approximately 18°13.5657'N, 65°37.6615'W, northwest coast of Vieques Island at approximately 18°08.2350'N, 65°32.7160', South coast Vieques at 18°06.2104"N, 65°22.0513"W

C. Participating Institutions.

Center for Coastal Fisheries and Habitat Research, NCCOS, NOS, NOAA, Beaufort, NC

D. Personnel.

Chief Scientist; Dr. W. Judson Kenworthy, CCFHR, NOS/NCCOS (252) 728-8750 work / (252) 241.3474 cell / (252) 728 2157 home
Jud.Kenworthy@noaa.gov

D. Scientific Personnel:

Male:	d = diver, ob = observer diver
Kenworthy	d (divermaster)
Burke	d
Kellison	d
Merello	d
Degan	d (chief diver)
Kirsch	d
Di Carlo	d
Taylor	ob
Mitchell	ob
Hackney	d

Female:	
Uhrin	d
Whitfield	d
Landry	od
Hansen	
Van der Plyum	d

GRAND TOTAL	15 (one alternate)

All scientific personnel planning to board the ship should have in their possession at the time of boarding, a proper photo identification card (agency ID, driver's license, etc.), and all necessary medical clearance forms and contact information approved.

Up to date NOAA or AAUS dive and NITROX certifications will be cleared through the NOAA Dive Office before arrival aboard NANCY FOSTER. All dive personnel should have in their possession at the time of boarding, a copy of their NOAA certified dive physical (water proof paper preferred). All arrangements for diving personnel will be handled by the Chief Dive in consultation with the Chief Scientist.

E. Administrative. The Chief Scientist is the Point of Contact for Science Party. The alternative Point of Contact is John Burke. The ship will have to gain permission to enter waters under Dept. of Defense jurisdiction at Naval Station Roosevelt Roads (NSRR). As was the case in the three prior cruises the Chief Scientist will initiate contact at NSRR to coordinate ship's arrival and make final arrangements for clearance in consultation with the Commanding Officer of the Nancy Foster.

III. Operations:

A. Data to be Collected. Visual assessments of seagrass, macroalgae and coral abundance, seagrass biomass, seagrass growth rates, bathymetry, general benthic habitat characterization, fish species composition, size and abundance by visual census and hydroacoustic sampling.

B. Staging plan. Ship will berth at U.S. Coast Guard Station in San Juan, Puerto Rico for loading and unloading science staff and equipment.

C, D, E, F. Cruise Plan, Waypoints, Daily and Station Operations Plans and Underway Operations. The daily schedule will generally involve deployment of three field teams each in separate launches, one team (**seagrass**) will be working on seagrass sampling (plant marking, visual assessments and sediment coring) and bathymetry measurements, and two teams (**fish**) will be conducting visual fish/habitat surveys and diver operated push net sampling. A fourth team will be conducting hydroacoustic surveys on board ship. We will also have a sample processing team on board the ship at all times which will be processing seagrass and push net samples and also collecting ciguateric fishes (e.g., barracuda). The fish teams will either be working in close proximity to each other in the same sampling zone or leap-frogging with one team advancing to the next station within a zone. The fish team will be sampling along established transects running from the mangrove to the edge of the bank shelf. All of these sample sites are expected to be in less than 30m of water.

The seagrass team will be working independently of the fish team and may include two sub-teams, one doing visual assessments and bathymetry, and another team doing the sediment coring.

The hydroacoustic survey team will be working day and night directing the ship along transects as illustrated below for each of four regions around the island of Vieques. Each night survey will have a corresponding daytime survey. Multibeam transects will be conducted simultaneously.

Dive operations and Benthic Sampling:

All divers will be certified at least at the NOAA Scientific Diver or observer level or will have presented their current dive physical information, dive certification card, and letters of reciprocity to the Chief Diver and Nancy Foster Divemaster. Most dives will be conducted on Nitrox in water less than 30m. Bottom times will be determined according to water depths, dive tables and Divemaster approval. The Sea Ark, RHIBs and potentially the RV Foster will be utilized to transport divers to specific dive locations. The latitude and longitude of all dive sites will be selected ahead of time and stored in either separate Garmin GPS or Trimble DGPS units (one per launch). Each boat will navigate to the dive site using the GPS or DGPS provided by scientific party.

Seagrass Sampling:

For the seagrass team working in Ensenada Honda, Puerto Medio Mundo, Bahia Algondones, Puerto Ferro, Puerto Mosquito, northwest coast of Vieques and south coast of Vieques most dive sites are less than 10m deep and pre-determined during a prior study. The seafloor consists of a relatively continuous cover of seagrasses intermixed with macroalgae, coral and other invertebrate species.

Among the seagrass meadows are a series of physical disturbances where either a vessel grounded or manatees excavated seagrasses during feeding. The protocol for sampling each site includes the following; 1) a DGPS map of the perimeter, 2) qualitative visual examination and video transects, 3) quantitative visual census of seagrass, coral and macroalgal cover and species composition, and 4) quantitative measurement of seagrass shoot density and biomass by extracting sediment cores. We will also be conducting bathymetry surveys at each site.

Upon locating a sampling site using DGPS one dive team will recon by snorkel to verify site conditions. Next, a second dive team will lay out either metric calibrated measuring tapes or buoys to make the perimeter of the sites. One dive team will conduct benthic sampling inside the injury and the second dive team will conduct benthic sampling in the uninjured seagrass meadow adjacent to the disturbance site. Each diver will be equipped with a $0.25m^2$ collapsible PVC Braun-Blanquet quadrat, one $0.04m^2$ PVC quadrat for shoot counts, and one clipboard with data sheets and a dive team will also have a corer. Each team will navigate to the pre-determined random points where a visual census will be conducted. Once the benthic sampling is completed the divers will return to the launch and map the perimeter of the disturbance using DGPS. A separate team of snorkelers and divers will be taking 15 cm diameter cores, placing the cores in mesh bags and returning them to the launch.

On the south coast of Vieques seagrass team be conducting a habitat characterization study and bathymetry and assessing the condition of two lagoons, Puerto Ferro and Puerto Mosquito and in the vicinity of Ensenada Honda part of a joint collaboration with NOAA's Office of Response and Restoration in conjunction with the Vieques Restoration Project.

We will also be conducting a leaf marking study at the previously studied seagrass blowouts on the northwest coast of Vieques. Individual seagrass shoots will be marked within defined quadrats located and labeled underwater by SCUBA divers. The plants will be marked on the first day and recovered on the final day. This operation requires two vessels and a minimum of four divers. All stations will be located and recovered using DGPS.

Fish Sampling:

The purpose of fish investigations will be to determine the distribution of fishes among benthic habitat types along three cross shelf transects to include the mangrove shoreline, adjacent seagrass/coral habitat, shelf habitat and shelf edge habitat. Four benthic habitat types are of primary interest: mangrove prop root fringe, reef, vegetated bottom, and unconsolidated sediments. Fish investigation field parties will consist of two to four dive teams. The vessel will

navigate to locations picked from study area habitat maps via DGPS. Data collection will consist of band transect visual census and Braun Blanquet habitat assessment by SCUBA divers. A diver operated push net may be deployed in vegetated and unconsolidated sediments to collect voucher specimens of resident juvenile fishes. Trolling for barracuda may take place to collect specimens for ciguatoxin research from the Nancy Foster.

Vessel operations will typically be a ~ 18 hour workday. A "give and take" operation cycle will be instituted during these workdays via consultation between the Chief Scientist and Commanding Officer in order to balance crew complement with demands of day-night operations. In Science Party, the Field Party Chief is responsible for organization of operations and data, respectively; Chief Diver is responsible for dive record keeping and developing dive profiles for presentation to the Chief Scientist who will clear them with the Commanding Officer or a designee. The Chief Scientist has the authority to revise or alter the technical portions of the instructions provided that, after consultation with the Commanding Officer, it is ascertained that the proposed changes will not: 1) jeopardize the safety of the personnel on the ship, 2) exceed the time allotted for the project, 3) result in undue additional expense, or 4) alter the general intent of the Project Instruction. Additional operations and ancillary projects, not covered under the main project, may be performed on a "not to interfere" basis. The Chief Scientist is responsible for determining the priority of the additional work, provided that any changes are discussed with the Commanding Officer and do not constitute a risk to the safety of the ship or personnel and do not significantly change the schedule for this cruise. If the requirements for the additional work place significantly different requirements on the ship, amendments to the Cruise Instructions must be prepared and approved.

Daily Schedule:

26 April (Wednesday-Thursday):

All: Science party boards vessel in San Juan to begin gear preparation.

27 April (Friday, Day 1):

All (0800-1200): Ship steams to northwest coast of Vieques (≅18°13.9690'N, 65°37.5473'W). See Figures 1,2, and 3 in Appendices. Science party installs gear, conducts gear shake down, organize dive plans, and mission briefing with science party and ship's crew. Organize science party into field teams.

SEAGRASS TEAM (1300 – 1700): Deploy two launches. Seagrass sampling teams will transit to blowouts in seagrass bed on northwest coast of Vieques mark seagrasses for leaf growth.

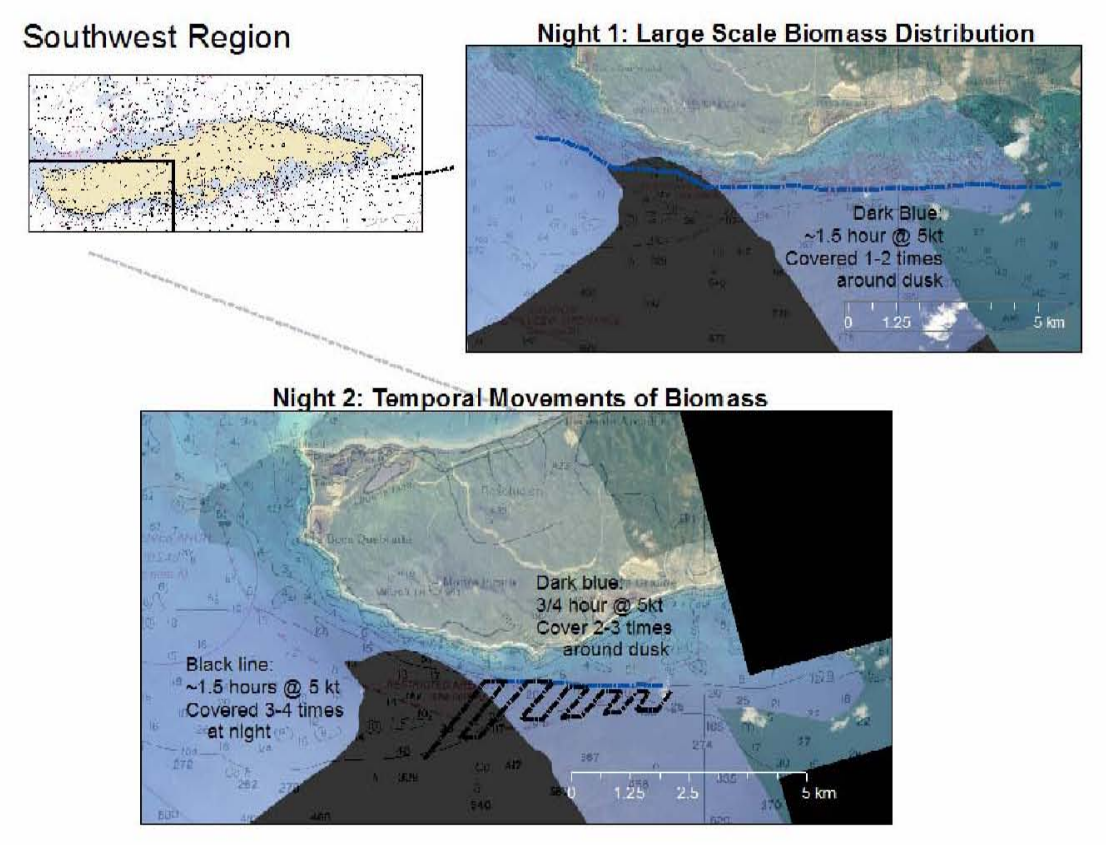
FISH TEAM (1300-1700): Deploy one launch. Fish survey team will transit to patch reefs off of northwest coast of Vieques for sampling (≅18°12.2654'N, 65°39.3729'W).

PROCESSING TEAM (1300-1700): Sample processing team will set up laboratory and

processing stations on Nancy Foster.

HYDROACOUSTIC TEAM (1300-until complete): After boats are deployed, hydroacoustic and multibeam transects will be run near to offshore of northwest coast of Vieques until seagrass and fish team are recovered.

NANCY FOSTER (1700-until complete): After picking up Seagrass and Fish Teams from afternoon ops, Nancy Foster will steam to southwest region of Vieques before dusk to begin crepuscular hydroacoustic and multibeam sampling. When hydroacoustic survey is complete Nancy Foster steams to Ensenada Honda on NSRR (≅18°13.3509'N, 65°37.5710'W) to be in place for morning ops.



28 April (Saturday, Day 2):

SEAGRASS TEAM (0800 – 1700): Nancy Foster will steam to Ensenada Honda at NSRR (if not

already at anchor there) and deploy one launch (≅18°13.3509'N, 65°37.5710'W). Seagrass sampling teams will conduct shallow water (water depth < 2.0 m) visual assessments and core sampling all day. Seagrass team will need to bring lunch.

NANCY FOSTER (0900-1700): After deploying seagrass team Nancy Foster will steam back to southwest coast of Vieques (see Southwest Region nights 1 and 2 above for general location) to deploy fish team and stand by with fish team while conducting hydroacoustic and multibeam surveys.

FISH TEAM (0900-1500): Deploy two launches. Fish survey team will transit to stations on southwest coast to sample visual transect sites (Specific transect locations to be determined). During the day they will sample from offshore to inshore along transects.

HYDROACOUSTIC TEAM (0900-1500): After Fish survey team launches are deployed, hydroacoustic and multibeam transects will be run from Nancy Foster near to and offshore of southwest coast of Vieques until fish team is recovered.

NANCY FOSTER (1500-1700): After recovering fish team Nancy Foster will steam back to Ensenada Honda at NSRR and recover seagrass team.

HYDROACOUSTIC TEAM (1900-until complete): After recovering Seagrass Team from Ensenada Honda at NSRR Nancy Foster will steam to southwest coast of Vieques to conduct hydroacoustic and multibeam surveys (see Southwest Region Night 2 above). When complete, Nancy Foster may steam back to Ensenada Honda at NSRR.

PROCESSING TEAM (0800-2200): Processing team will remain onboard preparing for samples and after dinner begin to process first set of samples.

29 April (Sunday, Day 3):

SEAGRASS TEAM (0800 – 1700): Nancy foster will steam to Ensenada Honda at NSRR (if not already there) and deploy one launch. Seagrass sampling teams will conduct shallow water (water depth < 2.0 m) visual assessments and core sampling all day. Seagrass team will need to bring lunch.

NANCY FOSTER (0900-1500): After deploying seagrass team Nancy Foster will steam back to southwest coast of Vieques to deploy fish team and stand by with fish team conducting hydro-acoustic and multibeam surveys.

FISH TEAM (0900-1500): Deploy two launches. Fish survey team will transit to stations on southwest coast to sample visual transect sites (Specific transect locations to be determined). During the day they will sample from offshore to inshore along transects.

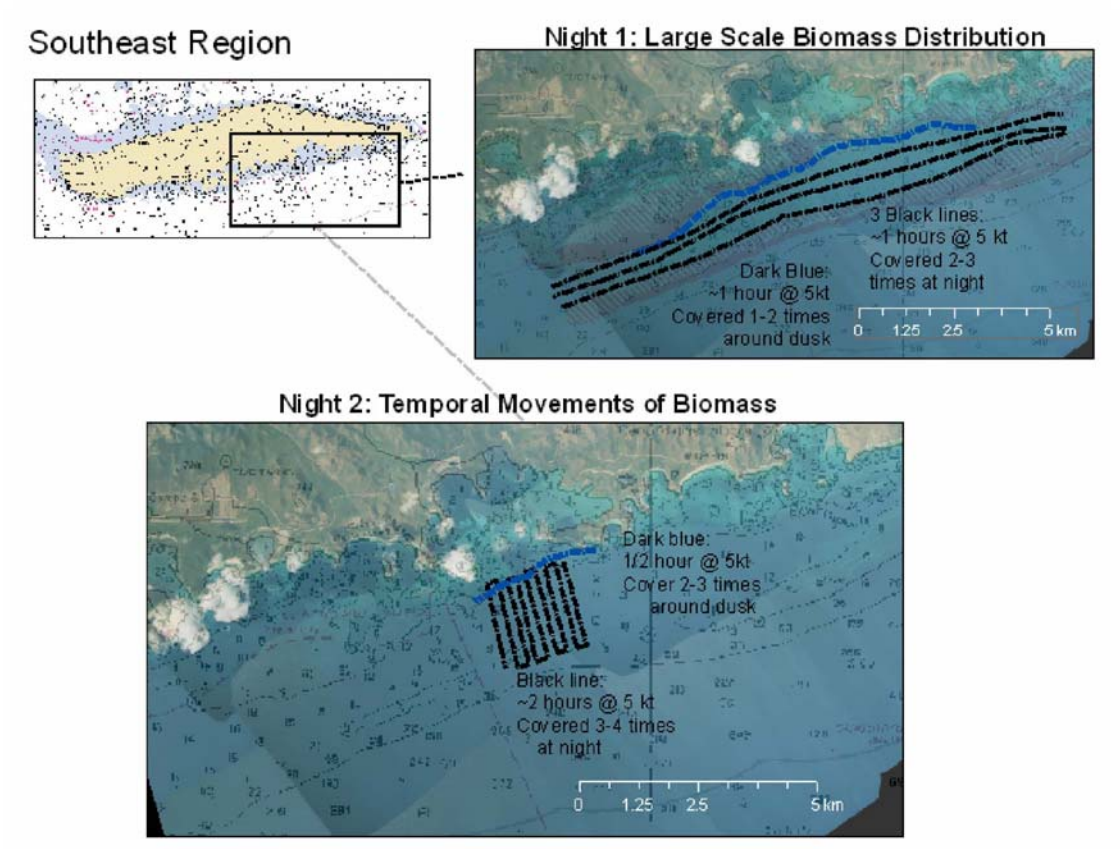
HYDROACOUSTIC TEAM (0900-1500): After launches are deployed, hydroacoustic and

multibeam transects will be run from Nancy Foster from near to offshore of southwest coast of Vieques until fish team is recovered.

NANCY FOSTER (1500-1700): After recovering fish team Nancy Foster will steam back to Ensenada Honda at NSRR and recover seagrass team.

PROCESSING TEAM (0800-2200): Processing team will remain onboard preparing for samples and after dinner begin to process first set of samples.

HYDROACOUSTIC TEAM (1900-until complete): After recovering Seagrass Team from Ensenada Honda at NSRR Nancy Foster will steam to southeast coast of Vieques to conduct hydroacoustic and multibeam survey. If Nancy Foster arrives before dusk, a crepuscular survey will be conducted (see Night 1 Southeast Region below) After night hydroacoustic and mlutibeam survey, Nancey Foster will stand by in the southeast region of Vieques. (≅18°06.0849'N, 65°21.9191'W).



30 April (Monday, Day 4):

FISH TEAM: (0800-1700): Deploy two launches. Fish survey team will transit to offshore reef of southeast coast of Vieques in the vicinity of Ensenada Honda to sample (≅18°06.0849'N, 65°21.9191'W). During the day they will sample from offshore to inshore.

SEAGRASS TEAM (0800-1700): Deploy launch. Seagrass sampling team will transit to south coast of Vieques in the vicinity of Ensenada Honda, Puerto Ferro and Puerto Mosquito to conduct benthic habitat characterization sampling (Final sampling locations to be determined).

HYDROACOUSTIC TEAM (0800-1700): After boats are deployed, hydroacoustic and multibeam surveys will be run near the southeast coast of Vieques (see Southeast Region above).

PROCESSING TEAM (0800-1700): Continue Processing samples on Nancy Foster.

HYDROACOUSTIC TEAM (1900-until complete): After picking up Seagrass and Fish Teams from afternoon ops, Nancy Foster will steam to southeast region of Vieques before dusk to begin crepuscular hydroacoustic and multibeam sampling (see Night 2 Southeast Region above) After night hydroacoustic and multibeam survey, Nancy Foster will stand by in the southeast region of Vieques.

01 May (Tuesday Day 5):

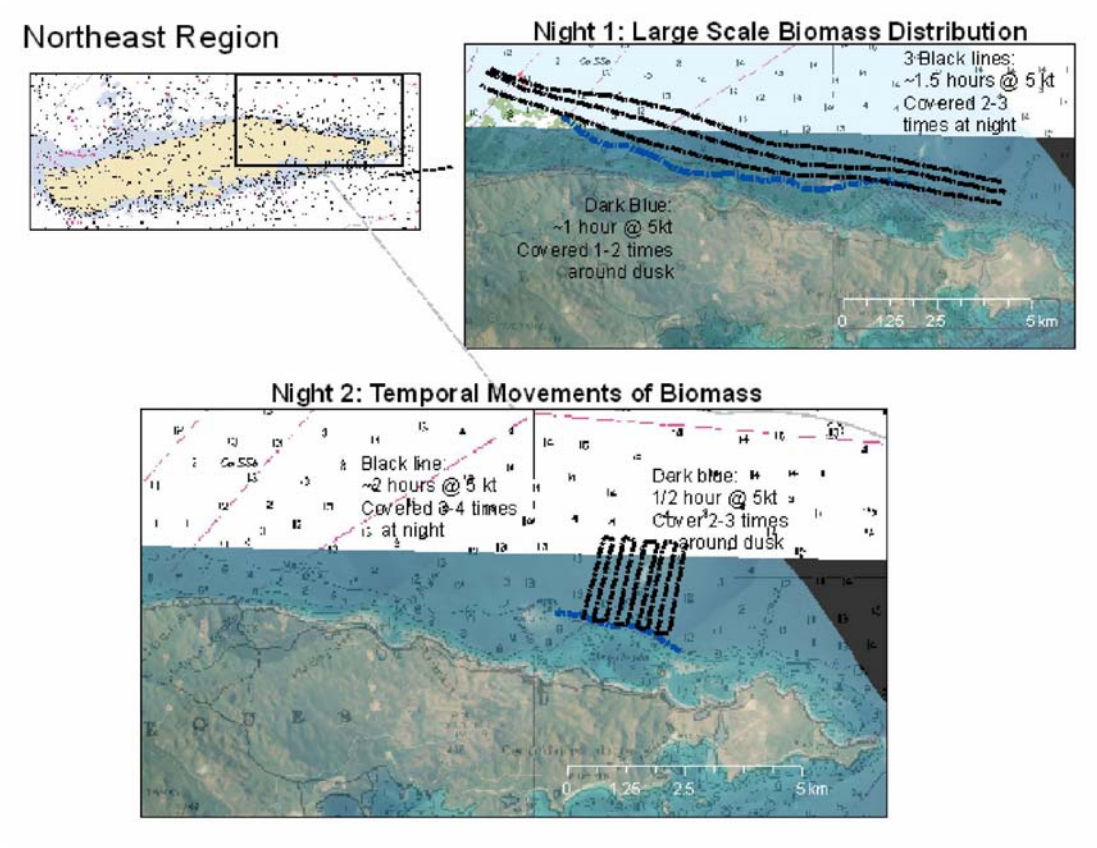
FISH TEAM: (0800-1700): Deploy two launches. Fish survey team will transit to offshore reef of southeast coast of Vieques in the vicinity of Ensenada Honda to sample. During the day they will sample from offshore to inshore (Final sampling locations to be determined).

SEAGRASS TEAM (0800-1700): Deploy launch. Seagrass sampling team will transit to south coast of Vieques in the vicinity of Ensenada Honda to conduct benthic habitat characterization sampling (Final sampling locations to be determined).

HYDROACOUSTIC TEAM (*0800-1700):* After boats are deployed, hydroacoustic and multibeam surveys will be run near the southeast coast of Vieques (see Southeast Region above).

PROCESSING TEAM (0800-1700): Continue Processing samples on Nancy Foster.

HYDROACOUSTIC TEAM (1900-until complete): After picking up Seagrass and Fish Teams from afternoon ops, Nancy Foster will steam to northeast region of Vieques before dusk to begin crepuscular hydroacoustic and multibeam sampling (see Night 1 and Northeast Region below). When hydroacoustic and multibeam survey is complete Nancy Foster steams to Puerto Medio Mundo at NSRR to sample (≅18°15.4388'N, 65°37.3717'W) to be in place for morning ops



02 May (Wednesday, Day 6):

SEAGRASS TEAM (0800-1700): Nancy Foster will steam over to NSRR (if not already there) offshore of Puerto Medio Mundo and deploy launch with seagrass team. Seagrass sampling team will transit to Puerto Medio Mundo at NSRR to sample (≅18°15.4388'N, 65°37.3717'W). Seagrass team will need to bring lunch.

NANCY FOSTER (0800-1700): After deploying seagrass team Nancy Foster will steam back to northeast coast of Vieques to deploy fish team and stand by with fish team while conducting hydroacoustic and multibeam surveys

FISH TEAM: (0900-1700): Deploy two launches. Fish survey team will transit to offshore reef of northeast Vieques to sample. During the day they will sample from offshore to inshore (Final sampling locations to be determined) .

HYDROACOUSTIC TEAM (0900-1700): After launches are deployed, hydroacoustic and multibeam transects will be run near to offshore of northeast Vieques.

PROCESSING TEAM (0800-2200): Continue Processing samples on Nancy Foster.

HYDROACOUSTIC TEAM (1900-until complete): After launches are recovered Nancy Foster will conduct hydroacoustic and multibeam surveys on northeast coast of Vieques (see Night 2 Northeast Region above) When hydroacoustic and multibeam survey is complete Nancy Foster steams to Puerto Medio Mundo at NSRR to sample (≅18°15.4388'N, 65°37.3717'W) to be in place for morning ops

03 May (Thursday, Day 7)

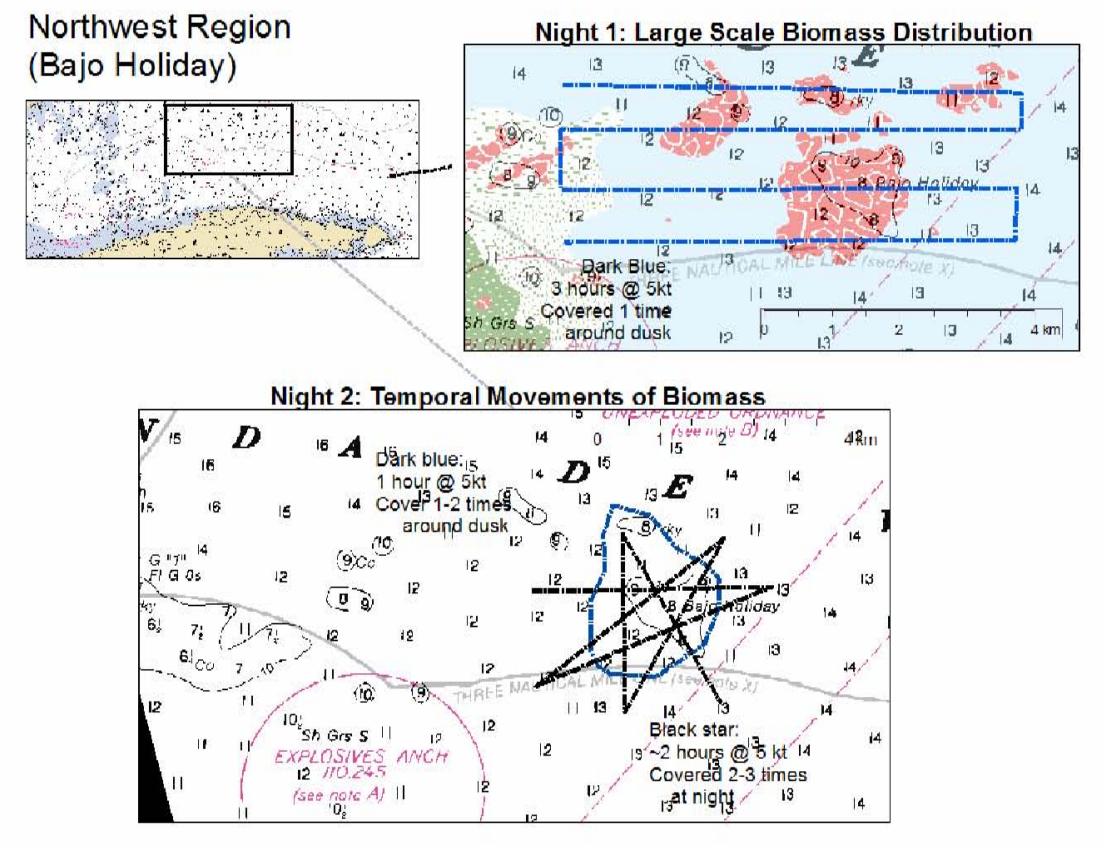
SEAGRASS TEAM (0800-1700): Nancy Foster will steam over to NSRR offshore of Puerto Medio Mundo (if not already there) and deploy launch with seagrass team. Seagrass sampling team will transit to Puerto Medio Mundo at NSRR to complete sampling(≅18°15.4388'N, 65°37.3717'W). Seagrass team will need to bring lunch

FISH TEAM: (0900-1700): Nancy Foster will steam back to northeast coast of Vieques and deploy two launches. Fish survey team will transit to offshore reef of northeast Vieques to sample. During the day they will sample from offshore to inshore (Final sampling locations to be determined).

HYDROACOUSTIC TEAM (0900-1700): After launches are deployed, hydroacoustic and multibeam transects will be run from near to offshore of northeast Vieques.

PROCESSING TEAM (0800-2200): Continue Processing samples on Nancy Foster.

HYDROACOUSTIC TEAM (1900-until complete): After launches are recovered Nancy Foster will conduct hydroacoustic and multibeam surveys either to complete northeast coast of Vieques or transit to priority sites to complete unfinished transects in southeast or southwest Vieques. Alternatively, Nancy Foster will steam to northwest coast to begin hydroacoustic and multibeam surveys (see Night 1, Northwest Region below).



04 May (Friday, Day 8)

SEAGRASS TEAM (0800-1700): Nancy Foster will steam over to NSRR offshore of Bahia Algodones and deploy launch with seagrass team. Seagrass sampling team will transit to Bahia Algodones to conduct sampling (≅18°13.3509'N, 65°37.5710'W). Seagrass team will need to bring lunch

FISH TEAM: (0900-1700): Nancy Foster will steam back to northwest coast of Vieques and deploy two launches. Fish survey team will transit to offshore reef of northwest Vieques to sample. During the day they will sample from offshore to inshore (Final sampling locations to be determined).

HYDROACOUSTIC TEAM (0900-1700)*:* After launches are deployed, hydroacoustic and multibeam transects will be run near to offshore of northwest Vieques.

PROCESSING TEAM (0800-2200): Continue Processing samples on Nancy Foster.

HYDROACOUSTIC TEAM (1900-until complete): After dinner Nancy Foster will conduct hydroacoustic and multibeam surveys either on northwest coast of Vieques (see Northwest Region night2), or transit priority sites to complete unfinished transects in southeast or southwest Vieques.

05 May (Saturday, Day 9)

All activities on Day 9 will be determined from the outcome of prior days sampling. If priority sites are not complete the Chief Scientist and Staff will determine which sites are to be re-occupied and consult with Operations Officer and Commanding Officer, otherwise we will continue sampling on northwest coast of Vieques as described below.

SEAGRASS TEAM (0800-1700): Nancy Foster will steam over to NSRR offshore of Bahia Algodones and deploy launch with seagrass team. Seagrass sampling team will transit to Bahia Algodones to complete sampling (≅18°13.3509'N, 65°37.5710'W). Seagrass team will need to bring lunch

FISH TEAM: (0900-1700): Nancy Foster will steam back to northwest coast of Vieques and deploy two launches. Fish survey team will transit to offshore reef of northwest Vieques to sample. During the day they will sample from offshore to inshore (Final sampling locations to be determined).

HYDROACOUSTIC TEAM (0900-1700)*:* After launches are deployed, hydroacoustic and multibeam transects will be run near to offshore of northwest Vieques.

PROCESSING TEAM (0800-2200): Continue Processing samples on Nancy Foster.

HYDROACOUSTIC TEAM (1900-until complete): After dinner Nancy Foster will conduct hydroacoustic and multibeam surveys either on northwest coast of Vieques (see Northwest Region night2), or transit priority sites to complete unfinished transects in southeast or southwest Vieques.

06 May (Sunday, Day 10)

SEAGRASS TEAM (0800-1100): Nancy Foster will steam to northwest coast and deploy two launches (≅18°13.9690'N, 65°37.5473'W). Seagrass sampling team will recover seagrass plants which were marked on day1.

FISH TEAM: (0000-1100): Deploy one launch. Fish survey team will return to patch reef site on northwest coast and complete sampling.

HYDROACOUSTIC TEAM (0900-1100)*:* After launches are deployed, hydroacoustic and multibeam transects will be run near to offshore of northwest Vieques.

PROCESSING TEAM (0800-2200): Continue Processing samples on Nancy Foster.

ALL (1200-1700): Nancy Foster steams back to San Juan, Science staff stages down, packs equipment, cleans lab and deck space, and prepares to depart ship.

07 May (Monday, Day 11)

Science party completes cleaning berths; lab and deck space and departs ship.

G. Applicable Restrictions. There are no known restrictions.

H. Small Boat Operations. Use of the Sea Ark and both RHIBs are requested. Small boat operations are described in detail above. Navigation for sampling surveys and dive station location will often be by Differential GPS. Science Lab will use independent DGPS that is compatible with program software - communication on navigation will be maintained. Small boat ops will be directed both by NANCY FOSTER and program DGPS. Station operations will be recorded in DGPS. For the rest of the cruise, navigation will be by the best method available.

IV. Facilities:

A. Equipment and Capabilities Provided by the Ship

1. 3 small boats (2 RHIBs and Sea Ark) for dive, survey, and equipment. Deployment operations - a boat driver for the SeaArk and each RHIB that is launched - access to 12V battery of launch for powering small inverter.
2. Support for dive operations.
3. Divers to assist in dive operations (optional).
4. Laboratory space for survey equipment, sample processing and sample storage, including a **freezer for sample storage**.
5. Air compressor and NITROX system for SCUBA tank and bank filling; training in use of same.
6. Emergency oxygen for dive operations with sufficient capacity for 3 h breathing for two divers.
7. Diver recall system.
8. Hand held radios for communication between deck, Sea Lab, launches, etc.
9. Survey technician and technical support to operate multibeam.
10. Support for the ships deck equipment.
11. It is requested that a copy of the ship's *Deck Log - Weather Observation Sheet NOAA 77-13d* for and digital SCS data for the entire cruise be provided to the Chief Scientist upon departure of the science party or transmitted within 2 weeks thereafter.

B. Equipment and Capabilities Provided by the Program

1. Dive equipment for SCUBA divers
2. 2~5 laptop computers.
3. Misc. benthic sampling equipment.
4. Permits for conducting otherwise prohibited activities in Puerto Rico
5. Sample processing supplies.
6. Cell phones..
7. Extra emergency oxygen kits.
8. Underwater Video Cameras
9. Spill response kit.
10. Hydroacoustic equipment (EK-60 Simrad 7 degree split beam)
11. NITROX SCUBA tanks

V. Disposition of Data and Reports

A. Data responsibilities. Chief Scientist and designee are responsible for compiling, archiving and storing all scientific party data.

B. Pre- and post cruise meetings. Commanding Officer, Operations Officer and Chief Scientist will plan all necessary pre and post cruise meetings as needed to.

C. Ship operation evaluation report. Chief Scientist is responsible for completing and submitting evaluation report to;

Office of Marine and Aviation Operations
Program Services and Outsourcing Division
SSMC3, Room 12872
1315 East-West Highway
Silver Spring, MD 20910-3282

VI. Additional Projects.

At this time there are no additional scientific projects planned. Pending approval, we are considering having an educational and outreach film crew from the Essential Image Foundation film our field sampling.

VII. Hazardous Materials.

An inventory list and a *Material Safety Data Sheet* for each hazardous material will accompany hazardous material brought on board NOAA Ship NANCY FOSTER by scientific parties. This information should be provided to the Commanding Officer. On departure from the ship, scientific parties will provide an inventory of hazardous material to the Commanding Officer

showing that all hazardous material brought on board have been properly used up or removed in suitable waste containers. Anticipated hazardous materials (due to their flammable nature) include:

1) ~ 40L [10 gal] Ethyl Alcohol for fish sample preservation
2) Emergency oxygen for diving ops (portable kit with 2 bottles)
3) Three, 2.5-Oz. Butane refill canisters for cable repair, kept in toolbox.

The *Material Safety Data Sheet* is normally available from the manufacturer of the hazardous product. Procedures followed for use of chemicals will be those outlined in the *Chemical Hygiene Plan for Chemical Labs* aboard NOAA ships. The Science Party will provide a small spill containment kit appropriate for these chemicals.

VIII. Radioisotopes.

There is no planned use of radioisotopes.

IX. Miscellaneous.

A. Scientific berthing. Final berthing assignments will be made by the Operations Officer in collaboration with the Chief Scientist. The Chief Scientist will ensure that a proper ratio of male to female scientific staff allows for appropriate berthing.

B. Medical Forms and Emergency Contacts. Prior to departure the Chief Scientist will provide a completed NOAA Health Services Questionnaire and list of emergency contacts for all scientific staff to the Marine Center and ships Executive Officer.

C. Shipboard Safety. The Chief Scientist will ensure that the scientific staff adheres to all safety protocols and participate in all shipboard training exercises, e.g., man overboard and fire drills.

D. Communications. A progress report on operations prepared by the Chief Scientist may be relayed to the program office. Sometimes it is necessary for the Chief Scientist to communicate with another vessel, aircraft, or shore facility. Through various modes of communication, the ship is able to maintain contact with the Marine Operations Center on an as needed basis. These methods will be made available to the Chief Scientist upon request, in order to conduct official business. Due to a new directive from Marine Operations Center, the ship must charge the science party for all calls made on the cell or sky-cell telephone. INMARSAT, Sky Cell and cellular communication costs shall be reimbursed to the ship for telephone calls made by all scientific personnel. These charges will be assessed against the program after NOAA Ship NANCY FOSTER receives the bill. There is generally a three-month delay receiving the bill for review. The Chief Scientist will be required to keep a log of all calls made by the science party. The program will also provide a cell phone to be kept on the bridge.

E. Port Agent Services/Billing. Arrangements to be determined by Commanding Officer and OMAO.

F. Wage Marine Working Hours and Rest Periods. The Chief Scientist will work in close coordination with the Commanding Officer to plan daily operations in accordance with the capabilities of the ship operating crew to support a 24-hour mission. The Chief Scientist will prepare a daily plan of action to be provided to the ship's bridge each evening. The plan will be review by the ship's officers and finalized in coordination with the Chief Scientist.

G. Foreign National Visitors Access to OMAO. If applicable, the Chief Scientist will comply with all requirements pertaining to scientific staff who are foreign nationals.

X. Appendices.

A. Equipment Inventory. The Chief Scientist will provide the Operations Officer an inventory of all equipment brought aboard the Nancy Foster at the time it is loaded.

B. Hazmat Inventory. The Chief Scientist will provide the Operations Officer an inventory of all hazardous material brought aboard the Nancy Foster at the time it is loaded.

C. Additional Figures and Aerial Photos. See following pages.

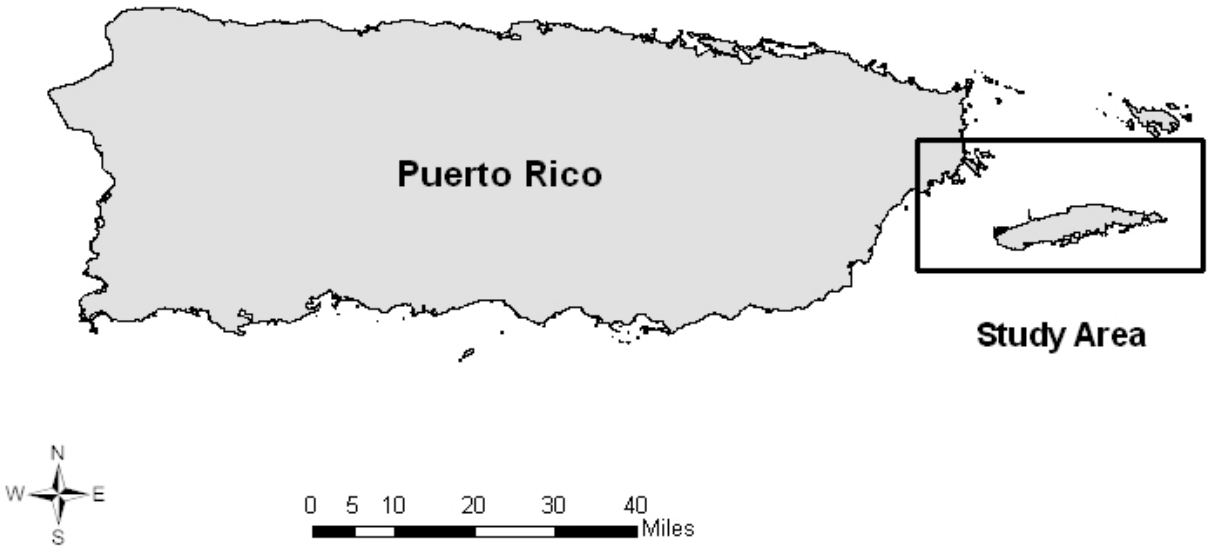


Figure 1. Map of Puerto Rico showing the general area of the study site enlarged in southeastern Puerto Rico.

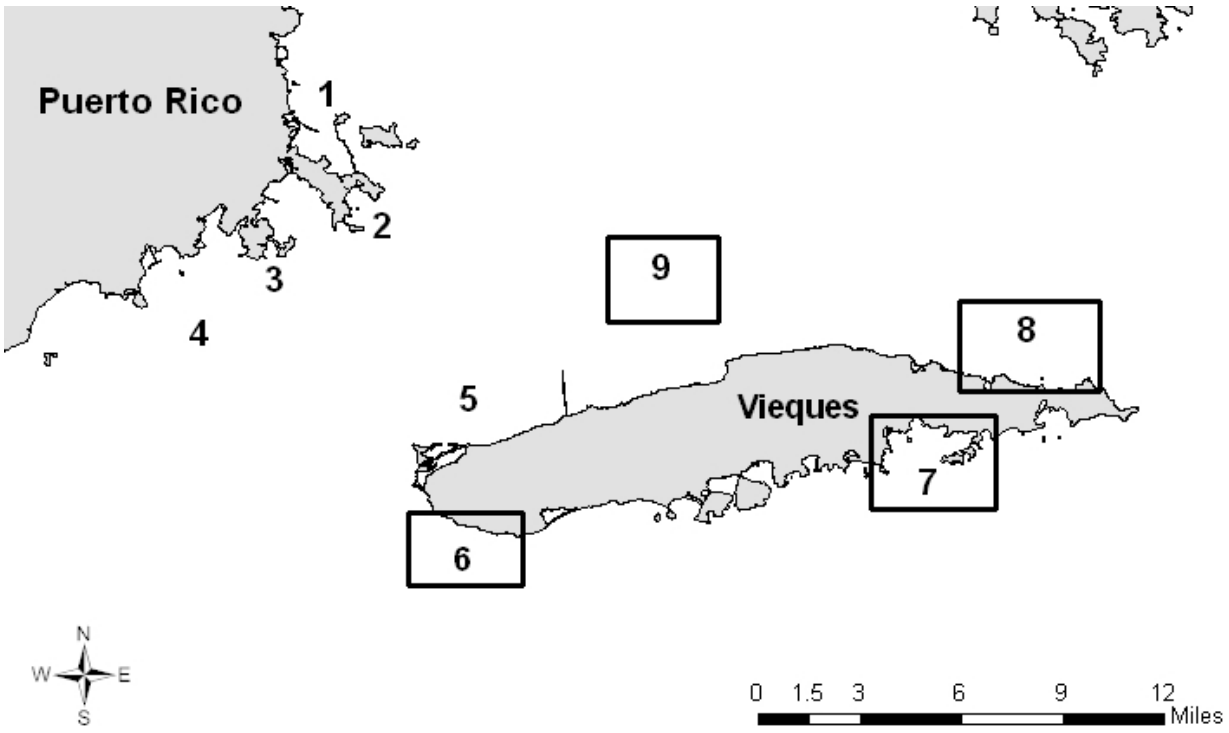


Figure 2. General map of the location of study sites at NSRR and Vieques. 1) Seagrass disturbance site at Puerto Medio Mundo, 2) Seagrass sampling sights at Ensenada Honda, NSRR 3) Seagrass disturbance site at Pelican Cove 4) Bahia Algodones 5) northwest coast of Vieques blowouts, shallow seagrass fish sampling sites and patch reefs, , 6) SW fish and hydroacoustic survey area 7) SE fish, benthic characterization and hydroacoustic survey area 8) NE fish, benthic characterization area and hydroacoustic survey area 9) NW fish and hydroacoustic survey area.

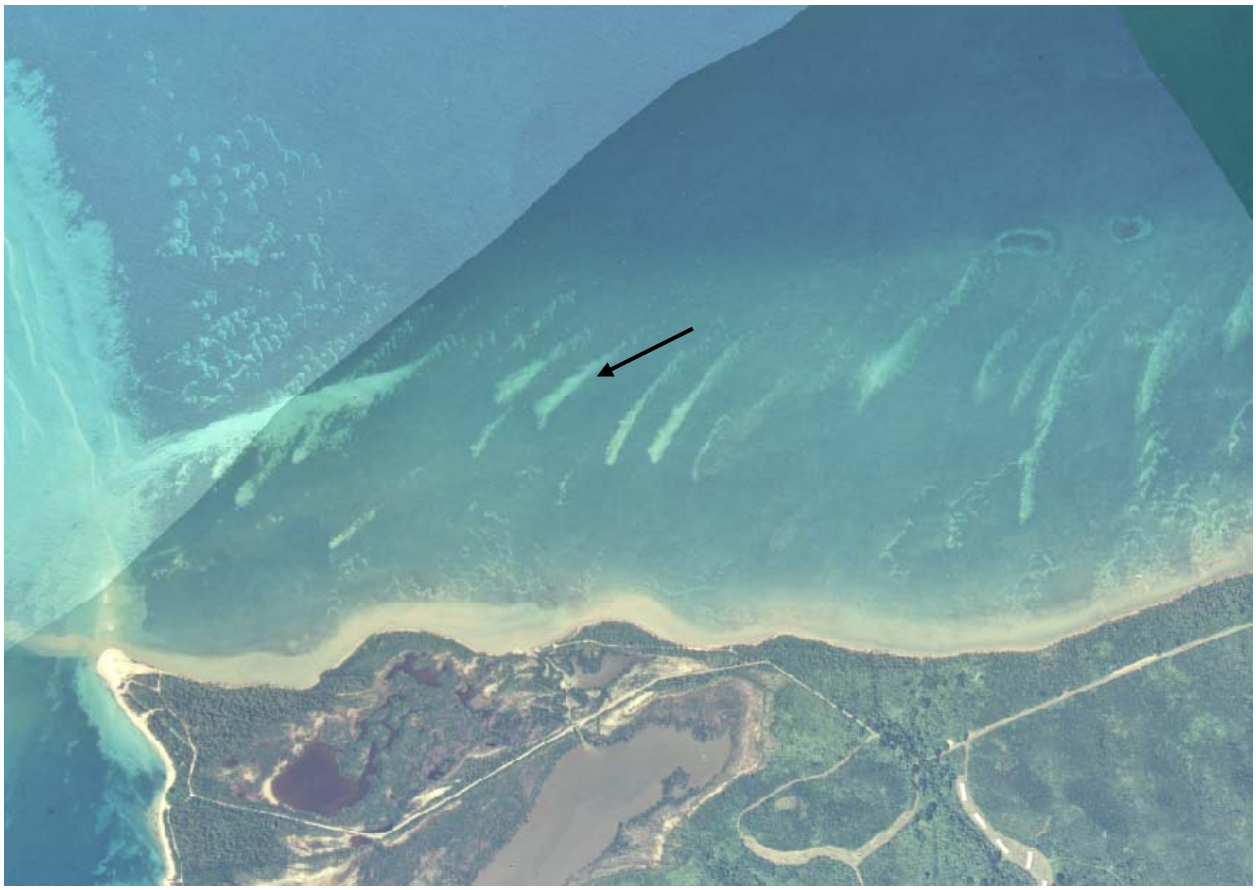


Figure 3. Aerial photograph of the northwest coast of Vieques. The shoal on the left side of the photo is Punta Arenas and the variable shaped light colored features scattered throughout the seagrass bed are the disturbances we will be sampling. Also visible in the upper right hand corner of the photo are the two patch reefs to be sampled.

APPENDIX I

TIDES AND WATER LEVELS

(No Tides and Water Levels Report Available)

APPENDIX II

SUPPLEMENTAL SURVEY RECORDS AND CORRESPONDENCE

(No supplemental Correspondence)

APPENDIX III SURVEY

FEATURES REPORT

No AWOIS, DTONs, Maritime Boundaries or Wrecks

APPROVAL PAGE

W00234

Data meet or exceed current specifications as certified by the OCS survey acceptance review process. Descriptive Report and survey data except where noted are adequate to supersede prior surveys and nautical charts in the common area.

The following products will be sent to NGDC for archive

- W00234_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- W00234_GeoImage.pdf

The survey evaluation and verification has been conducted according current OCS Specifications, and the survey has been approved for dissemination and usage of updating NOAA's suite of nautical charts.

Approved: 
Digitally signed by Abigail Higgins
DN: cn=Abigail Higgins, o=NOAA, ou=Office of Coast Survey, email=abigail.higgins@noaa.gov, c=US
Date: 2012.09.29 14:33:48 -04'00'

LT Abigail Higgins
Chief, Atlantic Hydrographic Branch