



Our Journey Begins

On the Trail of the Northern Atlantic Right Whale

The New England Aquarium and NOAA Fisheries has enlisted the help of NOAA's National Marine Sanctuaries to initiate a research tagging program that gives biologists a rare opportunity to study the nation's most endangered large whale species, the North Atlantic right whale. Several thousand right whales once existed in the North Atlantic Ocean, but years of commercial hunting at the turn of the century severely depleted the stocks. Today the right whale is threatened by ship strikes, fishing nets, and habitat loss. Current estimates indicate that fewer than 350 remain in the North Atlantic Ocean.

This scientific cruise, launched on January 6 from Fernandina Beach, Florida, joins:

- New England Aquarium,
- NOAA's Fisheries Service, Office of Protected Resources,
- Gray's Reef National Marine Sanctuary,
- Georgia Department of Natural Resources,
- and the Florida Department of Environmental Protection

The collaborative effort will use very high frequency (VHF) radio technology to observe and document the behavior of right whale cows and calves in their winter range, the coastal waters of the southeast U.S. When weather permits, researchers will be monitoring tagged whales 24 hours a day for the next six weeks. A [mission log](#) and photographs will be available on the cruise home page at this Web site.

In earlier tagging cruises in 1995-1998, NEA attached satellite linked tags to six right whale cows to better understand their vulnerability during the calving seasons. Scientists obtained daily

movement data for a period of 10-31 days and migratory movements from two of these tags that transmitted locations for 53 and 102 days. These tracks suggest a constant rate of movement during migration, perhaps making the whales less vulnerable to vessel strikes than during their winter residence in the southeast.

Although much was learned from the satellite-monitored tags, New England Aquarium and NOAA scientists hope that the 1999 cruise will allow them to track mothers and calves over the course of several weeks. They hope to learn about right whale behavior, such as dive times and surface resting periods, in the calving grounds, and record behavioral changes and reactions when the pair comes close to large vessel traffic.

The information collected from these efforts will provide the qualitative basis for determining when calving right whales are vulnerable to ship strikes, how whales react to passing vessels, and profiles of their daytime versus nighttime behaviors. Researchers can then use the data to advise the shipping industry on how minimize the likelihood of collisions.

Partner Web Pages (will open as separate pages)

- [The New England Aquarium](#)
- [NOAA's National Marine Fisheries Service, Southeast Fisheries Science Center \(SEFSC\)](#)
- [Gray's Reef National Marine Sanctuary](#)
- [The Georgia Department of Natural Resources](#)
- [The Florida Department of Environmental Protection](#)
- [U.S. Navy, Office of Naval Research](#)

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Revised by [NOS Web Team](#) on: 2000/12/18:15:04:38

URL: <http://www.rightwhale.noaa.gov/>



About the Trip

The 1999 Cruise

During this cruise, researchers plan to coordinate their tagging efforts with the Early Warning System (EWS) aerial survey, which can help find whales for tagging and relocate them using a receiver in the plane. The Florida Department of Environmental Protection (DEP) and the Georgia Department of Natural Resources (DNR) are also helping with the sightings. They will conduct aerial surveys along the Florida coast during the course of the cruise.



Once researchers locate the whales in the high-density areas of the calving grounds, they will use tagging equipment to attach a VHF radio transmitter. The tracking vessel will maintain a distance of at least a mile from the whales at night and during times of reduced visibility to prevent affecting the pair's behavior.

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Tagging right whale cows

New England Aquarium researchers plan to identify cows for tagging by the close association of a small calf or by positive identification from the right whale catalog. Photographs of individual right whales will allow researchers to collect data on the whale's age, sex, and reproductive status.

Team members will record the response of each whale to tagging. Based on observations of comparable disturbances while obtaining biopsy samples not anticipate any long-term behavioral impacts on the whales, based upon observations of comparable disturbances while obtaining biopsy samples and previous tagging efforts. In

addition, no whale will be tagged more than once.

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Team efforts in tracking

The crew aboard the **Jane Yarn** plans to track the tagged whales. The vessel will carry a tracking team of five people, in addition to the crew of the **Yarn**. It is capable of staying offshore for a minimum of three to four days between docking.

If sea conditions allow, tracking will be done continuously for at least seventy-two hours after tagging. Researchers will depend on air support from the [EWS](#) team, with help from the Florida DEP and Georgia DNR, to help relocate whales after bad weather. Once the whale has been found, shipboard tracking efforts will resume, maintaining round-the-clock radio contact.

After tagging, the team will document every surfacing, dive intervals, breathing rates, and behavior of the mother and calf at the surface. Researchers will compare radio and visual observations during the day with radio observations at night to determine patterns of diurnal behavior.

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Questions answered

Collecting detailed information on the 1999 cruise will enable researchers to determine if certain temporal or spatial behaviors can be associated with increased vulnerability to vessel strikes. For example, do calves tend to nurse more at certain times than others? Do mothers sleep at the surface at certain times? Are these behavioral traits associated with water depth or other oceanographic features that increase vulnerability to ship strikes?

Location data collected from tagged animals will be plotted on a GIS mapping system. These plots will contain information on water depth and human activity. Aerial surveys in the region and records from the tracking vessel will provide data on military and commercial shipping as well as on fishing and small-vessel activity. Plotting the location of ship channels and dredge transit zones will allow for analysis of whale distribution and movement patterns in association with those fixed features.

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PEOPLE ON BOARD

The 1999 radio tagging of Northern right whales brings together a team of scientists from NOAA Fisheries, the New England Aquarium, and the Gray's Reef National Marine Sanctuary. Joining them will be members of the NOAA Corps.



Reed Bohne, Gray's Reef
Joe Contillo, NOAA Fisheries
Bruce Cowden, Gray's Reef
John Erickson, NOAA Corps
Michele Finn, NOAA Corps
Peter Fischell, NOAA Fisheries
Jack Javitch, NOAA Fisheries
Amy Knowlton, New England Aquarium
Stephanie Martin, New England Aquarium
Tony Martinez, NOAA Fisheries
Ralph Rogers, Gray's Reef
Joe Roman, New England Aquarium
Becky Shortland, Gray's Reef
Chris Slay, New England Aquarium
Steve Swartz NOAA Fisheries
Jim Tobias, NOAA Fisheries

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About the Whale

Several thousand right whales (*Eubalaena glacialis*) once lived in the North Atlantic Ocean. But years of commercial hunting at the turn of the century severely depleted the stocks. Whalers considered the animals the *right* whale to hunt because they were slow moving, migrated close to shore, and stayed afloat after being killed.



Today, despite more than sixty years of protection, the North Atlantic right whale has not recovered. Scientists suspect that recovery has failed for a variety of factors, including the effects of human activity. There are only about 300 right whales left in the North Atlantic, and ship strikes account for approximately 50 percent of their known deaths.

The right whale is a robust, medium-size baleen whale. Adults are usually 45 to 55 feet long. Distinctive features are a black body with no dorsal fin and a large head with a narrow upper jaw and a strongly bowed lower jaw. Age at sexual maturity is five to nine years, with females giving birth to a calf every three to five years. Calving occurs during the winter months along the southeast coast of the U.S. Calves nurse for at least nine months.

Today, more than a half century after it was first given protection, the North Atlantic right whale remains one of the most endangered whales in the world. However, the small population has allowed researchers to individually identify most whales and keep a catalog of photographs and sighting histories at the New England Aquarium. NOAA and aquarium researchers will use the right whale catalog to identify whales in the study.

Critical Habitats

Calving right whales usually winter in the waters between

Savannah, Georgia, and West Palm Beach, Florida, with an area of high density mainly between Brunswick, Georgia, and St. Augustine, Florida. Unfortunately for the whales, many commercial and military vessels use this area; three major ship channels, serving three commercial ports and two military bases, transect the high-density calving grounds. The traffic in this critical habitat has increased substantially over the past forty years.

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Southeast Early Warning System Consortium

The New England Aquarium has been flying aerial surveys in support of the Southeast Early Warning System Program since 1994. These surveys are designed to locate right whales on their winter range and are supported by the U.S. Navy, the U.S. Coast Guard, the Army Corps of Engineers, NOAA Fisheries, NOAA's National Marine Sanctuaries, the Georgia Department of Natural Resources, the Florida Department of Environmental Protection, and a network of volunteers.

The surveys have shown that right whales are concentrated in and near the major shipping channels in waters between Brunswick, Georgia, and St. Augustine, Florida. The survival of right whale mothers and calves can be impacted by frequent coastal shipping and other vessel traffic.

Slow moving in general, right whales are especially slow when accompanied by calves. With only the flat of their back visible at the surface, they are difficult to detect from large, fast moving vessels. Today, collisions with ships kill more right whales than any other documented cause of death.

To mediate this threat, aerial surveys were established in 1994. The surveys are flown daily, weather permitting, from December through March. Pilots cover more than a thousand square miles of ocean, including shipping channels, in a grid pattern 750 feet above the water. Aboard each plane are two observers, a data recorder, and a pilot.

Surveys gather information on right whales, other marine species such as dolphins, sea turtles, sharks, and rays, as well as vessel traffic. Additional surveys to the north, south, and east of the right whale high-use area are conducted by the Georgia Department of Natural Resources and the Florida Department of Environmental

Protection, helping to broaden the area of the Early Warning System.

More information about the many aerial surveys completed by the Aquarium's Early Warning System can be found at <http://whale.wheelock.edu/whalenet-stuff/reports/> ([top](#))

Aerial Survey Report - 12/29/98 through 1/4/99

After being grounded due to inclement weather most of the last week in December, the Early Warning System program was finally able to operate a full survey on the 31st. Our patience was rewarded with a sighting of two adults at the southern most point of our survey area, approximately 5 miles off Jacksonville Beach. The pair was sighted at 1453 hours local time. One animal appeared to be a full grown adult while the other was slightly smaller and may have been a juvenile. There was considerable surface activity and body contact. The smaller animal breached several times, was lobtailing, and generally raising hell. A great first sighting and well worth the wait. The wind and seas increased in the days that followed, giving us less than favorable survey conditions. Although we flew over moderate seas on Jan. 1st, conditions changed for the 2nd through the 4th with wind speeds commonly 15+ knots. Overall this week, we saw 444 bottlenose dolphins, 136 loggerhead turtles, 7 leatherback turtles, 2 kemp ridleys, approx. 30 cownose rays and 15 mola mola.

Still waiting for the moms....

Team Right Whale

Chris, Alicia, Mike, Reb, Jesse, Sean

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Aerial Survey Report - 01/05/99 thru 01/14/99

This update covers the past ten days rather than the usual seven. We're running a little behind as we gear up for a radio-tracking

project designed to help us better understand a day (or more) in the life of a right whale cow and calf. Attaching a thumbsized radio transmitter to a mom will allow us to track her for several days, maybe weeks, during her stay in the calving ground. We'd like to know more about the behavior of these animals, especially what traits make them so vulnerable to ships. For example, do calves tend to nurse more at certain times than others? Do mothers sleep at the surface during the day or at night? How fast do they swim and do they move more during day or night? Are there behavioral traits associated with water depth or other oceanographic features which increase the vulnerability of these animals to ship strike? Exactly what percentage of time do they spend at the surface, visible to aerial survey teams? This information will help policy makers develop management strategies to better protect the whales and their habitats.

But there's a hang. No whales. Actually, there is at least one mother/calf pair in the area and three or four other individuals that may include a mother-to-be. But that's about it. Unfortunately it's not too difficult to recount the season to date. There have only been 11 confirmed sightings by aerial survey teams since the first of December. Four of these were sightings of what's probably the same mother and calf. The Offshore Survey (OSS) sighted them off Savannah on New Year's eve and a week later (01/07) they found them a few miles off the south end of Amelia Island. The EWS picked her up on 01/09 off Little Cumberland Island and three days later (01/12) off Brunswick. We had good sea states (< beaufort 3) 01/06, 07, 08, 09, 12, 13, 14. That's 7 nice days out of 10, in early January, normally the peak of the season. Planes were offshore, inshore, up the coast, down the coast and all we got was a mother/calf pair and three other whales (hopefully expecting). There were only 8 sightings from all surveys-- EWS, OSS, FLDEP, GADNR, CSA-- Savannah to Cocoa Beach and 40 miles offshore. During the past 5 years the EWS effort alone has averaged 15 sightings during this 10 day period. This year we've had 4.

Word from the west coast is that the gray whales moved out of Alaska late this year. Hopefully that's what's happening here and everything's a little late because of the slow drop in water temps this season. Perhaps it's been a bad couple of years for foraging right whales--reproductive fitness has been compromised? Could be a lot of things. For now, we'll assume they're late. Maybe next

week?

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Why We Are Undertaking This Mission

Over the next month our team of scientists from NEA and NMFS will provide dispatches from the NOAA Research Vessel **Jane Yarn** as we cruise the east coast of Georgia and Florida to track a Northern Right Whale and her calf. This is an important scientific cruise as we try to observe and document the behavior and movements of the right whale mother-calf pair. Ship collisions kill more right whales than any other documented causes of mortality. Researchers hope that information collected from their efforts will provide the qualitative basis for determining when calving right whales are vulnerable to ship strikes, how ships are detected and how whales react to passing vessels, and

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profiles of their day versus nighttime behaviors. Researchers can then use the data as the basis for providing advice and guidance to the shipping industry to minimize the likelihood of ship and whale collisions.

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JANUARY 8, 1999

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While the antenna equipment is being installed, I have travelled out to the local airport to rendezvous with the Air Wing of the program, known as the [Early Warning System](#). The Aquarium has contracted with Environmental Aviation Services to fly observers along the southeast coast from Brunswick, Georgia

to Cape



Mike Frick

Canaveral to locate right whales and their calves. Mike Frick, sea turtle and whale expert from Savannah, Georgia, has just returned from the morning flight. Mike has worked with us on



Environmental Aviation Services

our loggerhead sea turtle program at Gray's Reef Sanctuary tracking turtles with satellite transmitters. Mike invites me to join the afternoon flight which will survey from mid-Cumberland Island Georgia, to Little St. Simons Island, Georgia, back and forth running east and west to 15 miles offshore.



Cessna

Our craft is the venerable Cessna 02A, a twin engine fore and aft, four seater. It is painted black and sports the US Air Force insignia in red on the tail. The plane was built in 1967 for the Air Force and was used in the Vietnam War as a nighttime surveillance plane along the Ho Chi Min trail.

The attachment hardware for the rocket pods is still mounted to the underside of the wings. We rev up and fly north to Cumberland Island to begin our aerial transects. We're cruising at 90 knots and at an altitude of 750 feet. In addition to any whales we may encounter, the observers record sightings of Bottlenose



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dolphins, sea turtles, large pelagic fish such as the mola mola or ocean sunfish, and vessel traffic, predominantly shrimp boats.

Shrimp boat

It takes time to recognize accurately the critters passing below. I spotted a small speck below which Mike reported was a juvenile loggerhead turtle. It was at the scale of a grain of sugar on a dinner plate. Observers are to look out below the plane and out to a distance of about 1.5 miles. When and if we spot a right whale, the pilot will circle to allow the observers a good angle for a telephoto picture. With a good close-up photo the individual whale may be recognized by the pattern of calosities on its head. Unfortunately, that afternoon we did not encounter any whales, but we did spot a number of loggerhead turtles and dolphins. One of the turtles in the area is one we captured at Gray's Reef this summer.



Submarine tugboat

Called Humpty Dumpty we know it is in the area from the satellite transmitter signals that put its position off north Florida. (The trail of Humpty Dumpty is charted on the [Gray's Reef Web site](#).) On our return to Amelia, we pass by the Kings Bay Naval Submarine Base and spot one of the special tugs that guide the subs in and out of the harbor.

These tugs use special propulsions systems amidships to avoid interference with the submarine. The next report will cover the whale tagging effort.

Reed Bohne, Sanctuary Manager

NOAA's Gray's Reef National Marine Sanctuary, Georgia

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The staging area for our cruise is Fernandina Beach, Florida. The New England Aquarium leases out a couple condominiums at the beach for their scientists taking part in the right-whale winter observations. Today we will complete the journey down the Georgia coast to meet the scientific party from the aquarium and NOAA's Fisheries Service.



Bruce Cowden

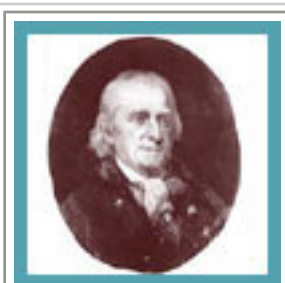
We set out from St. Catherine's Sound at 8 A.M. Yesterday's front has passed and we have calm seas, so we have decided to leave the Intracoastal Waterway and steam out into the Atlantic for the morning's trip to Fernandina.

From Gray's Reef, Bruce, Ralph, and I will run the first week of the cruise. Becky Shortland has also joined us for the trip to Fernandina, to serve as an observer. Right now she's on the flying bridge, keeping watch for any right whales that may be in our path. Since ship strikes are the chief cause of mortality for the whales, extra care must be taken when cruising these waters in winter.

We are following the same route to Amelia as that traversed by the early colonial naturalist and explorer William Bartram in 1774.

Bartram travelled extensively through Georgia and Florida and published the record of his journeys in his book *Travels*. Bartram's account of the new world was a bestseller in Europe and later in the United States. It was described as a "wonderous kind of floundering eloquence" by Carlyle to

Emerson and is credited for inspiring the poets Wordsworth and Coleridge. Here Bartram in full flourish describes the view of the ocean from St. Simon's Island GA. " But yet how awfully great and sublime is the majestic scene eastward! the solemn sound of the beating surf strikes our ears; the dashing of yon liquid mountains, like mighty giants, in vain assail the skies; they are



William Bartram

beaten back, and fall prostrate upon the shores of the trembling island."

As Bartram passes by boat along the Georgia coast to Amelia he remarks " The vessel in which I was to embark for east Florida being now ready to pursue her voyage, we set sail (from the island of St. Simon) with a fair wind and tide. Our course was south, through the sound betwixt a chain of sea-coral islands and the main. In the evening we came to the south end of St. Simon's, having been hindered by the flood tide making against us. Next morning early, we got underway, running by Jekyl and Cumberland islands, large, beautiful and fertile, and consequently excellent for deer, bears and other game."

"It may be a subject worthy of some inquiry, why those fine islands of Georgia, are so thinly inhabited; though perhaps Amelia may in some degree plead exemption, as it is a very fertile island, on the north border of East Florida, and at the Capes of St. Mary, the finest harbor in this new colony".



Historical marker to Bartram

We have arrived into this fine harbor tying up at the Fernandina City harbor on Amelia Island. The entrance to the marina is graced by an historical marker to Bartram, recounting his visit here and celebration of the natural environment. Our tasks at the harbor are less prosaic. We must finish installing the toilet below decks and prepare the vessel for installation of the antenna array which will be used to track the whales.

Reed Bohne, Sanctuary Manager
NOAA's Gray's Reef National Marine Sanctuary, Georgia
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JANUARY 5, 1999

CRUISE LOG



R/V Jane Yarn

Over the next 45 days our team of scientists from the New England Aquarium and NOAA Fisheries will provide dispatches from the **Jane Yarn** as we cruise the east coast of Georgia and Florida to track the northern right whale.

During this scientific cruise, we will document the behavior and movements of a right whale mother and calf. Since ship collisions kill more right whales than any other known causes of mortality, we hope the behavioral information will be used to develop recommendations for ship-traffic protocols within critical habitats to minimize the likelihood of collision.

At 2 P.M., we cast off lines from the dock and started motoring south. The new year blows in over Georgia with a fury, but we caught only the mild edges of a storm that had frozen out and socked in the Midwest and Northeast over the holidays. We cruised south on the Intracoastal Waterway from our dock at the Skidaway Institute of Oceanography on Skidaway Island, Georgia, with the sky beautiful and clear, and the sun roasting the golden colors of the salt marshes. Captain Bruce Cowden and crew were glad to be underway and away from the manic preparations that always precede a long cruise.

Our slow lumbering ship, vintage 1953, is the perfect carrier to track a mother and calf pair, and the flying bridge constructed by Bruce Cowden will make visual observations much easier. We expect the mother whale will be about fifty feet long and weigh forty to fifty tons. Our ship is sixty-five feet long and weighs in at around ninety tons. We only hope mother and calf don't outrun us.

Our vessel carries the name of an extraordinary woman; Jane Yarn was instrumental in establishing Gray's Reef as a national marine sanctuary and protecting Georgia's magnificent barrier islands. We passed by many of these islands on our trip south: Wassaw, Ossabaw, Sapelo, St. Catherine's and Cumberland.

Today we traveled to St. Catherine's Sound, where we anchored up for the night just north of Sapelo Island. The sun set at 5:45 P.M., ringing the western marshes and hammocks in deep orange and red. We celebrated our first day's run with a spaghetti dinner.

Reed Bohne, Sanctuary Manager
NOAA's Gray's Reef National Marine Sanctuary, Georgia
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Voyage of the Green Noodle

Technology and nature have conspired against us these past few days. On our first test of the transmitter and receiving unit for the tracking system, we have discovered that the ship's generators create an electronic disturbance that interferes with reception of the transmitter's signal. The scientific team has been working aggressively with technical consultants to remedy the situation.



Green dive noodle

Part of the solution involved creating a tin tent over the generator in the engine room to shield the receiving unit from the electronic shower it's emitting. It looks a little like something out of the Wizard of Oz but it has improved the situation. Today we ran a test trial on the tracking system out in the sound, setting the small dart-like transmitter adrift on the green dive noodle we use for SCUBA operations. When we dive, the noodle float is attached to a line and the diver trails it behind him so that the surface vessel can follow the diver's path. Today we attached the transmitter to it with high-tech scientific supplies of duct tape and an empty plastic milk jug.

The lone noodle drifted away and we steamed ahead to determine if the receiving antenna on the **Jane Yarn** would be able to detect the bearing of the noodle from the ship. When the transmitter is attached to the whale it will tell us the direction of the whale relative to the ship. This is especially important at night when we need to keep the whale in range without having the daytime observers to guide us. The test went well this morning, and we continued to receive a strong signal over two miles away. We turned and drove back to the transmitting noodle using the directional receiver to guide us and plucked it back out of the soup and back on board.



Milk jug with duct tape

As the technical bugs are removed, we are still faced with the disappointment of not spotting whales in the area.



Yesterday the spotter planes located a mother calf pair off Brunswick, Georgia, about 30 miles north of us. Unfortunately, today we were unable to relocate the pair and therefore the tagging team remained ashore. We have a new member of the vessel crew aboard with us now. LT. Michele Finn of the NOAA Corps has joined the project to assist in ship handling with Bruce Cowden and Ralph Rogers. Michele is a pilot for NOAA, flying aircraft out of the Tampa FL, area for scientific studies. She has assisted on other Gray's Reef diving projects and we're glad to see her back with us.

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Saltier than thou

Tonight we hosted the science team for dinner aboard the **Jane Yarn**. Captain Bruce Cowden fired up the oven with two garlic roasted chickens and we believe the scent hypnotized the science team topside. They came floating below decks to the galley like cartoon characters hooked by the aroma. Whenever oceanographic parties meet aboard for the first time invariably the stories turn to sea tales with a "can you top this?" undercurrent. Tonight was no exception.

Reed Bohne, Sanctuary Manager
NOAA's Gray's Reef National Marine Sanctuary, Georgia

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JANUARY 11, 1999

CRUISE LOG

The Plot Thickens

We had our pre-cruise planning meeting with NMFS and NEA scientists aboard the **Jane Yarn**. The team reports that a mother-calf pair has been reported in the area, and we hope to tag the mother. However, today they have only counted three right whales in the area. Last year at this time, they counted 22 and it was the lowest on record for right whales sightings in this area. Scientists caution that our mission is a highly speculative venture with many possibilities of not meeting our objectives. This type of in-depth mother and calf right whale observation has never been accomplished for the right whale off the southeast coast. In the past, the longest observations they have made is 20-30 minutes from small boats and on occasion 2-3 hours from a blimp. There is excitement about the possibilities of discovery for this most endangered whale. It is tempered, however, with the recognition of the difficulty of the task, and concern about the very low numbers of whales in the area at this time.

Reed Bohne, Sanctuary Manager
NOAA's Gray's Reef National Marine Sanctuary, Georgia

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Over the next month our team of scientists from NEA and NMFS will provide dispatches from the NOAA Research Vessel **Jane Yarn** as we cruise the east coast of Georgia and Florida to track a Northern Right Whale and her calf. This is an important scientific cruise as we try to observe and document the behavior and movements of the right whale mother-calf pair. Ship collisions kill more right whales than any other documented causes of mortality. Researchers hope that information collected from their efforts will provide the qualitative basis for determining when calving right whales are vulnerable to ship strikes, how ships are detected and how whales react to passing vessels, and

Cruise
Log

January 21

January 20

January 19

profiles of their day versus nighttime behaviors. Researchers can then use the data as the basis for providing advice and guidance to the shipping industry to minimize the likelihood of ship and whale collisions.

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JANUARY 21, 1999

CRUISE LOG

Bruce Cowden reports: "We're just off St. Simon's now, 18 miles due south of the reef. For the observers, it's unbelievable; they're tickled. They're getting some incredible data, with uninterrupted tracking of the whales for more than 24 hours. It's flat and calm today. The whales will come up, play around, hang out. Luck is finally with us."

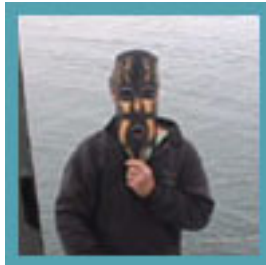
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Bruce Cowden and African mask

"We've been asking *Chief Boatrungood*, our carved African totem mounted in the wheelhouse, to favor us. We rub his forehead for good weather, his nose for good sailing, and his chin for whales. He came through."

"We'll be heading in tomorrow afternoon. A front is moving in, and we're out of water and coffee and lots of little things. There's lots of shopping to do for our next trip."

Reed Bohne, Sanctuary Manager
 NOAA's Gray's Reef National Marine Sanctuary, Georgia
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JANUARY 20, 1999

CRUISE LOG



Leatherback turtle
Photo credit: Scott A. Eckert, PhD

Bruce Cowden reported at 10 A.M.: "An offshore survey plane just found a mother and calf, 30 miles off Fernandina Beach. We're about 22 miles away from it. Chris Slay is on his way out in his Zodiac to tag the whale. Seas are like glass out here today, and we've seen another three leatherbacks."

3:20 P.M.: "Chris is on the radio right now; he just tagged the whale! We're re-rigging the antenna on the **Jane Yarn**. We'll slow down and ease into the area and start following the whale. We're about six miles away. Just wanted to give you a heads up on this. The work is beginning."

Reed Bohne, Sanctuary Manager
NOAA's Gray's Reef National Marine Sanctuary, Georgia



JANUARY 19, 1999

CRUISE LOG

The **Jane Yarn** departed Fernandina Harbor at 7:30 A.M.. The science team has decided that although no mother-calf pairs have been sighted they will put to sea and help the survey planes in their search for right whales. I've returned to Savannah but will continue to receive dispatches from the ship via cell phone from Bruce Cowden of NOAA's Gray's Reef Sanctuary.

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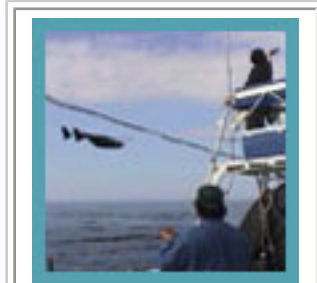
Aerial Surveys



Leatherback turtle
Photo credit: Scott A. Eckert, PhD

Bruce reports in: "We haven't had any whale sightings, but one time I thought we did. It came up right close to us, but it turned out to be a large leatherback turtle. I would say this thing was six to seven feet long; it was huge, black, and shiny. It would bob up and then go down, and it wasn't until we got right up on it that we knew it was a leatherback. It's the biggest one I've ever seen. It was gigantic.

"It's real nice out here today, flat and calm. We're running between nine and ten knots. We're in communication with the survey planes.



Spotter plane

Tonight we'll drop the hook. We'll jump up in the morning and pick up lines again, start heading back up north, and see if we can't find the elusive northern right whales, who don't seem to want to be found. That's all for today, it was nice to get away from the dock and underway."

Reed Bohne, Sanctuary Manager
NOAA's Gray's Reef National Marine Sanctuary, Georgia
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Over the next four weeks, members of the scientific team will be sending dispatches to NOAA headquarters describing their adventures, accomplishments, and tribulations. Along with the record of the voyage, this Web page will contain right whale photographs and information about their behaviors, the technology used on the cruise, and selected profiles of the many scientists and staff members contributing to the cruise. Reed Bohne, manager of the NOAA's Gray's Reef National Marine Sanctuary, serves as author, editor, and coordinator of these dispatches.

Three types of dispatches will be sent. The first, a daily log, is accessed through the dated page links on the right. Background pieces, such as "Aerial Surveys," are accessed through the page links on the left. And finally, every week or two, the team will provide a brief summary of events. These will be added to this column.

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January 29

January 28

January 27

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January 25

profiles of their day versus nighttime behaviors. Researchers can then use the data as the basis for providing advice and guidance to the shipping industry to minimize the likelihood of ship and whale collisions.

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JANUARY 25-29, 1999

CRUISE LOG

It isn't often that we get four straight days of good weather off the Florida coast during the winter field season. So nothing was taken for granted during our last week tracking when the longed-for "light and variable" winds moved into the area. From January 25 to 29, we followed #1612 and her calf, through a heavy chop and into calm seas, for more than ninety-five uninterrupted hours.

Right whale #1612 was first identified in 1986 with a calf in the waters off Cape Cod. Most females bearing young in the southeast U.S. migrate to Massachusetts Bay or the Great South Channel in the spring and then move on to the Bay of Fundy in summer. Though this female has followed the migratory pattern from the southeast U.S. to Massachusetts, she has never been seen in the Bay of Fundy. We refer to such whales as offshore mothers, since they appear to go to unknown nurseries outside the near-coastal areas we usually survey.

Her calves have been closely monitored since birth. Born in 1986, #1613 is a male who has been sighted in the southeast, Massachusetts Bay, and the Bay of Fundy; he was last seen in 1996. Born in 1992, #2212 is also a male and has been sighted in Massachusetts Bay and the Bay of Fundy; he was last seen in 1995. We're happy to see that another calf can be added to #1612's brood this year.

Even though we were fogged in for all of January 27, the antenna system hooked up to the wheelhouse on the Jane Yarn allowed us to keep up with the mother-calf pair, noting the mother's swimming pattern and how much time she spent at the surface in different sea states, weather conditions, and times of day. The mother and calf were traveling a lot during this time. The mother's signal would disappear for up to fifteen minutes, and when she resurfaced the signal could barely be heard, making her difficult to track at times. But we'd slowly move our boat in the direction of the signal, sometimes getting just two or three chirps, and then wait for her next surfacing. If her signal was still faint, one of us would seek out her signal with a large directional antenna mounted on the flying bridge atop the bow. We never lost our whales, but



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the gathering of data in the dark and fog-- especially when the sea kicked up, making sleep impossible and researchers irritable--got old.

After thirty-six hours of no visibility and the same old song-- the piercing "chirp, chirp, chirp," like the drip from a faucet on an upturned pan-- the entire crew was very glad to see the sun rise over an unclouded horizon on January 28. With good visibility and a flat sea, we were able to begin correlating the radio-signal data we had been collecting for the previous two days with the whales' behavior. We noticed that even when we weren't getting a signal from the mother, the calf was often at the surface, lifting its dark head above water or taking a few breaths. It was clear just how vulnerable this calf is, spending so much time with its head above the surface or hoisting its flukes in the air. In centuries past, whalers would rely on calves to help them locate the adult females. An active newborn can be spotted even in a rough sea, giving both mother and calf away. Once approached, both animals would be killed for their baleen and oil.

Though whalers are no longer a threat off Florida, large warships and merchant vessels, some traveling more than 20 knots, pose a risk to the whales. Whenever we see a ship within five miles of our boat, the captain of the Yarn gives a radio call to the approaching vessel, with a report that endangered whales are in the area. The crews of military and commercial vessels have been cooperative and careful to avoid crossing paths with the whales.

On January 29, we completed four days of tracking. The whales had taken us into the warm edges of the Gulf Stream, and their pace had slowed. We were in water over 24 degrees centigrade. As we drifted near the resting pair, translucent Portuguese man-of-wars floated along the bow, a few spotted dolphins crossed our stern, and a large barnacle-encrusted loggerhead turtle surfaced off to starboard. We enjoyed the final hours of this cruise--watching the calf slap its tail in the water and drape itself over the mother's head. It was clear that the forty-five foot mom was this calf's entire world. But for us--after four days at sea and with a large storm drifting east over northern Florida--a long hot shower and a good meal ashore seemed in order. We left the becalmed pair in midafternoon about twenty-five miles east of Saint Augustine, Florida.

With the storm now past, our mission is to relocate the pair with our Cessna tracking plane, so the Jane Yarn can head offshore for another expedition. Whether the whales will turn up farther offshore, down south, or back up north is anybody's guess.

Joe Roman and Amy Knowlton
New England Aquarium

The Fat Lady Sings

The Jane Yarn came in on the heels of a fierce northeaster which grounded our aerial reconnaissance for three days and took thousands of cubic yards of sand from our beach. For two days the sky shifted in heavy greys while the sea remained implacable and black. Seven foot waves pounded away at the edge of the continent while offshore the violent interface between air and water must have challenged the calf. Maybe it's learning a thing or two about the stability found at depth, about holding its breath.

As the front cleared out on 02/02/99, pilot Jim White and I bolted the yagi antennas to the wing struts of the Cessna 182 and headed down the beach, about 10 miles off, at 3000 feet. The wing-mounted contraptions look like TV antennas (for those who remember) and can pick up a signal from the transmitter at 20 nautical miles (NM), sometimes 30. The sea was still somewhat shredded and none of the survey planes were up. We flew past Cape Canaveral, leaving the launching pads over our right shoulders then turned offshore and headed north, 20 NM out, antennas searching 40 NM off.

Nothing. Could she be farther out? In the Gulf Stream? Is it more stable to swim into big waves? How far northeast could she have gone? For the next four days we took the yagis flying. Up the coast as far as Charleston and down to Cocoa Beach. Ranging offshore in the 182, further than I want to admit, back and forth, listening for a signal in the crackling headphones. A week earlier, Jane Yarn's scientists found the piercing chirp of the transmitter as annoying as a faucet dripping in a quiet house. Now, going a little stir crazy, they eagerly volunteered for the fatiguing flights. We also outfitted the Offshore Survey team with tracking gear loaned

by the FL-DEP. They were kind enough to monitor their thousand square miles of ocean. For five days our antennas swept the area between Brunswick and St. Augustine, out to 60 NM, while making forays far to the north and south. Still nothing. A helicopter crew conducting maintenance on navigation/meteorological towers off Savannah reported a right whale mother and calf about 20 NM off Ossabaw Island on Friday afternoon. We flew the area Friday and Saturday (02/05, 02/06). No signal.

Another mother was reported off St. Augustine on Sunday by the CSA Survey team. The Offshore team flew in to see if she could be our mom. No signal. Laura Morse, of the Offshore team, ID'd her as a new mom for the year. So we have three calves for 1999. That news more than offset our disappointment that #1612 had vamoosed, or lost her tag, or both.

Fortunately, the Savannah-based chopper crew videotaped the whales they'd seen on 02/05. The Gray's Reef folks obtained a copy for us and the whale on the video appears to be #1612, without her tag. That'd put her about 100 NM north/northeast of where we left her a week ago-- looks like she's headed home. So we'll settle into the process of analyzing 136 hours of tracking data; otherwise... standing by in Fernandina, Florida.

Chris Slay
New England Aquarium
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JANUARY 29, 1999

CRUISE LOG



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Right whale flipper and back

At noon, the **Jane Yarn** and her crew were nearly in the same position that they reported from yesterday. The mother-calf pair they've been observing all week long have stayed nearly in the same place for the last 24 hours. According to Ralph Rogers, "The whale has settled down. She isn't in the travel mode anymore, so we are drifting along with her. We were able to get close today and got some really good observations this morning. We're going to do a little more of that this afternoon

and then head in."

The crew has now been tracking the pair for the past 93 hours. Though the crew works in shifts, sleep doesn't come easy on a small vessel, with the constant engine noise and people always in motion on the boat. So most of them are ready for a sound sleep onshore. The boat and crew head back to the dock this afternoon in anticipation of a cold front, bringing wind and waves and making it too rough for observations. John Erickson of NOAA said, "We have done well. I am not kidding; we couldn't have done better."



Crew in galley--Lt. JG Peter Fischell, John Ericson (NMS) and Jack Javech (NMF)

The observations the crew members have recorded will provide a baseline for right whale behavior. The information that the researchers have gathered over the past four days will help them determine if surface activity varies according to time of day, sea state, or water temperature. This new data can then help managers make recommendations for shipping protocol in the area.

Tony Martinez and the other observers have been watching the mother and calf interact with each other for much of the afternoon. He reported: "She will roll onto her back, wave her pecks [pectoral flippers] up in the air, and lift her head slightly out of the water. The calf circles her, swims up on her, and rubs up against her, and



Close-up with mom
and baby's pectoral
flipper

has continued that type of behavior--as opposed to steadily swimming. At this early stage of the calf's development, there is a lot of contact between mother and calf."

Those kind of observations sure makes it more apparent that there are some real similarities between the observers and the observed.

Cathy Sakas, Marine Educator

NOAA's Gray's Reef National Marine Sanctuary, Georgia

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JANUARY 28, 1999

CRUISE LOG



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Jack Javech

At 12:45 P.M., Ralph reported the location of the **Jane Yarn** as northeast of the St. Augustine Inlet off the northern Florida coast. He said that last night's fog had cleared out, and the crew were enjoying a beautiful day. Since noon, they had been drifting with #1612 and her calf. The mother has been very accommodating today, giving the scientists ample opportunity to observe her and her calf. Ralph said, "The whales are on the surface,

and everyone is in good spirits. We are over the hump of bad weather and the third day at sea, and we are way past getting on each other's nerves." Jack Javitch, a graphic artist and scientist with the National Marine Fisheries Service in Miami, added, "The crew and boat itself are very accommodating. The food is outstanding, and I am glad to be helping out on this mission."

"She's taken us south and way offshore. We're in about 95 feet of water now, maybe a hundred; whereas yesterday she was in 65 feet of water, closer inshore, and she wasn't moving as much," Ralph reported. The NOAA personnel earned their keep yesterday as they maneuvered the boat to the whales. But today she has been doing what researchers call logging, resting at the surface as the calf rubbed its head against her and swam about.



Right whale mother's back



Ralph noted that an aircraft carrier was about four miles away, but the mother whale didn't seem to take notice of the huge ship. Such large and fast ships can be a danger to these logging and nursing whales.

Cathy Sakas, Marine Educator
NOAA's Gray's Reef National Marine Sanctuary, Georgia

USS Aircraft Carrier
Kennedy

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JANUARY 27, 1999

CRUISE LOG

At 1:00 P.M., the seasoned and somewhat weary crew of the **Jane Yarn** was several miles off the St. Marys River entrance. Ralph Rogers reported, "We are just drifting right now. The whale, #1612, is on the surface, and we're just following her wherever she goes." He noted that around 4 A.M. they became fogged in, reducing visibility to less than a half mile. Although they couldn't maintain visual contact, the radio tag did its job, and the receiver chirped through the day, indicating the whereabouts of the mother and her calf. Ralph said that she moved more quickly than she had the day before. In the afternoon, she moved through the bustling area east of the Saint Johns River, entrance to the port of Jacksonville. Whale #1612 and her calf were surrounded by more than half a dozen ships, including freighters, tankers, and car carriers. Once they crossed the shipping channel, the whales picked up speed.



NEA watchers spot whales. Mom is on left, baby on right.

Amy Knowlton of the New England Aquarium provided some background information on #1612, who has not yet been given a name: "We first sighted her in 1986 with a calf. She had another calf in 1992 and was seen in Cape Cod Bay in '94 and '95. This is her first sighting with a calf since '92, so we might have missed a calf in this seven year interval. She has never been seen in the Bay of Fundy, so perhaps she is one of those offshore mothers who doesn't make it all the way up there."

Right whales use the coastal waters of Georgia and northern Florida as their calving grounds during the winter months, usually arriving in late November or early December from their feeding grounds in the Bay of Fundy off the coasts New Brunswick and Nova Scotia. The winter water temperatures of the southeastern coast are about the same as the those of the Bay of Fundy in the summer--cold. In the summer, the Bay of Fundy is rich with krill and copepods, zooplankton that whales suck up by the gallons. The tiny creatures become trapped in the whale's baleen, hornlike

plates that hang from the upper jaw, when the animal expels seawater using muscles on the lower jaw. It is amazing that one of these large mammals can get enough calories, nearly a million a day, from some of the smallest prey in the ocean. But in the winter calving grounds, the mothers go without food. The only feeding activity going on is that of the calf nursing on the mother's rich milk.

According to Amy Knowlton, #1612's "calf is probably about a month old, maybe older. It has whale lice, or cyamids, on its head, and it's beginning to show eruption of the callosity tissue which happens a few weeks after it's born." Callosity tissue is protruding, wartlike skin that becomes colonized by small crablike cyamids that are passed from mother to calf.



Mom's back of head

The crew of scientists and NOAA personnel are presently enjoying the abating seas after a rough night. They are trying to catch up on lost sleep because of the boat's endless rolling in the swells. "Its nice out here now," Amy Knowlton said, "almost like sitting on the beach." Not exactly--more like an island with a 360-degree view of the ocean. Not bad . . . until the wind and waves rock the boat.

Cathy Sakas, Marine Educator
NOAA's Gray's Reef National Marine Sanctuary, Georgia
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JANUARY 26, 1999

CRUISE LOG



Chris watches from Zodiac

Around 3:00 P.M. yesterday, the crew of the **Jane Yarn** linked up with the right whale mother they radio-tagged last week. As the front passed through, New England Aquarium researchers had time to review the photos and determine the identity of the tagged whale. Individual right whales can be identified through callosity patterns on their head. These callosity patterns, which are patches of cornified skin often surrounded by cyamids, or whale lice, are unique to each individual. For the past 22 hours, they have been following #1612, a whale first seen in 1986, and her calf in a southerly direction. So far the pair has traveled about 10 miles.

During daylight hours, two observers are positioned in the flying bridge while another observer is stationed in the wheelhouse, monitoring the signals from the radio tag. When the mother is at the surface, the antenna is lifted out of the water and we receive signals every 0.6 seconds. When she submerges, we lose the signal because the VHF radio waves can't penetrate the water.



Amy and Stephanie Martin (NEA) on observation tower



Tony Martinez (NMFS) at the instruments

The five scientists aboard stand six-hour watches, monitoring the radio around the clock. It's only during daylight hours that they stand watch on the bow. It can get pretty darn chilly out there, exposed to the salt spray and cool air. But right now, with unseasonably warm temperatures, abundant sunshine, and calm seas, the task is tolerable if not downright enjoyable.

Tony Martinez of the National Marine Fisheries Service out of Miami, Florida, is one of the five scientists onboard. A computer specialist in the Protected Resources Division, Tony reported that

the observations of the mother-calf pair was "business as usual. The mother and calf are hanging at the surface. The mother was much [more] active earlier this morning with numerous half to two-thirds body breaches."

When a whale breaches, the front portion of the body rockets up out of the water, and while in the air the whale may make a half twist, reentering the water with an impressive splash on its back or side. No belly flops here. No one's sure why whales breach, it may be to dislodge parasites or just to play. Maybe it's a combination of the two, or neither.

Tony continued: "Now they seem to be just--near as we can tell--under the surface, coming up occasionally, taking a breath and just dipping down low enough to cover the radio and antenna again. Not a whole lot of activity at the moment. They don't seem to be moving around or engaging in anything interesting." And so it goes. Kind of like watching a baseball game. Eight innings of routine stuff, and then a home run in the bottom of the ninth. Ralph Rogers added that he observed the mother and calf staying within flipper and fluke distance of each other. On several occasions he noticed the calf with its tail laying across the back of its mother.



The final word from the crew was best summed up by Tony: "Things really couldn't be going any better right now." We can all agree with that--as we enjoy this wonderful weather.

Cathy Sakas, Marine Educator
NOAA's Gray's Reef National Marine Sanctuary, Georgia
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JANUARY 25, 1999

CRUISE LOG



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Jack Javech (NMF), John Ericson (NMS), Joe Roman (NEA), and Lt. Rogers scan the water for a right whale pair.

Over the weekend, the **Jane Yarn** sat at the dock in Fernandina Beach Marina. The storm system that cut a treacherous swath through Louisiana and Alabama reached the southeastern Atlantic coast by Friday, churning up the seas and spawning tornadoes with pellet-size hail. Lightning struck the research vessel, knocking a few of the electrical systems out of whack, but the crew wasted no time getting things back in order. After making the necessary repairs, they reviewed the protocol for taking behavioral data of the right whales. And by this

morning, the winds had subsided and the seas were reduced to swells of less than three feet.



Photos of the back of mom's head will help the New England Aquarium to identify and catalog the North Atlantic right whale population

"Its a beautiful sunny day out here," reported Lt. Ralph Rogers of the Gray's Reef Sanctuary. "We have a gentle breeze out of the north, and the swells are beginning to come down from the high seas we had over the weekend. We expect to have clear weather here for about three or four days."



Close-up photo of
mom

After receiving information from the tracking plane, the crew of the Jane Yarn got underway. The mother and calf had been sighted, with the transmitter still chirping away, about 15 miles east of the dock. The crew was heading toward the

location with great expectations.

Cathy Sakas, Marine Educator
NOAA's Gray's Reef National Marine Sanctuary, Georgia
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FEBRUARY 1, 1999

CRUISE LOG



USS Aircraft Carrier
Kennedy in
distance

The **Jane Yarn** arrived back at the Fernandina Beach Marina at 7:30 P.M. on January 29. The crew was tired but in great spirits because of the quality and quantity of information collected.

On her way into port, the **Yarn** came within two miles of the aircraft carrier John F. Kennedy. Her wake was felt by all aboard the research vessel. Ralph Rogers was at the helm at the time and alerted the bridge of the Kennedy to the **Yarn's** activities and the location of the whales. The navy vessel diverted course and was not seen again.

As the wind-driven rain pelted the boat this weekend, the dock lines strained to keep the boat in its slip. The well-rested crew isn't sure when it will get back out again. The weather system must pass through, and the seas and wind abate before the EWS aircraft can fly. Air support is essential to the tracking efforts. With antennas attached to the struts of a plane, the researchers can locate the whales from up to twenty miles away.



Early Warning
System plane
searches the water
for signs of whales
and warns ships
away.

"They have more speed and range than we do and can locate the whale much more quickly," Ralph said. "We rely on the airplane to locate her, and then we can steam to that location. It makes our work a heck of a lot easier."

The tracking electronics on the **Yarn** depends on line-of-sight broadcast, which limits its range to approximately two or three miles. Ralph said, "We have a back-up system that we can operate manually, which will give us a little more range, but it's sea-state dependent. We can work it for three maybe up to five miles." Any farther and the crew must depend on transect lines and hunches to locate the whales.



Joe Roman (NEA)
at the instruments

When they ended their last excursion, the crew left #1612 and her calf approximately 50 miles from port. To find them after a big storm will require some luck and a lot of effort. The EWS team and the tracking crew are both flying up and down the coast in search of the pair.

Cathy Sakas, Marine Educator
NOAA's Gray's Reef National Marine

Sanctuary, Georgia

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