



**NOAA Teacher at Sea
Clare Wagstaff
Onboard NOAA Ship *Nancy Foster*
September 11 – 18, 2009**

NOAA Teacher at Sea: Clare Wagstaff

NOAA Ship: *Nancy Foster*

Mission: Florida Keys coral reef disease and condition survey

Geographical Area: Florida Keys – Key West

Date: Saturday, September 11, 2009 (Day 1)

Contact Information

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Weather Data from the Bridge (information taken at 12 noon)

Weather: Overcast early am and sunny pm

Visibility (nautical miles): 10

Wind Speed (knots): 2

Wave Height (feet): <1

Sea Water Temp ($^{\circ}$ C): 30.4

Air Temp ($^{\circ}$ C): 27.5

Science and Technology Log

“The first few days are always a settling in period,” commented one of the scientists this morning. It seems as if there is so much to do and already there may not be enough time!

The majority of the science crew and I arrived yesterday afternoon into the warm and sunny Key West. A pleasant change to the cold, Autumnal weather I had been experiencing in Buffalo, NY. We boarded our new home for eight days, the NOAA ship *Nancy Foster*. The objective of the eight-day research cruise is to survey multiple preselected coral reef sites and study the coral for its condition and the presence of disease. The assessment of each dive site will be done by a group of NOAA qualified SCUBA divers who are also trained scientists, mainly marine biologists. This study has been performed for the last 13 years and has so far amassed a large quantity of data that has produced technical memorandums, peer review papers, and an EPA (Environmental Protection Agency) publication based on the data from cruises 1997 through to 2002 cruises.

I have been kindly invited along as a Teacher At Sea to witness the science team in action and serve as part of the project's outreach messaging service. The objective is to give the general public a broader understanding of the cruise's mission.

The science team on board the *Nancy Foster* is made up of the following people:

Scott Donahue – Chief Scientist

NOAA's Florida Keys National Marine Sanctuary

Interesting Fact: Scott's main inspiration to study lobsters early on in his academic research, was partially based on the fact that he loves to eat them! Scott commented that there are always a few lobsters leftover after a study, but that they never go to waste!

Geoff Cook – Co-Principal Investigator

George Mason University, Virginia.

Interesting fact: Geoff is currently writing his dissertation for his Ph.D. on comparing bacterial communities associated with diseased and apparently healthy corals.

Lauri MacLaughlin – Co-Principal Investigator

NOAA's Florida Keys National Marine Sanctuary

Interesting Fact: Lauri has close to 2,000 dives logged and has personally mapped the majority of the coral reef sites this cruise is studying. She has a special rapport with the ocean and corals, knowing individual coral heads and jokingly referring to them as her "babies!"

Josh Voss, Ph.D. – Co-Principal Investigator

Robertson Coral Reef Program

Lonny Anderson - Survey Team Member

NOAA's Florida Keys National Marine Sanctuary, Florida.

Interesting Fact: Lonny used to help his parents with their commercial spear fishing business, catching grouper and red snapper off Daytona Beach. Now Lonny is working to protect the things he used to kill!

Paul Chetirkin – Videographer

Monterey Bay National Marine Sanctuary

Mike Henley – Survey Team Member

Smithsonian's National Zoological Park, Washington D.C.

Interesting Fact: Mike is interested in all invertebrates and will happily skip the panda bear exhibit at the zoo in preference to watching the cuttle fish!

George Garrett – Survey Team Member

City of Marathon

Sarah Fangman – Cruise Dive Master and Survey Team Member

NOAA's Gray's Reef National Marine Sanctuary

Interesting Fact: Originally from Minnesota, as a young child Sarah went to the Grand Cayman on vacation. She became so captivated with the underwater life there that even when she got extremely sunburned she still wanted to snorkel and was only allowed to fully clothed! Sarah has also ventured 10,000 ft down in the submersible ALVIN in the Gulf of Mexico.

**Kathy Morrow – Survey Team Member
Auburn University, Alabama.**

Interesting Fact: Kathy is actually studying coral “snot” as part of her Ph.D. program. Strangely enough, she is extremely passionate about it and has had a great interest in marine biology since she went to Sea Camp in 6th grade!

**Cory Walter – Survey Team Member
Mote Marine Laboratory's Tropical Research Lab, Florida.**

Day one begins with a 7am breakfast followed by a gear check and a brief meeting with the science team. The ships Operations Officer and Chief Scientist go over the day’s dive plan. The objective today is to ensure that all the divers are identifying the correct species of coral, correctly estimating their size, and identify any coral disease present.

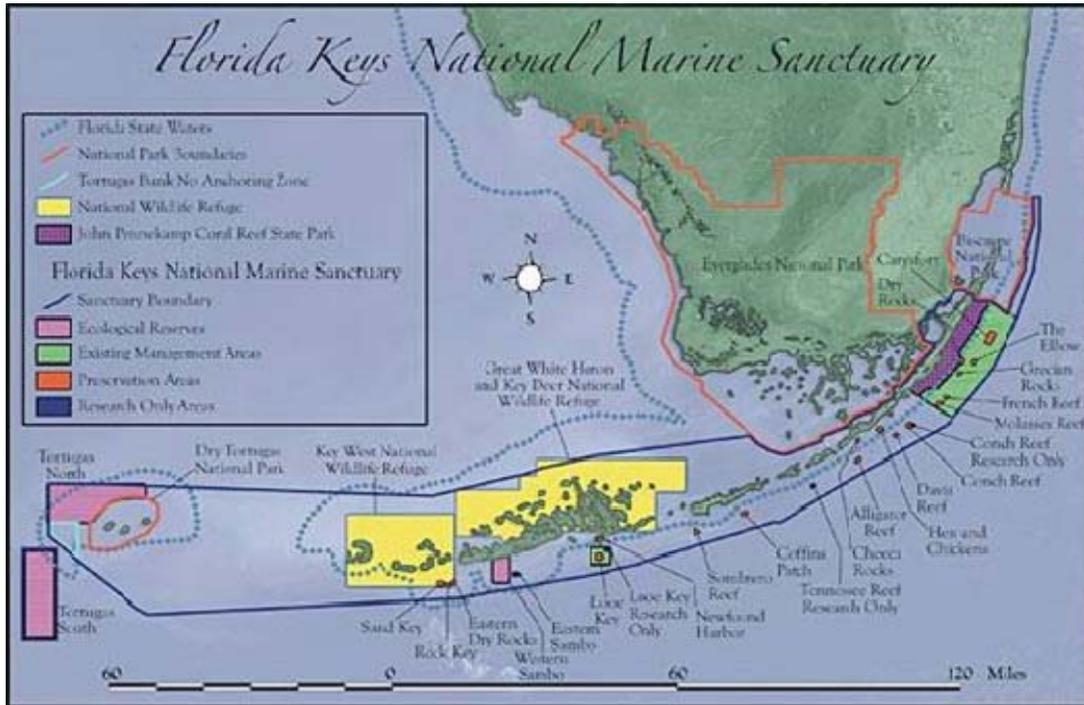
The dive teams quickly collected all the necessary dive gear and prepared to board two small boats borrowed from the Florida Keys National Marine Sanctuary. These take us from the *Nancy Foster* to the shallower dive sites. The first location today is set within the Florida Keys Marine Sanctuary and is located near to one of the 5 lighthouses in the area that mark the shallow reefs. Certain areas have been marked off with buoys that signal a “No Take Zone”, where extractive activities are not allowed (e.g. fishing, collecting coral, catching lobsters).

Each of the dive sites that we will be surveying has a unique name. The sites to be surveyed were originally randomly generated by a computer program when the research first began in 1997. The first dive site we visit today is called Sand Key Reef also referred to as SK01. This is the location for QA/QC dive survey, which stands for quality assurance/quality control. The objective is for each diver to assess the same area of coral and identify each species over 10cm in diameter (except *Agarica* (all species) and *Dichocoenia stokesii* which are measured if they are over 5cm). This site is always used to establish a baseline in identification. Inter and intra quality assurance takes place, checking not only each diver against each other, but also against themselves by each diver repeating the surveying process of surveying this site twice.

Where are we?

The Florida Keys is a chain of islands at the southern most tip of Florida. About 100,000 years ago the area was under the waters of the Atlantic Ocean and existed as a string of living coral reefs at the edge of the continental shelf. The sea level was 25 feet higher than today. As the last glacier period (the Wisconsin) began, the ocean receded and the sea level dropped, exposing the coral reefs. The combination of various environmental factors killed the coral, but left bedrock of limestone exposed as land. As the climate and sea level changed over the preceding years, the lower elevation limestone has partially resubmerged and allowed living corals to attach and grow again, forming a new coral reef “highway”, 4 to 5 mile offshore.

The science team will be surveying coral reef sites inside the Florida Keys National Marine Sanctuary and Dry Tortugas National Park.



A map of the Florida Keys National Marine Sancturay
 (http://floridakeys.noaa.gov/research_monitoring/map.html)

On the third dive site for the day, Lauri MacLaughlin pointed out multiple Elkhorn Corals (*Acropora palmata*) whose appearance is just as its name suggests! Lauri noted that these were relatively young corals, perhaps just a few years old due to their size. She also stated that they had reproduced through sexual reproduction because there was no fragmentation of their flattened branches, which would happen in asexual reproduction. This coral is on the United States Endangered Species list and classified as threatened.



Staghorn Coral (*Acropora cervicornis*), in the same family as the Elkhorn (*Acropora palmata*)

Because we departed early this morning on board the sanctuary boats, the science team missed the safety drills that are performed within 24 hours of each ship departing port. Instead the

Operations Officer, Abigail Higgins gave us a run down of the safety procedures. We were also required to try on our survival emersion suits.



The science team and Teacher at Sea, Clare Wagstaff (right) in their survival suits

Personal Log

Well here I am at last! My second attempt at being a NOAA Teacher At Sea! In May of 2008 I was on board the *JOHN COBB* studying harbor seals when the engine crankshaft broke just a few days into the mission. The *JOHN COBB* was not only the smallest, but also the oldest ship in NOAA's fleet. With a crew of just eight, everyone knew each other well and lived in very close proximity. However, the *NANCY FOSTER* is very different. At 187ft in length it is nearly doubles the size of the *JOHN COBB*. In fact, the *NANCY FOSTER* has it beaten on almost all fronts regarding scale. Built originally as a Navy yard torpedo test (YTT) craft, she was outfitted in 2001, to conduct a variety of oceanic studies along the U.S. Atlantic and Gulf coasts and within the Caribbean Sea. It is crewed by 21 people and can accommodate 15 scientists. It seems quite strange to be at sea again on a NOAA ship, but in such very different circumstances. I keep comparing it to the *JOHN COBB* and I still feel a little sad that I was on the *JOHN COBB*'s last mission before it was decommissioned.

I am sharing the smallest room with one of the ships crew, Jody Edmond. Jody is a Mate in Training. It is a simple, yet comfortable room, with two bunks, a small wardrobe, a desk and a sink. However, for two people to both standup in the same space let a lone get dressed or brush your teeth, it is very difficult due to the cramped conditions! Jody is living on the boat full time and so has a lot more "stuff" than I, so I am trying very hard not to take up too much room. Because the ship needs to be constantly manned 24 hours a day, the crew on the bridge is on a

shift system working 12-4 (am and pm), 4-8 (am and pm), or 8-12 (am and pm). Some of the crew even work a schedule of 12 hours on and then 12 hours off, a pretty long day! Jody is on the 12-4 shift, which means during the majority of the time I am awake she is sleeping. This isn't uncommon so everyone on the ship has to be respectful of the noise level and keep



One of the many barracuda that would circle around snorkelers

relatively quiet during all hours of the day near the sleeping berth areas.

Unfortunately, although I am a qualified NAUI (National Association of Underwater Instructors) scuba diver, I am not certified by NOAA (National Oceanic and Atmospheric Administration) to dive. This means that during the dives I will only be able to snorkel and so I must watch from above what the scientists are doing below. I thought this would lead to some frustration on my part, as I would love to be working side by side with the science team 30 feet

below the surface.

However, while the divers survey the area, I snorkel around on the surface watching them. I am not alone though! I am surrounded by moon jellyfish and one rather large barracuda that seemed to take quite a liking to me. I am very careful to avoid swimming into the jellyfish, which can cause a nasty sting and keep my hands close to my body in case the barracuda thinks my fingers might be dinner!

“New Term/Phrase/Word”

Hyperplasia – is a general term referring to the proliferation of cells within an organ or tissue beyond that which is ordinarily seen. This can be seen in coral species such as symmetrical brain coral (*Diploria strigosa*). Geoff Cook described this as a coral looking like Arnold



A brain coral

Schwarzenegger or a coral having Botox!

Coral Mucus or “coral snot”– secreted by the coral. When too much dirt (sediment) collects on the sticky mucus layer, the coral sloughs it off and makes a new one, acting as a replaceable defense mechanism. Some corals also use it to catch food and it is loaded with microbes, not unlike our skin.



“Who are they?”

Florida Keys National Marine Sanctuary

Established in 1990 it was done so to protect a spectacular marine ecosystem. It encompasses 2,800 square miles. It is the only sanctuary that completely surrounds a community, that of all the Florida Keys.



NOAA

National Oceanic and Atmospheric Administration

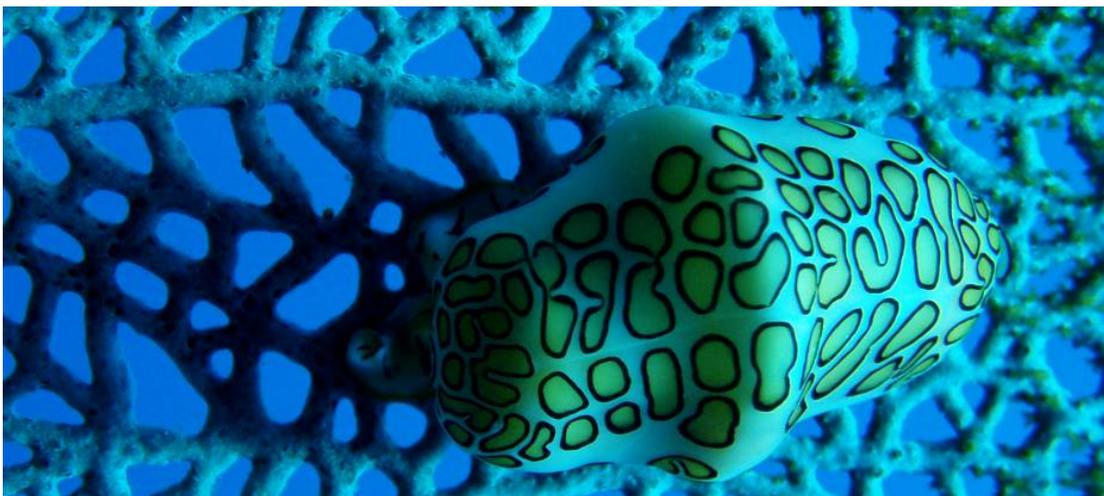
Formed in 1970, it is a Federal agency focused on the conditions of the oceans and the atmosphere. It encompasses, daily weather forecasts, severe storm warnings and climate monitoring to fisheries management, coastal restoration and supporting marine commerce.

“Did You Know?”

Key West got its name after the Spanish conquistadores reportedly found a beach in the southern most islands stern with the bleached bones of the Native Americans. They called the key, *Cayo Hueso* (pronounced KY-o WAY-so) or “Island of bones”. Bahamian settlers pronounced the Spanish name as Key West!

“Animals Seen Today”

Among many different species of coral and other animals, was a personal favorite of mine Flamingo Tongues. These are a variety of snail that are predators that feed on *gorgonians* (sea fans).



Flamingo Tongue on a common sea fan (*Gorgonia ventalina*)