MAY 9-10, 2008 SUBMARINE OBSERVATIONS OF GROUPER POPULATIONS IN THE OCULINA CORAL REEF RESERVE.

R. GRANT GILMORE, JR., PH.D.
SENIOR SCIENTIST,
ESTUARINE, COASTAL AND OCEAN SCIENCE, INC.,
VERO BEACH, FLORIDA
772/562-9156
rggilmorej@aol.com

The following notes on recent Oculina Reef grouper observations are presented for three primary reasons: (1) they indicate that "protected" Oculina Reef grouper populations are still being fished significantly; (2) adequate grouper spawning assessment has not taken place since the OHAPC was formed; (3) reiterate, after 18 yrs presenting acoustic monitoring capabilities to the SAFMC grouper-snapper section, that the only way to effectively monitor illegal grouper fishing in the OHAPC is to use permanent acoustic monitoring systems.

The first detailed studies of gag and scamp grouper social and prenuptial behaviors were recorded during 74, 3-4 hr duration, Johnson-Sea-Link (JSL) submersible dives, from 1977 to 1985. Over 80% of these grouper assessment dives occurred on either Jeff's or Chapman's Reef, the two largest remaining Oculina coral reef formations off the Florida east coast (Gilmore and Jones 1993). During this period literally hundreds of scamp and gag grouper were observed on single dives on Chapman's and Jeff's Reef from late summer to the following spring. For this reason I was eager to make my first JSL submarine dive on Chapman's and Jeff's Reef in twenty-three years on May 9-10, 2008.

CHAPMAN'S REEF: OCULINA HAPC- RESEARCH RESERVE

I made the last detailed coral transects on Chapman's Reef from the *Clelia* submarine in 2001. We observed healthy coral heads on a series of ridges during this dive all of which were recorded with high-definition video cameras. Few groupers were observed. Seven years later on Friday 9 May 2008 I was able to return to this reef observing from the aft compartment of the JSL submarine. I was surprised to see coral rubble all around the submarine and a few larger heads that appeared to have been broken up, one with the remains of a trawl net hung on it. The trawl net had fine invertebrate or algal growth on it indicating that it was not a recent occurrence. It appeared that at least the portion of the reef we surveyed on 9 May had been damaged by trawlers. I did not observe any grouper aggregations on what remained of this reef. Grouper aggregations could have been on another portion of this reef, but the objective of the dive was to place coral transect markers on the bottom, not to attempt to observe fish populations.

JEFF' S REEF: OCULINA HAPC – RESEARCH RESERVE

The last dive I made on Jeff's Reef was in September 2001 in *Clelia*, to place and retrieve an acoustic recording device adjacent to a known grouper spawning site on the north side

of the reef, known as the “grotto”. We saw a group of scamp, 7-8 individuals exhibiting social and prenuptial behaviors in 2001.

However, the position of the *Clelia* observation window, adjacent to the bottom and the lack of timed stationary ambient light observations around the reef precluded comparable grouper aggregation observations to be made. The last comprehensive detailed series of grouper harem and aggregation social behaviors occurred during a series of *Johnson-Sea-Link* dives in 1985, 23 years earlier.

On Saturday, 10 May, 2008 I was able to make a sub dive in the sphere, on Jeff’s Reef. Our mission was to deploy as many coral transect markers as possible in one hour. We immediately began deploying markers on the west side of the reef starting at the south reef base. We deployed six markers on the reef from the base to the highest central ridge. I saw **scamp grouper** at all six deployment sites and groups of 5-8 scamp exhibiting prenuptial behaviors on the top ridge marker sites, Marker No. 3 and Marker No. 6. Two large **gag grouper** were observed when we remained stationary at Marker No. 4 near the base, the south slope. We never made it to the north side of the reef or grotto where **most historical grouper spawning activity** had been observed over 20 yrs ago. No **warsaw, snowy** and **speckled hind** groupers were observed. These latter species were always present in historical studies. Amberjacks were about 10% of previous observed school size in historical studies. No little tunny, *Euthynnus alleteratus*, were observed. Their schools were typically over the Oculina Reef during most historical dives.

This was the first time I was able to use the JSL submarine to observe Oculina grouper behavior since our intensive studies over 20 yrs ago. Two things were apparent: (1) There were obviously fewer grouper on Chapman’s and Jeff’s reef than in previous studies, and Chapman’s was heavily damaged by trawlers; (2) In order for an adequate comparable grouper study to take place, *Johnson Sea Link* submarines would have to be used to make stationary all-systems-off (motors, hydraulics shut down) stealth mode observations that were used so successfully historically. Clelia does not allow elevated nor panoramic observations. The JSL does. ROV and AUV camera transects are inadequate in high current on the Oculina coral reefs. This is based on my use of all these vehicles, ROV’s and AUV s included, and over 350 dives in manned submarines, mostly in *JSL* s but also in *Clelia* and *Pisces*. This means we do not know whether groupers have returned to aggregate or spawn on these *Oculina* Reef formations as no definitive studies have been conducted using the same techniques employed historically before the OHAPC was implemented.

I must qualify the May Jeff's Reef dive as being incomplete and not comprehensive. I am sure more groupers would have been seen if it were a grouper assessment dive. **A JSL based grouper assessment dive survey has not been conducted since the Oculina Research Reserve was established**. This is unfortunate as this means you have no basis for comparing Oculina grouper populations with historical data. I cannot endorse any fish work that claims to have done so.

I strongly urge the SAFMC to consider encouraging federal and state support to repeat our historical JSL grouper assessment studies. I know that the country and NURP is not being supported for manned submarine operations. This is unfortunate at this time of great need.

CORAL PROTECTION ENFORCEMENT AND ACOUSTIC OBSERATORIES:

During our May 10 Jeff's Reef sub operations there were eighteen boats just off our port side. Fishing line was on the coral all over the reef, as well as trash and netting. This is the last remaining substantial Oculina coral reef and it is only 1000 ft EW by 400-500 ft NS. It is still being heavily fished and literally trashed.

During my Jeff's Reef JSL dive, we (Phil Santos and I) miraculously managed to retrieve my ALMS acoustic observatory unit deployed by scuba divers on Jeff's Reef in July 2005. This would have been impossible without the JSL. Hopefully, we will have some data on boating activity as well as fish activity on the reef. Jeff's Reef was being fished with bottom rigs the day we deployed the ALMS with scuba divers. There were literally hundreds of boats pouring out of Ft. Pierce Inlet with hot dogs and pizza being served from a concession boat to the boating public (estimated in the hundreds) in Fort Pierce Inlet alone that day, July 2005. A fast boat on a calm day can be on this reef in 30-45 min from Fort Pierce Inlet. This reef is very accessible to the public, but, unfortunately, not to the fisheries scientist or law enforcement.

ECOS presently has a prototype buoy supported acoustic ocean observatory system that could be deployed. It could store or send data via radio signals to a tower on the beach. Similar ECOS observatories are now operational with web access to continuous data streams on boating activity and fish spawning. Fishing vessels have diagnostic acoustic signal patterns and vessels can be detected miles away. Small boats have diagnostic acoustic signatures. Groupers caught on a hook and line have a diagnostic acoustic signature. Divers also have diagnostic acoustic signatures. I have already completed this sound classification work for FWC to assess artificial reefs (2003-2006).

I strongly believe that if a real time ocean observatory is not supported there will be no way you will know how the Oculina Reef is being protected or managed. This goes for any offshore MPA that has been designated. My acoustic equipment has been deployed to 1,000 m. With upgraded electronics and acoustic release experimental observations could easily be made with acoustic systems in deeper water or with permanently anchored buoys in shallower water, like Jeff's Reef. An experimental unit could be deployed and data analyzed for under $100,000. Certainly for less money than spent on previous assessment and protection programs that obviously have not been effective.