

# MINUTES FCC3

## *Florida Coastal Ocean Observing Systems (COOS) Caucus Meeting 3*

Tuesday, December 6, 2005 • USF St. Petersburg, Fish & Wildlife Research  
Institute Auditorium • 10:00 AM to 4:00 PM

### 65 In Attendance:

Audra	Ames	Marine Desalination Systems
Bill	Arnold	FWC/FWRI
Jeff	Banner	Sarasota County Government
Luiz	Barbieri	FWC - Fish & Wildlife Research Institute
Debbi	Berger	Florida Aquarium
Peter	Betzer	USF College of Marine Science
Jay	Blaire	University of Miami
Lawrence	Borne	Harbor Branch Oceanographic Institution
Hope	Botterbusch	USF College of Marine Science
Melbourne	Briscoe	Office of Naval Research
Otis	Brown	University of Miami
Adrienne	Carter	Nova Southeastern University
Kevin	Carter	Broward Co. FL Environmental Protection Department
Catherine	Corbett	Charlotte Harbor National Estuary Program
William	Dentel	Aquatrak Corporation
Richard	Dodge	Nova Southeastern University
Jeff	Donovan	University of South Florida
John	Englander	International Sea Keepers Society
Andrew	Farmer	University of South Florida
Grant	Gilmore	Estuarine, Coastal and Ocean Science, Inc.
Judith	Gray	NOAA
Holly	Greening	Tampa Bay Estuary Program
Tom	Gustafson	Nova Southeastern University
Michael	Hall	USF Center for Ocean Technology
Michael	Henderson	NOAA
Ron	Hoestine	DEP
Brian	Keller	Florida Keys National Marine Sanctuary/NOAA
Gary	Kirkpatrick	Mote Marine Laboratory
Tom	Lee	University of Miami
Chad	Lembke	College of Marine Science, USF
Mark	Luther	College of Marine Science, USF
Kumar	Mahadevan	Mote Marine Laboratory
Gil	McRae	FWC/Fish & Wildlife Research Institute

Cliff	Merz	University of South Florida
Paul	Moersdorf	NOAA
Christopher	Mooers	University of Miami
Steve	Morey	FSU
Geoff	Morrison	International Sea Keepers Society
Frank	Muller-Karger	University of South Florida
Kathleen	O'Keife	FWC/FWRI
Stacey	Patterson	University of South Florida
John	Paul	University of South Florida
Jon	Perry	Sarasota County Environmental Services
Dick	Poore	USGS
Ellen	Prager	Earth2Ocean, Inc/University of Miami
Matt	Previte	YSI/Sontek
Andrew	Remsen	USF College of Marine Science
Mitch	Roffer	Roffer Inc
Donald	Roman	USM Department of Marine Science
Michele	Rowand	University of Miami
Howard	Rutherford	Pier Aquarium
Jeff	Scudder	University of South Florida
Nick	Shay	University of Miami
Chris	Simoniella	Sea Grant Extension
Alex	Soloviev	Nova Southeastern University
Allan	Sosnow	Broward County BOCC
Mike	Spranger	Florida University
David	St. John	WeatherFlow, Inc.
Vembu	Subramanian	University of South Florida
Kevin	Tilley	Oceanographic and Commercial Programs
Sandra	Vargo	Florida Institute of Oceanography (FIO)
Georges	Weatherly	FSU
Stephen	Wood	FIT
Carla	Wright	Environmental Protection Commission
Gary	Zarillo	FIT

**10:00 AM Welcome, Overview, and Introduction - Host: Dean Peter Betzer**

In the meeting today we need to address key issues including red tide, etc. We also need to discuss the use of legislature to leverage funding. I would like to show you our poster child magazine article featuring Dr. Mark Luther.

**10:20 AM Featured Speaker: Dr. Andrew Clark, Ocean.US** and president of Harris Corporation's Maritime Communication Services via **Dr. Ellen Prager, Earth2Ocean, Inc.** (Dr. Clark has had an unavoidable schedule conflict and has asked Dr. Prager to present his National COOS activities update materials).

Gave PowerPoint presentation (available on FCC web site:

<http://www.nova.edu/ocean/flcoos/fcc3.html>

Audience question: How does FL position itself in the IOOS Regional Associations (RAs)?

Prager: FL needs to decide either to become their own RA or work with existing RAs to position itself within these. If this is not done you may be left out if Federal Funding goes through the RA system.

Luther: We must be full partners in both the Gulf of Mexico (GCOOS) and the Southeastern (SECOORA) RAs. This is the only way it will work. All agencies must be integrated by both.

Prager: Based on the interest in resource management at both the State and Federal level it is important that you identify the benefits in all societal issues, but specifically in this area.

Muller-Karger: What concepts must be considered for industry?

Prager: It is important to bring in industry. The Ocean Research and Resources Advisory Panel (ORRAP) has formed an Industry Sub-Panel, chaired by Andy Clark. The first goal of this sub-panel is to look at ways to bring industry to the table in ocean observing. They will be having their first meeting, hopefully early next year. We hope this will be helpful to the observing community.

Muller-Karger: So how do we do this in FL?

Prager: We must have a concerted effort to identify industries and involve them via showing them the benefits of their involvement and provide products they can use.

Audience members: Red tide is devastating to industry, therefore they are interested in what scientists will do to solve this issue, and we must connect with the industry on solutions.

Prager: Well this is about the relevance of problems with the industries. In order to get them involved, it has to be relevant to their needs and it must save them \$.

### **10:50 AM Panel Discussion on Current COOS Activities and Opportunities**

**Co-Conveners: Dean Otis Brown, UM & Dean Richard Dodge, NSU**

Dodge: Please note that Sandi Fury cannot be with us today. Instead we will have a follow up discussion from Kumar and the Gary Kirkpatrick will give a presentation on Biosensing. Let us begin with our first talk

### **10:55 AM SEACOOS (Southeast Atlantic Coastal Ocean Observing System)**

**By: Dr. Chris Simoniello, USF (gave Bob Weisberg's PowerPoint presentation)**

### **11:15 AM IOCARIBE-GOOS and CaRA (Caribbean Regional Association)**

**By: Dr. Frank Muller-Karger, USF (gave presentations)**

I will give a brief overview of CaRA, please note I do not represent either organization but was asked to give these updates today as their representatives cannot be here. The concept of CARA was born out of the lack of progress in the development of IOCARIBE-GOOS, as getting funding in the Caribbean is difficult. PR and USVI representatives (J. Morell and J. Corredor of UPR and R. Watlington of UVI) got funding from NOAA CSC to develop both a governance proposal and a business plan

Cesar Toro is the secretary for IOCARIBE and the presentation on IOCARIBE builds on the presentation that Doug Wilson gave at the last FLCOOS meeting. There has been some progress in IOCARIBE since the Indonesian Tsunami and it includes the placement of some early warning systems in the Caribbean. Tide gauges are one of the simplest observing systems and George Maul, Doug Wilson and I (FMK) have been leading an effort to try to understand which ones are working and which one is not. This is a huge undertaking. As far as IOCARIBE-GOOS, it is not progressing. Other activities that are relevant are the CARIACO time series funded by NSF. Another time series is funded by the Dpt. of Energy and Puerto Rico EpsCOR off PR. The Meso American barrier reef has a large number of activities currently active. Lots of these activities are not yet operating under CaRA or IOCARIBE.

Questions:

Gustafson: The RA's that could reach IOCARIBE is GCOOS & SECOORA, has either of them contacted IOCARIBE?

Muller-Karger: On the SECOORA side I have not heard of any interest

Prager: At the Mexico meeting, the representatives were interested in more than just a tsunami warning systems, they wanted a coastal hazards system especially addressing storm surge. With some funding available, this would be a great opportunity for the US to expand observing capability into the Caribbean.

Muller-Karger: Mexico is engaged through a number of initiatives, from IOCARIBE to the Gulf of Mexico States Accord (GoMSA), to the Gulf of Mexico Alliance.

**11:25 AM SECOORA (Southeast Coastal Ocean Observing Regional Association)**  
**By: Dr. Judith Gray, NOAA (no PowerPoint presentation)**

We in SECOORA are not doing the interesting science as going on in SEACOOS, however we are trying to create the governance structure and marry that to what we have to do to be a recognized RA. I am a member of the steering committee and within 2 months documents should be finalized. FL is the biggest chunk of SECOORA with the most coastline and institutions, so I suggest you get on our website and sign up for the first meeting of SECOORA and then you can vote on the board members. They will be 15-25 members, with state allocation of 3 board members from GA, NC, and SC. A chief executive officer will run daily operations, as the board is only advisory. Under the advisory board several committees will do the work of SECOORA. A finance committee will also be formed to perform congressional visits to the Hill or region. All these committees will be

long standing. The Task force will deal with the short term issues. Program committees will report back to the executive officers. Membership categories will have an allocation of board seats. I will share the Membership documents and welcome your feedback. The first type is a sustaining member for \$10k per year. This is the only category that gets 4 board seats. The Organizational memberships, not to include individuals, –for \$1K per year and we have up to 9 seats on the board for this. The Individual memberships are \$500 per year and there are up to 6 seats available for this. Affiliation is the final kind of membership and is a non voting membership. I am not sure how many members there can be. The SECOOS/SECORA membership should be a natural evolution. FL has a huge stake so please sign up for membership.

Q&A:

Muller-Karger: We need to take advantage that Ellen Prager and Mel Briscoe are here to ask some questions. Ellen and Mel: Do you think that \$ will flow through one of these regional associations for all research in a region? What strategies have been decided on?

Prager: It is not clear yet how funding will be distributed.

Briscoe: If you have 3 Principal Investigators and they each get \$, they must stick to this funding system. Once you write the proposal you must stick to how you foresee fund allocation

Muller-Karger: What is the role of RA?

Briscoe: To pre-validate that this is the group that will take care of the region. My guess is there will be some sole source to look after regions

Don Roman: Is this Business Plan in the mechanism

Briscoe: No there will have to be a proposal

Mahadevan: I don't think congressional ear marks will go away. I see that there is a coordinated role for the RA that will bring in those fringe elements

Gray: Yes that is the whole idea.

Luther: Just because you are not on the board, you still are a member of RA and you can still influence outcomes.

**11:45 AM GCOOS (Gulf of Mexico Coastal Ocean Observing System Regional Association) By: Dr. Mike Spranger, Florida Sea Grant (see PowerPoint Presentation)**

**11:55 AM GMA (Gulf of Mexico Alliance) By: Dr. Catherine A. Corbett, Charlotte Harbor National Estuary Program (no PowerPoint)** The GMA is a result of a US Action Plan recommendation that called for IOOS and GMA came out of that to coordinate the water quality in the Gulf. Our five priorities can be found on our website. We host a system of community workshops to involve stake holders etc. and to identify issues of concern from the Gulf. Some top issues were discussed in breakout groups and several workshops were then created. From them a long term action plan for each of the 5 priorities have developed. The Summit will be in March and Gary Lytton is now the point of contact not Kacky Andrews at DEP. The FL Water Resource Monitoring Council is still in infant structure format. There are 26 seats on the steering committee with DEP having standing seats but seats included all groups including academia and non profit. For the most part there will be 2 to 3 people designated to these seats. So you could get involved there.

I forgot to mention that the council will document what monitoring is currently being done in FL and what is being collected?

Luther: Isn't DEP doing that?

Corbett: The state is supportive.

Muller-Karger: GMA is an outgrowth of OAP and OC, if we can break political barriers this is how we can be connected through GCOOS and then the governments will work together.

**12:05 PM FOCRC (FL Oceans and Coastal Resources Council)**

**By: Dr. Tom Lee, RSMAS (see presentation)**

**12:25 PM FOA (FL Ocean Alliance)**

**By: Dr. Kumar Mahadevan, Mote Marine Laboratory (no presentation)**

Discussed FOA committee formation: FOA truly is not like other academic groups. It is more of a round table with port directors, cruise lines, fisheries industry and others all discussing ocean issues. FOA is essentially trying to educate the legislators. We sponsor Oceans Day in the legislator city, which is a good educational effort over past 6 years. Please participate in the functions that we have organized. We also monitor and respond to state and federal legislation but have no great amount of resources or staff. An evolving role is interacting with the oceans council to propose projects and research plans and also provide input to projects. We can give direct input to legislators and the governor. We are trying to see a robust economic budget put in place. Aquaculture and stock enhancements is also one of our goals. Now if we focus on COOS, other than the ocean council, we need to coordinate with this council. A few months ago, we received a request from the Caucus to become involved. We had a meeting to discuss this and essentially we cannot take a time consuming role due to lack of staff and funds. The FOA board is pleased to see all the evolving collaboration at the Caucus meetings and wish you the very best.

**12:35 PM MOTE Marine Laboratory - Biosensing**

**By: Gary Kirkpatrick, Mote Marine Laboratory (see PowerPoint)**

**12:50 PM National Data Buoy Center**

**By: Dr. Paul Moersdorf, NOAA (see PowerPoint)**

**1.00 PM LUNCH followed by Break Out Sessions relative to FL PCOOS proposal draft**

**Group Leaders - Dr. Chris Mooers, UM (4<sup>th</sup> Floor) & Dr. Mark Luther, USF (3<sup>rd</sup> Floor)**

*Discussions Questions included:*

What COOS efforts have been initiated from each of FL 14 ports?

What should be considered to make funding available?

What is important to Florida's interests?

Breakout groups Discussions

### **3rd Floor Breakout Session - Dr. Mark Luther**

Mark Luther went through draft of FLPCOOS proposal. Discussed dollar amount and the value of having observation systems in port facilities. The original idea came from Otis Brown Brown and Ellen Prager, and Chris Mooers facilitated the Prospectus; they are at RSMAS in Miami.. There are similar observing systems in major, ultimately all, the ports in Florida and we can use these as a spring board to move out into all the coastal waters of FL to take measurements other than those required for maritime transportation. We are here now to get additional input and create a basis for an optimal observing system for all FL waters. This will include resource management and environmental protection needs. We need to keep the system focused and keep the target audience in mind i.e. to sell to a particular group of people.

Prager: Who is the target audience?

Luther: Primarily for the FOCRC and state legislature as it was originally perceived. We need to incorporate maritime transportation communication first since it focuses on PORTS. The State pilot's association are concerned it will dilute what they have in place. In Tampa Bay they are prime customers, and therefore wonder if this will diminish their influence on how the system is operated. They have also asked if they will get the same products and services. Therefore the first goal of IOOS is to integrate and sustain existing systems.

Prager: Maybe a letter from someone associated with the PORTS supporting the system will be helpful. I suggest a letter from the ports council, harbor pilots, or other user communities to make

our case stronger. Also an official endorsement of the revised document will help. We need to make the point at state level that there is not enough coastal observing systems in place as of right now. The case must be made that there are some working systems, but they are not widely distributed. We need some kind of marketing effort.

Spranger: The State marinas would assist with endorsement if it is shown there is relevance to customers, and recreational boaters. Let them see how they are written into to document. Consider port maintenance. Monitoring is related to dredging, and this is a whole separate issue from navigation. The Army Corps or dredging companies are the paying customers. The dredging companies need to work in compliance with the data that's currently provided in real time (in Miami, this a model that the Corps is asking to extend to more northern ports like Jacksonville).

Kirkpatrick: With recreational fishing and other recreational users i.e. boaters, show products that are of use to them.

Greening: Why not bring ocean observing to shore to provide further shallow water systems. I know that estuarine managers are interested in this. This provides interpretive tools to make sense of available data to resource managers. The private sector would play an important role here, helping to develop tools for making data useful to resource managers.

Prager: About development of products, e.g. Buoy data during hurricane season is talked about by forecasters, so maybe solicit them for support for such a system, and include a paragraph on products and dissemination tools related to media. Include names of well known forecasters?

Luther: Who should this DRAFT come from? Would FCOOS Caucus be broad enough?

Brown: We don't want it to be too much from academia. It needs to come more from a general group, maybe Florida Ports Council, National Oceanographic Partnership Program (NOPP). We should list institutions or organizations by category who support this draft.

Luther: not individuals!

Brown: We need to show it is good for everyone! If it has many potential stakeholders, it has a better chance of going somewhere. So one of the challenges is to go to different sectors, sell them on idea and bring them on board.

Luther: Who will be responsible for going to various groups and asking for support of this DRAFT? Then play on strengths and look for who has prior contacts with which group. Make sure this effort is carefully coordinated so that message does not get jumbled along the way. The ultimate recipient is State Legislature, but our intermediate audiences are all the people that we want to have endorse it; we need this DRAFT to be available to everyone. The document should be written from a user point of view. The ultimate goal is to get the public to support the effort because they will get something out of it. The people need to be able to read the document and answer what is in it for them, what motivates them to pick up the phone or write letter to support this?

Brown: This document is written from a ports point of view, with the original thought process of how can we put a structure together that is guaranteed to be stable? How can the structure scale up to statewide observation systems? How can the structure have stakeholders from day 1 and show benefits to users that this has been done, other than in academia? This led to starting with the ports around state and using them as the catalytic points around the state to build upon and now we can argue about what the right process is to build out from them.

Prager: There are 2 documents really being discussed here. Is this draft for this council audience, and almost all of whom are PhD scientists who will recommend research projects to legislators? It isn't a document to utilize if you are going to get public support. But, the process that has been put in place by the state is this council, and we have no choice in that, so we really have to write a document to that council. In this draft, we need to show there IS public support for COOS, but we can't give this particular document to the public. (Ports and other areas identified as priorities by resource or ecosystem managers, by councils and other state agencies should be strongly worded in the document). Maybe write something else for getting public support, a one-pager that hits the high points.

Simoniella: Regarding Outreach – is the message the same? The target is a very specific community so we should find out where they get their information from, what their interests are, how this will enhance their ability to do their jobs. Instead of a high level one-pager, the information will be totally different for the different communities. You may be selling the same data or information to different communities, but we need to target individual's specific interests in it when trying to sell it.

Brown: If the document doesn't show things that make people's lives better in whatever stakeholder community they are in, then it fails. We need to interact with the community to identify needs and if they can be addressed. We have not reached that phase yet. If this project makes another Tampa Bay somewhere else then that is ok, but if it makes Tampa Bay less effective then it is not ok with navigational users in TB. Interaction is required to learn these perspectives. This document doesn't address this yet. Interaction with communities gives council the information on user needs.

Luther: Let them tell us what they need instead of us telling them what they need. The Pilots Association for example. To sell them something, you must have a strong proposal of what you might be able to provide to them, and then listen. If that is not enough or if it is what they really want, can some slight modification be done to give what is wanted?

Let's consider what other useful parameters are available to others? Start with basic measurements that are of interest to maritime transportation, those are the same measurements of interest to things like water quality management also. Once basic measurements are being made, we can include additional like bio-optical measurements, or measurements that are useful to environmental protection for example. This is what happened in Tampa Bay. We want to ultimately spread to all coastal waters, but there are 14 ports in the state, all in estuarine environments.

Spranger: I heard about a new office called waterway boating that created capturing money generated from boaters as well. We should do something similar to get local legislators to hear why they should vote for this because it will benefit their individual port. Get in touch with local politics of location to have folks participate in deciding what is best for local community.

Prager: We should put cost/benefit analysis of Tampa Bay PORTS in draft.

Luther: The benefit is 5 to 8 million bucks/year.

Gray: How much of PORTS system maintenance is NOAA's responsibility? Where is that financial line drawn?

Luther: NOAA takes some liability; we would want someone else to take liability of the use of the data (QA/QC, tech. support). NOAA owns, QA/QCs and disseminates data so they are liable for Tampa Bay PORTS data. I am not sure any would want to operate such a system, without this protection from liability. This is not addressed in this document, but we probably ought to be thinking about it. Don't know cost of QA/QC and ongoing tech support, in addition to liability.

St. John: The possibility of a Public/Private partnership allows for data sharing between private and public and provides some sort of cost-sharing. We don't want to reinvent the wheel for example install a weather station where another group has installed a weather station.

Luther: It goes both ways, data acquired at public expense can be repackaged by one of these groups for a particular market. We need to consider What kind of costs are associated with integrating both sources of data (private and public). NOAA applies their QA/QC routines to 3<sup>rd</sup> party data and what comes out is just like it is NOAA's own data as far as users and systems downstream are concerned.

Moersdorf: Who will pay for this? Already National Data Buoy Center (NDBC) is 51% outside data. If you provide NDBC with QA'd data all should be fine. Now NDBC is going in too many directions. We should try to use existing infrastructure. By getting the partnership right initially can lead to minimal cost. If we get the scientific community in at the beginning, and agree on QA standards, this takes away the problem with determining what is good and what is not, and the problem of changing algorithms. Then the method just has to be hard coded into software/firmware, or have 24 hour watch. It isn't just the observing systems; it is the processing, dissemination of data, and the archiving. Selfless sharing. We need single threaded initiatives. The RCOOS and individual states need to come together. If this all works, if RCOOS says individual states have this much funds to match funds from federal funding, the ability to draw that money is significantly greater than if someone goes in and says I don't have any money. This would be helpful for this DRAFT.

Luther: Is there any way to build into the document a statement that says we expect the feds to become full partners in this and provide data aggregation and a QA/QC function for which we would hope they would get extra money through their funding channels to do that.

Moersdorf: There is a different appendix for each user. The expectation is that the federal backbone will build towards the shore. Who is currently listening to public?

Prager: The audience is the council, the council is asking what are the priorities, what is going to be most beneficial to the state and meet the states needs. These needs should be bullet points up front about safety benefits, economic benefits, future benefits. Don't put how you got to where you are in the beginning – put this in appendix. Knowing what the FL Caucus is isn't what is critical. What is the state going to get, and how some of the research priorities are going to be addressed is critical to be put up front in the DRAFT. If you can say that the observing system cuts across the board with all of those priorities, you give them power.

Luther: Where is the document that summarizes priorities?

Englander: The document needs to start with what is in it for the people of the state of Florida, that is what politicians respond to. Ocean monitoring is a broad term, and refers to many types of data. If we say the people of FL have a need in good ocean data, whether related to seafood industry, transportation, beach closures, hurricane warnings, diving, etc we start with a few sentences illustrating the broad use of COOS, not just pertaining to transportation. Good data that aids in hurricane analysis can aid in beach closures and red tide information. Start with that as a mandate. Include transportation, but show in the first two sentences that it is a great public need. We need to say we need a good, unified comprehensive ocean monitoring system in FL because of all of the obvious vested interest of every person who lives in the state, and then we list the needs of the individual sectors. Pander to everyone who is interested in public need.

Prager: Remember this is for the council, not the public, and the council is coming up with research priorities that address user needs, but the council has to justify why this system is going to be one of their top priorities for research needs. The reason is that this initiative cross-cuts all needs but there also needs to be a separate public piece of literature addressing public needs. In the back of the document, we need to couple the relevance because legislatures will not fund research for research's sake; a separate document is a good idea. I like the idea of going as ports because Tampa Bay PORTS has been so successful, but is that considered research if you go with ports?

Gustafson: You are going to research how to implement a system, what instruments are needed, and what the overhead is.

Prager: If you are targeting the council, it needs to be research focused on how to meet states needs, then somehow incorporate the ports concept. Going as Ports backbone may not be such a good idea for a council prospectus. That said you could also write a separate, but related prospectus focusing on the ports aspect. But you have a real opportunity where observations are high and cross-cutting on the research priority list.

Gustafson: Then do both, do ports that focuses on the trust fund from the transportation pot, and general research that focuses on GR money from DEP etc. ports that are interested in both

Betzer: Is it research or applied use of the data.

Briscoe: The need for data drives availability of data. Ocean suffers a tragedy of commons in terms of funding, if it's everyone's business then who should pay for it? So if you can make a case that you can pay for the system in terms of transportation applications and money, then you have a 1:1 relationship that you pay the bills with a greater return on the investment. Everyone else gets the free ride. So research can say that for a tiny increment on top of this transportation system, we can get this fabulous research system, everybody looks at it like what can I add to something that has already paid its bills then. At the Federal level homeland security mainly deals with ports security including what is being shipped out. Hidden hooks maybe if we know what's happening around the ports we can get information about security of the ports to homeland security. We need to add water quality; I'm betting that over half of the 14 ports are on the impaired water list. This fills another FDEP goal, and the real application of data.

Luther: Water moves around and that has a big control over water quality, so if you are going to do water quality you have to know where water is going, where it came from and so yes, that is something that should be put into the document very firmly. Tidal residual circulation, changing freshwater inputs are important to water quality.

Merz: Another application of measured wind energy: Was offshore wind farms proposed? Coastal and offshore buoys provide important wind data for this application. Another cross-cutting piece of information which is potentially valuable to the state from a research point of view but controversial for putting into document though?

Luther: Winds are more important than ADCP data now for the harbor pilots here. Winds are important for lots of things

Simoniella: We can find cross cutting themes for bullets at the beginning

Prager: With two groups we could easily pull out council identified and user identified priorities.

Luther: When dealing with legislators, if you don't grab them in the first paragraph, you lose them completely!

Kirkpatrick: The biological sensors/water quality comes into document at the last minute. I think there could be more included, but depends on what we are trying to drive home. If it is water quality, then maybe don't need to do a lot of bio observation, but if it has to do with environmental quality that changes

Brown: The general feeling is that there is an imbalance in the maturity of autonomous sensors. There is a priority in sensor development in biological oceanographic measurements

Luther: How do we want to balance the document? Do we want it to be the comprehensive OOS for all FL waters, or keep it focused on something achievable in the near term? What kind of system are we looking at, long term or short term?

Prager: It is critical to keep in mind who your audience is here. Who is the target and what's the purpose? More than one for this document. For the council, we need one with more weight on

research themes and priorities and how the OOS addresses them. For a second one, it could be more focused on ports and that would go to the ports to try to get funding that way.

Gustafson: What about FOCRC members, when they give recommendations it goes from DEP to the governor, from the governor to legislatures, who have the power to be funded. Whatever comes out of the FOCRC's mouth is guaranteed to be funded. There are two approaches: do we have a separate document that we try to cram onto as an add on to the FOCRC document, which is just as easy to decouple later, or do we take what we had in mind and put it in code every ten words of their draft so you can't cut it out? Then we separately take your draft over to the FL ports council and you try to cut your best deal so that they will help you draw the money out of the DOT. That means some of our program is coming in through the FOCRC general revenue supported by the governor and some of it is a rogue effort to get it out of the DOT with proper support from ports. We should do both! Separate documentation for efforts to get money out of DOT and FOCRC, and then integrate this with FOCRC requests. Get our words in what FOCRC is writing, then go for DOT funds, then whatever we don't get we do legislatively.

Luther: That is consistent with the suggestion to look at their fifteen goals or however many and state how what is in this document would benefit each of those goals, is essentially critical to each of those goals. If it is not in this original grand plan, it is harder to put stuff in later, so what do we want to put in now? Don't be specific, but broadly stated for example say sensor development rather than bio sensors specifically.

Gustafson: We don't redo this one but put this with the FOCRC document. I don't think there will be another revision of this document, so let's blend portions that fit with FOCRC into the FOCRC document, and whatever is ports specific becomes a new ports document. There is no reason to write another of these documents, but there is a reason to write documents we think are going to pass.

Prager: We need another document. We can't just amend the FOCRC document, you need a document to go to the council to bring them on board and to put your project in as a high priority – that is the process already established.

Brown: It is called a concept, but this is an implementation perspective, distinguishing characteristic of this document

Gustafson: How much of our words fit in their words (FOCRC). Figure out what they are going to pass, write our language in to what they plan to pass.

Roffer: Make sure the private sector is represented. If the fisherman feel left out, particularly the offshore industry, this is all very coastal oriented. We need to go out to the Gulf Stream for the east coast if you want to get the ocean fishermen interested. We need to go 80 to 100 miles off the west coast. We also need to have input from other areas of the shelf to run effective models of ports anyway.

Brown: Regarding the state and federal domain of the ocean (12 miles to EEZ) How do you balance the interests of each?

Gustafson: If 12 miles is the limit, consider a 50/50 match for outside of 12 mile limit. As soon as you nail down your state general revenue because it came under FOCRC initiatives or the ports money which came out of the DOT, and it is all sort of restricted to the 12 mile limits, you go to the feds and say now I want a 50/50 match for the non-ports outside the 12 mile region and then the feds start looking at FL as being somebody who reduced the cost of coastal ocean observing by half. We need to deal with federal issues and federal domain with federal money

Brown: There is no magic line that the fish or fishermen care about. We need to craft this so that it marries appropriately, and this was one of the not-so-obvious reasons as to why it was made this way, because clearly the state has its own way of doing things. What is the arrangement of payoff between buoys close to shore and further offshore, as the ports facilities don't care about offshore. I don't think the state is so unenlightened as to not support a buoy that has all the right sensors on it because it is 15 miles out.

Luther notes that some COMPS buoys are farther out than that.

Moersdorf: The regional associations will need to sort this out. This will take faith in partnerships.

Betzer: The ports projects are planned years in advance, will our proposal have a chance at being funded?.

Gustafson: We will have to be an add-on to something the ports already want to do from something already in place. DOT is an easy target to hit if you have a good story, They have a big budget. As long as we are an "add on" and not a "take from", DOT is ok with us, in theory. If we are helping them carry their load, and we are serving their needs, then we should be welcome.

Betzer: Research & Development is being built in FOCRC. A lot of research and development needs to be done in bio sensors, and it would be interesting if we asked FOCRC if that is being built in as a research initiative for the state.

K Carter: The timeframe for feedback is by late December.

#### **4<sup>th</sup> Floor Breakout Session - Dr. Christopher Mooers**

Dr. Christopher Mooers gave an introduction to the breakout group by stating that the draft prospectus to be discussed grew out of the last FI-COOS caucus in August. It is meant to develop a Florida initiative that would fit the purview of the Florida Ocean Alliance. Another theme is academia collaborating with government and private sector with open participation by all parties in the process. In the spirit of COOS it's open to federal and state agencies as well.

By 3 pm this group will have come up with a summary of highlights from the discussion that follows. After requesting a show of hands to see who has read through the document, Chris called for time to review.

As Chris reviewed the list of Institutional Coordinators on page 1, Frank Mueller-Karger recommended not having names but a generic statement referring to a partnership and list the institutions without names. Chris explained the purpose of that list is not to show authorship but to list those who have agreed to provide institutional coordination in their subdomain of concern. Kumar Mahadevan added that an outside person reading this document won't know who at the particular institution to call without such a list. This list is helpful to get additional input or to direct the reader's questions. He would rather not have to field those calls in his office but give the readers a contact list.

Frank asked the purpose of the document? To him it makes more sense to have the list of names at the end as points of contact. People that read this may find that they are either left out or that a group is trying to co-opt the process since this will eventually be submitted for funding. If it doesn't include people outside of academia, it makes others feel left out and perpetuates an image that this group is exclusive rather than inclusive.

Chris stated he would be happy to move the list to an appendix and commented that he personally didn't share Frank's sensitivity. Frank added if the intent is to present this to the commission and the legislature it should be altruistic with no implication where the money should go.

Chris commented the intent is for this document to inspire the system to support a long term program in COOS.

Allan Sosnow asked why ports persons weren't asked to contribute to this document. Chris answered that Mark Luther was to present this to the pilots association. Dick Dodge stated it had not been presented yet.

Chris explained this is a working paper in progress and not a final statement.

Allan Sosnow stated the document should go through the Florida Ports Councils and Florida Pilots Association.

Chris stated to date COOS has been focused on national and academic interests and not the state.

Allan Sosnow stated the ports group is concerned about good tidal conditions. With a good port system for the major ports in the North West, it seems to me like you are trying to formulate a separate COOS rather than say it's an industrial aspect to the existing COOS.

Chris explained it was through the FOA and it's awareness of ports issues that led the authors to this version of a prospectus. The whole environment on the continental shelf is affected by port activity.

Kumar stated, ideally we want a system that encompasses all of Florida but that is not practical. It makes more sense to build on what currently exists. That is what this document lays out.

Chris added the state is looking at matching funds. Let's try to focus on the vision.

Jay Blaire stated this document is being addressed to varying audiences. The vision statement should project what this could mean to the individual. It should explain to the reader, for example, how this FL-PCOOS idea helps me do my job.

Dick Dodge stated one of the morning speakers explained an operational COOS and how it helped the users. He suggested reviewing the slide from previous talk for examples of wording.

We could say thing like this would be useful in daily navigational decisions etc. ADCP moorings could show where oil is likely to go, etc. stated Chris,

Chris asked who do we assume are the expected readers and what are their backgrounds.

GENERAL NOTE: paint a clearer picture. Perhaps add graphics to document.

Frank suggested a specific list of desirables beyond simply port and fisheries support. We also cannot pretend that the sole recommendation of all marine researchers in the state of Florida is to focus only on ports and fisheries. The text now reads “ To provide information to marine transportation and observations”, for example. The way it’s written it’s a closed statement. The Florida issues are more than just fisheries. Tourism is an even bigger issue.

Dick suggested the use of terminology such as “Ecosystem based AND management” to not eliminate coral reefs or other subgroups.

Kumar stated red tide has economic implications. On the west coast it’s a big issue and it’s getting a lot of attention. These same people are our eyes and ears who can do something about it. Homeland Security is also a big issue.

Frank stated you want to stimulate the economy from a number of points of view. Stimulating the economic vitality of the state is a key issue. This means highlighting technology development and linking observations to improved economic benefits.

Allan stated he would like to have some kind of statement in this document saying you will try to contact the local port authorities.

Frank expressed general concern over various issues the coordinators of this document don’t include. Chris explained it’s the beginning of the process. Frank continued that he thought it was important to point out this entire plan would not be pinned down by the ports.

Frank added the overall system should not radiate out from the ports but have a coherent vision that Kumar mentioned. The infrastructure should connect these existing systems and build a stronger broader system. Not radiate out from ports, ignoring what exists now. There is a danger of exclusion. We need to develop a coherent plan in a coordinated fashion from the ports to the shelf. Perhaps there should be a separate paper for all the aspects.

Tom Gustafson explained there is a strategic advantage to start at the ports. FDOT will pay a state share of a federally funded program. It's as good a point as any to start and the FDOT has the biggest trust fund to tap. If the FL Ports Council likes this plan they can tap into this.

Frank restated the ports specific idea is a problem.

Georges Weatherly stated all the current data is at Tampa Bay. This has worked. Maybe this is an approach for the future. It has worked in the past. He would like to see Port Everglades or Jacksonville added.

Allan added the port would have to pick up the maintenance costs and it would be expensive. Using the port system, there are data points in that system from the 14 deep water ports. There is confusion when you use that terminology "the port system".

Chris stated even in the Tampa Bay area maintenance costs are an annual crisis. There is much more potential to add to it. We would like to avoid the annual crisis issues in the future. The term "ports" needs a synonym.

Allan suggested we define the system so there is no confusion

Tom Gustafson asked if we were going to draw circles around included areas where would you draw them.

Allan said he would circle the 14 deep water ports represented by the FL Ports Council. Tom said now imagine circles around deep water ports and smaller circles around the smaller ports. How soon can you move the diagram off the coast?

Allan stated Port La Dania may take ships with a 10 ft draft and Port Everglades can manage up to 42 ft. So Tom asked what subset of the huge job from the ports to 200 miles out are we able to address here. Where do we start and how do we end in this document?

Chris stated the FOCRC is working on a plan for the state of FL on a major Federal initiative in the coastal ocean. Funding opportunities already exist. Tom added, there is a second source in FDOT. It's all theoretical until the spring legislative session.

Chris explained the IOOS thinking is that the states, not just the federal government are to participate in the funding. So far in Florida there has been no effort to develop this COOS process.

Frank stated he finds the terminology of developing the ports and radiating out from there is a problem. Tom asked him where he would start. Frank said the ports need to be part of the formula but they don't need to be the seed. Red tide, fisheries, cruise liners dumping outside the state waters limit as they move from port to port, and beach pathogens are but a few clear and relevant problems of today. Coastal run off, silting and others are also important issues. All these issues are important, and Florida should be able to address all these simultaneously, not in series. We can walk and chew gum at the same time. Tom said to encourage the draft in such a way that ports and these five other issues are touched upon. There is nothing wrong with this suggestion.

Frank reiterated, the ports issue is not the highest priority. There is a set of priorities and not just one. The other issues could suffer with too much emphasis on the ports.

Tom explained this not a program to solve all problems so silting wouldn't be solved but it would be observed as part of the system. Every aspect of marine science should be able to get the observing it needs to get its work done. What is the priority for the order of issues?

Tom stated the gas tax is source of funds. Freight movement gets you back to ports. Other issues are tied to general revenue. There are two lists. Two funding sources.

Jay stated the topic was chosen for pragmatic reasons. It's one of the important issues. We have to coach the phraseology in such a way i.e. this is one area where we could in a 5 – 10 year period make a positive impact on the problem. We could prove our worth.

Chris stated the ports topic contains many issues. Tom added, if you draw your circle bigger you get all of Frank's issues covered. The size of the foci is important and still ties it to transportation dollars. Chris stated Tampa is a big port and it's important.

Frank emphasized there are issues that stand on their own, larger than the ports. I think we should put forward ports and the important issues but we should not hang everything on this one issue.

Chris asked what is better organized than the ports? Tom replied beaches and fisheries are well organized. Tourism is not.

Tom stated every time Florida has a hurricane the FDOT gets bigger. It grows with inflation. You are making a good argument with the ports council if you make the circle 50 miles around it and the governor would support it. Write it as politically sensitive and scientifically responsible as possible.

With a port emphasis one of the largest estuaries would be missed. Tom pondered the link between ports and estuaries. They are all openings to the sea.

Chris wondered if a focus on estuaries would fly with FOA.

Frank added the focus on transportation includes multi-modes. You could include traffic, health, resources issues and so forth. Marinas and tourism could be linked.

Chris reiterated the ports were determined to be a place to start. Dick added, the document is not meant to exclude any of these places. There is an infrastructure, user base, etc. Chris added this is a starting place with legs.

Frank suggested starting simultaneously.

Chris stated let's include non-port issues in the scope. We have no one's committed support of this document yet. It's open on all sides.

Document notes \*\*Change to “deep water seaports” and say something about other seaports. We should say how many are major estuaries to strengthen the statement.

Dick asked if there are any ports that are not estuaries. Chris replied, Port of Miami is in a coastal lagoon, as just one example.

??Major concern of DOT is going to be sediment management, channels, navigation and bridge water. Will DOT see this prospectus as environmental related and not be interested.

?? You have to figure out how to play the game between agencies that don't talk to each other. Depending on where you go for funding you have to focus it one way or the other.

Chris said the only port that has modeling support is Tampa Bay.

Tom Lee added another point, when you decide where to start, it's important to try to pick a port that has not much going on now and to try to make it more interdisciplinary than it reads now, add sustained observations of biological parameters, water quality, red tide, watershed, etc.

Chris asked what would be a good example of a non-estuary port. Tom Lee answered Jacksonville. Port Canaveral has no connection to the Indian River lagoon

Chris suggested picking a place to start with that hasn't received much attention to demonstrate a new effort. St. John's River is a good one but is relatively distant from institutions that can manage monitoring.

Tom Lee said the Panhandle is a possibility: Panama City. East Bay, West Bay

Document Notes \*\*\*Use “deep water ports” terminology.

Other suggestions are the Port of Palm Beach and adding Canaveral. There is a NOS gauge there already.

Kumar noted the ports are already listed. Are we adding to these things?

Another suggestion is that Ft. Pierce is rather deep.

Chris stated these are not hard recommendations. We don't imagine we can address all of them at the same time. There is much still to be determined depending on funding possibilities.

Frank said let's not focus solely on ports. We need a diversified approach to the breadth of marine science issues in Florida. Chris answered we are going to make it more general and make non-port and estuarine issues.

Frank stated the NEPs and NERRs are not reflected here.

The prospectus as it stands right now is port centric. If you hang your hat on one funding source it's not a good idea. You want to diversify.

Kumar stated the document needs to go back to the concept. It needs to be rewritten to build on the strengths we have. It's more important to say we would be taking in more relevant data than we are now. The document doesn't come across that way. We need to say how that will be done. One suggestion is the Biosense program.

Kumar continued, it is being deployed in Tampa Bay and in red tide breakouts. Nutrient technology has come a long way. There also is relevance for biological data to be collected at buoy sites. You can make sense of the science collected in those habitats at those sites. This system we are talking about needs to say this. It doesn't have to all be real time. Collecting data in the same place is important. Benthic stuff doesn't need to be real-time data. If you can document a community you have something significant. The message is not getting across in this document. People are concerned about marine mammals and fisheries. All the data doesn't need to be real time.

Chris told Kumar, you are talking about chemical/biological sensors that are revolutionary. It will change how people do business.

Frank stated time is short. If this is the only document that comes to the FOCRC, I'm concerned. Public outreach is completely missing. What is the caucus input into this process? One recommendation is that the state supports this process. Maybe suggest funding for the FOA with outreach and public education as part of it.

Kumar said Frank you are looking at it much broader than my understanding. Florida needs to have a COOS strategy. We need to engage the state of Florida, and private foundations as well to say we can come up with a COOS for all the citizens in FL. That should be the overriding statement. Then how are we going to do. The ports will be the entry system, not just to help the ports but to grow the entire system. It so happens the port system is already in place. The caucus needs to have something in hand before the legislature convenes and the FOCRC needs to say this is a good idea. If you don't do it by January you have a whole year to work on this.

Frank stated he would like to see diversity at the starting point. We can do this. We can expand into estuaries etc. To me, 3-4 starting points make more sense.

What are the ideas about data management and distribution? What kind of budget is needed and so forth.

Chris replied we aren't to that stage. This is not a proposal it's a prospectus. Significant resources would be needed for the proposal.

There should be some mention of data management and sharing. Chris answered data sharing is a COOS concept.

Tom Lee stated a port is just the geographical location of where the system will be deployed. Kumar added this group seems to say, instead of using ports, use major estuaries of Florida. Frank commented that ports and marinas terminology would be good for FDOT.

Chris asked what is the OCREC. Is it funded?

Kumar point out it's different to say "the application will include" from saying "specific sensors are located...."

Geoff Morrison commented DOT won't be very interested once you get 200 miles off shore.

Where are the water management groups in this program? They need the data for the models. SFWM always has problems with their boundary layer. They would be good partners.

Chris asked which Florida state agencies should be engaged in this activity.

Geoff stated the water districts block funding so they don't need to play with us.

They have a lot of money but it's not focused where they really need it. They are good partners to help you go out and get the money. Geoff added they get sued all the time.

Frank asked what is the purpose of the priorities list? Look at Page 6. Item one does not include remote sensing which is important for the state. How do you bring this in?

Chris added SEACOOS is not listed here.

Frank commented the NEPs and NERRs are missing in bullet one. Chris asked if they are part of COOS?

Frank stated COOS has been a closed shop. NEPs and NERRs should be added. Chris asked if they make their data available to everyone else.

They are willing to share and become part of this process.

The National Park Service has monitoring stations. Chris stated we aren't going to do the water management department jobs.

Kumar requested Biosense gets added to the priorities.

### **3:15PM Reporting back/Summary Session**

Tom Gustafson explained to everyone that Mark Luther and Chris Mooers would give a summary of what they heard in their sessions to the general group. Anyone who feels they skipped anything is encouraged to speak up.

Mark Luther reported the general consensus was to keep the document focused rather than dilute it too broadly. Two pieces might be better than one. Mark's group had a lengthy discussion of who is potential audience. If it is the FOCRC this document needs to be research oriented. If it's FDOT then we want to focus on the ports and not so much on research issues. The general consensus is to take one piece to the FOCRC and the maritime commerce issues to the Ports Council.

Another suggestion is to bring the major benefits and end user applications to the first paragraph. Why would any legislator care about this prospectus? Emphasize up front that the observations will cut across all 13 issues that have been identified by the FOCRC.

Chris stated that his group has five points of lesser magnitude compared to the above proposal to develop two pieces. This group has trouble with the ports focus per se. There was a lot of discussion about defining the ports sphere of influence based on radial distance as well as perhaps using terms like coastal ocean or other terms rather than ports per se. Estuaries were not currently listed as among the ports. We need to have a better understanding of the state agency interests including the EPA and others like the Water Management Districts (WMDs) which are an overlooked potential. WMDs have thousands of sensors and responsibilities down to the shoreline. There are a number of federal programs in the state of Florida that are not linked to our COOS activities like the national estuaries and the national marine sanctuaries. There is a state agency dimension that is not yet integrated into our thinking.

It should be mentioned in the document that there are new opportunities due to technological advances such as in biosensors and autonomous capability in monitoring that would help with proper integration and development of the program. There is potential for satellite and other remote sensing to help advance the Florida COOS capabilities.

We need to recognize in the document the importance of data management and the generation of information and knowledge. Although it's implicit in the COOS concept, we must emphasize data sharing and data archiving as part of the prospectus. It will be important to understand and protect the interests of the commercial sector in this regard.

We have a semantics problem with the term PORTS. It conjures up a single point and we want to focus on a more broad observing system.

Kumar added traditional biological monitoring could be part of this statewide observation effort as well. While the emphasis in COOS is on real-time monitoring, the biological aspects should be emphasized in the prospectus as important albeit not real-time.

Frank added there is under-emphasis on outreach to data users and other operators. This should be prominent and part of this effort. If you don't do this the prospectus will be mired in the same perceived exclusivity issues as this organization.

Chris stated the overall impression is there is a tremendous amount of activity that needs to be linked together. We represent only a small fraction of this community, e.g. liaison to all ports for example. We don't have the resources to link these things yet. We have to put some things on hold until we get some resources started and expand the liaison activity.

### **3:15 PM Plan of Action - Tom Gustafson, NSU IGPP**

Tentative dates for the next meeting were discussed. After polling the audience for possible date conflicts Tom said he will distribute the next several meeting dates to the mailing list as soon as they are firmed up.

What we have looked at today is the draft that was called for at FL-COOS Caucus 2. The plan of action is to go for the money. Federal and state funds are the only two sources. The state is likely to come up with it first. The formation of the FOCRC came from state. We don't know yet if what we are trying to do will be on their agenda or not. The research plan has a January 2006 deadline. Resources have a February 2006 deadline. As much of "P-COOS" or however it is finally called, should be part of it. The idea is to initiate a state effort to push a national effort for a FL-COOS.

The initial FOCRC research plan will be smaller than the annual update, Tom continued. They are going to make recommendations. Money will have to ramp up anyway. Meanwhile they need to find out what the resources are. The first task FOCRC had to do was come up with a research review. Both activities are opportunities to fund what you think is important. That money could be leveraged with federal money.

Mark added DEP is water quality. That is the coastal health report card. That is continuing with the FL Gulf Alliance. There is a water resource monitoring council but not just water. All monitoring resources would be included. Kumar mentioned the FL coastal high hazards committee which deals with hurricanes and storm surges.

Frank commented that at the Federal level, the White House is going through a process to define the research priorities for the entire country, as part of the U.S. Ocean Action Plan. This process is focused at the NSTC's Joint Subcommittee on Ocean Science and Technology (JSOST). There will be a public comment process leading up to a White House report on priorities to be release in December 2006. Ellen Prager is engaged as Chair of the Ocean Research and Resources Advisory Panel to the White House's Committee on Ocean Policy. Florida needs to be sure that what we are trying to do is part of that document. How is the FOCRC linked with that document?

Mel Briscoe announced the National Academies of Science just made a call for additional names to be considered in a National Research Council committee that will review the JSOST research priorities document. Frank stated the JSOST draft plan reviews by the community are necessary because it covers so many things.

### **3:50 PM Closing Comments - Dean Peter Betzer**

Peter Betzer closed the meeting with thanks to everyone.

Additional written comments:

**Fri 12/9/2005 7:03 PM via email from Frank Muller-Karger**

I think the subjective comment that Chris made (i.e. "Chris stated that his group has 5 points of lesser magnitude."), should be deleted from the record and not considered in defining the strategy for the document. While Chris did make the statement, I for one am not sure why he did. It clearly reflects only his opinion, not that of the people that provided the input to Chris.

I am also concerned about the idea floated several times during the day, including during plenary, that Florida should consider developing its own IOOS/COOS Regional Association (RA). I personally don't understand this suggestion - RA's are a concept that was developed to help span political boundaries across states or nations. Within a single state we don't need additional formal bureaucratic structures, which bring additional costs, red tape, personnel, more parallel committees, etc. etc. I hope we can work within the framework of an existing state agency (e.g. perhaps FWCC's FWRI) to develop a coordinated approach to sustained operational environmental observing within the state, and strengthen our links to inter-state RA's to get the job done.

**Sun 12/18/2005 4:58 PM via revised minutes from Frank Muller-Karger**

[NOTE: I BELIEVE IT IS A MISTAKE FOR FL TO BECOME ITS OWN RA - THIS MAKES NO SENSE; the state of FL needs to serve that function, rather than additional bureaucracies being established]

TUE/20 DEC 05 from Chris Mooers

Though I currently think FL-COOS should strive to become an entity within both SECOORA and GCOOS, I must point out, regarding Frank's appeal below, that Alaska has its own RA (and, with a coastline comparable to Florida's, California even has two RAs); hence, it would not be unprecedented for Florida to end up with an RA if matters come to that.

Further, in an email exchange with me, Frank made the good suggestion that our plan be entitled "A strategy for linking Florida [NB: I have added "coastal ocean"] science and operational capabilities in support of economic development and ecosystem-based resource management".

**Tue 12/20/2005 11:53 AM via revised minutes from Chris Mooers**

Response to: Muller-Karger: On the SECOORA side I have not heard of any interest.

Chris Mooers: this is incorrect; from the getgo, both SEACOOS and SECOORA recognized the need and opportunity to connect to IOCARIBE-GOOS and CaRA.

Response to: Luther: The benefit is 5 to 8 million bucks/year.

Chris Mooers: Mark should include a rough estimate of the cost.