

1 **1st Binational Collaboration Workshop**
2 **U.S./Mexico Red Tide Programs**
3 **June 10-11, 2003**

4 *Tuesday, June 10, 2003*

5 *Tape 1A*

6 **Bryon Griffith:**

7 Welcome to New Orleans, Louisiana. On behalf of the Gulf of Mexico program and all
8 of our states and federal partners and our binational friends from Mexico, I welcome
9 everyone to what has turned out to be lovely weather for this time of year in New
10 Orleans. When you run a meeting of this sort in this city, you are just glad to start
11 anywhere near 8:30 with these many seats filled as we have in this room. Normally, we
12 have to go find you all down in the Quarter, what is called the French Quarter here. So,
13 welcome. I want to cover very briefly before I get into the expert panel presentations,
14 some of the logistics about our meeting, what you see in front of you and what it means.
15 First of all, we have many but not all of the presentations, and not all of them, we'll start
16 with mine, translated in both English and Spanish, to aid in the speed and continuity of
17 the process today and tomorrow. The two projector systems up here to my right are what
18 we refer to as a parking lot. What we will keep there are either the actions that together
19 we want to follow up on later, or the commitments that we will make during the course of
20 these discussions. This way, we will have a record that we can come back to as we close
21 out each one of the segments of the discussion. This room adjoining us, behind the green
22 wall in the back, we have acquired it strictly for the purpose should any of you care to
23 take colleagues aside in any of the discussions or to network later on. It is intended
expressly for that purpose for your use. So, please avail yourself with that. We have,

1 unfortunately, we federal folks have limited capacity to bring coffee into a meeting like
2 this, and I apologize for that in advance. But please feel free to get up and stretch your
3 legs, these are going to be a relatively long couple of days, go downstairs, and if you care
4 to get coffee before or between breaks or at breaks, of course, there will be water. The
5 headphones, I am told, are for your translation services. The representatives in the back
6 will translate each presentation in the opposite language of course. Everyone at their seat
7 should have one of the headphone systems and please check it out, make sure it is
8 working properly because if it is not, we certainly want to replace it for you as quickly as
9 possible. Well, I guess I realized just now that I opened without recognizing I am Bryon
10 Griffith. I am the acting director of the Gulf of Mexico program. Our office is located
11 about 50 miles to the east of here. We host many such meetings, not quite like this one,
12 but in the New Orleans area and again we are glad to have you. On behalf of my friends,
13 I like to allow everyone to give an introduction so that you, of course, we are going to
14 have an attendee list, the attendee list is as it was compiled in anticipation of everyone
15 being here. We have had some changes, as meetings like this tend to result in. We will a
16 concluding attendee list of the actual attendees of the meeting for you to, hopefully, leave
17 with when the conference is over. In advance, what I'd like to do is just take a moment
18 to ask each person in the room to introduce their name and their organizational affiliation,
19 so that all of you can get some representation of where we all come from. And I will start
20 with Bill Teague.

21 **Bill Teague:**

22 Yes, I am Bill Teague. I am from the Naval Research Laboratory. Mississippi,
23 oceanographer.

1 **Patrick Connor:**

2 I am Patrick Connor with the EPA office International affairs, Washington, D.C.

3 **Diane Regas:**

4 Good morning, I am Diane Regas. I am the director of the office of Wetlands, Oceans
5 and Watersheds, and the Environmental Protection Agency in Washington, D.C.

6 **Bryon Griffith:**

7 If I can get you to hold off just one second I am going to use this as a test. Is everyone's
8 headphone working?

9 **Merril Johnson:**

10 I am Merrill Johnson from the University of New Orleans, Department of Geography.

11 **Bryon Griffith:**

12 I know what the problem is; the folks in the back who actually do the translation cannot
13 hear you to conduct the translation over the headphones. So, if you would on the
14 microphones on the table if you can get near them.

15 **David Clawson:**

16 I am David Clawson - The Latin American Studies Director at the University of New
17 Orleans.

18 **Jim Lester:**

19 I am Jim Lester, I am with the Houston Advanced Research Center and I manage the
20 National Biological Information Infrastructure project which includes the Gulf of
21 Mexico.

22 **Rodolfo Martinez:**

1 Good morning, I am Rodolfo Martinez from the Papaloapan Development Council. I am
2 a GRS and [unintelligible] specialist.

3 **Armando Collier:**

4 Good Morning, I am Armando Collier of the Council of Development of the Papaloapan,
5 from the Government of the State of Veracruz.

6 **Juan Manuel Irigoyen:**

7 Hello, I am Juan Manuel Irigoyen from the state government of Veracruz, Papaloapan
8 Development Council.

9 **Marco Giardino:**

10 I am Marco Giardino with the Earth Science office of NASA at the Stennis Space Center.

11 **Sherryl Dae:**

12 I am Sherryl Dae with the Northwest Fishery Science Center and I handle data
13 management for the Harmful Algal Blooms program.

14 **Steve Mort:**

15 Hello, I am Steve Mort and I am with NOAA Marine BioToxin program in Charleston,
16 South Carolina.

17 **Tracy Villareal:**

18 Hi, I am Tracy Villareal. I am from the University of Texas at Austin.

19 **Quay Dortch:**

20 Hello, I am Quay Dortch. I am the [unintelligible] coordinator at NOAA.

21 **Nicolás Chantiri:**

22 Good Morning. Dr. Nicolás Chantiri, Director of Sanitary Regulation of the Health
23 Services of Veracruz

1 **Rosa Aurora Samar:**

2 A fine good morning. I am Rosa Aurora Samar. I am Assistant Director of
3 Environmental Health of the Health Services of Veracruz.

4 **Roland Paz:**

5 Good Morning. Roland Paz, GOVECA, Government of the State of Veracruz.

6 **John Meyer:**

7 John Meyer, U.S. Navy, Meteorology and Oceanography Command.

8 **Landry Bernard:**

9 Landry Bernard, I am with NOAA's National Data Buoy Center, at Stennis Space Center.

10 **Ralph Cambry:**

11 I am Ralph Cambry, National Data Buoy Center at Stennis Space Center.

12 **Larry Collazo;**

13 I am Larry Collazo with the National Coastal Data Development Center.

14 **Sonia Gallegos:**

15 I am Sonia Gallegos with the Naval Research Laboratory. I am an oceanographer there.

16 **Jesús García Cabrera:**

17 Good Morning, Jesús García Cabrera of the National Water Commission of Mexico.

18 **Francisco Moreno Quiroga:**

19 Good Morning, Francisco Moreno Quiroga, Federal Delegate from SEMARNAT in the
20 State of Veracruz.

21 **Amparo Martínez:**

22 Good Morning, Amparo Martínez, Advisor for Seas and Coasts of the Secretary of the
23 Environment of Mexico.

1 **Frederick Kopfler:**

2 Good morning, I am Fred Kopfler with the Environmental Protection Agency at the Gulf
3 of Mexico Program Office in Stennis Space Center, in Mississippi.

4 **Ana Laura:**

5 Good morning, Ana Laura, from the Ecology Institute, Coastal Resource Program.

6 **Quenton Dokken:**

7 Good morning, I am Quenton Dokken with Texas A&M University at Corpus Christi.

8 **Unintelligible name:**

9 Good morning, I am [unintelligible] with the U.S. Environment Program.

10 **Eduardo García:**

11 Good Morning, Eduardo García, from the Council of the Development of the Papaloapan,
12 Head of Fishing and Sustainable Development in the Papaloapan.

13 **Manuel Rodríguez Gómez:**

14 Good Morning, Manuel Rodríguez Gómez, Technical Director, Veracruz Aquarium.

15 **Kirk Wiles:**

16 I am Kirk Wiles, Director of the Seafood Safety Program, Texas Department of Health.

17 **Luis Benavides:**

18 Luis Benavides from the Secretary of Education and Culture of Veracruz.

19 **Rubén Morales:**

20 Good Morning, Rubén Morales from the Mexican Institute of Water Technology.

21 **Jimmy Johnson:**

22 Jimmy Johnson with the U.S. Geological Surveys and National Weather Research Center
23 in Lafayette, Louisiana.

1 **Zaira Padrón Cortés:**

2 Good Morning, Zaira Padrón Cortés from the Federal Commission for the Protection

3 Against Sanitary Risks in Mexico, the Federal District.

4 **Aída Albuerno y Piña:**

5 Good Morning, Aida Albuerno y Piña from the Federal Commission for the Protection

6 Against Sanitary Risks of the Secretary of Health. I am the General Director of Sanitary

7 Control.

8 **José Luis Díaz:**

9 Good Morning, I am José Luis Díaz, Executive Director of Sanitary Supervision of the

10 Federal Commission for the Protection Against Sanitary Risks of the Secretary of Health.

11 **Virgilio Arenas:**

12 Good Morning, I am Virgilio Arenas, Director of the Center of Ecology and Fishing of

13 the Veracruz University. A pleasure to be with you.

14 **David Gómez López:**

15 Good Morning, David Gómez López from the Center [unintelligible] of the Veracruz

16 University.

17 **Francisco García:**

18 Good Morning, my name is Francisco García, I am a researcher from the Veracruz

19 University in Mexico.

20 **Manuel Jesús Angulo Romero:**

21 Good morning, my name is Manuel Jesús Angulo Romero. I am Secretary of Ecology

22 for the Government of the State of Campeche.

23 **Luis Jorge Morales Arjonas:**

1 Good morning, Luis Jorge Morales Arjonas, Secretary of Ecology of the State of
2 Yucatan.

3 **Paul Lee Jack:**

4 Paul Lee Jack with the Florida Department of Agriculture, Division of Aquaculture.

5 **Rich Pierce:**

6 I am Rich Pierce, Director of the Center for EcoToxicology at Mote Marine Laboratory.

7 **Mary Culver:**

8 I am Mary Culver; I am at the NOAA Coastal Services Center in Charleston, South
9 Carolina.

10 **Brian Bendiss:**

11 Brian Bendiss, I am with the Florida Fish and Wildlife Commission, in Saint Petersburg,
12 Florida.

13 **Karen Steidinger:**

14 I am Karen Steidinger, Florida Fish and Wildlife, in Saint Petersburg, Florida.

15 **Darlene Haverkamp:**

16 Darlene Haverkamp, Florida Fish and Wildlife Conservation Commission, I am the Data
17 Manager.

18 **Tim Orsi:**

19 Good morning, my name is Tim Orsi; I am with NOAA's NCDDC at Stennis Space
20 Center.

21 **Jeanne Allen:**

22 I am Jeanne Allen; I am also with the National Coastal Data Development Center.

23 **Tom McIlwain:**

1 I am Tom McIlwain; I am with the NOAA's Fisheries Science Center out of Miami.

2 **Joe Stinus:**

3 Good morning, I am Joe Stinus. I am with the National Coastal Data Development
4 Center, out of Stennis Space Center.

5 **Frank Muller-Karger:**

6 Good morning, I am Frank Muller-Karger, I am with the University of South Florida and
7 also with the U.S. Commission on Ocean Policy.

8 **Carlos del Castillo:**

9 Good morning, my name is Carlos del Castillo; I am an oceanographer with NASA at
10 Stennis Space Center.

11 **Larinda Tervelt:**

12 I am Larinda Tervelt, Environmental Protection Agency, Gulf of Mexico Program Office.

13 **Gloria Carr:**

14 Gloria Carr, I am with the Gulf of Mexico Program Office.

15 **Bryon Griffith:**

16 And all of you met Terry because you registered coming in, my special assistant. Well,
17 again, welcome. That was a little stretching exercise because we are getting ready to start
18 two days of very hard work. As we look at the agenda together, and before I do that, I
19 want to make one recognition. If Mr. John Stinus and Mr. Juan Manuel Irigoyen López
20 would please stand up, and Dr. Marco Giordino too, I just want to recognize the folks
21 behind the scenes that actually helped put this together. Without them, we, actually,
22 would not have this meeting today and I hope you will get to know them very well over
23 the course of the two days and the days to follow. Thank you gentlemen.

1 Applause

2 The agenda, while it's very structured, is also very adaptive. The idea that what we are
3 about to try to accomplish here in the course of just two days is to lay out the elements of
4 a coordinated and collaborative plan to join our Harmful Algal Blooms programs
5 together. I was reminded this morning that the word is harmful, not hazardous. Our
6 Harmful Algal Blooms programs together as essentially a stepping stone to what we hope
7 to be many other activities in the future related to our sharing of the ecological
8 environmental issues in the Gulf, particularly as they relate to observing systems
9 frameworks, an observing system procedures and processes. With that in mind, as you
10 look at the agenda - and as I said - while it is structured it is also very adaptive, it is
11 intended to have you participate, and I could not possibly over-emphasize that. During
12 the course of time in which we'll be in those areas of sampling procedures and protocols,
13 information technology, frameworks, and the others, I am very very hopeful that you will
14 engage the experts. It is hard to assemble them all at one time in a room like this, I hope
15 you'll engage the experts individually in the course of those discussions to the point
16 where we can isolate the opportunities and the issues to move ahead. So, one point I'd
17 like to make is this is a workshop for you. It is not intended to be a presentation from this
18 podium to you. So, I will invite your strong and aggressive participation. In light of that,
19 as I said before, we will close out each of the segments over here with these parking lots,
20 and make sure that we have captured the primary aspects of either the things we've
21 agreed to or the things we need to follow up on. Again, that will require your
22 participation and confirmation that we have indeed gotten it right. I am just going to take
23 a moment and give you a perspective from the Gulf of Mexico program office as to the

1 importance of this workshop and what it means to us. In essence it is the first binational
2 workshop certainly for us to address any theme related to sharing issues of ecology and
3 the environment even though we have been involved in very specific technical work with
4 many of the organizations in the past. Certainly, looking at the responsibilities we share,
5 we do indeed have together one of the most economically productive and ecologically
6 important ecosystems in the entire world. And it is a very complex one as well. When
7 you drain the water from the Gulf, and think about its processes, we have a nearly
8 enclosed sea. The combination being that the influences of the effects of our river
9 systems, our near coastal system on each other is profound. It only makes sense that we
10 share in this responsibility and consequently need to share in such programs as we are
11 talking about today. If I am successful at this, give me just a moment, I am going to try
12 to bring two animation models of the Gulf, both the current and salinities that I want to
13 talk about in a minute. As the slide points out, we not only share the ecosystem
14 responsibilities because, instead, it shares us, and whatever influence we have on it. Bear
15 with me. When you look at these two models in simulation, they are actually as current
16 as of three days ago running since February. What we have here on the left side, the
17 currents' model. At the end of the model as it nears the latter days of June, you'll
18 actually see an eddy pinch off of the loop current. In combination, if you look at the
19 right, on the salinity model, interesting illustrations are the effects of our [unintelligible]
20 systems as they transport a whole host of things into this nearly enclosed sea that
21 obviously do not stay confined to the political borders that we manage. My point being
22 that whether it is Harmful Algal Blooms or other issues of transboundary focus and
23 consideration, this ecosystem is dynamic. It is very interactive. Correspondingly, as we

1 look down the road to the issues of Harmful Algal Blooms, and advance the research
2 together, it is tools such as these that are strongly, in fact, almost exclusively, aided by
3 observing systems technologies that will lead us along the path to the solutions towards
4 better management of these adverse impacts of the nature of the Harmful Algal Blooms
5 would actually create for us. With the focus on *Karenia brevis* or red tides, in this
6 conference, as you heard the representative speakers tell of where they come from, each
7 comes from the red tide programs from a different perspective: from observatory and
8 sciences, to practicing application managers like Karen Steidinger or Kirk Wiles, and
9 your own State Departments of Health and ecology. What do you do once the blooms
10 have actually occurred and are set up off your near coastal boundary? What effect has
11 that on your shellfishery industry, your tourism industry? I know that one of the
12 representatives from the Aquarium for Veracruz is in the audience with us today, and his
13 intakes for his aquarium system reach out into the Gulf of Mexico and the devastating
14 effect of a red tide, *Karenia brevis*, organism could be devastating. It matters not terribly
15 individually what our perspectives are, as much as we have to manage the effects of these
16 phenomena together. Within the U.S. which is where I had the opportunity to meet Dr.
17 Chantiri and Juan Manuel in Saint Petersburg in early December, it became evident that
18 this was an excellent stepping stone or bridgework theme to begin to bond together,
19 integrate our respective programs around. Because we have so much in common to focus
20 on managing if not one day mitigating the issue down the road. The moral to the story of
21 this slide is “we affect each other”. Having said that, to get the kind of interest, both
22 federal and from state program managers, at least on the U.S. side, and I must be very
23 candid with you, you have to focus on the economy as well as the ecology, it is a

1 sustainability issue. That is the focus of our program. The economic impact of the Gulf
2 of Mexico in and on the U.S., as I am sure it is in Mexico, is profound. In a moment I
3 can only present you this morning the economics of the U.S. side of that equation. I can't
4 help but as go through this, imagine that the combined economics from your country with
5 respect to that would make our, in fact, the annual impact, the effect of the economy of
6 the Gulf of Mexico, the production of the Gulf of Mexico, far greater than the Gross
7 National Product of many countries of the world. With that in focus, let me take you
8 through it. When we split the system in half and focus on the U.S. side we have two
9 specific fisheries that are dependent on the ecology of the Gulf. The shrimp and oyster
10 industry, just to feature two - of which there are more - the takings of shrimp in the Gulf
11 are 80% of the national domestic takings of shrimp and 60% of oysters. These are two
12 very important fisheries; in fact, shrimp is the number one fishery in the U.S. Our
13 recreational fishery accounts for over seven billion dollars in annual economic impact.
14 1.9 million anglers, which I am proud to say I am one, but I have not entered the water
15 but one time this year, and the expenditures which are actually conservatively weighed
16 here, do not account for all of the secondary markets associated with this particular trade.
17 Tourism, by far the leading of direct impact on the near coastal economy, 16 billion
18 dollars in annual spending along the five gulf coast states of the U.S., 25 million visitors
19 per year. Energy, needless to say, the focus of the current time, 90% of our U.S. offshore
20 production and 38% and 48% of our natural gas reserves, respectively along the Gulf rim.
21 It suffices to say, again, if I could imagine that in joined value we have so much at risk
22 we have no real choice except to manage it together. So, therefore, we need to find the
23 areas that are easiest to connect with and join those strengths to address those issues.

1 With respect to the issues, they can be, in some cases, overwhelming. I am reminded of
2 my dinner last night, I had the opportunity to meet with Juan Manuel and some of his
3 staff. We shared similar problems. We have very small staffs covering very large issues
4 in very large areas, too many issues. In the U.S. we tend to concentrate, and hopefully,
5 for the right reasons to form enough of a critical mass around something to make a
6 difference, we tend to focus on priorities. Priorities can, admittedly, be politically driven,
7 economically driven, which don't tend to distance too far from the politics, whatever they
8 are; they are the priorities of the day. That is how we begin to build the basic building
9 blocks of the systems that we have. In the public health arena we have three featured
10 priorities on the U.S. side today. In the Gulf of Mexico program, all of the representative
11 state and federal government here at the table have helped us focus to narrow our public
12 health issues down to those of shellfish growing water recovery. This is actually a
13 spillover to our interest and program investments in harmful algal bloom observing
14 system advancement. Harmful Algal Blooms beyond the basis of shellfish, public
15 bathing beach safety, and the like, is simply an offshoot of that. Seafood safety, most
16 recently, mercury, for those of you that would see the national and the international press,
17 is an issue. There is a very heightened political interest in mercury in seafood,
18 particularly large (?) species of fish, tuna, marlin, if you can imagine eating a marlin - I
19 can't imagine eating a marlin personally - king mackerel, swordfish, and the like. When
20 we look at nutrient enrichment, and if you remember the slide relative to the salinity
21 model running in the Gulf of Mexico, we have a particular focus on that zone of
22 distribution right in the center of the Gulf, which is the mouth of the Mississippi river, the
23 largest river in system in the U.S.: Gulf hypoxia. Gulf hypoxia is a zone of low dissolved

1 oxygen that sets off of the continental shelf in Louisiana and extends into Texas. These
2 days it now borders on the size of the state of Massachusetts - 8500 square miles. It sets
3 up typically about this time of the year or a little earlier and the duration extends up and
4 well into the fall and early winter season. This particular focus on hypoxia relates to
5 nutrients introduced by these large riverine systems as a result of land based activities.
6 Again, as we look at the models and imagine the similarities in our systems, and I look at
7 the basins and the river systems in Mexico and the advancement of development in
8 agriculture and prosperity for that matter, there are also issues that go along with that and
9 if you think again about that nearly enclosed sea, we are introducing more and more
10 together to that nearly enclosed sea that is actually having, we believe, an effect.
11 Together as we look at the impact on Harmful Algal Blooms the research is very undone
12 in this area. But the suspicion associated with the introduction of nutrients from these
13 systems as the fuel or source to Harmful Algal Blooms is the science that has to be
14 advanced and the conclusions credibly offered from those programs but needless to say,
15 these are intermingled issues and situations. Whether you call it harmful algal bloom one
16 that creates a public health issue by associating with respiratory impact of shellfish
17 poisoning, in the case of gulf hypoxia it is still another algal bloom that expands in
18 scopes of which basically absorbs the oxygen from the bottom orders of the shelf. This is
19 terribly harmful to other species others than ourselves. Coastal habitat, I hate to be the
20 one to report to you, in fact, if you did not already know this, the last hundred years over
21 50% of the coastal wetlands and 20 to 80% and approaching 100% in some estuaries of
22 our sea grasses have been lost in the five northern gulf state region. This is particularly
23 alarming. In light of the fact that if I were to, again, back up to those fisheries values.

1 Those fisheries are so interdependent on the vitality and sustainability of these wetlands
2 areas, in particular these near coastal sea grass and marsh areas, I couldn't begin to tell
3 you how critical that this could ultimately result in being for all of us. The fisheries that
4 you harvest and the fisheries that we harvest are interdependent on the health of this
5 patient, if you will, in its totality. As we look at one the largest systems in Louisiana, the
6 Louisiana Coastal wetlands, literally, just southwest of where you are stationed here for
7 this conference for the next couple of days, the red at the bottom of the slide indicates the
8 anticipated loss of coastal marshes in Southeast Louisiana in the next fifty years. Now,
9 as that changes, both the structure of that largely productive nursery, the salinity regime
10 associated with those highly productive oyster growing areas, shrimp, nurseries and
11 habitats, we can't help but anticipate that we will see a profound impact down the road in
12 terms of if we are not able to, in some regard, mitigate and reverse this trend. For
13 anecdotal sake, that energy industry that I referenced earlier essentially centers its landing
14 basis off of these three coast of this deltaic system. They are what you might look at in
15 terms of the value of the fishery approaching a billion dollars in annual revenues. The
16 infrastructure there is in the many billions of dollars at risk. The reason for my pointing
17 this out is that it doesn't matter from which angle you come at, as long as you get people
18 associated with the problem to address it from their advantage point, the outcome is the
19 important thing. We want the oil and gas industry, they are very concerned, to be
20 focused on the vitality and sustainability of this system. We want the fishing industry,
21 we want agriculture, we want municipalities, and the impact and sustainability associated
22 with them, and the impacts that they have. The last one that I am going to feature for you
23 is invasive species. This slide shows the Australian spotted jellyfish. It was introduced

1 just a few years ago to us. It adds up to the many thousand of others that have taken
2 residency here. Just to give you an idea of the effect and impact of this animal, it used to
3 be the size of a trashcan. You could literally, when they set up that summer, in the
4 northern gulf, it looked like you could walk on them between the islands. Now, if you
5 are a shrimp fisherman dragging a trowel, you could imagine what it is like to pick up a
6 net full of these. I can tell you what it's like; the boat comes to a screeching halt. You,
7 needless to say, don't catch any shrimp, and it was devastating to the industry on that
8 particular year. The scientists, like so many other scientists predicted that the organism
9 came from Australia and that the conditions in the gulf were not conducive after the
10 winter to harbor it over until the spring. Karen, I don't think that proved to be true, did
11 it? We still have them in the gulf. If you think of similar animals like the zebra mussel,
12 when it entered the Great Lakes, they said it would never leave the Great Lakes area. But
13 they have a tendency to prove us wrong. The point being that the focus on invasive
14 species is just now, for all intended purposes, starting. Again, I'll put the currents model
15 slide back in. Overlaying it with the shipping vectors, when you see those shipping
16 vectors and the transport arterial system of the gulf, associated with ship balanced and
17 ship fouling, you see where a lot of the issues of the species that we face, we actually
18 reach out and invite in. When you think about this conference and initial development
19 and, hopefully, the long term development and maintenance of an observing system, we
20 must be more capable of advancing the knowledge that we have these organisms now in
21 the gulf. That they are -in fact - right now set up in Tampa Bay. If there is any chance,
22 which as the science has proven to deal with invasive species, it is then and there or
23 never. You will manage them into perpetuity. Only through the ability to communicate,

1 transfer the technology, the understanding and the research, can we have any chance
2 whatsoever in the future of addressing these issues. We do trust that the success that we
3 hope to achieve in this workshop will be the foundation to address many of those other
4 issues that are priorities we can't help but think are common between us in the coming
5 years. We are just so very thankful and honored that all of you are here to take up that
6 mantle on that theme today as I am sure we'll all get to know each other very much better
7 over the coming months and years as we take up others in the future. I thank you again
8 and welcome you and look forward to a great conference. The last slide in the back cover
9 of your book is that we are one gulf, and only one community. It's future is totally
10 dependent on us. Let's start here. Juan Manuel, if you'll join me, I'd like to turn the
11 podium over to you.

12 Applause

13 **Juan Manuel Irigoyen López:**

14 Well we have to be very thankful for a gracious welcome and words of our host, Bryon
15 Griffith. We are going to speak later on about the Remote Sensor application that we are
16 using in Veracruz. It is a pleasure to be here in New Orleans. Our workshop constitutes
17 an excellent opportunity to launch binational coordination at different levels in order to
18 understand and prevent the red tide phenomenon in the coast of the Gulf of Mexico.
19 There is no need to expand on the importance of international regional cooperation to
20 face current environmental problems. As an example let me elaborate briefly on another
21 problem that will require attention in the future. According to information provided by
22 NASA, between 1982 and 1999 the climate became warmer, wetter, and sunnier in many
23 parts of the world. Nearly 20 years of satellite observation of earth's vegetation revealed

1 that these changes increased the overall productivity of land plants by 6%, productivity
2 that is the net outtake of carbon increased the most in tropical regions and northern
3 latitudes. In the tropics, climate changes resulted in fewer clouds and more sunlight,
4 while in the north temperatures increased. Productivity increased as climate change
5 eased the normal constraints on plant growth in a given region. This problem will require
6 attention of our countries very soon. Today we are meeting here because of another
7 complex problem related to the environment: red tide phenomena. Since our previous
8 meeting held in 2001, because of its negative impact on public health, the red tide
9 phenomena came to be considered as a priority. Considered as a common problem that
10 surpassed all borders, both state and national. As such, it was determined within our
11 health and environmental working groups to be a top priority. Today we are opening the
12 future to a homogenous binational system of red tide monitoring for the coast of the Gulf
13 of Mexico. As Dr. Nicholas Chantiri will explain later, the first important steps have
14 already been undertaken by the public health authorities. Our expectation is that this
15 system will be adopted in both oceanic coasts and by the three NAFTA state members.
16 However, I would like to emphasize that the main outcome of our workshop should
17 define how to start working together, to standardize equipment, and sampling methods
18 and protocols with present resources. We need to diffuse the information among
19 scientists and end users in order to develop in the future a common monitoring system. It
20 is important to mention that the Mexican Federal Government is now participating with
21 us, strengthening the purpose our efforts and decisions that we arrive at the end of the
22 workshop. So, it is my pleasure to welcome the representatives of the COFEPRIS, which
23 is the National Commission against Sanitary Risk, the Environment and National

1 Resources Secretariat, the National Water Commission, and the Water Technology
2 Institute to our meeting. We welcome them. It is the first time that we have them in this
3 health and ecology panel. We have also confirmation that a couple non- gulf states should
4 be attending our meeting, we expect to have them later on. In our particular case, the
5 Papaloapan River Basin Development Council, that is the organization that I head, is a
6 public regional development organization of the state of Veracruz. Our commitment is to
7 develop and preserve the estuarine zones located on our coasts. We are also committed
8 with the rest of you in the gulf area. With that in mind, we have collaborated proactively
9 in this health and environmental GOMSA working group. It is with this broad
10 commitment that in conjunction with the health authorities of Veracruz, we have
11 collaborated in the organization of this workshop on the Mexican side. So, I am glad to
12 welcome you to the first binational workshop on red tide programs in the Gulf of Mexico.
13 Finally, I would like to express our deep appreciation to Mr. Bryon Griffith and his
14 special assistant, Mrs. Terry Teak, as well the rest of their EPA colleagues for their
15 excellent work performed in organizing this workshop today. Thank you.

16 Applause

17 **Bryon Griffith:**

18 Two more logistical items and we are going to boat into the panel sessions. First, you'll
19 notice that my staff made me take a leadership role and appear without a tie on. That is
20 not to embarrass anyone with the tie, it is to invite you to take it off during the breaks.
21 We would like you to be as comfortable as possible, it is New Orleans, it is now nearly
22 summertime, as would be evident if you were to just walk anywhere near the windows.
23 The course of the workshop will be business-casual. We would like you to be as

1 comfortable as possible. Secondly, in the course of participating in the workshop, when
2 you should ask a question, or for that matter should be recognized to answer questions, it
3 would be appreciated by the translators if you step to the speaker in the middle of the
4 room. That will allow them to broadcast that question to everyone in the room and for
5 everyone to be able to participate in the discussion at that point. Please take that into
6 consideration. Well, we are a little behind time but I should have anticipated that with
7 respect to registration of a meeting of this size. I have no doubt that we will make it up
8 over the course of the two days. Sometimes I am also reminded that there is no end to the
9 amount of time that we can spend on this in the two days. With that, I would like to
10 introduce Dr. Frank Muller-Karger.

11 **Dr. Frank Muller-Karger:**

12 Good morning, everyone. Welcome to the United States. I am going to speak in English,
13 but I can take questions in Spanish. I welcome everybody, government officials from
14 Mexico and the U.S. and academic friends. I was asked by Bryon Griffith and Juan
15 Manuel Irigoyen to give a summary of what we are doing in the gulf with respect to
16 observing systems. I am going to give you a quick of some of the elements of these
17 observing systems, I am also going to talk about what I do, and all this is coming together
18 in what we call the Integrated Ocean Observing System. I will try to summarize some of
19 the things we did last December and how we bring Mexico into this observing system.
20 The objective of the presentation is basically that. I am going to try to bring in Mexico at
21 the end of the talk and see how we can accomplish what Bryon talked about. I am going
22 to talk briefly, if you have questions later on, about what this IOOS, this Integrated Ocean
23 Observing System is all about and let's talk, what the relevance of this binational

1 workshop is regarding this observing system and then to find a strategy to incorporate
2 Mexico. Let's start with this IOOS, for those of you who might not have heard about
3 this, all of you have probably heard of GOOS - Global Ocean Observing System, this is
4 how this started a little over ten years ago
5 (Break on tape - end of tape 1a)
6 ... the direction of the ocean and the weather and the land and so on, and it is justified by
7 social, economic, and scientific needs. It is trying to bring these things together. If you
8 want to think of the weather system for the ocean, this the kind of thing we are talking
9 about here. It is being coordinated by an office set up at the federal level called Ocean
10 dot US, it is not really an office, unfortunately, even though it has a lot of recognition, it
11 still doesn't have that status yet, and that is one of the things we need to change. It has a
12 small staff, but it doesn't have much control over money, which is really what makes
13 things happen. It is controlled by something called the National Ocean Leadership
14 Council, Research Leadership Council which is supposed to have more money, but it still
15 doesn't have all the power that it should. This is the kind of thing we are drifting toward;
16 we are making these things more effective. The IOOS, we call it "the U.S. contribution
17 to the Global Ocean Observing System." It has a global component. It has a coastal
18 component, which is basically what we are talking about here. One of the most important
19 things that it has, is a data management and communications component. In fact, there is
20 going to be a meeting of this DMAC - Data Management and Communication subsystem
21 in Maine, later this week. I know Mary Culvert and I, and probably several of you, will
22 have to rush out of this meeting to go over to that meeting and see what they are doing
23 over there. Here is where we go from the national system, IOOS, to the more regional

1 system, this is what in the Gulf of Mexico we called GCOOS - the Global Coastal Ocean
2 Observing System - now the IOOS in the U.S. is supposed to be made up of regional
3 organizations that together make up the coastal observing system. This is just happening
4 now, the boundaries of the regions of observation and the regional systems are not quite
5 defined yet. This is an incipient system. In the Gulf of Mexico, W. Nalden, together
6 with several of us, has taken the leadership to try to put together a coordinating system,
7 but how do you coordinate a bunch of rowdy scientists to come together and share data
8 and ideas and be of use to society? The idea was to bring several of the things that are
9 happening in the Gulf of Mexico right now, we already have systems that have sprung up
10 from research labs for continuous observation. We have satellite products and several
11 labs. We have models that are being produced. We saw some that Bryon showed. We
12 have several other products that could be put together if they can be coordinated. Each of
13 these individual observing system has come from the ground up. They could be more
14 useful if they were integrated in a broader system. This is all supported by a variety of
15 sources, from industries, to government, to local sources. That is one of the big issues.
16 How do you keep supporting this? Can it be sustained? I am going to go through a very
17 quick tour of what the elements of this observing system are, and then get into how we
18 have tried to organize the GCOOS and the Gulf of Mexico. This is a summary; it's
19 probably not comprehensive of what is happening in the northern Gulf of Mexico. This
20 GCOOS is in fact very U.S. centered. It is focused on the U.S. coast. Here is where we
21 can have a tremendous collaboration with people in Mexico, in expanding this as Bryon
22 showed, attaching the bottom part of this and having a comprehensive ocean observing
23 system for the Gulf of Mexico. These are basically buoys, meteorological buoys or

1 coastal buoys; they measure winds, tides, salinity, etc. Some of them have current
2 meters; some are a bit more sophisticated and have optics, like fluorometer on them. It is
3 still a sparse system. Most of them have data that are collected individually. Very
4 recently, with the help of NCDDC and the National Data Buoy Center of NOAA, some
5 of this data is being collected and collated through NOAA, and then it goes through
6 quality control and then it is served out to the public at large in a coherent way. We also
7 have several institutes around the periphery of the gulf. There are many others in the
8 U.S. and there are some in Mexico that collect Real-Time satellite data. I will take the
9 opportunity to show you some of what I do. Our institute is called Institute for Marine
10 Remote Sensing. We collect MODIS data. The University of Colorado collects and put
11 together maps of altimetry for the Gulf of Mexico. You can go to their web page and
12 animate the data. We also have Remote Sensing at LSU in Louisiana, where they have
13 both capabilities for collecting [unintelligible] the same as we do, and at the University of
14 South Florida. To give you an idea of what you can do with some of this data, I will
15 show the capability of the University of South Florida. We have web access and analysis
16 tools for this data that are very unique, and I want to make sure you understand that you
17 can use, without knowing anything about satellite data, you can go into these web pages
18 and use the information, not just look at a picture. We have MODIS data, MODIS is a
19 Modern Resolution Imaging Spectro-Radiometer that NASA flies. There are two of them
20 flying right now in space. It collects data on sea surface temperature, and chlorophyll
21 and other optical parameters. We have SeaWiFS, which is also an ocean color sensor
22 that also gives sea surface temperature. In our website we also have coral reefs
23 information which is very important, because we are working with some groups in

1 Mexico as well as some in the U.S. to put together this website that offers satellite data
2 basically free through the web as well as interpretive products based on ArcIMS. An
3 example of what we offer is we have brought MODIS with the sea surface temperature
4 data and ocean color products, like chlorophyll into a GIS system. You can bring down a
5 picture from MODIS and you can overlay coastlines and grids and so on. But what is
6 really neat about ArcIMS is that you can download the data and put your own layers on
7 top of these images without knowing anything about the satellite data. You can see
8 patterns and color, patterns and temperature, and you can put wheel tracks or polygons
9 that show HABs on top of these images. You can zoom in, or out. This is an example of
10 a MODIS high-resolution data. MODIS is a sensor that provides us almost daily images
11 of the entire Gulf of Mexico, the entire Caribbean, East Coast of the U.S. 250-meter
12 resolution and 500-meter resolution. Those are available in our website also. An
13 example of another tool that is available for sea surface temperature and pigment
14 concentration is this here. If you go to our website you'll find we have information for
15 sea surface temperature going back to 1997. For SeaWiFS we have information since it
16 was launched. You can click on each one of the daily products; we have daily composites
17 and weekly composites. You can click on the image itself and you'll get a little table.
18 Whenever you click, you'll actually get a reading of the chlorophyll concentration or of
19 the temperature right on that spot. Alternatively, you can go down to the bottom, left
20 hand corner and input latitude and longitude and it will give you the chlorophyll or the
21 temperature at that location. I don't think anybody else has this kind of thing on a website,
22 where you don't need to know anything about the satellite data. It is just not a pretty
23 picture anymore, it is data, and you can input your track or you can get data on a

1 presumed track and copy and paste onto a spreadsheet, for example. It is taking us a lot
2 of work to do this and I thank Karen Steindinger for providing the funds to do this. She
3 is actually the one that funded this and made it a reality. We also have a red tide
4 detection research program where we take several different bands from these multi-
5 spectral sensors and put them through a classification scheme. We've worked with the
6 ecoHAB people off the of Florida and we can make maps like this where we can actually
7 track, detect and track red tide blooms. We essentially cover the whole intra-Americas
8 seas. All of what you see here, we can do anywhere in this entire area. You are welcome
9 to come in and work with us - if you are interested in these very broad, synoptic scaled
10 data. To show you the other thing that we are doing and the kind of thing that we have
11 for Mexico as well as for the U.S.. These are LAN sap scenes that we have for which we
12 are doing a coral reef map. We are funded by NASA to do this at a global scale. We are
13 trying to make a map of different types of geo-morphological structures on reefs. Of
14 course, the LAN sap data is available to anybody that wants it. In the Gulf of Mexico,
15 there are several modeling programs. Some of them are very high resolution on the shelf.
16 I understand that the Navy now has a 1/16th degree model resolution for the entire gulf.
17 Is this correct? That is an incredible step forward. There are some that focus on the
18 Texas/Louisiana coast, others focus in Florida. There is another regional association of
19 observatories called the SeaCoos that wraps around Florida. All of these things are now
20 available and our intent is to put this on the web, for example, we could overlay some of
21 the products from these models or some of the buoys on top of satellite data, and that is
22 where we are going with the tools that I showed you. One of the big components of the
23 observing system, the GCOOS, the Gulf of Mexico Coastal Ocean Observing System, is

1 data management. How do you get all this stuff, how do you pipe it in into a location,
2 serve it out? Are we always going to be in the mode that each individual has to go and
3 track each individual data set? Or can we get these products integrated in some way?
4 That is where this concept of the data management communications subgroup comes in
5 the Gulf of Mexico. This has been funded through National Ocean Partnership Program
6 via the University of Rhode Island, Texas A&M, and spread about in the Gulf of Mexico.
7 With a program called NVOADS - National Virtual Ocean Data System - this is actually
8 being adopted by the national system. It is based on something called Open Dot, and it is
9 a transport mechanism where you go to a spreadsheet or NATLAB, or IDEAL and you
10 make a query for data, this singles out on the web. You don't have to know where the
11 data is. It goes out, gets the data and brings it to your computer in the right format. For
12 example, our MODIS data at USF is served through this program. We belong to this
13 NVOADS program. It is served to the world via Open Dot. Anybody who has an Open
14 Dot client can get our data in Windows for example, the MODIS data, right from our
15 servers. That is what we are moving toward. The intent is to have Open Dot be the base
16 transport, for not only the GCOOS, but also IOOS in general. There is a formal process
17 for these ocean-observing systems to develop, you have to come up with a vision, a
18 mission, a business plan and propose to the IOOS to show them that you are real. That
19 there is actually somebody there who is going to manage the shop and be able to manage
20 an observing system. We, recently, met here at Stennis Space Center, in Mississippi, and
21 developed the vision, the mission, and signed a piece of paper, we actually created the
22 GCOOS. With this vision, it is established to sustain an observing system to do this kind
23 of thing. These bullets here are shared by all observing system in the U.S. It is part of

1 the IOOS, the Integrated Ocean Observing vision. It is really to predict climate, to serve
2 society, to protect property, help monitor the environment. These kinds of things that we
3 all really want to do. They are all interrelated goals. The only way that they are going to
4 be interrelated is if we share this information and put it all together. You can read our
5 declaration of formation in the pages in your book. We want to start with making an
6 inventory of who can provide data. The whole point of the game here is to provide data
7 openly. We all agreed that we are going to share data openly. This is a basic tenet here,
8 especially if we are going to get federal money. In my opinion, anybody that gets federal
9 money should put the data out there and have people share it because we all paid for it.
10 This is going to be a basic baseline tenet of this Integrated Ocean Observing System, at
11 least I hope so, there are still a lot of people that get a little bit antsy when somebody says
12 something like that, but I hope that we all buy into that. I have learned that if I don't put
13 my data out there, it is likely that it will never be used. I feel lucky when somebody uses
14 my data because it is probably a paper I could have never written. It takes a while to get
15 to that realization. It takes me a long time to convince my students that they have to just
16 give it up. We want to have a user form. We need to have initial input from users as to
17 what products they want, what do they need, and have a process of feedback where that
18 product is improved through user feedback. Researchers are building this from the
19 bottom up, primarily. A lot of these researchers have their own idiosyncrasies about data
20 property, intellectual property, data format, and so on. The truth is that we actually have
21 to turn this around. We have to have people that tell us what it is that they need for this
22 thing to be operational and effective. We want to find out what the priorities are for the
23 federal network, priorities for regional enhancements and then find out how to link all

1 this together especially in the international sense. Well, one the things we want to do
2 with GCOOS is bring in Mexico and Cuba. This was discussed at length at the GCOOS
3 meeting at Stennis. There was a lot of back and forth between some people. Some
4 thought it was a good idea, others didn't. What do we do with Cuba, for example? The
5 whole point is that we are trying to develop a network of observation, so we need to look
6 at where stuff comes from. There is a lot of water that comes through the Yucatan Strait,
7 some of it gets re-circulated, and some of it gets back to the coast of Mexico and the
8 western gulf. We all live in this place together so we have to collect the data together and
9 share it. I can't over emphasize this point. In your book, there is a resolution that was
10 signed by all the members. I hope the people from Mexico take this resolution and study
11 and see if we can expand this group of people that signed this resolution to become part
12 of the GCOOS to make it an international system. I think that is a conceptual step at this
13 point, but it will be a very important step to give some validity to the idea that we can
14 have an international GCOOS. The resolution is in your book, please read it. I will be
15 here until about noon tomorrow, or you can email me or you can email W. Nalden and
16 see if we can actually get you to sign up to this system. The formality of this regional
17 association that we are calling GCOOS, is not there yet. Recently NOAA had a call for
18 proposals from the Coastal Services Center, and maybe Mary can talk more about where
19 this is going. They had a call for proposal to establish a couple of pilot programs to
20 actually implement a real regional observing system. They also had some funding
21 available to coordinate some of the, let's call it, the incipient bureaucracy, of some of
22 these observing systems. Several people in this room helped put our proposal together
23 through Texas A&M to create this GCOOS formally and put the proposal in to the CSC.

1 I hope it happens, it is not major funding, but it will provide funding for a series of
2 meetings that we actually develop a business plan that then can be submitted to the
3 National Ocean Partnership program to get funding. This is the resolution. This is what I
4 would like you to read - especially people from Mexico. People from the U.S. that have
5 not participated in this, and if you want to be a signatory to this, I welcome you very
6 much. The idea is, you collect data, you want to be considered as a partner in this and
7 you will provide data openly to the group. There is an issue here with intellectual
8 property if you are a commercial or industrial provider. I think the language now reflects
9 some of the issues that have to do with industry proprietary data, and we are trying to
10 accommodate that as well. Your book also has a list of the present signatories, again,
11 there is nobody on that list from Mexico. It would be great to start adding people from
12 Mexico to this. Even from the U.S. point of view, individuals have come up and signed
13 up, we don't have to be officially sanctioned to sign up into this. We just want to provide
14 our data into the system. It would be great if at some point we have actual formal
15 government entities be participatory in this process. How do we bring Mexico into this
16 picture? This workshop is a wonderful opportunity, the GOMSA - the Gulf of Mexico
17 State Accord Process - provides at least a forum where we can talk. One of the things we
18 need to focus on is what do we do short term and where do we go in the long term?
19 Clearly, sharing information is an important goal, at least the commitment, the
20 psychological step to give to share information is an important one. What do we do for
21 capacity building? This is an important thing that we already talked about in December.
22 There are some things that we agreed on, and let's see if we can carry those forward.
23 What makes this observing system if we integrate Mexico? What areas in Mexico need

1 to be the focus of this at the beginning? What type of HAB detection equipment should
2 be implemented, not only here, because, I think, we are not ready in the U.S. either but
3 what needs to be done gulf wide? Can we develop joined HAB programs? Maybe in the
4 next couple of days this is something that can happen, an actual idea for a science project.
5 Can we develop joined proposals? That is where we really need to work closely together.
6 Up to this point we have gone separate ways. We need to find a mechanism for
7 developing a joined proposal, be it through NSF, NASA, there are several NASA
8 representatives here, EPA, of course, maybe EPA is interested in providing great amounts
9 of funds to get this going. One thing that I want to point out is that there is another group
10 that provides a forum for this. That group is the IOC - the IO Caribbeic GOOS is one
11 group that has tried for years to come together and develop a plan for an integrated Intra-
12 American seas-observing program. So, we can't leave that out. The IOC has provided a
13 vehicle for the coordination of the international GOOS. As I wrap up, I want to
14 summarize some of the things we did last December. Bryon and Juan Manuel mentioned
15 the meeting we had in Saint Petersburg last December, in which the environmental
16 working group of the GOMSA accord came up with a series of what they called draft
17 ideas, for advancing to the GOMSA executives as to what could be the initial step, and
18 what it would cost to get something going in a binational nature to look at HABS. This is
19 the kind of thing that we came up with and that actually has numbers attached. I think
20 that it adds up to about three hundred and fifty thousand dollars. So, it is not major
21 funding for capacity building, getting something in the water, and sharing information. If
22 we can revisit this budget, this is in your book, or you can come up with a new budget,
23 but you should quickly focus on how much it would cost to do a certain specific thing

1 that we can then take forward to one or a series of agencies. If we don't do this in the
2 next two days, it is not that we would've wasted our time, but we need to do this. I mean,
3 this is the only way that anybody is going to listen to this group, if we have a specific
4 pilot program, or maybe a couple of pilot programs, you focus on them, you polish them,
5 you put numbers on them and then you advance them to a series of agencies, both in
6 Mexico and in the U.S. If you want to join or learn more about GCOOS and IOOS, and
7 GOOS and all these OOSSES, please go to the GCOOS website, send a message to W.
8 Nalden if you want to join. He is the one who is coordinating the list of signatories, his
9 email address is right on that paragraph down there, wnalden@tamu.ddu. So, thank you
10 very much, and I will entertain some questions if there is time.

11 Applause

12 **Bryon Griffith:**

13 Thank you Frank. Frank was so right as we march our way down the agenda and actually
14 set the stage for much of the discussion to amount to the focus of this afternoon and
15 tomorrow around the building blocks. The last slide that he had up that referenced very
16 specific actions to be agreed to and then to be marketed to success, is the design of this
17 workshop. I feel very comfortable, maybe not in every respect that you had up there, but
18 I feel very comfortable that we will reach that conclusion, Frank, over the course of this
19 meeting. Next, I'd like to introduce again, Mr. John Stinus from the NOAA National
20 Coastal Data Development Center. We have the opportunity, as I said, with so many
21 experts in the room and programs to have a presentation on a rapidly developing pilot
22 program in the northern gulf. The Harmful Algal Blooms observing system pilot, and the
23 National Coastal Data Development Center and many other programs within the larger

1 framework of NOAA, the Navy, NASA, EPA and the states are involved in this pilot. It
2 has been the focus of several presentations even at GOMSA and elsewhere, but I am
3 comfortable today we are going to kind of narrow the focus down to where do we go
4 from here with that binational integration. I am very anxious to Dr. Chantiri's
5 presentation on a plan for binational involvement and integration.

6 **John Stinus:**

7 Welcome to New Orleans, I don't know if this is your first visit, but hopefully it is not
8 your last. I'd really like to send a message out that we are new. We just started about a
9 year ago. We are really trying to make headway in basically providing coastal data and
10 information to a variety of customers and users, and that is what, hopefully, you will take
11 away from this presentation. First of all, I would like to go over our structure. Where do
12 we come from? How are we connected within the U.S. government? Well, we are part of
13 the Department of Commerce and under Commerce there is an organization called the
14 National Oceanographic and Atmospheric Administration. It has a number of activities.
15 There is a National Ocean Services, there is a National Weather Service, there is
16 Fisheries and then there is this big huge name here, National Environmental Satellite
17 Data and Information Service or the acronym is NESDIS. We are located down at
18 Stennis Space Center. We are a small little center that is just starting out. This is our
19 mission, very simply put, to go out there and find coastal data and connect that data to
20 coastal data users. When we say data, we are talking all types: imagery, text, information
21 coming from sensors, that are out there in the water like IOOS, as you saw earlier. We
22 are plugged into IOOS, we make the IOOS data available in the Gulf of Mexico and other
23 parts of the U.S. as well. Our connection with the Gulf of Mexico HABS program really

1 came into play a couple of years ago, in 1998 with the actual start up of the program. But
2 in 2001 we got involved with the pilot projects, and it was shortly thereafter that we
3 decided to really support the data basing and the web capacity, of which you'll see
4 examples of that. We are involved with supporting the Harmful Algal Blooms observing
5 system, both in a web support basis, and the data basing and data accessing display
6 capability. Throughout this week you will probably get more details on this, if you have
7 any questions Tim Orsi is here, he can answer any detail that you might have about that.
8 What was HABSOS all about? What was the design? It was user designed. The user
9 said "this is what we need - we need a capability to find this data that is reported from
10 various universities and/or states programs and provide it within the community in a very
11 timely basis so that we can make detection and warning and get this information out in a
12 forecast so we can mitigate some of the damage that the harmful blooms would create.
13 The ultimate outcome is forecasting and prediction of blooms. It takes a lot of people to
14 make this happen. Here is a list of some of the partners that are members of the
15 HABSOS group. As you can see, we have every state that runs the northern part of the
16 gulf involved, and then there are a number of contributors that also participate. If you
17 look at the bottom of the contributors list you will see that we are starting to get
18 industries involved as well. Marathon Oil is sharing our data, and that was a major
19 undertaking, you are dealing with lawyers, with both NOAA and industries, I don't know
20 if you know anything about NOAA, but a good part of their staff are lawyers. HABSOS
21 users pretty much stated this is what we need, this is what we would like to see this
22 program provide, and these are the types of activities we'd like to have data information
23 on to support. We tried to make sure we were in contact with each of these activities

1 within the states and find out where their data sources were, what kind of data formats
2 they had, and put it into a form that not only they could use, but that they could share
3 with other activities that were very similar to theirs. Some of the goals were to provide
4 this data in a timely fashion so that you could get a warning out within 24 hours. If you
5 go to the website this is what you'll see, this is our home page. This is a collaboration of
6 all the partners. They all had input into how they wanted to see this formatted: what
7 types of selections or buttons, tools, search tools, display tools were to be used. You are
8 looking at a spectrum of customers from kids, if you look at the right hand side, you'll
9 see that there are teachers that will go and access this page, there are children who will
10 access this page, there are also decision makers for different agencies or universities that
11 will use it. So you have everyone from kindergarten all the way up to university level. It
12 has to be a very flexible and a very dynamic page and we have been able to create
13 something like this because of the partnerships and the input we've had. If you haven't
14 been to this page, I encourage you to check it out. Frank mentioned IOOS, we are a
15 signatory for the Gulf of Mexico and we also support the other regions as well. We have
16 an individual that is going to meet with you and kick off the meeting for GoMOOS, the
17 gulf of Main region or initiative, to look at some of the regions' specific needs and then
18 apply the capabilities that they find at these meeting toward the national program, and
19 that is pretty much our role. We have an interest in not only in the Gulf of Mexico but all
20 the other U.S. regions that run the entire coastline. So, any technologies, tools, or
21 capabilities that we discover from these other regions, we can bring them to the Gulf of
22 Mexico. Our current philosophy is that we would like to develop tools and capabilities
23 for data sharing and data display within the Gulf of Mexico. So, it was designed and

1 developed within the gulf and then applied and distributed towards the nation. We do
2 have a national mission but our developmental focus is pretty much within the Gulf of
3 Mexico at this point in time. There are a number needs to HABSOS and we are trying to
4 tackle each one at a time, and find out who are those experts, who has that technical
5 expertise. Again, we are just the connectors. We connect the data collectors, the
6 scientists, and the users. We don't do the analysis on the data. There are biologists out
7 there, there are experts that provide that capability. There are Remote Sensing experts
8 out there. What we do is we find out who they are and connect them. So, you can go to
9 one site, the HABSOS web page, and find all this capability. It is evolving, it is not
10 perfect yet. But it is pretty robust, and it is taking input from members such as you and
11 other users as to what changes, or improvements are required. If you see something up
12 there that addresses some of your needs or some of your quest for data information, that
13 is great. If it's not, I'd love to talk about it and we'd like to include that capability in the
14 web page. Again, it is an open and dynamic capability, and it is ever evolving. One of
15 the unique things that I want to point out about working out of Stennis, I don't know how
16 many people have had the opportunity to visit Stennis Space Center. I know your time is
17 very limited here and you're probably packed with all kinds of activities, but I highly
18 recommend you get a chance to go out there. I'd be more than happy to extend that offer,
19 get in touch with me or Tim Orsi, or someone else from our center, for contact
20 information. I'd be more than happy to set up a tour of the facility and the capabilities
21 that are out there. This is a unique evolving science city. There is NASA out there, EPA,
22 NOAA, the U.S. Navy, thirty of forty different vendors that bring a variety of science and
23 engineering and technologies. I think there are close to five thousand employees and it is

1 still growing. There is a wonderful connection with all the universities within the state of
2 Mississippi, and Louisiana, they have a graduate studies program also. The picture I am
3 trying to paint is that we have a huge collection of very talented and very capable
4 individuals that are trying to build this energy and bring all these capabilities together and
5 put them to our various problems and issues. One of the things that is happening, and is
6 underway right now is the new acting director for NASA, and he has put together a group
7 of all the leadership out of Stennis to create a strategic plan that will truly build this
8 science city. One of the things we are looking at is let's get a project that we all have an
9 interest in, that we all can focus on, that we all can contribute to, and we can demonstrate
10 to headquarters up in Washington and other legislators and funding agencies that we are
11 integrated, that we can bring all these resources to bear on an issue. One of the issues on
12 the table is HABS, the Harmful Algal Blooms Program. What can we do to take that
13 next step, to make this more dynamic, to make it more energetic and provide capabilities
14 to all the players that are involved in this. I think this is pretty exciting, the timing is just
15 perfect, that we have this meeting this week. At Stennis we are thinking of using one of
16 these programs, this particular program, as an example of how we can bring all these
17 other participants together and really launch it out. It is something to keep in mind and if
18 you would like to talk about this a little more later on, I'd be more than happy to. If you
19 go to the HABSOS web page, one of the things that a lot of the customers, a lot of the
20 users, a lot of the participants, and partners have asked for is a display of the data.
21 Everyone can relate to a picture. Everyone loves satellite imagery. Everyone loves
22 maps. A picture kind of gives you the geo-reference of where the data is, where it is
23 going to be at some point in time, it is a nice foundation for which you can lay your

1 predictions, your models, any other associated information you have. To me, it is a point
2 where you can take all the variety of information and share it and use it as a central
3 dissemination point. Frank mentioned ArcIMS, it is a popular package to work with for
4 displaying geo-spatial data. We are also using ArcIMS, in fact, later on this week we'll
5 have a demonstration of how this has evolved and some of the capabilities that are there.
6 We are in the process of working with ESRI to develop tools and one of our missions is
7 to provide tools and to provide data free. That is one of the challenges that lot of my
8 predecessors have had. Yes, we have a great capability, we have a lot of data, but to
9 access that you have to buy this license, you have to have this training, and you have to
10 put it in this format, well, having listened to all the participants out there, they said, we
11 don't want to buy a license, we don't want to have to change format, we like the formats
12 we have and those new tools that you have, we would like to have them, easily integrated
13 into what we already have. So, that is kind of the premise under which we stood up: to
14 make the data available free, to mitigate this issue of licenses and to take whatever format
15 you have of data and integrate it with all the other formats of data. So you can go to one
16 website, tap all that data that is out there, from all the different states and all the research
17 activities and pull it up and display it. Then, there is another example of one of the most
18 exciting aspects of these capabilities imagery. Mary Culver is going to talk about the
19 bulletin portion of this. Both, she and Rich Stumpf have been providing this capability
20 here on a regular basis, of tracking this. This is going to be one of the more dynamic and
21 exciting areas of merging all these tools and these capabilities that these universities
22 have, and the state and federal programs have, for taking imagery and taking models and
23 taking the data from the observing systems, fusing it together and truly coming out with a

1 predictive capability. These are some other activities that we are involved with. One that
2 is very exciting is Jackson State University. NOAA, through the [unintelligible] activity,
3 put out a grant to develop some capabilities that would provide some predictions.
4 Basically, it would focus on, what happens after a major storm. For all that nutrient
5 flushing and all the change in the salinity in the water, how does that impact on fishing?
6 One of the aspects that they were looking at was that was does it impact and to what
7 degree and can you predict the blooms? How does it impact blooms? So, they are in the
8 process of providing some tools for the state programs that close down shellfish beds.
9 They are putting them into an ArcIMS capability, they are looking at a number of
10 reporting stations or sensors that are out there that are using imagery and this will be
11 made available through HABSOS too. This two-year program, I think we are just
12 entering into our second year. We are pretty pleased with some of the results that we
13 have seen thus far. In conclusion, we really extend the invitation to take the Gulf of
14 Mexico data, both the north and the southern portion of it. As you can see, we have a
15 couple of reporting stations off the Mexican coastline, we would like to increase that.
16 We would like to make those tools that we have presently available, available to the
17 programs within Mexico. Again, I think Frank made a really good offer there to get
18 involved in the Gulf of Mexico observing systems, that way you can get the data, Real-
19 Time, coming off those sensors. One of the things that, hopefully, Landry Bernard, from
20 the National Buoy Center, is going to talk about is seeing if we can get biologic and
21 chemical sensors on these platforms as well. As mentioned earlier, a lot of them monitor
22 weather conditions and surface oceanographic features. What we would like to do is to
23 drop some tails into the water and have some actual bio-chem measurements as well.

1 This would be very useful, coupled with the models, coupled with the satellite imagery,
2 coupled with all the other reporting stations you have a great network that is sort of
3 giving you a snapshot of every particular region of interest, as to what is happening and
4 how you can predict and forecast. I believe that is it. If there are any questions, I am
5 going to turn it over to Mary Culver from Coastal Services Center in Charleston.

6 Applause

7 **Mary Culver:**

8 I appreciate the invitation to come here and speak to you all today. I want to tell you a
9 little bit about one of the programs that is ongoing that is in support of HABSOS, and
10 these are a couple of things that we are doing to provide rapid access to information
11 during a harmful algal bloom event. To tell you my perspective on this, I am from NOAA
12 Coastal Services Center, and our mission is to link people, information and technology.
13 Our primary constituents are state and local resource managers. These could people who
14 are managing protected areas such as National Marine Sanctuaries, National Estuarine
15 Research Reserves or other protected areas. They may also be part of regulatory
16 agencies, wildlife agencies, such as the Fish and Wildlife Conservation Commission, they
17 may be planners, scientists, State Sea Grant people or emergency preparedness officials.
18 The particular program that I am associated with is the Remote Sensing Program. And to
19 take that mission into that realm, what we are looking for is particularly technologies and
20 information that is associated with Remote Sensing. We do this by providing data
21 acquisition and access. We have funding opportunities to provide you with data, we also
22 do a bit of work similar to NCDDCs work, where we take data being produced by
23 somebody else and put it in a slightly different format. We do tool and product

1 development. We also have Remote Sensing training and GIS training programs
2 established. We do a lot of outreach. We have a few applied research and applications
3 development projects, and we work generally through partnerships. The problem we are
4 talking about today is *Karenia brevis*, which we had gone over briefly earlier, I am going
5 to talk today mainly about *Karenia brevis* events. As you know they cause fish, bird, and
6 marine mammal distress and mortality, public health problems and economic loss. One
7 of the solutions that

8 (Break in tape- end of tape 1b)

9 *Tape 2A*

10 Cont. from Mary Culver...

11 ... providing continuous supply of information, which is a website that we've been
12 working on in collaboration with NCDDC that supports the larger HABSOS effort. First
13 to bulletins, if you haven't seen one, I have a few printed out here that I can show you
14 what they look like. I also invite you to send me your email address and I will put you on
15 the list to receive those bulletins. To give you a brief history of their occurrence, in 1999
16 they began as emails with small attachments of imagery that were provided by Rick
17 Stump, they were coordinated monitoring with Florida. In 2000, we found a few other
18 pieces of information that might be useful and we decided to bring those pieces of
19 information together and provide them in a PDF format, so, you'd have one piece of
20 paper, essentially, that provides you with information of different types and it's drawn
21 from different areas, primarily within NOAA. We also started looking at coordination
22 with Texas, Louisiana, Mississippi and Alabama to increase the regional perspective of
23 these bulletins. In 2001 we expanded the analysis. In 2002, there was an effort

1 underway with Tracy Villareal, who is also here in the audience, to get some funding to
2 improve the interpretation within Texas and also to incorporate some new models to take
3 to the next step. We are also doing that again this year and we are beginning a transition
4 to an operational status so it is not so much on an “as request” basis, there is probably
5 going to be a little more regular provision of these bulletins. Right now we have just
6 under a hundred subscribers and the distribution throughout the Gulf of Mexico. We, of
7 course, have subscribers in Washington, D.C. who keep an eye on things. Also in
8 Bulford, North Carolina, where *Karenia brevis* has appeared in the past, as it moves up to
9 the gulf stream, and Charleston where [unintelligible] processes take place, and that is
10 where I am from. And then throughout the Gulf of Mexico, at least on the U.S. side, and
11 as of late last week, we have two Mexican subscribers, please let me know if you are
12 interested in getting this. The subscribers are associated with several different types of
13 offices. We have county government subscribers, state, federal government, non-
14 government organizations, and also academic institutions that are associated with
15 monitoring programs with the state. I should mention that we have had requests from
16 newspapers, businesses, also Dr. Beach, who does a column on the World’s Most
17 Wonderful Beaches, and what we try to limit the bulletin to are people who have actual
18 monitoring responsibilities. So, we refer people outside of that realm to the red tide
19 online site. If you haven’t seen a bulletin, this is what it generally looks like. It is in a
20 PDF format, it is sent as an attachment. It provides you with the notice of changing
21 conditions and it is available as an email. It contains a SeaWiFS chlorophyll image, this
22 is within the last couple of days. It is provided via a licensing agreement or purchased
23 via NOAA CoastWatch and provides for us just a general chlorophyll map. It looks kind

1 of small here, but with the Acrobat capabilities you can zoom in. We also try to provide
2 the last known position when the information is available. We get that information from
3 the states. We have it right now from Florida, and we are working on obtaining that
4 information more rapidly from Texas as well. It is difficult to see but there are some dots
5 there on the left side of the B that gives you information about where that bloom was last
6 seen. That is usually within a week or so. The insets there provide you with potential
7 areas that have been affected. These are areas where the chlorophyll is changing rapidly
8 or increasing rapidly. It is not necessarily *Karenia brevis*, it is areas where there is
9 chlorophyll associated it may or may not be *Karenia brevis* but it is probably an area you
10 might want to look at, particularly during certain times of the year. We also provide local
11 winds and these are done from NDBC buoys that are scattered throughout the gulf. We
12 provide the buoy that is closest to the bloom on the front of the document and then if
13 there are other areas that are affected, then, those will be placed on the back. There is
14 also room for data interpretation, so, if you are not familiar with the imagery or not
15 familiar with the data, then you can read this text and interpret it. To tell you a little bit
16 more about the insets, this is the anomaly method for identifying blooms. It has been
17 particularly effective in Florida and these are areas where chlorophyll again is increasing
18 and it tends to work because red tides are so frequent there, particularly in the summer
19 and the fall. They do tend to occur in high densities. This method works in turbid
20 waters, is compatible with different optical algorithms and it has been shown to have
21 accuracy greater than 80% in the summer and the fall. The graphics here show you sort
22 of how it is calculated. You take the current day image on the far side of the slide, you
23 compare it to the mean image for the past 60 days and look at what areas are changing.

1 Those areas that are changing the most rapidly are flagged in red and less rapidly in
2 green. If they are not changing very much at all, they are blue. This is data from a study
3 that was looking at how accurate is that anomaly working. What we found, this has been
4 done by Shirley Thomanson, who works with Rick Stumpf, the data has been submitted, I
5 have a copy of the paper if you are interested. This method has been particularly
6 effective in region 1, which is down here in the Keys; region 4, which is the larger area
7 between Charlotte Harbor and Tampa Bay; region 6, out near Appalachicola; and region
8 7, out near Cape St. Blas. So, there are areas where it doesn't work particularly well, and
9 areas where you have to be fairly careful. There are very few false negatives, in other
10 words, if there is a bloom and it doesn't show as an anomaly, that is very rare. There are
11 several false positives, particularly in the spring, in other words, there's an anomaly that
12 does not prove to be *Karenia brevis*, it is supposed to be a diatom or trichodesmian (?) or
13 something else that we don't need to worry about. That also occurs in region 5, which is
14 out near the big bend of Florida, that is largely due to the Appalachicola. I mentioned
15 this since it is relevant to many of the people in the room, but there is a project going on
16 now to improve this anomaly detection in Texas. It has been tested fairly well in Florida
17 but not in Texas. We do provide wind data and the reason for that is that, in many cases,
18 the *Karenia brevis* occurs at the surface and it is transported via currents that are wind
19 driven. As you can see in this example, the anomaly shown on August 20th is fairly
20 small and farther down south and after a period of northerly winds you see an
21 intensification and you also see after a period of southerly winds, a movement toward the
22 north. That is why we provide the wind, to give you some idea of where this bloom
23 might have been and where it might be going. We are working right now with an oil spill

1 transport model that is looking at surface currents to more quantitatively model where a
2 bloom might go. In this example we see the progression of the 1999 bloom that started
3 there at the bend in Saint Joseph's Bay. It proceeded westward, and if you model the
4 wind, then you can see in the red, dotted red and the blue line, what that transport might
5 look like across the west. You can see the black dots, that is approximately when it was
6 sampled, and if you see the M and the L, that is the oil spill model result, and as you can
7 see they track the observer's results fairly closely. So, we hope to implement this type of
8 more quantitative bloom model this season. In support of this, to kind of collect our data,
9 and also to look at what sorts of problems might be encountered when you are looking at
10 Real-Time data, we've been working on the Real-Time data access. This is available
11 through the HABSOS website as well as it also sits on our server. It was done with the
12 format developed by the NCDDC HABSOS team so that they would look similar enough
13 and there wouldn't be a big learning curve switching from one to the other at this point.
14 In some point in the future, probably the next year or so, these will be merged. What this
15 site does, it allows you to look at Real-Time data that is available out there right now. It
16 gives you a visualization of available data. It provides maps and data. It is available
17 anytime on the Internet and it is updated daily. It provides you with data and
18 information, we have data layers, you can see some of them here, sea surface
19 temperature, wind data, etc., that we use for the bulletins as well as a few other features.
20 There are some definitions for things that may be unfamiliar to you. There are also some
21 query tools available if you ArcIMS, there is nothing here that is not out of the box out of
22 ArcIMS, at least not quite yet. You can download the data and receive the FGDC
23 Metadata. In the end it takes many people to create something like this, and again, here is

1 a list of the people who have been involved in supplying data or in the project
2 development, and here is my contact information, if you are curious about some of other
3 projects that we are doing or if you have questions about this one, I'd be happy to answer
4 them for you.

5 Applause

6 The question was are we currently using SeaWiFS data and do we have any plans to
7 change to MODIS. At this point we are looking at both, MODIS and GLI to transfer to,
8 if the NASA agreement with SeaWiFS falls apart. We haven't made the decision on
9 what we are going to do at this point.

10 **Sonia:**

11 Yes, I would like to know the percentage of error in your forecasting of red tide off the
12 Florida coast.

13 **Mary Culver:**

14 The percentage error on forecasting in particular or the anomalies?

15 **Sonia:**

16 On the anomalies, that is part of the forecast too.

17 **Mary Culver:**

18 Well, the anomalies are a little more than 80% accurate, about 83% accurate for the
19 anomalies. The forecast piece of this, we don't keep track of it because I don't consider
20 it a forecast in a technical sense, such as the weather provides. In large number of events
21 these bulletins provide information when conditions are changing. Not necessarily are
22 we expected to go here in two days. That information is usually not there but it is a

1 notification that something is changing, and perhaps take a look before you go out and
2 monitor.

3 **Unidentified Speaker:**

4 Tienen algún método estandarizado para la medición de clorofila?

5 **Mary Culver:**

6 The question is do we have any standard method for measuring chlorophyll. In the case
7 of the bulletins, we are not actually going out, or my group is not responsible for going
8 out into the field and measuring chlorophyll. I think, probably, some of the people who
9 do that, Brian Bendiss perhaps can answer those questions better for you.

10 **Unidentified Speaker:**

11 Considerando todos los limitantes que tienen los modelos que Ustedes utilizan, con qué
12 precisión se puede establecer la migración de estos organismos hacia el sur, hacia el
13 norte, cómo se desplazan, no sé si ya han hecho ese ejercicio, supongo que sí.

14 **Mary Culver:**

15 Could you repeat one more time please?

16 **Unidentified Speaker:**

17 Sí. Con estas herramientas que Ustedes utilizan y considerando todas las limitantes que
18 éstas tienen, qué aproximación se puede dar sobre los desplazamientos de estos
19 organismos, si ya han hecho algún ejercicio de ver cómo se desplazan, si hacia el norte, o
20 hacia el sur, a ver cómo se están moviendo constantemente.

21 **Mary Culver:**

22 The question was, given all the limitations that we have, do we have any estimates of
23 how effective we can measure the cells moving north or south. Is that correct? I think,

1 quantitatively, we probably cannot answer your question very satisfactorily. The
2 research has shown that these are often transported by wind currents, there are often at
3 the surface, however, they are often at the bottom as well. They may move around,
4 particularly in the initiating phases in the bottom currents. But once they reach the top,
5 we can look at where that is via Remote Sensing and see where they are moving. Of
6 course, with Remote Sensing we are limited to movements on the surface of the water
7 column.

8 **Karen:**

9 The most recent red tide off of Florida is a very good example of that. We had very
10 strong winds from the south every afternoon and that red tide came up from Naples. We
11 sampled weekly from Naples up to [unintelligible] county. So I think you can look at the
12 progression of this particular red tide in relation to the wind direction but they were
13 sustained winds out of the southwest that moved it up.

14 **Mary Culver:**

15 I think the key in a lot of cases is sustained winds. I know with the oil spill model work,
16 if the winds are variable, particularly light and variable, they have a lot of trouble
17 tracking and the same would be true with the red tide. If you were trying to track it with
18 winds, light and variable winds are going to be difficult to quantitatively predict.

19 **Frank Muller-Karger:**

20 I was wondering, some of the algorithms to detect the tide, it is really just based on an
21 anomaly of chlorophyll, but we have shown significant issues with the chlorophyll
22 concentration in coastal waters. There are other ways to detect red tide specifically,
23 which are much more sophisticated than (noise) and also it is not only an issue of Remote

1 Sensing but also an issue as of being modern. Some of the groups in the Gulf of Mexico
2 have developed very very sophisticated 3-dimensional time dependent modeling
3 capabilities, but you are proposing to use basically a 45 degree to the wind type of model.
4 I would like to encourage you to use and nurture the regional capabilities more, for
5 example, our university is not even on your list there, when we have played a significant
6 role in that type of research.

7 **Mary Culver:**

8 Yes, that is very true, thank you Frank. We are looking at implementing a couple of
9 models put together by Ken Carter, which will be one of the improvements, hopefully,
10 for the anomaly type of algorithm and, again, a lot these are in the research phase. We
11 are looking at something that we can do, somewhat operationally and this has been sort of
12 the low-hang fruit, the first thing, and there are several programs that are in progress right
13 now and we hope this all comes together.

14 **Bryon Griffith:**

15 Thank you, Mary. Well, that generated in the end a host of questions not all of which
16 were satisfactorily answered during the course of that discussion but hopefully will be
17 more directly addressed in those segments of the agenda when we bore in on the
18 associated techniques and procedures. It does, however, as I am sitting at my own spot at
19 the table, I am stacking my own list of questions like a Christmas shopping list, I hope
20 you are as well, that we will be ready to explore at that time. It is great pleasure to
21 introduce the next speaker who is Dr. Marco Giardino. He comes to us from the NASA,
22 Earth Sciences Applications, Director, where he is Chief of the Integration Division at the
23 Stennis Space Center. NASA, of course, as those in the audience well know, their

1 responsibilities particularly associated with the assets of space-based Remote Sensing are
2 prominent and are going to be essential to the overall framework of what we will develop
3 here and elsewhere. So, with that, Dr. Giardino.

4 **Dr. Marco Giardino:**

5 Thank you very much and thank you for inviting me. I'd like to cover the general
6 overview on the program and how it applies to Stennis and then finish up with
7 augmenting what Dr. Culver and Frank and others have talked about. Specifically in
8 some relationships that NASA has established with NOAA and EPA to do coastal
9 ecosystem management. NASA is an agency that reports to the President of the United
10 States. As an executive agency it doesn't have a secretary, it has an administrator. It has,
11 probably been most lauded for its efforts in space exploration. A portion of the budget,
12 about one and a half billion dollars of the 14 billion dollars are applied to earth science. I
13 think, it is probably a wise move on the part of the agency, to use the same technology
14 that has mapped the outer planet and the moon and turn it upon our own planet. In fact, a
15 few years ago, we used to call this enterprise "Mission of Planet Earth" - which I thought
16 was a little more descriptive than the Earth Science Enterprise that it is today. We at
17 Stennis, have the unique mission of having to take the research results of the several
18 thousand earth scientists that work within NASA and turn them into practical applications
19 that benefit society. The 25 civil servants and the 80 contractors at Stennis have a very
20 small piece of that budget and it is our duty and task to take the research and apply it so
21 that every time Congress asks Dr. Asward Du Xing who is our associate administrator
22 what is all that money that we are giving you being used for we don't have Velcro and
23 Tang but we are working towards something that is as useful. One of the things that has

1 happened recently is that the NASA vision and mission have emphasized very strongly
2 Earth Science topics. As you can see from the slide, to improve life here requires
3 monitoring and understanding the planet and its systems and the impact of human beings
4 upon it. To understand and protect our home planet is a departure from the standard
5 NASA mission of the past and as you can see, it emphasizes how strongly the kind of
6 topics we are discussing here today. This has been mentioned before, we are dependent
7 on science and research to do our job. Science and research generate immense data
8 sense, the data sense that are collected from our sensors is overwhelming in terms of
9 storage and processing, and they are, basically, useless without good models and,
10 hopefully, they are being used to improve those models. This has been discussed by
11 other speakers, but I wanted to emphasize again, that NASA and R&D agencies depends
12 exclusively on its partners to move from the research realm to the operational and
13 practical application realm. Therefore, the partnerships that we are so lucky at Stennis to
14 have co-located. From the program office we get these flow diagrams that try to explain
15 our projects. We have an armada of satellites, which I will describe in a second, there are
16 eighteen satellites with eighty sensors currently orbiting and measuring the planet. They
17 are, obviously, supported by airborne validation and verification and by in sea and
18 ground verification teams. This data feeds into models, and from these models come
19 results that support the type of decision support tools and support systems that Dr. Culver
20 just showed in the HABSOS model. We are looking for partners in each one of the
21 applications that have been identified as a priority. I will show you those in a second.
22 And the payoff is of value to the citizens of the world, both, socially and economically.
23 We do not have to spend time on the many challenges that face the planet today. NASA,

1 of course, is involved in a whole range of Remote Sensing approaches, from hypo
2 spectral to active, and the validation and verification of radiance and irradiant algorithms
3 and reflective algorithms. The surface is a non-orbiting system right now. Most of the
4 other ones are actually in orbit. To give you an example of how crowded the sky has
5 gotten, you can see that we have a whole series of satellites, all transmitting down to a
6 network of receiving stations and supported by a sub-orbital or airborne program. To
7 give you a better sense of what they are, the ones on top have mostly been launched.
8 Terra and aqua are the two platforms that are the MODIS sensor, which has increased the
9 revisit or temporal resolution of that sensor, as well as added some significant data to the
10 oceanography community, as well, I am sure, to the atmospheric community. We still
11 have a substantial aerial program and it is the sub-orbital aerial program that offers the
12 possibility, both, for validating and verifying the orbiting systems but also for stepping
13 the application from the satellite into an operational and more practical mode. Based on
14 the research that is done on the spectral responses of some of these orbiting sensors, one
15 can characterize a sub-orbital flight specifically targeted to some issues. Clearly there,
16 the accessibility of the data and even the cost of the data for an application decreases
17 accordingly. NASA loves acronyms, here is a whole page of them. You can see that the
18 movement has been from observation satellites and technology, many more are proposed
19 in the future and all the systems and subsystems that make up the physical planet. Dr.
20 Asward has made a very good point in numerous of his presentations showing the
21 evolution of NASA's ability to look at the plan as an integrated system because of the
22 continuing success of these orbiting sensors. Going back to the early LAN sat missions,
23 we were, at that time, just basically observing, monitoring was the next step, watching

1 forestry get deforested. Now we can move towards a more, not only empirical, but also a
2 systemic approach to see how the different subsystems interact. On this, slide, those in
3 black are missions that have been approved and funded. The ones in blue are close to
4 being funded. The ones in red are, hopefully, going to be funded and part of the future
5 armada of satellites. At the Stennis Space Center we are taking this data and these
6 models and we are looking to do an applications research approach, which extends the
7 scientific findings to an operational environment. We have a strong validation and
8 verification operation where ground systems and airborne systems under-fly commercial
9 and federal sensors to assess the spatial spectral capabilities and proposed or at least
10 asserted capabilities of these sensors as well as to try to validate and verify the
11 application. The desired outcome is, you can see, that the partner organization in our
12 current model being a federal agency, would improve the way they do their decision
13 processes by using NASA data. It is a tall order. The twelve applications that have been
14 selected as having national importance have been described both, as eternal, and someone
15 mentioned it as the twelve apostles. They cover just about everything. As you can see, it
16 is an attempt by NASA and its partners to identify areas of issues where Remote Sensing
17 can have a significant impact. I am going to concentrate on one of them, coastal
18 management, which, I think, is appropriate for this conference. I am repeating from our
19 point of view what you have just seen and have been presented. Dr. del Castillo here will
20 probably speak more some of these. With the partnership with NOAA, the process has
21 been, how can you take optical data derived from the new NASA sensors, ingest it into
22 your decision system and thereby make better decisions? In a nutshell, that is really the
23 description of our current program and applications. The primary partners you have seen

1 before, also EPA, Gulf of Mexico, and Office of Naval Research. Every application has
2 its own roadmap, which mimics the overall program system. We are looking for the
3 payoff to be those things that I think everyone in this room on both sides of the Gulf of
4 Mexico [unintelligible] in this respect, with no boundaries, physical, political or
5 otherwise. We all have the same issues. We are all trying to solve the same problems.
6 This approach specifically identifies the measurements that are related to coastal issues,
7 the models that are being developed, how this information is processed through a series
8 of decisions, not all of them automated decisions, some of them just the normal human
9 beings in a room talking and coming to a conclusion based on the data, and, hopefully,
10 the payoff. There are many ways to illustrate this. Both MODIS, MISOR (?) and a
11 whole series of current satellites have increased the capability of scientists to observe,
12 model and possibly understand coastal issues, which are, I understand, very complicated
13 from a Remote Sensing perspective. The approach can also be documented as a roadmap
14 that has a timeline at the bottom. It has a payoff at the top, for HAB and hypoxia forecast,
15 estimated by 2012. We are extending the questions that were asked of Dr. Culver, the
16 payoff would, hopefully, be that in the next decade or so, the probability of predicting
17 some of these events would improve dramatically because of the use of data from these
18 current and future sensors. Another project that I might mention in relation to this
19 conference is one that is of particular interest to me and therefore, I am going to mention
20 it because I am up here speaking. It is not solidly approved by NASA Headquarters, but I
21 don't think they are represented in the room so we are still Okay. I am an archeologist by
22 training and a lot of the agencies that we partner with, specifically, the Corps of
23 Engineers in coastal Louisiana, have the awesome task of meeting the national

1 environmental policy act requirements and historic preservation act requirements and
2 identify cultural resources that are in danger of being damaged or destroyed because of
3 our particular project. The project that we are talking about, to follow up on one of the
4 slides that Bryon had, is the Loss and Erosion of Louisiana's wetlands. The (?)
5 Mississippi delta (?) have formed land where Native Americans had lived for thousands
6 of years, many of us believe that they came from Veracruz about two thousand years ago,
7 but nobody has proven that. This will be a good topic for a later discussion. NASA has
8 attempted to support the Corps of Engineers by providing commercial, orbiting or
9 satellite data, airborne data. They are doing a very accurate geo-referencing of the data,
10 validation of the fields with highly accurate GPS, to get down to the spectral signatures
11 that are unique to these archaeological sites. Then, of course, they are dealing with
12 digital data, being able to classify large areas to target for the Corps and their crews,
13 where we think the highly probability areas for other archaeological sites are. In
14 Louisiana it is a relatively easy thing to do because, the land being so flat, any type of
15 elevation, a foot or two above the current surface encourages an entire different
16 vegetational community, primarily live oaks and hackberry. Identifying those species
17 remotely, is really relatively simple. The process to institutionalize that identification
18 process in the Corps of Engineers is a little more difficult. Technically, it is not difficult
19 to do. I have an example of one that is particularly interesting, this is in Plaquemines
20 Parish, Louisiana. You can see from the boat what it looks like. You can see a three-
21 band airborne sensor. What we are looking at is a cluster of eleven prehistoric mounds,
22 you can not only observe from the Remote Sensing the location of the mounds and the
23 accurate GPS that was taken, but also some of the hydrography and the geomorphology

1 that surrounds those features in the marshes. The cultural resource management aspect of
2 the U.S. for federal agencies approximates about four to six hundred million dollars per
3 year in expenditures for surveys and the like. We suspect that applications of Remote
4 Sensing along these lines are going to save a significant amount, and also because they
5 are, technically, relatively simple, as opposed to coastal waters, may help sell this
6 technology to federal agencies that are not predisposed at this point to incorporate or
7 institutionalize them. The last slide wraps up, we think that NASA has a well-articulated
8 strategy to move research to practical applications. It is our job at Stennis, with our
9 partners, to do that. It is the job of the Garter (?) Space Center in Maryland to come up
10 with a science that we won't have to translate for a practical application. The transition
11 of these research observations and models has innate pitfalls, both in the relationship with
12 scientists and their unique culture and also in the applicability of the data directly to an
13 application. It is hard to rush a scientist to a conclusion, but it is also true that one good
14 scientist will employ a thousand engineers. Laughter. NASA people don't like to hear
15 that, but it is true. Our mutual challenge and with our new partners here, certainly, a
16 regional challenge is to use Remote Sensing observations from these earth science
17 products and apply them in a series of high priority area to see if indeed there is a value
18 to this investment. I leave you with one caveat, one that we are struggling with in our
19 program, NASA is an R&D agency, and so once that benefit of that sensor of that data set
20 has been validated, who is going to carry then, the operational data sets to that customer
21 who is now waiting for those results. It probably won't be NASA. So, there has to also
22 develop as part of this program, a national strategy to convince the funding congress to
23 take the results that are being prototyped in these applications and develop operational

1 sensors like NOAA already has, to carry for agriculture, for coastal management, for
2 disaster management and so on. I think that is the last slide, I thank you for your
3 attention.

4 Applause

5 **Bryon Griffith:**

6 Thank you, Marco. In terms of context, in the whole host of presenters that have been up
7 here so far, the reason and the design of that was to give you some illustration in fact, of
8 my term, “the business of the business” - of this type of technological advancements,
9 meeting R&D agencies like NASA, putting up assets that can conduct [unintelligible] of
10 work that they had no anticipation it would be used, like a painter’s palette so to speak,
11 the colors and the artistry are up to the artist. Down to the practical applications of a
12 whole host of assets in terms of the harmful algal bloom bulletin system that we heard
13 from NOAA about. This idea of this balance and mix is relatively complex as it is. It is
14 very important for us to understand as we get into a lot of portions of the agenda and
15 figure out how to couple these things together and to, basically, exploit these capacities to
16 an end, this end being the ability to manage and mitigate red tide impact in our respective
17 countries. I am going to give a quick announcement just as I have the opportunity to
18 introduce the next speaker. At the end of this presentation, particularly given the time
19 that we have been in the room, after this next presentation we will take a five-minute
20 break to stretch and allow Dr. Chantiri’s presentation to be set up. It is with great
21 pleasure that I introduce the next speaker, Ms. Diane Regas comes to us from our EPA,
22 Washington, D.C. Headquarters. Ms. Regas is the Director of the Office of Wetlands,
23 Oceans and Watersheds, her responsibilities include all aspects of EPA’s work involving

1 oceans and coastal programs, she is going to lead us into related cooperative and
2 collaborative programs in White Water to Blue Water.

3 **Diane Regas:**

4 Thank you. Good morning. It is hard to be on the podium between us and the five-
5 minute stretch break. I know I could sure use it. I am going to be talking today about the
6 White Water to Blue Water partnership initiative. My goal is to explain to you some of
7 the thinking that has gone into it. This initiative was developed for the 2002 World
8 Summit, on Sustainable Development, which was held in Johannesburg, South Africa. I
9 have to start with some good news and some bad news. The good news is we have the
10 presentation in Spanish for those of you in the audience who are Spanish speakers. The
11 bad news is it is a different presentation than the one that I am giving. I will refer you to
12 the information behind tab five in your notebook. The Spanish presentation does have all
13 of the same information, it is just in a little bit different order. We decided not to run
14 both slide presentations at the same time. This initiative is based on the vision that
15 recognizes the value of healthy, well-managed and productive marine resources. More
16 than 50% of the world's population lives in coastal areas and we depend on healthy
17 oceans and coasts for our survival. Yet, we know that there are great threats to these
18 resources. 70% of the world's fish have been over-fished or fully fished. 25% of the
19 world's coral reefs have already been lost with many more likely to be lost over the next
20 decades. We know that land-based sources of pollution are growing causes of Harmful
21 Algal Blooms, zones of low oxygen, sedimentation and other kinds of problems. We
22 know that the great fraction of the world's population can sustainably rely on the
23 productivity of oceans and coasts only if there is integrated watershed and marine

1 ecosystem management. That is a tremendous challenge. We also know that there is
2 very limited future funding for such initiatives. I don't know some of the details of what
3 is happening in the states where you are from, or in Mexico, but in the United States,
4 certainly our governmental budget is shrinking. We must recognize that no one entity
5 can undertake the integrated watershed and marine ecosystem-based management that
6 must occur for us to support sustainable coasts and marine ecosystems. So, we know that
7 we must engage in partnerships. We know that we must leverage our resources in order
8 to make as much progress as we possibly can. The White Water to Blue Water initiative
9 aims to stimulate partnerships that will promote integrated watershed and marine
10 ecosystem-based management in support of sustainable development. Our initial focus
11 will be on the Caribbean, but we hope to apply what we are learning on the Caribbean to
12 develop a model and to transfer to other regions of the world, perhaps with another
13 country, or countries, in the lead. As I said, the initial focus will be on the wider
14 Caribbean region, which includes all the countries bordering the Gulf of Mexico and the
15 strait of Florida, the east coast of Florida, six of the seven countries in Central America
16 that are bordering the Caribbean Sea, northern South America not including Brazil, all
17 the island states and territories in the Caribbean Sea. The seaward boundary of the
18 initiative includes the 200 nautical mile exclusive economic zone. The reason that this is
19 relevant to the work that you are doing, the very important technical work that you are
20 doing, over the next couple of days is the partnerships that you are working to develop
21 today, tomorrow and the next day, and have been working with up to this point, provides
22 a terrific opportunity to provide an example in the context of the White Water to Blue
23 Water initiative of the kind of work that our countries can do together, the kind of work

1 that Mexico and the United States can lead together as we go into implementation of the
2 White Water to Blue Water initiative. With the expertise in the room, I don't need to
3 point out to you some of the large-scale changes that are resulting from human activities
4 and from multiple stresses. Chronic nutrient and sediment input from land, die-off of an
5 important algae eater, sustained heavy fishing, and naturally occurring storms cause the
6 kind of degradation that you are seeing in this coral reef between

7 (Break in tape sequence - end of 2A)

8 *Tape 2B*

9 ... continuation... across the world. This particular reef rapidly declined over a very
10 short period and in most cases, the rapid decline of ecosystems comes from a multiple set
11 of stressors, and, as you can imagine, the loss of the ecosystem functioning can have
12 dramatic economic impacts on a particular region. We know that 80% of marine
13 pollution is derived from land-based sources. Whether it is increased sedimentation and
14 nutrients, and we certainly have that issue in the Gulf of Mexico, destruction of wetlands
15 and habitats, and again, we talked about the loss of wetlands in coastal Louisiana, one of
16 the most dramatic examples we are experiencing in the United States today. And urban
17 run-off and human wastewater is a very important contributor to the decline of marine
18 ecosystems around the world. Whether it is sediment, pesticides or other pollution from
19 human activities, whether it is deforestation or cultivation on steep slopes, all these
20 practices can affect marine ecosystems, can affect the productivity of the marine
21 ecosystem, can affect coral reefs and other important aspects of the marine environment.
22 Fisheries and marine ecosystems will be evaluated under the White Water to Blue Water
23 initiative looking at over fishing, looking at management of aquaculture, looking at

1 destructive ecosystem practices, but I would like to make a point about each of the
2 sectors that I am going to talk about. Every sector that we are looking at as part of the
3 White Water to Blue Water initiative has a potential partnership because each of these
4 sectors depends on healthy coastal and marine ecosystem. So, some may look at fishing
5 and say, well, we depend economically on fishing, some may look at fishing and point
6 out the degradation to marine ecosystems. But I look at the fishing community and say
7 we have a potential for strong partnerships between government, other entities and the
8 marine fishing industry, because they, in turn, depend on healthy marine ecosystems.
9 Similarly in shipping and marine transportation, we are concerned about some of the
10 potential impacts on the marine ecosystem, whether it is release of ballast water or an
11 invasive species, which is a tremendous concern, causing really immeasurable economic
12 impacts in our country and in countries around the world. Bryon talked about the
13 example of the jellyfish in the Gulf of Mexico. We are struggling with all kinds of
14 vegetation changes across the country as well as invaders into the Great Lake system,
15 which is an important fresh water system in the United States. Even though shipping and
16 Marine Transportation, we think about these steel hauls kind of going through the water,
17 not so dependent on marine ecosystems, depend on healthy coastal communities in order
18 to be able to have the kind of port facilities, the kind of trade facilities, the kind of
19 encouragement of economic growth that is so important for this industry. So, again,
20 some look at this industry and recognize the problems that it can cause for our marine
21 ecosystem. We need to also look at this industry and recognize that they are a potential
22 partner in helping us address the very important problems that we together face. In
23 tourism, the connection to partnerships is a little more obvious. You can't sell cruises,

1 you can't have people visiting beaches and swimming in the water. You can't do what I
2 like to do, which is, dive in coral reefs. If the coral reefs aren't there, if the beaches
3 aren't clean, if the cruise ships have nowhere to visit the tourism will suffer. Tourism
4 does depend on a healthy coastal ecosystem and tourism, can in turn, of course,
5 contribute to the degradation of that ecosystem. When those two things come together, I
6 see potential partners. As part of the White Water to Blue Water initiative, we believe it
7 will be a catalyst for improving collaboration, between governments, between non-
8 governmental organizations and the private sector, whether at the national level, the
9 regional level, or the specific state within a particular country. We are anxious to
10 enhance existing partnerships and to promote new partnerships where the field is right for
11 those partnerships. There is a lot of work to do, capacity building and training, we are
12 anxious to promote best practices. The initiative recognizes some important needed
13 actions that will become the focus of the White Water to Blue Water initiative. One of
14 the needed actions is the awareness of the linkage between land-based activities and
15 coastal health, which I already talked about. Another is the importance of building
16 national and regional capacity to practice integrated watershed and marine ecosystem-
17 based management. Another needed action is the increase in all of our ability to do
18 science-based decision making. I've been just thrilled sitting here today being able to be
19 exposed to some of the cutting-edge work that you are doing to provide a kind of
20 scientific foundation for the decisions that I need to make in my every day work, that my
21 boss needs to make as the administrator of our agency and ultimately, that congress needs
22 to make about what direction we'd go in protecting, whether it is our national resources
23 or whether it is our cooperation in protecting global resources. We have identified that is

1 very important for us to coordinate between local, regional and international long-term
2 strategies and again engagement of partners from all walks of life, in particular business
3 and industry is a very important part of the White Water to Blue Water initiative. The
4 goal of the initiative is to bring together some new partners as well as build on existing
5 partnerships, mechanism and organizations. The belief that is behind the initiative is that
6 promoting an active exchange of ideas on sharing lessons learned, whether it is successes
7 or in some cases, places where we had to go back to the drawing board, we can improve
8 collaboration and communication, we can raise all of our ability to protect the important
9 marine ecosystems. A key event in the White Water to Blue Water initiative is the
10 Miami Partnership Conference which is scheduled for spring of 2004. The Miami
11 partnership conference will be gathering of the different regional partners that I've been
12 talking about and an opportunity to channel that regional participation into new
13 partnerships, into sharing of existing and broadening of partnerships. I think, that you
14 really have an opportunity over the next couple of days to get a spark going, that could be
15 built over the next year or so into something that can be a real shining example at the
16 Miami conference. I hope that you will keep that in mind over the next couple of days as
17 you talk about how you can continue and enhance the work among and between you, on
18 the scientific issues that will be the focus of the conference that we are all attending
19 today. The conference should be a good opportunity for education and training. As we
20 undertake the planning for the conference we will identify some of the areas where
21 further education and training would be helpful to the participants at the conference. The
22 themes of the conference recognize the important topics such as sources of contamination
23 or degradation of marine environments, solutions that we need to invest in for the future.

1 We realize that there are overlap among those but the four themes of the conference will
2 be Marine Ecosystem-based management, shipping, sustainable tourism and Integrated
3 watershed management. There is a steering committee put into place to make sure that
4 the conference is not just another conference but rather a true turning point opportunity
5 for all of the states and the wider Caribbean region to build on and learn from each other.
6 You can see from this list the representation of some the different entities in the steering
7 committee. Governments: including, government of the United States, United Kingdom,
8 France, Canada Universities: including University of the West Indies, Universities within
9 the United States International Organizations: including the United Nations environment
10 program, OAS NGO's: there is heavy involvement from non-governmental
11 organizations, from civil society to be able to contribute their knowledge and learning
12 into our partnership building and enhancement. As part of the preparation for the
13 conference, we are conducting consultations in countries around the Caribbean region,
14 the Multi-stakeholder International Visitor teams are visiting countries. There have
15 already been five visits, I believe that a visit is planned to Mexico in the coming months.
16 The purpose of these Multi-stakeholder visitor teams is to visit with a country prior to the
17 conference to inform interested parties in that country of the purpose of the conference to
18 get feedback as to what are the points of contact in each country, to understand what the
19 conference goals and objectives should be and get input from all the interested parties as
20 to what those should be. The teams will also assist in the in country preparation for the
21 conference so that we can assure that the conference itself is not a beginning but it
22 reflects ongoing work that is taking place in each of the countries. Each country will be
23 asked to organize a small delegation to participate in the conference with interdisciplinary

1 and NGO representation. The conference organizers will sponsor at least two
2 representatives from each country and we are asking each country's government to
3 sponsor an additional small number of attendees. We are continuing to explore ways that
4 we can find funding to sponsor additional attendees from each of the participating
5 countries. We are looking for participation from ministries of finance, forestry, water,
6 planning, all the different ministries that have to do with really building the case that we
7 need to protect marine ecosystems and to build the expertise to show how we move
8 forward with that kind of protection. In addition, we are looking for participation from
9 civil society organizations, from universities, and importantly from private sector as well
10 as I try to emphasize this private sector partners are going to be an important part of the
11 future of ecosystem management. The concept of the country team has particular
12 responsibilities or objectives for the country team, including identifying some of the
13 needs and national gaps for each country. Before coming to the conference the country
14 team will also be asked to identify what are some of the real showcases, what are some of
15 the things that each country is doing that are potential to really share across country lines.
16 The country teams will also be asked to explore new ways to link management strategies,
17 whether it is from the top of the mountains and what is happening in agriculture out there,
18 down to the coastal environment. This exploration includes how cities are being
19 developed and operated in such a way that they affect the coastal marine environment.
20 The country teams will be asked to think about new cross-sectorial partnerships that can
21 be developed to participate in the White Water to Blue Water initiative. The country
22 team will also be asked to provide some post-conference feedback for use in future
23 efforts in different regions, so that as we expand the White Water to Blue Water initiative

1 from the wider Caribbean region to other parts of the world, we can learn from the
2 successes and challenges we encountered in developing the White Water to Blue Water
3 initiative in the wider Caribbean region. We are hoping that the country teams remain
4 engaged in activities, and continue to advocate for integrated watershed management in
5 their own particular country, and potentially, form a bit of a network of folks who are
6 learning from each other as we go forward. This recaps that, before the conference we
7 have the steering committee. We are working to design the meeting in Miami next
8 spring. Their consultations are ongoing with in-country visits. There is formation going
9 on of country teams to identify what they can bring to and get from the conference,
10 identification of priorities for the conference, and there is a development of a partnership
11 website to start sharing information before we walk in the door in Miami. During the
12 conference we have to provide a real opportunity to form some new partnerships, to build
13 on existing partnerships to show examples of where partnerships are working to make a
14 real difference on the ground. There will be an opportunity to discuss some best
15 management practices and similar ecosystems around the wider Caribbean region. There
16 will be an opportunity to coordinate and strengthen some of those partnerships. There
17 will be an opportunity for some site visits as well as for some specific training that is
18 identified in the pre-conference planning as needed. In addition, we expect from the
19 United States, very high-level participation and an opportunity to engage governments at
20 a fairly high level from Washington along with some of our regional participation.
21 Conference only makes a difference if there is post-conference follow-up if the
22 partnerships that we identify as needed in the partnerships that we get started, the
23 conference can continue a life of their own after the conference. The country teams will

1 be asked to help follow-up, to help nurture those partnerships so that they can continue
2 forward. There will be follow on activities as part of the White Water to Blue Water
3 initiative and there will be a website to continue to exchange information as we go
4 forward. We hope to undertake a strategy for next steps after the conference to see what
5 are the best things coming out of it and how we can build on those best items coming out
6 of the Miami conference, an incorporation of the lessons learned from the wider
7 Caribbean into the way we move forward with the White Water to Blue Water initiative
8 throughout the rest of the world. I'd like to leave you with one thought. As we've talked
9 today about some of the science, and I've just been incredibly impressed with the
10 strength that you have already found in partnerships across different kinds of entities -
11 governmental and universities - has been a repeated notion in the presentations we've
12 seen today. These partnerships take advantage of the strength of each entity, take
13 advantage of what each of us can bring to the table and also enhance our ability to really
14 deliver results. We do know that the challenges facing us in the coastal ecosystems are
15 tremendous. We know that no entity, whether it is my office at EPA or anywhere that any
16 of you comes from, no one entity can really undertake design and implementation of
17 integrated watershed management in the coastal areas that will successfully deliver the
18 kind of sustainable resource use that we all hope for and expect from the region. The
19 partnerships that you are working on today will be great examples in Miami. We hope to
20 have lots of others. We hope to encourage folks to continue to build them on that concept
21 so that we can bring the entities together, that each brings something unique and tie them
22 together in a way that accomplishes the very important societal goals that we all share.
23 Thank you.

1 Applause

2 **Bryon Griffith:**

3 To wrap up that segment before we get into Dr. Chantiri's presentation, one of the
4 reasons for having Diane give the presentation on White Water to Blue Water was
5 precisely what she said, the opportunities that we have here today, anything we would
6 have chosen to break the ground on the issues and the opportunities and learn that
7 pathway, those are going to be transferable case studies to the efforts that we are
8 undertaking in the wider Caribbean. We have the stage before us to put our signatures on
9 that process and be invited in. I appreciate it, Diane. We are going to take that 5-minute
10 stretch break, I know you have been waiting for, so go -you'd probably appreciate,
11 hopefully, a southern 5-minute break, it is a little longer than five minutes.

12 It is a distinct pleasure to introduce the next speaker, Dr. Jorge Chantiri Perez. As your
13 agenda shows, he is Director of Regulations and Sanitary Development for Veracruz
14 Health Services. He is also much more than that. I got the opportunity to meet Dr.
15 Chantiri in Saint Petersburg at the Gulf of Mexico States Accord and asked to have the
16 opportunity to co-chair the accord's health session on health ecology and the environment
17 following this meeting the latter two days of this week. As my co-chair and my newly
18 developed friend, let me introduce him and bring him up to the podium where he is going
19 to give us a perspective on actually integrating these binational efforts on red tide. Dr.
20 Chantiri.

21 **Dr. Jorge Chantiri Perez:**

22 Good afternoon, many thanks to Bryon for the hospitality that you have shown to us who
23 have come from the State of Veracruz and also our thanks to the persons who are with us

1 from SEMARNAT, from COFEPRIS, of the Secretary of Federal Health and also to the
2 colleagues from the sister States of the Mexican Republic, of COVECA, from our friend,
3 Juan Manuel Irigoyen. I am going to make some brief commentaries about how this plan
4 of binational linkage for attending Harmful Algal Blooms. I want to publicly thank
5 professor, Rosa Aurora Samara Arismendi, who is the Assistant Director of
6 Environmental Health of Health Services of Veracruz and to the group of collaborators
7 who have made this possible which we are going to present. As background, the Harmful
8 Algal Blooms are, as you know, produced by diverse micro algae and they may be
9 observed in salt water as well as in fresh water, and due to the collaboration that they
10 produce are commonly called Red Tide. 10% of the red tides are harmful to human
11 beings and their effects go from slight, to moderate, to sever, causing even death.
12 Unfortunately, approximately one year and a few months ago, we had the problem of the
13 Red Tide in some States of the Gulf of Mexico, fortunately on the coast of the Gulf of
14 Mexico we did not have any deaths, but yes in the State of Chiapas and Oaxaca in which
15 there were four deaths caused from having consumed contaminated bivalve mollusca. In
16 the year of 2001, the Harmful Algal Blooms caused in the Gulf of Mexico due to the
17 dinophlagellate *Karenia brevis* provoked severe economic, ecological and health damages
18 in our country. We had the need of implementing an interdiction for almost four months
19 on the coast of Veracruz, Boca del Río. We had to pick up approximately forty tons of
20 dead fish and in fact, by asphixia, four sharks of a shark school that is found in front of
21 the coasts of Veracruz. Due to the fact that the Harmful Algal Blooms are a phenomenon
22 that affects the entire Gulf of Mexico of the Mexican Republic as well as that of the
23 United States, it was decided to carry out a plan of binational linkage in order to confront

1 it, and control it, and therefore minimize its effects. The purpose of this plan is that of
2 having a greater knowledge about the behavior of this natural phenomenon with the goal
3 of being able to predict it, control it and act opportunely in order to minimize its effects.
4 The benefits that we hope to obtain with this plan are the installation of a network of
5 monitoring the harmful algal blooms and the diffusion of the results through accessible
6 electronic media that allow us to evaluate their behavior, with which we can acquire a
7 greater knowledge about the phenomenon, which will allow us to take the necessary
8 actions in an opportune manner, avoiding, as Bryon mentioned a while ago, the economic
9 damages to the tourist sector, promoting alternative tourist places to visit them free from
10 the phenomenon and avoiding in this manner the economic damages to the fishing sector
11 which hits them very hard, in order to propose alternative places of extraction free from
12 the phenomenon and the commercialization of other species suitable for human
13 consumption. But, above all it shall allow us to prevent that which is fundamental for us,
14 in the Secretary of Health, that are the damages to the population's health. In order to
15 carry out this plan, it is necessary to establish strategies such as collection that you, those
16 who went before me, the binational information, the creation of a database for its analysis
17 and retransmission, the use of regional observation systems, the carrying out of joint
18 scientific projects, training in methods of sampling and identification for unifying criteria
19 that include sampling and the analysis of phytoplankton, rapid methods of quantification
20 of brevetoxins and the acquisition of detection equipment. As advancements, in February,
21 2002 we began this project which forms part of the projects that are carried out in the
22 area of health ecology and environment of the agreement of the States of the Gulf of
23 Mexico that begins in this city, the day after tomorrow. It has not been easy, but

1 throughout these two years the following advances have been achieved: In collecting
2 binational information, we have established contact with National Oceanic and
3 Atmospheric Administration (NOAA) and currently our monitors form part of the
4 bulletin of the Florida Southwest coast, and here I want to thank Tim Orsi and of course
5 John Stinus, for having invited us. Regarding the database, an internet page on the red
6 tide was created within the portal of health services of Veracruz, in which can be found at
7 present the monthly information of the monitors carried out in Veracruz. Furthermore,
8 we held a forum on red tide of the States of the Gulf of Mexico of the Mexican Republic
9 with which we hope the monitors of the rest of the states are included on the internet
10 page. We have received the approval of practically 100% of them. In systems of regional
11 information, within the monitors, we actually have additional information of the
12 parameters such as Ph and temperature. With the support of the Council of Development
13 of the Papaloapan Basin (CODEPAP), which our friend Juan Manuel Irigoyen directs,
14 within the project of remote sensors we hope to have, of course, better information. For
15 the training in methods of sampling and identification on a national level, in 2001 we
16 carried out a workshop on sampling and identification of red tide with the participation of
17 the states of the Gulf of Mexico. Further, thanks to the binational linkage that has been
18 generated through the agreement of the states of the Gulf of Mexico, in July, of the
19 current year, personnel from our state laboratory of public health of Veracruz, shall
20 receive training about identification of species and brevetoxins in the laboratory of the
21 Florida Marine Research. Many thanks, Karen, for the support that you are granting to
22 the state of Veracruz and to Mexico. This training shall be replicated in the month of
23 August to the participating states of the agreement, by means of a course for unifying

1 criteria of sampling and identification of phytoplankton. Currently, in the state of
2 Veracruz there is the necessary material for monitoring the phytoplankton and for
3 determining brevetoxins. The samples are sent to the National Laboratory of Public
4 Health. Nevertheless, the State Laboratory of Public Health of Veracruz is proposed as
5 the regional laboratory for red tide, for which personnel shall be trained and the necessary
6 financing shall be sought for implementing the technology for detecting brevetoxins. A
7 few moments ago, Frank Muller commented, and we are going to ratify it, whether there
8 have been important advances in the meeting of the Agreement of the States of the Gulf
9 of Mexico held in Saint Petersburg, Florida, the need was established for short-term
10 resources for activities such as sharing information, that we have already commented
11 about among ourselves, between both countries; Training, bases for the establishment of
12 a system of regional observation, detection equipment of biotoxins and the development
13 of common scientific programs. Budgeting the costs of these activities, we are going to
14 be repetitive. We have to, in order to share information, it is necessary to hold two
15 workshops a year with scientific personnel requiring \$15,000 for each workshop. For the
16 integration of the database of harmful algal blooms, oceanography and the use of the
17 internet, \$30,000. For the training of fifteen persons during one week, \$60,000.
18 Scientific studies through scholarships to two Mexican graduate students per year,
19 \$40,000. In order to establish the system of regional observation, complementing the
20 current system increasing three automatic systems of coastal observation in Campeche,
21 Quintana Roo and Veracruz, which shall provide data about parameters such as salinity,
22 temperature, surge and meteorology, which shall be transmitted by satellite, \$30,000 each
23 one, plus \$20,000 installation. Equipment for detection of biotoxins includes the

1 acquisition of inputs for tests of ELISA \$50,000, this equipment shall be aimed at the
2 State laboratory of public health of Veracruz as headquarters. In order to establish
3 common scientific programs it is proposed to hold a workshop for developing strategies
4 for bilateral studies with a cost of \$50,000. The total of these actions, as Frank has
5 already mentioned, is approximately \$370,000 that was one of the points of agreement to
6 which we arrived in Saint Petersburg in the last meeting. The participating States, in this
7 plan, we actually have the participation of the States of Louisiana, Texas, Florida,
8 Tamaulipas, Tabasco, Campeche, Yucatan and Quintana Roo. All of them belonging to
9 the agreement of the States of the Gulf of Mexico. Also important is the participation of
10 the Veracruzian University with the support that we have had institutionally. The
11 advances as well as the arrival of this project would not have been possible without the
12 support and the coordination of all of the States of the Gulf of Mexico to whom we are
13 grateful, and especially to the agencies such as Environmental Protection Agency, Gulf of
14 Mexico's program office, National Oceanic and Atmospheric Administration, BABSOS
15 and the Florida Marine Research Institute, of the United States, our sister State. Council
16 of Development of the Papaloapan Basin of Veracruz, The Veracruzian University, as
17 well as the health services of the States of the Gulf of Mexico, and now, quite especially,
18 to the Federal Commission for the Protection Against Sanitary Risks of Mexico ---
19 COFEPRIS--- and to SEMARNAT. Thanks to their participation, we are all, each and
20 everyone of us, convinced that upon carrying out tasks in coordination between the
21 nations, we have achieved bringing together our efforts for the common good which is
22 the health and progress of our countries. Thank you very much for your attention.
23 Applause

1 **Bryon Griffith:**

2 Dr. Chantiri. On your agenda, you'll note that we are coming into a little bit longer
3 break, in fact, we are going in the break to load the joining presentations that will follow
4 on the sessions to come. Let me point out before we actually do disband, and I am sure,
5 go to our room for a moment, or the restroom, or to get a cup of coffee, or anything else
6 we might do, to focus a little bit on Dr. Chantiri's presentation, which is the second time
7 a leadership focus in this regard has been featured. In Dr. Karger's and Dr. Chantiri's
8 presentations we now actually have a template as a backdrop. Having that template in
9 place outlining areas of training or technological exchange being featured, I have every
10 expectation by virtue of that, we will fold that in to the discussions to follow. You will
11 actually see in many regards they can easily be separated into the subject matter of the
12 building block areas that we will discuss. One of the things that we are going to do is to
13 pay homage to that prior thinking and feature those elements of transfer and/or
14 technological exchange discussion in those segments. I know, intuitively, having had the
15 opportunity over the past several months to prepare for this conference with Juan Manuel,
16 that when we talk about these monies, this is not a play for money. This is a feature of
17 putting before us what is the "in point" that we are after and how much it gets to get
18 there. With as much capacity as we have in the room, and I think back to Diane's
19 presentation about the partnering organizations and collaborators at all federal levels, at
20 all state levels, at all NGO levels, we are going to reach in and try to achieve those goals
21 cross-organizationally. That is the tendency that we have to do our business and what we
22 bring to the table as a brokering out of the office, brokering to an end. We are going to
23 find, already, as I look at that featured template of activities, and Dr. Chantiri recognized

1 that there is some of that already taking place. I think we are going to find that there is the
2 prospect for much of that to take place with what is already in motion. I referenced
3 earlier proposals on the part of many agencies to advance either NASA's sensor
4 programs, EPA's Beach Monitoring programs, NOAA's proposal call for elemental
5 development of what amounts to the GCOOS or IOOS components. All of these things
6 are now going to have to start to come into play in these adjoining conversations as we
7 look to break this thing down. Now, a little bit about the later segments. Up on one top
8 of the grid you have largely the federal kind of asset level overview. Now we are going
9 to get down and in the next segments you will notice that the features are almost
10 consistently state level representatives. That is by design. These are the practitioners,
11 like you, both sides of the [unintelligible]. You are the folks that have to make it work.
12 You close those beaches, you close those shellfish beds, and you direct fisheries to open
13 cleaner waters, that kind of thin. So, this is where the discussion is actually going to take
14 hold with the practicing level state and local governments, to teach us, in many respects,
15 what it is like to apply these capabilities. In that regard you will see that the presentations
16 then stack, because what we were asked to do was to allow the U.S. and in most respects,
17 as you see, is the lead in the segment, the U.S. will tell how it is done. How do you do it
18 in Florida, how do you do it in Texas, what underpinnings do you have to do it with, and
19 then correspondingly how do you do it in Veracruz, in Campeche, in Tabasco, and all of
20 that. Then to look at the variability there, the variation, and to isolate it and to come
21 together and discuss out means of resolving any incompatibilities or associated problems
22 in that respect. So, I am really excited with this last list of presenters, as Diane pointed
23 out, I am always learning. I learned from this morning's presentations about how much

1 capacity there is to apply. The application is next. This is your workshop and we can not
2 make you uncomfortable, otherwise you would not enjoy this workshop at all, let's go
3 ahead and take the balance of 15 minutes to the bottom of the hour, 12:30, to deal with
4 what you might have to deal with while we set up the arrangements for the following
5 sessions. We are, for all of us in here, looking to a 1:30 or thereabout lunch break. I
6 know that is a little bit later than normal for many of us, especially our east coast friends,
7 I know at this time that you are probably rolling and growling, I apologize for that. If
8 you give us your attention back here at 12:30 promptly, I will appreciate it. Thank you.
9 Okay, we have approximately an hour and a half set aside for the first component of this
10 next part of the agenda. This is a little bit of trial and error, in the sense that it is not set
11 up just with presentations through a discussion. What would recommend that we do is to
12 go ahead and follow the dialogue, and the questions, and the constructive part of this
13 schedule to a point that reaches a comfortable conclusion on or about 1:30 or 1:45. If the
14 session tends to extend beyond that, then we will reconvene and finish that session after
15 lunch so that we don't extend too late. With that in mind, everyone is stretched, watered,
16 I hope, and all of that, we are about to get into the nitty-gritty, the hard work. We are
17 going to start this segment with presentations again, on the basically how it's done part in
18 our respective countries. Leading this segment, we'll be actually taking them out of
19 order, at their preference, I will start with Dr. Jesus Garcia Cabrera, Laboratory and
20 Monitoring Manager for the National Water Commission in Mexico. Join me in
21 welcoming Dr. Cabrera, if you will come up and take over, we'll track with you.

22 **Dr. Jesus Garcia Cabrera:**

1 Well, good morning. I work in the National Water Commission - General Technical
2 Assistant Directory in the Department that is the Management of Sanitation and Quality
3 of Water that is in charge of one of the monitoring networks of the National Water
4 Commission which is the National Network of Monitoring. I am going to present to you
5 this talk in two parts. The first part is how we are currently operating the national
6 network of monitors and the national network of laboratories and, in the second part, how
7 we have supported at a time phenomena of red tide. Why do we monitor? The General
8 Law of the Ecological Equilibrium and the Protection of the Environment in its articles
9 133 and 159 establishes clearly that the National Water Commission is responsible for
10 the systematic monitoring of the quality of water in all national bodies of water. This
11 includes fresh water and part of the brackish ones. Further, the Law of National Waters in
12 its article 9, headings 5, 6 and 9, article 86, heading 1 --indicates to us that there must be
13 monitoring of the quality of water of the epi-continental waters. The regulations of the
14 Law of National Waters points this out and obligates us to have the periodical data about
15 what is the water of the water. The impact that we have with this information that is
16 generated is fundamental for administering the quality of the resource. In order to
17 control, maintain and improve the quality of water in an aquatic system with the goal of
18 conserving the equilibrium between its benefits and its uses as a receptor body. That is,
19 the famous concept of the sustainable development that is forwarded in almost all the
20 world. In this slide I want to demonstrate the diagram of how we are operating the
21 monitoring system right now. We have, basically, divided the national monitoring
22 network in a primary network, that is like a snapshot of the quality of the water each
23 month that we take a sample, we obtain a series of data and we are storing them and

1 interpreting them. One secondary network that includes suitable sources and non-suitable
2 sources, which, basically, are associated with discharges, discharges from industry,
3 discharges from agricultural returns, etc. And, we have special studies. They are studies
4 of support for the primary and secondary network. They are studies that we generate in
5 certain bodies of water of interest, such as the Chapala Lake, such as the Alvarado
6 Lagoon, etc., etc., and it is an evaluation of basins that are reports that other areas of the
7 National Water Commission give us and that information we put it in a database. Border
8 studies, we are working on the Río Grande with the colleagues from the United States.
9 There are also other studies. In these studies we put information that we are generating
10 when we support an event of red tide such as is the case that I shall present to you later.
11 We attend to ecological emergencies, basically they are timely studies that we make of
12 the quality of the water when a massive mortality of organisms becomes present, be they
13 fishes, be they aquatic or semi-aquatic fowl, etc. We have other external sources of
14 information of the quality of water that are, basically, from research institute that are
15 dedicated to this type of research, or other sources that we can serve in order to enrich our
16 database. Each one of our networks has a component of superficial waters, subterranean
17 waters, and some coastal waters. Well, the form in which we manage the information,
18 here we see it on the little map, we on a central level have a computer with all of the
19 databases and we are connected with our different regional managers. We monitor
20 through an integral global framework with very, very specific objectives. As I was
21 commenting to you, the primary network is to carry out the evaluation of tendencies of
22 the quality of water at national, regional or local level. We, in this sense, right now we
23 are in a process of redesigning this national monitoring network because in the past, since

1 1974 to date, diverse physical-chemical parameters were determined, between 300 and 50
2 different parameters, which were at times not of any use, they were not necessary,
3 moreover to be determined. Therefore, we, in this primary network, are seeing indicative
4 parameters that are integrating and that give us much more real information about
5 conditions of the quality of water in our country. The secondary network supports and
6 evaluates the performance and fulfillment of the regulation of the contamination of
7 bodies of water, that is, we associate this network or the sites of the network, with
8 impacts by discharge as I commented earlier, or by some other event that at some time is
9 necessary...

10 (break in tape sequence - end of tape 2b)

11 ...other types of toxics. The hydroecological emergencies that have supported us in
12 seeking red warning lights, because there are events that are presented very close to one
13 another at the same point, therefore the environmental conditions are indicating to us that
14 we can prevent at some time an event of this type, as in the case of Yuri in the State of
15 Guanajuato, where we are presented with massive mortality of migratory birds that come
16 from Canada. Obviously, we are helped in fulfillment by international agreements and
17 commitments when we have, as in the case of the Rio Grande, in the case of the Rio
18 Verde with Belize, Guatemala, etc. We monitor lotic and lentic systems, that is, rivers,
19 lakes, lagoons, dams, we monitor some points of coastal zones and the aquatic ones,
20 basically. The variables that we determine are the temperature, color, conductivity, Ph,
21 dissolved oxygen and turbulency in the field and in the laboratory we see alcalinity,
22 hardness, overcome, grease, and oils, active substances at blue methalyne, solids in all
23 their forms, floating material, total organic carbon, nitrogen in all its forms, phosphorous

1 in all its forms. The biological ones that we make as a routine are the total faecalis
2 coliforms and now we are including the enterococci with the sanitary monitoring that we
3 are doing on the various beaches of our country. We are implementing the toxilological
4 parts with test for toxicity, basically with daphnia magna, and with vibreofisheries, or the
5 microtox system, as it is known. The part of variables such as environmental indicators
6 that we are using as a routine are faecalis coliforms, washing down solids, with
7 tendencies [unintelligible] are, basically with nutrients, and for the presence of remnant
8 waters we make DBO, nitrogens and faecalis coliforms. The secondary network that is
9 for controlling subjective contamination is to arrive at fulfilling the standard, and to
10 ensure that the water of the ceptor body shall reach the quality standards that have been
11 defined for its use. Therefore, the norm is very specific regarding the particular
12 conditions of discharge that our legislation has with respect to the quality of water of the
13 receptor body. It is a flexible component, at some time we can place a monitoring site,
14 we determine the physical-chemical characteristics, and when there is no problem, that
15 point disappears, simply because there is no problem anymore. Specific sources of
16 impact of the aquatic systems are associated, it generates prescriptive short-term and
17 medium-term information, and it supports regulatory and control of contamination
18 actions. This we do with the area of the Administration of Water of the National
19 Commission of Water. At present, in the superficial primary network we have 215
20 monitoring sites, on coasts we have 45, and in waterways we have 143. For the
21 secondary superficial network, we have 227, for coastals we have 17 and for
22 subterranean, 45. With special studies and a reference network we have 122 sites,
23 making a total of stations in the country of 1014 monitoring sites. We have 13 regional

1 laboratories in the different basins in which the National Commission of Water is
2 divided. We have state laboratories. We have a national laboratory of reference in
3 Mexico City, which is dedicated to approval of laboratories that make studies on water
4 quality or make analyses in principal waters and to validate techniques. We have a total
5 of 34 laboratories distributed in the entire Mexican Republic. With respect to this, the
6 National Commission of Water has a mechanism for collaborating in attending hydro-
7 ecological emergencies and environmental contingencies throughout the country. In this
8 case, in a handbook that is right now in force and that is distributed to all the institutions
9 that have to do with water and that at some time can be responsible or co-responsible for
10 some event of this kind. For this end we have a mechanism of special attention that is an
11 organization that we ourselves have through our general coordinator that would be our
12 regional manager. It happens with an executive coordinator who is the state manager,
13 and an operative coordinator that is the assistant state technical manager, all of whom
14 coordinate field brigades in order to be able to support or attend in case of a hydro-
15 ecological emergency. The head of the land brigade, who is the head of the
16 administration of water, has two in-house technicians who are those in charge of seeking
17 all the corresponding information when an event presents itself, for example in this case,
18 red tide, in order to see what antecedents there are. The chief of the aquatic brigade or
19 chief of the quality of water is a field technician who helps taking samples, in this case
20 the secretary of health, water samples for determining the quality of the water in column,
21 as well as helping it also to make the concentrations of the organisms for the sub
22 determination in the laboratory. The chief of the support brigade, who is our hydraulic
23 police, our hydraulic vigilantes, help watch over the areas that are interdicted at some

1 point where it is prohibited for the entrance or consumption of the growing of organisms,
2 in this case, this program we do it through the Mexican Program of Health for Bivalve
3 Mollusca that the Secretary of Health coordinates. We already have put into place in
4 some states, in the case of Tamaulipas, that is the most advanced state in this regard, the
5 coordination with the Secretary of health, in order to attend to this type of events. The
6 first level that we manage with the Secretary of Health is the locating of the place and the
7 dimensions of the event in order to see up to where the problem is. Second level is the
8 sampling of waters, collecting phytoplankton in the case of the red tide. The third level is
9 the permanency of cells in days, some statistics are kept together with the Secretary of
10 health in order to see how the event is. And the fourth level is the quantifying of toxins
11 by means of laboratory analysis, that is basically the Secretary of Health and we only
12 give support to these activities. These are the events that we have participated in as
13 collaborators with the Secretary of Health with regard to the case of the red tide. In 1996,
14 out of four events that we had in total, only one referred to red tide. In 1997, we had
15 three. In 1999 we only had two. In the year 2000, there were four the same as in 2001.
16 We have not had any collaboration during 2002 and 2003. They have not requested
17 support from us, nor have we detected any abnormality during 2002 and 2003 on the
18 points that we have as a national monitoring network. I should clarify that in this regard
19 the national monitoring network for red tide would have to be a network with a very
20 special purpose, very specific for locating the monitoring stations. Therefore, we would
21 have to redesign at some point or relocate, as the National Commission of Water, some
22 points for being able to support and making follow ups that shall be given to how the
23 organisms are moving. We have observed it there in Mexico. This was my question that

1 I would make before with these very interesting models. If one could not see the
2 movement, because we have seen it through applying all of the simply visual
3 determinations. It is very interesting to be able to apply all of these tools for this decision.
4 Where to place my monitoring site in order to be more preventive than corrective in this
5 sense. This is a summary of the events that I had already presented in the previous table.
6 Here I just wanted to emphasize that in the past two years, the National Commission of
7 Water has not had to participate in events of this type and that we thank them very much
8 for this opportunity because I want to inform you that at this time, the law of national
9 waters in our country has been revised, it has been modified in some aspects and now it
10 corresponds mainly to the National Commission of Water to attend to what is the coastal
11 and marine areas. Therefore, we have to include ourselves immediately in these
12 programs, and to that end the National Commission of Water is developing the analytical
13 techniques for [unintelligible], in which it is saltish marine water that has some analytical
14 modifications and that we have to train the personnel from various institutions in order to
15 be able to apply with a uniform criterion this type of decisions. That is for a program
16 which we call in Mexico "Clean Beaches". For red tide we can create the same
17 dynamics. I speak for Mexico and after we are going to talk like two countries who are
18 going to collaborate. This is all I wanted to say, I thank you very much and I am at your
19 service.

20 Applause

21 **Unidentified Speaker:**

22 Many thanks for the talk. I wanted to know if you have reports of red tide in the states of
23 Quintana Roo and Campeche?

1 **Dr. Jesus García Cabrera:**

2 No.

3 **Unidentified Speaker:**

4 There are none.

5 **Dr. Jesus García Cabrera:**

6 There are none.

7 **Unidentified Speaker:**

8 They never occur.

9 **Dr. Jesus García Cabrera:**

10 I could not assure you of that, what happens is that what I presented to you are the ones in
11 which we participate and that at some time they inform us about, but for example, in the
12 state of Veracruz, I am seeing that it has had various events that I do not have in my
13 database, and that would be interesting to include in order to be able to see the red focii
14 and be able to follow up on them as this phenomenon presents itself, if it is the same
15 phenomenon or they are different phenomena, etc. In case of the National Water
16 Commission where we have participated is in the state of Tamaulipas because each year
17 the phenomenon presents itself, and in fact we already know about it so much that we
18 already have preventive measures in order to be able to receive it, let's say, if you can say
19 it like that.

20 **Dr. Frank Muller-Karger:**

21 Of all the events that you have observed, in which year has the event been the strongest
22 that you have had?

23 **Dr. Jesus García Cabrera:**

1 In 1998 the event presented itself and lasted three months.

2 **Unidentified Speaker:**

3 What months were those?

4 **Dr. Jesus García Cabrera:**

5 I do not remember them, but if you have the copy of the presentation, they are there.

6 **Unidentified Speaker:**

7 Yes, to answer Dr. Muller, in August of 2001, from the fourteenth almost to the thirtieth
8 of August, a red tide occurred in the state of Yucatan, that embraced approximately 45
9 miles of the coast. It was practically 20 days stalled on this entire area. It was not a toxic
10 tide, but yes it did cause serious economic damage, for the species that died there as well
11 as for the bottleneck of its branchiae, as well as for the tourism that had to flee from that
12 area for the rest of the summer.

13 **Unidentified Speaker:**

14 Also, in order to answer Frank's question, we have a forum of the red tide, the one we
15 mentioned for 2002. In this forum each one of the states presented how many events they
16 had had. The memoirs are on the internet on the page that we already mentioned and
17 Quintana Roo mentions that they have Ciguatera. That is the microorganism that they
18 have and that causes serious damage.

19 **Dr. Jesus García Cabrera:**

20 Many thanks.

21 Applause

22 **Bryon Griffith:**

1 I would like to welcome Dr. Maria Amparo Martinez Arroyo, Secretary Advisory of
2 SEMARNAT. We are going to extend further the discussions of federal involvement in
3 red tide monitoring in Mexico.

4 **Dr. Maria Amparo Martinez Arroyo:**

5 Thank you very much. I am going to give this presentation in Spanish. I wish to begin
6 with this slide because in all of the other previous discussions, and those that our North
7 American colleagues are used to seeing, is where only the North is presented. We always
8 work with this one. I hope that after these meetings we can offer the complete Gulf of
9 Mexico. The part that I am going to give is from the Federal Government and as you can
10 see for the theme of the red tide, really we are getting into it, I am going to explain now
11 in general the problematic, because giving this panorama it is more probable that we can
12 find how to collaborate in an efficient manner. Mexico has more marine territory than
13 land, in spite of which, we have not had an integrated or centralized policy for doing it.
14 Now, that policy is trying to be made, in fact, what the Federal Government is trying to
15 do at this time is establish that which is called the agenda of the sea in which we attempt
16 to arrive at a national policy of seas and coasts, which we have not had throughout our
17 history. In just speaking about the federal environmental sector, and in order to offer an
18 idea of the complexity that each project may come to have in this sector, we have more
19 than 20 dependencies that are treating marine and coastal issues which have some kind of
20 competency, only within the federal environmental sector. Therefore, in order to begin to
21 fix this lack of coordination, that I speak with a lot of liberty here because I know that the
22 same thing happens to you, that neither do you have this problem of coordination solved
23 at the marine level. Therefore, what we are doing is, first, to create a functional

1 coordination. We thought that it was useless to create another agency that was another
2 institution that would only bring together all the problems. What we do is that each one,
3 in the agency to which they belong, we are creating a functional coordination. For now
4 we have called this The Group of Follow Up on Seas and Coasts. This includes all the
5 agencies that have to do with, within the Federal Government only, research, such as the
6 National Institute of Ecology and the National Commission for bio-diversity. It also
7 includes others such as the Protected Natural Marine Areas, the Environmental
8 Procuratorship, which is the one that oversees the fulfillment of the environmental
9 legislation, the National Water Commission, which has just presented to you about
10 monitoring water, that is to say, we bring together all of those who have something to do
11 with the management of coastal and marine areas. We have a group where we are
12 analyzing. We already have an internal page for working and to see issues about the
13 permits that are given on the beaches for placing establishments up to issues about the
14 environmental impact of works by Mexican Petroleum [Translator's note: PEMEX], or
15 anything else. I am going to proceed quickly, since this is not the only theme. I believe
16 that it is important to situate ourselves so that the relationships that we wish to establish
17 can be more firm and with more knowledge. Therefore, we have some instruments for
18 managing the marine area. Among them, very important, is that about protected natural
19 marine areas. In fact, when we arrive at the part about agreements, we want to propose
20 that in these natural protected marine areas it is where buoys and monitoring systems may
21 be placed, besides all of the others that are placed, fixed because these have constant
22 protection on behalf of Mexico's navy, so that no instrument that is placed be in danger.
23

1 These can be a good site for monitoring as well as their being the best cared for
2 environmental areas. Within this new environmental period for seas and coasts we have
3 contemplated, a part that you also saw in the presentation of White Water to Blue Water,
4 that is the integral management of basins. We already have this contemplated of not only
5 treating coastal or marine part, that is an attribute of the Federal Government in Mexico,
6 but of trying to integrate all that which is happening in the basin until arriving there. As
7 you know, the Gulf of Mexico, well, more than 60 percent of the waters that are
8 discharged in Mexico are into the Gulf of Mexico the same as with you, two thirds go to
9 the Gulf of Mexico. It is very important to see what happens along the entire trajectory.
10 Also we have a policy for integral coastal management. All of these things are being
11 discussed a little at a time with the governments of the states, which on many occasions,
12 as in the case of Veracruz, some go much farther than others. Another instruments of
13 procedure are the regional and local ecological ordinances. On the one hand, one of the
14 concerns in this administration, is the Gulf of Mexico has been proposed as a priority
15 area. In this regard, we have seen which are the main interactions that we have in the
16 Gulf of Mexico. Evidently, this is the greater part regarding the territory with the United
17 States and also with Cuba. In fact, there is a project that was approved on behalf of the
18 GEF and which the funds have not been liberated yet but it is a tri-national project in
19 which we are going to have to approach the general problems of the Gulf of Mexico in a
20 joint manner. It is very important to also comment that we have great interest in
21 binational treaties about problems in the Gulf of Mexico. Practically we have half and
22 half of the responsibility in the Gulf of Mexico, a small part for Vuba, but now what
23 happens within the Gulf, there is an amount of agreements in which we wish to work in a

1 joint manner. In this regard, we are very much thankful for the invitation from the
2 organizers of the Gulf Accord, who have been working in a very important manner and I
3 believe who have advanced a lot, not only in regards to the visualization of the problems,
4 but regarding the relationships that have been established already in a bilateral manner
5 with the states in order to be able to fix it. I believe that this will cause the Federal
6 Government now to attempt to catch up with them and be able to support them regarding
7 what is required. But, a part that we see as being very important, is to begin to arrive at
8 very precise agreements in the actions that are going to be carried out. Between Mexico
9 and the United States we have a large quantity of signed accords, some that are fulfilled
10 and some that are not. It seems to me that the problem is that in environmental issues, it
11 is that which is least fulfilled, by both parties, therefore it is a good opportunity for the
12 Gulf of Mexico to demonstrate that we can carry out joint actions, not only officially
13 signed accords. If we can leave here with plans for action and specific work, that would
14 be ideal. This is a little of what we have at a political level in order to enter into this type
15 of agreements. In the first place, there is the Accord of Governors, and also there are
16 some instruments that we have at a governmental level that we want to participate in
17 these collaborations in order to give them more body. Regarding the red tides,
18 particularly, you have been given a panorama view of what has begun to be the National
19 Water Commission. In reality, when they told me that I had to speak here about the
20 monitoring of red tides, I said, how easy, there is nothing, what there is in reality, is a
21 large amount of work at an academic level in the research institutions, you can find many
22 disperse studies, important ones about red tides, but we have nothing at a national level
23 really systematized. There is an attempt at an important network that the Center for

1 Biological Research of the North directs, that is on the Pacific side, that has achieved in
2 joining forces of many technological institutes, which is medium higher learning, and that
3 collaborate in a network of weekly measurements of the red tides, well, but in a quite
4 modest fashion albeit systematized, trying to do this. On the global level, I can tell you
5 that when we spoke for the first time about the group of follow-up of marine and coastal
6 issues, I asked how did they monitor the red tides, they explained to me that when a
7 fisherman notified that he saw dead fishes, someone from the navy and from the federal
8 environmental procuratorship from the state go out, they take a boat and they go see it.
9 This is for many parts of the Pacific, by luck we have a lot of others where something
10 else has been achieved, such as in Veracruz, which is now monitoring, as they have
11 explained in a very different manner. We have some sites where also it is done
12 differently. But in a systematic manner, let us say, a good integration has not been
13 achieved. Therefore, the idea now is to achieve that all of this capacity that really exist,
14 from specialists in the country for carrying out this type of work, we can join it together
15 into these efforts and not have them all dispersed doing important work no doubt but that
16 finally cannot contribute, because of how they are placed, to the management of these
17 areas and of these emergencies. I would like to tell you that out of the federal subjects
18 who would have to intervene in these issues of the red tide, would be the Secretary of the
19 Navy, who at the constitutional level is responsible for overseeing the contamination of
20 the seas, the Secretary of the Environment and Natural Resources who is responsible for
21 the health of the ecosystems, the National Water Commission, who in this case would be
22 at the level of monitoring and is within the environmental sector, the Federal
23 Procuratorship of Environmental Protection, who also now did not directly have a

1 function but is going to participate much more in this overseeing of this type of
2 phenomenon, and evidently, the Secretary of Health, who until now, in legal terms, is
3 who has the attribute of declaring the interdiction on fishing when a red tide is detected.
4 The only problem that there has been in terms of coordination with the Secretary of
5 Health and that we are now solving it, is that, evidently, what they have to treat is the part
6 related with human health. Therefore, there is a great amount of problems associated
7 with the ecosystems of the red tide, for example, the damage that they can cause to the
8 reef systems, the damage that they can cause to a quantity of the ecosystems which, well,
9 Does not concern the Secretary of health, and there was no one who was looking at that.
10 We are now entering also into a coordination to see not only the human side, but what is
11 evidently, the most important one, as it was mentioned to you, we have deaths due to red
12 tides, especially in the Pacific. Evidently, those who are in contact, those who can see,
13 monitor, and more so, suffer the effects of the red tides, are the local governments, the
14 society, the coastal communities, who it is intended to support in all the efforts that are
15 carried out for having local monitors and that the local measures are being taken for the
16 healthiness of the ecosystems. In this regard, this Accord of Governors is a good
17 example of that which can be done, and now that we are going to place, at least on behalf
18 of the Federal Government, all the effort in making these linkages which are lacking
19 between the different levels of government for being able to act jointly. The national
20 academic institutions and research ones, as I was saying, are a key point which until now
21 have not been taken into account sufficiently in our country. There is a saying in Mexico
22 that says that the dogs on a ranch are only let out for fights and are locked up for parties;
23 that happens at times with our academic and research community. When some point

1 needs to be defended, they set about studying but suddenly when they need to be taken
2 into consideration for managing it, they are not taken into account. I believe that there is
3 a very clear policy of this administration of changing the relationship that exists in the
4 academic institutions, at least with regard to the marine and coastal issues. We also think
5 that they are relevant, in the case of the red tides, an important actor that can continue to
6 publish it on paper everything that it does, but above all else that it direct its work
7 internally towards management.

8 Applause

9 **Bryon Griffith:**

10 In the two presentations related to federal programs, of both the water commission and
11 SEMARNAT, do you, either one or the other, or both, see yourselves in a coordinating
12 leadership role for delivering the level of federal program management assistance that
13 would be necessary to carry out a binational program for red tide monitoring? When you
14 referenced the twenty-plus agencies is there one or two, or less than twenty agencies that
15 have a more senior leadership role in that coordination?

16 **Dr. Maria Amparo Martinez Arroyo:**

17 Within SEMARNAT we have a problem and that is in the previous administration
18 everything that refers to fisheries and to the National Institute of Fisheries which carried
19 out the marine issues in a very clear manner and the aquatic issues in general, was
20 separated during this administration and is now in the Secretary of Agriculture. This
21 translated into a vision, on the part of fishing, moreso in terms of production, [than] in
22 commercial terms, and the marine and coastal ecosystems remained somewhat
23 unprotected. Although by law, everything that is cared for in ecosystems corresponds to

1 SEMARNAT. In this regard, who is carrying out the leadership now for this is
2 SEMARNAT directly from the office of the Secretary in the coordination of advisers of
3 the Secretary. But for every issue in particular, there are agencies who have more power.
4 The office of the Secretary is carrying out the coordination. In particular for red tides,
5 there is no one who something else, except that now that the National Water Commission
6 is going to begin to take the samples and to carry out the monitoring, it is going to have
7 greater relevancy in this respect. But what is being organized is that the network of
8 laboratories that are going to work for the programs of beaches, carrying out the analysis,
9 also functions for red tides, and that is going to be coordinated by an inter-secretarial
10 group, in which are the Secretary of the Navy, the Secretary of Health, SEMARNAT, and
11 the National Water Commission. In this sense, perhaps, one cannot place the
12 responsibility that you are asking me directly upon one office, but rather work is going to
13 be by programs. In this case, it is going to be programs of coastal Sanitary.

14 **Frank Muller-Karger:**

15 Thank you, Amparo. Do you have some estimate of the annual cost of the impact of red
16 tides in the Gulf of Mexico? Economic impact and social issue?

17 **Dr. Maria Amparo Martinez Arroyo:**

18 No, there are very partial estimates. Above all regarding events. I could tell you that
19 now greater attention has been paid to the red tides that occur on the Pacific because of
20 the social problem that it represents, because of the problem of the deaths that have been
21 there. In fishing terms it is very changing because the greater part of the fishing that is
22 carried out is rudimentary, it is small scale and is very difficult to evaluate in this regard
23 the effects, which are not easily reported. Furthermore, we have a multi-specific fishing

1 in which, suddenly, if there is a problem with the resource in the sea, perhaps they go on
2 to fish more in the coastal lagoons or also change the place of fishing for mollusks, or
3 something else. As a Federal Government it does not have one. Now, if there are at local
4 levels, some evaluations, but basically, as far as I know, referred to special events. What
5 also exists is a certain estimate about in which season the red tides appear more, in
6 summer, in August, September, in Veracruz; and Tamaulipas up to July. Now precisely,
7 on the Pacific side it is the strongest period, and therefore this is related with the fisheries
8 that are stronger at this time. But, there is no general evaluation. The Mexican Institute
9 of Technology of Water is also collaborating in the group. What happens is that since
10 INTA did not carry out anything marine, until now that they joined us in the issue of
11 beaches, it had not been in the follow up group, but it is going to be incorporated now
12 because also the INTA is one of our potential resources for managing the satellite images
13 for monitoring the red tides as well as the National Meteorological which is another site in
14 which the management of the satellite images can be handled, that now it is coming out
15 that it can be one of the agreements at which we arrive in this meeting.

16 **Bryon Griffith:**

17 I know I mentioned 1:45 as a possible breaking period, I am going to extend that to 2:00
18 by virtue of allowing Dr. Steidinger to give her presentation. There is actually multiple
19 reasons for doing that, one of which is that it is a good breaking point and will offer, I
20 think, some interesting dialogue to actually be discussed over lunch, in reference to the
21 previous presentations. So, now I will introduce Dr. Karen Steidinger, who has had quite
22 a history in the U.S. in dealing with Harmful Algal Blooms. I hope you welcome her and

1 Dr. Steidinger, I will let you take us in to lunch, it is actually better to be taken us into
2 lunch than to deal with the technical issues after lunch.

3 **Dr. Karen A. Steidinger:**

4 This, I feel is going to be a very interesting meeting because we have a lot of
5 opportunities here to integrate our programs between Mexico and the Gulf states. My
6 first comment is my title was wrong. There are not only public health concerns in
7 Florida, but there are natural resource concerns with mortality of animals, and their
8 economic effects. So, we actually have several agencies that are involved. My agency is
9 the Florida Fish and Wildlife Conservation. We have a Department of Health, we have a
10 Department of [unintelligible] and Consumer Services and we have county health, and
11 the Department of Environmental Regulation. So, there are a lot of agencies involved in
12 Florida to monitor, and when you have a coastline like Florida's you need all those
13 agencies to help you monitor. We also have a partnership with Mote Marine Laboratory,
14 Richard Pierce is here. Florida's red tides are unique. Florida has red tide almost every
15 year. They last three to five months. They can last up to twelve months. Where else in
16 the world do you have Harmful Algal Blooms that cause fish-kills, manatee mortalities,
17 respiratory irritation, toxic shellfish, last that long except on the West Florida shelf. So,
18 this is a unique environment to be able to study red tides. I want to point out one thing
19 that Frank will appreciate here, this discoloration caused by *Karenia brevis* is visible to
20 the eye, about a million cells per liter of water, but his satellites of 400 miles or whatever,
21 can detect hundreds of thousands per liter at the surface. Now, the other thing is that
22 these can come in on the bottom so you might not be able to detect them, but when they
23 are a surface phenomena the satellite is a lot better than the human eye. Florida, like

1 other states, has an event response capability and so we respond to fish-kills, we respond
2 to manatee mortality, birds mortality, and someone earlier this morning, I don't
3 remember what time that was, mentioned GIMNET. Florida was part of GIMNET when
4 it first started. There is an 800 number that you can call into, that helps a lot. For human
5 impacts, there is the aerosol, there is toxic shellfish, there is economic effect and
6 everybody has been mentioning fisheries impact. It is not just a public health concern.
7 As far as the economic impact, no one has a good handle on economics and what it is
8 going to cost. In the 70's they estimated 15 to 20 million. In a study that we funded
9 through a Florida Harmful Algal Bloom taskforce, they were not able to really get a good
10 grip on what the economic cost was for the red tides. They have been around for a long
11 time, one of the things I want to point out is that they can occupy ten thousand square
12 miles. In Big Ben in 1964 it was absolutely a very large area and it can go to a depth to
13 120 feet. So, when we talk about control, which we are going to be talking about later, I
14 am sure, in mitigation, we need to consider that once it has already started, it is pretty
15 extensive. They can last 3 to 5 months. They can last up to 18 months. The north part of
16 Florida has had 21 red tides since 1957. Southwest Florida has had 43. There have been
17 10 of them in the East Coast and 14 down in the Keys and Miami area. I left out Texas
18 because I know somebody is going to cover that. The interesting thing is that they really
19 do occur in fall, late summer and fall. They occur the least in April, May and June.
20 Although they do occur in every month, they are least frequent during those. What I
21 would like to point out is that there are a lot of web pages on this and one of the websites
22 is www.floridamarine.org and the reason I mention that is that there are status reports on
23 there, there is a historical account going back to 1844. You can look up the status of this.

1 You can go and see other websites like Mote Marine. You can go to Red Tide Online.
2 You can go to Frank's, you can go to Bob Weisberg's Physical Oceanography. We
3 monitor the water and we monitor shellfish for toxins. We monitor the water for cells.
4 We are expanding our program because we are finding out that not always through the
5 cell counts equates to the toxin levels. We are concerned about this, because we close
6 our shellfish areas based on counts, five thousand cells per liter. In the beginning of a red
7 tide, they do equate, but as the red tide progresses we are not getting correlation between
8 counts and toxins. There are a variety of ways that, depending on what your approach is,
9 and what your need is, you can monitor for fish-kills and discoloration of an airplane.
10 We used to be able to use the Coast guard to collect samples, actually offshore, and be
11 able to pinpoint the boundaries of the red tide in a day. It was a wonderful service but
12 now they are called upon for other things like homeland defense and so, we can't use
13 them. There are research vessels like the RRV SunCoastal from USF, various EG Clark
14 from Mote marine laboratory, and there are a variety of platforms that are out there, for
15 example, the USF has buoys as a matter of a comp component. One of the things I'd like
16 to suggest is that Florida has had a lot of successful volunteer programs. Now, volunteer
17 programs are hard to get started and hard to keep going. They are not really funded but
18 you do provide sample equipment, you do provide...

19 (break in tape, end of 3a)

20 *Tape 3B*

21 .. we have eleven transects off of Florida that sample, charter boat captains sample 1, 5,
22 10, 20, 30 miles offshore. They sample normally once or twice a month. The problem is
23 that it is surface sampling. That is easy for them to do. What we are trying to do now is

1 build kits for them to be able to sample at depth, because we have been missing
2 populations of brevis by not sampling the depth. We can organize that and it is not very
3 expensive. If you have a large coastal area, the one thing you want to do. We put up our
4 sampling results quickly and we produce maps, this is a volunteer map. We have three
5 regions northwest, southwest, and east. We code our data and I would like to talk about
6 this because this is a point of contention for some, in that what we do, is we aggregate our
7 data so we don't present cell counts as they are done. The reason being that the public
8 will take a count of three hundred thousand at Venice Pier versus three hundred and thirty
9 thousand, ten steps down and say it is worse ten steps down. We want to protect that, for
10 some point in time, but it does not have to be forever. For example, the HABSOS
11 website has counts, and Mary will be getting counts. So, if you are looking at cells you
12 look through an inverted microscope. There are several ways that you can do this. You
13 can use Loogalls solution for preserving the red tide organism. You can use live counts.
14 When you use Loogalls you use a settling chamber; it is very similar to [unintelligible].
15 When you use live it is called pipette method, and what I would like to point out is that
16 EPA Gulf of Mexico program, years ago, funded us to do a manual on Harmful Algal
17 Blooms in the Gulf of Mexico and public health risks. This is up in our website, which I
18 just gave you, www.floridamarine.org. It needs to be updated, but there are standard
19 operating procedures in that for counting, for Mouse Bioassay, for a variety of things
20 leading to HAB sampling and analysis. We do it beyond like microscopy. We have
21 found out that there are at least five Karenias in the Gulf of Mexico. They have been
22 identified more [unintelligible] and also genetically, and they have been differentiated by
23 New Zealand scientists. Allison Haywood was working from New Zealand and came up

1 with new species that she has described in the journal of psychology. There are Karenias
2 besides brevis and mikimotoi, which you are mostly familiar with, and we have
3 selliformis, papilionacea, and longicanalis, if anyone is familiar with that, and other
4 Karenia. Now, the important thing is that these are toxic. They all have similar pigments
5 and they might have ecological differences. We don't know, but the toxin profile varies
6 between species, and that is what the Japanese found out by working with Allison's
7 isolates. Everyone is doing a probe for Karenia brevis, molecular probes, to identify it so
8 that if its whole cell will light up and you will be able to differentiate it from other cells,
9 you can also work with [unintelligible] probes. Allison is the only one that has whole-
10 cell probes. She is the only one that has probes that differentiate all the Karenia species
11 that she has found in New Zealand. The interesting thing is that we only started to see
12 these organisms about two or three years ago in the gulf. We had mikimotoi every since
13 the 1970's and probably before, but the other ones, papilionacea and selliformis, just of
14 recently started to show up. They also occur in Kuwait, and other areas. Florida has
15 been documenting red tide since 1946, but most of it is hard copy. If you got any red tide
16 data, what you really want to do is go in and rescue it, digitize it and put it into a
17 database. I think, there are nearly 57,000 samples now. We have a cd that is available
18 and it is 1954-2002. There are limited fields here, there are brevis counts, temperature,
19 salinity, location, depth, date. The best data that you will have is the cruise data, not the
20 event response data. But where you sample before red tide, during red tide and after red
21 tide, that is the most valuable that you can get. There are these cruises that actually are
22 available from 1954 to 2003. In 1997 to 2003, ECOHAB Florida - NOAA, EPA, actually
23 involved USF and Mote Marine Laboratory for their vessels on the RV. There is good

1 data, with, not only counts, but with nutrients, some chlorophyll. There is relative
2 fluorescence, there is extracted chlorophyll, and there are a variety of variables that,
3 actually are being written up now for the proceedings we will have in Florida. This is the
4 famous HABSOS site of Texas, Florida, Alabama, and Louisiana. I think, it is an
5 excellent idea that came of time, because it can serve as a web portal for data, and that is
6 one way to go ahead and manage data. We all know that shellfish bio-concentrate toxin.
7 How many here know Mouse Bioassays? Kirk, in the back, Okay, Mouse Bioassay is the
8 goal and standard for brevis toxin analysis and it is the only approved FDA method.
9 FDA is reviewing that procedure right now. The test takes 2 days, because of extraction,
10 and then injection. We are seeking more rapid analysis, like the ELISA. As Richard will
11 tell you, we don't really know what the ELISA is measuring. It looks like it measures
12 parent toxins and metabolites, and we don't know what that means in relation to toxicity,
13 so, Richard Pierce, and FDA, and Bob Dickie at FDA are assessing whether or not an
14 ELISA method or a similar method might be able to replace the Mouse Bioassay. But I
15 can tell you that the ELISA method is a good screening test, at least for us, for tissues for
16 marine mammals. This is the ELISA test, again, it is screen, at it is very good. This is
17 Dr. Barbara Kirkpatrick taking a swab of a lifeguard's throat. Another thing is that,
18 beside the toxic shellfish, you have an aerosol. There is a NIH program to evaluate
19 whether or not the acute effects are long lasting, whether they are chronic effects. There
20 might be in the future, a possibility of having some preventative type measure, where you
21 take a pill so that you don't experience the coughing, and the tearing when you are
22 exposed to the aerosol. We do counts, we do toxin analysis, and we go ahead and post a
23 lot of this stuff on our website. The Department of Ag has a website of the closures, and

1 has also the shellfish harvesting areas. Red tide monitoring is now going to involve
2 toxins and cells, and we have to include now, other species, we didn't anticipate that
3 several years ago. We are looking at multiple methods, but the whole thing is to forecast
4 blooms. This is what I wanted to point out and take the time to mention. You heard
5 Mary talk about the use of a satellite and it was a 2-dimensional model for looking at
6 wind and its influence on surface population, and Frank raised the question of what was
7 essentially a 3-D model. The differences with John Wassenberg and Bob Weisberg's
8 model, you are looking at processes. So, you are looking at your surface and bottom
9 population. You are looking at interaction between species. They are really different
10 kinds of models. Everyone is concerned about control and mitigation and management,
11 as well they should. When you talk about control, you have to talk about area and depth.
12 These are very extensive blooms. You have to look at it from a point where is it
13 contained, in a Back Bay area, do you do a [unintelligible] and then have to redo it
14 because the tide is bringing in another population of brevis? There are people working
15 on control and mitigation. I want to mention two things to you, one is clays, you've all
16 heard about clay and how it flocks out cells and absorbs the toxin, and that is being
17 researched by Woods Hole Oceanographic Institute, and Don Anderson. Richard Pierce
18 is also doing that. Years ago there was a man by the name of Walter Bloguslawski, that
19 came down from Connecticut and his idea was that you can control red tide to a confined
20 area by using ozone. He was right. It did work. What somebody had mentioned here,
21 was that for the aquarium they were having problems with toxins and ozone would be
22 good, chlorine, gas-alpha chlorine, and activated charcoal. There is research going on
23 that provides a monitoring opportunity for you. There were over 140 stations with

1 ECOHAB Florida, and with volunteer programs and remote green laboratory, we were
2 able over a period of about four years to go ahead and monitor red tide fairly well. The
3 new horizon is platforms with automated sensors and the automated sensors can be
4 molecular probes for brevis, sensors for toxins, sensors for pigments, there can be aboard
5 buoys, they can be aboard gliders, they can be aboard anything that will serve as a
6 platform. That is really, what MIR have, another U.S. program initiative to look at the
7 development of sensors so that you have early sentinels in coastal waters. This is an
8 estuarine platform; it is a pontoon boat with a variety of variables that can be measured,
9 and if you are interested in something like that, Brian Bendiss is the formulator for
10 Marvin. This is Frank's picture of the famous November 14th, 1978. What that shows
11 you is that back in 1978, you could detect red tides. As Mary has pointed out, you can
12 still detect red tides. You can go ahead and do what she and Rick Stumpf have done and
13 flag them and then send bulletins out to everybody to tell them where the red tide is and
14 where it is going. There is another thing that you can use Remote Sensing for. That is to
15 look at transport. In 1972 we had a red tide that went from the West Coast of Florida to
16 the East Coast. That happened in 1977, 1980, 1983, and 1987, and also in 1987 it
17 happened in North Carolina. This is an image showing an intrusion into South Carolina.
18 Now what we do is we monitor red tides in South West Florida and up the east coast and
19 if we think it is going to go around and go up in the gulf stream, we notify North Carolina
20 that they might have a red tide. We should have known this was going to happen because
21 we did drift bottle studies in the 1960's and the drift bottles got around the same places
22 where the red tide landed in North Carolina. Drift bottles got to Texas too. So, I don't
23 really know what that says about red tides and where they can go, but I suspect they can

1 go all over the gulf. I think that the 1996 red tide from Florida went to Alabama and
2 Louisiana. Florida export is red tides, you might want to think about basic currents and
3 what is happening because you can't use Remote Sensing to look at the currents'
4 structure at certain times of the year. We have a lot of partners through USF, MOTE
5 Marine Laboratory, even a private Susan's group which is not on here, it is called
6 START - Solutions to Avoid Red Tide - and we work closely with them. These are our
7 partners, and Florida, really because its coastline requires a lot of collaborators and
8 partners to get the work done.

9 Thank you.

10 Applause.

11 **Frank Muller-Karger:**

12 I want to ask you what I know and you know. I've asked you before, but since you
13 brought in the issue of circulation, I want to go back to a proposal that we wrote together
14 a few years back and submitted to ECOHAB. Of course, it was our best proposal ever
15 written and it was declined. In that proposal we proposed to examine the ideas that some
16 of these Karenia cells are coming from Mexico, around the periphery of the
17 [unintelligible]. We do see its edge highlighted as a high-pigment in satellite images, I
18 was wondering if you had thought about this anymore, since they flow out of Florida to
19 other places.

20 **Dr. Karen A. Steidinger:**

21 Yes, just look at what happened in Louisiana and Alabama. It hit Galveston! The red
22 tides that are in North Florida, they do this circular pattern, it goes over like this and
23 eddies go over to north Texas? Isn't that right Tracy? Ah, Sonia, we should be asking

1 Sonia. What do you think about the transport around the Gulf of Mexico where the
2 transport included brevis population?

3 **Sonia Gallegos:**

4 I believe the theory that the red tides come from Mexico, from the Yucatan. I believe
5 that. I also think that there are just a few eddies that actually are generated at the level of
6 Yucatan that actually hit Texas and produced red tides. Not all eddies produce red tides.

7 **Dr. Karen A. Steidinger:**

8 So, what you've got from the western gulf, in the Yucatan, over to the eastern gulf, which
9 is what Frank suggested about 5 years ago.

10 **Sonia Gallegos:**

11 I really think that we are talking about two different environments, the eastern gulf and
12 the western gulf. And even for prediction, that should be taken into consideration. The
13 different patterns of circulation, different forces acting on each side, I truly believe the
14 western gulf is a lot easier to predict than the eastern gulf.

15 **Dr. Karen A. Steidinger:**

16 Is it more a luke current influence in the western gulf?

17 **Sonia Gallegos:**

18 I really think so. But I still haven't figured out which eddies in the eastern gulf actually
19 produce red tides, and which do not.

20 **Dr. Karen A. Steidinger:**

21 Well, that is your life's work right there.

22 **Unidentified Speaker:**

23 (Question inaudible)

1 **Dr. Karen A. Steidinger:**

2 That is the 1800s U.S. Coast. This is interesting because you are doing by inference.
3 They wrote about massive fish kills and their bait fish dying in their wells, as what they
4 went through, what they called “poison water”, that was in the 80’s. But if you look at
5 1980 for shellfish toxicity, Mr. Walker and his daughter got ill from eating toxic oysters
6 and the human symptoms that they experienced are the same that you would experience
7 today. So, you are inferring because the organism was not identified until 1946 or 1947.

8 **Unidentified Speaker:**

9 Thank you, that is interesting. Another question, do you have evaluation of all the
10 diversity of animals that are affected by *Karenia*?

11 **Dr. Karen A. Steidinger:**

12 Well, it seems like everything could be killed by it eventually. What happens is, one of
13 the things that was noted early on, in like the 40’s and the 50’s, and the 60’s, was that
14 bottom fish were affected first. It takes fish 3 days to float, so divers and fishermen
15 would be reporting fishkills offshore and then you would find them floating where you
16 could see them on the surface of the water. But it did affect bottom fish first.

17 **Unidentified Speaker:**

18 I am asking this because last year we had an experiment in the Veracruz rigs. We were
19 studying the diatoms that are colonizing and we had a red tide event. Some of them died
20 immediately. So, we may have the chance to estimate the toxicity of the *Karenia*, just by
21 measuring how many species are killed.

22 **Dr. Karen A. Steidinger:**

1 I think that different species have different susceptibility and different life stages. For
2 example, an egg, as it hatches and it goes through the yolk stage is not susceptible to the
3 toxin, but after it absorbs the yolk sac, it is. I mean, the water. So, there are different
4 susceptibilities among species and different susceptibilities among (unintelligible.) It is
5 something that you can test.

6 **Unidentified Speaker:**

7 In the year 2001, in Veracruz, we had a very strong event where the cell counts were
8 millions. One of the things that I want to ask you is, how do you count, statistically or
9 manually, the cells?

10 **Dr. Karen A. Steidinger:**

11 The question was, how do you manually count the cells? You can do it with preserved
12 material, where you fix it in Loogalls, or you can fix it in gluttoaldehyde or you can count
13 them live. I always counted my material live, because I can see them swimming, and one
14 of the things you will find out about dinoflagellates, and even the different Karenia, is
15 that they have a different swimming pattern. One the counts are low, live material often
16 helps you detect motile Karenia cells. Preserved material is good when you have
17 moderate to high counts, and that you can settle it out, you can dilute it and you can count
18 the bottom of the chamber, like at 10X. The other thing about different Karenia species,
19 you can identify them by the placement of the nucleus plus its shapes, so you don't need
20 a scanning electron microscope to identify them.

21 **Unidentified Speaker:**

22 The second question is in relation to what Frank said that the tide came from Veracruz,
23 not from Veracruz, but from Mexico, and specifically from Yucatan, we have

1 experiences with the red tide that appears in Veracruz, regularly comes from Texas. We
2 have had a very clear link, we are placing the blame on you, but the experience that we
3 have had since 1995, is that it begins in Texas, passes through Tamaulipas and after to
4 Veracruz. But, in the year 2001 there was a very strange phenomenon because it began
5 simultaneously in the entire state of Veracruz, from the part of Panuco, adjoining with
6 Tamaulipas up to adjoining with Tabasco. Therefore that was quite a strange
7 phenomenon.

8 **Dr. Karen A. Steidinger:**

9 The statement was that Mexico gets Texas red tide and I know that is true. They can go
10 both ways, I remember in 1987, they have some drift out there and it was showing a
11 circulation pattern between Texas and Mexico, it was in the year '87 bloom and then you
12 can have red tide from Veracruz. So, your circulation patterns..

13 **Sonia Gallegos:**

14 Karen, I think what happens is that in the last red tide 2000 you had two simultaneous
15 events. In the 2000 red tide there was one event along the Sabine pass, and another one
16 in front of [unintelligible]. There was another one at the level of Veracruz. So, I don't
17 think that red tides come from Texas to Mexico, I think that it just happened, and the
18 circulation dictated that these three various red tides occurred at the same time.

19 **Dr. Karen A. Steidinger:**

20 Okay, you guys from Texas are off the hook.

21 **Unidentified Speaker:**

1 Doctor, I have a question, what are the preliminary results that ELISA has presented
2 compared with the Bioassay, or are they still in very early stages for determining the
3 future that this method before the FDA will be accepted or not?

4 **Dr. Karen A. Steidinger:**

5 Now, if you could ask, I think the question is whether FDA will accept another method
6 besides Mouse Bioassay eventually? We will know more after Richard does his work on
7 looking at toxins in three different mollusks and using different techniques. You can use
8 a receptor binding technique, you can use the ELISA technique, you can use the Mouse
9 Bioassay, you can use sciological techniques, the thing is what are all these different
10 methods measuring? It is more than that because different solvents extract different
11 chemicals. There is one group saying that it is the solvents that you are using that are
12 influencing your results. With the Mouse Bioassay it is diethylether. We all want to get
13 away of diethylether because we have to do in an “explosion” proof room, and it is too
14 much, you should be able to do this in a chemical hood. I think eventually FDA will
15 approve another method beside Mouse Bioassay but they will have to be convinced that it
16 will be measuring the current toxins and will be of public health significance.

17 **Unidentified Speaker:**

18 Doctor, only one more observation. In the case of Tamaulipas, we have had a permanent
19 vigilancy through monitoring the entire coastal area and that allows us to make a series of
20 measurements through a contingency plan that we call for incrementing the monitoring as
21 of September through January, that is when the phenomenon, historically, presents itself
22 in the region. My intervention is nothing more but to strengthen a little what you say,
23 and when we find out that in Galveston there is a red tide, there we turn on the red lights

1 in order to intensify the monitoring and go to the laboratories with all of our samples and
2 be able to have the documents that allow us to establish the interdiction of the bivalve
3 mollusks, which are the main source of intoxicification for people. In 2001, the
4 phenomenon was a little strange along the coasts of Tamaulipas. We called it a
5 Dalmatian effect because it presented itself with spots that allowed that there were no
6 deaths of fishes because those species that had contact with that spot, as soon as they
7 abandoned it, at the same time, avoided death. It was a problem that caught our attention
8 quite a bit and it was quite stationary along the southern area of the coastline, while in the
9 center of the coastline, and in the north of the coastline we did not have the presence of
10 *Karenia brevis*. Possibly it is, we thought, in accordance with the experience that we
11 have in the region, to attribute it a little to the currents, to the form in which the currents
12 of water are moving under the influence of the winds, the presence of hurricanes, have to
13 do a lot with this kind of thing. I believe that it is worthwhile that while we are here, that
14 we look in a very broad manner, as to what is it that is happening in the gulf so that in
15 this way we can help ourselves with the technical information or with the monitoring or
16 with the experiences that each one of us has in the region. Many thanks.

17 **Dr. Karen A. Steidinger:**

18 One of the points that you brought up is really very significant. You were talking about
19 how fish can swim into a stain or patch and survive. We have seen exactly the same
20 thing. We've usually seen it at the end of blooms. But there are different situations
21 where you can have fish surviving in dense populations of red tide. There was a
22 presentation by [unintelligible]'s student on an antagonist to *brevis* toxin. I think that
23 they are just getting ready to publish on that. But what that says is that its produced at

1 certain time during the life cycle of *Karenia brevis* and it will inhibit the effects of the
2 toxin. So, there is a lot that is being done now in the laboratories, that might help explain
3 some of the field things that we've seen. Thank you.

4 Applause

5 **Bryon Griffith:**

6 I think all of you will agree in listening to the presentation and the questions that it really
7 features again the theme of this conference. Many of the scientific questions and the
8 leading research that will follow, can not even be entertained, unless we began to network
9 the relative technology, observations and data that we can put into the equation over the
10 course of time. Given that, as I break you off for lunch, I want to take you back just a
11 moment because these are excellent presentations but we have a lot of work ahead of us
12 in this segment. The title of this segment is Sampling Methods & Protocol Coordination
13 and Compatibility. Before we end this part of the presentation after lunch, we are going
14 to need to get down to minimum standards of performance in this area to set a framework
15 for discussion about what kind of transfer ability and coordination we can do. With that
16 as a "lunching thought", I will leave you with breaking now and ask that we return a
17 4:00. We will see you at 4 o'clock and continue our workshop. Thank you.

18 [after break]

19 Cheers! For the balance of the session we are about to go through and conclude, literally,
20 the base footing of the monitoring and sampling program areas with respect to our future
21 collaboration. Dr. Kirk Wiles from the Texas Department of Health is going to lead off
22 the balance of this after-lunch session. I just want to point out some things that are going
23 to depart from your agenda just a little bit. We are going to advance presentations from

1 Mr. Manuel Rodriguez Gomez and Dr. Virgilio Areanas Fuentes, to come up after Dr.
2 Tracy Villareal as we have been informed that their programs relate more to the aspects
3 of the monitoring and sampling and/or operational aspect of red tide monitoring. So, we
4 are going to adapt that schedule change. We have a long way to go this afternoon and
5 into this evening. We are going to try to pick up the pace a little bit so that we can get
6 pretty far along but not at the cost of completing the segments of the agenda where we
7 lose very valuable footing for the balance of the meeting. With that, I've had the
8 opportunity to actually sidebar with Dr. Wiles, to actually help stimulate some of the
9 post-presentation discussions that will feature this parameter-setting issues. Dr. Wiles, if
10 you'd join me out on the podium and actually take it over.

11 **Dr. Kirk Wiles:**

12 Well, the first thing I am going to have to do is dispel the idea that I am a doctor, so, I can
13 just be a mister and that will be fine. We will let Tracy be the doctor. For the sake of
14 hurrying up and speeding through, I will skip a lot of my discussion that Dr. Steidinger,
15 so ably was able to talk about and hopefully relate a few stories from Texas that might be
16 of interest to the group, not only for the people from the United States, but more
17 specifically, from the Mexican states. In 1986 the waters turned red. People began to
18 experience respiratory difficulties, thousand of fish began to die, and that was in the
19 summer of 1986 off the little town of Freeport, Texas, on the middle Texas coast. 1986
20 was also the time when Chernobyl had the nuclear meltdown. At the same time that the
21 fish were dying in Freeport, there was discussion about potential nuclear releases into the
22 atmosphere. So, naturally, the Freeport local paper made the link between the two. The
23 headline became "Chernobyl causes dead fish at Freeport" - Laughter - That is how I

1 began my introduction into the red tide business. It was an uphill battle, and as we began
2 the battle, we immediately talked to our friends in Florida and Dr. Steidinger educated us
3 and pulled us up and out of the idea that it was, actually, a Chernobyl event. Since that
4 day, we have had many opportunities to study red tide through the years. I am going to
5 skip over most of the background information and try to get right to the juicy part and the
6 things that will be of most interest to most people. Obviously, Harmful Algal Blooms
7 can be caused by diatoms, dinoflagellates, *Pfisteria* like organisms, algae, and some fresh
8 water algae as well. Human illnesses can be associated with many Harmful Algal
9 Blooms: Ciguatera fish poisoning, amnesic shellfish poisoning, diarrhetic shellfish
10 poisoning, paralytic shellfish poisoning and neurotoxic shellfish poisoning. For the
11 remainder of my discussion, I will deal almost exclusively with neurotoxic shellfish
12 poisoning. *Karenia brevis* is the species of concern around the gulf, and I think, most of
13 the people here have experienced it or have experience in working with it. Brevatoxin is
14 the toxin that is produced and there is a lot of variability in the different type of breva
15 toxin that is produced. Usually, the shellfish related illnesses are non-fatal, although they
16 can be life-threatening if dosage is high enough and body weight low enough. I am sure,
17 over the next several days you will be hearing more discussions about the loop current
18 and potential transport mechanisms of red tide around the Gulf of Mexico. One thing that
19 we do know now is that the blooms that occur in the gulf have little respect for
20 geographic or political boundaries. We can argue about where they initiate, where they
21 begin, where they hit shore. But once they hit shore, and are transported by long shore
22 currents, either north or south, I think it would behoove us all to build better lines of
23 communication, share information so, that we are able to do our jobs, specially those jobs

1 related to public health protection. In Texas, in order to anticipate where a bloom might
2 occur, we need information about blooms that are occurring in other parts of the gulf.
3 Whether they are occurring in Mexico, or whether they are occurring in Florida, it is
4 essential that we, in Texas, have the information necessary to anticipate where we need to
5 sample. The last thing that we want to find is a red tide in an estuary with shellfish being
6 produced that are in the market. That is the recipe for illnesses and disaster. I think we
7 all know that the *Karenia brevis* blooms cause discolored waters, respiratory problems
8 and certainly the shellfish, the mollusk become toxic. Shellfish bed closures criteria is
9 determined, in the United States, by the National Shellfish Sanitation Program. Based on
10 some work that Dr. Steidinger did early in her career, all of the Gulf Coast states close
11 shellfish areas when cell counts exceed 5000 cells per liter. If there is a situation where
12 toxin is found in the shellfish themselves, then the shellfish beds have to be closed as
13 well. These are criteria that are set in the National Shellfish Sanitation program. All
14 Gulf Coast states in the United States have to comply with them. Water samples are
15 collected in areas offshore, in the passes, as well as in the estuarine areas. All of the Gulf
16 States rely on some sort of early warning that there is a bloom offshore, either reports
17 from commercial fishermen or the Coastguard, or dead or dying fish offshore. That is
18 almost essential in order to be able to determine where you need to concentrate your
19 sampling efforts. So, we rely on a number of different agencies and public participation
20 to inform us when there are fish kills occurring offshore. I think, in the same light, it
21 would be very good for us to know when there are blooms occurring in Mexico so that
22 we can step up our monitoring in our passes and in our offshore waters in order to protect
23 the consumers of shellfish. After the water sample is collected, then we begin cell counts

1 on the water samples that were collected and preserved. We already talked about how
2 many ways there are to count cell, and certainly, there are many different ways to count
3 cells, in our agency we developed a counting system using a Sedwick rafter counting
4 chamber, 1mm, and we use Loogalls and settle and then make cell counts from those.
5 We will use live samples, especially to aid identification, because it makes identification
6 a lot easier. Once shellfish beds are closed, the real trick is getting them reopen again.
7 That is a very difficult, and time consuming, often times politically unfavorable job. The
8 criteria that all the Gulf States have to use is we have to have cell counts in the growing
9 areas of less than five thousand per liter and no toxin present in the shellfish. Once we
10 found an area where the oysters..

11 (break in tape sequence - end of tape 3b)

12 *Tape 4A*

13 ...we are allowed to begin sampling meat, oyster meat. And almost all of the Gulf States
14 will wait until the cell counts are low enough to begin sampling. Because, as Karen has
15 told everybody, the Mouse Bioassay procedure is the test we have to use. Few of us like
16 it, but those of us in the United States have to use that Mouse Bioassay procedure for
17 determination of toxin. The test is difficult to run, laborious, painful to the mice, I
18 suspect. They are not very pretty to watch. As I said, the real trick of the red tide is
19 getting the shellfish beds reopen after they've been closed. In the 1996 bloom, the bloom
20 initiated around September the 16th on the coastline and in the estuarine areas. Around
21 the 31st of October we had an extremely heavy rainfall event in Texas that lowered
22 salinity in the estuarine areas below ten parts per thousand salinity. So, we actually know
23 in this particular bloom when the insured area stopped producing red tide toxin. And as

1 you can see by the length of time that it took for the shellfish to detoxify, we had areas,
2 you know, open as soon as two or three weeks and closed as long as three to four months
3 following cessation of the bloom. Those days when we had the longest closures were
4 also the days when we had the more intense blooms inside the estuarine areas for the
5 longest period of time. So it makes sense in that the exposure time related to the
6 detoxification curves. Prior to 1986, anecdotic information indicates we probably had a
7 bloom around 1953 in Texas based upon some newspaper reports from Galveston and the
8 Freeport area. In 1986 we had a large-scale bloom. And it began in Surfside, which is
9 south of Galveston and for the next several months migrated southward along the coast in
10 the Mexican water. And as you can see, on these large-scale blooms all of them have
11 ended up in Tamaulipas. We have very good documentation of the southward movement
12 of the blooms and the progressive closing of shellfish bed to the south in all of these
13 blooms. And we have accompanying cell count information with them for these years.
14 One of the things that we have found, in Texas, and especially in the middle and lower
15 part of Texas, is that once a bloom occurs offshore, moves into the estuarine area and
16 then dies out, we continue to see populations of *Karenia brevis* inside certain areas. The
17 most, most of the areas are manmade areas of poor circulation such as marinas,
18 subdivisions and canals and ship channels. Often times the cells we have to sample at
19 depth in the ship-channels when salinities will be low on the surface. Yet we sample at
20 depths of fifteen to twenty feet and find viable cells and it is real easy in your monitoring
21 effort to miss these types of situations because these serve as pockets of organisms that
22 can bloom out when conditions get good again. The scary part of that is, is that you don't
23 see the discolored waters, you don't have dead fish, you don't have respiratory irritation,

1 yet you have the potential to bloom out within a base system and your shellfish become
2 toxic without any of the classic finds. Therefore in our contingency plan in Texas we
3 now have to continue sampling after the bloom is gone as long as salinities, even in the
4 bottom of these channels, are sufficient to hold populations that are viable and able to
5 bloom. The atypical localized blooms occurred in other years in Texas. These are not
6 the blooms that we discovered offshore that followed the long shore currents all the way
7 to Mexico. These are blooms that pop up and I am sure that the blooms themselves are
8 initiated offshore and induction occurs into these areas where there is a favorable habitat
9 and suddenly in one day in August we end up with a localized bloom. Fortunately, most
10 of these areas are in the higher salinity areas of the middle and lower coast where there is
11 very little shellfish production during that time of the year, during the late summer and
12 fall. In Texas, all of the summer time oyster production occurs in Galveston bay. And
13 Galveston bay has only been affected by one red tide since we've been keeping records.
14 I would suspect though, that the laguna in Tamaulipas probably has similar situations
15 with the higher saline waters. The economic impact can certainly be devastating,
16 especially in small local communities, the Appalachicolas of the world are the Fultons
17 and Cedres of the world where small fishing villages rely on oyster income. In those
18 areas the impacts are very severe and certainly in a large-scale bloom the tourist impacts
19 are obviously difficult to overcome. Where do we go from here? And I guess that was
20 what Bryon had asked me to talk a little bit about what we could do in Texas as far as
21 offering up something. One of the things that we can do, and would be happy to do, is
22 we can and will be happy to offer all of our cell count data in nearly Real-Time, within a
23 day or two of collection. We can offer that up to the Mexican officials or other state

1 officials as well within the United States, especially on the gulf coast to allow a better
2 exchange of information about when and where we are finding the cells. The additional
3 information that we could offer up would be shellfish bed closures when they occur and
4 make sure that that information is transmitted to all of the gulf states, both Mexican and
5 U.S. On the other hand, we would like to open direct lines of communication so that we
6 know when there is a bloom occurring in Veracruz or Campeche so that we can increase
7 our monitoring efforts and hopefully do a better job of protecting consumers of shellfish.
8 Because the worst case scenario is to end up like North Carolina where you have a bloom
9 that is onshore and you really didn't know it was coming and you can't believe it's there
10 and you end up with fifty of sixty cases of neurotoxin shellfish poisoning. So, we will
11 offer up better communication, hopefully through this group we can develop some direct
12 lines of communication and hopefully do a better job of public health protection.

13 Questions? Ron,

14 **Ron:**

15 Kirk, under what medium would you see yourself offering it up, through the Coastal data
16 center portal or what?

17 **Kirk Wiles:**

18 If a Real-Time, easy to enter data sheet can be configured for that, we would be happy to
19 enter it in that format. And I think Tim Orsi has been working on putting together such a
20 data sheet. And we would put our data on to it as long as it was easy to use and quick
21 and convenient and we would offer up to whatever lines of internet communication or
22 direct communication is more appropriate.

23 **Unidentified Speaker:**

1 Years ago, gulf states fishing commissions set up a web site to do that type of thing, I
2 don't know if it still exists and if it does, would you contribute to that now?

3 **Kirk Wiles:**

4 I think the website exists. But it is more in terms of where people are reporting red tide
5 as opposed to being in a format that is easy to transmit cell count data. And, I think that
6 is what is actually needed is a format in agreement upon what kind of cell count data and
7 agree on the parameters that we are going to use. For instance, Florida doesn't put actual
8 cell count numbers but they put groupings of numbers together. I think what we really
9 need to do as a group is to develop a protocol, standardize how we want to do it and we
10 would certainly offer up through the Gulf States marine fishing commission or through
11 (inaudible) or any other group. But the idea is to make it easy enough so that we can get
12 information on to it in Real-Time.

13 **Unidentified Speaker:**

14 Is anybody looking between testing the water as far as the measurement as it corresponds
15 to different techniques?

16 **Kirk Wiles:**

17 Are you talking about cell count numbers? If you get a difference of 20 % in the plankton
18 or you know a coefficient variation of less than 20% you are doing very well. And
19 remember, from a shellfish perspective, we don't waste a lot of time counting very high
20 numbers. We count mostly on the peripheral edges of blooms and evaluate low-end
21 numbers and the technique that we use is designed for good low-end numbers not high-
22 end numbers. If you are going to use high-end numbers, you need a different technique.

23 **Unidentified Speaker:**

1 In the network that we are proposing of the state of Veracruz and that we want all the
2 states of the Gulf of Mexico to become integrated with, we have cell counts and also
3 results from assays of Mouse Bioassays. This is already on the Internet page of the
4 health services and we would like that you review it in order to see it is suitable that all
5 this data be included, those that you have, with the page that we have.

6 **Kirk Wiles:**

7 Oh, I think that is a very good idea and we certainly would be agreeable to exchanging
8 data but I think what we really need is a format that somewhat standardizes so that we
9 can interchange between the two or three arenas that the data ends up in. I think it's
10 important that we standardize some formats and make data entry as easy as we can
11 because we are all under-staffed and we want to share the data and we need to get it out
12 there as quickly as we can.

13 **Unidentified Speaker:**

14 The manner in which we do it in the state of Veracruz is that each one has a key or code
15 for accessing the Internet and can fill out the part that corresponds to it regarding the
16 monitoring format of cells as well as the findings that they have from the assays,
17 therefore I believe that this would be possible because it is very easy to load those data
18 and to be able to give trustworthiness to those data, sign electronically and only they have
19 the password to be able to access keying in the data, we give you a special password so
20 that you can access and key in the data and it is very easy via the internet.

21 **Kirk Wiles:**

1 Well, that sounds like a very good, easy, protected system and I think it would behoove
2 the group to develop those protocols and agree to them and use them. Any other
3 questions?

4 **Unidentified Speaker:**

5 Look, I want to make one more proposal. All of the studies, all of the cell counts, should
6 lead us to a single goal. We, in the Secretary of Health in Mexico, there was established
7 a series of criteria so that in fact the risks were able to be communicated. We have to see
8 that this is a risk for the health of the population be it through consumption of products,
9 by the effects that the presence of the toxin in the sea has that generates one of the aerosol
10 effects, also by the contamination of bivalve mollusks, I am sure that within these criteria
11 it is important that this working group considers in a special way or in a basic manner
12 that which is the communication of risks. What we do is worth nothing if the people do
13 not know what we are doing. In Tamaulipas, our contingency plan has allowed involving
14 the community and I am speaking about fishing producers of the municipal authority, of
15 the health authorities, of the mayors of the coastal municipalities so that all of them in a
16 joint manner, we look over what is the risk that we have in front of us in order to be able
17 to establish a series of measures that do not generate neither an economic, nor political or
18 tourist scandal. Therefore, this group should take into account this type of measure so
19 that the value of the research would be such that on the contrary I believe that everything
20 will just remain on the books and it is not fair when we have so many resources and so
21 many things that have been done in the name of the red tide. Thank you.

22 **Kirk Wiles:**

1 I certainly agree with you, and not only do we need to discuss the risk but we really need
2 to clarify what is not at risk and shellfish, of course, is what we have developed our
3 program for, however other seafood species are also affected commercially because of
4 the halo effect of discouraging consumption of any seafood so whatever message that we
5 give, we should be very clear and I agree, there needs to be more work in that arena.

6 **Unidentified Speaker:**

7 Kirk, I think one of the aspects of that comment, one of the aspects of that comment or
8 question centered a little bit on asking the question how as one practicing state, how do
9 you deal with the communication in the event response scenario with Texans or the
10 shellfish market? How do you do that today?

11 **Kirk Wiles:**

12 Well, the shellfish market we take care of in a straight regulatory fashion. Those
13 shellfish beds are closed. What is difficult, the difficulty of the situation is explaining to
14 the press that other sea foods are not affected, that it is safe to consume other seafood.
15 And we have done that through a series of press releases through websites, through Texas
16 Parks and Wildlife, we found that one website with all of the state agencies working on
17 one website in one press release works better than three or four agencies putting out press
18 releases. So those are things that we've done in Texas to try to clarify what the risks are,
19 and not to discourage consumption of other seafood that remain unaffected. Another
20 issue that hasn't been talked about much here is the respiratory irritation, and its effect
21 upon tourism. And that is a difficult phenomena to discuss in the press because one day
22 you have a bloom offshore and the wind comes up in the afternoon and you have an
23 aerosol problem. The next morning is calm, the bloom may still be there and you don't

1 have an aerosol problem. So, one thing that we have found is that we do better as a state
2 communicating from a single source rather than from multiple sources giving mixed
3 messages.

4 **Unidentified Speaker:**

5 That was the meaning of the review that I made, because in the case of Mexico the health
6 authority is the Secretary of Health. Our samplings generate a series of measures in other
7 agencies that finally move or are managed as a function of the findings that we obtain.

8 Here the proposal is in the sense of the market because when in some Gulf state this type
9 of problem is generated, the alert goes out to all the states and the markets that it affects.

10 Therefore, one must define the location of the blooms and the possibility that they can
11 extend upon the basis of knowledge that each one has, we are going to say even of the
12 marine currents, the possibility of winds, the possibility of a storm and can move the
13 blooms even to other areas, but make it clear where it is so that other markets are not
14 affected. We have had our situations, for example in Tampico, where the restaurant
15 chamber has asked us in fact to end interdictions when still the counts are high because
16 the sales of their products have fallen. We cannot do that as a sanitary authority, but yes
17 people tell us that in other parts it is not closed then why only in Tampico, to which we
18 respond within the measurement of the impact of that phenomenon is a risk and it has the
19 population regarding a phenomenon of this nature.

20 **Kirk Wiles:**

21 Now, that is a very valid comment.

22 **Unidentified Speaker:**

1 I was wondering if you have an idea now as to what is your feeling as to when and where
2 the red tides are coming from, what the parameters are that make a bloom, and how it
3 moves into the embedment or the lagoons, and why some lagoons have it and some
4 don't?

5 **Kirk Wiles:**

6 The argument about initiation where the blooms are initiated is one that I really don't
7 care to weigh in on. I'm not real sure I understand it, whether it's in the Yucatan or
8 whether it is transported from the eastern gulf, I'm not sure. However, whether or not a
9 bloom enters once it makes landfall in Texas, there are transported by the long shore
10 currents. There is really no mystery about that. The question about why some enter
11 lagoons or embedments, in Texas it's pretty simple. If we have a bloom offshore and it
12 moves towards the pass, and of course Texas has a barrier island system, so water can
13 only come in through the passes, if the bloom gets to the pass and the salinity is high
14 enough to support brevis, we have blooms in the bay. Period. Now some times they last
15 a long time, we have had within the embedment for three months, and yet, sometimes
16 they appear to die out very quickly. But in our case, if we have blooms offshore, and we
17 have sufficient salinity to support the organism, we generally always see them within that
18 base system, and of course, that makes it very difficult for us because that is where our
19 shellfish beds are located within the estuaries.

20 **Unidentified Speaker:**

21 My question is what is the salinity at the bottom of these lagoons that you are talking
22 about? And why do say the salinity is the limiting agent and not the temperature or
23 something else?

1 **Kirk Wiles:**

2 Because we've had blooms in every month of the year and in all of the blooms that are
3 headed down the coast, that have covered the entire Texas coast in those estuaries where
4 the salinity is high enough, twenty-three, twenty-four parts per thousand, we see
5 entrainment of cells in blooms within those estuaries. And Galveston has always been
6 protected. None of our earlier blooms starting in '86 went into Galveston bay but in the
7 year 2000, we were in the middle of a drought and salinities were twenty-five to thirty
8 parts per thousand in Galveston bay which is a rarity and for the first time we had to have
9 shellfish bed closures in Galveston bay which is the most productive estuary in Texas.

10 **Unidentified Speaker:**

11 Thank you.

12 **Unidentified Speaker:**

13 Are these blooms always transported into your bay or have you ever seen a bloom form
14 within Galveston bay?

15 **Kirk Wiles:**

16 I think we've never seen a bloom form in Galveston bay. However, we have seen blooms
17 occur inside Corpus Christi bay, inside Arkansas Bay. Those are high salinity bays,
18 higher than Galveston. The salinity is higher than Galveston. But again that is not the
19 case of a bloom initiating within the bay. I think those are cell that are induced into the
20 system and then they find a localized condition and have localized blooms.

21 **Unidentified Speaker:**

22 And the ones in Corpus, are those *Karenia brevis* or something different?

23 **Kirk Wiles:**

1 Karenia brevis. Yes. And as Karen said, now suddenly we have a soup of Karenias out
2 there as opposed to mono-specific blooms that we saw in '86. Which makes it more
3 difficult in your cell counting but since they are all toxic, we don't get that picky about
4 them.

5 **Unidentified Speaker:**

6 But, is that because we are looking more closely and Karen has taken some time to
7 identify to a deeper level?

8 **Kirk Wiles:**

9 I can't answer that, can you Karen?

10 **Karen Steidinger:**

11 Uh, in '86 when I was in Corpus, we bred some beautiful [unintelligible] Have you seen
12 a butterfly? You've seen mainly just brevis. [unintelligible] The mikimoittoi, yes, the
13 mikimoittoi has been in the gulf since the 70's. Yes, we both have seen the brevis and the
14 mikimoittoi type before. Yes, Pat Tester is taking a look at some of our samples and found
15 three or four different Karenias using electromicroscopy. But, I want to point out,
16 because we are talking about salinity, there was that one bloom in '97, uh, '96, which I
17 have to point out a curve of low salinity, and there is tons and tons of data and I'll be the
18 first to admit that it is generally only found in high salinity, we got that one bloom, we
19 sent a sample to Karen and she thought it was K. Brevis, uh, but we got some samples
20 archived and we are going to look at them again to make sure it was K. brevis, because it
21 was so unusual, but you can't, because of that one incident, you have to be careful using
22 just salinity in your guide. We continue to look and what we have found is once the
23 salinity drops below twenty, we don't find viable blooming populations unless they are

1 coming up from the bottom of the ship channel from a subdivision, canal, from some
2 place where there is poor circulation and we were aware of your findings at the time and
3 we still continue to look at that but we have not experienced low salinity K. Brevis
4 blooms.

5 **Unidentified Speaker:**

6 Yes, but is that because the transfer of fresh water keeps the blooms from moving in or
7 because the salinity is too low?

8 **Kirk Wiles:**

9 Well, I, you know, I think they are both related. The fact that we are having fresh water
10 inflows lowers the salinity in our estuarine areas, therefore, whether it's a .. I would guess
11 it is a matter of the salinity being lower, as opposed to something in the fresh water run-
12 off that is restricting their growth.

13 **Unidentified Speaker:**

14 Kirk, Dr. Chantiri has the floor.

15 **Dr. Chantiri:**

16 Wow, everything is extremely interesting. The expectations of this have surpassed the
17 limits that we thought about, but taking into account that we have in the health services of
18 Veracruz, it would be worthwhile what I commented a while ago: of calling for a
19 meeting, to set a date for it so that binationally a singular format could be created in
20 which, well, I would suppose and propose that it were the experts who elaborated the
21 singular format that is going to be to the benefit of both nations.

22 **Kirk Wiles:**

23 I agree with that point.

1 **Unidentified Speaker:**

2 This question is so on a tangent, how, I mean, you have an issue, for example in the
3 Galveston Bay, where you may have deepened the channel, uh, and we will probably see
4 more of that where we have more dredging, bigger ships coming into ports, is that an
5 issue, or is the cost associated with these blooms going into these bays completely offset
6 by the economic requirement of deeper channels and bigger vessels coming into ports?

7 **Kirk Wiles:**

8 Well, that is a really tough question. I think the reality of the situation is that at least in
9 Texas where we build dams in the dessert and we deepen and widen ship channels while
10 cutting off fresh water inflows, I think that that's inevitable that we will continue to see
11 elevated salinities. When you have elevated salinities in your shellfish producing areas,
12 then those areas are then vulnerable to red tides. If the estuarine areas were operating as
13 they should, as they used to fifty years ago, I think there would be salinity protection in
14 many estuaries in Texas. And I think that's why we are seeing such an economic impact
15 on the shellfish industry now, a combination of factors that have resulted in increased
16 salinities in many estuarine areas.

17 **Unidentified Speaker:**

18 Kirk, Thank you.

19 Applause

20 **Unidentified Speaker:**

21 For the benefit of the group as I introduce the next speaker, Dr. Tracy Villareal, also from
22 Texas, the Marine Science Institute from the University of Texas, I'd like to reflect on a
23 few other points that hopefully no one thinks are being lost. One, as each of the

1 presenters and the responders have demonstrated, there is much going on across the gulf
2 to collect data and information about these events. Yet, the science that answers many of
3 these questions is starving for this to be collaborated and acceptable so that many of these
4 answers can be more thoroughly interrogated and dealt with in the future. In light of that,
5 and again because it's becoming a repeated point, when we come to the summary section
6 of this particular aspect of the agenda, I am going to assure you that one of the responses
7 that has been posed and proposed three times and should be adopted, is we must
8 undertake in some medium, a thorough examination of the data and the parameters and
9 the programs that are in place today and/or ambition to be in place to come up with a
10 standardization in the protocol for collection and dissemination and we will certainly be
11 our intent. But while we look forward to that end, there are again, a couple more
12 presenters that I think they are going to lay a little more of a backdrop to that association
13 as well and Dr. Villareal is one of those. Thank you.

14 **Dr. Villareal:**

15 Thank you very much. While we are getting the other presentation up I want to offer my
16 thanks to the Gulf of Mexico program for asking me to be here today and for providing
17 the funds for me to be here. It is very important at this time of our budgetary crisis in this
18 great state of Texas to be able to get funds for such a thing. What I'd like to talk with
19 you about today, are the types of half monitoring data that are currently being collected in
20 Texas. This is information that is provided by the Marine Science Institute as well as
21 colleagues of mine at Texas A&M and the Geo Physical and Environmental research
22 group at Texas A&M and information provided by Texas Parks and Wildlife.

1 Routine collection for looking at cell count information for *K. brevis* began only recently.
2 The bloom of 1986 really was a pivotal event in the efforts in Texas to understand what
3 *K. brevis* was and what the effects are. As Kirk mentioned, the bloom was quite large.
4 The estimates are that it killed tens of millions, perhaps as much as a hundred million
5 fish, and it changed the awareness of red tide. There are several cases if you go back into
6 the state records, where fish kill information is maintained, of large suspicious blooms
7 that occurred over tens of kilometers of beaches that were actually attributed to shrimp by
8 catch. When in reality, it was more than likely due to just unrecorded *K. brevis* red tides.
9 However, that sort of information is impossible to really take any further than that, but I
10 think it's important that we recognize that awareness as much as sampling has changed
11 our view of the frequency and the effect of *K. brevis* red tide. Okay, Kirk had just talked
12 about what the Texas Department of Health does in terms of monitoring the shellfish
13 resources. I also want to talk about the response to fish kills that Texas Parks and
14 Wildlife undertakes but I want to highlight that as of this time there is no regular
15 monitoring of cell count by state agencies. It is by large done by academics entities in the
16 state of Texas that provides this information as it is appropriate to the state agencies. For
17 example, I have the distinct recollection of calling Kirk on a Friday afternoon, in
18 December of 2000 or 2001, and leaving a message of, "Hey, there 40 cells per mill on the
19 ship channel here in the port of Aransas", which, of course, led to a response and what
20 was that, about a four or five month shellfish closure at that point? Okay, in the Texas
21 Parks and Wildlife Department our response is controlled by the mandate from the state
22 legislature to monitor, protect and preserve the aquatic resources of the great state of
23 Texas. They actively respond to reports of discolored water and dead fish. And if these

1 fish kill themselves, it actually triggers the formal response where they send teams out,
2 they take water samples, record dissolved oxygen and some other parameters, estimate
3 the numbers and species of dead fish for recording in the states archives and if possible,
4 determine the cause. And this is where it gets rather tricky because frequently dead fish
5 accumulate in places other than where they died, we've been told today that it takes three
6 days for a fish to float, well, they can travel a long distance in this time. So, often it is
7 very difficult to ask for the correct cause and effect unless you have confirmed reports of
8 red water, respiratory irritation, and the like. Once the response has been activated, these
9 water samples are sent to local academics or state personnel who have the expertise to
10 identify potentially toxic algae. The information is recorded in the state database, which
11 is public record, for the information they have is possible source of the kill, the numbers
12 and the types of fish that were killed. The actual cell counts themselves are not recorded
13 by Texas Parks and Wildlife. For example, if they sent me a sample and I do a count, I
14 may return that information to them as to how many cells per mill there were, but they
15 don't actually record that. Something we really didn't discover until recently, we both
16 assumed that somebody else was doing that. And for coast wide blooms aerial surveys
17 are also used to track the general extent of the visible portion of the bloom. Texas Parks
18 and Wildlife also maintains several websites on harmful algae. First there is the Red Tide
19 Website, and then there is a website that they started just recently dealing with the
20 Golden algae *Prymnesium parvum* which has become a great problem in certain areas of
21 the state, and it is most evident in the fish hatcheries that it affects. It also originally
22 sponsored the Tex HAB, the Texas Harmful Algae Bloom committee which is now an
23 officially recognized arm of the state toxic something or other committee, I can't

1 remember the exact nomenclature. But it is a multi-agency committee that meets
2 quarterly to discuss harmful algae bloom issues and this includes both state and academic
3 representation and it includes Kirk from the Texas Department of Health, myself and
4 some of my academic colleagues as well as representatives from Texas Parks and
5 Wildlife. To my knowledge, the academic effort for monitoring *K. brevis* at the moment
6 resides basically in two programs. There is one at Texas A&M, which is a MERHAB
7 project funded by NOAA, currently under development with the system not being
8 actually deployed at this time, although it is in the process of being deployed, it is
9 relatively new funding. And then there is the project that I have running at the University
10 of Texas of Austin, which is also funded by MERHAB but is of limited duration, three
11 years, and I'll talk about that here in a little while. There is other event-driven sampling.
12 That is, if a red tide occurs other local academics and/or state personnel may be taking
13 samples, but this not an organized effort and it does not have a common database that the
14 data is entered into for recovery sometime in the future, and that is a major weakness.
15 This data may exist but unless somebody knows about it you can't access it. The Texas
16 A&M system is this really nifty high-tech video camera with seawater pumping through a
17 flow cell. It's called the flowcam, sea water is actually pumped through a flow cell
18 illuminated with a laser, there is a schematic right here on the board, and a video-camera
19 takes images of these cells as they flow past the camera. The images are recorded, and
20 the system is being designed so that these images can be transmitted immediately back to
21 a shore-based facility for recognition and also for archiving. Cells that have a
22 characteristic shape that the system's software can recognize can be enumerated. So, it
23 has great potential to provide some near Real-Time or Real-Time capability for

1 monitoring *K. brevis* population offshore. This is an experimental system, it is being
2 deployed on a large buoy system which will be integrated into the TABS array, which
3 stands for the Texas Automated Buoy System. This is an image from their website. Each
4 of these points here with arrows is a clickable icon that will take you to the site that gives
5 you the Real-Time, well, within twenty minutes or so, near Real-Time data for the sea
6 surface and meteorological conditions at that point and selective buoys also have
7 currents. The system was designed for tracking oil spills but *K. brevis* isn't too different
8 from an oil spill in many regards. So, there is great capability in the system for actually
9 having some short term predictive capabilities when it is integrated into this flow cam
10 data. As I said, the system is experimental and at the moment there is only one
11 deployment planned. Probably somewhere in the area in the D or the H buoy, which is a
12 fairly close offshore from the port of Aransas, which is where I am home based. So, we
13 should be able to provide some concurrent data from the near shore waters as well. The
14 program that I am working on, is part of a satellite detached in a monitoring program for
15 *Karenia brevis*, specifically focusing on the western Gulf of Mexico. My particular
16 portion is supplying the required validation of cell counts and chlorophyll data for Rick
17 Stumpf and his colleagues to develop and modify their satellite algorithms for this
18 particular area. The idea is to eventually expand the experimental half-bulletin to the
19 western Gulf of Mexico and have some direct experimental validation of their
20 assumptions in this particular region. The Texas coast is very different than the Florida
21 coast. We have very different types of reflectance as well as different bloom
22 characteristics because of the relatively large dribbling flow we have in the north, and the
23 transport down along the shelf. But this is the general idea, that eventually this bulletin

1 will be expandable to the western Gulf of Mexico if we can validate the various
2 algorithms. My sampling is conducted in conjunction with the Texas Parks and Wildlife.
3 It is an ancillary program and that is the only way it was fundable because of the cost of
4 getting this type frequency of sampling. I've been using this regular finfish survey
5 cruises that are conducted in these blue areas along the Texas coast. These are the passes
6 that Kirk was talking about earlier. These are the five major passes through the barrier
7 island systems. Parks and Wildlife has cruises twice a month, they do trolls for fin-fish
8 population surveys and they also collect surface water samples for me that are preserved,
9 filtered and/or frozen as appropriate and returned to the Marine Science Institute for
10 evaluation. The actual types of data we get are preserved cell counts. We get a 250-mill
11 alioquad. We'll settle anywhere from ten to fifty mill in an inverted microscope system
12 for cell counts. These are (inaudible) preserved. We have chlorophyll, which is filtered
13 and frozen, and run on a fluorometer, nutrients run on a nutri-analyzing system, and then
14 there is temperature, salinity and dissolved oxygen data recorded on site by Parks and
15 Wildlife personnel. This is set up as an experimental program. The idea of this and some
16 previous similar work I've done has never been to actually provide monitoring data in the
17 sense that it would be available within two to three days for managers to evaluate. It just
18 physically, was not really possible. However, recent developments in the Gulf of Mexico
19 pilot project, part of the Harmful Algae Bloom Observing System, has really given us
20 some nifty tools for providing this data and more of a near Real-Time application to
21 allow us to have a rapid presentation of the cell count data that's going to come on a
22 platform that everybody can use. This is, I think, the third time that we've seen this. I
23 like this, this is just a really cool website to go play on. This is part of the Gulf of

1 Mexico pilot project, the Harmful Algae Bloom Observing System. One of the questions
2 that the pilot project was addressing is, can we incorporate this data into some
3 meaningful presentation that will be both accessible and interpretable but yet at the same
4 time give us some of the safeguards that we need with our data that Karen alluded to in
5 terms of over-interpretation of it? Well, at the moment, we [unintelligible] Orsi and the
6 folks here at the NCDCC are providing us with some data entry tools that will allow us to
7 have a user-friendly format, a user-friendly entry into a convenient format. And we are
8 still going back and forth as to whether we want this to be web-based, type the number
9 into a form, or some form of uploadable file or some combination thereof. In Texas,
10 there's a lot of interesting use in this system, both for the *Karenia brevis* work I'm doing
11 as well as recording the *Prymnesium parvum* data the Texas Parks and Wildlife has. And
12 I am also interested in using this as a much more research oriented project focusing on
13 some *Ciguatera* work that I'm doing along the Texas coast. I am just going to run over a
14 couple of quick examples of how we are trying to use this information and exploring its
15 capabilities for use within the state of Texas. I provided the NCDCC with the
16 *Prymnesium Parvum* data from Texas Parks and Wildlife, and without trying to look at
17 this in too much detail, they basically took a spreadsheet for part of the, I think it is the
18 Trinity river system, some of the lakes on it, on just fish kill information and plotted it
19 using the GIS tools that they had there, provided this back with the recording of the
20 different colors, the different degrees of fish stress, and again this is just a very
21 preliminary step. This was done the week before this meeting. So, this is something that
22 is very much being developed now as we are talking. Same information on cell count, I
23 am not going to spend too much time, but again, gets you very localized and detail

1 information on where different cell count frequencies are occurring. What I did in this
2 slide, is I went to the publicly accessible HABSOS website, that is the one that anybody
3 can get to, and extracted information for the 2000 red tide bloom. This is one of the
4 major blooms that Kirk talked about. And what I'd like to show you here, is the value of
5 this type of information/presentation in understanding and tracking how this bloom is
6 progressing down the coast. Now, the data is coming in at two-week intervals, the first
7 half of the month and the second half. I compressed them into monthly files to save some
8 space and make it legible. But, again, you can do this at whatever time frequency is
9 appropriate for the sample for the data collection as it is coming in. But, July 2000, no
10 one had any idea there was going to be a red tide. There was a small red tide event down
11 in Brownsville, which is the very south end of Texas, and you see there is a little green
12 dot on South Padre Island, there was a fish kill. It was on the 4th of July, which, of
13 course, minimized the response by anybody in the state, lasted a few days, drifted north,
14 interestingly enough, and then disappeared. And at the same time, I think this is data that
15 QUAY actually provided, there was an indication of a small event just off of Mississippi.
16 This is pretty interesting. August was the main event. I came ashore in the Sabine area,
17 which is right between the Texas/ Louisiana border, and over the months of September
18 and October drifted south and entered the base. I think graphically it's pretty clear of the
19 southward movement of the bloom and then by November, the whole bloom had moved
20 off into the waters off of Tamaulipas and had essentially disappeared from our particular
21 radar, except from some minor occurrences that persisted within the embayments
22 themselves. I'd like to just kind of summarize the main points here. There are a variety
23 of programs that are currently collecting data along the Texas coast. However, it's

1 important to realize that these are not long-term programs. There are experimental
2 programs. They are research oriented and they will not provide a continuing source of
3 data into any source of data system that is developed. These programs are of limited
4 duration. But it's important to realize that data presentation tools are available now that
5 can provide rapid distribution and visualization of the data. Now, I actually was going to
6 finish what I had to say here, but want to go back and provide some information that is
7 relevant to some of the things that we talked about earlier. There has been a lot of talk
8 about how our major blooms move from the north to south in Texas, and that's true. You
9 can't have a major bloom in the Texas coast that starts in Brownsville and moves south.
10 By definition, it is no longer in Texas and it can't become a major bloom, you can only
11 have a major bloom if it starts somewhere up north and moves south to cover the whole
12 coast. That is pretty logical but what it tends to do is to minimize the data information
13 that we have that there are a large number of blooms that seem to move up from the south
14 and just don't go very far. In historical records there are records of blooms in
15 Brownsville in 1948, 1955, 1999 and in 2000. In most cases these blooms just
16 disappeared but it is interesting to know that in the 2000 bloom, this bloom moves
17 northward along South Padre Island until it got to a region where the long shore currents
18 converge, it disappeared. The bloom showed up off of Sabine about two weeks later.
19 Okay, if you look at the oceanography of that region of the Texas coast, there is a gyre
20 that transports water north, along the edge of the continental slope from that area of
21 Texas, off of where the long shore currents converge up to the Sabine area. We don't
22 have any way of evaluating this at this moment. But it is easy to hypothesize that that
23 could well be the source of the bloom that we saw off of Sabine in August of 2000. Cells

1 that that [unintelligible] north out of Mexico, transported north until the currents
2 converged, pushed them offshore where they became entrained in this gyre circulation
3 and pushed north up to the Sabine area, and they may well have interacted with one
4 forming eddy at that point to transport the water back into shore. I think this really
5 highlights how terribly important it is that we have data from the waters of Mexico. The
6 earliest recorded blooms in the Western Hemisphere come from these waters. There are
7 blooms recorded in 1648 from the coast of the Yucatan, and then 1792 and in subsequent
8 dates from Veracruz. In fact, the earliest case of respiratory irritation in the Western
9 Hemisphere comes from off of Veracruz. So, clearly, there is a lot going on in these
10 waters off of Mexico that are just of critical importance to Texas. And at the moment we
11 don't have any good way of getting that information into a common database. But I think
12 now that some of these tools are available, and I am all for it, just charging ahead and
13 making these types of tools available for all these investigators so that we can, I mean,
14 this will be really cool just to click on a website and suddenly see what is happening in
15 the western Gulf of Mexico. It will be an extremely powerful tool for everybody to use
16 for both, basic research and for managers, to be able to understand where things are
17 happening at any given point. That ends my sales pitch, I guess I can take some
18 questions now.

19 Applause

20 **Sonia Gallegos:**

21 [unintelligible]

22 **Dr. Villareal:**

1 Well, where it went, prior to having this type of data entry tool, is it went into a report to
2 Texas Parks and Wildlife, and eventually I had planned for publishing it but, of course, it
3 takes time to get it out in the press and isn't terribly useful as a Real-Time data
4 management tool. But, yes, basically it just goes in the report. There was no place to put
5 it.

6 **Sonia Gallegos:**

7 Okay, thank you.

8 **Unidentified Speaker:**

9 I am wondering what kind of bio-optical data are you collecting to develop these
10 algorithms?

11 **Dr. Villareal:**

12 The bio-optical component is being handled by Rick Stumpf. There is no data, that I
13 know, at the time that is actually in situ by optical data. He is using the SeaWiFS
14 chlorophyll data coupled with the actual chlorophyll measurements that I am making in
15 surface water to try to modify that particular model from Florida and see how well it
16 works in Texas waters.

17 **Unidentified Speaker:**

18 Tracy, do you think the academic community will have problems freely sharing data
19 more or less on a Real-Time basis or would it compromise the ability to publish the data
20 later on? I mean, there is always a concern in trying to integrate data from many sources.
21 So maybe something has to be overcome, I'd just like to have your thoughts on that.

22 **Dr. Villareal:**

1 I used to be concerned about that. No one wants to see their data taken by someone else
2 and used without their permission. But, I really don't view that as much as a problem
3 now, because the type of information that you can get that's specifically set up for a
4 monitoring program is not really the type of data that you'd use for a much more focused
5 research effort. For example, if you're doing transects on and offshore to look at depth
6 distributions of *K. brevis*, that data is going to be nowhere near Real-Time to get on to
7 the web. It is going to take months maybe to get those transects analyzed. If you have a
8 program like the SMR HABS program I am working with right now, it is really designed
9 to provide him the information and resources for evaluating the satellite model. Well,
10 he's got the model and I don't have any problem putting the cell counts up because they
11 are not really that useful in a research format by themselves. It is only in conjunction
12 with something else and I think that is an important think to keep in mind. If it is a
13 research oriented program it is going to take to long to be an effective monitoring tool. If
14 it is set up to be monitoring, well, it is not really usually well-designed to be a specific
15 research tool although you might be able to use it to answer research questions. But only
16 if the data is available. So, I don't have a problem. Now, I know in other states there
17 have been issues at higher political levels about releasing the information and those are
18 some of the barriers that the pilot project actually identified, it is that each state has its
19 own particular set of issues they have to deal with. But by and large once we found the
20 data, it generally was fairly available. The question is whether it is going to be available
21 in Real-Time as a monitoring effort.

22 Applause

23 **Unidentified Speaker:**

1 We are at the point where I have to look at my sheets to get to a little bit of the departure.
2 I ask that we now have Mr. Manuel Rodriguez Gomez from the Aquarium of Veracruz,
3 explain to us both, the monitoring sampling programs and the issues.

4 **Bryon Griffith:**

5 I just want to spend a moment talking to you about the style in which I'd like to use this
6 first session as a test. My style in this kind of situation is to look out on an audience like
7 this, and challenge its capacity, rather than just wait for the resulting solution to emerge,
8 so to speak. I've been at the front table here over the last several minutes, actually,
9 taking the initiative of what will be well-viewed to actually craft a proposal, the elements
10 of a proposal to stimulate, for lack of a better term, efforts to be undertaken in
11 approximately the next six to seven months to set the foothold, if you will, on that
12 standard protocol for acquisition, entry and reporting. And after these next two presenters
13 just get faded a little bit, I am going to step up here and I am going to present that
14 proposal to you. Now, it is going to include, up front, some challenges that the Gulf of
15 Mexico program is going to apply to a few of you in the audience, to step up to, and at
16 least discuss in concept if not directly and acceptance of those roles. But it is clear to say
17 over the course of what has been a very long day, that we're cycling around some very
18 common points. And that is, we must come and close the book on how, when, and where
19 we are going to enjoin these resources. And so, in just the next few minutes it should get
20 a little more exciting in terms of those who will have to accept or decline those roles. So,
21 bear with me. Are we ready? Oh, sure.

22 **Mr. Manuel Rodriguez Gomez:**

1 Good afternoon everyone. Thanks to the organizers for the invitation in the name of the
2 aquarium of Veracruz. We are an institution that is born in 1992 by an initiative of the
3 government of the state and currently is managed by a civil non-profit association. We
4 are every day improving our installations as we are going to see below and we are very
5 concerned by the quality of water that we are currently obtaining in the area, in fact we
6 are working with natural water, yes, and in spite of our having closed filter systems, we
7 need to replace water constantly. We have had problems with the red tide because we
8 have a corral with sharks where we adapt before placing them in the main tank and we
9 have had deaths due to this cause. We believe also that we are an institution that has a
10 location in front of a reef system. That is, it would be fruitful for the researchers to work
11 together with us because we have laboratories and we are going to have nearby a place
12 where we can house them. Following we are going to give a very brief presentation of
13 what we are. We have as an institution, a mission and a vision. And, well, here in this
14 part of our mission we have in an institution the nature of an advanced research center.
15 That is what we want for tomorrow. And, well, also that in regarding the part of the
16 vision, we expect to have a contribution in the knowledge of the environment. The
17 location of this land that was used for the construction of the aquarium. As you see, we
18 have the reef system here, we have a reef here in front, and well, this was a piece that the
19 sea won back. We have a master plan of knowledge, this was the first part that we made,
20 we are within a commercial center, and the red part is the aquarium. That is the master
21 plan, we already have this other section built and well, right now we are going to place
22 this warship that is going to serve for housing the researchers. And well this could be the
23 first distribution with which we have, we handled two million and a half of liters of

1 water. And now we are part of the installations. The white part, that is the aquarium of
2 Veracruz. This is the new section. This part here that you see was a parking lot and we
3 created the shark compound. Some interior aspects. We work with the tiger shark. We
4 work with the manatee. What is called the touch pool. We have changed the museum
5 that was previously contemplative to an interactive area. We have a support
6 infrastructure. The filters; the pumps, that is, the new area and is the other technology
7 that we use. It is our own technology; also we have it computerized already.
8 Laboratories - we have been revamping them. Also, we have integrated human
9 resources. We have an educational department that is very important to us. We have
10 obtained a registration that we denominate CONACYT, National Council of Science and
11 Technology. That from the year of 1996, no institution has achieved it and it is based
12 upon graduates and the courses that we give at the aquarium. And the supports also to
13 the institutions. We have links at a national and international level with aquariums, with
14 governmental agencies, and with universities. Also some achievements along research
15 lines with the ecology of coral we work with the Veracruz University, since 1998.
16 Also, we have work in cultivating corals and we have collaborated with GeoThermal
17 Agriculture Reefs Foundation. Also, we work with the sharks. Currently we have a tiger
18 shark that is four years old; nine months of aquarium life. There we the male and female.
19 And also we are close to carrying out studies on fishing sharks. With manatee we are the
20 only current center in Mexico that rehabilitates breeding of manatee. And we form part
21 of the technical subcommittee for the protection of this species. Currently, we are
22 cooperating with the council of development of the Papaloapan for creating the unit of
23 research/conservation of wild life in the wetlands of Alvarado, Veracruz for the

1 reintroduction of the species. The tank is being constructed there. Here we have a corral
2 for reintroducing the breedings. Also we have a program of turtles. There we see the
3 marking of the Sobe, and this we carry out on three islands that we have practically in
4 front of the aquarium. Also, we are carrying out marine cultures. We have some
5 publications, for example, we have a guide for identifying corals, which represents ten
6 years of works that we have represented in different form and a guide of species that we
7 handle. We already have a position within Latin America as an institution and we give
8 support to Costa Rica, there is Punta Arenas, in technical specs of filtration as well as
9 construction. We work also... right now we are beginning with Panama and the
10 Smithsonian. Punta Culebra has this aquarium right now and we are going to create a
11 bigger one along with them. And well, we also have a relationship with Cuba. And well,
12 we have new projects; here is the vessel that we expect to run aground this year. Already
13 we are in the phase of adapting the terrain. As you can see it is quite large and can house
14 the researchers. We have also the project of the Marine Park that is going to have all the
15 species that we see here: dolphins, wolves, penguins, nutria, crocodiles, turtles and
16 flamingos. There is a virtual image, and in front we have an island where we have the
17 corral of sharks. That was affected by a red tide and they all died on us... which we had
18 adapting themselves there. And well, we have an ecotourist and archaeological project to
19 be approved. We are creating a laboratory of some multiple uses because we have many
20 requests from the universities and from some official agencies of power to produce works
21 in the aquarium and well practically we hope in two months to finish that. And well, we
22 extend the invitation in the name of the institution so that if you need some support,
23 logistically we are well located in the Gulf of Mexico. We have vessels, we have

1 laboratories and we can do something thereof. We, as I said, are very interested because
2 we depend on water and practically everything that we have achieved in ten years. Well
3 we have a time bomb there if we do not know how to monitor all of these conditions.
4 Here as we can see, this is the corral that was affected by a red tide. Here is where we
5 adapt the sharks before they are taken to the natural environment, I mean, to the
6 aquarium, pardon me. Thank you.

7 Applause

8 **Bryon Griffith:**

9 Thank you, Mr. Gomez. The last presenter in this segment is Dr. Virgilio Arenas
10 Fuentes, and forgive me if I've not pronounced that correctly. The Ecology and Fisheries
11 Center of the University of Veracruz.

12 **Dr. Arenas:**

13 Good afternoon. My name is Virgilio Arenas. I am the director of the Center of Ecology
14 and Fisheries, and precisely, I have asked Manolo that he do me the favor of leaving this
15 last presentation as it is, to talk to you about what I want to say. What you see here, as
16 Manolo has said, is the Isla de Sacrificios [Island of Sacrifices], please, if you find that I
17 am going too fast, give me a signal there. Isla de Sacrificios is only an example of the
18 reef system that is in front of the aquarium in Veracruz. There are around twenty-four or
19 twenty-five units such as these. Nevertheless, they do not all have an emerged island, but
20 this one is a good example of that. We have been working with Manolo since
21 approximately three, four years with them and this has been an extremely fruitful
22 relationship. And this is a little of the theme that I wish to talk to you about. I am going
23 to be very brief because, first, I thank you very much for having given me the opportunity

1 of opening a space in this presentation in order to present this to you. I do not want to
2 present all of the achievements that we have obtained in the relationship with the
3 aquarium, I only wish to pinpoint some of them that seem relevant to me. It has been
4 approximately one year, in Veracruz. As Manolo says, a red tide was presented that
5 killed the sharks that they had in this corral on the Isla de Sacrificios. Curiously, when we
6 went to see the fishermen with whom we were working, they never reported a dead shark.
7 The sharks that died were sharks that were in the corral. Well, it is proof that the sharks
8 that populate the Veracruz reef system achieved this by somehow avoiding or
9 escaping. We were called to understand the cause of the death of the sharks; thanks to
10 the call from the aquarium, and eventually we enrolled in the program of red tide in the
11 Veracruz area, and we found very interesting things. I am going to be very brief with the
12 data. We are working with the fishermen that exploit the Veracruz reef system. When
13 we went to see them, in effect, we found at the coast of the sea, hundreds of dead fish.
14 We saw the navy men search the coasts of Veracruz and we saw them bury the dying
15 fishes on the beach. To our surprise, and to that of the fishermen, the fishermen told us
16 "that one I have never seen, that one I never fish, that one I do not get it from here, it is a
17 species that I have never seen". Let us give you some background about the fishermen of
18 the Veracruz reef system. There are about 500. And together there are about 200
19 launches that go out to fish daily and they return and in total according to our estimates
20 they do not get more than one ounce of fish a day. Surely, it is clear to you what is one
21 ton, I like to express it in a more emphatic manner, so I tell them that it is equivalent to
22 this thing full of fish, so that imagine please that 500 people go out in 200 vessels and
23 return and put the product of their catches here. When we the biologists arrive and we

1 take out what is there, we find around eighty species of different origins. This is a fishing
2 of extreme diversity and of an abundance per species, minimum such that we need to
3 generate handling strategies adequate for this purpose. But the surprise was when we
4 found that the species that the fishermen were fishing they were not those that they had
5 died in the red tide. We began to identify the species and we found that the greater part
6 of the species that had died were not species that the fishermen catch. The greater
7 biomass that the fisherman catches are pelagic species that are in the inter-reef areas.
8 When we began to identify the paper that preceded me, one of the papers that precedes
9 me, it precisely spoke of the importance of identifying the dead species. Surprise, what
10 we found that there had died morays, rabbits, bulls, wolves, all of these are not only
11 animals of the sea, they are fishes of the sea as they are called by the fishermen. In order
12 to explain this we found that there was only one reason, and it is the dynamics of the red
13 tide. In accordance with what occurs in these ecosystems, if you see this ecosystem, it is
14 an island and immediately outside the island you can see a large reef lagoon that is
15 bordered by the reef border precisely. The surge that arrives from any side hits the reef
16 border and therefore the speed of the moving mass of water that enters the reef lagoon
17 significantly increases its time of residency. This is normal in the atolls. I measured
18 them, and a mass of water that delays in displacing the equivalent of the longitude of the
19 reef lagoon approximately eight to ten hours, once the mass of water enters the reef
20 ecosystem, it takes around six or seven days. Therefore when the red tide comes, the red
21 tide really acts like a trap, a mortal trap, for the fishes that live on the reef. Because the
22 fishes live on the reef are territorial fishes, that do not have a capacity to avoid the trap
23 that the red tide is representing to them. Well, it seems very important to me to indicate

1 that a red tide is a deep ecological crisis in an ecosystem... in an ecosystem of this
2 complexity. I referred earlier to an intervention I made, that we were carrying out some
3 experiments also and we found that the diatoms simply, the diatom is a plaque of glass
4 sustained during four days in the middle of the reef is populated immediately by diatoms
5 and in the presence of the red tide, some died preferably than others. This probably
6 means that we have on hand a bioassay mechanism through which we can identify with
7 clarity species by their sensitivity. It is a work that we want to continue and it is a work
8 with which we ask your cooperation, that you help us understand what we are doing. Our
9 data in this event of red tide went a little beyond that, because we have had the fortune
10 with the collaboration of the aquarium we have come out to be transects, video transects,
11 we went diving and we made transects in the slope and in the reef lagoon. Anyway, we
12 have made around some 60-80 transects in the entire Veracruz reef system and we had
13 the opportunity of making an evaluation of the total biomass of fishes. How many fishes
14 there were in the complete reef system. It is very difficult to calculate the biomass of the
15 reef fishes in the fifty thousand hectares that it represents. All of you who have seen in
16 video, or who have submerged in the sea, would agree that there are fishes that are about
17 this long but are flat and therefore do not have a significant biomass. Others are
18 depressed dorso-ventrally and therefore do not have a very large biomass. Well, with
19 these risks and these sub-estimates or difficulties for estimating, we arrive at an
20 approximation. Our estimate is that in the event of the red tide, between 10-30% of all
21 the fishes of the Veracruz reef system died. This is an ecological crisis. It is a process
22 of violent ecological disturbance. Without a doubt, the reef system has been eventually
23 recuperating itself. Well, it is part of our subject for study. What I want to bring to the

1 table is to recover this once again, a red tide goes beyond a crisis for human health. It is a
2 crisis for the ecological systems, and this is an example. When we wanted to transfer this
3 effect and see the consequences on the fishermen, we found other interesting data. I have
4 told you that 500 fishermen return each day after work with around one ton of fish. Well,
5 what they receive as payment, distributed among themselves does not reach even \$5.00 a
6 day. That is, our fishermen carry out a very rudimentary fishing, they are of subsistence
7 level. As soon as they found out that the health authorities were concerned by what was
8 happening with the dead fishes, they knew that they were going to be attended in a
9 similar manner; that they were also going to be attended because of the crisis extended to
10 them. But the crisis became greater for them when they found that the visitor, the
11 fisherman and the authorities had decided that fish should not be consumed. And they
12 saw that the species they had accessible for their fishing was available there. In that
13 manner, their life crisis of \$5.00 per day turned into an even greater crisis - the children
14 stopped eating. For about 6-7 days the children did not eat their usual beans and tortillas.
15 We found this out by attending the schools; the school of the fishing village. We need to
16 understand that the problems of this nature go beyond this. It is very important that we
17 see them as an ecological crisis. I wanted to say that. In addition, I also wanted to say
18 that this collaboration with the aquarium is very important. The aquarium of Veracruz,
19 and Manolo did not want to say it because of modesty, is an extraordinarily important
20 center so that Mexico known to its public, to the Mexican public, the importance of the
21 conservation of nature. It is the aquarium of Veracruz where the Mexicans go during
22 Easter week, well, all throughout the year, nearly two million visitors arrive at the
23 aquarium of Veracruz. 95% of them are Mexicans; middle class Mexicans and below.

1 That is where we have to handle the message. Because they go to the aquarium; they go
2 to see the sharks and they go to seek an area of recreation. We have to find the
3 alternative to tell them that red tide exists. The red tide is like this and that, and that it
4 can extend itself thus or run like this and that... so that we go on educating them and the
5 go on acquiring a sense of why it is important to do research; why it's important to have
6 monitoring, and for this purpose, we consider that the relationship with the aquarium of
7 Veracruz is extremely important to us. Well, therefore, if you allow me, we will turn this
8 off. Now I want to comment about this other side, if you please. In the northern part of
9 the state of Veracruz there exists a river, it is the Tuxpan River, and we have designed
10 a...excuse the presentation, they have done me the favor of making some photocopies and
11 eventually it will be available to each one of you, but I have not wanted to let the
12 opportunity pass in presenting it to you. It is a project that seems to be to be
13 extraordinary. It is the basin of the Río Tuxpan [Tuxpan River]. It concerns managing
14 and conserving the basin of the Tuxpan river under the focus of white water, blue water.
15 Deep-felt within Mexico we profoundly resist approaching this focus, and it is very
16 important that we apply it in Veracruz. Because here 35 percent of the runoff of the
17 country travels through Veracruz, through the rivers of Veracruz. They constitute salt
18 marshes, salt lakes by the sea, swamps, mangroves, and eventually outside, coral reefs,
19 continental platforms, etc., where the sea-fishing outside depends on 75 percent of its
20 species, of the health of the coastal ecosystems. We have to make this work well. We
21 need to demonstrate that the interaction between what happens above the basin is
22 important for what happens below the basin. In this way, what we have been taking
23 advantage of in the north of the state of Veracruz, a fact that seems to me to be very

1 important and I want to make it clear. I am convinced that if we do not achieve that the
2 citizenry participates, that NGOs are organized, it will be difficult for ourselves, scientists
3 to achieve to transform our authorities. When the scientist is alone and places in doubt
4 the decision of the authorities they becomes a sniper. And therefore the universities do
5 not receive support. When the authorities need, it is like Amparo told us, it turns out that
6 we are dogs that they let out to bark only when there is a crisis. Definitely, we need to
7 find this link with the civil society. And here we have found the perfect level to do so. It
8 turns out that an extremely well-to-do family as you say in the United States, has an
9 enormous amount of resources and are from Tuxpan origin, and have found to their
10 surprise that Tuxpan, their native city, is an ecological disgrace. And that the mangroves
11 that are just around their city, Tampamachoco, Tumilco, are in a process of profound
12 devastation. Therefore we have been approaching them, and they have been approaching
13 us and we have created an NGO, better said, two NGOs. And we are approaching the
14 creation of a fund of ecological restoration through the Mexican fund for the conservation
15 of nature in the area. What we are telling them is that it is necessary to restore, even the
16 ecological restoration, to return to creating the links between the high part of the jagged
17 mountain chain, that the Sierra of Otontepec, and the lower part. What we are now
18 promoting and it is nice to be able to announce it to you, is that you will surely find it on
19 the web-page soon, that the reefs that are out there, because out there there are six similar
20 reefs to which are on this side, six reefs that are the last ones that extend to the northern
21 part of the Gulf of Mexico of the reef systems. They are extraordinary reef ecosystems.
22 They are going to be found on the web-page... that they are being declared a state natural
23 protected area, excuse me, federal. Otontepec is a small extraordinary jagged mountain

1 chain. This is a jagged mountain chain that is an island, in the concept of a sierra [jagged
2 mountain chain], where isolated species of a forest of mist remain. What remains as a
3 remnant is a forest of mist. It is being declared a state natural protected area the fifth of
4 June, which just passed. The mangroves that are just below it, Tumilco and
5 Tampanachoco, are being declared area... with the purpose that these areas receive
6 special treatment. But what we're doing is having the civil society move in order to
7 restore the lost ecological values; having them understand that it is necessary not to put a
8 glass bell on Otontepec and another one on the reefs offshore. We need to recover them
9 alive. They need to again offer the environmental services that they did at one time.
10 Excuse me for having taken so much time. I thank you for your attention, and please
11 excuse me once again for the interruption. Many thanks.

12 Applause

13 **Bryon Griffith:**

14 Well, some people say I am the most dangerous. And I have a free hand to draw people
15 into the conversation. My inability to translate this sitting at the desk into Spanish, but I
16 am going to try to walk my way through it. I am just going to walk through this very
17 quickly because I think it keys on the principal elements of discussion that we've been
18 having. This is the proposal in its most simple form. In essence, in a minute, as you see
19 at the bottom, there is an old if there are no new ideas, and I think you'll find that to be
20 the case here. What I would propose in course of the discussion in the sampling and
21 methods protocols is that someone or some institution must serve in some capacity to
22 round up all of the elements of the discussion that we had this morning and many that we
23 did not. And so the proposal is for a contractually assisted study to be done in the next

1 six to seven months to actually go out at the state level, state and federal level,
2 particularly keying on the eleven binational states of the Gulf of Mexico, to determine the
3 current state of monitoring and sampling programs, in essence as a foundation to
4 understanding the parameters of acquisition and reporting that could be folded into a
5 recommended standard protocol. It's just really that simple. I say, it's that simple. It
6 seems to me that we have a tremendously valuable infrastructure with which to swing
7 many of our concepts off of, and one of them is the GOMSA. The GOMSA will meet
8 again, as I understand, in Cancun in December, to wrap up the national meeting schedule
9 that is always held the first of second week of December. We have approximately six to
10 seven months to conduct this work and to get about it. What I would propose to do is that
11 my program office, the EPA program office would actually fund the study. And would
12 get about the process of instituting the specifications and the schedules to conduct that
13 survey and analysis. With the specific intent of creating, from that analysis, this set of
14 recommendations for standardization which will be delivered at the GOMSA meeting in
15 December. We often use the term "reverse engineering" this is reverse engineering from
16 the December time frame. In light of that, there are a half a dozen or so key elements that
17 would have to be agreed to, to entertain such a proposal. As I said before, to start the
18 challenge rolling, my program office would offer to initiate that study. The study
19 coordination, particularly in Mexico, is essential. One of the things I did not spend too
20 much time on this morning is to explain the complexion of running an office such as our
21 Gulf of Mexico program
22 (Break on tape sequence, end of 4B)

1 *Tape 5A*

2 ... bring the capacity of twenty-plus agencies, we have no means of doing that in your
3 country. Consequently, I need to lean on your capacity to get there from here. So, the
4 proposal would have us have the water commission and SEMARNAT co-lead that
5 coordinated effort with the six states of Mexico. What does that mean? That means the
6 associated local presentations and workshops that would need to be undertaken in
7 coordination with this contractor. I would have to rely on your capacity to aid us in that
8 regard. The follow up workshop facilitation that references this back in, can you prepare
9 this and deliver it by December? That workshop format is co-chaired by the health
10 services of Veracruz, Dr. Chantiri. Consequently, I would ask and challenge Dr. Chantiri
11 to feature this in Cancun. And basically establish this as the theme, with focus of that
12 particular exercise. Obviously, the back end of this is the development of, this was
13 discussed earlier, the tools, the standardization tools for entry, retrieval and ultimately
14 analysis. I would challenge the NCDDC, which already has the foundation work
15 established in their operating pilot that you'll be hearing more about over the course of
16 the next day, to accept that role in light of the programs they already have either
17 underway, or plan to have underway. And the last piece of the action, although there are
18 many, obviously most of us are project managers in here and we can explode this list
19 indefinitely, but one of the main features of this, is once you have an operating system,
20 how do you implement it? And where will the training implementation come from? It is
21 going to come a little later in this session, in fact, it is going to come tomorrow. But I'll
22 just bring it out of the box today. The GCOOS that was referenced in Dr. Karger's
23 presentation this morning, we know for a fact, has a proposal called to aid and abet the

1 processes and the workshop efforts that are going on here. And actually we have,
2 through that process, an application to know its call for proposals to assist us in
3 coordination, workshop, training and implementation development. As any pre-
4 application would dictate, the devils are in the details. Well, the details are rapidly
5 emerging in a workshop like this. And so, consequently, plan A, as it is referenced if you
6 could read that here, is that we already have a playing card in that game. And we would
7 hope to, we being everyone in this audience, would hope to play out very well in that
8 process. That would be plan A. If in fact we are not successful in that bid, in the RFD
9 call, we would need a plan B. And this is where I would challenge the balance of the
10 states, both from Mexico and the U.S., to begin to think about the plan B without filling
11 in the blanks here, as we can share in this process, as we will over the course of the next
12 day - to back stop this kind of process. If we could get through these four key elements
13 by December, we will have gone a long way in progressing on this process. And I will
14 just offer the floor to comment or discussion.

15 **Unidentified Speaker:**

16 It seems alright to me, especially because of the situation of the red tide being like an
17 inverse epidemiological study. We know where the origin of the problem is, which is the
18 origin of the situation, what it can generate for us, which is the risk that we run, but we
19 cannot control it. Inversely than an epidemiological study, because we start here, when
20 we are talking about epidemiology, about the presence of cases and we have to go seek
21 the origin in order to take the adequate measurements and correct or avoid any problem,
22 right? The problem of the red tide, is basically about monitoring information - about the
23 validation of data. I believe that in a framework where we ourselves can increase the

1 monitors and have in order to detect opportunely any alteration of the presence of the
2 *Karenia brevis*, I believe that it is going to allow us to take actions or arrive at making
3 correct decisions for favoring the population. This has two frameworks. From the point
4 of view of human health, and from the point of view of the damages that it causes to the
5 natural resources. They are two different perspectives. Those of us who are health
6 workers are on the side of human health, and in this case, we are very concerned because
7 if we do not intervene, if we loosen up on the monitoring, simply having it as an
8 obligatory thing in our programs of action, we, the secretary of health, would appear as
9 the ones responsible for everything. We are concerned simply because if there is an
10 event of this nature and we do not have the measurements, the plan in play, they throw
11 the guilt on us. The easiest thing is to blame the secretary of health, the health
12 authorities. And if the other occurs, no. Therefore, starting from this basis, the proposal
13 of Tamaulipas, insofar as it has sought to establish criteria that define the studies on the
14 red tide, is to be able to have the information about what is happening in all of the states.
15 Our contribution to the program that you suppose is exactly in placing at your
16 disposition, our weekly samples or biweekly or monthly and the findings of the same.
17 Thanks.

18 **Bryon Griffith:**

19 If I understood you, then you are reinforcing in favor of this proposal. Thank you. Frank.

20 **Dr. Frank Muller-Karger:**

21 Thanks, Bryon. One of the things that I mentioned this morning, would be useful is
22 somebody in Mexico taking the lead of forming a counterpart office for GCOOS, for
23 example. I assume that there are Coos groups and IOCs in Mexico. And I don't think

1 they are necessarily represented in this room, at the moment, but it would be useful for
2 the individual people and the individual agencies in this group on the Mexico side to read
3 the mission vision and the proclamation of formation of the GCOOS and think about
4 signing up as step one. Then forming a counterpart office that forms a point of contact
5 to, is that SEMARNAT? Is it the Water Commission? Who is it? To determine a point a
6 contact for GCOOS so we can start formalizing the process of linking the two.

7 **Bryon Griffith:**

8 Excellent point. An obvious enhancement to what is up on the screen, especially in light
9 of the fact of basically leveraging GCOOS in item four, we must play a more formal role
10 in the GCOOS process together, I think that is your point.

11 **Dr. Frank Muller-Karger:**

12 If we could announce that actually by December, that would be wonderful.

13 **Bryon Griffith:**

14 And my parking lot folks, are they capturing this? Okay.

15 Laughter

16 Yes.

17 **Unidentified Speaker:**

18 We had a presentation today by our colleague from NASA on Remote Sensing, and I am
19 not sure how the NASA component might fit into your project, could you give us a little
20 bit about that?

21 **Bryon Griffith:**

22 Well, that is an excellent question. The question, I assume because Pat spoke into the
23 microphone, everyone has heard it, the question relates in how do we draw in all of this

1 capacity that we heard about this morning. Well, Dr. Giardino knows me pretty well, and
2 he knows he is not going to just to get to sit there for the balance of the two days. In the
3 next segment, where we are actually doing with Remote Sensing, I am trying to break
4 this down. NASA, as you would point out in this RND role, would not be in this
5 operating role typically. As we begin to break down the kinds of assets that would come
6 into the forecasting, and/or predictive nature of the build up of the capacity that we are
7 talking about just basically, the Phoenix rising here, is something that we look beyond,
8 obviously this relatively initiating component to, down the road. As we get into the
9 Remote Sensing capacities that are going to be needed to be propelled to achieve exactly
10 what we have in this presentation, how do you achieve that predictive analysis technique,
11 be incredible and defensible in the next ten years? I think, well within the ten year time
12 frame was his prediction in his presentation. We have to factor in where NASA is going.
13 I think you are going to see that emerge as that chapter as this workshop unfolds.

14 Yes sir.

15 **Dr. Jorge Nicolas Chantiri Perez:**

16 Many thanks. We really accept the challenge, as they say, yes, completely in agreement
17 with what Frank says of ourselves being the counterpart in Mexico. I would like that in
18 this plan A we integrate, besides SEMARNAT, federal, that we integrate COFEPRIS.
19 COFEPRIS is the Federal Commission of Protection Against Sanitary Risks where there
20 are to be found three people here present. They are our directors in sanitary regulation in
21 the Mexican Republic. Therefore, I make the proposal that it be made up of, besides the
22 federal SEMARNAT, also the federal Commission.

23 **Unidentified Speaker:**

1 Yes, I just want to reinforce what Dr. Chantiri said - the guidance of this type of work in
2 Mexico is under the Secretary of Health. The sanitary regulation is that which is the
3 equivalent to the FDA with you in the United States. Therefore, all the work of the
4 Mexican health program of bivalve mollusks that we manage is handled in what is
5 currently COFEPRIS. All of our findings, all of our monitoring, all of our actions end up
6 in Mexico City with our authorities in the Secretary of Health. Here there is no doubt
7 who is the head of the works that in this sense are carried out in Mexico, it is not
8 SEMARNAT, nor is it AGARPA, nor any other agency, because strangely enough, they
9 do not have knowledge of everything that is happening in this. We ourselves during
10 many years have developed a series of activities but only thought out, as I just said to
11 you, in only one sense. We see it from the viewpoint of human health. I believe that this
12 is more valid in this meeting and the leadership is fully defined. It remains in the hands
13 of COFEPRIS.

14 **Unidentified Speaker:**

15 Furthermore, one important thing is the work that COFEPRIS is carrying out with the
16 United States with the bivalve mollusks. I understand that already once again the
17 importation, the exportation from Mexico towards the United States is being accepted in
18 two important regions, they are Baja California and Sonora.

19 **Juan Manuel Irigoyen López:**

20 I believe that it is important to point out the purpose of this meeting. That is, to gather all
21 the parties together who have to do with attending still the theme of the red tide. It is a
22 theme that was chosen as the starting point for other types of monitoring and bilateral
23 actions. In this sense, it is very important to keep in mind that the horizon that we should

1 be seeing is not only the red tide, but the coordination of all the monitorings in the Gulf
2 of Mexico that eventually could be opening the doors for attending to disasters such as
3 disasters of a petroleum nature, or other types of activities. Therefore, it is for this reason
4 that SEMARNAT is being invited into the federal block and also the National Water
5 Commission. Because what we have seen, and this is what motivates us to meet, is the
6 lack of coordination that occurs among our different agencies within the very United
7 States from state to state, as well as among ourselves, between two countries. Therefore,
8 what Bryon is proposing is that there is a head on the part of the United States and
9 making the concession that in Mexico we have many agencies that attack this problem,
10 well to make the concession that it not just be one, but rather that it be a coordinated
11 effort. And I believe that yes, it is important to include both SEMARNAT as well as the
12 National Water Commission, because ultimately the background of this meeting has to do
13 with the methodologies of sampling. We depend very much upon those agencies for
14 these works. Thanks.

15 **Unidentified Speaker:**

16 Yes, to reinforce the words spoken by Juan Manuel - red tide implies many more things
17 that are behind itself...than the simple fact of being red tide, and that it has in effect, or
18 that it can have a harmful effect on health. It is much more what is behind all of this. It
19 is contamination. They are continental contributions; they are the system of treatment
20 that does not function, what do I know. There is much more of all this and therefore
21 likewise I second the proposal.

22

23

1 **Dr. Maria Amparo Martinez Arroyo:**

2 Thanks. Well, I believe that this issue of the red tides should be able to be resolved quite
3 well because if we all fight to have it, it means that we are interested in solving it. I
4 believe that this is good. I do not see a contradiction, in fact, I commented with the
5 colleague from the National Water Commission, SEMARNAT is representing the
6 environmental sector within which is the National Water Commission. We can enter
7 together as one. And furthermore we have the responsibility of the natural, marine
8 coastal ecosystems, and everything that is the marine system is a federal attribute. In this
9 sense we can participate and it is our obligation. The Secretary of Health, on the other
10 hand, by way of the commission, in effect specifically handles the red tides insofar as a
11 risk to human health. In this sense, it should participate and has much data about it, there
12 is no discussion. But above all, what we would have to consider is that the federal
13 participation, in this case in particular, would have to be for facilitating, for promoting
14 and for helping in everything that the states are deciding to do, who are the ones that are
15 working the problematic. In this sense it would not be arriving at a problem from above
16 that they have already been working, but rather it would be really entering a synergy that
17 we all require in order that it be effectively resolved. And the only thing that we would
18 be giving as a guarantee as federal government is that it would be participation similar to
19 the states giving facilities to everyone who does not have them right now. The same so
20 that we could enter into a binational treaty in good conditions.

21 **Unidentified Speaker:**

22 First of all, I would like to say that if anyone wants to discuss sampling methods, any of
23 my colleagues in Mexico could help. Somebody asked a question in how we measure

1 chlorophyll and standardized chloroform in the state of Florida, I'd be willing to discuss
2 that afterwards. It is certainly easy to discuss this here and talk about how we are
3 sampling, in terms of how you are going to collect this information via email or via web
4 based format. However, you are going to collect to do this survey, this binational survey,
5 it will be interesting to see how that works out. I am wondering if there is much of an
6 obstacle, and maybe the folks from DOH and the Florida DACS, and then other
7 regulatory agencies, both in Mexico and the U.S., the regulatory agencies have laws on
8 how they measure certain things like d.o. and cell counts, and if we are going to
9 standardize protocols, what obstacles there will be in trying to standardize those because
10 the protocol is already written maybe into their laws, into their regulations on how things
11 are measured. So, I am not sure what types of obstacles there might be. We need to be
12 aware of those.

13 **Bryon Griffith:**

14 Well, let me respond to that a little bit. We have, obviously for the sake of the time that
15 we have together here, over two days, we could have spent three days on sampling
16 protocols and methodologies. I don't think, literally anyone in here is not expecting to
17 find some abrasive spots in terms of the variations, dissimilarities in some cases, action
18 limits, parameters, collected, not collected, etc. However, the sense that I get in the
19 discussion, regardless of what those dissimilarities are going in, is a normalization
20 coming out. Something that is suitable to carry the concept into practice of binational
21 cooperation and data exchange and information exchange. Whether that means one
22 country will revamp its technique to follow another, I kind of doubt that, that is not the
23 intent here. The intent is obviously an exchange that will enhance, or better the situation

1 yet come out the other end of the pipe with an advancement far beyond what we are able
2 to achieve right now. So, I too, by the way, am looking forward to the outcome of this
3 study and the survey. Let me, because I feel the necessity to, I need to do two things.
4 Actually, I need to round up, I actually heard representatives from SEMARNAT, the
5 Water Commission, Health Service of Veracruz, and I need to kind of round out the
6 situation here. The challenges that I put on the table and I need to hear from NOAA,
7 NCDDC, in terms of acceptance in those particular roles.

8 **Unidentified Speaker:**

9 I think the real challenge is going to be coming up with a protocol that everyone agrees
10 to. I think once that is in place, developing the tools, getting something rolling that will
11 address everybody's needs, is, from my perspective, the easy part of this. So, we think
12 this fits really nicely with what we have in place for it now, and what we have projected
13 to build over the next couple of years. So, we look forward to providing this support.

14 **Bryon Griffith:**

15 Well that, in essence, rounds up the challenges to the challengers. Now let me back up
16 just a little bit to the discussion that was had regarding the Health Ministry. And let me
17 give you my interpretation of that and my recommendation. It would make sense that
18 both, the Water Commission and SEMARNAT, if I understand them, and I think I
19 understand them well enough to make this statement - in the world of water quality
20 monitoring and issues of the ecology and the environment, they are, I think, very similar
21 to the U.S. service agencies. When it comes to the theme of event response things
22 associated with the Health Ministry - how do you protect the citizenry from shellfish
23 poisoning? the aerosols on the bathing beaches and the like? That is where the theme has

1 been engaged and transitioned to another department. Consequently, if I understood the
2 discussion and the fortification of that discussion, it was recommended that because the
3 theme is red tides, and because that theme transcends into public health issues, that the
4 health ministry be featured as a co-coordinator in regard to the SEMARNAT and the
5 Water Commission. And I am getting affirmation of that point from the representatives
6 in the back. So, that is how we'll basically, in one respect, modify this proposal more
7 formally as we move towards the end of the day. Well, what do you think about that
8 process? I hope that this is the same kind of approach that we are going to take to each
9 one of the segments. We are going to have to close it out, to be effective, with actions,
10 because our words don't go very far. And so, consequently, this was a little bit of a dry
11 run, a little test, for how that would work with the group and it seems to have worked
12 very well. And I am very pleased with that and I hope you will be too. You have spent a
13 lot of money, a lot of time, and have been taken away from work that you have to do
14 elsewhere to leave here with something of value, and we want to make it as valuable as
15 possible. Let me talk to you a minute about the balance of our agenda. It's not going
16 well time wise. [laughter] So, we need to do a few things. One of which is, we have a
17 very important member among us, Mr. Landry Bernard from the National Data Buoy
18 Center, who actually cannot be with us tomorrow. So, I had promised him, and he is next
19 anyway, I had promised him that we are going to get to his technical presentation on the
20 buoy systems before he leaves this evening. So, needless to say, we have definitely got at
21 least one more presentation before we leave this evening. Now, as I was sitting at my
22 place at the desk studying our massive three ring binder of materials, I got pretty close to
23 the end at least of all the featured presentations that have taken up most of the balance of

1 the day. As we move into tomorrow, I think you'll find it a much more aggressive, it will
2 be less presentation oriented and much more aggressive towards the actions that we
3 might focus on together. So, I am relatively confident that we will get through the
4 ponderous and the most important parts of this format, irrespective of the fact that we are
5 obviously moving very late into the evening today. So, again with your indulgence, a
6 little dancing choreography with me up here, I think we'll make our way through this. I
7 can honestly tell you, and we are going to go a lot further than this, if we got no further
8 than what we just agreed to, we will have gone a long way to catapulting this theme and
9 this process forward. So, in light of the terms used locally in New Orleans, the rest is a
10 little bit of "Lagniappe" on top of this, a little something for nothing, as they say. I
11 would like to introduce Landry Bernard, from the National Data Buoy Center, of NOAA,
12 and set way directly into the segway on the agenda that deals with the technologies of the
13 observing system frameworks that are out there. Landry.

14 **Mr. Landry Bernard:**

15 Instead of speeding things up I think I am slowing things down. Good evening, I was
16 hoping I wouldn't have to say good evening, I could have tried good afternoon but it just
17 didn't work out. Good morning would have been better, but anyway, I am with the
18 National Data Buoy Center, I am going to talk a little bit different than some of the things
19 we just heard. I am going to talk about a network, really we're the backbone to the
20 federal network. We run roughly about a 160 stations, some are buoy some are land sites,
21 we operate twenty-four by seven, 24 hours a day, 7 per week. And that is predominantly
22 what we do. We have three buoy configurations, our typical three, we have a 3-meter,
23 which is all the way on the left, we have a 12-meter and then a 6-meter. And these are all

1 standard configurations, we do have some two and a half-meter, we have some
2 Styrofoam, but these are kind of the workhorses that we put out. Here is where we are
3 located, we have quite a few on the Gulf of Mexico, and I'll have another view graph on
4 that while we just talk about that. The slot is somewhat outdated around the Alaskan area
5 we have eleven buoys that we have installed over the past two years out there. In Alaska
6 area we'll have in another two years we'll have a total of twenty-five buoys in that area.
7 We just picked up, as a matter of fact today, we started the operational support for aid
8 tsunami buoys, we picked up from one of the NOAA laboratories a specific marine
9 environmental lab where they were operating this network of six tsunami buoys and we
10 picked that up. We just finished a cruise today where we went out and outfitted and
11 refurbished five of those buoys and now we are operating them starting today. Our sea
12 manned sites, these are the land sites, as you can look at it, some of them all the way from
13 the left as something we just configured to put instrumentation on, some of them we
14 augment light houses, and some of them sea manned even though they are shored based,
15 some of them do get a little bit wet, as the one all the way on the right. Again, our parent
16 organization is the National Weather Service. So, there are a lot of things we have been
17 doing for, say, twenty-five years that really has been weather measurement, weather
18 observations. Here is where our C-MAN sites are located, with the C-MAN and the
19 buoy, we have roughly about one hundred and sixty sites that we maintain. I apologize
20 for only showing part of the gulf, and not the whole area. The reason I was trying to
21 show here, if you look at the blue and the red, are predominantly the sites that we own
22 and operate as part of the backbone. When, I'd say, previous administrations that we
23 had, are viewed, if we didn't collect the data, if we didn't build the buoy, then, obviously

1 it wasn't good data. And as you realize, since you are in the same business, there is a lot
2 of other good data around there. So, one of the things we started doing was we worked
3 with, to the Texas side, we worked with the Texas Land Management Office and we are
4 actually getting data from their buoys in Real-Time. We run it through some quality
5 assurance, quality control routines and actually get it out into the numerical runs for the
6 models that are being run by the National Weather Service. It also gets into the European
7 center, to all of the [unintelligible] models that they are getting to run and it's a source of
8 data for us; it's the cheapest way to get data. The most expensive way for us to get data
9 is the data where we have to put in our own buoy, or our C-MAN. The same thing
10 around the Florida coast, the yellow there, is the system that is operated by the University
11 of South Florida, and we do a similar thing with those sites. We do the same thing with
12 GoMOOS, the gulf of Maine. We do similar things with Skidsway, and LUMCON.
13 There are a lot of smaller networks that we are starting to pick up and from the National
14 Weather Service point of view, if we are really interested in good data, it's cheaper and
15 it's better for us to get data from other sources. This was just, I tried the things I just
16 talked about, you know, it's a service that the group that we interface with actually has
17 the big expense of putting in the sensors, maintaining the sensors. We do provide Real-
18 Time Q.C. Every hour we get the information from them. It automatically goes through
19 a computer algorithms, people are not even in the loop, and mainly it gets out onto that
20 thing called GTS - Global Telecommunications System. So, for the organization similar
21 to IOC, you have the WMO, the World Meteorological Organization, where they have
22 their own format, their own data standards, sampling techniques. That information gets
23 right out. It is not an Internet based system, it's mainly a point system where you

1 actually get the data. One of the things we do is to provide this. Our main customers are
2 these weather forecast offices. There are 125 weather forecast offices throughout the
3 United States. And mainly our data is used for warning and safety for our number one
4 customers. That is what our mission is. There are other areas that when the systems
5 intercept, that is where the National Weather Service numerical models are run, they are
6 also a big customer. We do work now a lot with the general public. The taxpayers' pay
7 for all our data. Everything we have is public domain. Our website gets a little over, say,
8 twelve million hits a month. During hurricane time we got up to one point four million
9 hits in one day. So, it is an active site. It is pretty simple. We pride ourselves in having
10 good high-quality data. And a lot of that data we get from people in this office also, in
11 this room right here. If I look at our standard 3 meter, some of our buoys we don't get
12 out to visit to maybe four years, other we get out to every year. Again, our heritage
13 started in the weather side, so, a lot of it has redundant sensors. When we start talking
14 about water column information, reeling things to the surface, biofalling and all these
15 other things, our model of getting out once every four years, we know it's going to
16 change. And we do run some systems now where we have to get out actually once a
17 month, depending on what time of year and clean sensors and all. So, if you look at it,
18 the top part is predominantly wind speed and direction, air temperature and humidity, as
19 you get further down, barometric pressure. All of our buoys collect wave height and we
20 have nineteen that have wave direction. Water temperature, sea surface temperature is
21 our standard configuration, that is kind our standard met configuration. If you look at the
22 oceanography side, we have predominantly, we take surface currents. Most of our
23 systems are ADCP, just looking down, so, you don't really get that surface such as

1 current even, you get the profile currents. We also take salinity. Some of the systems
2 we've had, we've had off the coast of California, we've had ADCPs taking current
3 profile measurements out there over the past twelve years. We have some sites that we,
4 clearly, that is our longest set up data that we have, twelve years of current profiles. But
5 currently, any buoy that we put out - when I say currently, right now we are putting out
6 buoys that have a standard MET package and a standard ocean package starting one
7 October is in the Federal Government when we get our new money. We actually have
8 requirements from the weather service to put out oceanographic sensors. Most of the
9 time when we put out our oceanographic sensors, it was mainly dealing with partnerships
10 with different customers we had. Middle Management has been working with us for
11 years. The Corps of Engineers is another customer we have that has actually paid for our
12 Directional Wave Program that we've had over the past twelve years we've been running
13 with them. I didn't want to take too long, but one of the things I just wanted to mention
14 that we are interested in and we do work with other people where they may have a sensor
15 that they want to try on of our buoys. Our main operation is 24/7. There are ways that
16 we can integrate a sensor on a buoy that maybe has its own communications or its own
17 power and is low-risk to affect our 24/7 operation. We work with people like that all the
18 time and actually put their sensors on our platforms. We also work with some people that
19 may have a sensor that takes different kinds of observations and we may put it on ours
20 and use through the communication system that we have. It is a little more risk, but
21 actually we can still work out some arrangements like that. Typically our buoys report
22 data every hour. That is the way we normally get the data, every hour. Some of the
23 buoys report every thirty minutes. We have a few that report every fifteen minutes and

1 those tsunami buoys - if they indicate a certain pressure - then we get data from them
2 every fifteen seconds. So we have different degrees of data coming in. The good part of
3 our data is you get more data. The bad part is that it takes up batteries and there are more
4 visits you got to go out. So, on the ones that we have four years, we have generators on
5 them. We have a big area of solar panels and it is just whatever the mission is. So, if
6 there are things that you think that come out at the end of the workshop, if you need
7 somebody to try to test some sensors, let us know. We'd be willing to talk to anybody
8 that is interested in that. So, that is all I had to say. Thank you all for staying this late
9 and I hope the rest of your evening is better.

10 Laughter

11 Applause

12 **Unidentified Speaker:**

13 Where do you retrieve your reading from the southern gulf? You have no more stations.

14 **Landry Bernard:**

15 The reason why I showed that is that is where we have our observation stop. We are part
16 of the GCOOS, so we are interested in filling out observations in the rest where we just
17 get data from, say, the Mexican states, or even further around. Cuba does create a
18 problem for us as we talk about (overlapping voices) with the Federal Government.
19 Right now, the ones that I showed that is all we have observation coming in from.

20 **Bryon Griffith:**

21 Aside from money, what are the primary obstacles through that?

22 **Landry Bernard:**

1 I hate to say money sometimes is not an issue, but I couldn't say it with a straight face.
2 Most of the time there are things that we try to expand our network. We are trying to do
3 new sensors, new things ourselves. So, if we could share [unintelligible] somebody else,
4 say, spend less money developing a sensor, and we can augment it with our buoy, we'll
5 bring the buoy to the table, they bring a sensor and we work on it. We put some
6 engineering support and so, some of the things, it is on a case by case, it may not be a
7 money issue on some of the customers we work with.

8 **Unidentified Speaker:**

9 Are you aware of RONMAC? The project RONMAC?

10 **Landry Bernard:**

11 No, I am not.

12 **Unidentified Speaker:**

13 It was funded by NOAA. It is based in Costa Rica and it collects a lot of the coastal tide
14 gauge, meteorological data, the gulf transmissions and basically just serves out the data in
15 a very primitive format through a website. I think it was in part a response to hurricane
16 Mitch, in trying to set up something, in that sense it is good that it's there but it is still
17 very primitive and the support level is very small. So, the question is what is the marginal
18 cost for you to incorporate an additional station, somebody else's station, for you to
19 quality control and serve it and then can you absorb something like [unintelligible]
20 network of stations in the entire GCOOS to serve out.

21 **Landry Bernard:**

22 Well, one of the things we agreed to at the workshop was, as much as the data ...NCDDC
23 was going to offer up the data through the portal. The thing we agreed to do is much of

1 the data as we could get, we would QC it, and when I say QC it , we'd run it through our
2 Real-Time algorithms and we also have meteorologists, roughly about eight
3 meteorologists/oceanographers that actually look at the data. And so they look at
4 anomalies, they look at trying to find if something looks bad, are there adjacent areas or
5 other things. In the weather world it's pretty easy because there is a lot of observations
6 being taken. So, part of us trying to take other people's data is actually to build up that
7 buddy system, so you can actually look at different observations in the ocean. So, I guess
8 we don't charge you all anything for taking your data. Texas, we are not charging them.
9 GoMOOS, we are not charging them. Skidway, we are not charging them, so I think we
10 have a pattern going here. So, I'd say that to pick up that data is something we want to
11 do. And if they are going to pay for the observations, then for us to QC the data, I'd say
12 that would be no charge. We are looking for data. So, if they go through the expense,
13 then that is a data set we could incorporate and mainly make the numerical models better.
14 It helps the forecast office clearly when hurricanes are forming and things like that, I
15 think it would be a good source. If you let me know, I'll make contact with the people
16 and see what we can do. But we did agree for the GCOOS to actually try taking all of the
17 data in the gulf that we could get, and we didn't limit it to just U.S. data. We signed up
18 for taking data.

19 **Patrick Conner:**

20 I noticed on your chart of the buoy locations, there weren't any buoys in the Puerto
21 Rican, U.S. Virgin Islands area, do you have anything there as well?

22 **Landry Bernard:**

1 I don't think we do. I am not sure. This was pretty accurate at some point in time. So,
2 most of the additions have been coming from California, Alaska, and really the North
3 East, so, I'd say if it is not on that, we don't have any there.

4 **Unidentified Speaker:**

5 How much does a buoy cost, the simplest one, with all its equipment?

6 **Unidentified Speaker:**

7 Repeat the question.

8 **Landry Bernard:**

9 We gave an estimate to Bryon. If you look at our buoy, take the 3-Meter buoy, just the
10 haul to get built is like \$45,000. You augment equipment and a lot of the equipment we
11 put on are dual sensors, there are a lot of batteries that have solar panels, it is roughly
12 around \$150,000. You can clearly go out on a commercial market and get things cheaper
13 than that. The thing we are looking at is kind of tied into our maintenance philosophy -is
14 the U.S. Coastguard does a lot of our deployments and we only have so much time. So,
15 when they go out to deploy a buoy, we have a full buoy on the deck that they go out, take
16 that buoy up, put in the new one and then come back to port. We try to minimize the
17 services. There are other configurations where, as I just mentioned, we pick up the
18 tsunami buoys. In that case, we don't have as many spares, we actually go out with one
19 buoy, we take the old buoy out of the water we put in the new one and why you steam
20 into the next area you are refurbishing that buoy. So, a lot of it depends on the
21 maintenance philosophy on how you are going to go out. In our case, we wanted a lot of
22 batteries, and we wanted different things so we didn't have to go out as often. I'd say, in
23 our world, the way we build it, it's when you throw in some spares, it actually gets to

1 \$180,000. They are expensive, even though we build them, but it depends on the
2 maintenance philosophy and that is what we use. So I'm saying there are cheaper.

3 **Dr. Frank Muller-Karger:**

4 To satisfy my own ignorance, I guess, can you describe how you're working with NODC,
5 and what your responsibility is relative to NODC?

6 **Landry Bernard:**

7 Our mission is Real-Time because we support the weather forecast office. We are
8 interested in getting data Real-Time and the Real-Time data, even when we have our
9 analyst look at it, we think it is pretty good, but if you are a researcher, you may not think
10 it is research quality. So, we are interested in the Real-Time part. All of our data that we
11 have goes to NODC. We do have that relationship, we give them data, usually by once a
12 month. Years ago it used to be once a year, maybe never, but now it's once a month we
13 give them data. As we go back and find out, you know, we found out that we had some
14 sensors that wind direction had a fifteen degrees bias. We actually corrected all of that
15 data and resubmitted that to NODC. We do work with Joe's group, NCDDC, where we
16 are now looking at some of the things we do instead of having sometimes, say, the
17 NCDDC, at the back end. We are looking if we can integrate them into the front end and
18 actually use them as the broker to get in the data. Not only the raw data, the Real-Time
19 data that we are trying to get in, where a lot of the data people deal with now clearly
20 NODC is archived data. We do work with the archives but we want to get Real-Time
21 data. Thank you all for staying with me.

22 (Break on tape - end of 5A)

23 *Tape 5B*

1 **Unidentified Speaker:**

2 ... you said that the first station tracks what is happening in the Mexican part, so we can
3 figure out in your figure, [unintelligible]

4 **Landry Bernard:**

5 I don't really know, but I will find out when I get back and I will let Bryon know to get it
6 into the minutes. If you give me a card, we can exchange emails, or I will talk to you.

7 Right now, predominantly, it is easy for us to get somebody else's data. That is less cost
8 for us. As far as how NOAA goes about it to give money or build things for other
9 countries, I am not quite sure how that works. But I will find out.

10 **Bryon Griffith:**

11 I can answer that a little bit. That ought to really frighten a lot of folks in the room. We
12 are going to sleep on this a little bit this evening and take this conversation up in the
13 morning and carry it through a conclusion, much like we saw on the earlier segment. But
14 just kind of as a segway to that, there has been at least a couple of times that NOAA has a
15 proposal call out to advance again some of the developments of IOOS and GCOOS. Is
16 Dr. Sing still in the audience? Dr. Ashbindu Singh is has joined us from the United
17 Nations environment program. Dr. Karger, in his presentation mentioned there are many
18 proposors to be called for proposals that NOAA has left which is common, especially
19 these days, I've calls for proposals in the academic or research area.

20 **Bryon Griffith:**

21 UNAP, in anticipation of being a partner in this process, actually advanced a proposal in
22 that call. There is some infrastructure component to one level in the call, that UNAP
23 proposed to advance upwards of three sensors in this pilot that would involve Mexico.

1 Like in the previous discussion about when we get to the “how to” from here, it would be
2 a plan A. That means that there is action that is underway to try to stimulate an
3 investment. It is a long way around the question but what you are going to see,
4 undoubtedly, as something as complex as GCOOS or IOOS is actually installed in the
5 coming years. There are likely to be individual calls for money established and calls for
6 proposals that might span a wide number of organizations. That is just pretty common of
7 our practice. And so you have to, these are my terms - I guess - be opportunistic in those
8 calls. And in that regard, the UNAP folks used in fact the action plan that came from the
9 December, 2002 GOMSA. Now, they also used some updated cost figures from what
10 Landry just referenced and passed on to us in terms of what variability there can be in
11 these kinds of buoy stations. Suffice is to say, to the point, that there is little to no chance
12 that we can see the promise of predictive capabilities to understand the movement of red
13 tides after they’ve actually been qualified to have been established without some of these
14 oceanographic physical process parameters. And correspondingly, if we do not have
15 these kind of stations somewhere strategically located we can not produce accurately or
16 within the realm of accuracy those predictions. So, there are a lot of folks that have their
17 eye on the ball, so to speak, or are looking down that road. They are actually trying to
18 play that hand a little bit for you. Now, having said that, we would have liked to have
19 been on the other side of this workshop. To have been in a position to make and
20 participate in those proposal developments, but that is just not the timing of the event.
21 And so, consequently that being what it may, there will be just, as I was pointing out,
22 there will be no, and to use a baseball analogy again, there will be no homeruns to hit.
23 We have to look at each opportunity as it is put before us. And hopefully, if together we

1 have a plan, that is to say, to be less abstract, if together we come out in the coming days,
2 weeks, months and years together, if we know strategically if we have the ability, the
3 money, the technical capacity to put another station in, it would go here. We would be a
4 long way ahead of the game in establishing its role in the observing system framework
5 that will be necessary for your Health Services Department. When Kirk Wiles got up
6 here and said “It does me no good, in fact, less than no good to learn that I have *Karenia*
7 *brevis* bloom in my shellfish or that it was just hauled to California for those quaint
8 evenings, raw shellfish dinners, then those kinds of effects have to be mitigated the best
9 they can for the kind of predictive capacity to be put on the ground”. You can’t do it
10 without making investments in these areas. We are in hopes that, like any of the others
11 and any of the other proposals, I am sure, in hopes of their own plans and the elements
12 that they bring to the game - we are in hopes that a coalition of this size and this focus
13 will go a long way to focus on the limited amount of funding as was referenced by Diane
14 Regas earlier this morning. The limited amount of federal funding that will come out will
15 have to be very strategically targeted. So, it can no longer be for fun, it’s got to be for
16 practice, very specified practice. We are betting on the ... so to speak, that practice, like
17 management and mitigation of red tides is an application, whose time is right, to be a
18 building block for GCOOS in the future. Landry has no money to pass out, he told me
19 that before he agreed to come give his presentation, so, I guess we just have to let him go,
20 without leaving any money behind.

21 Laughter

22 We probably won’t go a great deal further than while he is gone. The danger of leaving
23 while we are still on the subject area is he may not leave any money behind, but he can

1 expect to see his name in the technical services area when he comes back, in terms of
2 what he'll commit to. Ladies and gentlemen, it has been an awfully long day but I think
3 an awfully productive one. I really appreciate, we do not often run meetings until seven
4 o'clock at night, and to the best of my knowledge, except those who had a flight, nobody
5 left. This has been a spectacular day and I'll look forward to tomorrow picking it right up
6 where we left off and as I said before move a little more aggressively because we have
7 the capacity to do that through the last pieces of the agenda. I wish you well, you can't
8 pick a bad New Orleans restaurant, so I have no fear you will be well fed tonight. If you
9 get too far down in the Quarter, I have some fear whether you will be back here in the
10 morning. [laughter] Given that, and if all goes well, we'll see you all at 8:30 in the
11 morning. Thank you.

12 *Wednesday, June 11, 2003*

13 *Tape 5B*

14 **Bryon Griffith:**

15 Where do you suspect would be the highest concentration point to go looking for them?
16 In bed? For the survivors, I hope your meal was as good as ours last night. It was really
17 good. The air was a little heavy in New Orleans last night, wasn't it? You got to really
18 experience the feel of the Big Easy. Well, this morning we're going to skip back, we
19 took Mr. Landry Bernard, but took one presenter out of order and I want to return to that.
20 The bottom of the segment, page two, and ask if Eduardo Garcia Santaella would please
21 come up and...oops, oops, casualty of war. [laughter] Wow, wow. He is sought. Let
22 me talk to you about some other things very quickly. A couple of things. One of which
23 is, and actually you'd probably, we should have more other participants in here for this

1 discussion as well. A couple of things: I'm going to look to break for lunch definitely on
2 time today, particularly given the weather, because it's likely you might not leave the
3 hotel. And to give you that option, I certainly want to make sure that they're not closing
4 the doors on you. So we can expect to break, at one we're going to have lunch anyway,
5 so wherever that break comes into play, it's not going to have a negative impact on our
6 meeting. The second thing is, in looking at the agenda, hopefully you noticed, that we
7 carried over to tomorrow morning on the technical sidebar, and there is no structure to
8 that piece, other than to provide the facility and the opportunity for representatives to
9 gather and discuss in greater detail, obviously, things that could not be discussed and
10 disrupt the flow of the agenda. And, that session is still on, and we have been asked by
11 several for a show of hands, so-to-speak, as an indication of how many folks will actually
12 be hanging around so that they would feel comfortable about their flight plans being
13 applicable to that, I guess. If you don't mind, if you are going to stay around until
14 tomorrow morning, if you would please raise your hands, I'll get a better indication for
15 the availability of that. Good. Well then, and Terry help me, it's this room and the other
16 room, right?

17 **Unidentified Speaker:**

18 It's just the other room.

19 **Bryon Griffith:**

20 Just the other room? Okay. The room behind the green shades there, so-to-speak. And,
21 we will also, the BERGEM (?), my BERGEM (?) office staff will be around to assist in
22 any regard that we can, and making sure that those networking opportunities come
23 [unintelligible]. Okay? I'm trying to remember, it's seems like some other logistics I'm

1 supposed to mention. Well, just one and I'm sure I'll repeat this in closing while we wait
2 on Eduardo. There are a few pieces of information, not the least of which is a, the
3 presentation, the one Manuel will give here in just a little bit that we are having cut to c.d.
4 and we'll be sending out, it out as a follow-up to this. The nature of the reproduction is
5 just too great and it would already over bind your books to start with. So we're going to
6 do that. There's been a request for several of the technical materials and with the
7 assistance of NCDDC and others, we're going to have those reproduced and sent out. So
8 there'll be a lot of follow-up material that will be coming to you. I think you'll be able
9 to, it is actually at specific request if you'll, you'll enjoy the package- so-to-speak. And I
10 think that's about it. We had a great day yesterday, at least by all the feedback that was
11 gathered and gotten and discussed and now the room is filling up. This is a good thing. I
12 have to look real closely to make sure it's not surrogates that you all sent out here...Are
13 you ready?

14 **Audience:**

15 Yes.

16 **Bryon Griffith:**

17 All right. Well, let me, we were wondering about you. We were trying to figure out
18 where to come find you. Eduardo, please come on up and take over.

19 **Eduardo Garcia Santaella:**

20 Hi. Good morning to everyone. Thank-you. Well, I'm a representative of a laboratory for
21 the Sarius Aquatic Eco-systems in the Papaloapan Development Council. And our
22 mission as a laboratory for the study of aquatic ecosystems in this area is to promote the
23 conservation of natural resources in the whole basin of the Papaloapan region. We

1 [unintelligible] about 43 municipalities in the Mexican Republic. We are emphasizing
2 mainly, in this Department of Development Council. The sustainable crustacean (?) or
3 fishers resources and mangrove ecosystems. As we think that, well, as it is, a mangrove
4 is the main habitat for the development on procreation of all the aquatic and marine
5 species. And most of the most important commercial species in Mexico come from these
6 ecosystems. Well, we already know how, what is the importance of the Gulf of Mexico
7 and the economic relevance of this ecosystem, in terms of fishers productivity and about
8 the oil exploitation that we all have in this area. This denotes the need for a sustained and
9 critical studies to protect all the resources we have in the region. And it is well known
10 that all the repercussions that it could have, for instance, an oil spill in the area – in the
11 south of Mexico. It can really damage the ecosystems in the mangroves and the swamps
12 that we have in the whole southern part of Mexico. In this Gulf of Mexico we have a
13 very high surface temperatures; and very good luminosity; and phytoplankton and silk
14 plankton is very high as well. So that gives us a very high and diverse productivity in
15 these ecosystems. Modern resources in the Gulf of Mexico sustain very important
16 fisheries. Most of the fisheries that we have in Veracruz are [unintelligible]. The
17 medium industry fisheries go to the San de Campeche, but the ones that we have in the
18 coast near to Veracruz, for instance, are mostly [unintelligible] and off subsystems. They
19 are for fisheries who have very low income and who have very low development, social
20 development and they are rural communities that depend mostly on fisheries. So, when
21 we have an occurrence of Algal Blooms in this area, these Harmful Algal Blooms, the
22 impact on the economy of these rural communities is very high. As we know, since we
23 were listening yesterday about one of these researchers who was talking about the

1 dependence of these fisheries and how much do they get from their fisheries, you can
2 imagine how these blooms affect their lives'. We can see here some of the activities of
3 fisheries in the Gulf of Mexico, mainly in the Papaloapan. We have oyster exploitation.
4 We have Tilapia, which is now being grown in aquaculture, floating cages. This is the
5 work we are doing with the fishers. And we have women's groups working with
6 aquaculture in these coastal legumes now, and most of the production is really from
7 fisheries. Wild fisheries. All depend on these ecosystems for their living. Well, we
8 know that the relevance of oil production in Mexico is about a thousand and 600 million
9 barrels of oil. To fulfill and follow with the commitments that we are going to establish
10 with this bi-national plans for floral, Harmful Algal Blooms. Sorry. The Development
11 Council of the Papaloapan is now committed to set-up, as I was telling you yesterday, the
12 first fixed station to follow and tract the environmental parameters that all we know.
13 Like wind direction, wind speed and the multi-parametric sound that is going to be fixed
14 together with this weather station. The main objective of this station is to monitor
15 oceanographic and meteorological conditions in the coast of Mexico. We are proposing
16 to set-up at the beginning three stations. One in the north; one in the south and one in the
17 center of the Mexican coast of the Gulf of Mexico. And of course, ours will be the one
18 set-up in the center of Mexico in the coast of Veracruz. We are still looking at the better
19 location. We are proposing, obviously, for the reasons that we have the Papaloapan,
20 explaining most of thirty percent of the national flow, continental flow to the ocean
21 comes from the Papaloapan river. And so we have an important income of sediment,
22 nutrients in this current. A specific objective we have...well, we can see here is the
23 mangrove area in the Papaloapan. This is from the River Acula, and it's one of the

1 mostly, the better-preserved areas in the mangroves. [unintelligible] distribution and
2 quantification of fight the phytoplankton biomass and [unintelligible]. Particularly for
3 those species which are indicators of Harmful Algal Blooms. To monitor these Harmful
4 Algal Blooms in the Gulf the Mexico; to support and provide this information to
5 HABSOS and to keep in mind surface patterns of temperature salinity, the salt oxygen,
6 Ph and nutrient. [unintelligible]. The area of the study we are proposing, and where we
7 are going to set this station, where we intend to set-up this station, is the opening of the
8 Sanda rear(?) in the Camaranolea (*interpreters note: phonetic spelling*) Lagoon which is like an
9 hour and a half from the main port of this part of the Gulf, which is Veracruz. And this is
10 the, it's an artificial opening for this Sanda rear (?) because it was closed for several years
11 and we are now doing this project to survey the behavior of this lagoon when the opening
12 is finished. Well, as we all know, I live in Mexico. There are no such stations already
13 set-up. We been finding some troubles to, for instance, getting just a quotation for parts
14 of this station and we already have and we [unintelligible] it was about twenty-one
15 thousand dollars. It measured up 12 parameters and it can be deployed for long spans of
16 time without taking care of the electrodes because it has a kind of wipes which cleans the
17 optical electrodes and it can stay in the water for several months, I guess, and without
18 maintenance. The set-up we are planning to do is a fixed set-up so we can collect the
19 data close to the coast and the [unintelligible] of this opening, which it goes to a counter
20 current we have very close to the coast in this area. So we are preparing to measure, as I
21 was saying, the direction and speed of the wind. Sound radius; relative humidity;
22 barometric pressure; environmental temperature and water temperature; salinity;
23 conductivity; chloride and Ph. There are 12 parameters that we can follow and keep track

1 with this [unintelligible]. We are already doing some field surveys because we are doing
2 profiling of these lagoons; these coastal lagoons we have in the area of the Papaloapan
3 river. There is an environmental problem in this area because we have high productivity
4 levels. Several of these lagoons are being lost to due to [unintelligible], and because
5 most of the industry discharged the waters in these rivers, and most of these discharges
6 are very high in organic matter. So we have a survey of the main, of the most important
7 lagoons in this area, which in the wetlands, it sums up to 200 lagoons. We are taking
8 only 15, which are the biggest and the most important, in terms of productivity. And for
9 using the aquaculture, we are doing it. Well, this is one we used from the internet, but it's
10 one of the images of what we can do with the parameters we are going to be collecting
11 and obviously we are going to be able to provide this information in Real-Time, as we are
12 planning to set-up the same kind of set-up that we have in the University of Southern
13 Florida. We've been in contact with Frank Muller-Karger, and he's kindly providing us
14 with information on how to set-up the system and the components that we should
15 contemplate. Obviously what we would like to see with the information that we are
16 going to provide is that, that black part in the photo shows all the information that we are
17 going to be collecting. So, our main goal is to be able to supply constant and sustained
18 information in order that this systems works in Mexico for the first time and to be able to
19 join with this network that is being set-up in the area of the Gulf of Mexico, in the
20 northern part. As well as creating a database, which is reliable and to train our personnel
21 and all of us who are going to be working with the system. We already have a network of
22 work with Mexican institutions. And we have the Secretary of Health, which is
23 represented here now. We are working with the Oceanographic Institute from the Navy

1 in Mexico. We have our first oceanographic campaign next month to survey all the
2 currents, and temperature, and surface temperature, salinity in the front of the state of
3 Veracruz, and with the Aquarium of Veracruz, who are offering the space and logistic
4 support for the work that we are going to set-up, and also the University of Veracruz.
5 Internationally, we expect to be able to sustain a very productive work with the
6 University of Southern Florida, and with the Institute that is so kindly inviting us and
7 coordinating this meeting with us. And the University of New Orleans. Well, you can
8 see there. Thank-you very much. If you have any questions.

9 **Unidentified Speaker:**

10 We're both curious as to why they were digging that canal between the lagoon in that one
11 picture you were showing.

12 **Eduardo Garcia Santaella:**

13 Yes.

14 **Unidentified Speaker:**

15 What was the purpose of making the two water byways?

16 **Eduardo Garcia Santaella:**

17 Well, this lagoon was closed artificially like 50 years ago to build the roads and the
18 railways, and what is happening is that we are losing all the fish communities' shrimp
19 production, oyster production. Because now, the lagoon has become mainly a
20 [unintelligible] system. We are trying to restore what was done in the past was done. As
21 you can see in the picture, the opening is already close to the road and there was a rail
22 track. Maybe you can just see the line over there. And below the road there are now two
23 big pipes that were set-up by the government some ten years - but it wasn't enough. We

1 have strong problems with sedimentation in the [unintelligible], and in some seasons, the
2 pipes close down the circulation. So we need to do the opening and to build a bridge to
3 improve the circulation in the area. This is the original summary, and it used to open in
4 the rainy season and close in the dry season, but now it is closed the whole year. It is a
5 complete mess. Well, in the presentation of the Lic. Irigoyen, you are going to also see
6 some other things as to why we are doing this to restore the original behavior of the
7 lagoon. We have a very strong reefer station program with mangrove. We set-up the
8 first national mangrove production nursery. We have the capacity to produce a million
9 mangrove plantlets per year, and it's going to start working this year. This mangrove
10 nursery.

11 **Bryon Griffith:**

12 Eduardo this question is, I'll pose it through to you, but you may need to coordinate it
13 with your other representatives. The nature of deploying oceanographic, meteorologic
14 sensors like you're referring to here has many applications. In the previous discussions,
15 yesterday in particular, regarding the Water Commission, SEMARNAT's focus on the
16 Gulf coast as a priority area, is there any developing consideration for the deployment of
17 those sensors anytime in the near future?

18 **Eduardo Garcia Santaella:**

19 Well, these sensors are already bought by the Papaloapan River Council, but we don't
20 know if SEMARNAT has any plans to deploy any other station or buoy in the area. We
21 are going to set-up ours. We have the funds to do that. I was asking yesterday if there
22 exists any chance to fund this work because we need, for instance, to travel and do some
23 training stage if with Frank or [unintelligible], with other institutions to travel over to

1 Mexico and help us to set it up properly. Because it's not only to set-up the equipment,
2 because we can do that. Or to build the station; we are going to do that. But to set-up the
3 whole system, with the computers and the satellite transmitter and all this stuff, because
4 in Mexico there is not that expertise. It's been very difficult for us to get just the
5 quotations for suppliers, because they cannot find all the items that Frank told us that we
6 should consider. So we got the funds. We haven't been able to get all the satellite
7 equipment properly set-up for a quotation because our suppliers don't know where to get
8 that. So yes. For the moment we are committed to set-up this station, and by the end of
9 the year, I guess, we're going to be able to start measuring the first samples -the first
10 monitoring. But that's where [unintelligible]. The plan for us.

11 **Unidentified Speaker:**

12 [unintelligible]

13 **Eduardo Garcia Santaella:**

14 Ah okay. With the Army we are planning this oceanographic survey. In the Navy.
15 Sorry. [laughter] Very different, yes. With the Navy, we are planning this
16 oceanographic survey. Since they don't have equipment, they are asking us to lend us
17 our [unintelligible] because they are doing this intensive campaign of measuring
18 oceanographic things, and we are going with them. On July the 16th we start the
19 campaign. We are going to be sampling like fifteen days in the front part of Mexico. In
20 Veracruz. There are like forty stations that we are going to be measuring. They mostly
21 are interested, obviously, in current circulation flow and all that stuff, but there is an
22 important team in the Navy which is working with the Algal Blooms and nutrients flow.
23 And so they are going to be in cooperation with us. We are going to help them out with

1 the sampling; with the [unintelligible]; and we are going to interchange information that
2 we'll be able to share.

3 **Unidentified Speaker:**

4 Explain to me one more time; you need to back up where the three sensors are anticipated
5 to go northern, central and ...

6 **Eduardo Garcia Santaella:**

7 Well, unfortunately, state didn't order them to show up here. We wanted to hear what
8 they would think of our proposal because obviously we have five of the Mexican states in
9 the Gulf. States? Stakes. And there are only Tamaulipas, Campeche and Yucatan here.
10 We are proposing to have one in the north, which could be Tamaulipas. Ours in the
11 center, I was saying, and Campeche could be the other state we could think of deploying
12 such a monitoring system. Because in Campeche we have one of the most important,
13 ecologically important coastal lagoons, which is the Taminus lagoon. It's very important
14 and most of the oil extraction is done in this area. In the south of Campeche, so would be
15 very interesting to follow up what is happening in this area. Yes.

16 **Dr. Frank Muller-Karger:**

17 Yes, thank-you. We would be very happy to help you find the vendors and put this
18 together. In fact, I gave yesterday, the name of a person that he needs to contact to give
19 you this information. So I think we already corrected that problem and we'll see if we
20 can get this thing together. What I wanted to mention and I think Bryon is very much
21 right, is - can we identify exact locations and the scientific and practical reasons for
22 sighting or locating specific sensors? Maybe it could be more than three sights. I mean,
23 your coast is huge, so maybe you can start with three that address very specific either

1 pollution issues, or erosion issues, or fisheries issues, or potential contamination issues.
2 Have the sights pre-selected so that when we get there, hopefully we will get there very
3 quickly now we have a specific sight that you can actually go and justify putting one of
4 these. I also want to add that I already have one of these stations that we're talking about
5 already in Mexico. This is to be put in Quintana Roo. We are trying to decide exactly
6 where the sight is going to be. Whether it's in Cancun, in Puerto Mari Luz or Isla
7 Mujeres or in Contobi (*interpreters note: phonetic spelling*). We're trying to figure out exactly
8 where we're going to put it. We're working with Mexican Navy and with the people
9 from Puerto Mari Luz to try to make that decision, and that's going to happen this year
10 anytime. So maybe one way to do some training is for you to, when we get ready to do
11 that, participate in the installation and the training which we will be...

12 **Eduardo Garcia Santaella:**

13 Well, that would be great. Yes. I agree with you. It's very important to have the sights
14 identified. For practical reasons, we are thinking of putting it close to the coast. We
15 don't have the funds to keep track of a buoy deploy in the ocean. We can't do that.
16 But, we do have an office and laboratory close to this area, which is ten minutes from the
17 [unintelligible] . So we won't have problems accessing the stations; to keep
18 maintenance and track of what is happening; to check if everything is going okay.
19 So that is what we are taking in this location. In this location of the river bloom,
20 which is also important to track, but since the river bloom is being surveyed by the Navy,
21 every two months they do a survey, so we think it's very important to set the other
22 stations.

23 **Unidentified Speaker:**

1 I thank-you. I have a question for you about partnering, perhaps, with PEMEX. They
2 obviously have oilrigs in the Gulf of Mexico. They may be able to partner with you to
3 perhaps have a fixed station at one of their oilrigs. I'm not personally aware of the
4 engineering needs for these buoys, and perhaps others in the audience might be able to
5 comment on that, but there may be an opportunity to use a fixed platform, reduce some of
6 your costs and perhaps gain a partner in assessing oceanographic events, which would be
7 very important to managers of these big platforms, and try to see if there was a way that
8 you could work with them. The maintenance costs, they've got vessels that, of course,
9 maintain out of their rigs all the time. So there is, perhaps a good synergy of partnership
10 there you might think about.

11 **Eduardo Garcia Santaella:**

12 Well, yes, of course PEMEX is a very important partner that we could seek. Now days
13 it's more feasible than before. All the measures that they took used to be...restrictive
14 information, I think. So you couldn't be able to access this information, but now days, as
15 well as the Navy, they opened up their information database. Yes. I think we could try
16 that. Actually, for the construction of this bridge, since PEMEX has three gas lines
17 [unintelligible] in this area, we are asking of them some support to do the projects. To
18 remove and reorganize the gas pipelines. So, yes, it's an opportunity we can seek.
19 Thank-you. Another question? Okay, thank-you very much.

20 Applause

21 **Bryon Griffith:**

22 You certainly got their attention Eduardo. When you start talking about actually making
23 the acquisitions and deploying the capacity, things start to elevate quickly towards the

1 practical. With that, I'd like to introduce my co-conspirator for organizing this workshop
2 – Juan Manuel Irigoyen to give his presentation. I'm sorry? We had taken those out
3 early yesterday. Huh? Yeah, we had taken those earlier and put them up in the
4 appropriate placement. I knew he was here this morning. We went to dinner last night
5 and came back to the hotel. [laughter] You know, it's a lot more low key in here this
6 morning. You all did spend a long time in the Quarter last night. [laughter]

7 **Juan Manuel Irigoyen Lopez:**

8 Yes, everyone seems more subdued today. Well, we'll just have to wait a bit...okay.
9 That's fine, because we have it both in English and in Spanish.

10 **Bryon Griffith:**

11 While we do that, I know what the other thing was I forgot this morning and that was to
12 ask anyone that has joined us, if you would not mind, if you were not in the original
13 introduction, if you would introduce yourselves to the audience and where you are from.
14 Just to get that started, I know that today we are joined by Dr. Kevin Sommers of the
15 EPA Gulf Region Laboratory. Kevin, would you mind standing up and saying hello in
16 the back?

17 **Dr. Kevin Sommers:**

18 I'm sorry I couldn't be with you yesterday.

19 **Bryon Griffith:**

20 Is there anyone else that joined us after the introductions were...okay. [pause]

21 **Juan Manuel Irigoyen Lopez:**

22 Well, we have a GIS Remote Sensing Laboratory in the Papaloapan Development
23 Council. That is a laboratory that was set-up mostly to support our agricultural projects.

1 Agricultural, environmental and now, also with the fisheries. Our logo was taken from
2 one of the Mayan [unintelligible] where you have an astronomer looking at the sky, and
3 our objective is Digital Information Analysis for environmental factors such as: water,
4 soil, vegetation climate and topography, and everything else that you can do with these
5 types of things that affect the region we are attending, which is the Papaloapan River on
6 the Veracruz side. The Papaloapan River is Mexico's second largest river basin and it
7 encompasses three states – Huajaca, Puebla and Veracruz. Huajaca and Puebla are the
8 higher parts. The mountainous part. And the lower basin and the Tuxla mountain range
9 are in Veracruz. That's our area of influence, since we're only encompassing activities
10 within our own state of Veracruz. Well, this is the state of Veracruz, and this is the
11 region that we have influence in. It has 43 municipalities. It's about 1/3 of the state. This
12 is a LAN sat infrared image where you have pretty much the areas that we cover. Our lab
13 has digital information; software and equipment; satellite image; total coverage with very
14 special resolutions of the Papaloapan River Basin Region. We have cartography at
15 different levels of cartography. The regular programs that you would employ; IGS,
16 ERDAS, (?) . And we also have special statistic modeling techniques...as you can see
17 here. These are some of the special resolutions that we use. We use LAN sap, RIS and
18 even ICONOS, but in certain projects. A lot of this imagery is very, very expensive and
19 it takes up a lot of resources, so we have to be choosy and selective. This is how you can
20 use it for agriculture, even on a plot level basis. With the infrared image, it becomes a
21 very useful tool. Also, for instance, in the planning of our projects, here we have one of
22 the lagoons from which we are...there's a river here...there's a lagoon from which we
23 are building an irrigation system for this whole valley. This a tobacco growing region,

1 and these type of tools help us to delimitate the aquifers and the micro basins, and that
2 way, we can do better planning of the project. In this case, it's very easy to see that this
3 is... all of these trees are supporting this lagoon. Whereas in this other lagoon, you
4 cannot see the micro basin because it's been so deforested. In that region, in the Tuxla
5 mountain range, which is the northern most tropical rain forest of the continent. We have
6 established a planned nursery with German (?) Bank. We're working with the National
7 University of Mexico Tropical/Biological Station, and we're trying to promote/sustain
8 forestry projects, but using forest trees that are native to the region with selective plants.
9 This is one of the experimental plots that we established. This is the modeling of the
10 basin. This is on a 3-D model, on an ICONOS image. Here we are modeling all of the
11 micro basins and all of, the way the water would flow within them. So that helps us with
12 the planning of each project. This is how some of the tools are used. This is an ICONOS
13 image of the lagoon where this is the forest plot that we established. One of the problems
14 with these tools is that the precise plot where we want it, we have [unintelligible]. So
15 here we try to filter it out with the infrared, and then, through further manipulation, we
16 are able to see a little through the clouds. And here we can see that this parcel is pretty
17 much similar to this one, at least enough to get through - more or less. And then field
18 visits we can confirm what were remotely sensed. Obviously, all remotely sensed
19 projects require field data. Without that, danger just gets in. Here we have set-up the
20 system operating. Of course, these are all just little trees because that's the problem with
21 forestry projects – they don't go fast. We are trying to implement the GIS tools, and give
22 them to all of the municipalities that we work with. So here we're doing some work with
23 the CIMMY which is International Maize and Wheat Organization. The top scientific

1 group in the world dealing with Maize; with corn and wheat. And we have a database
2 that supports about thirteen different crops. Twelve or thirteen different crops, and it's
3 scalable. And this is a tool that we're giving to all of the relevant actors within our
4 region of influence that will allow them to predetermine which are the ideal places to try
5 new crops. This tool will also enable them to do other types of projects with a GIS tool.
6 We have our website where you can make all sorts of consultations on a project-to-
7 project basis. Even to plot level, and even a picture of each plot. It's also, it's an open,
8 unrestrictive web page because we also work with some university people in certain areas
9 and some of the data is there. With a password they can access that information. So
10 again, it's a deficient tool, but it's also used to provide researchers with help. For
11 instance, we're working with the University of Louvaine; of Belgium. And the
12 researchers, they did their field work for a few months, and we continue feeding them
13 data through our web page, and with their password, they can even improve that data.
14 They have access, not just for consultation, but to work on the data as well. Well, this is
15 a global [unintelligible] of the Mangrove Reefer Station Project. This the Alvarado
16 lagoon. As mentioned, this is one of the best "preserved" forests of mangrove. We have
17 lost over 50% of our mangrove forest and they are continually decaying rapidly. The
18 remote sensing capacity allows us, at least, to have a good diagnosis of what's going on
19 as never before. Well, this is what we can see that's happening. This is within the
20 mangrove. This was taken on a helicopter, and these areas are a little difficult to
21 penetrate, but when you travel... you go by air, you can see that the different station is
22 still taking place, even though it's illegal. This is a training sight surveying with GPS for
23 the image analysis. That's part of the fieldwork that was performed in order to do the

1 survey on the Alvarado lagoon. This one here we're taking the [unintelligible]
2 measurement on hand held spectral radiometers. I was lucky there were no snakes that
3 day. Well, there's the reading of the spectral signatures of White mangrove. This was
4 with an IRS satellite image. IRS gives us, as many of you know, 5.8 meter resolution, but
5 it's a monochromatic and this is fused with, LAN sat, so it's not the best tool, but
6 ICONOS images or Quick Word are extremely expensive, and in this case, we had to
7 make decisions. Where we were going to place our resources, and this image was going
8 to reveal... about 50% of the photo was going to be just water. It had us thinking that
9 maybe we had to get lower resolution than we would ideally have hoped. This is the
10 processed image. The classified image, where we now have a reading of exactly how
11 much mangrove we have. We have 25 thousand hectars. Talking about the invasive
12 species - Water Lily - we have a parallel forest of Water Lily. So, since we have a UN
13 representative here, we want to see if we can get some carbon or oxygen production
14 money for the Water Lily. Because it's a joke. [laughter] It's the only thing that you can
15 get out of Water Lily, because it really devastates your lagoons. I say we have
16 hydroponia because we have very, very healthy Water Lilies, because this is on the
17 sugar. The Papaloapan is the biggest sugar production region of Mexico, so tons of
18 fertilizers wash into the river, so we have extremely healthy Water Lilies. Another
19 survey in the forest - going deep into the Acula river, up to one of the most forested areas.
20 We these types of tools, we do something more sinister. We are able to actually
21 supervise the forestry projects. Something that is giving a lot of headaches to the people
22 that are usually engaged in these activities. They are used to reporting happy numbers
23 with nobody overseeing. They tell you, "I planted a million trees right in the forest."

1 Well, who's going to go and count them? We count them. Not individually, but by
2 percentage of biomass. So we have the whole picture of the state on a given year. 2001.
3 Anything that's been done afterwards, we're going to check in another year, and then
4 we're going to be able to see if these things are going well or if they're not going well at
5 all. This allows us as well to do better planning. For instance, in this plot, we have
6 negotiated with the persons of this area, 150 hectares of reforestation, but when we see our
7 image, we realize that about half of that is fairly well reforested. Even my people cannot
8 report to me 150 hectares as reforested. They have to discount whatever we can see that
9 actually exists. Obviously there are different levels of biomass here. This is a much
10 thicker area, and this is a lot more sparse, but that gives us an idea that's it's not totally
11 lost in this area. We've done the seed collection for the nurseries. We have the
12 seedlings, and we have very basic type of reforestation projects using a lot of labor,
13 which is good because in those areas there's a lack of jobs and the Army. The Navy.
14 The Navy oceanographic oceanographers are with us in some of these workings. That
15 was the low tech. Here we have the high tech, where we have a big nursery with capacity
16 for a million seedlings and this should be operational within a few weeks. This will
17 allow us to do a lot more intense reforesting work. But this used to be totally covered and
18 you can see that a lot of it has been lost. But at least we hope to start reforesting the
19 federal lands and other lands that we negotiating of people. In order to have these
20 successful projects, you have to make them economically sound. Especially for the
21 people involved or the people that are used to destroying the trees. So we're promoting
22 labor vs. payment farmers for the mangrove reforestation. We're promoting the
23 aquaculture associated to the natural habitat of preservation because the mangrove is an

1 intensely important, extremely important ecosystem for all sorts of aquatic life. We're
2 teaching the farmers that if they destroy the habitat, then they're depleting their fisheries,
3 and this way, we can have both. Also, we are promoting eco-tourism and mangrove
4 honey production. Well, we have set-up a GIS network. We have our laboratory and we
5 have the Papaloapan Aquatic Existing Study Laboratory. That's the one Eduardo was
6 referring to that's in Alvarado, and we have a collaboration scheme with the Ministry of
7 Education of the State, where we are working with all the technological institutes. Not
8 all, but with three or four technological institutes within our region of influence where
9 we're teaching them the methodology of remote sensing. We have transferred some
10 equipment. We have transferred imagery; software; we've given them courses, and the
11 idea is to leave this type of expertise to the universities in the field, but transfer that
12 knowledge so that it becomes an applied tool for all sorts of projects. We are also
13 working with the University of Veracruz in some respects and other institutions. With
14 the red tide, we are working hand-in-hand with the states health authorities. Dr. Chantiri
15 who helps these efforts statewide. So our lab in Alvarado is helping in this monitoring
16 effort, at least the part that pertains to us specifically. We have specialized equipment
17 and lagoon transport capacity. We also have the two labs that are able to interact,
18 because we have the water quality and the Remote Sensing capability. This is another
19 one of Frank's images that everyone is using, but at least we're giving you the credit.
20 And with this collaboration that we are starting with you, we hope to be able to exchange
21 this information. Well, that's the aim of this meeting, and we also used Frank's images
22 on purpose because we have already been in contact for over a year, and in a fruitful
23 exchange of information and efforts in getting this started. We're committed to set-up

1 the multi-parametric station. As Eduardo mentioned, he had the images, but the imagery
2 was cutting off this part. This is the lagoon, and this is the open sea. This is an IRS
3 satellite image, and this would be the spot. Actually, last meeting that we had, we
4 discussed together what would be the correct spot and we determined that this would be a
5 good area to set-up this measuring equipment. These are the ongoing projects that we
6 have within our lab. The Study of Native Forestry Species at the San Martin Volcano in
7 Los Tuxtlas Biosphere Reserve. We're working with Dr.Martin Ricor (?), who is one of
8 the chief investigators of UNAM in this project, at the Los Tuxtlas Tropical/Biological
9 Station. So it's between UNAM and CODEPAP. That's us. What we want to do is a
10 survey using remote sensing tools of all existing vegetation within that area; forest
11 coverage diagnosis around San Martin Volcano, which is about 150 square kilometers
12 using remote sensing; plant sample collection for herbarium identification of three
13 species with at least ten centimeters of trunk diameter; handbook elaboration;
14 identification of tree species around San Martin Volcano, including their present and
15 potential uses. This is the importance of working with a team of scientists that are doing
16 sustained work at the area, but they did not have Remote Sensing capability, and that's
17 something that we're working with them. Even on the ground truth studies. This is a
18 coverage estimation of a tropical forest station. This is another of the projects that we're
19 doing. This is with the national ministry of agriculture. The [unintelligible] mapping of
20 inventory for Papaloapan River Region. The project leader was one of our people.
21 SeaOp(?) is the institution within the National Agricultural Ministry. They also have a
22 lab. We are pretty much in the same capacity. And, we want an information system for
23 agriculture, fishery and fisheries, mostly. This is more for the productive area. Well, this

1 is...we're getting there. We have a classified image already where we have several
2 factors: Water Lily, Water Mangrove, tropical forest Water Lily, wetlands, etc. We're
3 working on that and this is involving ground work surveys as well. These are all the
4 projects that we engage with. Tahin archeological site. El Tahin is the most important
5 site in Veracruz. The project leader is Dr. Yurgan Brugaman, who is the Project Director
6 of INAP. It's a beautiful place. You should come and visit it. You will not be let down.
7 This is where it's located. And this is an ICONOS image of El Tahin and the
8 topographical map. We are trying to get some order in the topography and even in the
9 exploration of the area, but first thing that we're doing with them is the digital model of
10 the whole site. This will allow us to correct many of these lines. This topographical map
11 is being performed over the years by a number of archeologists dating back to about 50
12 years ago. So, we are trying to correct many of the mistakes that were made, because it's
13 not one survey, but a collection of surveys. So, with modern tools, we can see where the
14 mistakes are and once we have the whole digital model set-up, it will even be used for
15 prospecting sites around the area. We have about 200-kilometer coverage of the site, so
16 this is unprecedented for INAP. They haven't done this before. This is the tri-
17 dimensional ICONOS image - modeled. Another look at the image of the site. This is
18 another project that we're working on with Dr. Pedro Jimenez from the University of
19 Veracruz. Dr. Pedro Jimenez has a very interesting project, which is called the "A
20 Pattern of Population of the Lower Papaloapan Basin". He's studying all the sites that
21 are within in the Papaloapan Gulf Region, which are not very well studied, nor
22 understood. This is another ICONOS image, and here you can see the pattern of one of
23 the sites. The mounts. We'll put the infrared, so we have a better sighting. And this is a

1 survey from a helicopter. Here you can't really see much. That is, you can see, what we
2 saw from the satellite image. We can see it from the air. We were helping them also
3 with some of the sub-aquatic archeology with the sub-aquatic team of INAP. That sight
4 is being eroded by the river, so it is very important to do a survey on the river, and with
5 our boat, we did the profile under the water; all the measurements where the
6 archeologists were working. This is another project with El Pital archeological site
7 survey. Project leader is Dr. Jeffrey Wilkerson, who is the Director of the Institute for
8 Cultural Ecology of the Tropics. He's also one of the almost permanent consultants for
9 National Geographic, and he's looking into El Pital, which is a city about five times the
10 size of Tahin, but has not been really been explored. We have also an ICONOS image.
11 This was very fortuitous, because we didn't actually order these images for these
12 projects, but we were lucky to have some correlation between some of the work that
13 we're doing in agriculture or in land managements; we managed to get some of these
14 images where these very important sites were located. Here you see the mounts. They're
15 enormous mounts. Here you have the infrared. A closer look. Okay. So that gives you
16 a broad survey of what we're doing with our Remote Sensing lab. As you can see, it's a
17 very diverse type of project, but obviously for us, the most important area is the
18 agriculture and natural resource management, forestry, and that type of thing. But we can
19 support different research efforts, as we've been doing, without many problems, because
20 we have the tools, and working with groups of scientists, you can transfer some of those
21 tools, some of that knowledge and create some synergy. The important thing is that as
22 government, once you transfer some of that knowledge to those institutions, they

1 continue following through. It doesn't just get to be a lost effort. Okay, well, that's it.

2 Thank-you. Any questions? Any questions?

3 Applause

4 **Patrick Connor:**

5 Thank-you. One of the things that the United Nations Environment Program is trying to
6 do for the Water Caribbean Region is look at sources of land-based pollution that may
7 effect the marine environment. Your GIS project is outstanding and could be a very big
8 contribution to the regional efforts to look at watershed definitions, and locations of point
9 sources and non-point source areas that are affecting the marine environment. I was
10 wondering if other states in Mexico share your technological advances in GIS production
11 that we could link up the U.S. assessment of watersheds and point source and non-point
12 sources with Mexican point sources/non-point sources - GIS activities. It would also link
13 into Central America, which has a very mature GIS program.

14 **Juan Manuel Irigoyen Lopez:**

15 Okay. At this point we pretty much know who's capable and who's not, because it's not
16 just a matter of buying software and that's it. You have to follow through with a lot of
17 other things. Part of it is simply groundwork. But, there are a few institutions in Mexico
18 that are working seriously with some of these tools. Some are very capable, but they
19 don't have the resolutions that are necessary. For instance, you have CONABIO, who
20 has very good scientists, but they're working with LAN sat, so that is very limited tools,
21 but there are other agencies. I mentioned the National Agricultural Agency, the Ministry
22 of Agricultural work of Mexico. It's called the C-OP (?). C-OP(?) has a fairly decent
23 operation, but they're working with SPOT. They have never worked with the type of

1 resolution that we're working with. Actually, this is the first time that they're working
2 from that resolution. The National University of Mexico has also a very good team.
3 Some of the surveys that we did here, we did with their people. INTA has a good team,
4 and the TECH of Monterrey, and that's pretty much it. The National Water Commission
5 also. They have some capacity, but there are not too many organizations, and this is a
6 new field. This is a new field worldwide actually. And some of these applications, it's
7 not surprising that, for instance, someone like Jeffrey Wilkerson, who's worked with
8 infrared photography for many years, this is the first time that he's actually using satellite
9 imagery. That's the gentleman from National Geographic. So, these are new tools that
10 have to be not only shown, but transferred. Yes.

11 **Unidentified Speaker:**

12 I have three questions. Have you done any work in the [unintelligible] area, in the south,
13 as far as the water contamination would do, petroleum activity and so...

14 **Juan Manuel Irigoyen Lopez:**

15 Okay, well, we are a regional organization so we are based on the Papaloapan Basin. We
16 have a capacity to do these types of Remote Sensing projects all throughout the state
17 because we have the tools, but we don't really leave our area of influence. We would not
18 be the proper organization for that. I don't know if that answers your question - more or
19 less.

20 **Unidentified Speaker:**

21 The next one is - have you done any analysis of urbanization within the basin as far as the
22 growth of the city, the spatial span and the impact of rural to urban migration?

23 **Juan Manuel Irigoyen Lopez:**

1 Well, we're not a research organization. It's sometimes deceiving. Sometimes it looks as
2 if we are because we are working with a group of researchers all the time. But no. We
3 don't really tackle urban problems. There is a department in the government of Veracruz
4 that is into urban development and we have transferred all of our data to them, and
5 they're working on that.

6 **Unidentified Speaker:**

7 And the third question is - which species of fish are most prominent in your aquaculture
8 project?

9 **Juan Manuel Irigoyen Lopez:**

10 Most prominent? The most prominent is the Tilapia. Because it's so easy to grow, and
11 it's so resistant, but well, Eduardo is the fisheries expert. He can answer you better, but
12 that's basically the most... the easiest one. It's grows very fast, they multiply and they
13 support all sorts of situations.

14 **Unidentified Speaker:**

15 Is there any risk of that becoming an invasive species?

16 **Juan Manuel Irigoyen Lopez:**

17 Well, it is an invasive species since many years ago, so now it's the most...you know,
18 Tilapia was introduced in the nineteen fifties, and actually it was brought from the United
19 States, because you used it for fishing in your dams. So that was transferred to Mexico in
20 the nineteen fifties, and from Mexico it was transferred to all of Latin America. The
21 Tilapia is originally from Africa, and it's definitely an invasive species, and one of the
22 problems that it has is that it eats the larvae of other species - so it's very aggressive. But
23 today, in the rivers, it's the prevalent species now. So we cannot really think of it in

1 those terms -as an invasive- because now it's the most prevalent species. We're not too
2 happy with that, but that's how it is today. You know, it's like cows in Iowa. [laughter]
3 They're invasive species, but now you have them. And you grow them, and you eat meat
4 from them. It's the same thing. Is there something you would like to say about that?

5 About the Tilapias?

6 **Eduardo Garcia Santaella:**

7 Well, yes. It's something of big concern. The whole area now is growing Tilapia
8 everywhere. In the past, some fifteen years ago, when the Secretary of Fisheries started to
9 promote aquaculture in the coastal lagoons of Alvarado, they did it with Tilapia. Because
10 of all the hostilities that it gave to culture it, and because it's very easy to reproduce, they
11 just gave the brood stock away to the fisherman and they just left it alone in the lagoons.
12 And it's what they used to close the lagoons. Put some Tilapia into them, and that's it.
13 You cannot find anything else but Tilapia now days. So we are starting to go back in
14 time to rescue what it has... [end of tape 5]

15 *Tape 6A*

16 **Mr. Eduardo Garcia Santaella:**

17 (cont. from tape 5)...because yes, it's a very strong species. A very invasive species.
18 Aggressive. Now days there are very good varieties that can grow up faster and they give
19 an opportunity to the fisherman to grow them in the cages, not in the wild areas. So with
20 this, we are looking forward to promoting those native species to come back to their
21 original places – these lagoons. We are stopping to close the lagoons. We are talking to
22 fishermen. We are trying to indicate to them how to work with their lagoons. With the
23 native original species, we have a program to reproduce original native species. It's a

1 kind of Tilapia, but it's a native one, and it has a higher price on the market than Tilapia.

2 We are already producing this other species to grow them in the lagoons.

3 Juan Manuel Irigoyen Lopez:

4 Frank.

5 **Dr. Frank Muller-Karger:**

6 Thanks, and thanks for your presentation. I was wondering if you could comment on

7 where you're going next and specifically where you're going with respect to this group.

8 Do you see some areas that we need to emphasize in the next few months to strengthen

9 that collaboration and develop a program?

10 **Juan Manuel Irigoyen Lopez:**

11 Well, definitely and we're doing that already to some degree with our friends from the

12 University of New Orleans. We find that it's very important to work with the universities

13 and to start getting them to use these tools and to understand them. And that's one area

14 where we have to work with. Basically, training and orientation towards practical ends as

15 well. These should not be tools for the demo, you know, for the conference. These

16 should be tools that should produce something, and that is the most difficult thing, but

17 I'm not sure I'm answering your question correctly.

18 **Unidentified Speaker:**

19 Well, I don't think that there is a correct answer. We're just wondering what we should

20 do.

21 **Juan Manuel Irigoyen Lopez:**

22 Well, I think we have to bring in the researchers, and government is already moving in

23 that direction, to some degree. That will have to be strengthened as well, but in

1 government we have a lot of changes so that's why we hope that the universities will be
2 more permanent hosts for these types of activities.

3 **Unidentified Speaker:**

4 *Yes*, if we moved to install these monitoring stations; the meteorological tide gate station
5 in the Yucatan channel, can you pay for somebody to go and participate?

6 **Juan Manuel Irigoyen Lopez:**

7 *Yes*. *Yes*, no problem. I think Eduardo would be very happy. *Yes*?

8 **Eduardo Garcia Santaella:**

9 [unintelligible] Oh sorry. I was saying that I'm very glad to hear that the Papaloapan
10 Management is already seeing the influence of the river on the sea. That's very
11 important. Also, it's very important to understand that the management of fisheries in the
12 Culso lagoons are very relevant for the fishers outside. So, I really would like to see your
13 work going rather...be fuller. You know, the reefs of Veracruz are very near to the
14 discharges of the Papaloapan River and they've got a lot of influence there. So, please,
15 let's work together. Shall we?

16 **Juan Manuel Irigoyen Lopez:**

17 Well, we try very hard to work all the time with the universities, and to be frank with
18 you, that's why we opened the office in the Alvarado in the first place. So, we're there.
19 We would like you guys' to be there as well. So, it's open, and the data is open for those
20 purposes too. Any other questions? Thank-you.

21 Applause.

22 **Bryon Griffith:**

1 Excellent project and excellent work going on. I'm looking at the agenda just before I
2 introduce Dr. Steidinger again and Dr. Johnson from UNO, who have been referenced
3 actually repeatedly throughout the discussion... I just want to point out, like we did a
4 little bit in the afternoon yesterday, about what this is about. The intensity of your
5 questions needs to now start elevating. Got to ware off those hurricanes from last night;
6 those good times in the Quarter - cause we have to get down to asking some basic
7 questions and concepts from the prior discussion about the extent of actually physically
8 locating sensors in [inaudible] Mexico. As Frank pointed out – where, when and why?
9 What exactly would they be applied to? The idea, as we get into this next conversation,
10 as you heard yesterday in the introductions, which in large part was stimulated as a result
11 of Preparations Workshop, in a minute I think Karen is going to extend the discussion
12 about the HAB bulletin process with respect to Remote Sensing. Now is the time to
13 engage the experts (and there truly are experts in the room). Not only experts, but there
14 are program managers of that expertise in the room. About what kind of Remote Sensing
15 capacity is actually necessary to carry out the basis of a foundation for a bi-national
16 program on red tides. So, this is where the rubber meets the road. Just to scare you a
17 little bit. You've been very quiet, but I've been up there typing my next suggestion for
18 you and set of challenges. So get ready. They're coming...shortly. And Terry tells me
19 that I have to let you have a break before I do that so we'll have a break after...when?
20 Right now? She says you need a five-minute break now. Okay. So if we can take just
21 five-minute break we'll set up the presentation for Dr. Steidinger.
22 [After break] You got anybody left in the hallway? ... Into this last piece of the Remote
23 Sensing section, I just want to bait your interest, and attention, and focus on this next

1 presentation. Actually, both of them, cause the next presentation has the feature. Again,
2 I'll reference yesterday in the announcement that the HAB bulletin licensing extensions
3 are being offered to the six states bordering the Gulf of Mexico. That implies an
4 operating practice, that in large part, would be an acceptance of responsibilities. One, on
5 the part of extending those licenses. The other, just immediately coming to mind, on the
6 part by the cooperative nature of that [inaudible]. Obviously, this technology is not 100%
7 pure, so the verification process of actually going out and doing field sampling on the
8 suspicion, by virtue of chlorophyll concentrations, of what it's seen by the satellite
9 systems or other systems is crucial. That's a crucial component of the conceptual
10 collaborative design, as is pointed out, and I'm sure that it's going to be pointed out
11 again. How that works? In Florida, as a practitioner, Dr. Steidinger is going to tell us
12 that. There are many questions, and I just want to tell you in advance. As you all are in
13 this room, and you come from very far away, regardless of whether it's here in the United
14 States or in Mexico, this is the time to interrogate that process. It'd be very hard for me
15 to back-up and replicate this forum on the phone or otherwise so pay attention. Ask the
16 hard questions. We got the lady to ask the hard questions to, and technical
17 representatives from NOAA, and managerial representatives from NOAA as well. So
18 with that, an introduction again for Dr. Steidinger, and I'll let you take over.

19 **Dr. Karen Steidinger:**

20 My comments will be briefer than yesterday. One of the things that we want to
21 emphasize in this talk was these Remote Sensing, at least in the United States. I'd like to
22 go back some years. This is when Frank was just a young man, and this is one of Frank's
23 famous pictures, well, images that came from a 1978 womb, and interestingly enough

1 about this – this is a 1978, with coastal zone color scanner imagery. And at that time,
2 they had used U2 flights with coastal zone color scanner to develop this, but, that was
3 correlated with direct *Karenia Brevis* counts. And so the correlation between the imagery
4 and the counts is absolutely fantastic based on density. That's one place where it really
5 started to become apparent that you could do this, but even prior to that, in 1972, we had
6 used LAN sat imagery, and that was to document the transport of a *Karenia Brevis* bloom
7 from the Southwest coast of Florida to the East coast. That's the news, again, with new
8 imagery, to look at transport up the east, from Southwest coast of Florida, up the East
9 coast. Even to North Carolina. There are a lot of uses of satellite imagery, particularly if
10 you can trace boundary currents and then ground truth it for HABS. So we've gone from
11 LAN sat, coastal zone color scanner, Sea WiFS. And Frank and Ken Carter are starting
12 to use MODIS and imagery, so we're using satellites as best we can for a lot of different
13 approaches and interpretation. But here you can see that that red enhanced is... what I
14 really love about all these images is that red tide turns out red. [laughter] And then you
15 have to explain to a group that doesn't know anything about Remote Sensing and
16 enhanced images that that's just enhancement. Sometimes you don't have to do that,
17 because it's more impressive that that's red tide, but that was a red tide in that year, and
18 you can detect it based on chlorophyll. What NOAA and Rick Stumph and Mary Culver
19 and their groups have done is worked on detection of chlorophyll as a potential forecast
20 of red tides, or depicting red tides. Red tides are, in the day time, surface concentrated.
21 At night, they can be dispersed or they can even actually be sitting on the bottom. They
22 can come in on the bottom, but when they are at the surface, they can be detected with
23 chlorophyll if they're in high enough concentrations like 100,000 cells per liter of water.

1 Even down to 60,000 cells per liter of water. You can detect them, and what NOAA has
2 done is that they have developed a method of assessing whether the high chlorophyll is a
3 potential HAB. Always remember that this always involves ground truthing and
4 validation. You have to go out there and see what species it is. You can assume a lot.
5 You can assume that if you've had a red tide in a certain area and it's showing up the
6 next week, that in all probability it is your red tide organism, but you still have to go out
7 and ground truth. What they've done is they've used chlorophyll and the averaging of
8 chlorophyll over a time sequence, and they've looked at what they call an Anomalous
9 Chlorophyll Value. Then they flagged it, for example, over here, the red area is a flagged
10 area. An anomalous chlorophyll area. One of the things that I'd like to point out is that
11 the accuracy is greater than 80%. I think that's pretty good; that false positives are rare.
12 False negatives are rare. [laughter] Most of the time when you go out there it is *Karenia*
13 *brevis*, but you can have *Trichodesmium* blooms; you can have *pseudonitzschia* blooms.
14 And that's another thing that people in the Gulf of Mexico should be aware of. Like
15 Quay, for example, of Louisiana had *pseudonitzschia* blooms in the millions of cells, and
16 I'm sure that they were detected by a satellite. Quay did you ever do any looking at
17 satellite imagery and *pseudonitzschia* blooms?

18 **Quay Dortch:**

19 There is so much chlorophyll there, in general, that people have [unintelligible]

20 **Dr. Karen Steidinger:**

21 Bad area to work in. [laughter] In Florida, our blooms do show up, but they can be
22 different like *Trichodesmium* or *pseudonitzschia* or even other dinoflagellate blooms.
23 And what they do on a weekly basis is send out a HAB bulletin. What we do; this is

1 what you really need to know in order for them to generate that bulletin, they'll even set-
2 up the winds for you so that you can look at wind intensity and direction for movement.
3 They will highlight in red, again, where there is an anomalous chlorophyll area that
4 presumably is a *Karenia brevis* bloom. And what we have to do to be part of this
5 program and to help them put out the bulletin, just like Texas will, is to provide
6 chlorophyll data for validation and also count data. So, we work in cooperation with
7 NOAA. To supply that data so they can validate their [unintelligible] and refine it.
8 That's pretty simple cooperation. It doesn't take that much to provide account and to
9 provide chlorophyll measurements. So, I think that for the trade-off, it's absolutely
10 phenomenal to be able to get this up-date on a weekly basis for where their projecting a
11 red tide has moved. Now, what we talked about yesterday was building in some two-
12 dimensional modeling for oil spill trajectories and looking at movement of particles and
13 surface [unintelligible]. That would help once the bloom was actually established. So
14 no, it's not just leading it there and looking at detection of chlorophyll and detection of
15 HABS, but also movement and forecasting of where HABS might move. As are others,
16 there are other modeling efforts that don't involve Remote Sensing. That involves (?)
17 oceanography and biological oceanography. One of the other things that I'd like to point
18 out is that everybody's been talking about movement in the Gulf. Currents obviously get
19 around. Particles obviously get around. We talked about movement from Florida to
20 Alabama. Louisiana. We've talked about movement back and forth between Texas and
21 Mexico. We've talked about Mexico to Florida. So that it would be worthwhile in this
22 group to set-up programs using Remote Sensing to position where we should be sampling
23 to locate *Karenia brevis* blooms. That's what Rick Stumph and his group does for us. He

1 tells us where there's a [unintelligible] HAB. We got out and sampled for verification of
2 that so he can validate. That would be worthwhile on a larger scale picture with the
3 whole Gulf of Mexico to look at transport of Phytoplankton blooms from one region to
4 another. It's been done on a regional basis for Florida where we've looked, as I've said,
5 to transport from Southwest Florida to the East coast. In 1977 there was transport. In
6 1980, 83, 87, 95. It's been fairly well documented, but what you have to do is – you have
7 to have the ground truthing to verify that. What the interesting thing is that there are
8 Eddys and they're all small features that'll tell where this is going to come in. And you
9 can go back and high cast and you can look where a red tide... for example, in 1980, we
10 had a red tide that went around the coast. Went up to Jacksonville, Florida. I don't know
11 why it chose Jacksonville, and it was and Edy that came in. You can go back, and even a
12 North Carolina case, which this is, and there's meander that comes in at the time that the
13 red tide was delivered. You can use Remote Sensing to look at transport, but if you have
14 a ground truthing program with that, think of what you could do to look at transport.
15 Something that is so mobile in the Gulf of Mexico is *Karenia brevis*, and to be able to
16 look at, transport that and then look at the forecast of it's movement so that maybe Frank
17 could find out if red tides are coming from Mexico. So there are a lot of features. A
18 HAB bulletin, and all you have to do is provide chlorophyll and cell count data. Then,
19 there could be an international cooperative program for looking. Knowing the physical
20 structure of the Gulf of Mexico where the loop current and it's Eddy's. It would be
21 phenomenal to set-up an international collaborative program to look at that and it's
22 influence in the different regions of the transported *brevis*. That's all I have on that.
23 Applause

1 **Bryon Griffith:**

2 It's been questioned as to whether the licensing allows the extension to be provided to
3 other governments, and that's probably a questions...

4 **Dr. Karen Steidinger:**

5 This is a NOAA question.

6 **Bryon Griffith:**

7 I beg your pardon.

8 **Dr. Karen Steidinger:**

9 I think that would be a NOAA question. I think I'm getting good at this. [laughter] This
10 is a NOAA question.

11 **Unidentified Speaker:**

12 Mary is actually... she left, but I talked to Rick Stumph before I left about this issue and
13 he said that that is not a problem.

14 **Bryon Griffith:**

15 [unintelligible] As would be pointed out, it's not a problem for the technical people in
16 room, and we'll have to follow-up with Rick, cause it's always a problem for lawyers.

17 **Dr. Karen Steidinger:**

18 Yes.

19 **Bryon Griffith:**

20 And if there are any lawyers in the room, I did not mean to insult you.

21 **Dr. Frank Muller-Karger:**

22 The alternative that we all need to really start thinking about, and actively move toward is
23 MODIS; if it is the precursor for the end-post system and post preparatory mission. I'm

1 not sure if NASA is going to continue the research Port Mission for Sea WiFS beyond
2 December of this year. That is an issue. It doesn't mean that Sea WiFS is going to go
3 away. [unintelligible] Image (?), who owns Sea WiFS, may continue flying it and
4 NOAA may continue buying a license, but that buys data for very specific, restrictive
5 purposes. People are not able to share it, presumably, so I'm not sure how widespread
6 this newsletter can be. Only certain people and certain agencies are supposed to look at
7 it, and obviously it's been circulated much wider than that. There are issues there that
8 lawyers, at some point, may look at or may not. Maybe we're lucky and they'll leave us
9 alone, but the point is that MODIS doesn't have any of these restrictions, and it is trying
10 to provide a product that is as good as Sea WiFS. There's still some wrinkles there, but it
11 is starting to look really good, and it is just a different format. It's more complex to use,
12 but we can make a product that is very easy to use. In fact, at USEP we're doing that
13 now, so it's not like we're talking about some science fiction thing in the future. We're
14 there now. We can do that now, and we should do it now. And the faster the whole
15 community drifts that way, then we don't have to depend on all these politics of being,
16 like with Sea WiFS. And we can move into the end-post framework, which is going to
17 happen soon. Within the next four or five years we'll have en-post [unintelligible].

18 **Dr. Karen Steidinger:**

19 Perhaps it would be best to use multiple technology since this is always...

20 **Dr. Frank Muller-Karger:**

21 Oh, absolutely.

22 **Dr. Karen Steidinger:**

23 ...evolving, and you said new things would be out.

1 **Dr. Frank Muller-Karger:**

2 We should, right now, for example, make a blended product where we merge Sea WiFS

3 and MODIS together...

4 **Dr. Karen Steidinger:**

5 Right.

6 **Dr. Frank Muller-Karger:**

7 ...we have seen some of their Sea WiFS [unintelligible]

8 **Dr. Karen Steidinger:**

9 Yes.

10 **Dr. Frank Muller-Karger:**

11 ...or half of the Gulf...

12 **Dr. Karen Steidinger:**

13 Right.

14 **Dr. Frank Muller-Karger:**

15 ...and we actually average the MODIS and Sea WiFS so that we can get full daily

16 coverage of...

17 **Dr. Karen Steidinger:**

18 That is definitely an advantage because you can loose a lot with [unintelligible].

19 **Dr. Frank Muller-Karger:**

20 We can do that, and we would be very interested to work with people in this region.

21 Maybe, as a pilot, provide that data. You know? We have absolutely no restrictions to

22 distribute the MODIS.

23 **Dr. Karen Steidinger:**

1 Ryan's writing that down right now. I can see it.

2 **Dr. Frank Muller-Karger:**

3 We collected Real-Time. It's there.

4 **Dr. Karen Steidinger:**

5 Tracy.

6 **Tracy Villareal:**

7 Karen, I'd like to second the notion you're suggesting – that we need
8 to be using multiple technologies. In the project I have with Rick, the MERHAB Project
9 off of Texas, the use of the MODIS state is explicitly mentioned in that. I think there's a
10 number of people working on this from different fronts, but I think, one thing that's being
11 lost in our discussions here is – without the ground truthing of cell count data, the whole
12 exercise is academic, and that's something that we really need to explicitly mention.
13 That there is no mechanism in place right now for long-term collection of this type of cell
14 data. Right now in Florida, excuse me, in Alabama, Mississippi, Louisiana and Texas,
15 this state is all being collected by academics, and it needs to have much more sustained
16 funding base. Otherwise, the data collection will stop eventually. I'll have no choice.
17 I'm sure in Mississippi, in Louisiana and Alabama – they'll have no choice eventually if
18 the funding runs out. We can only collect this as a research tool up to a certain point.
19 There is a point that has to be sustained by some other entity rather than research funding
20 directly.

21 **Dr. Karen Steidinger:**

22 I agree with you. There's several points there. We can set-up

1 training programs. That should be another thing in Bryon's notes there-international
2 training programs for identification, for counting, for talks and work-up and through a
3 variety of things, but we're talking about COOS and we're talking about COOS all over.
4 Whether it be the Gulf of Mexico COOS or other COOS. What we're going to do is
5 platform some sensors, and although three sensors might not define a bloom, you might
6 have to have more sensors. Like USF is developing a vertical profile to cover areas
7 between buoys and there's slocum gliders going out. This is for the United States, but
8 eventually what is going to be aboard these sensors is either bio-optic or other probes for
9 the detection of *Karenia* and other species. So down the road, cell counts have to be used
10 now because it's like a universal thing like Mouse bioassays, but down the road you're
11 going to have probes on sensors. Then it's a matter of what your coverage is that you
12 think would be adequate for being able to project things. Look at what they're projecting
13 now with limited sensors; limited platforms that are already in the Gulf. If we can get
14 molecular probes or bio-optic probes on those sensors for detection, we would have better
15 coverage, but right now, you're absolutely right. Cell counts is the universal method for
16 looking at what species are there. I honestly don't know what to say about academics.
17 Excuse me. It's just a joke Tracy. I'm only kidding. [laughter]

18 **Tracy Villareal:**

19 I know what you think about academics Karen.

20 **Dr. Karen Steidinger:**

21 I'm only kidding. Really, it shouldn't be left up to academics to do that. I mean, there
22 should be a state responsibility. Whether it be a U.S. state responsibility or whether it be
23 a Mexican state responsibility. There has to be a continuation. What happens with

1 universities is that funding is here; funding is gone. That happens with state governments
2 too, but it's not a long-term program, and you need a long-term program with a basis. I
3 honestly don't know how to address that.

4 **Unidentified Speaker:**

5 [unintelligible]

6 **Dr. Frank Muller-Karger:**

7 That if he could speak in the microphone, please. [pause] Can you hear me now? I feel
8 like this, what is it? The telephone commercial: "Can you hear me now?" [laughter].

9 **Dr. Karen Steidinger:**

10 You have to walk down a little bit since he didn't say that that. [laughter]

11 **Dr. Frank Muller-Karger:**

12 What I was trying to say is that there are very definite roles for research academics in the
13 operational entities, and what I see happening now is that the operational entities, in this
14 specific, where these products that are being shown, research products, and in fact, they
15 are based on very simple things that are being done that I don't think are peer reviewed.
16 They're not really deeply researched, and they're not even using the most advanced
17 research that is available in the area of Remote Sensing. So I'm concerned that
18 operational agencies are doing some research that is not peer reviewed, and they're being
19 put out, and at the same time you have academics developing an operational system and
20 increasingly doing operational things to try to support their groups and eventually their
21 own research. I think there's a little bit of an inversion of roles and we need to strengthen
22 the partnerships so that the regional groups are nurtured and supported to do research so
23 that then that research migrates into operations in a smooth way and in a way that it can

1 be sustained. I'm a little concerned about what I'm seeing here, even though there may
2 some issues with an 80% accuracy. Especially if that's translated to other parts of the
3 Gulf, and I don't think that you can just take chlorophyll and compare it to counts, and
4 hope that by magic or some statistical thing you'll understand what processes are
5 underlining the whole thing. I think we are mature enough to go beyond that and we
6 should go beyond that. That's one thing that I would like to do. I also want to support
7 very strongly the statement that Tracy Villareal made about how we can bring Mexico
8 into providing data; into a coherent system where we can work together and comparing
9 fields, data or participate in a science program similar to what ecoHAB of Florida so that
10 we can transfer technology, knowledge, sampling, mechanisms and integrating all these
11 tools to a Mexican counterpart.

12 **Dr. Karen Steidinger:**

13 That's an excellent point Frank, and there's somebody in the room – Quay. EcoHAB is
14 the United States program for looking at Harmful Algal Blooms. Portions of the Gulf of
15 Mexico have been addressed, but the whole Gulf, which we have seen pictures of today,
16 should be looked at as a system. Do you think it would be within NOAA's vision to see
17 the Gulf of Mexico as a whole system and perhaps entertain a proposal to look at
18 collaborative programs between Mexico and the United States in relation to *Karenia*
19 *brevis* blooms?

20 **Quay Dortch:**

21 Well, that's why I came to the meeting. I'm interested in seeing something like this be
22 developed, but I think it has to be a true collaboration. I don't think that NOAA could

1 put up all the money, and it has to go through the peer review process; that is part of
2 ecoHAB and MERHAB, but it's certainly something that is worth considering.

3 **Dr. Karen Steidinger:**

4 So, in the next ecoHAB round, it would be worthwhile for people that are in or that
5 would be in a collaborative effort for looking at U.S., Mexico HAB program, could
6 submit to the ecoHAB round.

7 **Quay Dortch:**

8 Yes, I think that is a possibility. What I don't see is how to make sure there is the
9 collaborative aspect of it, with funds coming from Mexico as well. The timing of these
10 kinds of things is very difficult.

11 **Dr. Karen Steidinger:**

12 Right. But, the next mission is a long time off isn't it?

13 **Quay Dortch:**

14 A year.

15 **Dr. Karen Steidinger:**

16 A year. So that we, as a group, there's coordination efforts already between Mexico and
17 the U.S., and it could be that that could be looked at as leverage. What would Mexican
18 states and scientists be able to bring to the table to go ahead and put in it's leverage or
19 match for an ecoHAB proposal. Tracy.

20 **Dr. Tracy Villareal:**

21 Well Karen, I think there are some very good models for funding this type of program.
22 Right now there's a joint EUROHAB, USNSF collaborative proposal being formulated.
23 That would explicitly allow European and United States scientists to submit to common

1 funding deadlines, which is, of course, one of the big problems we face – our funding
2 cycles are out of sync. The ships' scheduling cycles are not coordinated. I think that one
3 of the most important things that could come out of this workshop is to set-up a frame
4 work that would allow the scientists from the two countries to collaborate explicitly on
5 these types of problems that have common deadlines, and have a funding pool that they
6 could both draw from to create programs that are more akin to the joint global ocean flux
7 programs where there's multiple ships from multiple countries out simultaneously
8 looking at specific pieces of a puzzle. Then they have mechanisms for getting together to
9 discuss the results and integrating this into a larger framework. The Gulf of Mexico is a
10 perfect candidate for this program and I think it's been one of the major barriers that
11 we've had to working together at this level – we don't have a mechanism for funding
12 these large multi-institutional/multi-investigated proposals that can utilize the resources
13 of both countries. Right now I don't know how to do that. I'd very much like to do that,
14 but there's nobody I can submit to for that sort of proposal.

15 **Dr. Frank Muller-Karger:**

16 I would like to ask Dr. Jorge Nicolas Chantiri Perez to comment on this, because I think
17 some of the right people are in this room to help us at least develop a pilot, and so I think
18 that we don't have to look too far right now. Maybe they have some comments on how
19 we can sync into a process.

20 **Dr. Jorge Nicolas Chantiri Perez:**

21 Many thanks, Frank, for giving us the opportunity to speak. Specifically, it seems to us
22 to be a good idea; in relation to having a network. In fact, it is a very important part of
23 what the project is that we present from Gulf. And, in fact, we assume at this time the

1 leadership by GOMSA, but we are ruled by the federal authorities at this time. And they
2 are present, which is the good part. It is SEMARNAT and the Federal Commission for
3 the Protection Against Sanitary Risks, who are the ones that can unify all the states, on
4 the side of energy as well as on the side of health, in order to make a common effort and
5 have a network of monitors and to establish contact with what you are doing in the
6 United States and be able to join our data. And well to talk. The truth of the financing,
7 would be a question of asking those present here, to SEMARNAT as well as to
8 COFEPRIS. What is the financing that they could grant towards the states? Also a very
9 important part that also forms part of the agreement of the Gulf states is the Veracruz
10 University that also is here present and that also has, in part, a very important group of
11 financing. Therefore, it will be a question of elevating the federal level and not so much
12 the state one in order to join efforts and to see the way for obtaining financing.

13 **Dr. Karen Steidinger:**

14 Bryon, are you typing in that there needs to be a steering committee or something like
15 that to look at the joint proposal between Mexico and U.S. for funding of... you know,
16 have research in the Gulf of Mexico synoptic cruises?

17 **Bryon Griffith:**

18 The fact of the matter is both myself and [unintelligible], but we have a parking lot area
19 [unintelligible].

20 **Dr. Tracy Villareal:**

21 Thank-you. There are some possibilities for funding outside the U.S. and Mexico's
22 sphere. It may be a more international basis. The global environment facility, for
23 example, is one good source of funding with perhaps a Mexico lead as the grantee and

1 contributing and matching funds from the United States might help get something like
2 that going. If there's a possibility, you can leverage quite a bit of additional money
3 through the Global Environment Facility. You can demonstrate a larger issue than
4 strictly monitoring has if you can demonstrate the environmental benefits-the economic
5 benefits to both countries. That sort of thing, which I'm sure you can do. It would be
6 information that we've already heard in the last day or so. So, that's a good possibility.
7 That could be run through the United Nations Environment Program – very active
8 leadership in the region. And there's a...

9 **Dr. Karen Steidinger:**

10 And IOC also has a...

11 **Dr. Tracy Villareal:**

12 IOC. There's number of those. World Bank may also be an available...

13 **Dr. Karen Steidinger:**

14 Right. I like that one. Yes.

15 **Dr. Tracy Villareal:**

16 ...pot of money. There's some international pots that you might look at rather than just
17 the U.S. budget and the Mexican budgets. That's a possibility.

18 **Dr. Karen Steidinger:**

19 I think that's an excellent... I think that that would take a longer discussion, but if a
20 group were set-up to specifically look at what the sources are, and identify those sources,
21 and then decide and agree to a mechanism for organizing that and submitting that. That
22 would be very worthwhile.

23 **Dr. Tracy Villareal:**

1 There are also several international conventions that have secretariats that could help
2 coordinate that type of application process perhaps. So there's a number of opportunities.
3 There's a Canada, U.S., and Mexico Secretariat with the Commission for Environmental
4 Cooperation, and there's also the United Nations Environment Program. In Kingston,
5 Jamaica the Caribbean Environment Program, which could be very useful in helping to
6 broker some of those activities.

7 **Dr. Karen Steidinger:**

8 I think that broker is a good word for this, because I think that's how it should be done.
9 Yes.

10 **Dr. Tracy Villareal:**

11 I have a second question for you, unless you're planning to move her off the podium.

12 **Bryon Griffith:**

13 Not her specifically, but your questions to her, I wanted to point out, are a little...those
14 last questions are not directly relevant to Dr. Karen Steidinger. They're really kind of a
15 reflection of yourselves. If I may, before I get to Dr. Jorge Nicolas Chantiri Perez's
16 follow-up question or yours.

17 **Unidentified Speaker:**

18 I have a question for Dr. Steidinger, so if you'd leave her up
19 there on the podium, I'd really like to ask her a question. So, if I may. Looking at the
20 frequency of Harmful Algal Blooms that you've seen on the West coast of Florida, have
21 you gone back to the land management agencies in Florida or the federal land
22 management agencies and looked at trying to correlate those blooms with land based

1 sources of pollution? Whether it's non-point source; whether it's point source. Have you
2 tried to look at the contributing causes to these blooms.

3 **Dr. Karen Steidinger:**

4 Yes. If you look at the slides that I didn't go over yesterday, there's one in there on
5 nutrients. There are documented fish kills and respiratory irritation back in the 1880's in
6 Florida. Fairly well documented by U.S. coast and (?) survey. And if you go into more
7 recent blooms, the reason ecoHAB, ecoHAB produced data on nutrients. One of the
8 things is, if you look at... you know, stream flux is one thing we're looking at. We're
9 looking at atmosphere deposition. We're looking at Benthic Blooms; we're looking at
10 transport. There are different sources of nutrients for different phases of the bloom. So
11 when you get in shore, to the near shore environment by the barrier islands. One of the
12 things is how do nutrients affect that? That's one thing that's being assessed by Gabe
13 Vargun and the authors in proceedings of ecoHAB, Florida. That's one of the things that
14 they're actually addressing – their nutrient data from ecoHAB, and looking at it in
15 relation to different phases of the bloom. The phases of the bloom, I don't know whether
16 all of you have the same phases, but there's initiation no matter where it came from.
17 Whether it came from a modal population or whether, which hasn't been proven yet,
18 whether there's a resting stage on the bottom. That's initiation, and then there's growth
19 and maintenance. Then there's termination eventually, but it's the same thing that
20 happens in a lab culture. You have these different phases and you have different sources
21 because the bloom phases could be spatially separated so it can start off shore. They can
22 be transported into the inner shell where you've got different sources. And, it's even
23 being considered now - dead fish themselves are a phenomenal source for organics to

1 bloom. So, yes, they are addressing sources of nutrients, and it's so diverse. It goes from
2 the atmosphere to dead fish.

3 **Unidentified Speaker:**

4 Thanks. The idea that colleague Patrick Connor forwarded seems to me to be excellent
5 about requesting support from the World Bank. I would like to take this opportunity
6 along with what professor Samar has already stated, but when we meet for Plan A, that
7 we commented on yesterday, where we are involved with you, SEMARNAT, COFEPRIS
8 and ourselves, could a work group be formed specifically so that you support us in
9 creating the project in order to present it to the World Bank or to some other world
10 institution that could grant us the money? We know that it is scarce here and even more
11 scarce for us, but I believe that with the experience that you have in obtaining economic
12 resources through the World Bank, it could serve us as feedback and create a specific
13 working group to seek the source of financing.

14 **Dr. Karen Steidinger:**

15 Florida hasn't had experience with the World Bank. What we've had is experience of our
16 own legislature, and we've gotten millions from foreign legislatures to study red tides.
17 The other experience we have had is with the governmental agencies such as NOAA,
18 EPA and Frank has had experience with NASA. There are a lot of U.S. governmental
19 agencies that have funded and have even organized programs on HABS. Do you have
20 any experience with World Bank?

21 **Dr. Tracy Villareal:**

22 I've had a World Bank grant, yes. I do know that the U.S. generally is seen as a
23 matching fund contributor, rather than an applicant to World Bank grants. That goes with

1 the Global Environment Facility as well. Then perhaps Mexico would be the principal
2 grantee or the country they would apply for money with, and NOAA, EPA, U.S.G.S.,
3 State Department, NASA, whoever it might be, would be a contributor to that and show
4 support for the project that would then allow the World Bank to grant the money to
5 Mexico to actually implement projects in their country.

6 **Dr. Karen Steidinger:**

7 We had a program of State Department years ago that was funded with Spain and it
8 funded it for three years, and it helped the Spanish develop their red tide program. So I
9 think that is an interesting source.

10 **Dr. Maria Amparo Martinez Arroyo:**

11 Thanks. What was being discussed right now, we will surely discuss in greater detail, but
12 only to contribute to this part of the monitoring of the tides. I should like to say that the
13 first thing that we would have to do - both countries - would be to liberate these funds
14 that we have approved since October by the GIV and which we have not been able to
15 utilize. These are already approved projects, and specifically for the Gulf of Mexico and
16 for an integral study. On the other hand, this would give us the possibility of having
17 access to many other things, because this study that is approved is for giving a general
18 and integral study project of the Gulf. Therefore this would give us the possibility of
19 having many concurrent funds for these distinct researches. One could be red tide and we
20 could provide many other themes in this grand framework and gather funds from
21 different agencies that have very precise interests, as long as we are capable of showing
22 this integral plan. I believe that we can discuss that later, but it appears to me that it is
23 very feasible -that we can get it.

1 **Bryon Griffith:**

2 Dr. Jorge Nicolas Chantiri Perez, did you have a follow-up question or point?

3 **Dr. Jorge Nicolas Chantiri Perez:**

4 These quantities, would they be to lost funds that they could get...?

5 **Dr. Maria Amparo Martinez Arroyo:**

6 I do not understand the question.

7 **Dr. Jorge Nicolas Chantiri Perez:**

8 Sure, supposing that the economic support were obtained between the levels that you just
9 mentioned...

10 **Dr. Maria Amparo Martinez Arroyo:**

11 Yes.

12 **Dr. Jorge Nicolas Chantiri Perez:**

13 Would these go to lost funds?

14 **Dr. Maria Amparo Martinez Arroyo:**

15 Well, I believe that everything that they give us is for lost funds. [laughter]

16 **Dr. Jorge Nicolas Chantiri Perez:**

17 Lost funds is a grant.

18 **Dr. Maria Amparo Martinez Arroyo:**

19 Yes. Well, the GEF project, of course which was approved in a manner that they call
20 pre-project. They approved a quantity that is not very big. It is less than one million
21 dollars, but it is for three countries: Cuba, Mexico and the United States. It is to carry
22 out jointly a diagnostic, not of the state of the Gulf, but rather of the type of projects that

1 can be carried out that can be done in that area. To present a cartel of projects and
2 therefore obtain different backings.

3 **Bryon Griffith:**

4 Based on that, I'd like to actually reinforce that last point and my reason for coming up
5 and actually taking over for Karen at this point in the discussion is we rapidly moved our
6 way almost into the financing plan for the *it* before we defined what *it* was, and that is a
7 classic death for a program like this. Since we've offered a lot of observations based on
8 our years of experience, I'll offer my mine. The real point of the object of the discussion,
9 what's the most appropriate is – this group must take on a face. Not individually, but a
10 face as a bi-lateral/ bi-national involved in the focus on bringing this kind of capacity to
11 the Gulf of Mexico. In spite of all that was said, whether it be the World Bank, UNEP,
12 State Department, etc...we will compete with the rest of the world to be somewhere in
13 that priority line up. What will make us most competitive is if we are together, in one
14 accord, on the direction that we're going in. We're to know by example, that we were
15 after an extension of MODIS technologies, or if we were out to apply 36 sensors and 36
16 specific locations, I can all but guarantee you, we would know more and would present
17 more than most any other competitor that we would face. The essence of our work is to
18 build this one stepping-stone at a time so that, in the end, we all can clearly recognize
19 what we're talking about. We'll not be victorious in all of those competitions, but it will
20 get us to the point where we will move much more aggressively and much more
21 progressively towards the implementation; as long as we keep our eyes on the fact that it
22 represents all of us. We reinforce it in that regard. The reason that I wanted to come up
23 and take the podium back is – I think you're going to see that actually come in the closing

1 of the agenda as we talk about the financing strategies. It's best to look at financing
2 strategies when you know what you're going to finance, and consequently, I think we
3 have just a few more steps in this process to get down to narrowing the scope. As Dr.
4 Arroyo said, if you have the inventory of projects, you have the basis of the discussion in
5 which to engage the opportunities for those monies. So, let's not divert our focus so
6 much that we know which game we can get into just before we know how to play the
7 game. If you'll indulge me. Yes Frank.

8 **Dr. Frank Muller-Karger:**

9 Can you hear me now? [laughter] One of the things that I would like to see, which I think
10 is very tractable, is to do a historical study of the available satellite data going back to
11 CCCS, (which we also have), for the entire Gulf of Mexico and try to overlay, for
12 example, the historical HAB observations that Karen has. We've already actually done
13 some of that with Karen and John Walsh at USM, but doing it with the Mexican data.
14 Whatever is available. Whatever observation is available and somebody, I think Chantiri
15 mentioned yesterday that there was an effort to put some of that historical data on a
16 website. Maybe we should start there, and try to see what it is that you see. Where does
17 it go? Can you see it go anywhere and develop some of the science framework to put
18 some of the 36 or whatever sensors...?

19 **Bryon Griffith:**

20 I think you're reinforcing my point. That's exactly it. So with that...so that we stay a
21 little bit on course, and I think you'll be pleased - we'll get back to this discussion. It's
22 only to defer it, not to dismiss it, to the point in the agenda. We have one more
23 presentation, and I think a lot of this is actually going to come to the forefront after this

1 presentation when I present my thoughts to you on what those challenges might be to
2 incorporate these next steps. I'd like to introduce the representative from the University
3 of New Orleans, Dr. Merrill Johnson, who has been, as I've pointed out, referenced in
4 some of the prior discussions as having had the opportunity and pleasure to work with the
5 state of Veracruz as a, I believe, a sub-contractor to NASA, in terms of extending Remote
6 Sensing capacities to use many of the satellite images and then translating that into the
7 kind of analysis that would be taken of the ground, some of which were evidenced in the
8 Papaloapan Development Council presentations. The kinds of capacity that that would
9 bring to White water, to Blue water initiative development would be astounding, needless
10 to say. I can imagine where we would have been ten years ago and where we'd be ten
11 years hence with that kind of ability to do marine management planning and the like. It's
12 essential, frankly. Especially in a time of diminishing funds, not expanding funds. We
13 have to, as we use the term in the country, "In this country you have to do it cheaper,
14 better, faster." And those are the kinds of things that we're after. Terry has a real little
15 voice. You probably can't hear her down there. All right. Dr. Johnson.

16 **Dr. Merrill Johnson:**

17 Thank-you. Thank-you very much for the opportunity to be here this morning. I am
18 grateful to be among such distinguished environmental scientists and be listening to the
19 articulation of a vision. A very noble and worthwhile vision. I will speak in English
20 today. I've been told that every time I use my fractured Spanish, an international incident
21 occurs. [laughter] I'll also not make any reference to red tide. I must say, we're very
22 land loving types at UNO. What I want to do instead is to focus on a point that's been
23 made throughout. It's been transcendent in the discussions of this group and that is - to

1 focus on the importance of collaboration and cooperation. What I want to describe to you
2 today is a NASA funded inter-university, University of New Orleans and University of
3 Veracruz collaborative program that began about two years ago and will end as of this
4 month. Also, let me reassure you – I’ll be brief. Those are the three words my students
5 always want me to say. So, this won’t take very long and I will not go into great detail,
6 but we had a wonderful opportunity extended to us by NASA. It all began when several
7 professors from the University of Veracruz approached some of our NASA colleagues
8 about assistance in the Remote Sensing and GIS programs at the University of Veracruz.
9 NASA then contacted the University of New Orleans, which has had a long relationship
10 with NASA, to see if there could be some sort of NASA funded, inter-university
11 relationship established, and there was. On the New Orleans side you see the names of
12 the participants, including two Remote Sensing specialists. One of whom has quite a
13 NASA degree, Dr. Armond Joyce, and Dr. Mahtab Lodi from our faculty served as the
14 other Remote Sensing specialist. Then Dr. David Clawson, who is here today, was our
15 specialist on tropical land use in Latin America. On the Veracruz side we had several
16 faculty members. Agustín Ceballos, Juan Cervantes Pérez, Ignacio Mora Gonzalez and
17 we wish also to acknowledge the very important interest expressed in our project by Juan
18 Manuel Irigoyen Lopez. In New Orleans, we would call that Lagniappe - a little
19 something extra. We were not expecting to make his acquaintance, but we sure are glad
20 that we did, and you can see by the quality of his presentation that COFEPRIS Is doing a
21 lot of important work in this part of the world. The purpose of our relationship, of our
22 project, was to define ways in which the University of New Orleans could work in
23 collaboration with the University of Veracruz to apply Remote Sensing and GIS

1 technology to support college level instruction and agricultural land use analysis. What
2 actually happened was we focused more on the instructional side. We focused more on
3 how to teach basic principles of Remote Sensing and GIS at the college level and we
4 produced some teaching modules. I'll talk to you about it in just a moment to help that
5 along. So we changed our focus just a little bit as we proceeded. Our project activities,
6 very briefly a included first effect finding trip to the University of Veracruz, and then a
7 subsequent trip to the University of Veracruz where we presented a workshop in Remote
8 Sensing principles and applications to members of the University of Veracruz faculty and
9 students. In addition, we did a preliminary satellite analysis of selected land uses and
10 covers in the state of Veracruz. I've got one image shown there that was an outcome of
11 this preliminary analysis. Let me emphasize that it was preliminary. We were not
12 pushing back any research frontiers here. We were putting together some imagery that
13 could be used in the classroom, and we did a very brief change analysis that could be
14 used in the classroom as a part of our preliminary analysis. This is an example of several
15 that we produced - land-use/ land-cover map for part of the state of Veracruz. The most
16 important part of our activity was to design a set of teaching modules in Remote Sensing
17 and the use of Remote Sensing in tropical land-use and land-cover analysis, which
18 included an updated look at land classification. You will be relieved to know that I'm not
19 going to show all 230 PowerPoint slides that we created for this purpose. If you want to
20 see them, I'm sure I can make them available to you. If you need a cure for insomnia,
21 that's one way that I could probably suggest that you handle that, but I'm going to show
22 you several slides related to the land use classifications systems that we just introduced.
23 We haven't followed up on this to any great extent. We took the old U.S.G.S. land

1 classifications system and we embellished it a bit. We added some land use
2 classifications to it. Partly to reflect the increased analytical capabilities of new Remote
3 Sensing platforms; a more precise analysis that you can do with these platforms. In
4 green, we added our own categories and I'm not going to go through them in the interest
5 of time, but you see up there. We're talking about informal residential settlements and
6 large holder monoculture; smallholder farming and inner cropping and so forth, and so
7 on. It is our hope that one way we can extend our relationship with the University of
8 Veracruz is by looking at these categories in greater detail. Mainly to see if they make
9 sense. As I mentioned just a moment ago, our fourth activity, which was something of an
10 incidental activity, and became a collateral benefit, was to increase our ties with
11 CODEPAP (Consejo del Desarrollo del Papaloapan; Council of Development of the
12 Papaloapan) and we have a student right now who just, last week, was given a NASA
13 graduate fellowship and he will be doing his work, his research in Veracruz with the
14 University of Veracruz and I hope with CODEPAP as well. That's one very tangible part
15 of the relationship so far. By the way, thank-you NASA, wherever you are, for helping
16 out. One of the implications for this collaboration...I told you I would be brief. Several
17 implications flow from what we are doing with the University of Veracruz. We have
18 contemplated trying to find funding to help with creation of a Gulf Coast data warehouse
19 of some sort. And a research and instructional facility in GIS and Remote Sensing. One
20 location, multiple locations, binational, multi-national – all sorts of possibilities exist
21 here. A second point – collaboration with the University of Veracruz to promote basic
22 and advanced instruction in GIS and Remote Sensing throughout the Gulf region. Our
23 real mission was a teaching mission, and we would like to see that teaching mission

1 expanded in the future if that is possible. Done so in view of the existing teaching
2 missions in Veracruz and then the Gulf coast region of Mexico. We have interest in
3 designing distance-learning protocols. This is very technology dependant. We have an
4 interest in creating student cohorts to earn degrees in GIS and Remote Sensing. A cohort
5 is simply a group of students who all take the same basic courses and pass through a
6 program at the same time. Then of course, the usual student and faculty exchanges. I
7 just mentioned the one example of a student exchange that we're looking forward to here
8 in the near future. That is all I have to say. Thank-you very much for your attention.
9 Welcome to New Orleans on behalf of the University of New Orleans. I hope that you're
10 having a good time. Nobody has ever left New Orleans saying they did not have a good
11 time. [laughter] Thank-you very much.

12 **Bryon Griffith:**

13 Does anybody have any questions for Dr. Johnson?

14 **Unidentified Speaker:**

15 En el estado de Veracruz, como también en los estados del
16 Golfo de México, existen institutos tecnológicos-- estudios superiores. En el estado de
17 Veracruz, son 19 tecnológicos. Dos de ellos son tecnológicos del mar, con estudio
18 específico sobre el mar. Y tienen alrededor de 60 mil estudiantes. Yo creo que si se
19 pretende hacer un sistema de estudio de colaboración, yo solicitaría que se ampliara la
20 relación de la universidad de ustedes. No solo con la universidad de Veracruz, si no
21 aprovechar la red de institutos tecnológicos concretamente que existen en Veracruz. Y
22 esto permitiría que se pudiera hacer estudios mas sistemáticos. Que las redes pudieran
23 colaborar entre si, porque estoy seguro que el estado de Tamaulipas podría hacer

1 exactamente lo mismo. Lo mismo Campeche. Una red de institutos tecnológicos
2 interconectados que valdría la pena aprovechar, creo yo, con una visión mas holística del
3 problema. Allí hay investigadores que podrían colaborar, por ejemplo, en los aspectos de
4 estudio del alga en si misma. Hay investigadores y maestros cuya especialidad es
5 justamente electrónica. Comunicación. Hay especialistas en cuestiones agrícolas. Yo
6 creo que podríamos enriquecer si ustedes hicieran este tipo de colaboración. Enriquecer
7 con esas redes. Concretamente yo hablo de Veracruz. Con la red de institutos
8 tecnológicos de Veracruz, podríamos enriquecer los estudios y agilizarlos también para
9 que los proyectos puedan tener resultados mas pronto.

10 **Dr. Merrill Johnson:**

11 I couldn't agree more with the need to enlarge the network as widely as possible. I think
12 it's important that we look at a holistic type of response to this need. As you noticed, the
13 title of this presentation was "A Pilot Project", and that's important because we're not
14 quite sure where all the needs lie. We're not quite sure where all the possibilities exist,
15 and right now, we're in a position where we need to listen. If there is way that this type
16 of collaboration could be enlarged to include the technological colleges and other states,
17 we are very interested in listening. Other questions? Yes.

18 **Dr. Frank Muller-Karger:**

19 Yes, I agree emphatically with the fact that the program should be expanded to include
20 the technological institutes. That does not require any additional funding whatsoever. It
21 simply means to have them involved as well. They have just as good a capacity as the
22 universities, and in fact, it would take on, it would be another step forward of what we've
23 been doing already where we have set-up at least three GIS labs that already exist. Plus,

1 in regard to algal blooms, they have the Marine institutes. Two of them. So, I think this
2 is something the whole Gulf collaboration could benefit from – to include these marine
3 science areas into this Remote Sensing training program.

4 **Dr. Merill Johnson:**

5 Yes.

6 **Bryon Griffith:**

7 You're not supposed to ask the questions. Just comment. [laughter] I think that it might
8 be considered at two levels. One would be a basic level, which could reach the various
9 institutes. Technology institutes. Marine institutes. Perhaps starting with Veracruz and
10 expanding beyond - all along the gulf coast. The other would be a more advanced level,
11 where they would obtain degrees, as you indicated, and come back and prepared to do
12 training themselves so that we're creating an internal capacity which will become
13 sustainable in the long run in terms of expanding GIS and Remote Sensing abilities
14 within Mexico.

15 **Dr. Johnson:**

16 Yes.

17 **Bryon Griffith:**

18 I'd like to suggest the third level, and that would be the acceptance of GIS tools by
19 senior managers ministry officials. That would help instill the use of a GIS in everyday
20 decision making at the highest levels in government, whether it's in Mexico or the United
21 States. I was present at a conference where the governor of Maryland gave his whole talk
22 on GIS. His staff must have sold him very nicely on the use of GIS and planning for
23 sustainable development activities within Maryland. So, I think if there's a way that we

1 can, in addition to the technical needs and needs of the students and professors, if we can
2 also impart that to our senior decision makers, it would be very, very useful in the future.

3 **Dr. Merill Johnson:**

4 I agree, and we're doing that here in the U.S. The problem is – GIS... is a little bit like
5 hugging smoke. It's a little bit like...and once you've got it, if I can mix my metaphors,
6 you have a tiger by the tail. So, it's a real interesting process that you go through in this
7 education activity that you're describing which is a different type of education that I was
8 describing. But, it's relevant. It's important; a picture is worth a thousand words. Once
9 you show that beautiful map up there, then everybody's hooked, and everybody's a GIS
10 specialist. Thank-you.

11 **Bryon Griffith:**

12 As we close out this segment, I have some summary comments I'd like to make. Dr.
13 Johnson's presentation, at our request, was greatly appreciated. I just want to point out
14 that in the course of the last few months, especially after having the pleasure to meet Dr.
15 Jorge Nicolas Chantiri Perez, and Juan Manuel in St. Petersburg and preparing for this
16 conference, I discovered at least a dozen Dr. Johnson's I could have had come up here.
17 What that told me, interestingly enough, was – there is a lot going on that looks like a
18 collage rather than a mosaic. The point being that, the term that is most consistently used
19 is capacity building. And every Federal Program Manager, at least in the U.S.,
20 understands that term. We are involved in capacity building for our states, and our local
21 communities, and when we involve ourselves in bi-national, international program
22 association, you can bet that the leading characterization is capacity building. The
23 problem is – we're guessing at it, and what we need is a more strategic understanding and

1 leadership to emerge to say that capacity, since it's limited, in terms of it's delivery,
2 needs to be focused here until critical mass is reached and focused there until critical
3 mass or whatever. Otherwise, it's like a term we've discovered in our own program, it's
4 like a thousand flowers blooming that sometimes can add up to "so what?" in the end,
5 except, it was a great doing it, at least for someone. So I would just ask as we evolve our
6 relationship, our team spirit and our focus, that we keep that in mind, because we would
7 do you better and us you if we were to be very focused in the pattern of that delivery. If
8 in that discussion, if I understood it, wherein capacity, in one regard might be built up in
9 a university, but it really, in the practicing world, it operates in a municipal agency or a
10 state agency. Then, it questions the delivery mechanism. We want to question those
11 things, because we had our...whether it is yourselves, as I'm reminded repeatedly, as Dr.
12 Arroyo talked about the money that SEMARNAT has in the recent act that was passed or
13 our own - these are taxpayer funds, and they are critically important to be used properly.
14 With your help, we can focus that and be more surgical in the future. Because literally,
15 every rock that I turned over, I could find another related activity that most of us, in this
16 room, would not know about. That could be a little problematic. Believe it or not, I
17 could even find them associated to red tides, and most of us would not know about it. It's
18 just an illustration. I'm going to ask you not to get away from your chair, but to give me
19 about two minutes to load up my challenges for you up here on the screen. If you'll just
20 bear with me and talk to the fellow next door to you, I'll take just a minute. It's bad
21 when you challenge and you're not in here, cause you commit automatically. That's a
22 rule. It's certainly one that's been used on me over the years - it must be a rule. What I'm
23 trying to do is make sure that we wrap up topic areas as they're built into the agenda, and

1 this one dealt with the Observing System Framework. In the early presentations, and I
2 always want to reflect back, and you may have not noticed that yesterday...the original
3 conceptual plan that was put together in December of 2002 by Dr. Jorge Nicolas Chantiri
4 Perez and others - I'm incorporating those elements into this and reference them as they
5 occur. Yesterday when we went to proposal one, we actually picked up the first two
6 elements of that December plan. Moving ahead to the Observing System Framework,
7 this is what I would recommend based on the discussions. What is sought here, at this
8 point in our development together, is the deployment of a strategic pattern of physical,
9 oceanographic and meteorological sensors in the bi-national cooperative that we have.
10 Recognizing, and I'll just paraphrase here a little bit, that the attention to be given to that
11 missing element in the southern Gulf is made up by six bi-national states. The objective
12 of the activity is to secure the participation of each of those six states; that should be the
13 goal. The attitude is – a no one left behind kind of approach. Consequently, the
14 objective is to deploy, operate and maintain at least six fixed or moored stations. One in
15 each of the Gulf states of Mexico, as determined by the coordinating agencies of Mexico.
16 The proposed time frame that I would set the challenge on, and there was a reference
17 made earlier about when funding cycles actually occur, would be to use up the entirety of
18 the upcoming fiscal year and one quarter. So 1 and .25 quarters or 1.25 quarters would
19 take us to December, 2004 as a target period. That's just so you would understand the
20 basic element of this aspect of the observing system. So there'll be two proposals in this,
21 by the way. Is everyone with me so far? While I move down and look for the
22 challenges? In that regard, again, many of you have more experience, much more than
23 me, but I'll take the opportunity to reference six of the key elements. One would be the

1 development of the specific specifications necessary for the kind of equipment. The kind
2 of sensors that actually make up what would be of most utility and value to your bi-
3 national pilot. As Frank mentioned earlier, the secondary benefits that would be derived
4 from possibly adding a few more parameters on certain stations. Consequently, a
5 cooperative development of technical specifications, it was referenced and Frank said my
6 university would be glad to participate. And the national data buoy center both left
7 representatives here, but Landry left yesterday and said to be sure that we participate in
8 this, and they would be glad to participate in both isolating the specifications and
9 obviously understanding the market as to where these things could be gotten. The second
10 thing that's an effort, that is, in my terms, application based. The sensors have to match
11 the application. If you're not collecting the data, then it's not going to drive the
12 applications. Where do you place these things? I'm sure there's kinds of issues
13 associated in some respects with that, and that would have to be undertaken by the
14 authorities of Mexico, both in terms of the multiplicity of the values of those stations, as
15 well as the long-term operations and maintenance. You'll notice up here on the screen
16 that I have NAVY-Mexico in red. I am leaping forward to assume that the long terms
17 operations and maintenance of a water-based station would likely involve the NAVY.
18 That's just a guess on my part. Just so you'll understand, philosophically, where I come
19 from in these challenges is – it's my understanding that the water system and
20 SEMARNAT in correlation or contrast to the U.S. would be the service agencies again,
21 but the services agencies would establish the long-term viability of this operation. The
22 systems acquisition and deployment, well that was really interesting while I was sitting,
23 taking notes during the discussion, to learn that in-fact, although there is variability in

1 these sensor platforms as is evidenced in the discussions, but not to neglect how valuable
2 they would be in establishing that array. The Papalopan Development Council
3 referenced that there are now secured three to be applied in the central and other stations
4 in the Gulf. They were evidently very near shore sensors. USF pointed out that there is
5 one sensor secured or will be secured for Quintana Roo, Yucatan. That starts to set-up a
6 balance against the six. The GCOOS reference here, and he was not here when I
7 mentioned it earlier, but I asked him to raise his hand, is Dr. Ashbindu Singh, if you
8 would raise your hand in the back. He is here from UNEP, and UNEP has a proposal for
9 which my office is a collaborator on to the NOAA recent call for proposals to extend the
10 GCOOS operations. This proposal is to advance no less than three sensors in extension
11 to the six states of Mexico. The proposal anticipates the best of sensors in this proposal.
12 And consequently, my office is participating at a high dollar level to give the proposal
13 merit. The UN is giving the proposal strong merit by actually applying their principal,
14 investigative services as contribution to that effort. The point being, again like yesterday,
15 a playing card for you, in a game that was started in a very short period of time, just a
16 little while back. It is a very competitive process. We hope for the best like all the,
17 again, like all of the other competitors, but the idea here is, and it is expressed in the
18 proposal from UNEP, that serving in that facilitator/collaborator role, these are Mexico's
19 assets. For the purpose of extending the GCOOS concept forward. The short term, and
20 the impediments, as Pat and I knew I'd spell that wrong so forgive me. We'll correct that
21 in the...

22 **Unidentified Speaker:**

23 unintelligible

1 **Bryon Griffith:**

2 Okay. I beg your pardon. We understand what we're talking about together, right?

3 Okay. If there is a PANAMEX in Mexico, they do not know what they're getting
4 involved in. [laughter]. Yes, that's EMMEX. Anyway, related to the energy enterprise
5 in Mexico, the idea that the reutilization of fixed platforms is not a new concept, by any
6 stretch of the imagination, and should be pursued to extend that collaboration and
7 partnership formula where it's viable. Certainly operations and maintenance is better
8 taken up on a platform that constantly has personnel in power. In many cases. One of
9 the things that is often overlooked for some reason is the operations and maintenance for
10 these equipment types. The short-term operations and maintenance average of about 2
11 years, as I recall, is actually in the GCOOS proposal, as is the deployment cost. The
12 long-term operations and maintenance, it would be assumed, again, would go back to that
13 triad. SEMARNAT, Water Commission and/or the NAVY. Again, these assets become
14 the assets of Mexico. And the portal management operation, what happens with the data?
15 Where does it go? Is it an extension of the NCDDC, HABSOS operation? actually,
16 NCDDC operation. At least that's the challenge that's proposed here. Does this make
17 sense to those of you in the audience? I see heads nodding; that's a good thing. Yes, sir.

18 **Unidentified Speaker:**

19 [unintelligible]

20 **Bryon Griffith:**

21 You have to understand. From where I stand, we can include anyone. I just need it to be
22 organizationally correct, in terms of the leadership core that would have this
23 responsibility. So the name of the organization is again?

1 **Unidentified Speaker:**

2 [unintelligible]

3 **Bryon Griffith:**

4 Are you catching this for me? For my colleagues from SEMARNAT and the Water
5 Commission, is that the correct inclusion? Okay. We'll make that modification.

6 **Unidentified Speaker:**

7 Yes, because for instance, we have been working previously in the Gulf of Mexico and I
8 know some colleagues and we can take some opinions related to each segment
9 [unintelligible]

10 **Bryon Griffith:**

11 The strategic placement and plan of development coordination, because it's thematically
12 geared toward red tide, you have response, tracking and predictions. NAVY should not
13 have included the Health Ministry in this because of the application basis of the stations.
14 Just a question. I see a gentleman in back here shaking his head. Yes. Okay. So I'll
15 correct it to both NDA and the Health Ministry. Yes sir.

16 **Unidentified Speaker:**

17 What happens is that the two heads of work, on behalf of Mexico should be SEMARNAT
18 and the Secretary of Health. I had a comment a little while ago, in the sense that if
19 someone needs...

20 **Bryon Griffith:**

21 Okay, could I get you to back up. We're being translated in Spanish. Thank-you.

22 **Unidentified Speaker:**

1 Here the situation is very simple. All of the collaboration has to on the part of
2 SEMARNAT and the Secretary of Health. There are two instances for working this kind
3 of actions. I was going to comment a while ago that we should not lose them because the
4 Water Commission is a deconcentrated agency of SEMARNAT itself. They are the same
5 thing. Therefore here, if someone needs some kind of information from Mexico, [that
6 person] need only send a letter to the Minister of Health or to the Minister of
7 SEMARNAT so that the correct agency provides the data that they require for any study.

8 **Dr. Merill Johnson:**

9 Thank-you.

10 **Unidentified Speaker:**

11 I'm not sure if you have a subsequent slide, but I want to emphasize again with what
12 Villareal mentioned before. That is the actual collection of data that is not automated,
13 and how do you fit that type of data, which is really bio-geochemical kind of data, even
14 physical data, that is not collected by automated transmitted sensors, so that has to fit into
15 this frame or...

16 **Bryon Griffith:**

17 I think I'm going to get into that in the next... I think, but catch me if I don't, cause I'd
18 like to...

19 **Unidentified Speaker:**

20 One other thing is, going back to GCOOS, I hate to mention the same thing again, but we
21 need people in Mexico to organize themselves into a real structure, with maybe a rotating
22 chair that can be called a counterpart to the U.S. GCOOS so that there's a point of
23 contact. We really need to emphasize this, and also have people that would want to

1 participate in GCOOS; sign the resolution so that they are participants, and recognize
2 participants in the GCOOS program [end of side A]...

3 *Tape 6B*

4 **Bryon Griffith:**

5 ...it is raw data and it's uninterpreted at that point as well. The interpretations or the
6 folding into spreadsheets, and then corresponding models is actually a unique application
7 in each center that might pick the data up. It's not the intent of NCDDC or any other
8 enterprise in this room, to be the monolith that is the data management center of this.
9 Yes, Frank.

10 **Dr. Frank Muller-Karger:**

11 Well, I want to contribute to what [unintelligible] just said, and maybe once a specific
12 entity is identified to participate in GCOOS, three or maybe two could be added to the
13 state of management. Speaking with Joe, one of the things that could be done is a mirror
14 side of HABSOS, or maybe even an area of HABSOS that explicitly shows visually the
15 contribution that Mexico maybe making as a pilot for other international HABSOS or
16 expansion of HABSOS into other more global types of applications; where they could put
17 their own data and participate in the management and design of the HABSOS web page.
18 I think it is important that if it's going to be a true collaboration, that it show that there is
19 a counterpart in Mexico that is helping manage the site.

20 **Bryon Griffith:**

21 An excellent point, and to kind of summarize what Frank pointed out – there is a missing
22 and possibly even more than one step to that end. There's a missing elemental build-up
23 of an image of HABSOS, as it is in the Northern Gulf, in the Southern Gulf, with

1 Mexico. Your data management enterprise is featured and your relationship in that regard
2 is featured in the construction of this process, and I think that's a very important and
3 valid point. Before we get off to the next one, there was a gentleman right here in the
4 middle who wanted to make a point.

5 **Unidentified Speaker:**

6 I'm going to talk about a point to which you were just referring. In Mexico we used to
7 have an inter-secretary of commission [unintelligible], that's were EMEX, the NAVY,
8 UNEP, SEMARNAT were represented. Well, it didn't work quite that well in the past,
9 but I'm sure it was better than nothing; what we have now. So, I'd like to stress a point.
10 As we hear from [unintelligible], SEMARNAT has [unintelligible]. This agenda of the
11 sea is going to be suggesting more representatives than anything else, in Mexico, to do
12 this, to take these decisions about where and how to use this voice. I would like to stress
13 also [unintelligible] that I'm sure they are going to be quite useful for red tides. But as
14 we all know, we're going to get much more from that. It's very important to involve the
15 academic institutions in those things. That's what I want to stress.

16 **Bryon Griffith:**

17 Thank-you. Yes.

18 **Unidentified Speaker:**

19 Bueno, en este caso, no creo que la agenda del mar fuera lo mas adecuado porque esta
20 actuando a otro nivel. Esta actuando a...bueno, si puede ser, pero también hay otra
21 instancia que se construyó con las universidades y que esta liderando la Secretaría de
22 Marina, que es una coordinación de investigación oceanográfica. En donde también esta
23 SEMARNAT, de donde incluye ALACET, que no esta [unintelligible] salud; que

1 tampoco esta la agenda del mar. Podemos ver ya en México cual es la mejor instancia.
2 Eso nosotros lo podemos ver. De todas maneras, casi siempre somos, como en los
3 programas de televisión, los mismos actores en diferentes puestos.

4 **Bryon Griffith:**

5 That would be only to be expected. Here I sit at the front table and make-up some
6 enterprises, a real point that I think we reached, that is most materially important, is the
7 acceptance of these roles, and the acceptance of the basic bridge to move out in this area
8 is the most important thing. You have to be the ones to qualify the appropriate agency
9 construct to carry it out. You're correct, that has to go on in Mexico. But if I have
10 reached a point where there was something that was failing, we'd have to discuss that
11 further. Yes.

12 **Unidentified Speaker:**

13 Let us not lose focus. This is within the state of the Gulf Governor's agreement. So
14 when we were speaking about setting up this equipment, this has been an initiative of the
15 states. We have invited our counterparts from the federal government and we're very
16 pleased that they're here. But again, this is the work that has been established from the
17 state of Florida to the state of Quintana Roo. We hope that the federal governments of
18 both sides will continue carrying on and developing this system. We are very interested,
19 on a state level, to be able to establish this equipment, and to share it with our
20 counterparts of all the organizations that are here today. If we're looking for
21 counterparts, I think that we shouldn't lose focus of that. This is the Governor's of the
22 Gulf States Accord.

23 **Bryon Griffith:**

1 Right. Dr. Arroyo.

2 **Dr. Maria Amparo Martinez Arroyo:**

3 Si. Totalmente de acuerdo. Yo creo que esto lo podemos discutir en México y no tiene
4 mucho caso ahora hablar aquí. Estamos de acuerdo y lo que tenemos que hacer es ver que
5 parte cumple cada quien para que el trabajo salga bien y de acuerdo a los objetivos que
6 nos estamos planteando. Creo que lo podemos discutir en México.

7 **Bryon Griffith:**

8 It will come clear in the next proposal. From a time frame stand point, that discussion,
9 that undoubtedly will take place in Mexico, would aid the process greatly to hear the
10 recommendations and conclusions from that in Cancun - in December. It will actually be
11 a feature to the survey and the inventory that will spill over from there, so I would just
12 invite you all to take up that challenge. I can assure you that your collegiate
13 representatives on the U.S. side understand this issue. State, federal, transition of
14 capacity and authorities is not an easy map to understand, and it's individually unique in
15 every area. So we have to rely on you all to solve those problems, because they must be
16 bridged over so that we can lay down the framework. Let me take you to the next one,
17 because it actually begins to feature some of the same issues. By the same token, Dr.
18 Chantiri, if I was correct in doing so, I picked up the third element of the action plan in
19 December of 2002. Proposal #3. Let me read it to you:

20 Development of a Collaborative New Real-Time Remote Sensing Capacity

21 *[presenter's comment: now I'm getting away from the institute sensors and to the Remote*
22 *Sensing presentations that were made]*

1 Capacity for the purpose of extending the developing capacities to
2 directly, or remotely detect and/or forecast the occurrence of red
3 tide blooms in the Gulf of Mexico.

4 That capacity has been featured, in many regards, in Dr. Steidinger's presentation, Tracy
5 Villareal, Kirk Wiles and others. The ability to be able to take those assets and then do
6 the interpreting analysis of the data is the end point that many of us are after. Also, to
7 bridge the adjoining research that will take place for years that will be able to mitigate
8 and control these phenomenon better. The extension of the HAB bulletins programs of
9 the Gulf States of Mexico by NOAA and ESDA's CSC, we qualified the earlier question,
10 thank goodness, we just have to get through those lawyers, about the licensing agreement.
11 And we're going to take the "no problem" and go forward with that and then qualify that
12 more formally- the Development Implantation of Field Verification Program and
13 Coordination. This is really where the rubber meets the road. The idea of being able
14 to... the extension of these kinds of capacities is to work together to make them better.
15 The cell counts, the chlorophyll counts, the other parameters that are associated with
16 observing in response to the HAB bulletin process; the corresponding relationship; the
17 benefit derived – we must move into agreement in those areas so that the field is rich, so-
18 to-speak. As the detected or even predicted conditions for blooms are featured, then the
19 data would qualify or disqualify that. I'll allow the 80% margin of accuracy. It would
20 be my suspicion, and it's all I'm doing in this regard, so help me if I've ever erred in
21 these organizational profiles - because of the nature of the red tide focus, it would be my
22 suspicion that the Ministry of Health and the associated state level services would take a
23 very strong leadership role in that regard. As you've heard here (and that's where I get

1 my thinking from) you heard how FDA basically it's the Mouse bioassays until it's
2 something else. That's the Ministry of Health, for all intensive purposes in the U.S. I'm
3 bridging off of those kinds of technical profiles. The gentleman pointed out that all I
4 needed to do is reference SEMARNAT here, but the idea you then have is the back
5 stopping service agencies dealing with water volume monitoring and any other associated
6 technical services. This seems to be where we need to ensure that what flooded it is using
7 to help calibrate the accuracy of those predictions and detections is, in essence, the same
8 thing that Veracruz is using to calibrate and qualify the accuracy of those predictions. So
9 my assumption, to bridge to what Juan Manuel said earlier is – this is just the very top of
10 the iceberg profile, because that, in essence, means the six states Health Services of the
11 Gulf of Mexico, and then from that, branching out to the associated labs. I think there is
12 a regional lab that is proposed in the capacity they would have. That leads me to #3, and
13 that is - when you employ a technology that is not currently in existence, one could only
14 assume that there is going to be some holes in that process. So it is basically essential to
15 identify those holes as early as possible. It's a gap analysis – in essence. You conduct
16 that gap analysis because you're now dealing with a technology that we heard is available
17 now - can begin now. I would propose that we simply extend that in the specifications of
18 the survey to be conducted contractually in proposal #1. For the purpose of working with
19 the Health Ministries, and the Papaloapan Gulf Council, and SEMARNAT and everyone
20 else that's in that same process; to be able to bring those findings and recommendations
21 to the table in December. If I made any sense in my earlier discussion, this is one of
22 those points of funneling and focusing on what capacity means. What does it mean to
23 deliver capacity improvement or (?) capacity in this regard? It's very focused. Thematic.

1 This is what's missing. These are the organizations that do it. It's not somebody else.
2 It's not a contractor. It's not an institute. It's the lab agency. It's that kind of thing.
3 Then from that point, because I don't know what the recommendations will spell out, is
4 the implementation of those recommendations will be specified by the complexity of
5 those recommendations. So this is a matter that would be taken up in the December
6 session, and frankly, could only be taken up in the December session, by virtue of what
7 this thing looks like. Whether it's to advance the ELISA program vs. the Mouse
8 bioassays; or whether it's a whole host of things associated with the laboratory analysis;
9 whether it is the interrogation and better understanding of the non-federal NGO level
10 programs that you use to actually get in the fields, because the coastline is so vast. How
11 do you get those samples and not [unintelligible]? It is whatever it is, but it has to be
12 specified in order to know that. I realize there's two fives here; that's kind of an artifact
13 of my not being able to type fast. As Frank was talking, and I could've employed this
14 anywhere, but it seemed a good place here - it's time to conduct a research needs analysis
15 associated with red tide blooms in the Gulf of Mexico; the uniqueness of the enterprise
16 here, for the purpose of featuring those priorities to the institutions that fund such
17 research. Instead of just a conglomeration of things to do, having a collaborative
18 consensus on what the top things to do are will go a long way in the future to securing the
19 kind of funding necessary to move ahead with MODIS, ELISA – all kinds of things. I
20 would suggest that this is one of those areas that bridges to the existing capacity of
21 institutions like USF to take a leadership role in. The intent here and my program office,
22 although it would not focus specifically on red tides - we do a research needs analysis and
23 prioritization on basically a two-year cycle. This is for the purpose of having people not

1 forget us in the broad research arena. This would be the intent of that. Again, the
2 repeated element of this, so that it's not forgotten, is that it lends it's way back to the data
3 entry and delivery tools both formulated and administered at NCDDC. So that there is
4 agreement and the continuation of the enterprise that serves to serve anyone that comes in
5 from anywhere to access this data. I could go on for sheets and sheets, but I don't have
6 that much time. I'm just trying to capture the basic five tenants of what this kind of work
7 would take to move ahead, and I'm looking for a reaction. Yes, Quay.

8 **Quay Dortch:**

9 I think you read the HABRCA; the new Harmful Algal Bloom Bill. One of the things
10 there are mutual assessments of red tides, which I assume will include things like
11 [unintelligible] and it seems like what you're suggesting there is very similar to what
12 might happen under HABRCA and [unintelligible]...Cause it would be the same to do
13 such an activity twice, and I forget if that's the one that [unintelligible] at the request of
14 state or regional agencies, but it might be that once that's passed, however that
15 mechanism occurs, that might be a way of rolling in [unintelligible].

16 **Bryon Griffith:**

17 I'm not sure everyone could follow the discussion, simply by the basis of an acronym
18 being used. The U.S. Legislature is taking up a reauthorization of the Harmful Algal
19 Blooms Research and Control Act. I hope I have that right. There you go. How could I
20 leave that out? This is one of our features. Anyway, and what Quay has informed us is
21 undoubtedly, elements of that, the passage of that act will include infusion of resources to
22 conduct regional assessments for research needs. When you get into the strategies for
23 financing, we need to not neglect that that piece of legislation is in motion, and would

1 serve as a target to acquire the resources necessary to do a thorough job in that regard.
2 To have a collection of experts serving as a cooperative team like this is not necessarily
3 that common and it should go a long way in the opportunities to seek those resources and
4 that act once it has actually done it's thing. Yes Pat.

5 **Pat:**

6 I know we all appreciate congresses efforts to pass legislation. We all know that some of
7 these things take as much time as it takes a glacier to form, so you need to be a little more
8 careful about perhaps postponing activities. I would encourage us to proceed with your
9 time frame, and in the event that the congressional legislation is passed, we'll be way
10 ahead of the game.

11 **Bryon Griffith:**

12 In all cases, there's always a hybrid. There is a level of effort that can be undertaken by
13 December – not to be forgotten. And then there is a more thorough examination of the
14 stake of the research that could be entertained in the full sense of applying to a
15 [unintelligible]. Yes. Dr. Arroyo.

16 **Dr. Maria Amparo Martinez Arroyo:**

17 Thinking out loud, regarding what was said a while ago with Manuel, this concern that
18 the [lady] doctor mentioned. We could add a procedure in all of the parts where
19 SEMARNAT appears and this we would notify them after when we are in agreement
20 with the six states, but it could be an instance that unifies the state, local governments,
21 and the groups of research. There is an instance that has been proposed: also in Veracruz
22 the Center of Ecology that is a panel discussion. It could be that type or it could be where
23 the governors' accord had a place in designating the environmental authorities, for

1 example, or some group so that it participates like a group in that coordination. It is only
2 an idea that I mention so that that possibility would be taken into account and then we
3 would tell them how we thought that we could be better organized in order to include the
4 state and research levels.

5 **Bryon Griffith:**

6 Responses or comments? That sounds plausible to me.

7 **Unidentified Speaker:**

8 That is a good step in the collaboration that we are seeking, finally what we are talking
9 about is about the homologation of tasks which are already being done, and that they are
10 doing for each one of the representatives that are here in force, supposedly coordinated,
11 but that in reality has not done it in an optimal form. Therefore, yes it is necessary, that
12 from the beginning there is a dialogue about methods, protocols--- that type of things
13 between the states of the federation. Precisely what is being sought is that there is a
14 coordination, and for that reason we are here in New Orleans with our counterparts in the
15 United States. If we achieve those levels of such elementary collaboration, in things that
16 are already being done, we will have taken a step forward in an important manner. And it
17 is not a situation about hierarchies, agencies and representations. If not, they are aspects,
18 now in the mind, methodological ones that are the ones that we must first remember.
19 Therefore, we have to design a system in which all of us can feel comfortable and also
20 represented. The point that Arenas made about not excluding the researchers is very
21 important, because to date, we have given a very governmental orientation, when in
22 reality, the researchers have much to contribute, if they were involved in this type of
23 programs from the beginning. Thanks.

1 **Bryon Griffith:**

2 Just before I bridge over to Dr. Orsi, let me explain to you a little process associated with
3 these proposals that I want to recommend to you all, as will probably heighten the
4 discussion to follow. This is a basic skeletal outline of a major project plan, and of where
5 we have gotten tentative, if not direct agreement on the elements of this in this workshop.
6 The secondary approach to that would be to have each of the leaders, in each one of the
7 respective areas, supplement this with a more detailed project plan that outlines the steps
8 that they anticipate will be undertaken in the time frame associated with the overall
9 proposal goal. My office is lacking, unless someone else would like to propose to do that,
10 my office would be glad to serve as the coordinator in that regard. So that the blueprint
11 in it's entirety is tracked, understood and conveyed to the entire group and will help keep
12 us on course. That's just a suggestion to ponder as we go through the balance and figure
13 out how to wrap up the next steps. Just one suggestion - as particularly noticed in both
14 that conversation and the one that preceded it, in the closing of the prior area there, when
15 you are introducing something, as Juan Manuel said, both as fundamental, but as
16 important as this, it requires a very coordinated leadership role on the part of the
17 associated organizations. They will have to carry it out. The discussions that will go on
18 in Mexico are not similar to the discussions that will go on in the U.S. for the roles that
19 we carry in this. I look forward to seeing all of those pieces come back together and
20 formulate what will undoubtedly be a model and featured blueprint for much of the work
21 that's discussed for White water and Blue water and other things. You can imagine the
22 steps that we're taking here. Everyone's going to have to take on, no matter how big or
23 small the landscape is, new areas of these adventures. So, we'll cut that path together a

1 little bit. So that we can effectively give the presentation the time it needs and to break
2 correctly at one o'clock for lunch, I'm going to ask Dr. Orsi to come up and we're going
3 to get his presentations up. Actually if you'll just give me just a...(pause) Okay. Sorry.

4 **Dr. Tim Orsi:**

5 While they're setting this up, there were a couple of comments I'd like to make, or some
6 acknowledgements. One, I'd like thank Joe Stinus, who is the Director of NCDDC, who
7 inherited me in this program. He's been very supportive and I kept saying, "This is going
8 to be big! This is going to big!" And he's like, "Uh Huh" ...and here we are. Also, I
9 would like to thank the Gulf of Mexico Program. It's been a couple of years now with
10 Larinda , Ryan, Gloria and Fred. It's a wonderful relationship. You know when Jim
11 Giatina stepped down, we were kind of going...but you know, if this is any indication of
12 what's to come, this *is* going to be big. A third thing - we have a distinguished professor
13 here. Dr. Steidinger there's an awful rumor that you're going to retire, but she told me
14 yesterday that no, she just decided to work for free. [laughter] But on a personal level, I
15 wanted to thank-you for your support and for your enthusiasm. You're very inspiring
16 and it's been a pleasure. Sounds like a eulogy, but it's not. And last, you were talking
17 about opportunistic...last week I got a phone call from a student at Tulane University at
18 the Center for Public Health, and he said, "Well, can I come to that? I'm really interested
19 in HABS" And so, here he is. I said, "Get up and come on down." So we have a full
20 circle here. We have new students coming in so we have a future with this. I'm actually
21 glad it quit thundering, cause at nine o'clock at night I morph into a musician, and ask
22 Sam, there's nothing more frightening than a musician with thunder and a loud mike.
23 I'm not lying about that am I? It's terrifying.

1 **Bryon Griffith:**

2 What kind of music?

3 **Dr. Tim Orsi:**

4 Anything that will make a dollar. No, actually, it's kind of along the lines of the Neville
5 Brothers and ...well, I can get started on mine, that way we can...okay. My name is Tim
6 Orsi and Jeanne Allen is my assistant, and as Bryon said, she does all the work and I say
7 things like, "Yes, we can do that" and then she starts to fret and I...what I'd like to do is
8 start off with some slides that are redundant from what Joe showed yesterday, but I just
9 wanted to make sure that I mentioned a couple of points. I'll start off with a little history
10 of what we're doing with HABSOS. A little overview - go into the Arc IMS application
11 and then Jenny is going to demo this. Discuss some of the data needs that we have; that
12 are unique to this phenomenon. Discuss some of the design, and I'll try to go through
13 this rapidly. I'm not going to dwell on this, although I have until seven. [laughter] I can't
14 keep a train of thought that long so...and then maybe pat ourselves on the back and
15 discuss some of the accomplishments and really give some idea of where we're going
16 with this in the future. Okay, one thing I'd like to reemphasize is that HABSOS is not a
17 new idea. There was a guy in the back there, Fred Kopfler, with the EPA who had this
18 idea back in 1989. Fred thinks deep thoughts when he says things like, "I don't
19 understand why we can't..." and then you know something is getting ready to come out
20 of his mouth, and I would invite you, if you don't know Fred, to take a moment and get to
21 know him cause he's insightful. As you see down toward the bottom of this in the 2002-
22 2003, you see things are starting to accelerate. All this started from an email from Karen,
23 that Frank had sent to Karen, and Karen said, "Why don't you invite Tim over to brief

1 HABSOS at the accord meeting?" That was the day before the meeting, and so we
2 hopped on a plane and briefed it. Bryon happened to be there at the same time,
3 unbeknownst to me and one thing led to another, and here we are. Very briefly - what
4 we're trying to do is develop communication skills - a communication and support tool
5 for algal blooms. The most important thing here is that it's user defined. It really is user
6 defined, and the more input I get from you, the more I can make decisions as far as how
7 we implement this. I really don't think it's worthwhile for us to try to invent anything if
8 no one is going to use it. Again, there are a lot of people. Some are more engaged than
9 others. One thing I'd really like to emphasize is the fact that we've engaged industry.
10 Marathon Oil is very interested in what we're doing, and that's required some password
11 protections, because we're faced with protecting their economic investment. It was
12 decided that it's to our best advantage to be inclusive and to have everybody involved,
13 and then also, bridges to the commercial sector. For instance, the Weather Channel, who
14 is already supplying Internet based applications - do we reinvent the wheel? Do we
15 compete? I don't think we can. I think we would be smart to incorporate this where we
16 could. Again, 24-hour priority, so this is user defined. We're not reinventing the wheel.
17 HABSOS is unusual in that the state resource managers got together, in I think it was
18 2001, in Pensacola, and decided this is the sorts of things we need. Jeanne will go over
19 this in more detail. All I wanted to do was illustrate on here that we've already started
20 with this collaboration with our colleagues at Veracruz. Thank-you very much Rosa. It's
21 been a pleasure. We've already started including some of the functionality into the
22 website, so we have begun. One thing about HABSOS that makes it a little bit more
23 unusual than more observing systems is - it has a significant biological component. We

1 have the HABS information. You would think that those (?), it would be easy to
2 integrate into this, but it took some doing. We have shellfish information; (?) reporting;
3 volunteer watch. For instance, like Karen explained of Florida. We have aquatic
4 mortality. Fish kills; it's not quite clear exactly how we integrate this into this
5 quantitative system, but we're working on it, and a number of other things. Some of
6 them more traditional like biology, or oceanography and meteorology are part of this too.
7 This is a huge task and what we found is that we have to divide into what we call
8 modules, where we're taking each data type and mapping it out – this was a natural
9 evolution with HABSOS. There was some overlap between the various data streams, but
10 for the most part, they're uniquely involved; unique user groups. The advantage though,
11 is that it really aids me in particular in identifying the key agencies and technical experts
12 to assist in this. It focuses our resources. It brings technical people together with similar
13 and common interests. So, it really has a number of advantages that we're trying to
14 exploit. Foundational errors... we need bathymetry. We need boundaries. One thing I'd
15 like to mention is that during the discussion with Dr. David Dibbens of the National
16 Geophysical Agent Center, he expressed interest in that he would like to extend this
17 coastal release map to Mexico if he could obtain the data, so what I'm suggesting is that
18 if we can get information, we can divert into products. This is an example of the weather
19 module. Again, I'm not sure if it's appropriate for us to try to recreate the wheel. If
20 industry has already, or the commercial sector has already developed this, I'm not sure
21 how we deal with this. This is one of the things that we're having to work through.
22 Oceanography? We've mentioned the ocean observing systems. This has been
23 considered one of the major components for the Gulf of Mexico. One thing that we

1 found interesting is - just because we have information that's available or data at hand,
2 doesn't mean it all is going to be useful. This sounds like it was a no-brainer, but this
3 took a lot of time. What we came up with was the idea that we needed applications to
4 streamline the data entry process - to get this information into the system. It's critical if
5 we're going to have a Real-Time system. What we did is - we made some copies of this,
6 so they'll be available. We're in the process of revising this. Simplifying. And so, it's
7 available. Another thing that we're doing is leveraging existing projects. For instance,
8 like Steve Morton's group at Fort Johnson, who is developing the shellfish information
9 management system. This is going to come online somewhere around October. I think
10 this is what Paul said. So there's been a lot of interaction between HABSOS and Paul's
11 group in that - how can we exploit this and really leverage this to the next level? Again,
12 not reinventing the wheel, but trying to work together. It's been said a number of times,
13 but I'm not sure it's true. You know, "We're all working together", but we really are
14 trying with HABSOS. Another example has to do with Darlene Haverkamp and Linda
15 Harwell's GIMNET application. This is another example of one of the projects that we'd
16 like to try to leverage. Darlene simplified this. One of the problems is that some of the
17 data applications became too complicated so no one would use them, or there was some
18 resistance in using them. So, we're adopting a philosophy. Let's pill it back and go back
19 to the bare necessities and then maybe flesh it out from there and see what the optimal
20 level of complexity is. Remote Sensing? There was some comment made yesterday
21 about it not being clear who was going to supply the data; the MODIS data. I beg to
22 differ. I think it's pretty clear. You know, USF keeps coming up over and over again. It
23 would seem to me that this would be the obvious link into the satellite imagery. There's

1 some issues that we need to work through. Frank. Thank-you. By the proximity that the
2 center has with the NAVY, we have lots of opportunity to interact and there are a lot of
3 sophisticated models that are being developed. So what I see my role within HABSOS is
4 to see what sorts of products the NAVY is developing, and there's always interest in
5 providing use of these tools for what they call the continental U.S. These are operational
6 products made for warfare type applications, but a lot of them can be used for what we're
7 doing. An example of this would be the ECOM, the BE(?) Coastal Ocean Model. I think
8 Robert Caroussel had mentioned some interest in extending this from the Mississippi
9 westward. As you can see, the grid on this is extremely fine so this is a circulation model
10 that predicts salinities and that sort of thing. This is the source of information that we're
11 looking to integrate into HABSOS. Bid reporting? We talked about this *this* morning.
12 How do we coordinate this where a state resource manager in Texas can enter a question
13 in and it can be answered by somebody in Florida? There are all sorts of implications
14 here. One has to do with the press. The press sometimes gets exuberant and they like a
15 good story, you know, and this could be (?) if this gets out of hand. This is the sort of
16 thing that we're looking into and developing. Again, the volunteer watch. Karen showed
17 all these mechanisms of ways of observing. Really, it doesn't necessarily have to be a
18 physical measurement. It could be people among cruise ships just looking. Okay. What did
19 we do? I think we've been very successful in the time we've been doing this. We have
20 encountered just about every political and economic barrier you can run into and I think
21 we're solving them, only because we're listening and we're working through that. And
22 the HABSOS group really is a dynamic group, and so there is a real interest in making
23 this work. The HAB network is extending. It's expanding. There's a lot of interest all

1 over the country and all over the world about what we're doing down here, so it's
2 growing. We have a website. Feel free to check into that. It's at:
3 www.ncddc.noaa.gov/habsos. I think it's on some of the literature outside. We're
4 creating common online data tools, but we really need user input. I think Kirt Wiles from
5 Texas made it very clear yesterday that we need to have them simple so that we don't
6 have to redo things, and so we're very conscious of that. Again, we're collaborating.
7 We're leveraging. We're opportunistic. I think that's the word we used. So, I'd like to
8 turn things over to Jeanne and let her show what we've done so far. This is her baby, and
9 she's done a very good job. Any questions or we'll just go right to hers.

10 **Unidentified Speaker:**

11 It is really interesting that you gave us this presentation, because it's some sort of
12 integration of the ideas that we were trying to work in the previous station - on the
13 integration of the observation system in Mexico. How do you deal with the coordination;
14 with GCOOS and HABSOS and, I guess, Karen's laboratory or institute in order for you
15 to integrate this information in one entity or one institution so it's not being repeated? Or
16 how do you update...?

17 **Dr. Tim Orsi:**

18 At this point, I'm not sure how tied into GCOOS we are. I mean, there's interest in that,
19 but at this stage, GCOOS is in the process of formalizing the structure of that. HABSOS
20 did that a year or so ago with MOA's and MOU's and so I'm not exactly sure what the
21 status of that is. Texas A&M put together their proposal and I think Frank with
22 [unintelligible] Allen are getting this portion and ...

23 **Unidentified Speaker:**

1 If I could just chime in for a second. There are a number of connections that have been
2 made with other projects. I think that's one of the strengths and one of the benefits that
3 our center has been able to enjoy. We've got about a dozen different programs that are
4 very similar to HABSOS, but look at different areas. Not only geographic areas, but
5 different dynamic processes. And as we discover tools and capabilities and work with
6 the other state, federal and university organizations, this bleeds over into HABSOS. So
7 HABSOS was evolutionary a number of years that got to this point - we'll say a building
8 process. We started with one state at a time. We have people out in the field; we call
9 them liaison officers, that spend a good percentage of their time on the road visiting the
10 state agencies; visiting the universities; visiting the other federal agencies, and working
11 toward a consensus building to get the inclusion in place. As far as the ocean observing
12 systems, the IOOS or the GCOOS, whatever you want to call it, that has been ongoing for
13 even longer, and it's just recently that we got everybody together in a single room. Much
14 like this, to discuss what the needs were; what the desires; what the goals were, and to get
15 everyone to put it on paper so they could all see it and go, "Yes, that's what we want."
16 And sign it. During the last couple of years, we've connected a number of the observing
17 systems so they're all lined right now. We don't have all of them. We've got about half
18 a dozen major systems, plus the NOAA buoy system in the Gulf of Mexico. Out of all
19 the buoys that are there, I'd say maybe 70% of them are connected right now where you
20 could go and access their data Real Time and pull it up. It doesn't happen over night, but
21 it is something that we're seeing and that has really good (?) experience so far in bringing
22 these different interests together for the common goal.

23 **Dr. Tim Orsi:**

1 That's a good point. I said that because there's a separate program manager that handles
2 the IOOS effort within the center. Although we try to coordinate possibly... so when I
3 say, "I really don't know what the status is..." that's what I'm saying. I haven't talked
4 with him in the last week or so.

5 **Unidentified Speaker:**

6 Does that coordination also include with land based, terrestrial sort of agencies. Like
7 U.S.G.S, Department of Agriculture...

8 **Dr. Tim Orsi:**

9 It hasn't at this point. No, it hasn't. We've had some meetings with U.S.G.S., but one
10 thing we've found – you have to find the champion within each organization that's
11 willing to push the envelope. We have someone at MMS that's done that. With U.S.G.S
12 we had a meeting; a major meeting, and there was a lot of interest in working together.
13 You know, one thing led to another and somebody went in, and nothing happened. So, it'
14 s time to revisit that.

15 **Unidentified Speaker:**

16 I would agree. The connection with land based sources of pollution is a global issue and
17 it's certainly something that U.S. government supports strongly throughout all of it's
18 programs...

19 **Dr. Tim Orsi:**

20 If I could interject again, there are a number of different programs. One of them that
21 we're working on is Hypoxia, and of course, our definition for our mission is – we're
22 coastal based. What is coastal? Well, our definition is -- it goes in to include all the
23 watershed, so it's about 200-300 hundred miles inland and then at least 200 miles for the

1 exclusive economic zone, out. So, you're looking at a 500-600 mile sloth around the
2 U.S. that we're responsible for writing the data and information access. So we do have
3 pretty close ties with U.S.G.S. interior. In fact, we've got a program with invasive
4 species right now. We are trying to link, very similar to HABSOS, but it's a separate
5 program, a terrestrial based program within the U.S. and territories and islands with the
6 Marine Program as well. Yes, we are tied.

7 **Ms. Jeanne Allen:**

8 What I want to show you is a little bit of what we've done using the Arc IMS package
9 from ESRI; how we collaborated with the five coastal states in the U.S.; to pull the data
10 together and then to show that data. I think Tracy said it best; he loves to play with his
11 tools. We did start putting in the Mexico data. We received it a little while back and I do
12 appreciate that data being sent to us, so we could try to add that in there as well, and
13 we're looking forward to some more data in the future. This is Arc IMS. You can tell, if
14 you've ever worked with this, that this is not the out-of-the-box application. There's
15 been a lot of customization done to this. The customization that was done to this was
16 based upon the HABSOS working group that we had. And so this has been user driven
17 of how it was designed from the very beginning. We have data that is from the five
18 states. It took us a while to collect or gather the data from the states. There were
19 political issues. Some was just a matter of gathering the data. It wasn't even in
20 electronic format. It was still sitting somewhere else. So, with working with the five
21 states, we were able to take that data and bring it into one common format. Florida,
22 which is well known for wonderful data, had more than any of the other states combined.
23 So we just took out what we needed. Chlorophyll, dissolved oxygen, the cell counts,

1 temperature, salinity - those were the common fields that we used when we built this, and
2 this is how this was based. So we put it all into one common format, and this is how we
3 built this. And, I'll show you a little bit of what we've got. Just recently we did add the
4 Mexican states as well, so everything that I'm going to show based on the U.S. side is
5 working pretty much on the Mexican side as well, except with the cell count data. The
6 data I got there was toxicity and not actual cell count. Just to show a little bit of what
7 I've got, I'm going to show you how the time series model works, and this is where
8 Tracy probably has his best fun with this. This also will allow you to look at how the
9 blooms are moving during an [unintelligible]; you could actually see that through a
10 mapping software. I'm going to go ahead and zoom into Florida a little bit.

11 And the data we see here for Florida is from 1996 to 2000, so, it is a lot of data. Any
12 state resource manager, anyone looking at this would think that it is just too much to
13 comprehend, especially when you are trying to work with it in a smaller time frame. We
14 came up with the time series model that will let us break that down to a more manageable
15 time period. I am going to choose a time period that I am very familiar with. We are
16 going to go to the year 2000, September 25th and it is going to end on October 5th. Some
17 other things that we have built into the query as well, we can query with that time, with
18 salinity, temperature, chlorophyll, no, I am sorry, just dissolved oxygen, so, we can add
19 those three in addition to the times theory. Now, I am not going to do those for now. I
20 would click the submit button, and now, I have broken down the data from September
21 25th to October 5th, and you see just the data for that time period. I am going to zoom in a
22 little closer and show you what is going to happen when I do a little more study on this
23 particular bloom event. This is the data for the entire time period. What if I want to

1 break it down and look at one day at a time? I want to see the movement of the data.
2 The other option that I have in here as well, and you will see this happen when I click, is
3 that I now have September 25th. This is their data for September 25th. I also have an
4 option for imagery. We have coast watches supply us with the sea surface temperature
5 and the AVHRR. So, that we can add that in with the cell count data for a particular day.
6 If that day is available, we will see that, if it is not, we have to look for other means. We
7 created it as a thumbnail, because we did not want to slow down ArcIMS and bog it
8 down. We were trying to keep the speed up. Users are not going to want to come to the
9 site and wait 30 seconds for an image to appear. We were trying to help the users. So,
10 here is September 25th, I can click on SST and there is an image available for that
11 particular day. So, I am going to add it, just to let you see how it works, and there is my
12 imagery for September 25th with the data for that particular day. We take it back out, just
13 to show you how we can watch the bloom move. I am just clicking on a button that is
14 going to let me advance one day. As it advances, you can see the bloom moving. Tracy
15 has great dates that he uses in Texas, and I am not familiar with his dates in Texas. This
16 is what I was hoping to do for the Mexico states as well, if we can gather that data and
17 incorporate it into this system, we can map it in a relatively short time now.
18 When we started this, it did take months to get the data together; there was so much that
19 needed to be done. But as we have developed this, and we know what we now need, we
20 can shorten that amount of time and bring it up faster, so that it can be mapped and it can
21 be seen relatively sooner than usual. If I wanted to start over, I could actually start over.
22 I want to find a chlorophyll image really fast for you, and show you that one as well. We
23 have talked about how remote sensing can play a part of that and we are trying to

1 incorporate that into this system. I am not saying it is the best yet, we are working on it.
2 It is user driven. Whatever the users need to try to incorporate it to make it the best
3 system that we can. And that is all I have. Are there any questions?

4 Applause

5 **Unidentified Speaker:**

6 We want to know if the data that we sent you from Veracruz are those that you needed or
7 do you need something else? Because we do not know very well which are the
8 parameters that you are including in this system, therefore, possibly we are having other
9 parameters or measurements, and with the purpose of standardizing and being able to
10 have a real panorama, we want to know how to be in agreement with this.

11 **Jeanne Allen:**

12 We use cells per liter in the data that I have shown for the U.S. The data that was sent to
13 us from Mexico was in a different format. It is a different toxicity [unintelligible]. I am a
14 geographer, not an oceanographer, so you all bear with me when I am trying to get all of
15 this correct. I had to map it separately, so the time series query does not work for the
16 Mexico data right now. If we were to receive cell count data in cells per milliliter, cells
17 per liter, either one, I can do the conversions, then I would be able to map it in there and
18 then use the time series model to go with that. I mentioned earlier some of the fields that
19 we are using for the cell count. We do have the dissolved oxygen, salinity, temperature,
20 as well as the cell count. Those are the main parameters that we are using right now. In
21 the future we hope we can add more to it. That is what we started with.

22 **Unidentified Speaker:**

23 I have a technical question. The images that you integrate in the system (inaudible) or

1 like original images without digital [unintelligible] created by algal blooms?

2 **Jeanne Allen:**

3 They are Coastwatch images from NOAA. The assumptions that Rick Stumpf has done
4 are not added into that. It is just the imagery. I think you would have use the
5 [unintelligible] to probably go along with that to further analyze that.

6 **Unidentified Speaker:**

7 That is not raw data. They are processed in the standard way to give temperature. It is
8 processed.

9 **Bryon Griffith:**

10 I would like to mention that as a result of this meeting, we will be working in the next
11 twelve months, or hopefully less, on merging all the NOAA activities for HABS into a
12 single site. So, I am hoping to see the bulletin, in this particular website, merge. That is
13 fairly simple. I think that what we would like to do is, again, have a single site so you
14 don't have to do multiple searches to find associated data and information. That should
15 make things a little bit easier.

16 **Jeanne Allen:**

17 The ultimate goal is to be, as Mary Culver mentioned yesterday, in a real time application
18 where the data can be received in short term and be mapped out on a ArcIMS site so that
19 the folks who need to see it, can see it.

20 **Bryon Griffith:**

21 Jeanne and Tim, thank you. That was a great presentation and a great illustration of the
22 capacity that can be engendered from the collaboration like this. Getting the data in, is
23 obviously, getting the data out. That is what is most important. In response to that

1 question about compatibility, although I used a different set of terms in the prior close out
2 of the actions, the gap analysis or compatibility analysis has to be undertaken. The
3 opportunity to have this advancement from the data set from Veracruz and, obviously, the
4 outcome being the conversions that Jeanne mentioned, and then what happens by virtue
5 of those conversions, limiting the tool set to you, has to be exposed in an analysis, so that
6 we can differentiate between what can be changed, what can't be changed and why.
7 Benefits will typically drive those formulas. That is what is intended by that gap
8 analysis, and ultimately, where we would go. I was hoping the context of that
9 demonstration, where it was a demonstration of an actual application in Florida, and the
10 conceptual extension of that, to Mexico, would be well invited and a very useful tool set
11 to the practicing event response managers. Well, we are at the one o'clock time frame for
12 lunch, while we still have a lunchroom open downstairs, and luckily, the weather has
13 blessed us with a recess. I have not heard any thunder in a little while. We are to
14 reconvene here at three. We have made up a lot of time, in large part because we dealt
15 with a lot of financing and commitment issues during the course of the discussion. I feel
16 very comfortable with the way we will wrap up this afternoon. See you all back here at
17 three and continue.

18 [after the break]

19 We have one remaining presentation to give and get that was not in your agenda
20 originally. Ms. Ana Laura Dominguez is going to give us a presentation involving the
21 monitoring activities of the Ecology Institute, Coastal Resources program. Immediately
22 following that, we are going to get down to the work of summarizing, picking up our last
23 piece of the action in the information technology area and then summarizing where we

1 are. You probably haven't been paying any attention, right here on the right, to this
2 parking lot. It is growing. There is crowded parking there now, and we are going to
3 have to go through that together before we get out. Also, as we get started here, I would
4 like the opportunity to introduce to the group, Dr. Gary Springer, who is the Executive
5 Secretariat for the Gulf States Governor's Accord. He has joined us today, just in
6 advance of the Accord's meetings. Actually, he might want to say a word or two to us.
7 We would appreciate that.

8 **Dr. Gary Springer:**

9 Thank you very much, Bryon. In particular, I want to thank all of you for doing
10 something that the Gulf of Mexico States' Accord has never done before. That is, taking
11 an idea, taking a project that has been discussed for as many years as the Accord has been
12 around, and taking that project to the next level. This next level is, finding some
13 programs and some projects that we, in the Gulf of Mexico, in the U.S. side, and also on
14 the Mexican side, can collaborate on and can work to protect our most common resource,
15 the Gulf of Mexico. I congratulate and applaud Bryon and Juan Manual Irigoyen, Dr.
16 Chantiri and Frank Muller Karger, who all have collaborated to do this for the first time.
17 I applaud all of you for being first, and we know you won't be the last because we have a
18 number of other projects that are just about to do the same types of things in their fields.
19 If I can just announce one little thing, Bryon, before I leave the podium. We are in the
20 process right now of discussing what we are calling the Gulf of Mexico Transportation
21 Study. There are really two things that can do in the Gulf of Mexico. We can protect and
22 sustain our common natural resource, but then we also need to learn how to use it better
23 in a sustainable manner. A lot of that will have to do with shipping and trade and more

1 commerce back and forth across the Gulf of Mexico. One of the areas that we will look
2 at in the transportation study, which will of course include logistics and transportation
3 and distribution networks, and railroads and roads, and all of those good things. One of
4 the novel areas that we would like to create, as a piece of this transportation study, would
5 be an environmental impact assessment on the Gulf of Mexico. What will increase
6 transportation in the Gulf of Mexico mean to our common environmental resource and
7 how do we sustain it? This is the first go-round that you all are involved in in moving to
8 the next level. We will look forward to having you all involved as well on helping to
9 sustain our great national resource. Thank you all very much.

10 Applause

11 **Ana Laura Dominguez:**

12 Good afternoon. I prefer to speak in Spanish instead of doing it in poor English. I want
13 to talk to you a little about our institution that is the Institute of Ecology. It is a public
14 research institute sponsored by the COLAGE among others. Within it, five years ago, the
15 Program of Coastal Resources was inaugurated in which I work. The general purpose of
16 what the program is to try to combine what is theory, concept and methodological
17 approaches, in order to develop research and advance towards that which would be the
18 coastal resources. All of this goes towards what would be the managing of the
19 environment of the coastal ecosystems and of the natural resources. The main point
20 would be to integrate the economic, ecological and social framework in order to protect
21 the biodiversity and the functioning of the coastal area with a focal point towards the
22 sustainable development of the use of coastal resources. Now more concretely there
23 would be three main objectives that is to carry out activities of research and management

1 oriented towards the social, academic and private needs of the private sector, in order to
2 reinforce that which would be higher learning and in this manner reinforce the academic,
3 social and private sectors. And all this research that is done around it, publicize it
4 through the means of diffusion that would be reports, publications, etc. We have three
5 lines of main research. That on environmental sustainability, and the economic
6 development of the coastal area. The vulnerability of the coast and of the Gulf of Mexico
7 and the Caribbean due to climatic change and finally that which would be an integral
8 management, to carry out research on the integral management of the coastal area. We
9 are developing different projects related to the entire Gulf of Mexico. Here I am just
10 going to mention two, not because the others are not related with the topic that we are
11 seeing at this time, and the third one that is the panel that Dr. Amparo Martínez
12 mentioned. The first one that of developing statutory patterns of the ecological processes
13 and the functional structure of the statutory part of the Gulf of Mexico. The other is a
14 global evaluation of the international waters. It tries to establish a physical and
15 environmental characterization of that which would be the different states that make up
16 the Gulf of Mexico on the Mexican side that is from Tamaulipas to Quintana Roo. Here
17 the only thing that we see are different physical characteristics, the altitude that we may
18 have, the longitude of the coast line, the different municipals that make up the entire
19 state, and the coastal municipals, and the number of coastal lagoons that we can
20 encounter within each one of the states. Also its geology and its morphology are
21 characterized and we see, for example, in this slide, that the continental platform is wider
22 Towards the Yucatan peninsula and narrows towards Tamaulipas. Here are the
23 discharges of the rivers associated to the Gulf of Mexico. Here we see that which would

1 be all of the Gulf of Mexico, including, towards the bottom part, Florida, and towards the
2 part at the top, Mexico towards the Grijalva Sumacinta that is in the state of Tabasco that
3 is the last river within the Gulf of Mexico. This is the different patterns of tides along all
4 of the states. In each one of the states, each one of the lagoons is being characterized that
5 we can find. Here I am only going to show some examples. For Tamiagua lagoon,
6 located in the north of Veracruz, we discovered its surface, which is its geological origin,
7 what is its morphology, what are its characteristics that are determining its
8 hydrodynamics, as in this case are two mouths of estuaries, and the absence or presence
9 of superficial rivers, in this case, it is part of the basin of Tuxpanautla, but there are no
10 rivers that discharge directly into it, or are very intermittent. The Alvarado lagoon, which
11 has come to light here in different opportunities, the same comes, here it is important to
12 point out that it is a delta system, we have a very strong superficial river. And these are
13 characteristics that finally are going to give the productivity and the diversity of each one
14 of the environments as we are going to see below. The swamps of Xentla, that is where
15 the main river of the Gulf of Mexico is discharged that pertains to Mexico, that is the
16 Grijalva Sumacinta, and here we have what is a chain of interconnected deltas, and
17 therefore there are many wetlands that are associated to these, and also important areas of
18 mangrove associated to this plain. The lagoon of Términos, that together with the
19 swamps of Xentla, constitute one of the main areas more diverse in aquatic vegetation
20 and subaquatic from Mesoamerica, its importance is throughout these parts of wetlands
21 that we have. Here discharge three different rivers to the lagoon and it is one of the most
22 productive lagoons. Outwardly is one of the most important activities for Mexico that is
23 the petroleum exploitation with large continental platforms. The Serestún lagoon that is

1 just where the peninsula of Yucatan ends. This lagoon is important because its
2 discharges, does not have superficial rivers, but its subterranean discharges are very
3 important in the contribution of nutrients and of sediments. Here also we see that here
4 everything the complete physiognomy changes. Now it is a caustic environment. The
5 most important thing about this is its subterranean discharges. Here we see a photograph
6 or a framework of what would be a typical coast of the state of Quintana Roo. From the
7 coastal area we see that there is a reef barrier, a lagoon, seeing it from the part of the sea
8 towards land, is the reef breaking the barrier is, the lagoon in the middle and a beach
9 barrier or a barrier formed by the accumulation of sand and shells. Then here comes the
10 entire part of mangroves and internal coastal lagoons. Here Yancán, besides it being also
11 a protected area, it corresponds to that which would be two important areas regarding the
12 subterranean discharges that they have, and the great importance of the availability of
13 sweet water. What I mentioned to you, the primary productivity is going to in relation to
14 the contributions they have. We see that for Alvarado, Xentla and Términos, are the ones
15 they have, really, superficial rivers with continuous discharges. We see that a great
16 productivity exists in them. The species of mollusks also are highly diverse in the lagoon
17 of Términos and the Alvarado lagoon. Here we have still to search more in regard to the
18 diversity that exists, because here information is lacking. Macrocrustaceans, we see that
19 Alvarado and Términos are the places which they are more important Tamiagua and
20 Madre lagoon. The diversity of species of fishes is greater in the lagoon of Términos, but
21 one must remember that this is one lagoon where three rivers are associated. These three
22 rivers, internally, form lagoons and this cause there to exist a great diversity of not only
23 freshwater fishes, but statuary species and species of marine origin. Xentla is a swampy

1 place; the freshwater fishes are predominant. And Alvarado may have this similarity with
2 that which would be the lagoon of Términos. The project of Global Valuation of
3 International Waters, this is sponsored by the University of CALMAR and by the UNEP.
4 The difference in this embraces the Gulf of Mexico and we have determined that there
5 exist five important hydrologic regions within the gulf. The west coast of Florida, the
6 entire basin of the Mississippi River, the basin of the Río Grande, Río Bravo, the basin of
7 Leocuzamacinte, in Grijalva, and the basin of the Río Hondo. We from north to south.
8 The meeting of different experts we determine which ones would be of the most
9 important impact or the main problems associated to the scarcity of water, contamination,
10 modification of the habitat and of communities, exploitation non-sustainable resources
11 aquatic borders, and finally what would be affecting global change. Here we see that for
12 the case of the Rio Grande in particular, the scale goes from zero, no impact, to three,
13 very high impact. If you see that everything is red, it is because the impact is very high
14 regarding the scarcity of water. In fact in the year 2001, the mouth of the Rio Grande
15 closed because of the scarcity of water. This scarcity of water is directed to what would
16 be irrigation areas, or fishery uses. Here the results that are obtained from each one of
17 the subsystems evaluated for each one of the basins and we see that the contamination is
18 the factor that prevails in all of them. Also we see that the scarcity of water is, for the
19 Rio Grande, a main factor that has to be attacked besides the contamination. And with
20 regard to modification or loss of habitat, the Mississippi, towards the coastal side, is
21 losing a large amount of wetlands. With regard to contamination, we detect that the
22 contamination is associated moreso to the fertilizers and agrochemicals in general,
23 pesticides, etc. I wanted to demonstrate this to you because within the Institute of

1 Ecology we have a station that is the Center of Coastal Research in La Mancha that is
2 very near that which is the Nucleo-Electric, the only Nucleoelectric that we have in
3 Mexico. We think that within these installations it is very feasible to have a monitoring
4 station that we are right now talking about which would be the more adequate places and
5 who of us could make the follow-up of these timeslots that are necessary. Finally,
6 making an evaluation of that which would be all the physical, biological, characteristics
7 and the state of health of the ecosystems. I believe that these could be one of the stations
8 that we could begin monitoring, or, at least try to begin to make them in regards to these.
9 Each one of them, beginning from north to south, is the Madre lagoon, which is an area
10 that is drying up; then the Soto la Marina, that is an area also very much influenced by
11 the agricultural activities; the third one, is the Panuco River, this area is very important
12 because since Mexico City was a wetland, or it was a lagoon, or a lake, if you know that
13 history of our great city, to try and dry it up, they made all of the connections in such a
14 way that they discharge all of the dirty water to the Panuco River. It is a very important
15 place in regards to contribution of coliform and contribution of nutrients. The Tuxpan
16 River, the Verde lagoon, La Mancha, which is the city of Veracruz, the Papaloapan
17 River, which is what is associated to the Alvarado lagoon, the Quetzacoatl River... from
18 which rose the concern. The Grijalva Sumacinta River that is also associated to many of
19 the petroleum activities. There is one of the nuclei of exploitation of gas by Petróleos
20 Mexicanos, Ciudad del Carmen [Carmen City], the Términos lagoon, and even though it
21 presents high values of productivity and high values of diversity, is an area, that because
22 of the petroleum activities is also impacted, and because of the urban growth, the
23 Celestún lagoon, the Puerto de Progreso, that is in Yucatán, el Palmar, Cancún, la Ciudad

1 Carmen in Quintana Roo, Siancán, the Maya coast, and [unintelligible]...is a proposal.

2 This is what I wanted to talk to you about. Are there any questions?

3 **Unidentified Speaker:**

4 Rather than a question, a comment. Precisely, the relevancy of having that presentation,

5 was so our colleagues on both sides of the border could see that work has already been

6 done in the locating of the sites that would be good as starting points to monitoring which

7 can have many applications. In effect, here we have seen that there are many

8 coincidences. We are seeing, for example, in our case that we are speaking about the

9 Papaloapan River. We had a previous conversation where we discussed a little about the

10 proper location and we explained that we, the place that we are selecting is also due to

11 ease with which we would have to give maintenance and care to the equipment.

12 Therefore, the presentation that we are seeing is very welcome, especially since it

13 extends, not just to the Gulf, but to part of the Caribbean and all of this information

14 comes to facilitate many of the proposals that are on the table. Thanks.

15 **Unidentified Speaker:**

16 Would all of these stations you are proposing, they are shore-based stations? Is that

17 what you are planning for these stations?

18 **Ana Laura Dominguez:**

19 Well, we have to see the opportunities of the stations. What I am proposing is that in

20 front of what would be the coast, there are populations or there are persons who can make

21 a follow up for maintenance, caring for and operating the equipment. That is one of the

22 important factors because we could have it in a more adequate place but possibly we

1 would not have the ease of access to it. In principle, yes it would be, not the coast, but in
2 the sea. Thanks.

3 Applause

4 **Unidentified Speaker:**

5 As an observation to the question that was asked, I believe that the important thing is that
6 the points of study that they have, that the Institute has, could be receptors in case points
7 of sampling were placed there. It is not necessarily a proposal so that they are established
8 there. If not, because of the nature of the work that they carry out, they could ease the
9 capturing of information and from there remit it to where we agree upon. I believe that
10 that is their proposal, mainly due to the access that they have to the area of the gulf
11 towards where they discharge and where the lagoons of the gulf are, above all.

12 **Bryon Griffith:**

13 I want to come back and, actually, play back to that same comment. One of the things
14 that is certainly noticeable about a presentation like that, and, frankly, all the rest, is there
15 is actually an extensive amount of capacity in both countries. It is now before us today
16 and yesterday and thinking forward to tomorrow about how to organize that more
17 effectively around common themes, and approaches that we are out to progress in. I
18 think the nature of that has become evident in the course of the last day and a half. To
19 that end, even before I get into the segment that deals with information technology, as we
20 begin to close some of this out, I want to take the opportunity to, as a sidebar to this, Mr.
21 Bill Teak, who represents Naval Research Lab, based on the apparent ability to use much
22 of the combined assets that we have on the table, has told me that the Naval Research Lab
23 could extend and probably you would be best to state it properly, Bill, but to extend that

1 aerial access of that model that I was running a simulation of on the day that we opened,
2 so, that although it is at a scale that is still very usable, your entities would be able to take
3 those coastal current projections as sub-domains established for you to be able to take
4 those coastal current projections and begin to formulate your secondary analysis in terms
5 of impact area event response and that type of thing. Dr. Giardino had to leave earlier.
6 You left an incredibly lasting impression on him. He will go home now and feature the
7 six state band of the Mexico region, in light of the programs he manages, to integrate
8 aerospace applications directorate in NASA and the delivery of the assets that they can
9 either buy or deploy. He will go back and try to digest the kinds of application
10 interrogation you are trying to put that data to use for. He is going to come back and try
11 to establish a dialogue back through this group, with you, things like coordinate
12 structures and that type of thing so he can be more effective in bringing NASA to the
13 table. I think those are very substantial, immediate turn around aspects of just our efforts
14 to find the same flight times and city of arrival to come to as a group here today.
15 Let me propose to you that now, for all intents in purposes, although I am going to pay
16 very close attention to the context of our agenda, you can lay our agenda down. We are
17 now going to get into the summary section. We are going to do all the things that are said
18 in this agenda
19 (End of tape 6b)
20 Continuation, beginning of tape 7a...
21 And the proposal is this, we are a stage right now, where to exercise the technology is
22 going to be dependent on our laying the foundation or building blocks of getting the
23 observatory framework in place. Yet, at the same time, when he heard Jeanne's

1 presentation or Tim's, or Dr. Orsi's, we know that there are some immediate
2 opportunities in front of us. The HAB bulletin, how do you ingest that and make the best
3 use of? The opportunity to turn around the responses, if you will, I like the term, is the
4 data that is coming from Veracruz, relevant, and those types of things. It is going to be
5 dependent, even right now, which is an actually unique exercise, and to have so much
6 immediate capacity applied to the table in just a workshop setting causes almost a panic
7 reaction. What do you do next? Well, I don't want to panic. These are the proposals that
8 I would make in the area of information technology from where I sit. First of all, the
9 presentations that you were given, and I know we all appreciate it, were given from a
10 standpoint of a system design that was constructed from a domestic user base. The five
11 U.S. states and the representative service agencies that developed the corresponding
12 tools, have a vantage point about how the event response framework works for harmful
13 algal blooms in the United States. So, when you look at that and you think about how
14 that is being applied to you for your consideration, that may or may not be just exactly
15 what you do in Mexico. What that translates into is that the users' need analysis may or
16 may not match you that that system was constructed under. Correspondingly then, we
17 need to revisit the users' needs analysis. And simply extend it. It is very beneficial in
18 this particular state to resist and develop a life cycle to actually have an operating pilot
19 with which to extend it off of. And so, that is where we are. The proposal one would be
20 to actually move aggressively into the revisitation of the users' needs analysis as it was
21 presented with your participation. Obviously, I didn't copy the right file to this little
22 drive, because if I did, it would have one more line under these two representative
23 players. NOAA's NCDDC, whom you've heard repeatedly over the course of the two

1 days, is the purveyor of the technical capacity in that regard. The Gulf of Mexico
2 program, as also has been pointed out, we've been a facilitator bringing the parties to the
3 table and we would extend that role in this regard in the users' needs assessment. This is
4 state based so, it would feature to the capacity for an event response is, as I understand it,
5 and on this I need affirmation, is the state health services of the six states bordering the
6 Gulf of Mexico. So that users needs revisitation would include those three and all of
7 these. The presumption here is, we do the users' needs analysis and we find that, one of
8 two things, file is just transferred as is, no it does not, here are some of the opportunities
9 for modification. Correspondingly, because it is an application-based system, it is driven
10 by information technology, regardless. So, correspondingly, I would suggest, the
11 previous proposal was geared toward sampling and basically laboratory analysis
12 equipment. This one is geared towards the information technology side and we would
13 look to, in this exercise to identify the information technology gaps. It is to say, if you
14 had all of this that you could do, what good is it if you can't do it with something? If you
15 did not have the computer technology, the networking, the capacity to access and
16 retrieve, to turn the decisions around in a suitable time period so, what we are presuming
17 here is, we would correspondingly do an information gap analysis. This is proposed to
18 you as a service, exclusively as a service. There are two things to be conducted here.
19 This is something that exists, doesn't need to be modified and how. This is what it would
20 take to run it. This is where you are. This is the gap we would need to close to make it
21 truly effective to you. Because we don't know the outcome of such exercises, we are
22 going to get to that similar point that I was at earlier and that is that I would simply
23 propose to you that we would carry this to a conclusion, and we would present those

1 findings back to you. Actually, we would be presenting to each other in more of a group
2 form, but we present the findings. We present the options or recommendations to close
3 those gaps. Again, to lean and leverage the constructs that are already existing, with the
4 GOMSA program running, there will be a scheduled meeting and it will be proposed that
5 we present those findings and come to closure on those recommendations in that meeting.
6 That, interestingly, transcends to fiscal years for the U.S. federal complement, here
7 anyway, and it will actually parallel the opportunity to make recommendations that are
8 pointed at those things at that we have more control over in the second year. Given that,
9 and not knowing what the resulting response will be, we have to hold the question of how
10 do we implement the recommendation to the point of that part of the discussion together.
11 But the idea here, would be that what we are talking about to, basically, implement Dr.
12 Chantiri's plan for collaboration is we must have a cradle to grave infrastructure in place.
13 Although this is a rudimentary start up, needless to say, it is a start up nevertheless that
14 has all the four corners defined. That is my proposal. It is not as extensive in action, in
15 terms of extended action as the others, because I don't think it needs to be, because you
16 have the opportunity to bridge off of something that is in place as a pilot operation now.
17 I would offer that up to commentary. Karen?

18 **Karen A. Steidinger:**

19 Sounds reasonable to me.

20 **Bryon Griffith:**

21 Dr. Chantiri?

22 Well, that was too easy. You are in the Big Easy and that was too easy. All right, now
23 you are going to make me get there from here. If you were to back your way into the

1 binational strategy and the references to the December 2002 plan, we have actually
2 adapted, at least, 90% of the elements of that conceptual plan. Some of the basic
3 remaining 10% will have to be detailed particularly as it would relate to laboratory and
4 toxin sampling and testing in the resulting analysis and surveys that we would do. So,
5 hopefully, you will find that good. That makes it quite a conference to get this far.
6 What I am going to propose to you to do to close out this session is I am going to back up
7 all the way back to the top now. We are going to go together through the elements that I
8 have actually had a few minutes to modify based on those things you ask me to modify in
9 the course of my discussion while I was standing in front of you here. I want to make
10 sure we are still in accord on what we are proposing to do over the next, in some cases a
11 few months, and upwards of about 15 months together. In light of that, let me repeat
12 again, that as we go through this, those representative organizations that have a
13 commitment role are also committing to following up with a detailed sketch of how we
14 are going to accomplish this work and that activity in the time frame referenced. Now, to
15 make you breathe a little bit better, I learned at lunch from Gary Springer, that the
16 GOMSA meeting won't be December, it will likely be March. Whew! We have 90 more
17 days to pull some of this off. That would be a good thing and we will modify those days
18 accordingly.

19 **Unidentified Speaker:**

20 Although there will be two opportunities for interim reports.

21 **Bryon Griffith:**

22 That is true, and we are going to get to that, actually. You actually have two meetings
23 before the March meeting?

1 **Unidentified Speaker:**

2 We will definitely have one in September and it is likely that we will have one in
3 (inaudible).

4 **Bryon Griffith:**

5 Go for it. If you round them like this one, you have a job on your hands. Yes, sir.

6 **Dr. Chantiri:**

7 Well, what we were commenting about a moment ago...we are completely in agreement.
8 When we return to Veracruz, in Mexico, we are going to speak with the Secretary of
9 Health in order to call for a meeting with the Secretary of SEMARNAT and with the
10 Federal Commissioner of Protection Against Sanitary Risks. Further, we are going to
11 invite the Secretaries of Health of the other states of the Gulf of Mexico, well, in order to
12 notify them about the accord to which we have arrived here and not to land anything
13 because we are just beginning to take flight. What is interesting is... I was talking to
14 Gary a moment ago... is that this is a project that came out of the accord from the gulf
15 states. It is not from here, from the binational plan. We wanted... tomorrow... Gary
16 surely we are going to talk with someone in order to propose to them the already
17 completed project in general in order to see the ease of financing on behalf of also the
18 United States. I believe that the expectation that we had in this meeting that we
19 organized bilaterally, has been a success from all points of view. It is such, that the
20 researchers that are to be found at the Veracruz University are indexing our projects.
21 We are the operatives, and well, the research is going to correspond on behalf of the
22 researchers of the Veracruz University. I believe that it is important that also the
23 technological institutes of the sea be taken into account that we have in the state of

1 Veracruz, because they are going to of transcendental importance given the fact that they
2 are problems that are generated basically in the sea. I congratulate you because the
3 meeting has been extraordinary. It has surpassed the expectations we had. I just sent a
4 letter to the Secretary of Health of Veracruz in order to inform the Governor part of the
5 agreements to which we have arrived today. Really I want to congratulate all of you and
6 offer you thanks. We have not finished yet, but I do not want to take the floor once again
7 without congratulating you because of the feedback that we have had such as that which
8 you gave us a moment ago, and others that are going to come out from a downpour of
9 ideas that we shall certainly compile now... that will bring together the federal secretaries
10 with the state governments of Mexico. Many thanks to everyone.

11 **Bryon Griffith:**

12 Thank you. You know, a really smart manager would turn out the lights and go home
13 right now. Laughter. Thank you, Dr. Chantiri, I really appreciate those remarks. I feel
14 the same way about the workshop, by the way.

15 **Unidentified Speaker:**

16 Thank you, Bryon. It is difficult to follow those eloquent remarks but I would like to
17 remind all our colleagues in the room that the White Water to Blue Water conference in
18 Miami will be in March, 2004. So, we would not want to conflict with the GOMSA
19 meeting, we would like to have all of our special partners at that meeting as well. So, it
20 might be good to plan something together, if we could, to make sure we don't have some
21 conflicting schedule problems. I certainly would like to hope that the project between the
22 U.S. and Mexico, wherever it is developed, is a feature at this conference.

23 **Bryon Griffith:**

1 We are in good fortune on that point, Pat, because, although I don't schedule those
2 meetings, the fellow who does is right behind you. Yes, sir.

3 **Unidentified Speaker:**

4 It is so, that we came to this meeting with the theme of the red tide, but I believe that in
5 order to present in Cancun in December of this year, we should not lose sight of what I
6 mentioned yesterday. Red tide is a part of a grand total that exists in this. Mexico and the
7 Gulf States pertaining to the Mexican Republic cannot have the luxury of partializing a
8 project, that might only be red tide. We have to see all of the surroundings, and we have
9 to see how everything that this is going to produce can be linked, in this theme of red
10 tide, together with this, in order to support the port infrastructure, the communication
11 network, the productive activities. All of this information that is going to be generated
12 because of the red tide which can also be applied in many fields, which would give us a
13 lot of strength for arriving and presenting in the Cancun meeting. Therefore, yes, I
14 emphasize that red tide brought us together, but it is part of a whole. Thanks.

15 **Bryon Griffith:**

16 I absolutely could not agree with you more. There is limitless application ability to what
17 we've accomplished here over the last couple of days, as we would actually see it through
18 the implementation. Thank you. Let me focus again, and again, just to tell you a little bit
19 about the structure. I would like to move, effectively, through summarizing these
20 proposals once again to you and make sure there is no misunderstanding and that I have
21 actually recorded the recommendations that were made during the presentations. After
22 that, I am going to ask the two representatives over here, who have been keeping notes
23 for two days, to take us through the parking lot items and they are going to, for the most

1 part, but not exclusively, pertain to what we've captured in this project plan. I want to
2 make sure that we deal with those effectively before we depart our session. I feel very
3 comfortable, particularly now, that we will get through that and will be out of here by six
4 o'clock. So, let me move on. The proposal has not changed at all. This would be the
5 basic construction component of it. Extending HABSOS pilots to the eleven states by,
6 basically, conducting the eleven state contractual study, which extends over to the six
7 Mexican states. My office, again, will promulgate that contract and we will run that
8 contract as we pointed out. The extension here is to run that contract through the
9 enterprise that we have. To run it through the partnership that we have with the six states
10 and the federal representation in the room. The idea, again, being focused on the delivery
11 of a recommended common entry and reporting mechanism, which will ultimately
12 translate into the tool that Joe Stinus and his staff will build, test, implement and assist in
13 training. One of the important aspects, and it is very good that Gary has joined us here
14 today, is to reflect back on these commitments as I go through them, I will have for you,
15 and we will talk about that process at the end, I will have for you a detailed project plan
16 as that contractual study unfolds, actually, to unfold that contractual study. In the study
17 coordination, this is where it has often been pointed out, as the delegation returns to
18 Mexico and formulates the team; the team will present a team structure back in this
19 regard. The portal data entry tool development will be a small project plan,
20 correspondingly. The training and implementation on the GCOOS side, let me just
21 reference this once again. The reason I want to do this is in spite of how many of us, we
22 might even be in this room, may have given submitted competing proposals to the call, to
23 NOAA. I just want to keep this one in front of you, in terms of the relationship and the

1 agreements that we have reached here, to press forward. This one is under the umbrella,
2 simply, of a GCOOS proposal that was fronted by Texas A&M University. W. Nalden
3 worked on this, and he has extended the capacity to help in the workshops, and the
4 coordination and the training aspects of one of one those proposal elements in that
5 proposal he submitted. So, correspondingly, Gary, if GOMSA could give credence to
6 two proposals I am going to mention in the world of influence, that would be good. If in
7 fact, our proposal together does not see the light of day, if it does not happen, we will
8 simply have to drop down to a plan B. But, we are at the bottom of the implementation
9 stage. It is not an overwhelming task, and nor is it an overwhelming budget to carry this
10 out. I am not terribly concerned about this item, except that I would wonder who had
11 beat us in the call, in light of what we have to offer. Have I missed anything? There
12 were actually no requested changes, by the way, to this aspect. That may be because it
13 was seven o'clock last night, and you were hungry and tired. But there were no requested
14 changes. Let me move down to the observing system framework. The proposal was to
15 extend a strategic pattern of sensors into the southern gulf. Again, let me frame the
16 timeframes, the recommended challenge before us, is to carry this out in what amounts to
17 most of us thinking about, today being 18 months, but in reality is 15 months. As we
18 look at the start of the fiscal year being the start up of the process. And our fiscal year, I
19 am not sure about Mexico's, but our fiscal year begins October 1st. There are a lot of
20 things to be done in preparation to start up on an October 1st's fiscal year. In that regard,
21 the elements of action are, again, to summarize, the development of the technical
22 specifications. USF has offered an extension of their already funded services in that
23 regard. NOAA's National Buoy Center has committed to provide whatever technical

1 service and expertise the group might call upon them to provide. HABSOS technical
2 training team was not on yesterday's slide, but should not be overlooked. The
3 representative's portrayal of application environments that you have seen, Dr.
4 Steidinger's, Tracy's, Kirk's, etc., have been by virtue of an assimilation of many sensor
5 instruments and many arrays and we will call on that technical team to provide their
6 consulting input to that specification package. I am a firm believer in that there is no
7 substitute for someone with experience in something that you are going to involve
8 yourself in. The thing that I would also like to point out, in that respect, is today I have to
9 tell you that that team represents those representatives I talked about. Tomorrow when
10 we meet again, I will be talking about all of us because that team will now expand and it
11 will not be a domestic but a bilateral binational team. This is very exciting. The systems
12 acquisition and deployment, again, just for summary, it was pointed out that
13 [unintelligible] has three sensors in mind. That USF has one sensor, Quintana Roo.
14 Now, this is the second proposal. GCOOS and Dr. Sing, from the United Nations
15 Environment Program he led the proposal application, had to leave, but in this proposal
16 there are different levels in the NOAA's RFP call. This is the infrastructure side of the
17 proposal. This proposal has been submitted to extend no less than three and upwards of
18 six fixed remote stations to represent an array to be strategically patterned by the steps
19 outlined here in Mexico. The initial purpose is to extend the predictive descriptive and
20 forecasting capacity of HABSOS to you. That can only be extended by virtue of these
21 physical oceanographic parameters that can be introduced to the models. One can only
22 assume, as was the comment made before I started the segment, that red tide is only a
23 starting point. That to have such capacity in the field has limitless realization. This is

1 where care and consideration for placement has to be carefully thought out. The
2 representative organizations, COFEPRIS, the State Health Services, SEMARNAT,
3 National Water Commission, that discussion that took place yesterday was an
4 encapsulated team. That was my understanding. And that team represents both, a
5 managerial and a technical team that, like the work that we do on a daily basis, would
6 come to consensus on the approaches, the places and the procedures. That team has to
7 exist because the U.S. cannot supply that team. It can only come from one place and that
8 is from you. I have PEMEX here as a question mark only to keep it on the screen. I
9 think it is a very valid point and, again, it is not new. We do the same thing here in the
10 U.S. on the continental shelf. The idea of an already existing, fixed platform with
11 personnel empowered is hard to give up, if you think about the operations and
12 maintenance side. Only if those platforms should show up in your strategic array, to be
13 in the right place and suitable candidates not simply because they are there and,
14 consequently, corrupting, frankly, the strategic plan. The short-term operations and
15 maintenance, again just to re-emphasize that same proposal, Gary, as you all well know,
16 it is easy to buy things and then have kind of fall by the wayside without thinking about
17 the operations and maintenance. The short-term operations and maintenance or the two-
18 year operation and maintenance is, actually, included in the proposal. The longer-term
19 operation and maintenance would simply be anticipated would come from those who
20 could provide long-term operations and maintenance to such infrastructure that would
21 have so much re-utilization. Consequently, the focus on SEMARNAT, the National
22 Water Commission, and possibly the Mexican Navy, and you will notice it highlighted
23 here, because they are not represented here in our conference, to be determined by

1 consultation post this conference. That may or may not prove to be true, and I back up to
2 the consulting coordinating team in Mexico that will decide those things, but just to keep
3 it in front of us. The portal management, i.e. how do you deliver this capacity to one and
4 all in the HABSOS team partnership environment, rests with NOAA's National Coastal
5 Data Development Center and their commitment has been secured. So, again, without
6 having to go through the repetition, each one of these must now be exploited into an
7 operating plan in a timeframe framework that matches that 15-month schedule at least.
8 That is the goal. That is the challenge. Any questions?

9 **Unidentified Speaker:**

10 I want to go back to your points 3, 4, and 5. I want to put some points to stress the
11 relevance to consider the protected area of the coral reefs of Veracruz. That is a natural
12 protected area, and, as I tried to stress in my presentation, the aquarium is in that area.
13 Veracruz is a very important point for us and I am sure that the aquarium could prove
14 responsible for any long-term operation and maintenance there. The ecosystems go about
15 20-kilometers from the coast. So, we kind of think of something that would give us such
16 more relevant information. I highly recommend to consider that, and I would like to see
17 the name of the University of Veracruz, included in that team to discuss the places and
18 the advantages to consider the where and why to put the buoys there.

19 **Bryon Griffith:**

20 I need some help, Juan.

21 **Juan Manuel Irigoyen:**

22 Well, we are talking about the beginning of the deployment of three to six systems. We
23 have previously agreed upon, in previous conferences, more or less on which states those

1 systems would be placed, and, in fact, we are talking about the possibility of placing one
2 system in each state. The primary purpose right now is red tide, that is why we are giving
3 a very relevant position to the health services in this respect. We certainly welcome the
4 universities. The aquarium is one of our very intensive partners in many of the things
5 that we do. But I think this would be a starting point, this does not mean that other
6 positions would not be examined later on. But we want to start as a building block with
7 this system in that predetermined fashion. I think it is too many, just to get the official
8 organizations coordinated at the sampling level, that is our primary purpose at this point.
9 Definitely, we want to build and extend this system later on. But I think that is a
10 reasonable proposal as it is now.

11 **Bryon Griffith:**

12 To translate, if I may, into how that same effect is what we deal with on a daily basis, if I
13 could guess kind of opening and looking behind the curtain, what would have to take
14 place in that coordination activity is to outline criterion, benefit, cost and benefit criterion
15 for the placement concepts. The assumption would be almost like the discussion about
16 PEMEX platforms. When you look at placement operations and maintenance benefits,
17 etc., you would see the aquarium pop out or you would see a platform pop out, or you
18 would see a protected management area pop out because the assumption is your criteria is
19 trying to envelop and account for those secondary benefits as to placement acquisition
20 maintenance, etc. That is how, if you were to look at the array in the northern gulf, again,
21 if you could see behind those dots, you would see that there are very similar placement
22 coordination activities that take place. Even though LUMCON, you probably know that
23 university system name, or others, are featured, the coordinators are NASA, NOAA,

1 Navy, and that kind of thing, so, there is very much a parallel in that respect.

2 One of the things I would like to point out here, and take the opportunity, it just dawned

3 on me while I was listening to that conversation, to feature again, for you Gary, in the

4 short-term operations and maintenance or even the acquisition nature of this sensor

5 proposal, you will notice that each has a plan. Systems acquisition needs to have a plan

6 B. Plan B would be, what happens if the proposal is not one? And this is what we need

7 your help with, in terms of the GOMSA spin on this. At least two other subcommittees

8 of GOMSA are critically dependent on the ecology of the gulf. And red tide has a

9 profound risk response impact on tourism by example or fisheries and if we are not

10 successful in this bid, it has come up repeatedly in this conference, what is the GOMSA

11 financing methodology in terms of the world bank or others? So, I ask that you take

12 away from this a picture of possibly helping us put a plan B, and ultimately we might

13 have to look at a plan C, together so that we are backstopping the acquisition process if

14 we are not successful in one bid or another, just as food for thought. Because we think

15 we have something here that serves many masters in terms of the performance of where

16 they are going in their programs and relatively low price, I might add. Any other

17 questions?, comments? Well, then, I pulled that off pretty well. Proposal 3 –

18 Development and Collaborative New Real Time Remote Sensing Capacity for the

19 purpose of extending, developing capacities to the forecast and the currents. Behind the

20 scenes, what does that mean? It means how to make use of the satellites, particularly

21 satellites, but not exclusively satellites, assets that have been featured in the conference.

22 Again, even though it is repetitious, number one, a very highly noteworthy action the

23 harmful algal bloom process has been extended and it is capable of being in place

1 immediately. Development Implementation and Field Verification Program
2 Coordination – This is where, again, I can not overemphasize, the corresponding reason
3 for this is the ability to have the detection or the predictions verified in the field. So, it is
4 particularly important in a process that is so data and data string dependent to make sure
5 that these data sources do not become captured and trapped. Because, by example, we
6 would have a presentation that wouldn't show 80% verification anymore, it would show
7 “we have no idea”. Consequently, this activity really relates back to that coordinating
8 group. This activity must actually turn from a cooperative program, into a design, into an
9 application, into an implementation inside of Mexico. What does that mean? I thought
10 that Kirk Wiles put it best when he said, and I actually need to feature this and factor this
11 in, “I am prepared to deliver to you my findings right now.” So, that Tamaulipas, or
12 anywhere else, can begin their event response preparedness in anticipation that the long
13 shore currents might carry this bloom into their waters. That can only occur by virtue of
14 him transitioning that information immediately or as immediate as this process affords
15 him up to the system. This is one that, almost like all of the others, as much as we
16 collectively would care to, but you are certainly welcome to interrogate those Texas
17 processes, those Florida processes again, as we look for commonality and institute the
18 easiest and most effective methods. In regard to that, when we are doing that work and,
19 again, I can not overemphasize, I thought it was best illustrated by the question that Dr.
20 Chantiri's assistant asked, What is the relevance of the test data that you have seen
21 coming from Mexico. This is where we will be able to identify the technical gaps and
22 technical compatibility's gaps. This is item 3. Because it is so correlating, if you will, to
23 the study that we propose to do in proposal one, we would extend the specifications in

1 that study to include this gap analysis or this compatibility analysis. We, being the Gulf
2 of Mexico program, in cooperation with the state health services that are implementing
3 this procedure. To present the gap analysis find is a recommendations for the following
4 workshop the dates for which will change, I assume to March, Gary had to leave, so, it
5 will go now from December to March. These next two are modified from the discussions
6 with Dr. Karger and corresponding comments made by Patrick Connor. We have the
7 need, so that we do not lose opportunities, to get on the table, as fast as we possibly can, a
8 reflection of our research needs, both short-term and long-term. It was suggested that the
9 short-term needs assessment, phase one, could be conducted by USF in cooperation, and I
10 am going to come back to this point because I think it plays back to one of the comments
11 made earlier, you will notice my star, if I tried to put names on here I would leave some
12 out and I am often too guilty of that. My star is, whatever is the Mexico coastal research
13 network, the university systems, the Institute of Ecology, whatever that is, needs to be the
14 team framework that will match the corresponding U.S. framework for establishing a set
15 of priority collaborative research needs. Correspondingly, and more thorough, strategic
16 plan about how to advance not only research but policy to research, could and should be
17 undertaken as a proposal too. I see Dr. Dortch had to leave. Dr. Dortch reminded us that
18 our congress is in the final throws of passing a bill that has a provision in it to apply
19 original harmful algal bloom gulf hypoxia research and control act proposal too. We are
20 proposing here to do that. It would be phase two. So, if I have captured the commentary
21 in this regard correctly, we would not slow down the process of getting our short-term
22 assessment on the table and verify it on our longer-term, more thorough and actually
23 constructive development of a long-term research network in the gulf. Again, as we

1 pointed out earlier, red tide is an opening entrée. This would be anticipated to extend into
2 many other themes in the future. Once again, the gap analysis, gap recommendations
3 would be presented, in terms of the technology, this is really associated with the
4 laboratory technology that was mentioned in the survey, to us, in the March timeframe
5 for the next full meeting of the group. Actually, this is the implementation piece of that
6 piece that dealt with identification earlier. It is blank because we have to talk through
7 what opportunities we have and what commitments we can make at that point in time for
8 those recommendations that we would reach consensus on. Repeating, each one of these
9 actions has a corresponding data stream, management stream action to it. With respect to
10 the distribution framework, the portal framework, again, NOAA's NCDDC has agreed to
11 manage this responsibility in and through this process. Proposal 4 is the one that I just
12 went over and, rather than repeat myself, it remains as it stood. I have to deal with things
13 in relatively simple terms when they are as complex as this. That is why we have broken
14 it down to these four basic building blocks. I firmly believe that as we achieve success in
15 each one of these, we will all find it remarkable what the capacity of this little adventure
16 is. And it will serve to catapult us into many more actions together in the future leading
17 towards that total binational cooperation and ecosystem management of the gulf, which is
18 so important. I don't know that I would necessarily try to get you to add too much to this
19 for fear of adding too much to the cart in only a 15-month timeframe. There is a lot of
20 work to be done here. There are a lot of resources to be secured. There is a lot of
21 coordination to be undertaken. It is light year ahead of where we are today. I think I
22 would recommend to you that this is the composite of proposals that we will now review
23 the parking lot against. Let's make sure we haven't left any large items out.

1 **Karen A. Steidinger:**

2 What is your schedule or your plan for follow up and how is that process going to evolve,
3 so that by the next meeting there will be something to look forward?

4 **Bryon Griffith:**

5 It is funny you should ask that. Again, I learned a lot during lunch, I learned a lot at
6 lunch, I learned a lot on the street, the Quarter, etc. I learned at lunch that there are two
7 more quarterly meeting of the Health Ecology Environment subcommittee of GOMSA
8 before the March meeting. That is going to be very important to your question, I think.
9 This is what I am going to propose. The next meeting, being a quarterly meeting, is
10 anticipated to be held in September in Tampa. I didn't know that until lunchtime. In
11 light of that, what I would propose the next step to be, first of all I need to get your
12 confirmation on my prior proposal. Number one, I would propose that my office serves
13 to coordinate the development of this larger complete project plan, I need your approval
14 to do that. Do I have your approval? Then, I would ask for anyone that would be
15 objectionable to that. In light of that, what I would propose is that within a very short
16 period of time and given the quality that is needed, we take the next week to ten days to
17 summarize all the materials from this meeting. We would need to pick up all the loose
18 ends. Some of you would like some products mailed out. We need to take the time to
19 gather all of that information, all those data resources, and then construct a final version
20 of this proposal for you that will be targeted as it comes to you requesting that, in
21 essence, this is the timeframe, okay? In essence, over a monthly reporting period we
22 develop the corresponding project structure under each one of these elements to be
23 presented in their final version in September in Tampa. That would be my goal. The

1 reason that is very unique is, of course, that is the close of this fiscal year and the
2 beginning of the next. It is ideally, time wise, suited to this process. So, that is the
3 procedure. Correspondingly, what that means is my office will be bugging the heck out
4 of a lot of you. Haven't heard from you, September is coming, let me see some of those
5 drafts, that kind of thing. The office will also use a website structure to keep the
6 development of that project plan up and available to one and all in the group. So, that
7 you can witness its evolution and you can use that opportunity to comment to its
8 development. As competitive as I know we are, as evidenced over the last two days, I
9 have no fear we will be on the mark for September because we have so much to gain
10 together. But it still requires someone to herd the cats and we are prepared to herd the
11 cats to that end. That is the proposal.

12 **María Amparo Martínez Arroyo:**

13 There is a question that I do not want to go unasked because it may enter tomorrow at the
14 time we are discussing more accords, and it is in reference to this process of evolution of
15 which you are speaking. In the process that we have to implement the monitoring
16 stations, the buoys or whatever we achieve in doing, the question is for NOAA, and it is
17 if it would be possible that by means of an agreement with the group of governors, with
18 the group from the gulf, could the images of SeaWifs be used in order to see the
19 evolution of red tides in the gulf?

20 **Bryon Griffith:**

21 I have to, actually, let NOAA answer that question.

22 **Joe Stinus:**

23 We can't respond at this moment, but I will definitely take this in action and follow up

1 and will report back. But I believe, that what NOAA would like to do, just in general, is
2 make as much of NOAA's satellite imagery available as possible. But I think that NASA
3 would have to have a say in this because of the licensing and things of that nature but that
4 is changing, especially with MODIS coming on line. Definitely with MODIS we are in
5 the process working with NASA, there at Stennis, to set up a download site where we
6 will have the MODIS data directly and do plan to make that available to everyone. So,
7 that may be a better way to go about this. I will check about the SeaWiFs. There is no
8 problem with getting SeaWiFs if you don't mind getting it late. This means that for some
9 time period after it is received on the ground station that you can get it at no cost. But if
10 you want it immediate, then, that is when you get into the cost aspect.

11 **Bryon Griffith:**

12 That is a very interesting last point to his comments. If I understood your question, I am
13 not sure it was time relevant, it was more of a historical analysis of the transition, of the
14 movement of red tides in the gulf.

15 **María Amparo Martínez Arroyo:**

16 Well, of course the historical part... in fact we can obtain it because the National
17 University has a license for SeaWifs and receives the images. My question was more
18 about detail, to know that as we develop this system, can we begin implementing a kind
19 of training for the people of the gulf in the states themselves about how to read the
20 images, how to interpret them, and how to know if a red tide is coming based on the
21 images from SeaWiFs that even though they do not arrive instantly, with a pair of days
22 would be sufficient for us.

23 **Bryon Griffith:**

1 Which of course, is the implementation of the various tools that you saw earlier today, in
2 essence. Joe's response, we should allow him to walk away with your request and
3 respond formally back, we will actually help facilitate that response back. It suffices to
4 say we are after the same goal. If you can find a way to provide that access, then, that is
5 precisely what we will do. But probably, and equally as importantly, is, if he finds that
6 we have barriers to that, as we look down the road to MODIS implementation, we are
7 going to want to keep that feature on the forefront of our cooperation. Because it is
8 exactly that ability to establish, detect and forecast that is the thing of utility to you. We
9 must achieve that level of operational capacity, not dismissing the fact that between
10 proprietary data, streams and licensing, and the rest, we are going to encounter some
11 rough spots. We will have to work together around them. Let's reserve the answer to
12 that until Joe can get back to you and I will make sure that you get it. With respect to the
13 training, well, it is part in parcel, especially as we would move around in between
14 applications and resources. The corresponding training must be delivered to make the
15 application sail. He is going to be checking on that as well. What a conference like this
16 does when you have this much interest in one theme area to get to an end. Joe and I were
17 speaking just before the session restarted up. We were exchanging notes about how we
18 think what is being proposed here applies to several of our programs and we are going to
19 go back and interrogate them to see if they can be taken further than they already have.
20 So, let us get back to you.

21

22 **Unidentified Speaker:**

23 I just want to make a point. Maybe some of the questions that Dr. Amparo asked are

1 inserted in the HABSOS bulletin that includes process images, and it is implied in the
2 easy use of the images that you can get down from the Internet and put it down in your
3 computer.

4 **Dr. Maria Amparo Martinez Arroyo:**

5 But it does not cover the part of Mexico.

6 **Unidentified Speaker:**

7 The way I understood the question was, should imagery be available and we are trying to
8 extend the imagery coverage to cover the Mexican states, could we provide the training
9 so that the Mexican states do the analysis and then we have a complete picture of the
10 Gulf of Mexico.

11 **Unidentified Speaker:**

12 Obviously, if we are talking about extending the HABSOS system, we definitely have to
13 have the imagery portrayed on what appears to be today just a black spot. Otherwise
14 there would be no purpose.

15 **Bryon Griffith:**

16 That is why it is really embodied in the presumption of the construct of this. But there
17 are some immediate responses that can be gained to these questions.

18 **Karen A. Steidinger:**

19 I am sorry, there has to be ground [unintelligible] to that. There will be people that
20 would have to go out and collect samples for chlorophyll, for cell counts, to verify what
21 kind of bloom that was. And even with the HAB bulletins now, we still have to verify
22 what is causing all that chlorophyll biomass. There is needed training in other things
23 besides interpretation of images.

1 **Bryon Griffith:**

2 Well, that in essence, was the basis of two in this proposal, the field verification, the
3 corresponding action on the other side of this, is this number two. That was well pointed
4 out. All right! Any other comments, questions, issues? Then, I am really going to call
5 on my parking lot folks to take us through them. I don't know if everyone can read them
6 from where you sit in the room, I will just do my best to frame them properly.

7 The first one is define how we are going to establish collaboration between Mexico and
8 the U.S. It is a very general statement.

9 **Unidentified Speaker:**

10 I think that one of the proposals, considering that we are speaking about proposals,
11 maybe we should lay down on paper that we should have that black spot right now, as
12 part of the proposal that we would have the pictures up here in the HABSOS bulletin.

13 **Bryon Griffith:**

14 Yes, both, Joe and I know what you are talking about. We have to capture that
15 appropriately in the proposal. In other words, convey the balance of the southern gulf in
16 the imagery of the HABS bulletin.

17 *Unintelligible comments by audience*

18 **Bryon Griffith:**

19 You know, even before I get into these, in light of just a little bit of the confusion of that
20 last point, unless I am mistakenly representing this, the actual roll out of this proposal is
21 literally no differentiation between the U.S. and the Mexican states that represent the
22 HABSOS pilot. The intent, unless it is found to be otherwise not capable, is seamless.
23 Correspondingly, the images will have to come in to the conveyance of those bulletins

1 into Mexico, identically, as they would come in the conveyance in the U.S. Okay?

2 **Unidentified Speaker:**

3 Bryon, before you go on with this, I just wanted to relate to you that we have divided
4 these into different topics. The first one that you are going through is HABS partnership,
5 if it seems that it is not going along with what we've talked about, is because we have
6 broken them down into different topic areas.

7 **Bryon Griffith:**

8 Okay. Does everyone understand that? Because it is just capturing the points, we are
9 going to just try to define and refine them. What I am going to do is I am going to use
10 this multimedia technique. I am going to use the slides here, and reference to see where
11 we have embodied it or not in our proposals. To find how we are going to establish
12 collaboration between Mexico and the U.S. That is a very general and broad statement
13 and I think captures the essence of our agreement to work collectively on the
14 implementation of the binational strategy for red tide collaboration. Establish a pilot
15 project as suggested by Dr. Karger. Binational research programs. I do recall this
16 discussion. There are a couple of things here, and the place that I would suggest to you,
17 and I need your confirmation that you are comfortable with, is that this is captured in the
18 research needs assessment area. This is a very general statement. There is no project
19 defined here, it would have to be refined if it needs assessment. The White Water to Blue
20 Water conference and GAMSAs meetings in March, ties these together and as the last
21 comment implied, or make sure at least they do not conflict. Gary Springer actually left
22 here just moments ago, with that information from us and, actually, I would anticipate he
23 is probably working on this as we speak, as he is meeting with the executive committee

1 of the GAMSA. Organize a counterpart organization to GCOOS in Mexico. This came
2 up repeatedly, although I am sure the parking lot attendants did not repeat it repeatedly.
3 This is a very good idea but its relevance and importance did not come quite as clear to
4 me as it did when I was pointing out the GCOOS proposals to Gary. The GCOOS
5 proposals that we have made would have even greater strength if in fact you were
6 supporters formally of the GCOOS process. So, what I would suggest to you here,
7 especially since Frank left, is that I would take it upon the program offices responsibility
8 to break this down into what steps would be necessary for you to become reviewers and
9 signatories of GCOOS and present that approach as best as it needs to be refined it has
10 not
11 been aggressively slanted towards an international component at this point. I will work
12 with the leadership of the IOOS and the GCOOS from the program office to give you the
13 architecture of GCOOS and present to you, after negotiating with them, what would be a
14 recommended path for your review and consideration to being formal signatories of
15 GCOOS. I will actually say, I think it truly is in your best benefit, because it is nothing
16 more than the formulation of strength in a region to compete for advancement of
17 observatory infrastructure. You all will have to be the ones to review the operating
18 mechanics, legalities, etc., internally, but we need to put a package together for you to
19 review, that is comprehensive and all inclusive of what is going on in that program right
20 now for you to make that consideration. Furthermore, I would suggest that we also put
21 that into our project-planning framework and deliver that to you in the September
22 meeting if not in advance of the September meeting for your consideration. Does that
23 make sense? Yes, Eduardo, let's start with you

1 **Eduardo Garcia:**

2 I just would like to make up a point about the timing for delivering such a package of
3 information, because our delegates know very little about GCOOS and the structure, and
4 what it means, and what it is for. So, in order that they have a complete comprehension
5 of what it means, and why we are insisting so much in that structure in Mexico as well,
6 we will need to deliver this before September. That way, when somebody arrives there,
7 they will know perfectly what this is and why we are pushing forward with that.

8 **Bryon Griffith:**

9 Very good point, Eduardo. I actually anticipate that we can turn a package around to all
10 the delegates, and I would actually ask that it be coordinated, you all would need to figure
11 out who, I don't know how to begin to think about that. It is not just a package to the
12 delegates. You will need to tell us how to follow the coordination if it is a review. But I
13 think we can do that, out of that program within 30 days.

14 **Unidentified Speaker:**

15 I want to suggest that instead of referring ourselves always to universities, at least with
16 respect to Mexico, that we might refer ourselves to institutions of higher learning,
17 because this also comprehends the research centers that are not necessarily universities.

18 **Bryon Griffith:**

19 That was an anticipated response at some point. One of the reasons why I reference it as
20 the coastal research network, attempting to be all-inclusive of institutes of higher
21 learning, university systems, foundations, and/or any other mechanism. Your point is
22 very well taken. I am going to have to rely to be accurate, I am going to have to rely on
23 some assistance from Juan Manuel and others that have been helping me co-coordinate

1 this to understand that pyramid effectively. Bring in researchers and universities – In that
2 regard, the intent, with respect to that, is actually applying itself very directly here in this
3 proposal to insure that both, the long-term and the short-term research assessments are
4 bound by the research institutional frameworks putting those assessments together. So,
5 that is why I hope I captured this. Mexico’s states, federal components and universities
6 will organize themselves and decide the main context reached out of this collaborative
7 effort. That speaks for itself. Strengthen partnerships between operational, agencies and
8 academia – I think that is a statement bridged off of Dr. Karger’s concern that academic
9 institutions have a strategic and appropriate placement in the kind of exercise that we are
10 involving ourselves in, and the federal agencies have one as well. The supposition that
11 was made in the discussion was that we have our roles upside down. That often the
12 university systems are operating, in many cases, whether they simulate the federal
13 infrastructure and the federal programs are delving into research for which they may or
14 may not be well postured to do. I think that is a statement rather than an action or
15 question. We would actually look to avoid, if that is in fact the case, carrying that into
16 this process. Actually, I would more directly respond to that saying that the safeguards in
17 that particular case, are hopefully, infused in this proposal by virtue of these teams that
18 have coordinating responsibility to place us correctly aiding and abetting the right
19 organizations. Develop framework to allow scientists U.S. and Mexico to collaborate on
20 scheduling research vessel, etc, and on integrating results. This is actually a statement
21 that is kind of near and dear to my heart. I don’t know who said this, but I couldn’t agree
22 with it more. It is very frustrating – I know you must all see the same thing I do – I can
23 go into a port and watch four research vessels almost collide with each other, that can’t

1 seem, for the life of them agree to share data and parameter extensions, etc. This is
2 another one of those statements that is a tenant to watch over as we formulate the
3 blueprint for rolling out the HABSOS binational and I can only say that I agree with this
4 statement. It is an extensive exercise, however, to think that you could actually, almost
5 like an air-traffic controller, manage the network of activities that are undertaken
6 particularly in the water quality monitoring area, sampling area, etc. I know we certainly
7 see it on the U.S. Likely as not, the Corps of Engineers, Fish and Wildlife service and
8 EPA probably bumped into each other out here on the dock while I have been up here
9 speaking. This is one of those challenges within the challenge that will have to be
10 bettered in this process. The Gulf of Mexico program office will present final version of
11 the proposal to health, ecology subcommittee meeting in September, in Tampa. This
12 simply an action taken up, it is in agreement with our proposals. On the data side, create
13 an inventory of data. This transcended into the individual elements of the analysis that
14 we are going to conduct together in terms of formulating the HABSOS framework.
15 Find ways to share data, share website – I don't exactly remember when this came up, it
16 must have been early in the session. I hope that this entire segment has now been
17 comfortably understood to actually fold in to the capacity that has been agreed to be
18 delivered through the NCDDC and the portal, both the entry tools and the delivery tools.
19 Standardize equipment and technology – again, all of these have already been folded into
20 our proposal as I would have anticipated. Remote Sensing – Use remote sensing to track
21 transport of HABS, verify ground truths using cell counts. Folded in.
22 Use multiple technologies for remote sensing- this is not only just moving towards
23 MODIS, if it was not stated, I think I understood what the underlined theme was here.

1 MODIS was one technology, another was not necessarily satellite based systems. What
2 is one opportunity that we have before us, with an opportunity, you either seize it, or it
3 goes by you, is the utilization of particularly fixed wing aircraft with advancing sensors.
4 I will give you a case in point, NASA often stations its experimental Lear jet in Puerto
5 Rico. When it is going to travel back to its home base, it often asks if anyone would like
6 a flight path flown, because it has got to come home anyway. This is just an example of
7 the kind of infrastructure that we can bind together. Once we have this team where the
8 application is what is served and NASA can comfortably state that it has served an
9 enterprise like ourselves in terms of that flight path flown back home from Puerto Rico.
10 Complete historical study of available satellite data, SeaWiFs for entire gulf to develop
11 science frameworks and identify where to locate sensors – I don't recall this, but this is
12 kind of an interesting extension of Dr. Arroyo's question. Hers was more real time, this
13 one is more historical. If, and I would offer you in Mexico and the coordinating group
14 this, and I think that is what this statement pertains to, if as you get together, you think
15 about some of the tools that could be developed to aid you in possibly determining where
16 would those sensors best be placed, that might involve a historic analysis of data that we
17 can acquire and help you interpret, let us know. We will try to conduct that analysis with
18 you, for you, to aid your process. NOAA will find out about availability of SeaWiFs data
19 for Mexico and we have been through that. Monitoring – install fixed monitoring station
20 3. I want to stop here for just a second to refresh everyone's focus on this. The proposal
21 that the United Nations environment program has put it, I apologize that I did not have
22 copies here, I will get you copies as a follow up to your mailing in this meeting. The
23 proposal is for a minimum 3. If the cost are competitive, if more of those stations are

1 determined in your coordination to be fixed rather than moored it is very likely at that
2 that proposal one at all six stations will go in. That is nature and the design of the
3 proposal. Mexico will pre-select sites for monitoring stations [unintelligible] they are
4 training to include Veracruz people in installation of USF sensor in Cancun area. That
5 was an agreement made between USF and Veracruz when the question was asked.
6 I don't know if everyone heard that, but the United Nations environment program
7 proposal is in the gray folder in your binder. Let it not be said that we don't deliver fast
8 and furious. As I was pointing out, this last discussion with respect to Veracruz
9 personnel with USF sensor in the Cancun area was a sidebar discussion in many respects
10 where Dr. Karger asked if representatives from Veracruz could attend in that regard, and
11 agreement was made. Funding, Sources, including UNAP, WorldBank, State
12 Department, and others. The reason that I did not take us through the arduous task at this
13 point of a financing strategy is because we came up with one. In the course of the
14 deliberations of our proposal, it is not to dismiss this point that once we set this footing
15 down, and I have every expectation that we will do that together, once we set this footing
16 down, you are going to want a lot more. We are going to want a lot more together. We
17 need to keep our eye on the ball on UNAP and the World Bank and other institutions like
18 the State Department, White Water to Blue Water, whatever initiative comes out of the
19 hopper. We need to figure out where and how it applies to aiding and implementing the
20 collective plan that we develop together. This will stay featured, and I will recommend
21 to each of you, that as we reconvene each time, that we reflect on the emerging financing
22 opportunities to take our plan forward as they are going to be more relevant each time
23 and the time that has lapsed. New fiscal year has started, acts have passed, initiatives

1 have spun out of world summits on the environment, and all of that. I say this to remind
2 you that if we together stay on this course and we keep this plan in front of us, ours is
3 more marketable than most. Each one of these institutions looks to hang their hat on a
4 winner, and we need to prove that we are a winner, so that they will participate with us.
5 Establish work to identify all possible sources of funding – same discussion.
6 These are the opportunistic and evolutionary programs that we know are out there right
7 now. Now, as we actually reflect, UNAP is providing a sled to one of the proposals to
8 NOAA for you. The World Bank, hopefully, with Dr. Chantiri's assistance, will pressure
9 Gary to work on the World Bank side of GOMSA. The State Department, I have heard
10 through other channels, is already in interested in how to help in this respect. And others,
11 I don't quite know how to define others until I see them. But the idea being that together
12 we need to evaluate how much progress we have made collectively on implementing our
13 plan. We need to be very business oriented. We need to be very professional in looking
14 at where the plan might be languishing and pick up the boot straps of those areas together
15 and move always looking at the outcome that we are after. The reason I stopped there a
16 moment is, I am always afraid that people will walk away thinking that this is a done
17 deal. This is not a done deal. It will require all of our energy together for all of the
18 months we have associated in this process and many to come after that to pull this off. Is
19 that the end of the list? Did I leave anything out? Are you happy with that? Are you
20 tired and want to go home? Laughter
21 You look happy, you can't be terribly hungry, we ate a late lunch. The bar will open in
22 ten minutes. Laughter.
23 **Unidentified Speaker:**

1 I think we have a deal.

2 **Bryon Griffith:**

3 We have a deal? Alright! Well, I think there is not a better way in the world to end the
4 conference than Dr. Chantiri's statement and that statement that we have a deal. The
5 reason why we have a deal is all the hard work that all of you put into this. I want to,
6 however, take just a moment to recognize that, again, none of this could or would have
7 happened if it wasn't for the opportunity seized upon to meet Dr. Chantiri and Juan
8 Manuel Irigoyen Lopez. To bind that opportunity with the services and collaboration and
9 partnership with NOAA's National Coastal Data Development Center and representatives
10 from NASA who had to leave the meeting. They saw something in this. They saw the
11 same thing that you see in this, and they said, "We will do whatever we have to do."
12 Now I tell you, it also could not have happened if we did not have the kind of state
13 leadership that really makes this work: Dr. Steidinger, Kirk Wiles, Tracy Villareal,
14 Cynthia Moncrieff from Mississippi who had conflicts and could not attend the second
15 day. These are the people, some of them were presenters to you and others are unsung
16 heroes. They are prepared to take any question that you might have and any problem that
17 you might have and they will try to help you with it. They are anxious for that
18 opportunity to work with you and for you. So, those remarks were remarkable to have
19 received of Dr. Chantiri, but they are a reflection of every one of you. I just thank you
20 for your time, and we will wrap up all of the documentation, requirements that we have.
21 We will carry out the coordinating role that we have agreed to and we are winners and we
22 will be in the winner's circle with you. Thank you for a great two days. Thank you.

23 **Unidentified Speaker:**

1 Any closing remarks?

2 **Unidentified Speaker:**

3 Well, I think that these have been a very intense two days. The most remarkable thing at
4 the end of the first day is that it was seven o'clock at night and nobody even left to go to
5 the bathroom. I think that we stirred enough interest. I think that it has been seen quite
6 clearly that all parties here have intense interest that this goes further on and I think that
7 by these initial steps we can accommodate every one and all of these organizations and
8 that they are not going to regret that we are undertaking these first steps. I want to thank
9 you all. It has been a departure from your regular work. It is difficult, especially for
10 those who had to travel, not only those that came from Mexico, but others that came from
11 different offices. We also have to thank our hosts and also Terry. Thank you very much
12 for all your work and one more applause for the organizers. This has been a great
13 organization. Thank you.

14 Applause

15 **Bryon Griffith:**

16 One last thing, a little change in the networking session in the morning. It will be on the
17 first floor in a room called Diamond A. It is in the morning, I don't think there is a cash
18 bar there. There will be coffee and beignets. Thanks again, and if you are going back in
19 the Quarter, be safe, hopefully the rain has stopped. Enjoy New Orleans. We have our
20 staff here this evening and in the morning as well.

21 Applause for the translators. They were remarkable. Thank you all again, it is a pleasure
22 to know you all and I look forward to working with all of you.