Chapter V - Promoting Ocean Awareness and a Stewardship Ethic

- **K-12 Education**
- **Higher Education**

DR. COLEMAN: Good. Thank you, Admiral. The next two are really a pleasure to report on. It is something that is not controversial. Everyone loves education. We had some excellent input into our working group from our science panelists and others on K through 12 education.

(A slide presentation is in progress.)

DR. COLEMAN: The first bullet that you see up

the basic goal is to weave the ocean sciences into the national science education standards. We heard some very alarming statistics about science teachers in general. In K through 6, something less than only a small percentage of the teachers that teach that have ever had a science course. When you get up in the sixth grade and above, it doesn't increase that much, so there is a real need.

Our recommendation, the first one, is to commend NSF for developing the Centers for Ocean Sciences Education Excellence, "COSEE" as it is commonly referred to, but not only that, we recommend that NSF and other federal agencies really try to enhance and sustain this program. It would do no good to form four

or five centers and then the funding stops, so the sustainability of this program is important.

The next one a lot of people will probably not agree with that, but to place COSEE under the purview of NOPP. Again, that is a stability concept. NSF has a wonderful ability to begin programs, but very often they cannot sustain them over longer periods of time. We are searching for that agency that could sustain this.

Under NOPP there is a mandate for educational programs.

We recommend that ocean sciences case studies be included in the 2005 revision of standards. That is the first chance that ocean sciences could be used as a case study in K through 12. During that period of time, obviously you could get a task force to identify those science cases.

We also recommend strongly that all of the federal ocean agencies have education as an integral component of their missions and to support ocean education initiative and training programs as much as possible, and to provide incentives for their researchers that they are supporting to expend part of their effort in trying to develop case studies that

could be used in K through 12.

Then, the last one is very important. Provide support for increased involvement of the underrepresented groups in science education. When we use the words "ocean sciences," in many ways we just backed off and said "science" is the more important one and just injected "ocean" in a few areas. Those are the recommendations we had for K through 12.

DR. EHRMANN: Very good.

Dr. Rosenberg?

DR. ROSENBERG: I am comfortable with your recommendations, but I just wanted to comment on the COSEE Program and think possibly that recommendation needs a little bit of expansion, perhaps you have already done this. My concern about the COSEE Program is simply that by creating centers it is not clear to me that those centers will be serving a very large area.

The way most of the COSEE proposals have been developed, as far as I can tell, they link with schools within their state or maybe across a couple of states. Given that you have five centers and even if you had ten, it is not clear to me, then, that you are going to

be using that information more broadly than the specific schools that you link with in the proposal.

There needs to be some kind of a mandate in the COSEE Program to provide those products and an opportunity for not just the developmental schools to be, K through 12 schools and universities for that matter to be involved, but somehow to disseminate that material in a truly usable way to make those Centers of

Excellence raise K through 12 education as opposed to raising K through 12 education at a few dozen schools.

DR. COLEMAN: That is a very good point, Andy. If I am not mistaken, the coordinating body -- Roxanne, is that correct, the coordinating body has already tried to address that, the products of these COSEE Centers?

MS. NIKOLAUS: (Nodding head.)

DR. COLEMAN: I think we heard that from Sharon, but that is a very good point. I totally agree that they not only have to be sustained, but there have to be more of them. I know at least the one we have in the South is probably a two-state, three at most.

DR. ROSENBERG: Well, and also they need to go out beyond, it is not just a matter of having more of

them. For example, the one at New England and MIT and so on, I doubt that they are going to touch any schools in Northern New England. You could just say, "Well, let's stick another center in Northern New England." Well, if we had one in New Hampshire, then they probably wouldn't do anything for Maine.

DR. COLEMAN: Right.

DR. ROSENBERG: There needs to be something

specifically that mandates outreach beyond their immediate partner schools.

DR. EHRMANN: Dr. Hershman?

DR. HERSHMAN: Yes. Following up on the COSEE thing, I think COSEE conceptually is just an outstanding idea, an idea whose time has come. I think the centers are only now beginning, so there is no experience really or no analysis or evaluation of what is working and what isn't.

Just to give our report and our recommendations sort of longer lasting value, maybe we can get at what are the elements of what COSEE is trying to do that we really want to see happen. Maybe either it can be accomplished through COSEE, but maybe COSEE

will morph into something else; in other words, not get hung up just on that one program area. That is my suggestion.

DR. COLEMAN: That is true, Marc, and that is in the white paper that Sharon did for us, that discussion of it, what is, what they hope to accomplish, and so forth.

DR. HERSHMAN: The other comment I would have,

I think you may have commented on this at the end, Jim, is science education is identified here, but there is sort of ocean education more broadly which would take in a variety of other activities: history; culture, for example; economic use, even conservation goals and things like this, which aren't necessarily science investigation projects. I am wondering whether the intent is that the education be ocean education, or is it really just science education?

DR. COLEMAN: I am not sure we really thought about that. I think the discussion we had with our science advisors is that they did not want to emphasize everything solely in terms of the ocean, that if we did that physics would say, "Well, we want the same thing."

Chemistry would say that, too. I think their recommendation was to put it into a broader context of science, and then where we could inject "oceans." I do take your point about the broadness of the "oceans" versus "science."

DR. HERSHMAN: Yes. I would encourage you to think more broadly, because the scope of our Commission's activities is to look at a whole range of

things going on, and it seems like an education infrastructure to support that would be a very valuable addition.

Thanks.

DR. EHRMANN: Dr. Muller-Karger?

DR. MULLER-KARGER: Thank you very much.

I think these are very exciting recommendations. The whole issue of education permeates every single thing that we do on this Commission, and so I think it is pretty important that we do it right.

Marc brought up some important things. On COSEE, I think COSEE the way it was structured it has limited scope. For example, COSEE is not intended to develop products or curricula, but it is intended to

develop an infrastructure for communications.

DR. COLEMAN: I think it in there that they are also to develop curricula, et cetera, and products.

DR. MULLER-KARGER: Well, I think that they are trying to get together, they are supposed to communicate what it is, but I don't think that they are tasked -- some COSEE Centers may have that in their proposal.

DR. COLEMAN: I will check on that, though, to make sure.

DR. MULLER KARGER: This goes to the second bullet on the second page, that federal ocean agencies have education as an integral component, many of them do. In fact, many agencies or some agencies may have several education programs that are internally not coordinated. I think if there is a way to develop a strategy that you can coordinate this across agencies, it would be much more effective. One way the present situation was reflected is that some agencies require that you include education components in your proposals. Everybody is doing that, it is a new trend, and it is a great thing to do, but it is not coordinated. I mean,

everybody just hangs on a little piece of education to their proposals.

DR. COLEMAN: That is, again, in the paper. We didn't bring it out as a recommendation, but we will look at that again.

DR. MULLER-KARGER: Thanks.

DR. EHRMANN: Okay. Mr. Kelly?

MR. KELLY: Dr. Coleman, just in the

department of making sure we are taking advantage of all available resources, has the work group seen a recent paper on K through 12 education approved by the Ocean Research Advisory Panel in NOPP. It was an effort that was lead by Dr. Denise Stephenson-Hawk.

DR. COLEMAN: Yes, we have.

MR. TURGEON: We have seen it in draft form, but were asked not to use it.

DR. COLEMAN: We looked at it, we just can't use it at the present time.

MR. KELLY: Okay. I think it has been approved by ORAP now.

CHAIRMAN WATKINS: We heard it verbally.

MR. KELLY: Perhaps, it hasn't gone up above.

CHAIRMAN WATKINS: It has not, that is correct. That is what we heard. One of the things that we are going to have to make sure of, when we come up with our final overall governance structure here for carrying out the national ocean policy, when we flip things under things like NOPP, we have got to be very careful that we know what we are talking about.

Right now, NOPP has some very specific

guidelines under the Ocean Partnership Act of 1996. While it says certain things are required, others are done by the goodness of the people around the table. Who sits at the table today in the interagency working groups? Scientists, for the most part. They have very little knowledge of the importance of education up front in program development; okay.

They are also taking on now marine facilities, and that is marine facilities, not just the UNAL fleet, but all research facilities. Well, that is not in the Act; okay. So, they are trying to empower a very prominent group of leaders in nine federal agencies to carry these things out with, and they don't have the mantle; they don't have the teeth. That is what I

15 talked about earlier.

16 I think when we talk about putting things into

17 a specific area like this and not being more general,

18 you have got to be careful. We want to strengthen NOPP

19 under the Act. If that is what we want as the mechanism

20 within the federal agencies to do certain things for us,

21 then we need to include that in here.

22 We need to make sure that the law is

consistent with the tasking we are throwing at them. For example, in the integrated program management out of the research products that come out of NOPP, if it is not their responsibility, whose is it? Nobody knows. Who pays for it? Nobody knows.

An integrated ocean observing system from a scientific point of view is fine, but the implementation of that, there is no mechanism to do that. I am just saying be careful when we flip things under an existing program, we may be thinking of what we would like not to be, but make sure that we know what we are talking about so that we can make the right recommendations.

Have we lost Lillian?

THE COMMISSION: Yes.

CHAIRMAN WATKINS: Oh, Admiral Gaffney is back; okay.

(Laughter.)

CHAIRMAN WATKINS: Okay, all right. We can get on with the last issue.

DR. EHRMANN: Yes, it is the last one.

DR. COLEMAN: Correct. This one obviously needs a lot more work. It was the last one we

accomplished, but it basically is the ocean science graduate education and the workforce. We still have a paper coming in from CORE that was a contract, and obviously that will probably change some of our recommendations.

Right now, we really don't know the needs of the future in the ocean sciences from a graduate education area. Recommendations are that the ocean agencies develop a strategic vision for meeting federal and non-federal workforce needs. At the present time, you cannot go to any one document and find out what the workplace needs are in, say, 2010 or whatever in any one of the disciplines.

We also ask NOAA or an appropriate agency to

track the graduate student support. During our survey that went out from CORE, the universities don't track them very well. There needs to be someone to track graduate student support, look at it, find out what level it is, and so forth.

Go to the next slide.

(A slide presentation is in progress.)

DR. COLEMAN: Basically, that is what that is

saying is they need to adjust their stipends and salaries for the students to be commensurate with other science disciplines. It is very difficult to get a person to go into, say, marine science or oceanography when their stipend is $5,000 and that in physics is $15,000. There are some incentives there, and they need to maintain that to adjust those stipends within their own grants.

We encourage the expanded use of existing postgraduate career fellowships. Sea Grant Fellowships are a good model. There are several others that we are looking at.

Again, it is very difficult to attract students from an undergraduate to a graduate program in

some of the ocean sciences, so we really recommend that the federal agencies work with the universities and even the private sector to boost visibility of the career paths open to ocean science students.

Right now, there is very little incentive or visibility. You can't put your hand on anyone package to get a student and say, "This is why you should go in oceanography, it's exciting, it's fun," et cetera.

DR. EHRMANN: Very good.

Dr. Sandifer?

DR. SANDIFER: Jim, I understood this is incomplete at this point, but, like your former ones, it is a great beginning. With regard to the expanded use of currently existing postgraduate career fellowships and looking at non-research areas as well as to research areas, in light of our previous discussions concerning the need for a better science background in coastal zone management, it would be great if we could specifically identify some areas where fellowships for people who have a science undergraduate or otherwise can move into a policy arena and provide some specific science support and policy support in the area of coastal zone

management.

Again, there is a little bit of a framework there, as I understand it, through the Sea Grant network and others, but nothing truly formal that really designates coastal zones kinds of issues very strongly. I am encouraged in thinking along that line.

DR. COLEMAN: That is a very good point. The only program I know of that encourages a policy is the

Sea Grant Program at the present time.

DR. SANDIFER: Perhaps, a little broader than that would help, because that is a very small program.

DR. COLEMAN: Right.

DR. EHRMANN: Dr. Hershman?

DR. HERSHMAN: Just reinforcing what Dr. Sandifer just said, I think in looking at recommendations coming out of this Commission, just from today's discussion, in the fisheries area and in the coastal zone area and in the area of the translation function from observing systems down to management needs, I would see the need for a special kind of new person out there who both has the capability to understand the scientifically-derived information and

the data sets that are out there.

This person would have to be closely linked to what management policy needs are, the decision process that has to be followed and all of that. I think identifying that need that has to be met through graduate education would be very valuable as well.

Thank you.

DR. COLEMAN: That is a very good point, Marc.

We will look at that area, because we really didn't discuss that. I think for whatever reasons we were thinking more on the pure biological, physical and the chemical area, in the policy area and coastal zone management, et cetera.

DR. HERSHMAN: And the social sciences.

DR. COLEMAN: And the social sciences. Very good, thank you, Marc.

DR. EHRMANN: Admiral Gaffney?

ADMIRAL GAFFNEY: Jim, I just saw this week in a bulletin, either the "AMS Bulletin" or the "Oceanography Journal" that just came out from the Oceanography Society, a half-page advertisement for a federal program. I can't remember what the acronym was.

But the stipend was $23,302 for graduate students.

It listed ten disciplines, and they were all hard sciences and engineering and oceanography. It didn't include biological, marine science or the social things we have just been talking about. It might be something, Ken, you might look at. I will try to look for it. It might be something we can pile on and either make sure that the number stays up so it takes care of

the hard scientists or maybe it can even be expanded to take care of some of the social sciences.

One other comment. Marc made a very good point that I think is a little bit of a sequencing problem. I think if you start out on the social science side and then later in life try to gather the hard science side, the experiment has been tried and it doesn't work very well.

I think if you start out in engineering, hard physical sciences, biology, and then shift to social sciences, much like Andy has done in his career, you are more likely to get the job done, to complete the course of instruction. It is an observation.

DR. HERSHMAN: I do have an example or two of

those who have gone in the opposite direction, and have done very well thank you.

(Laughter.)

DR. EHRMANN: Dr. Rosenberg, you had a comment?

DR. ROSENBERG: Yes, I want to respond to that. I have done that, and I am not sure I can in good conscience recommend it.

(Laughter.)

DR. ROSENBERG: My comment was with regard to what Paul said about the advertisement for graduate stipends. There was also in the last issue of, "The American Fishery Society Journal" a half-page ad from NOAA looking for Ph.D. candidates, and there are a couple of things that are instructive about it.

First of all, it is for people to work in population dynamics or stock assessment or essentially quantitative analysis of resource management problems or in economic and social analyses from a quantitative perspective.

Quantitative is really important here because it is very difficult to find students in those areas

that will work in biological or social sciences that have sufficient quantitative training, but I can guarantee that I can provide hundreds of undergraduates in marine biology or, you know, marine mammal science or aquaculture or whatever because that is very attractive to students. It is very hard to find quantitatively trained students, and I think that is a need that we need to address.

The second point I would make about it is that that ad has four fellowships in it nationwide, Sea Grant and National Marine Fisheries Service partnerships. They are looking for four students to give out those scholarships to. They haven't had an easy time finding four students to fund, and this program has been going for several years.

But if you think about what the needs are in terms of resource management, if that is one of our strongest programs that I can point students at for an independent fellowship in those kinds of applied sciences, four fellowships isn't very many.

DR. COLEMAN: That's right.

DR. ROSENBERG: There also is something wrong

if we are having trouble finding four students out of applied math or statistics or biology to take up those fellowships and do Ph.D.s in those areas and end up doing the social and economic evaluation of a resource management problem. It doesn't have to be fisheries, it could be anything.

I think that would be instructive for the working group as well to look at that ad and talk to the

people who have been managing that program, which would be Emory Anderson at the National Marine Fisheries Service about the challenges they faced in filling those disciplines.

DR. COLEMAN: That is a very good point, Andy. I know in my own university if we get a grant from the Navy or NSF, very often there are stipends that are included in that to be paid. But if we get a grant from an agency that deals in coastal zone management, for example, boy, it is very difficult to convince them of putting money in for a graduate stipend. We will look at that, though, that is a very good point. If we could get some case studies like that, it would help. Thank you very much.

Mr. Chairman?

DR. EHRMANN: Thank you.

CHAIRMAN WATKINS: I would only say again to the staff when we begin to look at all of the recommendations coming in, we finally get to implementation and investment, one of the most important investments we have got to be concerned about are the human resources to carry out what we are intending here.

If we are successful and an integrated ocean and coastal ocean observing system goes, and if we begin to put into effect a number of these initiatives, governance initiatives and others, we are going to need marine policy graduates, we are going to need undergraduates, we are going to need technicians, we are going to need a lot of things.

Who monitors the human resource side of our recommendation? NOAA may have one component of it, but they may not have the ability to even look across. I have tried to get the Oceanography Society to take on the mantle of, How do we give guidance to kids that are going through the universities? Where do they go if

they don't go into research and they have master's degrees? We have a number of master's degree people who are some of the most competent, productive people on our own staff.

I want to encourage the human resource management side as well as, let's say, the normal budgetary process to be there, and for you all to think of those terms so that we can end them by saying this is

going to take some initiative on the part of some coordinating group to worry about the human resources that are going to carry out this thing.

Don't let it just be supply and demand that has too big a time lag in it; we have got to be proactive. What was it, prudent--? What was the thing?

DR. EHRMANN: Prudent foresight.

CHAIRMAN WATKINS: Prudent foresight. That completes the issues that we are ready to bring into public discussion from the working groups. Again, I would remind everybody that this is pre-decisional. We have not come down on agreement on recommendations, only that the recommendations present a vector to the staff to move along those lines to start preparing their

papers.

I am going to turn it over to the executive director, but I believe we are about in a position and we have notified the people who have signed up for public comment that we may be early. I want to commence that as quickly as possibly.