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WEBINAR: "Managing Ecosystems, Managing Fisheries: How do EBM and EBFM Relate"

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START TRANSCRIPT

1.

JOHN DAVIS (Project Supervisor, Marine Ecosystems and Management): [Let's get started. Our first speaker] is Jake Rice. Jake is Senior National Advisor for Ecosystem Sciences with Canada's Department of Fisheries and Oceans. Previously he headed the department's Canadian Science Advisory Secretariat, providing advice on fisheries issues, the ecosystem approach to management, and ecosystem effects of an array of marine activities such as seismic exploration and aquaculture. Here is Jake Rice.

JAKE RICE: Thank you very much, John. Welcome, everyone. I get the privilege of giving a very high-level and ethereal talk. Each of the subsequent two panelists are going to bring it down to more- and more-real levels. But because the ecosystem approach to management has such a large and diverse literature, I wanted to lay out what, from the perspective I work at as a science advisor to policy and management, really brings all the diverse threads together.

If we go to the next slide, we can see that as you look through all the different things written on an ecosystem approach to management, from a very wide variety of perspectives, there's really four themes that consistently come out. Two of them have to do with the physical and biological environment in which management occurs. Now there's two aspects of that. There's the input aspect to the activities being managed that you need to take account of the state of the ecosystem, the state of the natural forcers on those parts of the ecosystem that are going to be used, whether it's by fishing or any one of a number of other ways. Take account of the external factors in choosing your strategies for use in the medium and the short term. The other aspect of the environment is the output aspect of the activity being managed. It's no longer enough to simply be accountable for the impact of a fishery on the target species. You're accountable for the impact of fishing or any other activity on the whole ecosystem that is being affected by that activity.

The other two pillars are the human dimensions of placing people in these marine ecosystems. That's got governance aspects, one of them to do with integrating policy and management activity across all the different industry sectors that are taking place in the marine environment. And the second part of that is, within the policy and management sectors, making governance inclusive - making the people whose lives are affected by decisions feel they have a meaningful way to be heard and participate in those decisions.

Looking at these four pillars individually - if we go to the next slide - you can see on the case of taking account of the state of natural forcers....

SARAH CARR (Coordinator, EBM Tools Network): Jake, there's a lag between

the updating [of slides]. It's not updating quickly at all, even from my computer. Let me see if I can click back and get it.

JAKE RICE: Yeah. With taking account of the environmental forcers on ecosystems, there isn't anybody out there left to convince that's an important thing to do. There is consensus that it is. It's embarrassing to those of us who are specialists and advisors, though, how little consensus the experts have on the best way to do it. You can find proponents of making the assessment models we use more complex by including some of these environmental effects on recruitment, for example, or on growth or maturation right in the assessment model. There are proponents of putting the effects of the forcers not in the assessment models and the forecasting models but taking account of them in the management strategies that are applied, rather than making the computations more complex on the input end, they say: What ways to manage these resources are going to be sustainable under a wide range of plausible environmental conditions? And then there are advocates of saying every case is special and we need to do it case by case.

Dialogue among the groups participating in this webinar, for example, on those three different strategies can help us understand what are the advantages and disadvantages to each of those. Because there is no clear winner yet, and these are important things on which we need to make progress. Because whatever we choose to do, we have to find ways to use the ecological knowledge we have better - notwithstanding the uncertainties that exist. We've been using the uncertainties as an excuse not to give clear and direct advice. We have to get over that.

Now with regard to the next issue, taking account of the footprint of human activities on the ecosystem, again there's nobody left to convince. And I'm hoping there's another slide coming up soon. We've got very good knowledge of the direct effects of most of the activities we're managing on the marine ecosystems. And we even have good guidance documents on what to monitor, how to measure it, how to take account of those effects. What we need is certainly better understanding of the indirect effects of activities like fishing. And we need an answer to a question that has been around for some time now: If we're managing the direct effects, which we know how to monitor and how to manage...if we're managing the direct effects so they're all sustainable, are the indirect effects also kept at levels that are sustainable even if we have not been able to quantify, monitor, and manage every indirect effect? This is an area of significant scientific controversy, and it's another point we can discuss on this webinar. But what's emerging from the work that's being done is that one makes better progress when you take this strategy of focusing on where are the activities where it's safe to fish, rather than building longer and longer lists of types of areas where it's not safe to fish. We make much better progress in getting management accepted and getting policy accepted if we go ahead and say, "This is where this activity, we think, can occur safely," rather than threaten people with an ever-growing list of places that are going to be off-limits.

Now, when we move from the ecological to the governance issues, the inclusive governance...the cases for bringing stakeholders into governance have already been made and accepted pretty widely. The issue

that we have to come to grips with, in putting management of fisheries and other activities into an ecosystem context, is this issue of finding a place where the biodiversity agenda and the fisheries agenda can coexist. The objectives are not as different as people who work in one framework or the other seem to believe. When you move from one community to the other, they're actually striving for largely the same thing. What we see, though, is a very different risk-tolerance for false alarms, which to the industries, they consider a concern - when governments intervene and prevent activities that in retrospect are perfectly benign and would not have caused serious harm. They're risk-averse to false alarms. A biodiversity conservation community is very risk-averse to misses. They're willing to have management strategies that intervene often, even when in retrospect it may not have been necessary, to make sure that the government will intervene, management will take action, in the places where it is necessary. Because the objectives are not different, but their risk-tolerances for different kinds of management areas are very different, we're only going to resolve this controversy when we find a ground where the science experts who advise the management agencies and the science experts who advise the conservation agencies can come together, work together, and package advice in a way that agencies whose job is to conserve biodiversity and agencies whose job is to manage fisheries get the same advice so they can take the same actions. And then you're going to get better buy-in, you're going to get better compliance.

On the next slide, we see the final piece of this four-part structure, and that's the issue of integrated management. Now, everybody loves integrated management as a concept. Every agency that's got management responsibility has a very low appetite for yielding any of its autonomy to some integrating body. And a lot of the reviews that have been done do support the conclusion that the sector management that has been built since the Law of the Sea was passed is an effective way to manage industries. Let fisheries management manage fisheries, shipping management manage shipping. What we need to do is create fora where you get a suite of objectives that all the different sectoral management agencies are striving to achieve together. And that the suite of objectives is a coherent set so each agency doing its job well is working in harmony with, rather than in conflict with, some other agency with a different mandate.

And there's some practical guidance that's coming out of the governance discussion on this that we can see in the next slide. It's got basically four emergent ideas. Step 1 is to identify what constraints the ecosystem puts on all the sectors - what parts of the ecosystem are vulnerable to serious harm, what is serious harm, and this is a science-based activity. It's not a consultation and negotiation. For a given ecosystem, we usually know enough to know its limits of perturbation. Once we establish those constraints and those boundary conditions, you can set a suite of sectoral objectives with the different sectors all participating. So the suite is achievable within the constraints that exist. Then each sector can go off, apply the tools that work best for its own management activities that match its legal authority, its history, and its culture, so that they can achieve the management toward this suite of objectives best and stay in contact with the other sectors

so that this suite of tools as well as objectives work as much in harmony as possible. And as we do those things, we'll know where to focus our efforts.

Next slide. We know that all ecosystems are complex. But we don't have to understand every bit of that complexity to make management successful and humans uses sustainable. It comes down to having sound social and economic incentives, and if you have them, you can manage fisheries sustainably with a relatively modest amount of ecological complexity whether you put it in the assessment models or you put it in the management strategies. You don't need to understand the whole ecosystem if you have the right incentives socially and economically. But if you have the wrong incentives, there's no amount of ecological knowledge that is going to fix a fishery suffering the classic problems of overcapacity, perverse subsidies that support irresponsible behavior, and you have ineffective management, control, and surveillance. So the problems we need to solve are the problems we've needed to solve in single species management just as much. You'll hear more details of this very soon. I think I'm done.

2.

JOHN DAVIS: That's great. Thanks a lot, Jake. That was excellent. Our second speaker will talk about how we get started implementing some of these concepts that Jake has just described. David Fluharty is Chair of the Science Advisory Board of the National Oceanic and Atmospheric Administration in the U.S. He's also the Wakefield Professor of Ocean and Fishery Sciences at the University of Washington. In the late '90s, Dave chaired a committee that developed advice on how the National Marine Fisheries Service could implement ecosystem-based fisheries management. More recently he chaired a Working Group of the NOAA Science Advisory Board to advise on how an ecosystem approach could be applied across NOAA and its partners. Here is Dave Fluharty.

DAVID FLUHARTY: Thank you very much, John. It's a pleasure to be part of this and to also have a chance to welcome the 111 attendees on this webinar. As John said, this is an interesting effort to experiment, to see how we can facilitate discussion about ecosystem-based approaches to management. Next slide, please.

I want to echo the last few lines of Jake's presentation to say that if we continue to manage the way that we have been managing, we're continuing to dig ourselves into a hole. Ecosystem-based management is not a substitute for continuing to do what we do, but it's something that we need to work towards as a way of restoring ecosystems. Next slide.

SARAH CARR: Keep on presenting and I'll work on getting the slide up for you, Dave.

DAVID FLUHARTY: I think the first thing that is important to understand is that we are managing - whether we think of it that way - in an ecosystem context. So whether you're doing single-species management or whatever, you are working in an ecosystem. Most countries lack legislation or a mandate for an ecosystem-based approach. However there

is not a law against taking an ecosystem-based approach and in fact an ecosystem approach, as I think Jake has very clearly stated, has to be adopted as the best available scientific approach, where we use the information that we have available to manage better. Next.

So the starting point for ecosystem-based management is actually where we are at the present time. It is not some vague time in the future. We can actually think in terms of starting where we are. In some cases there's a fairly advanced effort to do this. In other cases, the effort is less. So we actually know more about the ecosystem than we apply in management. We can improve that. I want to emphasize that what people value and how they behave is part of the scientific inquiry that needs to go on in order to develop an understanding of how to do what Jake was mentioning - to get the incentives right, to have the proper behavior in the use of an ecosystem-based approach. With the right incentives, we can link ecosystem science to policy decisions and actually implement them. So the bottom line, as far I see it, and the easiest and simplest definition of ecosystem-based management, is using what we know to manage better - again, because everything we do is in an ecosystem context. Next.

So I tend to encourage people to think of ecosystem-based management as a process and not an endpoint. And I think that goes back to the debate that Jake was talking about: if you're in the biodiversity-conservation mode, you see an endpoint and the process of getting there is not as important, whereas if you're starting from bottom-up working from practical management, you need to see your way forward, and that represents a process. So we are actually managing human activities within an ecosystem construct and we will make progress toward the goal of ecosystem-based management, I believe, by incremental steps in a process. Next slide.

Each of the things that we do to move toward a broader conception of management, from single-sector to possibly integrated regional multi-sector management, can be taken as a series of steps. I think that Jake, and later Kevern, will give examples of how this moves. It gets harder the farther you go to the right in this diagram. Next slide.

Getting started means, I think, almost a shift in the culture that will require us in a training, education, and outreach effort to explain what is meant by ecosystem-based management. And to this I think I would add experimentation. I think that right now the diversity of approaches that we're seeing is actually evidence that we are trying different things and there's a lot of institutional learning that is going on.

To illustrate this approach - next slide - I use a simple example of, if you are training to be a high jumper you start someplace. It might be kind of low - the bar is low. So if we say our implementation of an ecosystem-based approach right now is low, but it doesn't mean we haven't gotten started... Things like stock assessments, bycatch controls, controls on fishing effort, and spatial management of fisheries are all things that we're doing to some extent and, to some extent well in many places.

But if we go to the next slide, we can see that the bar is higher, and we've learned within current knowledge to see where that bar is. We know we're not using all the information that we have, but we may not be able to reach that bar because we lack the skills, we lack the resources, there are conflicts, different kinds of things. But we can do better with existing information. So getting started in ecosystem-based management is something we can do today.

The next slide illustrates what happens in the case where we perhaps are trying to go too fast, so that you're beyond current mandates (as we talked about in the first slide, there are no laws that require this), we lack resources, and in some cases we lack knowledge to put it out and totally integrate it with multisector, regional-type analysis. If we think of this as where we ought to start, we'll never get there. Next slide.

And we won't get there for a lot of reasons, and these affect management and management decisions in multiple sectors. Fuel prices, for example, have really been an important issue recently. Revenue: what's happening to prices paid, and how do we deal with non-market values? Conflicts: we see a lot of resistance to change - it's natural. We also see competition between diverse goals. Technology, we've seen how it can help solve problems, but it also can create problems, especially when it increases our ability to extract more and more efficiently some of the resources we're using from the sea. Changing human values also are important. Are we thinking about fisheries the same way we did 20 years ago, 30 years ago...or even 5 years ago? Natural disasters have a big impact on marine ecosystems, and particularly coastal ecosystems as we've seen with things like tsunami and hurricane impacts. And these essentially press the reset button. We need to understand how that works within an ecosystem context. Climate variability and change are going to be something where I believe ecosystem science is going to be about the only way we can really start thinking about how to adapt and mitigate impacts of global climate change. Next slide.

So from my way of thinking, we're in the process of creating a sustainable culture of science values and management for the ocean through an ecosystem-based management approach. We can actually do this by using what we know to improve the way we manage, and this starts with the realization that we are managing in an ecosystem context whether we think so or not. I argue as well that ecosystem-based management is an incremental, adaptive framework and is a process whereby we will be moving to better management of our oceans in the future. I believe that's the last slide.

JOHN DAVIS: Excellent. Thanks a lot, Dave. That was great.

DAVID FLUHARTY: You're welcome, John.

3.

JOHN DAVIS: Our third and final speaker before we open up this webinar to questions is Kevern Cochrane. Kevern works at the UN Food and Agriculture Organization (FAO) in Rome, where he is Chief of the

Fisheries Management and Conservation Service. His specialties are stock assessment and fisheries management, including the ecosystem approach to fisheries management, a subject on which he has published widely. Here is Kevern Cochrane. We're going to bring up his presentation [onscreen] in a couple seconds.

KEVERN COCHRANE: Thanks very much, John, and greetings to all the attendees in this - in particular old friends of which I think there are a number out there. Is my screen up?

SARAH CARR: It's not showing up yet, Kevern. Did you press the button to share your screen?

KEVERN COCHRANE: Yes, okay. Is that it?

SARAH CARR: I'm noticing a bit of a lag. Yes, it's up now.

KEVERN COCHRANE: Okay, great. Thanks very much, Sarah. I think there's very little difference between what Jake and David have said and what I'm about to say. But I'm going to take an inverse approach to that taken by the two of them, and in doing this I want to start from the bottom up, to remind us all that EAF and EA are not all about building elegance and intellectual concepts and frameworks. They're about solving urgent real problems as best we can. I want to try to illustrate this by looking at two simple examples. The first is a real example and one that I think many of you will probably be familiar with.

This graph shows the trends of a certain trawl fishery on the Australian northwest shelf over a period of about three decades. I think you can immediately see there that a particular concern to fishers and managers was a steady decline they observed in the high-value preferred Lethrinid and Lutjanid species while other less-valuable species increased in abundance. The management response to this was to look at the problem, and there are in fact four possible ecological explanations for these trends - each one of which would elicit a different management response. I can't go into all the different explanations here but for those of you who are interested I would recommend that you read up on it and I'll give you a reference on one of the later slides. It's a very interesting and successful study, I think.

Recognizing this, the management authorities, well-advised by the scientists, set up a spatially based experiment to try to determine what was driving these observed trends. They did this by including some areas closed to trawling, some areas open to trawling, but trap fishing was allowed throughout. And after letting this run for some time, they found that in the area closed to trawling, the abundance of the high-value species started to recover and importantly, but not shown here, this recovery was associated with an increase in the abundance of small epibenthos. In contrast, in an area open to trawling, fish numbers and abundance of epibenthos continued to decline. Unfortunately the experiment was not continued for as long as had originally been planned. But sufficient results were obtained to indicate that the most likely explanation for the problem was that trawling was modifying the bottom habitat in a way that favored the lower-value species and adversely

affected the Lethrinids and Lutjanids.

These results also showed that it would be possible to develop a productive fishery for the high-value species if their habitat were protected - for example, by limiting the gear that could be used to suitable traps. I haven't been able to keep up with what has been happening in this particular case and hence what the current management arrangement is. But this example does provide a good case study of an ecosystem-based problem that could be addressed almost entirely within the framework of the fisheries sector - in other words, through an ecosystem approach to fisheries. Where that might not fit, and again I'm not sure of the details, is that perhaps in the transition from a trawl-based fishery to a trap-based fishery, there might have been some loss or might be some loss of employment opportunities, in which case the displaced livelihoods would obviously need to be absorbed in other sectors. But nevertheless, this can be seen as largely a self-contained problem within the control of the fisheries sector as a whole.

Now I want to take a look at another example. This example is based in most respects on a real case. But in order to make my points in the very limited time available, I have embellished the true case, mainly by adding a strong management action. To illustrate this, I have developed a totally fictitious time series. So this in front of you is the Gulf of Hypothetica, where the fishers were experiencing a problem almost identical to that being experienced in the previous example with, as you can see in the three lower lines, declining abundance as measured by catch per unit effort in some important commercially exploited stocks. This was an open-access fishery, so effort was escalating continually. The managers looked at this, they identified the problems - which in addition to the immediate fishery problems included conservation issues as well as bycatch of undersized fish. And being good fisheries managers and fisheries scientists, they came up with the classic fisheries response: that was to reduce effort. So here in this now-hypothetical world, they closed access to the fishery, established a set of rights that incorporated a 30% reduction in fishing effort, and implemented it. At the same time, to address the problems being experienced through bycatch of turtles, [management] introduced some gear regulations to try to address that. Then, satisfied with a job well done, they turned their attention to other problems.

However, when they came a while later to see what had happened, they were very disappointed - and more importantly so were the fishers and others dependent on this fishery for their livelihoods - as it became apparent that despite this big reduction in effort with the social and economic impacts it had, they were not getting the desired results. The exploited species were not recovering as had been anticipated. So they went back to the drawing board and they thought about it, and all they could think of within their fisheries world was again a further reduction in effort. So they went back to the fishers and they said, sorry guys, we tried but we obviously haven't reduced effort enough and we're going to have to implement yet another reduction. Now at this point the fishers were also desperate but they were out on the water every day and they knew that in addition to the impacts of fishing, there were other factors at play in this ecosystem. Based on their own observations, they knew that there

was extensive destruction of nursery habitats, mangroves, estuary areas, and others. They knew that there was pollution of the water from a very active petrochemical industry. And from various land-based sources, there was also eutrophication with all the problems that eutrophication brings. So they turned back to the managers and the scientists and they said, yes, we need a reduction, but it's not enough. And together they realized that while EAF is necessary to slow the decline in the abundance of the resources, it was not and never was going to be sufficient. In addition, to look after the social and economic impacts of displaced fishers, again one would need to look at other sectors.

So in this particular case, it was clear that an ecosystem approach would be the only way to ensure productive and healthy ecosystems to support sustainable fisheries production and also to minimize other negative impacts. In this case, any solutions would have to involve other sectors. And of course in involving other sectors, particularly with the social and economic importance of industries such as tourism, oil and gas, and agriculture, fisheries can very easily be marginalized, and efforts to ensure they are given priority will rarely be easy. Nevertheless, if we're serious about sustainability of ecosystems and sustainability of the services they provide, in cases such as this an ecosystem approach will be essential - of which an ecosystem approach to fisheries will be one component. I think what is particularly important about this semi-hypothetical case is that it would be common to almost all inland fisheries as well as to many coastal zone fisheries and some further offshore as well.

So to summarize, I don't think there's any simple universal answer. The relative importance of an ecosystem approach to fisheries, a sectoral approach, and a multisectoral ecosystem approach will depend on the case in hand. It will be affected by the type of ecosystem, the nature of the threats, and by societal needs and objectives, and those are where we need to start. Again, this is not rocket science, and good decisions can be made on the best available knowledge used in a precautionary manner. Using knowledge in that way will require full participation, and of course we shouldn't forget a good dose of common sense. The real problems as both Jake and David mentioned and described well come in the implementation. In particular, we're going to have to ensure that there is just and equitable reconciliation between ecosystem well-being and human well-being. And we need to ensure that there is reconciliation between the different sectors as described so well by Jake. With that, I will finish my presentation.

4.

SARAH CARR: Thank you, everybody. Now we'll open it up for questions for our panelists. Again, there are two ways for everyone to ask questions. You can type your question into the question box or you can raise your virtual hand to be called on and then we'll unmute you so you can ask your question. So go ahead and start typing your questions in or raising your hands at any point. We look forward to hearing your questions.

JOHN DAVIS: In the meantime - and again this is John Davis speaking, I'm Project Supervisor of Marine Ecosystems and Management - we have had a

couple questions submitted earlier. One is from Silvia Revenga, senior officer in the Spanish Ministry of the Environment, where she has worked for 25 years on fisheries marine reserves, namely as a tool for enhancing marine fisheries resources for Spanish artisanal fishers. Silvia would like the panel's opinion on the use of no-take marine reserves - namely the use of such reserves to protect both artisanal fisheries and biodiversity. You could restate this as, are no-take marine reserves a useful tool for ecosystem-based fisheries management and/or ecosystem-based management in general?

JAKE RICE: Who wants to start?

DAVID FLUHARTY: Go ahead.

JAKE RICE: Go ahead, David.

DAVID FLUHARTY: Well, I think that an ecosystem-based approach to management clearly includes spatially explicit management measures, but does so, I think as Jake explained well, with the idea that you're looking at these tools as being the best tool for the goal that you are seeking to accomplish. So clearly no-take reserves are part of an ecosystem-based strategy but instead of focusing on the areas to close per se, you focus on the areas to keep open. Again, this is where the marine science comes in and also the specification of objectives.

JOHN DAVIS: Would Jake or Kevern...

KEVERN COCHRANE: May I have a go at this one as well?

DAVID FLUHARTY: Sure.

KEVERN COCHRANE: I think pretty much the same as David has just said. Yes, I think no-take areas are potentially a useful tool. There's little doubt from results obtained in many cases that no-take areas do have significant benefits for biodiversity and various ecological characteristics and functions within the reserves, and can potentially have some benefits outside the reserves. As David said, I think you start by looking at your objectives. What are your objectives for the ecosystem as a whole? What are the objectives for the fishery? And how can a no-take reserve contribute to achieving those objectives? And a part of that is comparing the costs and benefits - not just in economic terms but in terms of the objectives you're trying to achieve - what are the costs and benefits of a no-take reserve compared to other management options? Out of all that, using the best information available, one would be able to evaluate first of all, does a no-take reserve have a useful contribution to make in this case, and then secondly, the aspect of the implementation and design of those no-take reserves. That would be my response.

JAKE RICE: It's certainly the case, just to try to add something to what David and Kevern said, that we have a history in fisheries of looking at a series of tools as the solution: quota management was the solution, and then effort management was the solution, and right now there's a community of advocates who argue that marine protected areas are the

solution - no-take marine reserves. I think we're emerging from that period of blind enthusiasm with a very rational view of these as one more tool to use. They're particularly effective under circumstances when the resources being protected are sedentary. The strongest advocates are trying to come up with mobile MPAs that track oceanographic features around the sea. The practicality of those concepts in the real world is yet to be demonstrated, even though you can build some really elegant models that work very nicely. The other thing to keep in mind when we're looking at the work that's been done to evaluate marine protected areas is, as both of the previous speakers said, they do have consequences on historic uses of fishing grounds. The effort that used to be in the closed areas has to go somewhere or be taken off the water. If the benefits come just because you reduce effort, there's nothing new. The arguments for reducing effort have been made for decades. There are studies that actually track where the fishing effort goes that show there are cases where no-take marine reserves simply displace a problem from one area to a new area, and the net result - looked at from a larger geographic area - may not be any particular benefits. Just, you've moved the problem somewhere else, as they found out with the closures for cod fishing in the North Sea. So those are some of the factors that need to be taken into consideration when you look at this tool relative to the other tools that are available.

SARAH CARR: We have another question from Patricia. Are you on the line? Patricia, you are unmuted if you want to go ahead and ask a question. Patricia? All right, then we'll go on with some more that were typed in. Go ahead, John.

5.

JOHN DAVIS: Okay. We have a question here from Scott Williamson in New Zealand. He asks, have any of the panelists considered the implications and incentives built into property rights-based systems such as we use here in New Zealand?

KEVERN COCHRANE: The silence let me come up with a few thoughts. I think this actually comes back to Jake's point about there being no silver bullets that on their own are going to solve all the problems. I would say that some form of rights-based approach, which in many cases would be a mixture of rights rather than one particular type - such a suite of rights-based approaches would be an integral part of an ecosystem approach to fisheries. Just as now, it's widely accepted that one needs controlled access, one needs a system of rights in order to manage a single-species fishery within the conventional framework. The same considerations apply to an ecosystem approach. Of course, again, if we come back to a multisectoral ecosystem approach, then one needs to start looking at rights across the different sectors, and that might be spatial rights, it might be access rights, of discharge, and a whole suite of rights. But somehow we have to manage all of those impacts and that's going to come down one way or another to a...I hesitate to use the word "rights-based approach" in the same way I hesitate to use the term "ecosystem-based approach". So I would say the use of rights within an ecosystem approach to fisheries, but I don't think you could have a functional ecosystem approach without well-controlled access and use

rights. I don't know if David and Jake would agree with that view.

DAVID FLUHARTY: Yes, I would like to say that I think that's a very good perspective. The other part of that is, there are a few people who have actually taken a look at the management of resources in primarily fisheries before and after implementing a rights-based approach. What they found is that where you do have, in this case, good single-sector management, including some aspects of ecosystem approaches to management, the increment is not large. So that's where you're actually seeing the effect of other management tools, along with the tool of rights-based management. So I think the other question to ask is, particularly as Kevern was talking earlier about making the tradeoffs and understanding what they are... One of the strongest things we've seen in the North Pacific is, where rights-based fisheries have been established, the industry has the right incentives for participating in, say, industry-funded research, work to deal with their own fisheries to make them have less impacts on other practices. And so in a sense they're better able to afford the kinds of management and afford the approaches to management that are needed to implement an ecosystem-based approach.

JAKE RICE: Well, I'll add to that. This is Jake. From the experience I've had, looking back, granting secure rights doesn't guarantee sustainability. The absence of secure rights makes achieving sustainability much, much harder to achieve. Not impossible, but much harder. The rights don't have to be to individuals - they can be to communities. There's a number of different ways that secure rights can be allocated. They certainly make all the other problems much easier to solve. The challenge comes when we put fisheries into this ecosystem context and make them accountable not just for the impacts on the target species - which is what the rights are given to - but when you start holding fisheries accountable for their impacts on habitats and bycatch species. The issue of giving access to rights for bycatch species of no commercial value is something that is being discussed now. Because if you have, for example, strict protected species legislation and very low sustainable takes of a protected species of no commercial value, it may be that take that is requiring fisheries to be closed. And allocating rights to that take may be the management tool that's needed. With no commercial value, the mechanisms to do it are still very much at the talking stage, but very germane to putting fisheries in an ecosystem context. Then, what rights do you give a fishery?

6.

JOHN DAVIS: Thanks. This is John Davis again. We've received a number of questions pertaining to the social science side of EBM. Henry Kucera has written: If we agree EBM requires multisectoral meditation, agreement, and coordinated response, what would you see as the best ways to achieve that dialogue between multiple levels of government, and industry sectors, and communities?

JAKE RICE: David, this is your turf.

DAVID FLUHARTY: Clearly we tried to, particularly in Jake's and Kevern's approaches, to look at ecosystem-based approaches as a dialogue among

multiple stakeholders, user groups, whatever the term...participants. And the ideal, I guess, would be to find ways to create sort of a community around a particular ecosystem whereby input is available, informed by sort of the transparent science delivered from neutral brokers about the ecosystem - so that as Jake was mentioning, we have a science message and we're not using science to send other messages. Clearly that's an ideal, but I think that developing processes that are usually bottom-up and place-based is going to be a key part of getting people involved in these kinds of things. Finding ways to enhance that in whatever context, both culturally appropriate as well as dealing with the relationship between citizens and their government is an important component as well. Thank you.

KEVERN COCHRANE: Yes, if I can add to it.... I think this is a very pertinent question and it is one of the many difficulties that we will have to deal with in implementing an ecosystem approach. I remember 10 years ago, I was reading a very good paper looking at the transaction costs - the time and the expenses - of trying to have participatory solutions in relatively simple fisheries. I just can't remember the tile of the paper now or the authors. It was North American-based. They used four case studies, looking at the nature of the problems and the difficulties of getting participatory solutions. And that was just within fisheries. As we scale up to multiple users and as we scale up to larger ecosystems, this is undoubtedly going to become more and more of a practical problem to get consultation - not just from two neighboring communities three miles or three kilometers apart on the beach, but between them and, say, the oil industry there might be 10 miles offshore or the large industry that's impacting some of the species that the small-scale fishers fish on. All of this will take time, it will take capacity-building, it will incur costs, which are going to be difficult to address. But we simply have to deal with it. And I guess this is where we come back to David's incremental approach, and we deal with the high priorities first and try to scale up as much as we can. Just on this theme, Patrick Christie, also from the University of Washington in Seattle, is heading an NCEAS group looking at the problems of scaling up, from small community management to large marine ecosystems, for example. Both David and I serve on that group, and it's throwing up some interesting problems and some interesting solutions. I think if all of us get around to finishing our papers, the end results should be published in the not-too-distant future. But I don't think there will be any magic solutions there. It's going to be [about] trying to find the most effective and pragmatic solutions to deal with conflicts and issues on a range of spatial and time scales.

JAKE RICE: Well, I'll add to that - just building on Kevern's point about the diversity of solutions at different spatial and time scales. My impression from what I've observed is that the closer to community scale the problems are that are trying to be solved, the more successful one can be with governments devolving power to communities. But when you get beyond the scale of communities, where you can establish a mutual accountability among the participants at the table, decisions require cooperation and collaboration among people who are not neighbors in a social science sense. Governments have to do their job and play a meaningful role. It doesn't mean they should cease consulting or they

should cease being inclusive. The scale of European waters, the RAC - the Regional Advisory Councils, most of which have been much more a success than a failure even though they're not perfect - work on large scales. But there is leadership by accountable governments that becomes more and more important the larger the scale at which management is planned, policies are made, and management is delivered.

7.

SARAH CARR: Okay. So, should we move on to the next question? We had one: "I was wondering what the current status of world fisheries is, especially fisheries that are near collapse or in collapse. Where do you start with an ecosystem approach: science, socioeconomic needs, governance?" Who would like to take a stab at that first?

JAKE RICE: Well, working for a country that has its share of species stocks that are in poor condition compared to historic levels, you can't pick one of them and fix it. You cannot deal with the biological needs of a species if you do not deal with the social and economic needs of the communities that have traditionally depended on it. About three years ago, there was a symposium on fisheries management strategies in Galway, and on the final day a fisheries manager, not a scientist, gave a perspective talk on what he'd heard from the week of very high level presentations. A point he made that really comes home in these cases where you have collapsed fisheries to deal with, his point was, when the problems are ecological and economic, I know what to do and I have lots of models that can help me. But when I try to deliver social justice with a collapsed fishery, there is no solution to that problem. At least in the Canadian experience, the single hardest problem to solve is not been knowing what needs to be done to the stock, but knowing what needs to be done with communities that have been dependent on fisheries for sometimes hundreds of years and can't wait a generation for a fish stock to recover to the size that a bunch of biologists would like to see it.

JOHN DAVIS: Kevern or....

KEVERN COCHRANE: Was that David coming in or should I go ahead?

JOHN DAVIS: You go ahead, Kevern.

KEVERN COCHRANE: I take a similar approach here. I can't remember the exact words you used. You said something along the lines of should one start with science, governance, consultation, etc. My answer would be yes to all the above. I think a very useful approach to this is the approach adopted by Australia through their ESD, and I can't remember, I think that's Environmentally Sustainable Development. The approach they have used, which FAO has adopted and promotes, is to start by identifying your priorities - by trying to look across the sector or the ecosystem that you are dealing with and to identify where the priorities for attention lie. In the case that you mentioned, one of those priorities would be a species close to collapse or an endangered species. That clearly requires fairly urgent attention. As Jake has been saying, that would then need to be taken into account with the other high-priority issues that were also identified, some of which might be other biological

and ecological problems and some of those would be social and economic. Once you've identified your priorities, you've then got to try and find solutions to those that [provide], as far as possible, maximum benefits for minimum costs. And again, that's going to depend on case by case. If in order to solve the problem of the threat to species one's got to incur substantial social costs, for example, then you're faced with a very difficult political choice - unless you can find an option that can provide both social benefits and ecological benefits or you can provide a solution to the ecological problem, a different solution, that doesn't incur equivalent social costs. But really it's identifying your priorities and then trying to find optimal solutions across all the key issues and key objectives for a particular ecosystem. I don't know if that gets toward answering your question.

SARAH CARR: It's definitely a start, and that question was coming from Ahmed Khan from Canada. John, did you want to go?

8.

JOHN DAVIS: Sure. We've received a number of questions. I'm looking for areas of connection between some of them. There are several having to do with data, and having the data necessary to start implementing EBM. Cindy Dawson says that to implement EBM, even in a step-wise manner, the necessary minimum data inputs for many fisheries are not available. So her question is, how do we address these data shortages? And then Andre Buchheister asks, what are the primary data or research needs necessary to implement EBFM - for example, critical habitat, trophic dynamics, fisheries economics, etc.?

DAVID FLUHARTY: Let me start with a pitch for the need to not use data as a barrier for thinking about the management in ecosystem terms. I think that if you think of the work that we've been doing with the NCEAS project, which will published in Coastal Management within we hope the next two months, it's pretty clear that when you go to local knowledge and historic people's knowledge of what's happening historically, you have a very good starting point for understanding what's going on. As you get into more sophisticated approaches to management, clearly you're going to have data needs, and your lack of knowledge about some ecosystem components may inform the research that you go about. I guess it's choosing to use what you do have right now, because to wait a long time before you have all the information you need is going to put too much emphasis on the data and too little on using what I would call ecological reasoning with the data that you have.

JAKE RICE: I'll reinforce David's comment. Again, I spent 12 years responsible for converting science into advice in our ministry. The thing that consistently impressed me was how much we do know. We can always make a list of the things we don't know. But there is a lot we do know: about the general impact of fishing gears, about the sustainable mortality rates of species with different life histories. The level of detail that we are used to pretending exists in our analytical models requires a huge amount of data to fulfill, and we've all learned the hard way that after we do that, we still don't have that level of accuracy and precision that our models may mislead some of the people who watch them

operate into thinking we believe we have. It is an uncertain world. It's a rapidly changing world. But from our knowledge of fish life history and our knowledge of fishing gears, our knowledge of what types of habitats on the seabed are more or less vulnerable to different types of fishing, we can put together fishing plans that can be tried out. And if we have an adaptive management framework where we're monitoring a small number of the things that are most likely to be both sensitive to the effects of the fishery we're managing and specific to it, we can make the adaptations in real time. The problem comes when you allow fisheries to expand way too quickly to the point where long before you can develop an adaptive framework and know which signals you should use in making the adaptations, you've got a fishery that's out of control and can't be managed with any degree of knowledge.

KEVERN COCHRANE: Yes, if I could come in here as well. First I'd just like to make a general observation. I'm finding the lack of feedback very disconcerting. Normally by this stage, one has had at least half a dozen people disagreeing with a point that you make, or some good argument going. It would be good if we could have a meter of measuring boos or cheers after each response, or something, so one could get a feeling for whether you're on the right track or not. Having said that.... I think again it's saying much the same as Jake and David. Let's take some real examples of many, many fisheries or many ecosystems, not just in developing countries, although I think that is where one would find the most extreme cases, but also some of the lower-value, small-scale fisheries in some developed countries that get very little attention from some management agencies, very little attention from scientists, but may be facing very real ecosystem-related threats, which might be a lot of ecosystem impacts from the fisheries sector or from some other sector, and resulting decline in benefits from the ecosystem for human uses. In cases like that, ideally you still want to be able to respond, you still want to be able to take management action. And in some cases management action is taken on the basis of traditional or local knowledge. That brings us to the point where we must always be trying to make sensible management decisions on the basis of the best available knowledge. If that knowledge is weak, then we have to apply suitable precaution, which is the appropriate way to go. But of course in these cases we must apply that precaution not just across the biological or ecological considerations but also across the social and other human considerations. So we need to be trying to find management responses that will solve the problems from an ecological and social point of view. As I think both David and Jake have said on several different occasions, we often know far more about what is happening in an ecosystem or a fishery than we ever use. I think that's a fundamental observation that we should use, and it applies equally to scientifically untrained stakeholders as it does to the scientific world. So essentially we must move forward where we have problems using the best available knowledge in a sensible manner.

9.

JOHN DAVIS: Along that line, we have two more quick, kind of related, questions pertaining to our knowledge of ecosystems and our knowledge of the effects of fishing on those ecosystems. Dave Lacey simply asks: Is

maximum sustainable yield too aggressive in its allowances? And Elise Smith touches again on the issue of no-take marine reserves in asking: Is knowledge from no-take reserves perhaps the most valuable data available on the natural state of the ecosystem, which obviously is related to understanding the effects of fishing on those ecosystems.

KEVERN COCHRANE: Kevern here. In terms of maximum sustainable yield, I think it's long been known that it's impossible to obtain maximum sustainable yield simultaneously across all the species in an ecosystem. If you are managing a prey species for maximum sustainable yield, it's going to have an impact on the predator species that will reduce their production to a lower level than would otherwise be the case. So I think maximum sustainable yield has to be totally reinterpreted within an ecosystem approach, and it must then become some sort of ecologically maximum sustainable yield that takes into account the role within an ecosystem, and probably in practice that comes down to some very simple rules of thumb. I don't know if it still applies, but in CCAMLR, looking at krill for example, after extensive studies, they eventually adopted a fairly simple approach to harvesting krill for some sort of maximum sustainable yield while at the same time ensuring there was enough left for the species dependent on krill as prey. I can't remember the proportion but if maximum sustainable yield for production alone was 50% of unexploited biomass, I seem to recall they set a target of either 0.7 or 0.8 of biomass at maximum sustainable yield (BMSY). So I think one has to take those sorts of considerations into account in a sensible and logical way rather than strictly quantitative way. A very rough and ready answer to a difficult question.

DAVID FLUHARTY: Another way to think about this, too, is questioning - even when you're concentrating on one species - trying to run it at the maximum...that you have to be very confident that you know what that maximum is. I like some of the papers that have been looking at ecological sustainable yield or some other things besides maximization as the approach to be used. There was a second part, a second question, and I've lost track of where we are.

JAKE RICE: We were actually asked two yes/no questions. Is MSY too aggressive, and I would say, yes. MSY is too aggressive and I think there's a growing number of publications that point to FMSY as much more a limit than a target for fishing. BMSY, on the other hand, is very much.... Even though you cannot fish all species at FMSY, you cannot take the yield associated with MSY from every species, you certainly can have all the populations at or above BMSY - the biomass associated with maximum sustainable yield. That's a very reasonable goal for management. With regard to the second question, which was, Are no-take marine reserves the best place to find out about what a natural system really is like, I'd say no. No-take marine reserves are a good way to learn what happens to areas that aren't fished. But it doesn't matter what scale the no-take marine reserve is, there will be system dynamics that go well beyond it that are still influencing what goes on inside it: whether it's the absence of great whales that were fished out 200 years ago, or major oceanographic processes that transport important nutrients or recruits from other areas into it. The systems I think management needs to be most interested in are not areas that are not fished at all, but areas

where with all the information we have available, fishing is sustainable. Whether we like it or not, we are facing a world where food security is becoming an even greater issue than energy security. We have to find ways to take a large amount of food out of the ocean in sustainable ways. Failing to do so dooms large parts of this world's population to starvation. None of us believe there's huge scope for increase in capture fisheries. But there has to be some way to deal with the role of fisheries and food security that is going to become much more important in 10, 20, or 30 years than it is today. And in a large part of the world, it is very important today.

KEVERN COCHRANE: If I can just come in on Jake's point about maximum sustainable yield, and in particular his comment on BMSY being in a sense a minimum limit point, I endorse that completely. I think that's captured in the plan of implementation of the World Summit on Sustainable Development from 2002 where, I can't remember the exact wording, but there it was agreed that populations or stocks should be maintained at levels capable of producing maximum sustainable yield. The interpretation of that was very much as Jake explained, that they should be at BMSY or above. I would agree that that is a sensible target and limit approach to aim for.

10.

JOHN DAVIS: This is John Davis again. We have about seven minutes remaining in this webinar. I know that there are a number of you in the audience who have questions that we've not yet gotten to. Whether you've typed them into the question box already or not, we do want to hear all of your questions. Anyone who still has a question, please submit it in the question box on your webinar screen. In case we do not have time to get to all of them, your questions will be invaluable for informing future issues of our MEAM newsletter. We look forward to tracking down answers. Also, please use the question box to contribute your comments on this webinar. As I mentioned at the beginning, we are looking to learn from this event. Was it useful to you? How could future webinars be improved? What topics would you like to see covered? We look forward to suggestions and benefiting from them. We have a question here: Are there best practices available for EBM or ecosystem-based fisheries management? Has FAO collected any of them? Where can you go for best practices on EBM?

KEVERN COCHRANE: FAO was raised there. I think there are a number of sources for that. I speak under correction, and Dave would probably be a very good person to correct me, but I think two examples of - let's say best progress, rather than best practice - would be the progress made in Australia in terms of implementation of ESD in their federal fisheries, and I think the - let me try to get my geographical bearings correct - the northwest of the U.S. and the fisheries commission there have made very good progress in implementation of EAF, hence my reference to David. There have been a number of publications. WWF put out a publication a year or 18 months ago giving some case studies of good practices in EAF or EBFM. The FAO has attempted to incorporate best practices within our guidelines without actually necessarily describing the cases themselves. But the FAO has produced technical guidelines on the implementation of an

ecosystem approach to fisheries. Jake Rice was part of developing those guidelines. They were published in 2003, I think, and we're continually reviewing that. We will be bringing out very shortly a supplement to those guidelines taking into account the social, economic, and institutional aspects of an ecosystem approach to fisheries. Again, in all of these, we've tried to build on the best practices that are available around the world. So I think if you skirt the literature, not necessarily just peer-reviewed literature but FAO, WWF, and other international agencies, you will find some information on where good progress is being made. David, perhaps you'd like to comment on my observations about the northwest of the U.S.

DAVID FLUHARTY: I think people generally agree that there has been a lot of progress made in the Bering Sea, Aleutian Islands, and Gulf of Alaska in terms of developing an approach in the North Pacific. But I think there are a number of examples that come from the U.S. regional fishery management councils that are evidence of getting underway with using this kind of incremental approach to changing fishery management toward a more ecosystem approach. Kevern, it strikes me, I understand that you have a series of about 12 case studies that will soon be published. I got to talking with people involved in writing some of those. I thought it was really interesting that you were trying to extract lessons and learn the experience from these, and the diversity of approaches was part of this. So rather than seeking a best management practices approach, per se, it would be looking at practices that would be for any given region the ones that would be most helpful to implement. Finally, I would mention that SeaWeb has a new "communicating ecosystem-based management" portion of its website that has a phenomenal amount of references to case studies and to other materials, so those who are on board here would be perhaps interested in checking out.

JAKE RICE: I want to make one quick contribution here. It does not say how to do it - because I agree with David, that's very case-specific - but I think one of the best places to go for a list of the factors that need to be taken into account is the Marine Stewardship Council's Principle 2 website, where you see for a fishery to be certified as sustainable, and we can all get into a discussion of the role of eco-certification today, but the list of questions that must be answered in the process of certifying a fishery I think is as concise a list as I've ever seen of the factors that I like to see considered when I'm trying to work with a management sectors to try to put together a fishery managed in an ecosystem context. That's P2 of the MSC website.

11.

JOHN DAVIS: Excellent. We have time for one more question. This is from Patricia Clay, who writes, "As an anthropologist, I was pleased to hear the comments about starting from values, culture, and economic needs of society, and about including fishermen's knowledge and observations. However, at least in Kevern's presentation, the assumption seems to be that where there is overcapacity, fishermen simply need to be absorbed into other sectors. A large body of research shows that fishermen, like certain other professions, are not easily transferred to the land-based or aquaculture options usually offered. Aren't humans not simply

conducting activities in the ecosystem, but part of the ecosystem? And how do we take into account their special place within it?"

KEVERN COCHRANE: Thanks, John. As I was specifically referred to in that question, I think I should come back. And I certainly take that point. In my response, I did not mean to imply that finding alternative livelihoods in other sectors was an instant and totally satisfactory solution. Clearly in this as in all other aspects of EAF you need to work in a participatory way. The sad reality, though, is that in some cases, perhaps in many cases, one will not be able to accommodate all the fishers, whether they are large-scale commercial fishers or small-scale artisanal fishers within any given fishery. In that case, you do have to look for other solutions. In the case of a small-scale fishery, an artisanal fishery, you would work with the community to work out how best to accommodate the displaced individuals, and obviously try to minimize psychological and social damage. But if there is more fishing effort than can be sustained within a fishery, some solutions have to be found. In some cases, it will have to involve moving fishers out. It must be done in a sensitive and participatory way, but in some cases it will have to be done.

DAVID FLUHARTY: To chime in a little bit here.... I think all of us see humans as part of that ecosystem, and the interactions we have are in an ecosystem context. We're both affected by and can affect the outcomes of those interactions. So that, too, is a given. I think we're going to be seeing some very interesting things happening that have a lot of important societal implications. You can have a fishery that can be caught quite efficiently by a few people. The question is, what is the appropriate number for a fishery that's, say, small but extremely valuable. There's concern over vesting certain people in a fishery with a highly valuable resource and the benefits are not widely shared. This is independent of what's happening in the biological part. I think there are many, many questions where anthropologists, particularly cultural anthropologists, are going to...we need their help in helping to sort through what kind of long-term social system is sustainable along with the fishery and ecosystem.

JAKE RICE: An 80%-efficient solution ecologically that's implemented very effectively with strong support from communities probably achieves more than 100% perfect ecological solution that is fought tooth and nail by the industry on which it's being implemented.

DAVID FLUHARTY: I agree.

JOHN DAVIS: Great. Well, with that, we conclude this webinar. On behalf of Marine Ecosystems and Management and the EBM Tools Network, I want to thank our panelists for contributing their insights and I thank the audience for participating as well. We will post a recording of the webinar on the EBM Tools website in the coming days, and again we look forward to your feedback on this event so that we can learn from it and make future webinars as effective and useful as possible. If you run out of time before this webinar concludes in a couple minutes, please feel free to e-mail me, John Davis, Project Supervisor of MEAM, at meam@u.washington.edu. Thank you, and good day or good night to

everyone.

MULTIPLE VOICES: Thank you.

END TRANSCRIPT