Valuing Ocean Ecosystems

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When I was invited to give a brief presentation, the steering committee indicated that I could give a ‘fireside chat’, so I do not have any powerpoints. I thought the best way to approach this is to talk to you at a personal level about how I view the issues of evaluation of ecosystem as an ecological economist. I hope that some of my ideas might strike some of you. First of all, we are really talking about management of human beings in their ecosystems. We often forget that, even the terms ‘ecosystem management’ and ‘ecosystem-based management’ suggest we are managing the ecosystems. We are not managing the ecosystems, they manage themselves and we do not have to worry about them. What we have to worry about is managing humans, and because we are talking about managing humans, we are talking about costs to humans of making decisions, having to make trade-offs. So if we are talking about costs to humans we have to talk in parallel about the values to humans associated with changing their behaviours and activities in ecosystems. I think it is very important to think about the concept of valuing ecosystems from the human perspective. Although, there are other perspectives of course, and I admit that, I think that at a pragmatic level it is really critical to think in that sort of framework or paradigm.

What do we mean by ‘values’?
I would say that we have to start out thinking that there are different types of values and there are different levels of values. To begin with, there are life support values, and frankly within the context of life support issues and life support ecosystem services there are no trade-offs. We are talking about lives. Within that context you might talk about trading off a life today for five lives tomorrow or whatever the common denominator, or the currency is lives, and human lives.

That is very different from a second level of ‘value’, which is what I call the commensable or compensable values. These are values for which there are trade-offs. Trade off between a glass of beer and a glass of wine - trivial relative to life support systems. And in that context the traditional kinds of economic evaluations that are done or the queries about tradeoffs, work relatively well, because people do accept substitutes and tradeoffs within the context of those kinds of things, goods or services.

A third is the cultural or spiritual types of values that have to do with ecosystems as part of bringing together and creating a cohesive kind of social capital. And at that level, the tradeoffs that are acceptable within cultures, between ecosystem services, ecosystem characteristics are determined by those cultures themselves; frankly it does not make a lot of sense for us to think about those in economic terms or narrowly in monetary terms. These are values for which people do not place prices. They are things that in fact if you try to place a price like values on them the communities reject them and are repulsed by the attempt and frankly they trivialize the system that people consider to be so important.
I would say it is really in the middle range of what we are talking about the ability to use the kinds of valuation techniques that I am going to talk about briefly.

**What is the difference between values and valuation?**
I just talked about values, things of importance to people; valuation is a completely separate issue because you are trying to set up a measure of these values and acceptable tradeoffs within the value system types that people have. A second issue associated with valuation, and values, is that there is a difference between what I would call personal or individualistic values, those values that we obtain for example as consumers in the marketplace, versus what I would call public or public citizen values. These are values that people have in a context of a community that they live in. And people can respond very differently to the same types of ecosystem services as a private citizen versus a public citizen. So when we are going about trying to determine peoples’ values and acceptable tradeoffs we have to recognize, particularly for some kinds of ecosystem services, that a public citizen role in setting up an evaluation circumstance or experiment has to incorporate the public citizen role of the individual, and that would be a different value elicitation procedure, process, experiment, however you want to frame it, compared to one that is a very personal type of value system. So the context of the individual as a member of a community is really important.

**Ecosystem services based management**
I want to talk about ecosystem services based management, as a driver for valuation. A group of us have been working over the last several years at the National Center for Ecological Analysis and Synthesis, in Santa Barbara, on trying to establish a new way of thinking about managing human beings in their ecosystems. It sort of stems from the ecosystem based management idea, which is primarily, largely, a view of understanding ecosystems before you fool around with them. This ecosystem services based management goes a step further, and thinks about managing human beings in the context of their ecosystems with respect to the services that those ecosystems provide. So it focuses on trying to evaluate the nature of the services that those ecosystems provide and then secondly, and only secondly, the valuations and tradeoffs that people have between those services. This ecosystem services based paradigm then tries to fully incorporate human beings and their values and what is important to human beings in the process of managing humans in their ecosystems. When we try to do valuations what we are trying to do is to establish connections between a complex of services that ecosystems provide to human wellbeing. What we are trying to do is ask - what difference do these complex ecosystem services have to human wellbeing? So one, it is human wellbeing, and secondly it is what differences these services make to humans. The kinds of valuation rulers that we have and that we can use range from things like simply understanding the relative importance of things to people. It does not have to be monetary, people think that when you talk about valuation and when an economist talks about valuation they are talking about putting them in dollar context. That does not have to be the case. All we are looking for is an understanding of how people are willing to trade off things within the world around them. We do not have to put it into a dollar ruler. Sometimes it is convenient to do so, and sometimes it is not. If we go to try to put things into a dollar
context that do not fit into a dollar context then we have a rather foolish result. If we can, if it is appropriate in the context of a particular ecosystem service and a particular cultural context, if it is appropriate to put it into monetary terms then we really have two options in the sense of what people are willing to pay for the service, or what they have to be compensated in order to forgo the service. Those are two very different things and the values under those two different kinds of queries or valuation paradigms are extremely different from one another and depend basically on what the rights are that we presume that the individual has going into the valuation context or services context that we are trying to ask about.

**What are ecosystem services?**

I think most of us have an idea of what they are. Just to start out from the basic and move to the more esoteric kinds of services - food production, fish production, obviously an important ecosystem service. How do we go about valuing that? Well a market based valuation would ask really two kinds of questions, one, what is the worth of fish to people versus what do they have to pay? In other words this is what economists call a consumer surplus. Sort of what is the net value that you get out of a fish by consuming. Secondly, what do the producers get out of it, and that is basically the difference between the price they receive for the fish and the cost that it takes to harvest them. When you look at fisheries those values are relatively small. They are much smaller than the market value of the fish, because it costs a lot to harvest the fish. When you are talking about what is the value of an ecosystem service with respect to food production, what difference does it make to human well-being, it is probably relatively small in a lot of contexts, and in others it is not. In some cultures and some contexts it is a subsistence life support based value, and that is very different than this one that I am talking about. In a subsistence valued context, what you have to do is think about what are the things that are of value to the people in that context, and it might be protein, and it might be time. When you look at the valuation of subsistence fisheries it is probably more appropriate to talk about protein and time efficiencies than it is to talk about dollar values. So dollars are not the solution to valuation problems in all contexts.

What about some of the other ecosystem services from the oceans? The services that emanate from the biogeochemical process of the oceans, the climate regulation effects, the effects of sequestration for CO₂, the temperature role that the oceans have in maintaining global temperatures, and coastal temperature conditions, actually, the role of the ocean in maintaining salinity levels and so on, that function to alter the upwelling and conveyor system in the oceans. When we begin to interfere with that ecosystem service we have Europe in a deep freeze. That is one of the most frightening things about this recent Arctic study, that is, the changes in the salinity levels and the effect of that on climates in the northern hemisphere. I would guess it would have a much larger human welfare impact than the loss of many of the fisheries that we have been discussing here today. Waste treatment values associated with the oceans, obviously CO₂ is a sequestration function, and nutrient sinks. These are important ecosystem services that the oceans provide and if we interfere with them it is going to be a lot more costly for human economies to operate.
Diversity values
The diversity values - now we get into things that are a perhaps a little more difficult to value, but there are diversity values associated with the ecosystem, such as the variety of species and the genes etc. How do we go about valuing those things? Obviously there are species specific values - we like cod, we like to eat cod, we like to eat salmon etc., Individual species can be valued, but what I am talking about is the complexity of species that constitute the biodiversity of the oceans. What is the value of that? Well from my perspective as an ecological economist, what I see is diversity having an insurance value. It assures a certain stability of the flow of ecosystems services and when you begin to diminish that diversity you begin to diminish the reliability of the flow of the services that you depend upon from the ocean. That is how I would go about valuing biodiversity in an ocean context.

What about supply values? Again, the role of the oceans in providing for the freshwater supplies, rainfall comes from somewhere, I assume it gets evaporated partly from the oceans, goes up in the atmosphere and comes down as freshwater. So the role of the ocean in the freshwater system is something that we haven’t even talked about here. The recreational values of the oceans, we haven’t talked about or about the coral reefs, the Great Barrier reef for example, there are ways to value those as recreational structures, as recreational services. There are a variety of techniques that economists have for doing that and I am sure they have been done, travel costs methodology etc. And there are other values of these systems, natural heritage sort of things, like the Grand Canyon, that people value even if they wouldn’t even use them. Culture, the role of the oceans in culture, we know the ocean services provide for the cohesion of the social capital of those cultures, and frankly I think it would be trivializing ecosystems to try to equate those sorts of values in some monetary form. And I would begin to draw the line at that point where it makes no sense to a community or it is insulting to a community to try and place trivial monetary value on something of hugely cultural and spiritual significance.

I would like to leave you with the idea that there is a much richer set of issues when it comes to valuing ecosystem services and that people are increasingly aware of where you can draw the line, when you can value these things reasonably with certain types of measures, such as monetary measures or other measures, and where it does not make sense to value them in that way, and to leave the valuations implicitly up to the communities in the form of organizing discourses and so on, in which they can express and act upon their values as they see them. But they are not going to be narrowly, purely economic values.