

Marine Bioregionalisation for Ecosystem-Based Management in ABNJ: Trends, Challenges and Opportunities

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The topic of my presentation today will be ‘Marine Bioregionalisation for Ecosystem-Based Management in Areas beyond National Jurisdiction.’ I’ll be speaking specifically about trends, challenges and some opportunities to make the link between natural sciences and social sciences.

Just to give you an idea of how we’re going to address this topic today, I’ll start with the importance of marine bioregionalisation for Marine Protected Area (MPA) network planning based on the Convention on Biological Diversity guidance. Then I’ll follow up with an Ecosystem-Approach to Fisheries Management and focus in more depth on the Northwest Atlantic Fisheries Organization (NAFO)’s work on the development of an ecosystem-approach to fisheries management and the roadmap that uses bioregionalisation as the basis for it. I will conclude with a look into future opportunities especially in law-making with respect to conservation of biodiversity in areas beyond national jurisdiction.

Let’s start with the CBD, the Convention on Biological Diversity. I’ll focus on the Aichi Target 11 to start with and then we’re going to look into Aichi Target 6 on sustainable fisheries. Regarding the Aichi Target 11, as you might know, the Convention on Biological Diversity was adopted in 1992 and came into force in 1993. Article 2 of the convention talks about in-situ conservation as one of the objectives of the convention as a means for conservation and sustainable use of marine biodiversity and terrestrial biodiversity as well. In-situ conservation through protected areas is one of the tools to reach that goal. A number of biodiversity conservation targets have been set along the way since 1992, but I’m going to focus on the 2010 targets because these are the latest ones agreed upon, and states now are running against the clock to achieve because most of them are due in 2020. In 2010, the tenth Conference of the Parties adopted 20 targets – biodiversity targets because states were generally concerned about the rate of biodiversity loss. Target 11 is specifically about protected areas – marine protected areas and other effective measures. So there has been a lot of emphasis on the numerical target – the 10% that should be protected – 10% of coastal

and marine areas, specifically areas of particular importance for biodiversity and ecosystem services. They should be conserved through effectively and actively managed ecologically representative and well connected systems of protected areas.

So states have been focusing a lot on the numerical target because it's measurable. It's something that is easy to measure. The current level of marine protected areas at the moment is 2.12%, so we're still far away from the 10% that has been set. These numbers are based on the MPA Atlas and you can check it online. We have about 5 years to complete the other 8%. The number of total MPAs globally is about 11,000 MPAs and the percentage of no-take areas is about 0.94%. I'm highlighting the no-take areas here just because there are a number of scientific studies highlighting the importance of no-take areas for marine biodiversity conservation for increasing resilience – overall resilience of the oceans especially in light of climate change and ocean acidification. The IUCN has developed categories of marine protected areas that range from no-take areas, very restrictive use, to sustainable managed areas. So there is a range. Marine protected area could also be zoned, where a combination of restrictions can be applied depending on the zone: no-take zones, as well as zones where sustainable uses are allowed can co-exist. So there are a range of possibilities.

This is a map also from the MPA Atlas that you can find online. The blue areas are the actual marine protected areas – the current protected areas. The yellow dots are the proposed marine protected areas. But if you look at the blue areas, these are the ones that we have in place right now. There seems to be something missing– if you think about representativity, which is also one of the qualifiers of Aichi Target 11. The same applies for connectivity. So this is a publication from last year that– the Marine Conservation Institute put together and they looked into the G20 countries' levels of marine protected areas. The United States and United Kingdom come first, but large part of these protected areas are in overseas territories. In coastal areas it's very complicated. We know that there are tradeoffs and there is a need to think about the livelihoods of coastal communities as well.

So in order to fulfill the Aichi Target 11, we should also look at the CBD Decision IX/20 from 2008. The CBD COP 9 adopted criteria for MPA network planning, and the criteria are the following: a network plan to be ecologically representative should contain: ecologically or biologically significant marine areas; should be representative of the ecosystems; should provide for connectivity (larval connectivity, and also species connectivity); should have replicated ecological features so that the replication can function as an “insurance policy” (for example, if something goes wrong in one of the sites, there will be at least two other similar sites protected). There is a general recommendation from

scientists that at least three replicated features in a biogeographical province would be more effective than just one or two. . An adequate and viable site refers to the size, the size that an MPA would be effective for providing movement of species but also having effective conservation measures in place to protect the features that it intends to protect.

The EBSA criteria (Ecologically or Biologically Significant Area criteria), was adopted in the same decision through Annex I of COP IX decision. The criteria can be met by fulfilling one or more of the seven elements of criteria, which Includes: uniqueness or rarity; special importance for life-history stages of species (e.g. spawning grounds or breeding grounds); importance for threatened, endangered or declining species and/or habitats (e.g. IUCN red list or Conservation of Migratory Species (CMS), Annex I and II species; CITES appendices, etc). Vulnerability, fragility, sensitivity or slow recovery is another criterion. For example, vulnerable marine ecosystems could qualify (e.g. cold-water corals, sponges, seamounts that hold those fragile types of species). Biological productivity is another criterion. So those maps prepared by the NEOPS team about chlorophyll and phytoplankton would help assess exactly that. Another criterion is biological diversity (e.g. hot spots for biodiversity). And the last criterion is naturalness, which are pristine areas that haven't been disturbed by anthropogenic activities yet. Since then, the CBD has established a process to describe areas that meet the EBSA criteria and the scientific information derived from this process can be utilized in a number of different ways, including for the adoption of appropriate conservation and management measures by states and competent international organizations.

This is a map of the Scotian Shelf. That's where I live in Halifax, Nova Scotia. So this is Eastern Canada here and this is a map that was put together as part of an exercise for MPA network planning. Canada's waters were divided into 13 bioregions. Scientists looked into biogeographical classification to conduct this division. This map is of just one bioregion, the Scotian Shelf bioregion. To conduct an assessment of representative areas that should be included in the MPA network plan, a seabed features analysis was conducted. If you want to follow best practices, at least three areas in each one of those ecosystems or habitats identified in the seabed classification map should be set aside for incorporation into the MPA network plan. But the network plan hasn't been finalized yet so it is hard to tell what it will look like.

Another example of using bioregionalisation for MPA network planning: This is the CCAMLR, the Convention on the Conservation of Antarctic Marine Living Resources in the southern ocean. A scientific exercise was conducted for bioregionalisation purposes, identifying 23 ecoregions, 9 bathomes, 562 environmental types and 107 spatially restricted

environmental types. The green areas are the actual MPAs that have been created and the striped areas here are the proposed MPAs. A recent study has indicated that the current system of MPAs is not representative of the diverse benthic biodiversity in the Southern Ocean. The authors noted that twelve ecoregions are not included in MPAs and none of the twenty-three ecoregions has their full range of environmental types represented within MPAs. You can see that by just looking at this map, we can see that the MPAs don't cover enough areas to be considered a representative network, but if the proposed areas are established, the study says it would considerably increase the representativity of the network, especially in eight ecoregions.

There's another study of the Northeast Atlantic in the OSPAR convention area. OSPAR had an objective of establishing an ecologically coherent MPA network and scientists struggled with that. Why it is an ecologically coherent network? They thought a lot about it and in 2013, there was an analysis done to check if the MPAs that OSPAR had established were ecologically coherent in terms of a network. They concluded that even though they're above the target, as they already have met the 10% Aichi Target, their network is not completely representative, and there are still some physical gaps that don't fulfill the connectivity criterion for network planning. The representativity gaps that they found were for deeper waters that weren't included in the network plan.

GOODS: This is another study that the CBD also considered. In this report, the Global Open Oceans Study for Bioregional Classification (GOODS), pelagic and benthic provinces were identified in open waters. This map is just the pelagic waters "provinces". This study was published by UNESCO's Intergovernmental Oceanographic Commission (IOC). In 2010, the CBD acknowledged this study and welcomed its use for MPA network planning purposes, but the areas (or provinces) are very large, so if you look into representativity, perhaps it would be good to subdivide a little bit more.

I want to talk a little bit about the EBSA process because I don't want people to confuse the EBSAs with MPAs even though EBSAs are one of the criterion as we saw for MPA network planning. They don't equal MPAs and the process that CBD established to describe EBSAs has evolved quite a bit and it's important to emphasize that EBSAs are not MPAs. . So I just want to focus a little bit on the EBSAs because it also provides an opportunity for bioregionalisation and description of those EBSAs based on the bioregionalisation context.

As we saw in 2008, COP 9 adopted that criteria but things evolved, and 2 years later, at COP 10, the Executive Secretary of the CBD was requested to organize regional workshops with

states parties and other to facilitate the description of EBSAs. Since then 9 workshops have taken place including in the North Pacific. I think that Japan actually contributed funds to that workshop and has been very supportive of the EBSA process as far as I know. This has been a very significant process in which the report of those regional workshops go to the scientific body of the CBD (SBSTTA) and then from there if they are approved, SBSTTA's recommendation goes to COP (the Conference of the Parties) so that the summary reports can be included in the CBD EBSA Repository and transmitted to states and competent organizations for proper conservation and management measures. The summary reports are also transmitted to the

UN General Assembly and its working group to study issues relating to biodiversity conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction. So, the International Maritime Organization, International Seabed Authority, Regional Fisheries Management Organizations, Regional Seas Conventions and so on should be receiving those reports for proper management action.

These are the areas that workshops – regional workshops have occurred so far. It's about 70% of the oceans. The next ones are about to happen very soon in the Northeast and in the Northwest Indian oceans, in the end of March and end of April, respectively. You will notice from this map that some of the EEZs have been excluded as part of the geographical scope of the workshops. Japan was one of the countries that didn't include the EEZ because they have similar criteria for describing areas of particular importance for biodiversity. Canada did the same. We have a very similar EBSA criteria in Canada, so it could cause confusion to the internal process. Australia did the same thing. So some countries decided not to include their EEZs in the regional scope of the CBD EBSA workshops, but they can still submit their respective information to the CBD Secretariat to be posted on the CBD repository (which is an online database/sort of a "clearing house mechanism").

The Northeast Atlantic is an interesting case because it was the first workshop, but it wasn't a CBD workshop per se. It was OSPAR/ NEAFC workshop and because of some issues related to extended continental shelves from a few countries the results of that workshop are still being revised and discussed extensively and remains unresolved at the moment.

This slide shows a study that the CMS, Convention on Migratory Species, commissioned from Duke University who's been providing a lot of the scientific and spatial analyses for those EBSA workshops. The CMS decided to take a look at the EBSAs that have been described by the CBD to see how much those EBSAs descriptions have been influenced by the presence or occurrence of CMS species listed in its Annex 1 and 2. For example, here's the Emperor Seamount. This EBSA was described purely for benthic species and therefore

no CMS species were identified in this case as a contributing species for that EBSA description. But the yellow areas in the map are the areas that CMS species had something to do with it to a certain degree, but this wasn't the sole reason why these EBSAs were described; while the red ones on the map, are EBSAs that were described because of the occurrence of CMS species, such as certain species of sea turtles, sharks, etc.

In the last CBD COP, the COP 12 in October last year, some states felt the need to go a bit further because so far this information on EBSAs that the CBD is producing and putting through its decisions is purely scientific and technical information only and it's up to the competent bodies to take appropriate management measures.. But there is no legal or policy request to do anything with that information. Some states feel that they need to do something with this information because these are areas that need – require enhanced protection through appropriate conservation and management measures to adequately protect those features or values that have been described in the process.

So the next logical step that some states thought would be the appropriate one would be to undertake a scientific and technical assessment of pressures, and stressors that those areas (that meet the EBSA criteria) are being subject to, and then it would be easier for competent organizations and states to identify the best conservation and management measure that should be put in place to protect these areas. For example, if bycatch is the main pressure in a certain area, gear modification could be one of the solutions; or if there are threats from mining in a vulnerable area then the ISA would have to ensure measures are taken to avoid those impacts. So there was a lot of discussion and this slide shows the text that was being negotiated at the friends of the chair group that was negotiating this text until very late at night. There are a number of brackets around 'pressures' and 'trends' and 'stressors' and several "as appropriate" –because some states were very concerned about going any further with this process, especially countries that have included their EEZs as part of the EBSA workshops. And some other countries were concerned because relevant parallel discussions are happening at the moment at the UN General Assembly BBNJ working group on the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction. After lengthy discussions and long nights, a watered down language was agreed upon and taken to plenary. When we go back to plenary, one state party tried to delete the whole paragraph. In the end, after more discussions in Plenary, they deleted the last part of the paragraph relating to the submission of that information (on the status of biodiversity) to the CBD Secretariat and to the Repository. In any case, some states still have interest in conducting assessments on the status of biodiversity and they are free to submit to the CBD Secretariat any assessment on pressures, stressors and trends for the inclusion in the CBD repository. Some organisations have already asked their scientific bodies to assess the

impacts of their activities on EBSAs. For example, NAFO's Fisheries Commission had requested the NAFO Scientific Council to assess the impacts of NAFO fishing on the Sargasso Sea EBSA. The Sargasso Sea EBSA includes seamounts chains as well. It was actually surprising to find out that there was some midwater trawling occurring on the Corner Rise Seamounts for alfonsino - a fishery that is not currently regulated or managed by NAFO. This has triggered interesting assessments and discussions on appropriate measures that should be put in place.

Moving on to the Aichi target 6, which includes the commitment to an Ecosystem Approach to Fisheries Management. This concept is not new. It's not something that originated from the Aichi Target 6. We have reference to this approach in the Fish Stocks Agreement when it imposes the obligation to consider the ecosystem in its Article 5. Even the Law of the Sea Convention (UNCLOS) indirectly addresses this issue when it establishes the obligation to take into account dependent and associated species when adopting conservation and management measures with respect to living marine resources. Also, the need to protect marine habitats under Article 194 (5) of UNCLOS can also be interpreted as part of an ecosystem approach.

The Fish Stocks Agreement expanded a bit more on the need and the means for the application of an ecosystem approach, and over the time and number of UN General Assembly resolutions have been calling states and regional fisheries management organizations to implement an ecosystem approach of fisheries. FAO documents have also provided guidelines on this. And Aichi Target 6 reinforces these previous and ongoing calls for the ecosystem approach, including through measures to prevent adverse impacts of bottom fisheries on vulnerable marine ecosystems (VMEs) – a matter that has been dealt with extensively by the General Assembly through its resolutions 61/105, 64/72, 66/68 and so on. This slide shows latest recent study of FAO and it's an interesting one. One of the authors is also involved in the NAFO working group on ecosystem science and assessment that I participate in. For this study, they looked into the LMEs, the Large Marine Ecosystems, and conducted an assessment – single species assessment and ecosystem level assessments of the fisheries occurring in those areas. It's fascinating to see this interaction. I'm going to talk a little bit in further detail about what NAFO has been doing because it's similar to that study.

This case study that I have is about NAFO's work on the ecosystem approach to fisheries management. I just want to point out that it was because of governance (policy and law, that enabling conditions were created for NAFO to make changes on the water. People that I talk to often times think, that policy is very boring, it takes a long time, and nothing changes. But I think this is a great example to see how much can change if proper governance structures are in place. In this case, for example, it started with the VME, the UNGA

resolution that I mentioned 61/105 that established a number of conditions for bottom fishing to occur so as to protect vulnerable marine ecosystems (e.g. cold water corals, sponges, seamounts, hydrothermal vents, etc). In the NAFO regulatory area, there are no hydrothermal vents but lots of coldwater corals and sponges and some seamount chains. So a non-legally binding resolution triggered a lot of change.

Similarly, the driftnet fishing resolution from 1991 established a moratorium on large-scaled driftnet fishing on the high seas and actually triggered state practice. In the VME case, in response to the conditions imposed by the UNGA resolutions on bottom fishing, NAFO has closed a number of areas to bottom fishing to protect those ecosystems based on comprehensive studies and habitat suitability models, Kernel density analysis but also validation through camera work and sample collection by scientific research cruises to find where those areas are. Now managers know pretty much where all of those things are. They have closed a number of areas, more than 20 areas to bottom fishing to protect those vulnerable marine ecosystems. Under the ecosystems approach to fisheries management, even though NAFO is an old convention from 1979 and it's very purely fisheries management oriented, they didn't really talk much about long term sustainability of ecosystems or ecosystem approach or precautionary approach back then, but in 2007, contracting parties to NAFO, including Japan, adopted an amendment to that convention imposing a number of more modern concepts, including the incorporation of the Fish Stocks Agreement provisions, and the ecosystem approach.

This slide shows NAFO's regulatory area, as well as its convention area. As you can see, the regulatory area is very small if compared to the Convention area. Most of the fishery takes place here - on the Grand Banks. So this is the extended Continental Shelf of Canada and here is where most of those fisheries take place. You have probably heard about the cod collapse in 1992, which was a combination of fisheries pressure but also climate and regime shifts due to climate change. Capelin disappeared and cod that preys on capelin collapsed as well because of the pressures that it was receiving, the stock could not cope. That particular stock is still under moratorium.

I have something to show you that is promising. Even though the amendment to the NAFO convention is not into force yet contracting parties have agreed to operate under the guidance of the new convention. So they established a number of working groups including working group on ecosystem-approach to fisheries management. Now, we have two working groups on ecosystem-approach; one is purely scientific and the other one is a combination of fisheries scientists and managers. It's a great evolution to see the scientist sitting at the same table as the managers and having an open dialogue – something that they didn't have a

few years ago. Progress is being made! So the starting point for the ecosystem approach that NAFO is developing was the delineation of the ecosystem boundaries and the identification of major ecosystem units “ecoregions”– that’s what they call, but it’s a bioregionalisation of the area. The scientists are really focusing on the shelf ecosystem where the fishery takes place including the Continental Shelf of Canada and the US as well because it’s part of the convention area. They use quantitative layers and link the physical and biological features of the ecosystems. And they also look into the trophic structure and species interactions through ecosystem models.

Here, I have three slides like that show the evolution of thinking in terms of the bioregionalization analysis in the region. Don’t get attached to the text too much. This is from the meeting last year in November, and this still needs to be endorsed by the Scientific Council, so it’s not official yet but this is the line of thinking.

Here again, biogeographical classification was essential to conduct those trophic level structure analysis and transfer efficiencies of species. The black bar indicates the ecosystem production potential, or the fishery production potential, of three different bioregions within the NAFO convention are: the Newfoundland and Labrador Shelf, the Grand Bank and the Flemish Cap. You can see that the potential is much higher than what’s actually been fished. But the problem is that depleted ecosystems can become more depleted before it has the chance to produce as much. So this is a new approach to actually see what the ecosystem is able to produce and how management can be adapted so as to rebuild the ecosystem. . The idea is to have a double checking point. So you would still have the individual stock assessments that would contribute to your individual total allowable catch being put in place, but on the top of that, you would also have a recommendation of total allowable catch for the ecosystem. Then you would crosscheck and make sure that the sum of the individual TACs won’t surpass the ecosystem level TAC and vice versa as well, as a precautionary measure.

This could be achieved perhaps through diversification of species that you’re targeting and that’s what the group is exploring at the moment. The scientists involved in those studies are still playing with the numbers especially the fisheries production potential, and refining the models. They are still deciding if 20% or 30% of energy efficiency transfer would be a good threshold and hopefully by next year, we will have a better idea.

Another next step for this ecosystem production potential is to include seabirds in the analysis as well. Cetaceans have been included but not seabirds yet. So next year, I think, data on seabirds consumption will probably be included. –The group is using Ecopath model and Ecosim by the University of British Columbia to conduct those assessments.

This is the ecosystem approach to fisheries management roadmap that has been endorsed by NAFO's Fisheries Commission. So this first step here is the bioregionalisation. Everything starts with the bioregionalisation. Then, the second step is multi-species assessment that I just referred to. Looking to each one of those ecoregions, conducting those trophic level interactions, the multi-species model being applied, and then we have individual stock assessments, still having bycatch considerations. We still have the habitat impacts being considered here to ensure that the fishing activities don't cause any significant adverse impacts on vulnerable marine ecosystems and other habitats. And then we have monitoring of fisheries and the effectiveness of measures, which in turn will help revisit and set new objectives and goals and maybe tradeoffs that would need to be made – and this is a feedback loop. This scheme has been adopted but now when we get closer – closer to getting numbers in place, we will see how it goes, so it can actually be implemented.

This is CCAMLR again. The bioregionalisation of the pelagic ecosystem has been done for the Ross Sea. NAFO has not done this bioregionalisation of the open seas yet. We have very good knowledge of the shelf ecosystem, but there are still a lot of uncertainties and the NAFO working group on ecosystem science and assessment has not had time to assess the numbers for the open waters beyond the shelf yet. But there is not significant NAFO fisheries occurring in those areas, there is not an imminent threat or an urgency that would require the scientists to turn their attention to this question right now. But it would be really good to have a comprehensive overview of the whole ecosystem for the region in the future.

The challenges: I think they are still present and even though we have seen a lot of progress in terms of bioregionalisation and its management applications, but there are still areas that would benefit from enhanced attention and refinement, such as the pelagic realm and the open waters ecosystems globally. For example, we saw that the FAO study looked into the LMEs, the Large Marine Ecosystems shelf system, but open waters have not been addressed in the same way (with some exceptions as noted in some of the examples I discussed). Another difficulty for doing this is scientific uncertainty. Scientific uncertainty is always a problem. N Baseline information, reliable catch data, and other numbers are important elements that feed into these models. Very difficult to assess marine ecosystems.

Climate change and ocean acidification and shifting of ecosystem structures also constitute a big challenge because it's a moving target. We need to consider those things when conducting those exercises. There is also a need for enhanced cooperation because we have a very fragmented system. So, for example, at NAFO we have closed areas to fishing to protect vulnerable marine ecosystems, but oil and gas activities are being conducted right beside those vulnerable marine ecosystem.

But in terms of future opportunities, I think, there is an opportunity emerging right now (re, BBNJ). Well, it's been discussed for 10 years, but it is finally making some progress. I'm referring to the UN General Assembly ad-hoc open-ended informal working group to study issues related to marine conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction. So this group has been looking into gaps in implementation but also gaps in regulatory frameworks for conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction and finally in January this year, it has recommended to the general assembly to decide to develop an international legally binding instrument under the Convention on the Law of the Sea on conservation and sustainable use of biological diversity.

Of course, it's not all good news because prior to holding an intergovernmental conference for actually negotiating the new agreement, they decided to establish a preparatory committee which will start next year and will discuss elements of the text and then recommend to the General Assembly whether or not to start this intergovernmental process to actually negotiate the treaty. But I think it's a step forward. This decision was required by the Rio+20 outcome document – The Future We Want -which also established a deadline for this decision to be made - by the end of the 69th session of the General Assembly (September 2015). States then decided that an implementing agreement to the Law of the Sea Convention is needed, but they will need to further discuss during preparatory committee. It has also been agreed that the agreement will be negotiated as a package which will entail area based management including marine protected areas, impact assessments, capacity building and technology transfer and marine genetic resources.

For marine protected areas and for impact assessments, bioregionalisation would be a very important tool to be used for planning and management considerations. Of course they also decided that they need to respect existing structures, existing bodies competent organization. They're not intending to wipe out all regional fisheries management organizations and start afresh. Instead, the agreement would provide a mechanism for cooperation between organizations to make sure that there is harmonic management of the marine resources to ensure conservation, long term sustainability and proper management.

This is what BBNJ is right now. It's a blank canvas. It could be anything states want it to be. So that's why it's an opportunity. I think it's an opportunity for academics. It's an opportunity for government. It's an opportunity for civil society to help draft the best text we can have based on the best available science including by making use of bioregionalisation as a basis for ecosystem based management, best possible MPA network design, among other uses. We can take advantage of this law-making opportunity and secure

this science-policy interface for the conservation and sustainable use of biodiversity. Such an approach would enable the continued evolution of the Law of the Sea Convention, through this implementing agreement and possibly through institutional mechanisms such as Conference of the Parties that could be established by it. The Law of the Sea Convention does not have conference of the parties. It's kind of static in itself. I think now we have the opportunity to respect and build upon what it has established and what it has accomplished. It's a very important Convention and we need to make sure that the evolution of this Convention strengthens and builds upon the relationship with other treaties such as the Convention on Biological Diversity as already provided for in its article 22 (of CBD), where the concept of bioregionalisation has been looked into and welcomed by states parties. Now we just need to build upon the strengths of what is available and create the enabling conditions for the implementation and operationalisation of a scientifically sound, harmonic and comprehensive governance regime for conservation and sustainable use of biodiversity in areas beyond national jurisdiction.

So with that I would like to say thank you very much.