

Spatial Scale in Coastal Zone Management: Current Approaches, Challenges and Possibilities

Poul Degnbol

Douglas Clyde Wilson

Hanne Askholm Grolin

Sten Sverdrup Jensen

**Institute for Fisheries Management and
Coastal Community Development
Denmark**

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Correspondence to lead author at pd@ifm.dk**

Abstract

Coastal zone management is expected to deal with land use and access while integrating concerns about environmental sustainability, aesthetic values and the linkages between the local coastal system and larger scale biological and physical systems. These concerns involve physical systems and social interests operating on diverse spatial scales. Traditionally, coastal zone management has focussed on the integration of interest sectors through local level using physical planning supported by property rights instruments. Mediation of interests has also taken place on the local level. However, large scale environmental processes cannot be addressed on a strictly local level. This means there is a need to bridge scales both in terms of the relevant physical and biological processes and in terms of the institutions responsible for management decisions and their implementation.

In this paper we review some of the accepted approaches to cross-scale integration and conclude that management with a strong focus on spatially based management instruments supported by property rights often offers purely technical solutions that are ineffective in addressing problems that are basically political. Effective coastal zone management requires conflict management and the identification of solutions that are at least minimally acceptable to most of the relevant interests. The fact that these interests operate on many different scales further complexifies the institutional problem. Two case studies are presented that illustrate this dilemma. The 'state of the art' optimal solution is a framework of nested institutions with representative decision making characterised by transparency and effective accountability. We conclude by proposing that such systems can be made more effective by the creation of a new kind of management professional who can move between scales, identifying and communicating issues, facilitating compromises, and enabling effective accountability. We offer an initial outline the skill set such a professional would possess.

The Problem of Scale in Coastal Zone Management

Global Agendas and Multiscalar Processes

Traditionally, coastal zone management has focussed on concerns on the local scale using physical planning supported by property rights instruments as the main approach. Integration across sectors and mediation of interests has taken place on the local level. However, policy issues are increasingly being articulated on the national, regional or even global level and decisions about the need and means to address these issues are being made at these levels. Examples are the global agendas relating to environmental and natural resource management as they are expressed in the Convention on Biological Diversity, the United Nations Conference on Environment and Development, the Kyoto agreement and most recently the World Summit on Sustainable Development. These agreements and conventions are supplemented with sectoral and/or issue specific agreements which specify how general principles are thought to apply to coastal zones, either globally such as the UN fish stocks agreement, the RAMSAR Convention and the FAO Code of Conduct for Responsible Fisheries or regionally such as The Convention for the Protection of the Marine Environment of the North-East Atlantic ("OSPAR Convention") or The European Unions Water Framework Directive. These large-scale agendas must, if they are to have impacts on the physical world, be implemented through a chain of decisions which ultimately will have consequences for citizens at the local level, in coastal communities and people with an economic or passionate interest in the coasts and the sea.

A stronger linkage between local and larger scales is also inherent in the connectedness of physical and biological processes which link human activities with impacts over large distances and across ecosystems. The ultimate example is global warming but local impacts of large scale anthropogenic processes are also developing on less pervasive scales such as the eutrophication of coastal waters due to increasingly fertiliser- and husbandry intensive agricultural production or the depletion of the fish resources on which a local community depend caused by the larger-scale increase in exploitation.

The emergence of large scale agendas and the larger scale of impacts of human activities are two aspects of globalization which management in the coastal zone must address and which is an ever increasing challenge to an approach based on primarily local scale concerns. This challenge is far more fundamental than what seems to be assumed in many cases of management where the problem of bridging scales is mainly seen as an exercise in physical planning where maps on various scales are over layered so that a set of regulations aggregated across scales can be developed for each local area.

Such approaches risk to neglect that different issues represented at different scales also represent different interests and that the same issue is represented on different scales on basis of both different interests and different discourses. Management across scales is mainly about conflict resolution and communication between discourses.

This is illustrated by two cases here. One case - the attempt to develop a plan to protect migrating birds in the Tønder Marsh area in southern Jutland, Denmark - illustrates the problems which arise when discourses on different scales collide in management. The other case - the problems to develop legitimacy for the Common Fisheries Policy of the European Union – illustrates the problems which arise if the biological connectedness of the local and the regional scale is not addressed in the management institutions.

Case: The Tønder Marsh

When marshlands at Tønder in the south-western corner of Jutland were conserved by statute in 1988 it was used for grazing for cattle and sheep and for cereals. It was conserved as an area with a

rich and varied bird life of international importance, and as the last existing Danish marshland. It was intensively drained and the farmers had started to cultivate an increasing part of the area. This had a significant negative impact on the presence of breeding birds, and the conservation was pushed through as an emergency conservation to save what was left of the unique nature. The Tønder Marsh is also protected as a Ramsar site and as an EU-bird protection area.

The conservation provisions are that the period of draining should be shorter and start at a later time, the animals should be set out later and there are restrictions on the amount of fertilizers that can be spread out. All fences should be removed. The Ministry for the Environment should pay for restoration, maintenance and operation of the pumps, and the farmers were paid large compensations in advance for the restricted use of the area and for removal of the fences.

A local consultative council was established with representatives from the local and regional authorities, the nature organizations, the farmers and the National Forest and Nature Agency. Very soon the council was dominated by one farmer representing the majority of the 500 plot owners who had great influence on the management of the conserved area although he had no professional knowledge about nature management.

The Act turned out to be seriously defective. The Ministry overlooked the fact that another Act managed all the provisions about water control in the Act on the Tønder Marsh. On top of that, a Supreme Court decision reversed the provisions on the use of fertilizers.

Ten farmers control the development of the area, and the pumps are consequently used for drainage in the periods where the birds are most dependent on the water. Pressure from grazing animals is higher than ever, destroying nests and eggs. Manure is added in very large quantities, with further severe future consequences for the flora and hence the fauna. When the deadline for the removal of the fences was reached, there were still 21 km to be removed, an action that had already been paid for. The result of 15 years of conservation and 60 million Danish Crowns (8 million Euro) was a seriously degraded area, with only a fraction left of the many birds that prompted the conservation to begin with.

The farmers have demonstrated an unwillingness to cooperate or to improve the condition of the marshlands. They reject scientific reports showing the degradation of the area, claiming to know better. The meetings in the council are so unpleasant that the ministry does not participate, and the administration of the Tønder Marsh is wandering from one office to another in the Forest and Nature Agency.

This conservation programme was initiated by a top-down decision with the aim of saving an area being destroyed. The consultative council established after the conservation was the first of its kind in relation to conserved areas. As an example of stakeholder involvement in environmental management the conclusion must be that it has failed. The intended cooperation to save the bird life in the Tønder marshlands never emerged. The prevailing attitude of the consultative council suggests that involving the local stakeholders in advance (before the decision to conserve the area) would not have resulted in the implementation of the conservation objectives.

The latest development in this case is that the present Minister for the Environment has promised the plot owners more money to obey the provisions in the Act. The Minister has reached an agreement for half of the conserved area mainly on land owned by the Tønder Municipality and not by private stakeholders, to lay out the fields under the EU programmes for Agriculture and the Environment. The money is paid as compensation. EU pays half the amount and the Danish government the other half and then some for a five year period. It is a temporary solution because the programme implies that the fields must be cultivated again after the five years.

Case: The Common Fisheries Policy

The management of fisheries resources includes many examples of large scale management with important if not pervasive economic impact on coastal communities but with no or negligible involvement of those who are impacted in the management decision process. The Common Fisheries Policy (CFP) of the European Union is an example on this. When the CFP was established in 1983 major decisions about fisheries management in the Exclusive Economic Zones of the European Union member countries were transferred from the national state to community level. The CFP did not include mechanisms for stakeholder involvement and was based on the dominant discourse on fisheries management at the time – that fisheries management by nature is a large scale responsibility due to a combination of the ‘commons’ problem and the understanding that the dynamics of most commercially exploited fish stocks extend across large scales, that management responsibility therefore must rest with large scale government and that policy decisions and implementation are most effective if management is based on top down governance with a strong emphasis on control as the main means of implementation. However, the possibilities for both legal and illegal non-compliance are many and the main result of these regulation and control mechanisms is new ways to nullify their effect. The result has been a development of an ever finer micro management to reduce the holes, so far with little effect. In its evaluation of the first 18 years of the CFP the European Commission concluded that the CFP had been a failure both in terms of conservation, economically and politically:

‘Almost twenty years from its inception, the Common Fisheries Policy (CFP) is confronted with major challenges. The policy has not delivered sustainable exploitation of fisheries resources and will need to be changed if it is to do so. Its shortcomings can be expressed in conservation, economic and political terms.

As far as conservation is concerned, many stocks are at present outside safe biological limits. They are too heavily exploited or have low quantities of mature fish or both. The situation is particularly serious for demersal fish stocks such as cod, hake and whiting. If current trends continue, many stocks will collapse. At the same time the available fishing capacity of the Community fleets far exceeds that required to harvest fish in a sustainable manner....

The fisheries sector is characterised by economic fragility resulting from overinvestment, rapidly rising costs and a shrinking resource base: this is reflected in poor profitability and steadily declining employment. In the future the Community fisheries sector will have to be significantly smaller than it is today, if it is to survive.

Politically, the stakeholders do not feel sufficiently involved in the management of the policy and many believe that there is no level-playing field in terms of compliance and enforcement.’(EC 2001)

Thus, the large-scale management model based on top-down control has failed and the history of the failure indicates that it is the top-down management model itself that may be a core cause for the failure. The Commission has acknowledged this by pointing to the political failure and that this point is a major cause for the conservation and economic failures. As a result, the reform of the CFP from 2003 includes provision for increased user involvement. The main mechanism is Regional Advisory Councils (RAC) which according to the new CFP regulation will have an advisory role. They can be consulted and may raise issues on their own but there is not from the outset any delegation of decision competence regarding policy decisions, identification of relevant information and knowledge or implementation modes. The detailed policies for the operations and competences of the RAC’s have not yet been developed but one may for reasons discussed below question whether such regional bodies with mainly a consultative role will contribute significantly to

increased legitimacy and compliance in European fisheries.

The Dimensions of Scale

The examples demonstrate that the scale problem must be addressed in relation to the scales of both the natural systems being managed and the social institutions managing them.

The scale of the natural system is *prima facie* the simplest dimension. The physical, spatial dimension of a biological or physical process is the starting point for how institutions managing the process should be structured across scale, e.g., they should be global to deal with climate change, regional to deal with fisheries, on a community level to deal with a small watershed, etc. The scale of the physical dimension of the process gives an upper bound to the scale of the social institutions meant to manage that process, perhaps most centrally the administrative level responsible for overall management decisions. However, this assumes that the scale of a process is a given fact which is undisputed by stakeholders. This is very often not the case. An example in relation to the CFP is the claim by North Sea fishers that the depletion of the North Sea cod stock is a construction because it represents the average of very different developments in the southern and northern North Sea. The perception of the scale of the process is therefore in itself an important issue to be addressed by management institutions.

Management decisions are based on specific perceptions of the character of the problem to be addressed and the prerogatives for its solution. Such perceptions are very scale dependent. Several studies have demonstrated that fishers' perceptions about the fish resources reflect another scale – smaller but with more detail in time and space - than the perceptions of civil servants in the management agencies or of the scientists which provide research based advice to management institutions. These differences in perceptions are further amplified by those basic differences in discourses which fishers, civil servants or scientists may subscribe to and which may also relate to scale, especially when global agendas form part of a discourse (Degnbol 2003)..

Linking institutions across scales takes more than just delivering decisions up and down. Those taking decisions have responsibility vis-a-vis those they represent. Hence, accountability, and the transparency that makes accountability possible, is the core mechanism for legitimacy across scales in management. Accountability depends on communications and the scale of management institutions has important implications for the ways communications can take place - how facts and interpretations of facts are exchanged, how conflicts are presented, and how agreements or compromises are reached. The move from direct participation to representation is fundamental and has important implications for communications and conflict resolution. Both the examples above demonstrate the difficulties in establishing representation which can form the basis for decision making which is considered legitimate by those directly affected. This is central to the analysis offered by this paper and is discussed in detail below.

Integration

The discussion so far has dealt with the scale problem as it presents itself when dealing with a single issue. However, the mainstream coastal zone management discourse has for more than a decade had as its ambition to integrate management across issues and sectors, based on the observation that the sectoral interdependencies in the coastal zone are so prominent that it is an illusion to believe that it is possible to address one management concern in isolation. It is becoming difficult these days to find a text about coastal zone management which not by default puts an I in front of the CZM. This default is based on the fact that the need for cross sectoral linkages is so evident as to be a truism and cannot be neglected in management.

It has however been difficult to develop mechanisms for integration which genuinely addresses the very different issues at stake in the sectors, and the central challenge has been how to

deal with scale. ICZM is not just a question of establishing communication and mechanisms for conflict resolution in the local context, integration, in most cases, requires communication across scales. One example is the integration of the management of fisheries resources with the development of local economies. Many basic decisions with extensive consequences for the future economy of local fishing industries are taken at international regional level without interaction with local communities or coastal zone management institutions. The development of other sectors are however dependent on infrastructure and a work force which may compete with fisheries activities.

Integration in coastal zone management will in most cases have to be ‘diagonal’, that is that different levels of management institutions must be involved according to the issues to be integrated (Figure One).

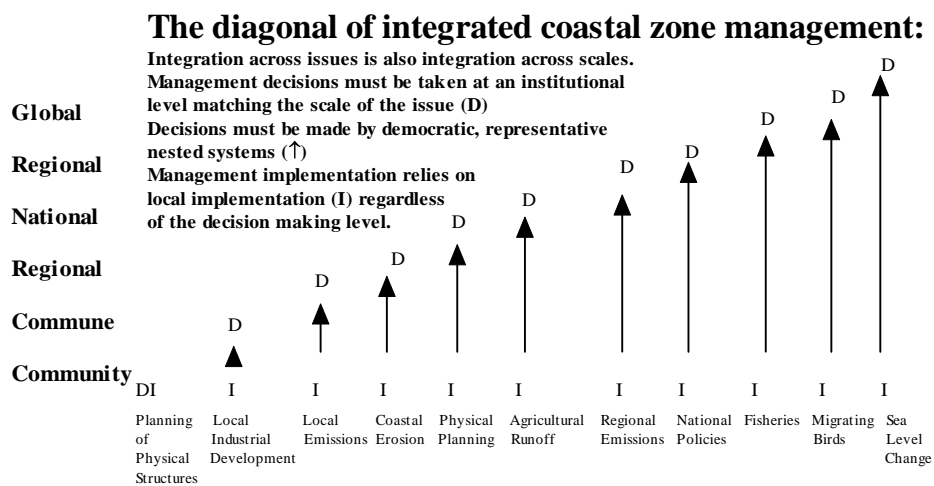


Figure One

Accepted Solutions to the Scale Problem and Their Shortcomings

The scale problem has been addressed through a variety of administrative settings or proposals for institutions to bridge scales. These solutions include the physical planning approach which focuses on the use of space and the distributions of rights in space, the neo-liberal approach which relies on the use of market mechanisms and nested representation. These approaches are not mutually exclusive but represents a very different emphasis on the role of the state, the market and civil society respectively.

The Physical Planning Approach

The physical planning approach has a long tradition in coastal zone management. It is discussed here on basis of the implementation in Denmark but similar approaches are used elsewhere. One of the specific features of the Danish approach to physical planning in the coastal zone is that there is very little integration across the waterline.

The starting point for physical planning is the observation that the morphology and biology forms different borders and defined areas in the open landscape– the visible borders. There are a number of invisible borders in the same landscape. Private property is drawing borders that are only visible on maps, and so are the administrative borders. The borders of private and administrative areas are often cutting across the visible borders, causing conflicts related to management on a regional or national scale.

The Danish physical planning system emphasises the need to create possibilities for the many with

the effect of limiting the activities for the few, and in Denmark there is no free exercise of property rights. Intervention in property rights and the individual possibility for development is exercised to protect e.g. the values of landscape elements, biodiversity, access to the nature and the experience in itself of the landscape with all the natural and cultural elements. There is public access to all beaches even if the visitors have to cross private property to go there, and all forests are open to the public though there are some restrictions in the private forests. The owners of the private property cannot remove an access way without replacing it with another. Owners of a conserved area may not alter the landscape elements or construct new buildings.

Physical planning or spatial planning creates a framework for the land use. The Danish planning system is a framework system with a high degree of vertical integration. The national planning lay down the overall guidelines for development and protection measures taking care of the national interests. These national guidelines must be implemented into the regional and municipal plans. The regional plans are important as these plans must ensure a total weighing of the different interests in relation to management of the region across the visible as well as the invisible borders. Despite the important role of regional plans in nature management, they cannot manage issues or areas crossing the county border. Municipal plans must reflect the regional guidelines for development e.g. on urban development. The planning system creates indirect restrictions for the individual and only the local plans can interfere directly with property rights.

The zoning system is dividing the country into urban zones, rural zones and summer cottage areas creating direct restrictions for the individual. The zoning system was made to protect the open country from other activities than farming, forestry or fishery. It implies that the county council or in some cases the municipality must permit activities on private land such as parcelling out land, new buildings or a change in the use of existing buildings or areas. The exemptions are numerous and there is a tendency to allow more activity and development in the rural zones than before, and the open landscape is slowly changing. The coastal planning zone was implemented to protect the open coastal landscapes from inexpedient development, and the beach/dune protection zone is recently expanded to 300 metres to protect the beaches and the dune areas from any change of the present state.

Shortcomings of the Physical Planning Approach. Restrictions in the individual activities are causing conflicts. The Danish management system is aimed at stakeholder participation at the regional and local levels. The instruments to solve conflicts at a local level are information and negotiation to obtain results through voluntary agreements. A voluntary agreement is often followed by an economic compensation. If a voluntary agreement is not possible the solution is either new legislation or expropriation of property. These are technocratic solutions to area-related conflicts. In the same way the framework management system is a technical solution to the scale problem. Neither of these solutions can solve the problems arising if there is a local resistance towards the management decisions. The Tønder marsh case described in the above is an example of what can happen to an area when the local resistance is putting the national intentions to shame, and it underlines the importance of local support.

Spatial planning is limited to terrestrial development. The coastline forms a strict border for planning activities with two exemptions. The county council are responsible for licensing aquaculture farms and extraction of raw materials in the near shore waters.

The international Ramsar convention and EU habitat directive are not restricted by administrative borders, and the appointed areas often cover several municipalities and cross county borders. Thus it is not possible to manage these areas at a regional level. The higher the management level the less the participation from the local stakeholders, and the framework management system does not promote cooperation or stakeholder participation across administrative borders.

Another cross border problem which the planning system fails to address is eutrophication of open waters caused by the intensive modern farming. Farming is managed by the Ministry for Food, Agriculture and Fisheries, and is primarily taking care of the sectorial interests, and the supply for the Danish consumers. Even though the same consumers are those with an interest for protecting the waters and its living organisms against the pollution with fertilizers there are no management instruments to involve these stakeholder groups in the debate or in the decision making within this sector. In the same way it is not possible to plan for the positioning of the EU-supported fallow to lie near the streams and rivers or the coastline of sensitive areas in the inner Danish waters.

Natural coastal development is determined by the laws of physics. The processes are not restricted by administrative borders and the powers of the wind, waves and current alters the coastline obeying these laws sometimes causing trouble for the cultural values on land. The counties manage coastal protection assisted by the Danish Coastal Authorities, Ministry of Traffic. Intervention in the physical processes in one stretch cause impact on the neighbouring stretch and maybe even on the coastline of the neighbour county. As the planning system is not promoting cross county cooperation in an understanding of the coastal processes the result is that the problem solved in one county moves on to the neighbour county.

Market-based Instruments

From a neo-liberal economist's perspective the solution to the scale problem is the "invisible hand" of the market. If the use of coastal resources is for maximization of utility in economic profit terms, the market mechanism will ensure not only efficient use of the coastal resources for any initial purpose but their use for the most financially rewarding purpose (e.g. fishing grounds turned holiday resorts). The scale problem in this framework may cause some market imperfections as market transparency may be increasingly blurred with scale. However, market mechanisms can handle risks and uncertainties at different levels.

For the market to work, privatization of the coastal resources in one form or the other is essential. If the resources are "common pool" and managed under open access regimes they are particularly vulnerable to overexploitation. This is because what is the rational level of exploitation from the perspective of society (maximization of the resource rent) is not rational from the perspective of the individual (dissipation of the resource rent). The incentive for any individual to engage in a collective action to change the management regime depends on the distribution of the benefits. If the benefits are available to everybody, there is no such incentive. This explains the absence of collective action in coastal zone management, even in situations where resources are on the verge of collapsing.

For privatization to work, whether it is full ownership to resources or exclusive user rights for a given period of time, active involvement of the state is required to install and guarantee the property right. However, allocation and protection of rights by the state is not always sufficient to prevent excessive usage. Rules on exploitation have to be set and enforced often by the state as well.

In the case of fisheries resources neo-liberal economists suggest that fishing rights should be exclusive, divisible and tradeable. Where fisheries management is under a quota regime, as is the case in many places of the world the solution is individual transferable quotas, ITQS. ITQS will drive the less efficient resource users out of the fishery, and leave the scene to the more efficient. The over-investments found in most fisheries will be dealt with once and for all and the resource rent realized. The same argument may apply to the exploitation of the resources of terrestrial commons.

Shortcomings of market-based instruments. The economists criticism of the invisible hand

solution is that the market price does not reflect the true costs of production. The externalities associated with coastal resource exploitation, most of them negative and putting burden on others, are not included in cost calculation. For that reason the market price is not the true price and the allocation of resources via the market therefore skewed.

Also the market cannot handle the equity issue of what the initial distribution of property rights or exclusive user rights to what was previously the coastal commons should be. That question economists have to leave with the politicians. The larger the scale, the more difficult to justify the privatization.

Neo-social economists agree with the resource rent problem and do not object to the need for efficiency: However, they see no reason why collective ownership or exclusive user rights over coastal resources should not be as effective as individual. It may require some rules and regulations within the collective, but that is required also where individual ownership applies. Often even more so. The understanding behind this social economic approach is that communities on the coast (and elsewhere) are more than just market places, where goods and services are traded. Communities are social constructions where people are rooted, where they ob- and maintain their livelihood from exploitation of the resources locally available, where their social needs are met, where they learn, and from where they view the world.

Nested Systems and Representation

From a social point of view the scale issue is best addressed through institutions based on representation and designed as nested systems. By nested systems (Ostrom 1990) we mean that management institutions exist within a hierarchical structure in which decisions are taken at the lowest possible “competent” scale. The idea of nested systems is based on the principle of subsidiarity, meaning that negotiations and decision making should take place at the smallest scale that reflects the bio-physical realities. Representation, then, is the mechanism through which decisions which must be made at higher scales are ‘passed up.’ The local coastal community is a member of – and by a truly democratic election process - represented in an association of coastal communities (or community interests) which can deal with resource management issues at a higher ecosystem or policy or other system. This association may again – in a democratic fashion - be represented in another association of associations working at even higher natural or social system levels. It is within a nested system of representation that the legitimate solutions to scale issues in coastal zone management is most often achieved. The solutions *per se* have to be reached through negotiations and possibly arbitration. Representation and nested systems is a common model throughout the world, though it rarely achieves its ideal in practice. It is currently the ‘state of the art’ in the design of institutions that must deal with multiple scales. It is found not only where coastal zone resources needs management at various scales but everywhere human society have experienced a need for problems to be solved at management levels higher than the local. The next section includes a more extended discussion of the technical reasons why nested systems and representation are such an effective institutional design.

Shortcomings of Nested Systems and Representation. Nested systems and representation, however, ameliorate but do not solve what may be the pivotal underlying problem that scale presents: how management institutions can process the information needed for decision making between larger and smaller scales. A critical reason that the mismatch between the borders of jurisdictions and scale of ecosystemic problems is such a hindrance to management is because information about the ecosystem has to be translated into the jurisdictional scale to prepare and implement a response. The problem of differing perceptions across scales is also mainly one of selecting, simplifying and organizing observations at lower scales to make them intelligible on larger scales. Effective accountability is fundamentally a problem of having information about

behaviours, and the reasons for those behaviours, that is rich and detailed enough to formulate effective and nuanced responses.

Scale creates constraints on information processing that restrain all human institutions, including the best designed representative nested systems.¹ On smaller scales decision making can be handled in face-to-face or nearly face-to-face communications in which differences about facts can be sorted out and differences about values can be debated and compromises reached. Where this process is truly effective, participants are free to introduce and discuss any information they feel is relevant, which is precisely what makes the decision making sensitive to all the relevant issues of fact and value. The presupposition of such a discussion is that it is oriented toward convincing participants that the decisions reached are the right ones (Habermas 1984). From an institutional viewpoint this orientation is what ensures that the information is thoroughly processed. This presupposition is not necessarily tied to the finalization of the decisions. It is a principle of the discussion process itself and it fulfills its function even where final decisions are not based on consensus.

On larger scales, however, these communications processes which allow for maximum sensitivity to factual truth and social values begin to break down. For one thing, the amount of information needing to be processed requires streamlining. The increasing number of participants and concerns means that some sort of culling process is required to simplify the information so that decision making is possible within a useful time period.

Just as important, the orientation of the discussion toward convincing participants that something is true or right begins to break down. As the scale over which institutions operate grows larger, their operations must begin to adopt a presupposition in communications that the opinions and values of individual participants do not matter. The presupposition that the goal of communications is to convince makes institutional operations too unpredictable, and increases the difficulty of maintaining uniformity and consistency in the way the institution functions. The behavioural outcomes that maintain the institution begin to require support by more and more coercive mechanisms that presuppose that communications are about confronting participants with specific choices and consequences. A top-down bureaucratic institution, for example, confronts individuals with the choice of complying with a requirement or risking sanction. A market confronts individuals with dichotomous 'take it or leave it' choices that can be negotiated, but only within tightly predefined parameters. These kinds of institutions rely on surveillance, enforcement and incentive mechanisms to make their decisions meaningful. The larger the scale involved the greater the role that coercive mechanisms must play.

This is not a moral problem with badly designed large scale institutions, it is the reality of what must be in place if behaviour is to be coordinated across large scales. The information processing problem it presents, however, is severe: the loss of richness and nuance in the information that the institution can identify and respond to. Institutional sensitivity to truth and value relies upon the presuppositions that communications are open to any claim and oriented to convincing participants that something is true or right. Where the presupposition of the institution's communications is a coercive, 'take it or leave it' choice such sensitivity is diminished and information is distorted or even lost entirely.

Combining this tendency to distortion with the need for simplification of information for large scale decision making often leaves large scale management institutions trying to respond

¹This analysis of scale based on the communicative properties of institutions is based on a perspective derived from Habermas' (1984, 1987) communicative systems theory and further elaborated in Wilson 1996, Wilson and McCay 1998 and Wilson 2003.

to ecological and social realities they “see” only through a glass darkly. Worse, the information distortions, because they are created by institutional imperatives will tend to be in a form that a) are not easily apparent to decision makers and b) tend to make the problems they are making decisions about appear more tractable than they are, and c) make their management seem more effective than it actually is.

One result of the increased reliance on coercion is that as scales become larger institutions are increasingly gamed. Individuals must adopt a more and more strategic and objectifying attitude toward an institution that confronts them as a coercive force with little or no sensitivity to what their values are, or even to what they believe to be factually true. This situation exists even when the individual agrees with the goals of the institution, a fact which reveals the shallowness of the naive equation of legitimacy with agreement or positive attitudes.

Nested Systems, Representation and the Problem of Processing Information Across Scales

Nested systems, when working correctly, help address this problem by sorting out which decisions should be made at which scales using the principle of subsidiarity, meaning that the decisions are taken on the lowest possible scale given the range of the problem to be addressed. This reduces the scope of the decisions that have to be made at higher levels. But those decisions that must be made on higher scales are still confront institutions with the same information processing problem.

Representation helps address this underlying problem by creating a structure that makes possible richer and more open communications with reference to larger scale problems and with broad input from lower scales. Representation, in effect, creates a small scale communicative sphere within a larger scale decision making institution. The problem is only solved incompletely, however, as the creation of this sphere happens within larger scale institutions and, as such, must involve some coercive mechanisms.

The only coercive mechanisms we are talking about here are those built into democratic processes for structuring and selecting representation. The term “representation” is used now and again to describe institutions that are not democratic, i.e. someone is appointed or appoints himself based on some traditional custom or political connection to “represent” some group of people within a higher scale institution. The representation we are referring to, however, is a more or less effective attempt to create a link between smaller and larger scale processes. If the people that are purported to be represented do not have a way to hold their representative accountable then there is, in fact, no such link and no representation is taking place. In the “non-democratic representation” case, none of the benefits ascribed here to representation apply. This is true even in the case where such ‘representatives’ are honestly attempting to speak fairly for their constituency because that is an individual idiosyncrasy, not an institutional link. The only effective system we know for such accountability is the democratic selection and removal of the representatives by the represented. These questions have been ably discussed, and the negative consequences of undemocratic ‘representation’ extensively documented in Agrawal and Ribot (1999) and Ribot (2002).

The best illustration of what we mean may be the “advisory councils” that are very common in environmental decision making. What makes them such a good illustration is they are a large scale institution that resembles, but does not reproduce, a small scale decision making process. In such councils large scale institutions invite people who operate on smaller scales to come and discuss policies with them. Advisory council members are asked to comment on various policy prescriptions to give advice on their impacts and/or the receptions the prescriptions can expect to have on the smaller scales. They are likely allowed to say whatever they want and raise whatever issues they will, but in the final analysis these discussions are about specific questions

that have already been framed by the larger scale institution. In point of fact, if they were not organized around these specific questions they would be a waste of time as they have no actual power or possibility of influencing policies beyond answers to these questions. Advisory councils are not a waste of time, but they are research mechanisms for the large scale institutions rather than communicative forums for institutional decision making. They are focus groups by another name. Participants are not free to raise any issue in a meaningful sense and the discussions are not oriented toward convincing participants that something is true or right. While advisory panel members are often inaccurately referred to as “representatives” they are not. These are not decision makers accountable to people operating on lower scales. Such people would be free to raise and frame issues and convincing them of truth and value would be a presupposition of the discussion and this would make them a link between scales rather than an arm of large scale institution with some surface resemblance to small scale ones.

True democratic representation, however, while critical, does not solve the information processing problem. The incompleteness of representation as a response to the problem of scale stems from the need for formal rules backed up by some form of coercion to structure this process of democratic selection and removal. These rules involve a number of complex issues such as the enfranchisement of the people to be represented, and the specification of the scope and techniques of the representation. As Luhmann (1990, cited in Jentoft et. al 2003) argues representation involves more and more decisions about making decisions. Jentoft et. al. (2003) describe the complexity of institutions for representation in detail. The consequence of all this is that participants must take a strategic and objectifying relationship to these institutions and information processing will, as a result, be distorted by political gaming in the form of party lines, changing of arguments to suit contexts, etc. This can easily be seen in large scale political processes where ‘discussions’ of policy are entirely shaped by the marketing techniques.

The bottom line is that nested systems and representation are the best techniques we know for addressing the information processing problems posed by scale. But they are only an incomplete response. Indeed, we can never hope to have an entirely complete response as scale is built in to the very core of how institutions process information. There are, however, other possibilities for building institutions which offer further, if partial, responses to the problem of scale. The final section outlines one possibility for consideration.

Future Possibility: A New Kind of Management Professional

The discussion thus far should have made clear that the underlying issues in dealing with scale in environmental management are not ones of technique. It is, of course, important to get the technical parts right, e.g., to do rational spatial planning and have a good understanding of how property rights should be defined. But in the final analysis, management is a decision making system, i.e. a political process that takes in information, uses that information to make decisions, and must then track results and adjust accordingly. Let us assume that we have built a state-of-the-art nested system with democratic representation, what more can we do to manage make this politicised information processing system as effective and responsive as possible?

Decision making and accountability operate both ways; up to larger scales and down to smaller scales. (It is too bad the terms upscale and downscale are already taken, they would be useful as we learn to analyse scales and social processes). Decisions taken at the lowest competent scale must respond to smaller scale concerns while addressing problems that may only be salient on large ecosystem scales. Those operating on lower scales must be held accountable from above for behaviours that take into account larger scale needs, especially when the benefits of these behaviours are diffuse across the larger scale. In this paper it would be reasonable to call this the *Tønder Marsh problem*. Those responsible for the larger scale management must be held

accountable from below for imposing on the lower scale the minimum costs necessary for achieving the larger scale needs. It would be reasonable to call this the *Common Fisheries Policy problem*, though that involves a number of downward accountability issues as well.

The information processing problem is fundamental to both decision making and accountability. Representation and nested systems contribute in important ways to resolving these issues. We would like, however, to propose a third kind of institution that focusses even more directly on facilitating effective information processing across scales. Could we not develop a new kind of management expertise that is specifically focussed on the problem of facilitating the processing of information across scales? By 'developing an expertise' we mean moving toward both credentialing and certifying this expertise and using various sorts of funding and to create a demand for it.

As discussed above, representation works by creating communicative space for large scale institutions that reproduce the factors that make small scale institutions sensitive to truth and value. Representation must be structured, however, by large scale institutions that suffer from the same insensitivity as other large scale institutions. A credentialed professional field, however, is an institution that functions to a large degree through the prestige of its incumbents. Prestige, as we use it here, is a mid-scale institutional mechanisms that we can contrast with the bureaucratic authority and market mechanisms operating most effectively on higher scales and with the fully open discussions among equals that operate most effectively on lower scales. Prestige operates as a communicative mechanism for the institution by investing specific individuals with the ability to guide communicative outcomes in desirable directions (Wilson 2003). Prestige is a way that institutions process information that can operate on greater than local levels while still retaining a good deal of the openness and orientation toward convincing that make possible the sensitivity of small scale communications. Guiding outcomes increases their predictability over fully open discussions, but it does so in a less distorting way than mechanisms which rely on 'take it or leave it' coercion. Prestige operating through the institution of a professional field processes information in ways that share both strengths and the weaknesses of the large and small scale institutions discussed in the last section. This makes the creation of such a professional field for environmental management a useful supplement to the representation and nested systems approaches.

The role of these practioners would be to move among the nested management institutions and between the nested institutions and the higher scale institutions in which they are nested. They would provide a downward and lateral link that would negotiate the implementation of the priorities and decisions set at the higher level. They would also provide social and natural science based informational support to the representative system that produces these priorities and decisions. One could think of them as "circuiters" working with a number of nested institutions. Perhaps the closest existing model for what we are pointing to are the third party certifiers that work with natural resource harvesters to ensure that they meet the environmental standards set by ecolabelling programs.

The remainder of this section outlines a first draft of the types of expertise that would be need to be credentialed to create this prestige-based, cross-scale, information processing institution. The required expertise is two-fold. First, practitioners of this field would need expertise in the facilitation of local decision making and conflict management. This would involve sociological, economic, and managerial skills. Second they would need expertise in the identification of management indicators of a number of types, this would involve biological, economic, ecological, statistical and measurement theory skills.

Conflict management is perhaps the key skill our practioners would need to put to use. Management is a better word than resolution. Conflicts in environmental management are rarely resolved because they are usually rooted in real differences of interest. Conflict management

usually works best on a small scale because of the complexity of finding acceptable compromises between conflicting small scale interests and between small scale and larger scale interests. Ongoing conflict, in fact, is usually the basis of local cooperation with larger scale interests (Wilson 2003). Outside facilitation is often helpful, indeed often necessary, in negotiating and renegotiating compromises. This would be a key role played by our practitioners. This expertise would involve skills in conflict assessment, i.e., discourse analysis and social impact assessment. Ongoing conflict management would involve facilitating planning to identify management goals and plans to reach those goals. This later function would involve considering both local needs and the implications of higher scale decisions and priorities

These efforts, however, would have to be backed up with ongoing accountability and that means these negotiations have tie their local management plans and goals to indicators of progress and effectiveness. To this end, our practitioners would need to be well grounded in general measurement theory, particularly in understanding the varying roles that quantity and quality play in defining and measuring goals. Substantive expertise would be required in the natural science aspects of the management questions. This would include questions particular to the management issues, such as pollution measurement or fish stock assessments, as well as an understanding of the principles of ecological interactions. Such expertise need not rise to the level of being able to identify and carry out edge research, but certainly to the level of being able to understand and evaluate research. Our practitioners would also have to understand how to work with different types of knowledge, including both and experience based (local) and research based knowledge.

These reflections, however, are only a first draft and a rough outline of the expertise our practitioners would need to call on.

Finally, a reasonable question to put to our proposal is why we need an entirely new profession. Why not do this with multi-disciplinary teams, then we would have deeper knowledge behind all these skills? The answer is that be creating a new profession we create the things that go with it: job descriptions, professional societies, certification standards, and incentives for professional advancement. Multi-disciplinary teams are almost always one shot affairs and usually ones with little incentive for making multi-disciplinary work the focus of a career. (This cannot simply be addressed by encouraging professions to ‘value’ multi-disciplinary work as this would create an impossible performance assessment problem for those professions.) By creating a profession focussed on addressing cross-scale issues in environmental management we are putting into place an institution that will both facilitate management and continually focus on how to improve that facilitation.

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