

# BOOM-BOOM

## *The Geoffrion Solution for IM: Bounded Objectives-Oriented Management (Iterated)*

Notes for Presentation

by

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for

Pacific Marine Analysis and Research Association

Annual General Meeting

Vancouver, May 30, 2006

It's a great pleasure to be here, but also a challenge. I've been working on questions of integrated management long enough to have become rather more confused than confident about all the right answers.

Nevertheless I propose here to talk a bit about integrated management and the need for interdisciplinary research.

One point to note before starting is that urging greater attention to interdisciplinary work, including economic, social and cultural concerns in particular, raises the ongoing tension between drawing on resources now for current human use as against investment in maintaining and increasing those resources to sustain the potential to meet future human needs. In the discussion of sustainable development, there is always a balance to be sought between conventional economic activities contributing to material wellbeing, other use of resources contributing to intangible dimensions of individual wellbeing and quality of life, and still other activities sustaining the fabric of social life and community health as well as ecological integrity.

This search for an appropriate balance in the intertemporal tradeoff between use of income now and provision for use in the future remains the underlying challenge facing any process of integrated management. It is the simple but unanswerable question at the heart of the many different disputes about the application of the precautionary approach, or the formulation of ecosystem-based management, or the appeal to intergenerational equity.

But beyond this, pressing the importance of current ESC objectives also conflates some very distinct concerns—precisely the tension just mentioned above about the balance between conventional economic concerns with material wellbeing (usually pursued through markets) and more general concerns with less conventional and less tangible social and cultural relationships and resources—social capital, cultural traditions, community norms. So two kinds of distributional tensions—intertemporal and cross-sectoral tradeoffs—have to be faced.

I'd like to suggest here a general approach, or a general conceptual framework, within which to think about addressing all these questions of balance within an integrated management process at the LOMA scale.

Maybe I should say a word about the title I've given this presentation. In the current management rhetoric, and in particular in the literature on integrated management, there has been something of a rebirth of the language of objectives-oriented management. In the present context, the concern to give greater and more explicit emphasis to ESC considerations nonetheless must be pursued within the framework of over-arching international and Canadian commitments to ecosystem health and sustainability. Those commitments translate into some precautionary limits and boundaries on the scale and character of human interventions into ecological systems. So the objectives-oriented management is bounded, bounded by the requirement to ensure the sustained ecological integrity that is the only basis for continuing future prosperity. Forging agreement on how to bring these 'ecosystem objectives' (as DFO terms them) into participatory processes as essentially non-debatable conclusions from underlying science without appearing to subordinate all the social concerns is a real challenge.

The management process must also be adaptive, which means endlessly adjusted as experience grows and learning takes place. Thus the basic BOOM becomes iterated, and we can think of the process as BOOM-BOOM. The late great hockey player Bernie Geoffrion translated his trademark Boom-Boom slapshot into a wide and enthusiastic following. The hope here is that collaborative processes might use the bounded objectives-based management approach in the same iterated fashion to lead coastal Canada with the same allegiance and success.

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## The Argument

- Integrated management demands coherent data, observations ordered and organized
- But also demands analysis of those data to produce an information base that serves as evidence for 'science-based decisions'
- Such analysis may involve inference, tests of hypothesis, modeling—all more or less subjective activities, leading to socially construed facts
- But the processing of observations may occur in other ways—cf. Brody on processing through dreaming; imaging; visualization; Integrated Landscape Management Modeling (PRI w/s);...

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## Interpretation, Commitment

- Evidence is interpreted very differently; drawing beliefs from evidence demands interpretation of that information in some interactive deliberative setting
- Conclusions as to the implications of evidence for action are also drawn very differently
- Effective implementation and compliance demand an inclusive participatory process

## Why PIA?

- Inclusive participatory processes needed because everybody interprets the evidence (and their responses to their understanding of the evidence) differently
- Different understandings shaped by different stories, narratives, cultures
- Different responses shaped by the different rules, incentives, norms in different cultural and institutional settings
- People act on the observed evidence in their own personal and institutional context

In brief, we have a continuing dilemma:

Humankind is becoming a mighty geological, biological, ecosystemic force, able to alter its own global environment

Driven by institutional structures of massive scale, we seem unable to 'see' the 'suicide machine' (Ronald Wright)—why?

But even if we can see, in principle, the need for action, we can't 'do'—why?

We seem unable to do what is seen to be the right thing, because of collective action dilemmas, structures of incentives preventing individual agents pursuing perceived rational self-interest from the necessary cooperative action

What lies under these collective action problems? Stories, narratives, histories, cultures giving rise to norms of conduct

Resolution demands communicative action, inclusive deliberative processes

BUT recognize that in recommending inclusive participatory processes and devolved decision-making, we are condemning ourselves to perpetual dispute

However, recognize also that we do not need to arrive at full consensus, harmony, unanimity on all beliefs; just need respect, tolerance of difference and willingness to act on basis of sufficient consensus in the short-term, within allegiance to the overall benefit of the process in the long term.

## So Main Conclusions

- There may (or may not) be lots of numbers and data points, but the judgments on which integrated adaptive management rests can only be made in a deliberative process
- The personal and community commitment on which implementation and compliance hinge can only be achieved in an inclusive participatory process
- A collaborative interdisciplinary approach is essential

Management objectives must be established in a process in which agreement on conflicting priorities can be hammered out among many conflicting perspectives and interests. This is not a task for managers by themselves, or scientists by themselves.

The integrated information system demands information on all the resources, assets, capitals on which future potential to meet human needs will rest. The integrated management process must take into account all the differing objectives of all the different agents related to all the distinct sub-systems making up the overall social-ecological system. Understanding the action required demands analysis of all the incentives and drivers in each subsystem, and this demands inherently interdisciplinary (or transdisciplinary) work.

The ecoframe proposed below as a conceptual framework is a form of modular decomposition of the overall SES, separating the laws of motion into distinct (but coupled) subsets relating to particular classes of assets.

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## Social-ecological systems

- Humans are part of the ecosystem; the dynamics of human systems are embedded in the natural dynamics of the natural world (the geosphere/biosphere)
- Integrated management does not manage ecosystems, or resources; IM attempts simply to influence human activities that draw from and discharge into the biosphere
- This attempt is confounded by the profound uncertainty surrounding our understanding of the earth's systems and by the limited controllability in the institutional structures that influence human interventions in those systems

## The Wealth of Nations--All Forms

- In thinking of the impacts of human activities, or prospects for future wellbeing, it is necessary to consider all forms of wealth (resources, assets)
- Not all forms of wealth (capital) can necessarily be substituted or replaced—some losses may be irreversible
- Consumption or loss of capital now means loss of potential to realize services later
- There is an obligation not to diminish that overall potential for future generations

“Strong sustainability” demands non-diminishing stocks of any essential forms of capital for which substitutes cannot be found. This idea might attach, for example, to the grand cycles of the earth systems—the carbon cycle, nitrogen cycle, hydrological cycle, the ‘conveyor belt’ of ocean currents, and so on. It might also be associated with photosynthetic capacity or the absorptive capacity of the atmosphere. The notion of sustained ecological health is closely related.

## *Stewardship* in a complex social-ecological system (SES)

The ongoing IM task is not easy. But the stewardship component is perhaps hardest.

There are many different, interdependent assets or resources interacting in complex ocean ecosystems

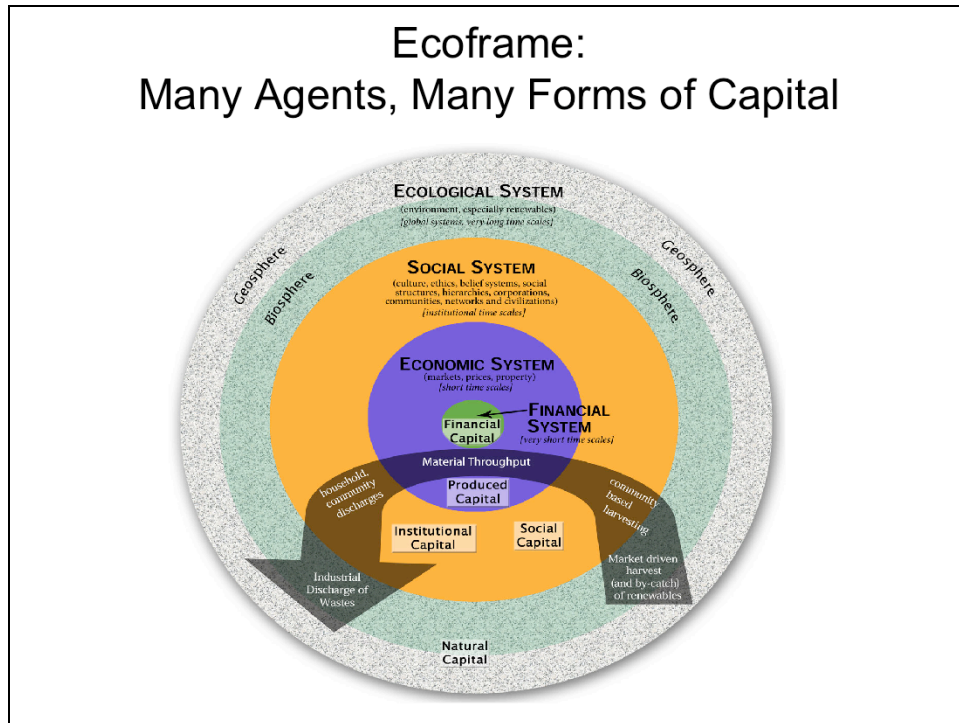
They throw off many different forms of income and benefit—including mostly intangible ecosystem services

Almost none of those assets and income streams are subjects of market transaction

The value of all must be safeguarded

It is important to note that we cannot get around the inherent difficulty of this stewardship obligation simply by getting together to seek 'win-win' outcomes. There are basic constraints to be recognized, fundamental underlying conflicts in the perceptions, attitudes and interests of the many players involved. Sometimes it may seem easier—especially with heavy emphasis on current ESC considerations—simply to short-change the future. There may be no strong voices at the table to speak for future commitments. [Indeed there are some very interesting questions surrounding the appropriate representation of so-called civil society voices in the negotiations around integrated management. Cf. Christopher Stone, *The Gnat is Older than Man.*] The challenge much more substantial than the illusory search for a 'win-win' outcome is to maintain allegiance and loyalty in the face of what seem clearly to be short-term losses and adverse outcomes. In the hard cases, there are always risks of adverse outcomes, and the burden of those risks is usually born by people other than those who benefit from running those risks.

## Ecoframe: Many Agents, Many Forms of Capital



With all these background considerations in mind, let's look at an overall framework within which to set the view of integrated management.

This diagram offers an image of the way in which various elements must be brought together. If we think of developing a model of the ecosystem in which activities are to be managed we could imagine setting out the descriptions of the way the natural physical and biological systems behave and evolve. Within the biological systems we have a number that relate to human beings as one more species on the planet. Among the descriptions of the way groups and individuals in this species interact are descriptions of well established social systems, including mechanisms for the representation of individuals in group decisions. Also included in these are some rather particular arrangements that have evolved or been constructed to deal with the use of resources to produce and distribute goods and services.

As noted earlier, the major interactions of humans with the ecosystem that surrounds them may be seen as relating either to activities drawing resources from the biosphere, or discharging materials into it. Just as the activities of trees can be seen as drawing carbon dioxide from the air and energy from the sun while discharging oxygen into the atmosphere, humans can be seen as drawing resources and energy from their surroundings, and leaving results and waste behind.

We want to monitor, describe and influence these processes in some fashion, for which we need simplified descriptions and communications.

## Resources, Wealth and Income: A footnote on language

Wealth is a stock—command over goods and services

Capital is a stock, an asset, a capacity to generate an income stream

Income is a flow

Capital is the tree; income is the fruit

A change in a stock is a flow

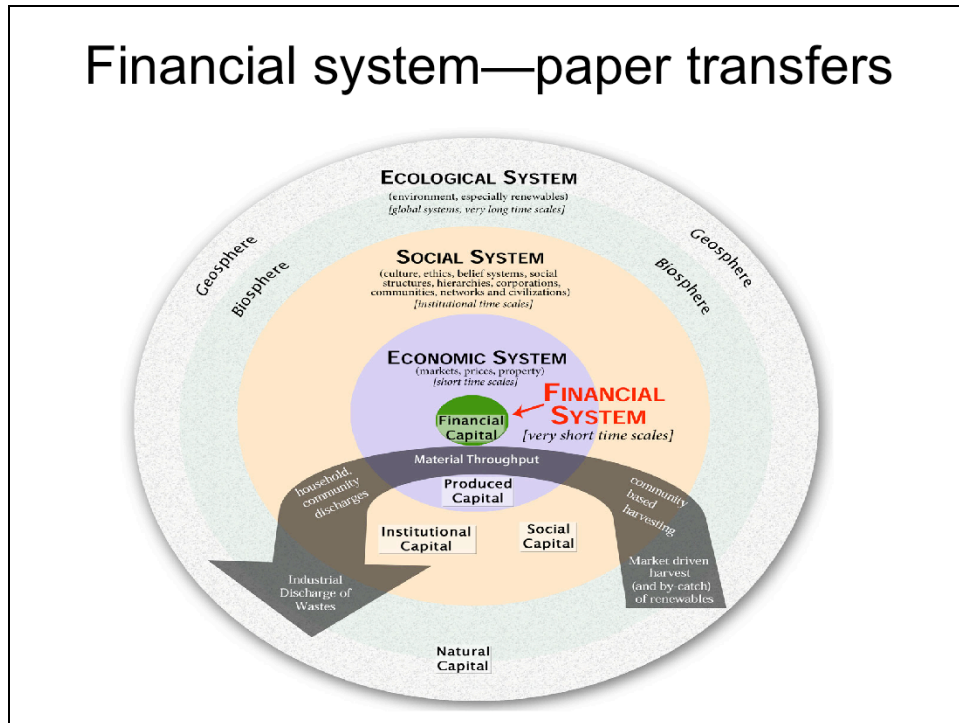
The value of an asset is the value of the future stream of income it can generate

Among the several questions of language and interpretation we have to keep in mind, is the problem associated with the use of the word 'capital'. People sometimes object to use of expressions such as 'social capital', institutional capital, cultural capital, because it seems to be somehow commodifying concepts that have much richer human associations. But as against that disadvantage to use of such language is the immense advantage of drawing attention to the importance of these resources as contributions to the capacity to meet human needs and sustain human wellbeing. The point of the language is to capture the idea of a power, a potential, to contribute positively to a stream of future services or goods to meet human needs.

To speak of 'human capital' does not (necessarily) imply that we trade humans, and establish stock prices for them, but simply that the services of the productive power (capital) embodied in a human being can be deployed to generate other services or goods that contribute to human welfare (and ecosystem health).

To draw attention to these less tangible sources of wealth even in a hard-nosed discussion of economic organization is becoming more respectable now, as mainstream economists have found ways to attach numbers to notions like trust and social capital, and to do factor analysis to demonstrate associations between trust, sense of wellbeing and measured productivity.

# Financial system—paper transfers

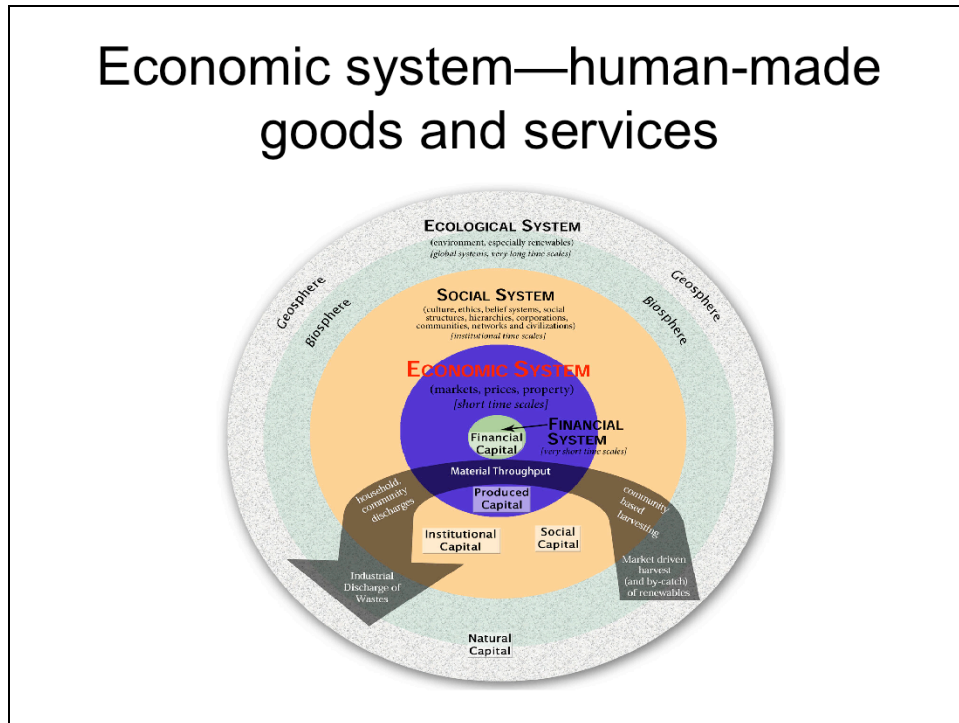


Looking to the centre of this ecoframe, we see reference to the world of financial instruments, paper titles, and digital or virtual property. The dynamic features of these highly volatile systems are very complex, much studied and generally driven by speculation. Reports on the scale and extent of transactions in these instruments, the prices at which they occur and (often) the resulting changes in holdings can be obtained virtually instantaneously; daily reports on price indices and stocks (levels) of financial capital are normal.

Distinct from this financial world—what used to be called the ‘monetary economy’ is what used to be called in economic studies the ‘real economy’. This is the sphere studied by Adam Smith and classical economists, where investment decisions by entrepreneurs create a base of physical capital—produced means of production—which, together with services of labour, land and other forms of assets and capital to be discussed below—can generate a flow of goods and services to meet human needs. Because of the neat features of double-entry bookkeeping, it is now possible (after a century of development work) to report very systematically on these flows of goods and services and on estimates of changes in the value of these underlying physical capital goods in a relatively uncontroversial way within internationally agreed systems of national accounts. Measures of aggregate value and changes—gross domestic product, national income and saving, and so on can usually be obtained quarterly and in great detail annually (with a bit of a lag).

This ecoframe diagram illustrates also the irony of our monitoring and reporting systems that account in such exquisite detail the paper claims and financing of economic activity while being able to report virtually nothing about

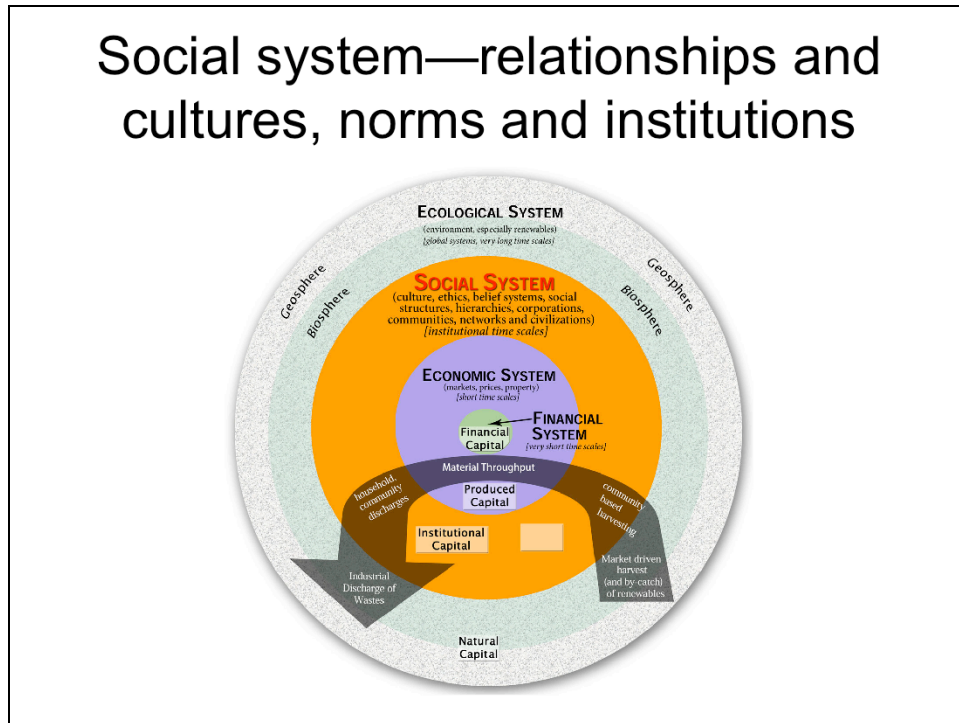
# Economic system—human-made goods and services



Marked in deep conservative blue is the overall economic system in which the financial system is embedded. Distinct from that financial world—what used to be called the ‘monetary economy’—is what used to be called in economic studies the ‘real economy’, or economics professors called the ‘real world’. This is the sphere studied by Adam Smith and classical economists, where investment decisions by entrepreneurs create a base of physical capital—produced means of production—which, together with services of labour, land and other forms of assets and capital to be discussed below—can generate a flow of goods and services to meet human needs. Because of the neat features of double-entry bookkeeping, it is now possible (after a century of development work) to report very systematically on these flows of goods and services and on estimates of changes in the value of these underlying physical capital goods in a relatively uncontroversial way within internationally agreed systems of national accounts. Measures of aggregate value and changes—gross domestic product, national income and saving, and so on can usually be obtained quarterly and in great detail annually (with a bit of a lag).

The data thus are available for creation of a variety of indicators to measure achievement of a range of objectives, relating to the use of produced means of production for purposes of producing yet further goods and services.

# Social system—relationships and cultures, norms and institutions



Of course the financial system and the market system are social constructs, evolving over time. Their rules and laws of motion are human creations and open to change, not given as immutable forces (despite all the chatter about nations being unable to exercise discretion in the face of market forces).

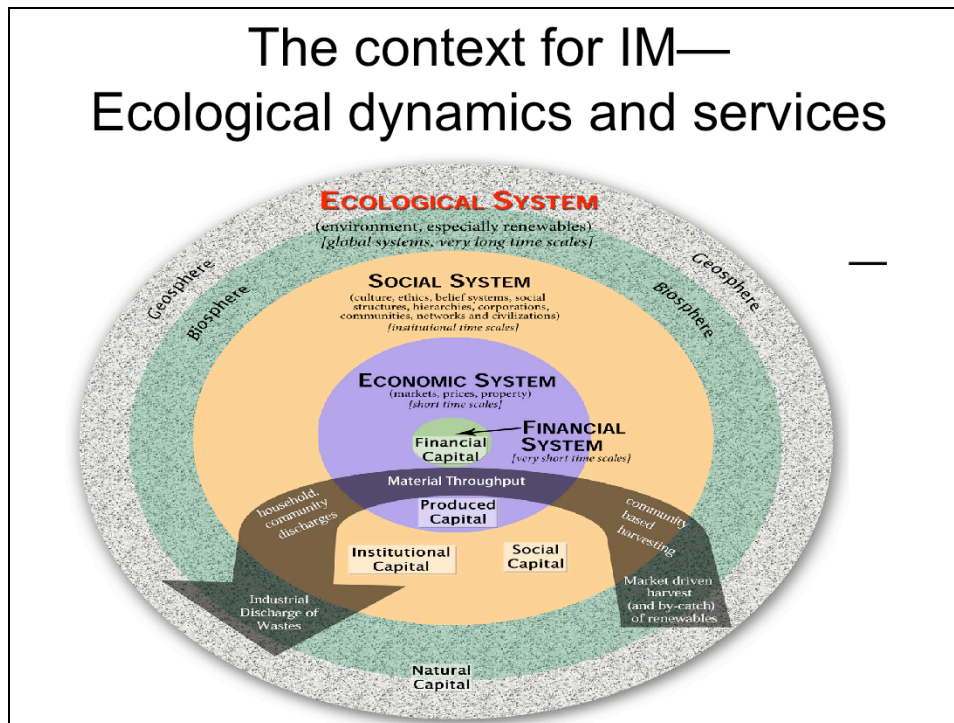
Outside these more formal constructs are other well-established more general social systems and regimes, with their own norms and rules and institutions (what Elinor Ostrom has labeled “rules in use”), evolving relationships and complex dynamics. Increasingly it is recognized that within this social structure we build up other crucial assets and resources that influence critically the output and productivity of the formal economy and its patterns of innovation, change and growth.

The development of human and intellectual capital, of organizational, social and institutional capital, of cultural capital is increasingly recognized as fundamental to the functioning of an effective economy and a tolerable community or society. Particularly in dealing with open access resources or commons problems, cultural capital and cultural evolution—the evolution of working relationships and norms of cooperation—are seen as crucial to agreement on and implementation of management intentions and plans.

Here in this household sector or civil society, outside the formal rules of state or market, few decisions are systematically evidence-based and even-less completely market-driven. Tracking decisions and their outcomes takes us into the realm of social statistics or social indicators. Population counts and demographic change can be estimated, tracked and reported, but more likely at decadal intervals rather than annually or more frequently. Other features of this social economy may be observed only as results from one-off special studies. When reported, these are individual constructs, with little comparability or commensurability in any overall framework, at least up to now. Monitoring and reporting efforts are sporadic and difficult to sustain.

In these circumstances, the role of narratives, stories and artifacts in shaping and maintaining norms and values of a particular group or culture, and in intergenerational transfer of cultural capital—and also the institutional and organizational capital of more formal organizational forms—is crucial. The management literature is now becoming replete with accounts of the roles played by institutional memory, organizational slack to accommodate informal relationships, and other features of community cohesion in maintaining organizational productivity and competitive position.

## The context for IM— Ecological dynamics and services



This whole human system—the development of social structures and norms of conduct, the emergence of more formal systems of organization of production (with the very particular and peculiar development of the limited-liability corporation), and the increasing dominance of transactions in paper claims driven by speculative motives—is nevertheless set within the physical dynamics of the biosphere and the geosphere. The complex system of human action is a subset of the complex dynamics of the natural system within which humans are embedded. [At the same time, humans find themselves to have become a mighty geological and biological force whose conscious individual decisions are, in aggregate, altering that biosphere itself. (Vernadsky, 1948)]

For purposes of thinking about a management framework we can think of the interaction of humans with the ecosphere as having two primary aspects—drawing on the ecosystem for subsistence and support of human activity, and discharging into the ecosphere the by-products and waste from human activity.

The incentives and rules that determine how harvesting and exploitation decisions will be made may come either from market-based institutions in the formal economy or state structures, or from informal institutions in civil society or the household sector. Likewise the scale and character of discharges may be determined within the formal market economy or state structure, or within the explicit rules or implicit norms that make up the traditional social economy or community structure.

The task of meeting social goals while reducing, through technological innovation and industrial ecology, the burden of material throughput has been described as the challenge of **dematerialization**. The task of altering formal and informal rules and incentives so as to reduce or reshape the character of social needs in order to reduce the scale and impact of the throughput necessary to meet those needs has been characterized as the challenge of **re-socialization**.

So the objectives of IM include maintaining and increasing all these capital stocks that contribute to the capacity to meet human needs and promote wellbeing.

## Multiple scales

- Managing at LOMA scale does not mean managing only at LOMA scale—entails managing linkages above, conveying constraints and objectives, and managing information from below, conveying information and knowledge of results and consequences
- Allocations and tenures within LOMAs must reflect priorities and rankings, not single-site criteria and approvals. It is the aggregate and cumulative impact that translates modest ‘free-riding’ by individuals into threats to entire ecosystems.
- These specific decisions must, in aggregate, keep individual activities within the overall bounds agreed at higher levels of management, through agreement on rules and norms applying in particular zones or regions.

In integrated management, as elsewhere, the decision-making process entails a flow of information and knowledge from the ground—from the systems in which intervention is planned in order to manage activities—to the higher-level or larger-scale setting in which guidance is to be developed or constraints and instructions are to be established. It also requires a flow of instructions expressing intention or constraints, carrying the weight of legitimate authority or jurisdiction.

So on the one hand we have the flow of relevant knowledge and interpretation up from the system, and on the other we have the exercise of the authority to establish constraints on the activities undertaken in that system.

The requirement is to match the extent of authority at each level in the system to the scale at which action has to be undertaken and the requisite knowledge to guide action can be established.

The central point is not that of multiple scales, but of cross-scale linkage. This issue is closely related to the delineation question—defining the appropriate boundaries for Large Ocean Management Areas—but also for the appropriate nesting of smaller organizational entities—communities and coastal management areas—as well as the relation to overall national strategies and international commitments.

## Intertemporal tradeoff

If we knew the way in which present use of assets would affect the potential for future flows, and if we knew the appropriate weight to assign to future flows relative to the present (to reflect the fact that owners prefer present satisfaction to future), then we could regulate present activities so as to achieve the maximum value of the complete ocean system and marine resources? Not at all so easy.

The problem is that we have to understand the dynamics of all this complex system, and the distribution of risks and benefits, in the face of profound uncertainty and substantial ignorance of the way that not only the physical systems but the human systems operate. We have to consider the different approaches to welfare and risk embedded in the many different perspectives that people in different circumstances and differing interests bring to a discussion in which multiple activities conflict in their claims on use of or access to the resources of the oceans. We have to consider challenging questions of intergenerational equity and justice, in differing cultural traditions and differing demographic circumstances, of people in different places at different times. Attempts to articulate a precautionary principle, develop a precautionary approach, are attempts to formulate a foundation on which people might build agreement on how to act.

These attempts to develop a precautionary approach reflect a sense of a need to respect a fundamental constraint—to assure continued ecosystem integrity. Translated into what DFO's integrated management efforts thus far have labelled 'ecosystem objectives', this constraint sets bounds for the domains within which human activities can be sustained. It sets bounds for the scope or scale of some human activities in drawing on the resources and functions of the biosphere, or engaging in discharges into the biosphere.

To understand these constraints requires discussion in settings in which concerns like fairness, equity, justice can be addressed directly.

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## Principal Conclusion

- Large Ocean Management Areas differ dramatically in their ecological and socio-economic features; integrated management within an area must establish some pragmatic agreement on functional rights in that area;
- Effective precautionary ecosystem-based management can only be achieved if sufficient authority is devolved to those able to understand and interpret the data on human dimensions as well as ecological dimensions in each individual LOMA, and to influence activity in that place

## Conclusions continued

The framework proposed here for addressing the ESC considerations includes the following points

- Involved in the IM table there will be many agents or interests, some directly concerned with the share valuations generated in the financial system; many concerned with market transactions and valuations in the formal economy; but also some concerned with the informal and social economies, the groups and relationships outside the economy, and cultural traditions where valuations are not just non-monetary and non-economic, but inexpressible except through social context; and there will be voices purporting to represent the interests of the entities and verities of the ecological realities that humans must take as given
- Most of the activities at the margins of human settlements involve interventions through harvesting or discharges; these activities are governed by complex systems of formal and informal rules and incentives; but neither the activities nor the rules are beyond human influence. Formal market mechanisms, regulatory requirements and social relationships can all be shaped by conscious social decision. It is up to us to act.
- These margins involve many forms of wealth, many forms of capital. Both our guesses at the stock of resources and our estimates of the value of the current flows of services from them need to take account somehow of the significance of ecological services, social relationships and overall ecosystem integrity.

It is ironic that, as the ecoframe diagram illustrates, our information systems offer the richest detail about the stock market transactions and economic activities that in the end are least fundamental to our survival. When it comes to the natural wealth and ecological services on which life most directly depends, we are astonishingly unaware and—largely—incurious about the magnitudes involved.

Our information systems have developed in waves. Double entry bookkeeping systems developed to meet the needs of merchants and joint stock companies, and moved along with the rise of empirical science to create the starting point for industrialization (see Mary Poovey, *The Rise of the Modern Fact*, for a fascinating discussion). Attempts to develop the notion of national income and its components began more than one hundred years ago, but had to wait for the Keynesian macroeconomic model to provide the organizational framework for a consistent macroeconomic model on which a consistent system of national accounts could be built to command international agreement on reporting practices. Through the process, a number of controversial conventions became so embedded that protests about the anomalies were for a long time relegated to the fringes. More recently the campaigns of observers like Marilyn Waring (*If Women Counted*) or Hazel Hendereson have been taken more seriously. In the 1960s, social indicators movements developed in many places, resulting in efforts to develop somewhat broader measures of welfare or wellbeing in order to counter the tendency to use available numbers (like gross domestic product estimates) to measure 'progress' in ways for which they were never intended, with significantly perverse results. The growing effort to find more appropriate estimates of social progress developed new momentum as efforts to relate national accounts to measures of economic welfare led to popular initiatives such as the Genuine Progress Indicator or the Human Development Index or the Indicator of Sustainable Economic Welfare which attempt to take into account the depletion or depreciation of asset base that is associated with ecological degradation or loss of community health. Many of these initiatives do attempt to deal with distributional concerns in some fashion. But major assessment efforts such as the Millennium Ecosystem Assessment initiative have abandoned the attempt to add up the various component indicators into a single index number (in part because everything depends on the highly subjective choice of weights used to construct the aggregate).

## Onward

This quick review suggests where some information bases and analytical foundations for decision might be built. It seems that there might be scope for some organization (DFO?) to lead in the development of a continuing consortium in which available knowledge resources could be integrated and mobilized—beginning first with federal agencies?

It remains to consider how and where appropriate deliberative processes might be located and launched. Many existing processes have been identified. Any integrated management body must consolidate and build on these.

There are many examples of attempts to date, in a variety of settings, to develop frameworks of objectives and to interpret them in the concrete setting of particular places. To move forward demands moving on with procedures and governance mechanisms

Adaptive management is about learning. What is needed now is to build, along three oceans, learning communities that span not just that ocean and the many communities that border it, but the borderlands in which all those communities interact and engage each other.

It is worthwhile repeating that this conclusion that we need to move on with learning communities, deliberative processes and mechanisms (nested institutions?) for devolved decision-making is not at all a recipe for a quiet life. Cultural, linguistic and intergenerational barriers ensure that evidence will be interpreted very differently and employed very differently as a foundation for advocating very different actions relating to issues touching the foundations of human existence. Resolution of these differences and differentness can not be expected. The key is to ensure that some resolution of the we/they distinctions can be achieved, that continued participation can lead away from situations where 'we/they' turns into friend/enemy in ways that demand conflict, and move toward friend/adversary distinctions in which adversaries can be respected, and advocacy of differing actions can be tolerated. What is crucial in that setting is to develop procedures that command continuing loyalty even by those who see their adversaries prevail on some occasions.