ROUND 1 SUMMARY
Social Values of Ecosystem Services and Resource Uses in the Coastal Zone
Title of the study: Mapping Social Values of Coastal Use relative to Ecosystem Services

This report contains the Round 1 survey results summary. For each of the three survey questions, results are described and the key messages are presented. In total, fifty-eight coastal ecosystem service experts from over a dozen countries completed the survey (45% response rate).

QUESTION 1: *List and describe the four most important issues or controversial resource uses facing contemporary coastal and marine management and policy.*

Results: Through content analysis thirty-six contemporary coastal management and policy issues were identified. Their importance is established by the frequency in which they appear in the survey response data. The frequency tabulation (number of references to each issue) was independently completed by two researchers. The inter-coder reliability, that is, the congruency between the two independent tabulations, was 87% (satisfying the most stringent measure of reliability). On the basis of this tabulation, the issues are ranked and the top twenty-two issues (60%) are identified (Table 1). Key concerns regarding each issue are also described. The remaining fourteen identified issues are also listed.

Table 1 – Question 1 Summary: Contemporary Coastal Issues (in rank order)

1. **Fisheries Overharvesting:** Rate/method of harvest considered unsustainable; issues include: uncertain stock assessment, tragedy of the commons, regulation enforcement, and habitat loss/degradation.
2. **Coastal Development:** Global migration toward coastlines coupled with population growth has increased building and associated infrastructure expansion; issues include: stormwater runoff from impervious surfaces, settlement in hazard prone areas, loss in ecological resilience, and habitat destruction.
3. **Pollution:** Proliferation of coastal development (see issue #2) has caused increases in point and non-point source pollution; noted sources include: fertilizer, trash/litter (marine debris), oil spills, sediment, sewage, industrial waste, and pesticides.
4. **Competing Interests/Resource Uses:** Competition for finite resources from industry, government, and local stakeholders; issues include: public vs. private interest, conflicting uses (i.e. commercial vs. recreational fishery), and the ongoing debate between conservation and development.
5. **Sea Level Rise:** Advances in the understanding of the potential impacts has outpaced adaptation to predicted changes of consequence to natural and built environments along the coastline; issues include: property rights, public access, coastal erosion, habitat shifts, and lack of mitigation investment.
6. **Sectoral Management:** Outdated laws and regulations coupled with the influence of political climates on the integration of science-based ecosystem management/policy has created an environment of disparate operating frames in coastal and marine decision making; issues include: lack of international cooperation, and competing national vs. local mandates.
7. **Habitat Loss:** Occurring as a result of both natural (i.e. erosion) and anthropogenic (i.e. shore development, boating) factors; issues include: sea level rise (see issue #5), loss of ecosystem resiliency, ecological alteration (natural and human-induced), and pollution (see issue #3).
8. **Oil/Gas Exploration:** Continually expanding efforts into increasingly difficult and fragile environments (i.e. deep sea drilling, arctic expansion); issues include: enhanced subsidence, increased dredging, and pipeline construction (along with other transport infrastructure).
9. **Climate Change:** Impacts beyond those resultant of sea level rise (see issue #5); issues include: increasing frequency/strength of hazard events (i.e. storms), changing hydrologic cycles, and altered habitat/biodiversity structures.

10. **Public Education:** The increasing investment and need to educate stakeholders at all levels of society regarding coastal science and management/policy practices; issues include: conveying scientific uncertainty, enhancing public trust, and translation of technical knowledge.
11. **Alternative Energy:** Increasing development/expansion (wind, tidal, solar, etc.) in the coastal zone requires better understanding of associated benefits and costs; issues include: aesthetic impacts, adverse habitat/species effects, regulatory hurdles, and public education (see issue #10)
12. **Freshwater Inflow:** Overexploitation of ground and surface water due to development in coastal areas (see issue #2); issues include: saltwater intrusion, changes in freshwater delivery regimes to wetland/estuarine ecosystems, and subsequent alteration to species composition.
13. **Biodiversity:** Large scale ecosystem change in coastal areas (natural and anthropogenic) leading to significant declines in species variety and abundance; issues include: overexploitation, development, habitat loss, and climate change.
14. **Shore Hardening:** Increasing coastal development (see issue #2) resulting in property protection via elimination of natural buffers (i.e. mangroves, accretion/erosion); issues include: species impacts (e.g. sea turtle nesting), habitat loss/ degradation, and high cost of artificial nourishment (and lack of effectiveness).
15. **MPA Management:** Disparate strategies/frameworks, lack of enforcement, and issues of jurisdiction causing variable effectiveness; issues include: public misconceptions, tragedy of the commons, and absent consideration of associated socio-economic impacts.
16. **Water Quality:** Increasing degradation of upland inflow coupled with development (see issue #2) and pollution (see issue #3) with wide ranging negative effects on coastal ecosystems; issues include: high cost of pollution control, nutrient over-enrichment, and unsustainable growth strategies.
17. **Public Access:** Shifts in natural coastal environments coupled with expanding private shoreline ownership/development has served to limit customary access points to general population; issues include: need for public/private planning, assurance/regulation of shoreline access, and control of restrictive development.
18. **Wetland Loss:** Development pressure (see issue #2), pollution (see issue #3), sea level rise (see issue #5), and decreasing freshwater inflow (see issue #12) all contributing to accelerating loss rates.
19. **Beach Nourishment:** Concerns over cost, effectiveness, impact, and sustainability of practice; issues include: who should pay, economic/ecological feasibility, and frequency of nourishment.
20. **Enforcement Efficacy:** Existence of laws and regulations does not assure adherence, seen at all levels of policy from international to local; issue include: deficient personnel, minimal prosecution, and unsustainable harvest designations.
21. **Resource Capture:** Business interest driving coastal politics and decision making resulting in unsustainable practices and large-scale negative ecological impacts; issue include: tragedy of the commons, overharvesting (see issue #1), and lack of enforcement (see issue #20).
22. **Unsustainable Management/Policy:** Decisions making based on short term gain without consideration of long term implications; issues include: resource capture (see issue #21), lack of enforcement (see issue #20), and reactive vs. proactive planning.

Other Identified Issues: Erosion; Eutrophication; Lack of Consistency in Shoreline Designation; Lack of Funding for Coastal Management; Loss of Cultural Resources; Mariculture Impacts; Ecosystem Service Valuation; Hazard Mitigation; Lack of International Cooperation; Lack of Social Science in Coastal Management/Policy; Issues of Management/Policy Scale; Nutrient Loading; Population Growth; and Sedimentation

In reviewing these issues, a set of issue categories naturally emerge: Category A – issues related to coastal/marine development, Category B – issues related to coastal ecology, and Category C – issues related to coastal management. Though the categories, and indeed the issues within each, are not mutually exclusive, they allow us to consider the issues from a different perspective.

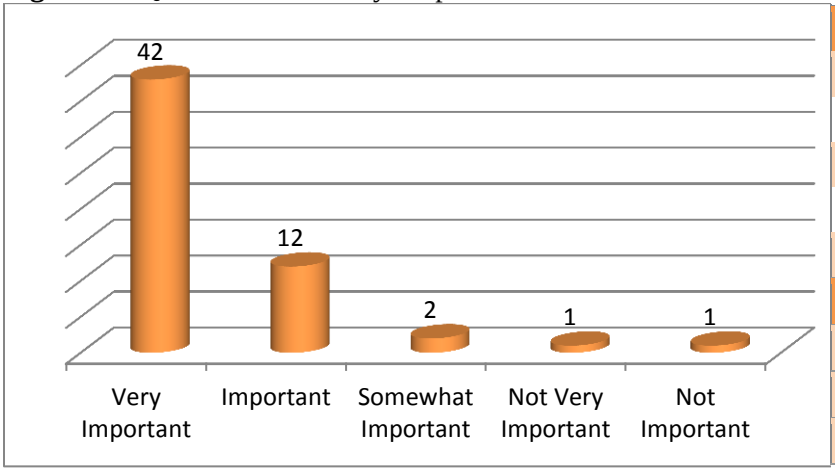
Table 2 – Contemporary coastal issues by Category (see Table 1 for issue definitions)

Issue	Rank Order
Category A – Issues related to coastal/marine development	
Coastal Development	2
Habitat Loss	7
Oil/Gas Exploration	8
Alternative Energy	11
Shore Hardening	14
Public Access	17
Lack of Consistency in Shoreline Designation	25
Loss of Cultural Resources	27
Population Growth	35
Category B – Issues related to coastal ecology	
Fisheries Overharvesting	1
Pollution	3
Sea Level Rise	5
Climate Change	9
Freshwater Inflow	12
Biodiversity	13
Water Quality	16
Wetland Loss	18
Beach Nourishment	19
Erosion	23
Eutrophication	24
Mariculture	28
Nutrient Loading	34
Sedimentation	36
Category C – Issues related to coastal management	
Competing Interests/Uses	4
Sectoral Management	6
Public Education	10
MPA Management	15
Enforcement Efficacy	20
Resource Capture	21
Unsustainable Management/Policy	22
Lack of Funding in Coastal Management/Policy	26
Ecosystem Service Valuation	29
Hazard Mitigation	30
Lack of International Cooperation	31
Lack of Social Science in Coastal Management/Policy	32
Management Scale	33

QUESTION 2: *How important is it for ecosystem service valuation to be inclusive of social values alongside traditional metrics of economic and ecological values?*

Results:

Figure 1 – Question 2 Summary: Importance of Social Value Assessment



Answer	Response
Very Important	42
Important	12
Somewhat Important	2
Not Very Important	1
Not Important	1
Statistic	**Value**
Mean	1.43
Variance	0.66
Standard Deviation	0.81

A majority agree that it is very important for ecosystem service valuation to be inclusive of inherent social values alongside economic and ecologic value metrics (Table 3). However, the analysis also reveals that social values of ecosystem services are still cloaked in conceptual vagueness; there appears a lack of clarity about what social values are with regard to contemporary conceptions of ecosystem services. Pertinent questions include: how to measure the social values of ecosystem services, what it means for assessment to be inclusive of inherent social values, who is required to consider them in decision making, and when to do so. On one end of the response spectrum, some contend that valuation of ecosystem services is a futile practice without equitable inclusion of all the value types – economic, ecological, and social. Others argue that social values are indeed the most important factor to consider within decision making frameworks and stand as the least developed in terms of their ability to be quantified (relative to economic and ecologic valuation paradigms). And at the other end of the spectrum, participants make clear that while social values are an important element in valuing ecosystem services they are either not as important or serve as an input to economic and ecologic assessments. This spectrum confirms the need to clarify what is meant by "social values of ecosystem services" and how it is to be defined and measured in coastal management and policy.

Table 3 – Question 2 Summary: Representative Comments

Very Important 72%

"An inability to quantify and articulate simple, market-driven, economic values for ecosystem services and the associated social values handicaps policy and funding discussions at local, state, national and international levels."

"It is not easy to attach a monetary value to the benefits nature provides us with. However, it is even more difficult to explain the social values attached to each ecosystem service. These are necessary for several reasons. First and foremost, we need to inform our stakeholders of the importance of ecosystem services and to do that we need to make them understand what the social values are. Also, social values would be of utmost importance for natural resource managers in their decision making process."

"Several of the issues impacting on ecosystem services stem ultimately from human behaviour and social values. Any 'solutions' that ignore this element are leaving out an important part of the picture - social values need to be considered as (i) a potential part of the solution to issues we face, and (ii) as a root cause of the problem too. It is also unethical to ignore social concerns while prioritizing ecological and economic dimensions - sustainability is, after all, also about people's wellbeing."

"The very concept of ecosystem services is rooted in social values so to leave them out makes the measurement of ecosystem services using only economic and ecological values less comprehensive and thereby, less meaningful. In fact, if all value is reduced to economic, there are a number of critical services that may be lost entirely. Moreoever, if we are actually interested in the values humans place on ecosystems, then we actually need to take an inclusive approach to how humans value things. While social values are certainly more complex to quantify, this is no reason to reduce all human value to economic. People and society, as a whole, is far more complex. Our valuation should reflect this complexity."

"Traditional methods of valuing coastal ecosystems have concentrated on economic worth. It is very important to develop social metrics so that these resources can be assessed in a way that includes their intangible, as well as tangible value."

"Nothing can exisit in isolation. Whenever ecosystem services are discussed, we have to be cognizant to one of the most important part that is the social values. Though economic and science are great, if the social values are not incorporated, it is not wholesome."

Important 21%

"Ecosystem valuation is important, but a difficult concept for the general public to grasp. Having accurate assessments of ecosystem values helps decision makers with funding allocations and decisions regarding use patterns. Social values estimation must be done as well. But the quantitative methods used must provide for comparable estimates and must be done in a manner that does not encourage bias and overestimation. The latter issues are a common problem."

"Social values can often drive decision-making in directions that are counter to best solutions. Lack of accounting for social values can destroy resources vital to community and resident functions in favor of outside speculation."

"The social value provides the selling point to everyone not receiving either an economic or environmental benefit. It provides a broader based ownership of the services provided."

"Social values are an important consideration with ecosystem valuation, particularly during project planning, however social values are difficult to use in project ranking. Therefore social values become qualitative considerations rather than quantitative economic considerations or ecological values that often are reduced to quantitative values. If social values can be defined and then normalized in some manner to economic and ecological values project planning would benefit."

Somewhat Important 3%

"I consider the social values to be somewhat important, instead of very important, because they are much harder to quantify, and enter into the decision-making process with much less impact. That is, decision-makers, regardless of the strength or time spent discussing social issues, tend to make decisions based largely on perceived or real cost-benefit ratios."

Not Very Important < 2%

"While social values can be important, ultimately I think the ecological values to a degree, but more importantly, the economic values will adequately capture this. If coastal resources are valued for aesthetic reason and represent a social value of entertainment or enjoyment, then society will place more value on more enjoyable resources and the economic indicators realted to how people choose to use those resources will reflect that. Restated simply, I believe the social values are inputs to the ecological and economic values and need not be broken out."

Not Important < 2%

"Economic and ecological values are not well defined or there are no broadly accepted methods for computing them - at least no method accepted by the public or managers outside of the "valuation" community. So we can't even agree on metrics for relatively objective things, how can we possibly agree on soft, social value metrics and valuations. Therefore, we should remove the social value issue completely from the ecosystem services valuation process and have a separate system, such as democracy."

QUESTION 3: *List and describe up to four social values of ecosystem services specific to coastal and marine contexts.*

Results: Through content analysis nineteen social values of ecosystem services in the coastal zone were identified. Their importance is established by the frequency in which they appear in the survey response data. The frequency tabulation (number of references to each issue) was independently completed by two researchers. The inter-coder reliability, that is, the congruency between the two independent tabulations, was 93% (satisfying the most stringent measure of reliability). On the basis of this tabulation, the issues are ranked and defined using an aggregate of response descriptions (Table 3).

Table 3 – Question 3 Summary: Emergent Typology of Social Values of Ecosystem Services

1. **Recreation:** Provision/context of favorite/enjoyable outdoor recreation activities.
2. **Aesthetic:** Provision/context of enjoyable scenery, sights, sounds, smells, etc.
3. **Cultural:** Place for passing down the wisdom, knowledge, traditions, and way of life of my ancestors.
4. **Spiritual:** Sacred, religious, or spiritually special place where reverence and respect for nature is experienced.
5. **Economic:** Provision of fishery (commercial/recreational), minerals, and tourism industry that supports livelihoods.
6. **Identity:** Spaces that engender a sense of place, community, and belonging representing shared values, goals, and pride that contribute to individual and group identity.
7. **Intrinsic:** Right to exist regardless of human presence, value based on existence (being rather than place).
8. **Life Sustaining:** Macro-environmental processes (i.e. climate regulation, hydrologic cycle, etc.) that support life, human and non-human.
9. **Therapeutic:** Place that enhances feelings of well-being (e.g. "an escape", "stress relief", "comfort and calm", etc.).
10. **Learning:** Provision/context of educational value through scientific exploration, observation, discovery, and experimentation.
11. **Natural/Wilderness:** Spaces that are preserved in a state representative of minimal human impact, related to intrinsic (see value #7) and future (see value #12).
12. **Subsistence:** Provision of basic human needs, emphasis on reliable, regular food/protein source from seafood.
13. **Future:** Allowance for future generations to know and experience coastal ecosystems as they are now.
14. **Access:** Places of common property free from access restrictions or exclusive ownership/control.
15. **Biodiversity:** Provision/context of a variety and abundance of fish, wildlife, plant life, etc.
16. **Symbolic:** Places that represent the distinctive "culture of the sea", highly related to cultural (see value #3) and identity (see value #6).
17. **Historic:** Places of natural and human history that matter to individuals, communities, societies, and nations.
18. **Novel Experience:** Provision/context of unique, deep, and profound human experience unable to be replicated.
19. **Transportation:** Ease of personal, recreational, military, and commercial transport of people and goods.

In comparing the typology presented here to those formerly developed we find that fourteen (74%) have been previously noted. The five emergent concepts include: identity, access, symbolic, novel experience, and transportation. While these are not necessarily unique values found only in the coastal zone it is interesting to note their definitions relative to terrestrial environments as many would not translate very well to, say, forest environments from which most previous typologies have been developed.