Management decisions based upon the biodiversity portfolio approach, North Uist - UK

1. Policy Objective & Theme

- ADAPTATION TO RISK: Integrating coherent strategies covering the risk-dimension (prevention to response) into planning and investment
- SUSTAINABLE USE OF RESOURCES: Preserving coastal environment (its functioning and integrity) to share space
- SUSTAINABLE USE OF RESOURCES: Sound use of resources and promotion of less resource intensive processes/products
- SUSTAINABLE ECONOMIC GROWTH: Balancing economic, social, cultural development whilst enhancing environment

2. Key Approaches

- Integration
- Participation
- Knowledge-based
- Ecosystems based approach
- Socio-economic

3. Experiences that can be exchanged

A novel technique called the Biodiversity Portfolio Approach has been used for an assessment of the services provided by coastal environments with a view to providing new insights into management strategies.

4. Overview of the case

The island of Baile Sear was split into its constituent biomes and their services and threats were determined by stakeholder consultation. The approach proved useful to show the link between biodiversity and its threats and provided information helpful for management decisions.

5. Context and Objectives

a) Context

The area studied was Baile Sear and Kirkibost islands, north Benbecula, south Paibeil and the North Ford inlet sands of the Outer Hebrides in western Scotland. It included the marine up to 3km seawards and 2km landwards. It is a dynamic area of erosion and dune accretion/migration with inter-tidal areas.

In order to take ICZM decisions, via the planning process, ecological, social and economic factors need to be taken into account. However, there is still difficulty combining analytical techniques with planning instruments to achieve an approach that is broadly holistic and usefully quantitative. The local authority used the biodiversity portfolio method, an economic theory originally conceived for banks. The adapted method, which has been used previously at both national and local levels, splits an area into a number of biomes which can provide ecosystem services. However, this return is often associated with one or more risks or threats. The key dynamics are then based on the interactions of the biome components.

b) Objectives

The objective was to provide an assessment of the services provided by the coastal environment of Baile Sear as well as an assessment of the risks to these environments.

6. Implementation of the ICZM Approach (i.e. management, tools, resources)

a) Management

Comhairle nan Eilean Siar is the local authority for the region and responsible for implementing actions and policies that influence the long term sustainability of the islands. It worked in combination with staff at Aberdeen University to conduct the biodiversity portfolio analysis.

b) ICZM tools

Workshops were held in 2006 with stakeholders including residents, mostly crofters (agriculture); national government bodies, including SEERAD (agriculture) and Scottish National Heritage (conservation) and local industry (quarrying and local game estate). These determined the twelve biomes or ecosystem categories which reflected the local resource use and exploitation patterns. They included the machair, one of the rarest habitats in Europe, a type of dune pasture with a high shell content and the black lands, another internationally rare habitat of dark peaty soils used for sheep grazing.

The study looked at twelve ecosystem services. These were food production from agriculture; raw materials being sand, gravel, rock and peat extraction; nutrient and waste absorption from waste treatment; recreation & tourism; cultural & educational; flood protection & coastal defence; fishing; hunting (including angling); intertidal gathering (seaweed); renewable energy generation and land take. These services were rated from 0 (no service) to 3 (extensive service). A set of risks for each biome/service was also drawn up and the impact of the threat rated, similarly, from 0 to 3. They included erosion, flooding including sea-level rise, tourism impact, pollution, changing agriculture, overharvesting the marine etc. A risk-return profile was then determined by calculating the risks to the biomes and the returns of each biome weighted by the biome area. The results are ordinal numbers which have no units. Each value is then given as a percentage of all the values.

One further step is required. In order to manage a particular biome such that return is maximised but risk is reduced, the interaction between the biomes is needed. This is because the risk-return profile for a portfolio of biomes which respond differently to threats is lower compared to a portfolio with biomes that respond in the same way. The results of this methodology showed that only four biomes had substantial risk-return values, the black lands, the shallow waters, sandy inlets and machair.

The highest service values came from renewable energy, tourism and conservation with agriculture placed only 6th. This is interesting because it is not in accordance with traditional, economic thinking about agriculture. This may be because in the past, agriculture has not been compared to conservation services because of the difficulty of measuring such services in strict economic terms. The result can simply point to the fact that our traditional thinking about agriculture has been wrong. It may also be because this study looked at future, as well as current, services. This over-emphasised the importance of renewable energy since if only current services had been taken into account, renewables would have been 8th. However, one of the main advantages of ICZM is to take us to a forward thinking management process. The biggest risks are infrastructural development, pollution, flooding, saline intrusion and change in agriculture.

The methodology is helpful for making management decisions and setting priorities. The results show that in order to maximise return and reduce risk one management scenario would be to have an embargo on causeways and infrastructure development in shallow waters and on inlet sands. Another would be to use financial incentives to optimise agricultural activities particularly for the black lands and machair and cease grazing on the dunes.

7. Cost and resources

No information is available.

8. Effectiveness (i.e. were the foreseen goals/objectives of the work reached?)

This approach provides a valuable tool for examining the service return of a group of biomes and provides a basis for further discussion with stakeholders e.g. the relative placings of the different ecosystem services deriving from the different sectors under study e.g. conservation versus agriculture. This enables actual economic data to be studied to verify or otherwise the results, if available. The whole portfolio for Baile Sear is highly sensitive to the different threats.

9. Success and Fail factors

Good data is needed to make the assessment robust. The approach succeeds as a technique valuing multiple functions and uses because it is both holistic and specifically quantitative. Using a group of stakeholders who determine the values of the services and the risks avoids bias and gives a more representational viewpoint.

10. Unforeseen outcomes

None

11. Prepared by

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12. Verified by

It has not been possible to verify this case.

13. Sources

- Bio-folio: applying portfolio theory to biodiversity. (2004) Figge F Biodiversity and Conservation 13 827 (not available electronically)
- The Biodiversity Portfolio Approach to Coastal vauation in ICZM: A case study from Baile Sear, North Uist, Scotland (2007). M. Carlisle (university of Aberdeen) & D. Muir (Comhairle nan Eilean Siar).

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the Biodiversity Portfolio Approach to Coastal Valuation (609.38 KB)