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The ocean provides countless ecosystem services. The Millennium Ecosystem Assessment describes ecosystem services as “the benefits people obtain from

have cultural significance) are on much the same footing as the other material that humans take from the sea, and may well have market value (see Chapter 8). However, even marketed objects of cultural significance have an added dimension that may well not be captured by the market. This is particularly the case where the cultural value lies in communal self-identification through sharing in the activity that wins the cultural objects (such as communal whale-hunting in the North-East Pacific or the Faeroe Islands). Other cultural ecosystem services stand outside any market: for example, the cultural/religious values that are obtained by having access to the sea during rituals, through the existence of special, sacred places, the cultural values that lie in the enjoyment of the seascape or watching the beauty of seabirds, marine mammals or corals and the knowledge that comes from underwater cultural heritage.

To mention value is almost inevitably to raise the issue of quantification: comparing values and assessing trade-offs require some idea of the relative sizes of what is being compared. There are many ways of measuring the benefit that humans derive from ecosystem services from the marine environment. "Consuming an ecosystem service" can cover all facets of deriving benefit from some aspect or aspects of the marine environment. It can, for example, include the way that, in some countries, houses enjoying a view of the sea can command higher prices than identical houses without such a view. It is not therefore easy to delimit the scope of what are the values that need to be taken into account. This is particularly the case with cultural values.

Looking only at economic valuations of the marine environment, one library among many contains nearly a thousand such valuations, with nearly twice as many valuation estimates (MESP 2014). And economic valuations are not the only forms of valuation that can be made: social and ecological metrics can be equally significant, without necessarily being reduced to a single economic balance-sheet. Among the metrics that can be important for many different groups of stakeholders are:

(a) The net economic value (for example, the net economic benefits that those who enjoy an ecosystem service derive from it (consumer surplus), or the economic value that those who use some component of the marine environment derive from it (producer surplus). This kind of metric can be valuable when the economic services enter directly into commerce;

(b) The gross and net revenues in monetary terms that are gained by those who enjoy an ecosystem service, or use some component of the marine environment. Such metrics focus on the cash flows related to the ecosystem service, and can sometimes be more readily derived as a measure of changes in the enjoyment of an ecosystem service. This kind of metric can be valuable in many contexts of ecosystem services,

	price of marketed goods	goods (for example, houses or hotels with a sea view compared with those that do not)		generalize from this to broader coverage.
Travel cost	Travel costs people are prepared to incur to access a resource indicate a minimum value	Recreation sites (for example, some marine protected areas)	Tourism	Technically difficult. High data requirements.
Contingent valuation	Ask survey respondents directly for willingness to pay for ecosystem service	Any ecosystem service (most widely used for non-market ecosystem and services)	Tourism	Expensive to implement because of survey costs. Vulnerable to many sources of bias and requires careful survey design.
Choice modelling	Ask survey respondents to trade off ecosystem services to elicit their willingness to pay	Any ecosystem service (most widely used for non-market ecosystem and services)	Tourism	Expensive to implement because of survey costs. Vulnerable to many sources of bias and requires careful survey design.
Methods using data not specific to the particular issue				
Benefits transfer	Value transfer: Use values estimated			

consequences of those changes can be seen to be massive. A good example of this is the El Niño Southern Oscillation

market-price, production-

transport, telecommunications cables, leisure and recreation, military defence, fisheries, aquaculture, water abstraction, mineral extraction, renewable energy, coastal defence, waste disposal, education, power transmission and storage of gases. For most of these, an estimate was made of the gross value added, but for some it was only possible to estimate the money being invested in the process. The detailed workings of this exercise show the

cent when the multiplier effect on the rest of the economy is taken into account.

WAVES (2014). The WAVES Partnership
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