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MARINE ECOSYSTEM SERVICES ASSESSMENT OF ST. HELENA

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1. INTRODUCTION

1.1. Ecosystem services

The Millennium Ecosystem Assessment (MEA) established the concept of ecosystem services on the global agenda as the “benefits people obtain from ecosystems” (Millennium Ecosystem Assessment, 2005) and although ecosystem services are defined in a variety of ways (Balmford *et al.*, 2008; Costanza *et al.*, 1998; Defra, 2007) the common theme is the translation of ecosystem functions and processes into direct or indirect benefits for human wellbeing (Potschin & Haines-Young, 2011). The MEA identified four categories of ecosystem services: Provisioning services that supply material resources; Regulating services that control ecological systems; Cultural services that provide non-material aesthetic, spiritual and recreational benefits; and Supporting services that provide the basic ecological functions and structures that underpin all other services, such as primary production, biodiversity, oxygen production, soil formation and nutrient cycling (Millennium Ecosystem Assessment, 2005). In the context of the marine and coastal environment provisioning services include services such as fish and fertilizer; regulating services include natural hazard protection and climate regulation; cultural services include recreation and values associated with the land/seascape; supporting services underpin all the other services and include essential life support services such as nutrient cycling and primary production.

Since the concept of ecosystem services was first developed by the MEA there have been a number of frameworks that have been developed and tested to further describe the ecosystem service concept and attempt to show the complexity of connections between the components of the ecosystem and human-wellbeing (Balmford *et al.*, 2008; Fisher, Turner & Morling, 2009; Haines-Young & Potschin, 2010; Nahlik *et al.*, 2012; TEEB, 2010). There is a broad consensus that there is a need to build upon the MEA classification in order to distinguish between the core ecosystem processes that support beneficial ecosystem processes which in turn deliver beneficial ecosystem services in the form of material or non-material benefits for human well-being (Figure 1) (Balmford *et al.*, 2008). The most recent interpretation of the ecosystem services framework presents the concept of ‘final ecosystem goods and services’ (Figure 1). The term “final” is used to demonstrate the last link in the chain between the natural environment and the realization of a [human] benefit (Nahlik *et al.*, 2012). The “beneficiaries” are those who benefit from the ecosystem service whether by active or passive consumption (e.g. food) or simply through a general awareness or appreciation of the ecosystem service (i.e. clean water for recreation) (Nahlik *et al.*, 2012). The identification of final ecosystem goods and services through the identification of the beneficiaries is considered to be the most effective way of measuring, valuing and communicating what ecosystem services flow from the natural environment and to whom (Boyd & Banzhaf, 2007; Haines-Young & Potschin, 2010). Willingness to pay (or other such valuation techniques) to realise a market value for freshwater can ascribe a value to the ecosystem services.

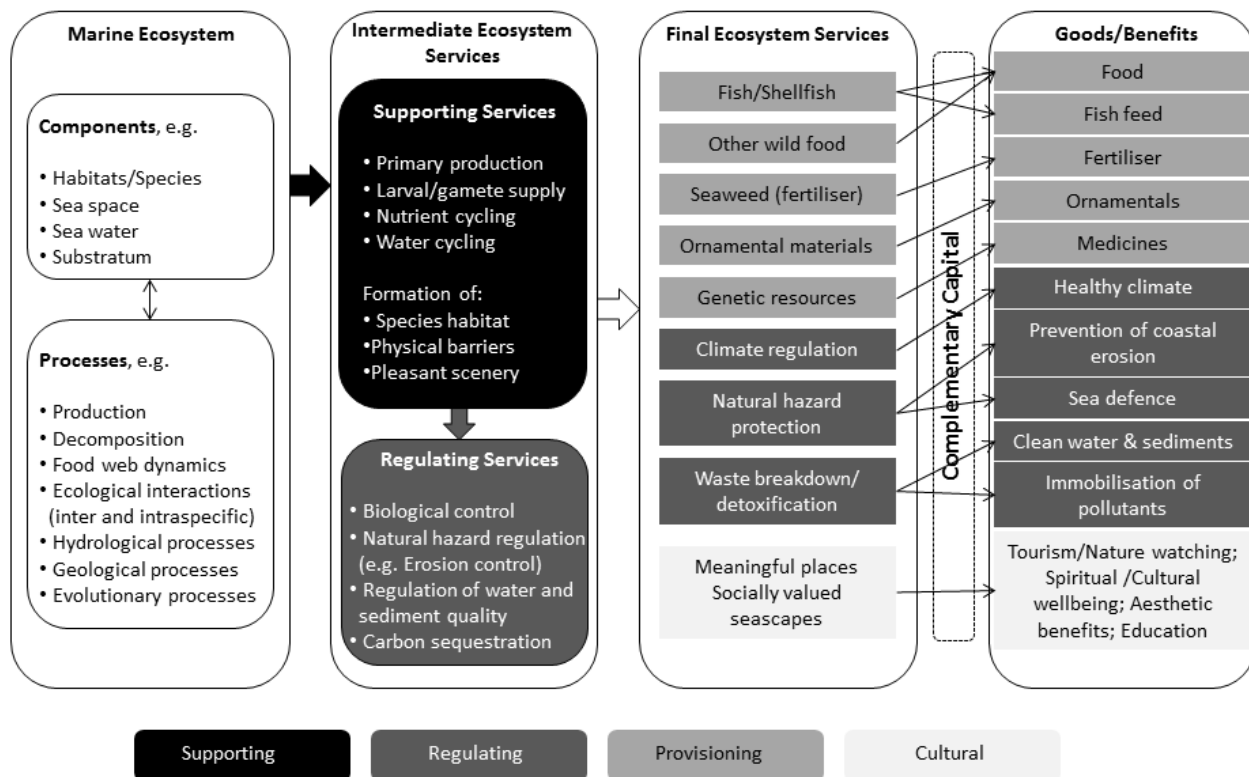


Figure 1 A conceptual model of coastal and marine ecosystem services. Source: from (Atkins et al., 2013) adapted from (Turner et al., 2013).

1.2. Ecosystem service assessments

The ecosystem approach demands that environmental, economic and social sustainability are balanced in the decision making process (Laffoley et al., 2004). The ecosystem approach recognises that humans are a key component of the ecosystem and therefore any management measures to protect biodiversity must focus on human use and interaction with the resource. The Government of St Helena is committed under Convention on Biological Diversity's (CBD) Aichi target 11 to contribute towards achieving 'by 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes' (CBD, 2010).

Linking biodiversity to ecosystem services, in that biodiversity underpins elements of human well-being through the provision of ecosystem services, is a didactically motivated interpretation that has served (very successfully) to draw attention to the need for global biodiversity conservation (Jax & Heink, 2015). However, the need to better understand the relationship between humans and the natural environment for policy and planning purposes at a much finer scale has meant that the ecosystem services concept has been transformed into an approach, an ecosystem service assessment. Ecosystem service assessments are now widely used as a decision support tool for marine policy and planning (Börger et al., 2014). Ecosystem

service assessments can serve to provide a more in-depth understanding of the links between the marine environment and the realisation of ecosystem service benefits. Additionally, the assessment method can also be applied to demonstrate how the ecosystem service delivery may change under different types of management (Pendleton *et al.*, 2015). The most recent experience suggests that ecosystem service assessments are most successful in influencing marine management when decision makers or stakeholders are involved (Pendleton *et al.*, 2015).

1.3. The current status of marine management in St Helena

The St Helena government recognises that the natural assets of St Helena support the well-being of the island residents and, if used sustainably, will provide the foundations for economic growth (St Helena Government, 2015). The St Helena Marine Management Plan has been developed by the Environmental Management Division of the St Helena Government. The plan makes provisions for the management of the entire 200nm Exclusive Fisheries Zone as an MPA under the IUCN protected area management category VI: Protected area with sustainable use of natural resources (St Helena Government, 2014). The goals and objectives of the plan are:

- To protect natural ecosystems and use natural resources sustainably, when conservation and sustainable use can be mutually beneficial;
- To conserve marine biodiversity and ecosystems, protecting in particular rare, endangered, globally significant and endemic species;
- To manage sustainably the marine natural resources of St Helena including fisheries and mineral extraction with minimum impact on species abundance, diversity and habitats;
- To manage marine tourism and construction in or near the marine environment to minimise impacts on the marine environment, especially in the face of increasing pressures with economic development;
- To safeguard benthic flora and fauna from the damaging impacts of bottom trawling;
- To protect the natural species assemblages by preventing the introduction of non- native marine species through management of marine species imports; and
- To promote education, nature appreciation and scientific research on the biological, geophysical and cultural values of the marine environment (St Helena Government, 2014).

The Marine Management Plan outlines a number of management strategies that balance nature conservation with sustainable use. A range of protection levels have been applied to zone activities within the broad MPA. This includes the designation of Lots Wife's Ponds as an IUCN category III (National Monument) to protect specific outstanding natural features and their associated biodiversity and habitats. Additionally, all islands around St Helena are designated as IUCN category Ia (Strict Reserve). These areas are set aside to protect biodiversity and geological/geomorphological features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values. Restrictions have been implemented for a range of activities that place a pressure on the natural resource. These include restrictions on fisheries (commercial and recreational); wildlife interactions; other wild harvesting; building and construction and; extraction. Provisions are made in the marine management plan for onward surveillance and enforcement and ongoing monitoring and evaluation.

The context for the management of St Helena's natural resources is set to change. The remoteness of the island has meant that resource use has (to date) been confined to local uses and a small number of visitors to the island. Alongside the continuing pressure from the long distance fishing fleets, the opening of the

first airport in May 2016 will enable access to the wider commercial markets associated with fisheries and tourism on St Helena. To support sustainable development it has been recognised, by the St Helena Government, that there is a key evidence gap in understanding the relationship between marine conservation, marine management measures and the social and economic benefits generated by fisheries and tourism. The purpose of this report is therefore to undertake an ecosystem service assessment that will build a common understanding of:

- The ecosystem services/benefits that flow from the marine environment of St Helena;
- The 'significance' of the ecosystem service to the local stakeholders; and
- The perceived level of 'sensitivity' of the identified ecosystem service to change.

2. METHODS

A workshop was held using the 'triage approach' designed by Pendleton et al (2015) which aims to improve the relevance of marine ecosystem service assessments to inform marine policy and planning. A full agenda for the workshop is included in Annex 1. The workshop was structured around the three key questions related to this report:

- i. What ecosystem services are provided by the marine environment surrounding St. Helena?
- ii. What is the significance of each of the ecosystem services provided by the marine environment surrounding St. Helena?
- iii. What is the sensitivity to change of each of the ecosystem services provided by the marine environment surrounding St. Helena?

The workshop was run using collaborative discursive methods in small and full group configurations. The workshop was attended by 15 participants representing a range of sectors with an interest in the marine environment of St Helena. Photographs of the results of the discussions were taken during the workshop and compiled into formal notes post-event. In addition, as an ice breaker exercise, a sceptic and believer exercise was undertaken in which participants, regardless of their actual views, were required to present arguments as either sceptics or believers in the importance of the sea to St. Helena. This exercise was useful as it brought into the open a number of arguments that are used to support or undermine the role of ecosystem services in marine management and which many participants may have held prior to the workshop (see Annex 2 for the results of this exercise).

3. RESULTS

3.1. Identification of ecosystem services/benefits and significance

Workshop participants identified 18 ecosystem service/ benefits that are linked to the marine environment in St Helena and also provided a rationale for inclusion along with more general comments (Table 1). Participants were also asked to rate the 'significance' of the ecosystem service to marine planning and management in St Helena. Significance was rated on a subjective scale of High (3), Medium (2) and Low (1) (also Table 1).

Table 1. Ecosystem Service Summary

Service / benefit	Assessment of significance	Rationale and/or comments
1. Carbon capture	None provided	This was identified as a service that is provided by the marine environment of St. Helena, but for which there is currently little understanding or data. It was therefore not possible to determine a significance.
2. Commercial fishing	High	Commercial fishing has an important contribution to the local diet. The monetary value of landings is considered to be limited compared to whole economy. The number of employees in commercial fishing is low in absolute terms but significant in proportionate terms. Fishing is important to local identity. It is also an important visual amenity of Jamestown harbour. There is future growth planned for the commercial fishing sector both in terms of making current fishing commercially viable as well as opening new grounds offshore (including the seamounts)
3. Sport fishing	Medium	Presently sport fishing is considered to have a limited contribution to the economy though catches supplement diet. It is recognised that sport fishing is a growth industry, particularly with the potential arrival of more tourists to the island. It must be noted that there is a difference between locals who go out sport fishing for recreation and to supplement diet who generally use their own boats and tourists who pay the marine tour operators to go out sport fishing.
4. Tourism	High	Expenditure on tourism services currently generates a significant contribution to local economy. Services include nature watching, nature interaction, nature tours. Swimming with Whale Sharks is particularly important. Tourism capacity is currently limited by access routes to and from the Island. Tourism is considered to be the number one future growth sector for the local economy. Sports fishing and scuba are focal points of tourism development.

Service / benefit	Assessment of significance	Rationale and/or comments
5. Recreation	Medium	Recreation is recognised as being important to the social and health well-being of population. The sea is the Island's playground. Most boat-based activities include payment to fishermen and or marine tourism operators. Includes: sailing, watersports, snorkeling, diving, spearfishing, etc.
6. Raw materials (Sand mining)	Low	The volume of sand extracted and its financial value is unknown. It is believed to be undertaken by one person on a part time basis. Marine sand is the main building material on the island.
7. Tradition and culture	High	Many traditional activities relate to the sea. These include activities such as rock fishing, beach parties, plo parties, fish fry ups, Mandy Thursday celebrations, and songs. The island culture and identity have also been forged by the sea.
8. Heritage (built heritage)	High	Heritage in human terms is important and is tied closely to tradition and culture on St Helena. There is a marine connection to global historic figures (Napoleon, Halley, Darwin, etc.) that is an important draw for tourism. St Helena's built heritage includes forts, harbours and wrecks. The Georgian architecture is of global significance. This service is not directly linked to the marine environment but provides an important, but indirect contribution to the local economy.
9. Spiritual	High	The spiritual role of the sea in St Helena was stressed significantly at the workshop. Benefits generated include: relaxation, health benefits, restfulness, connection with nature, watching the sea (especially when it is rough), rock fishing is not just about obtaining food, the sea is the setting for romantic liaisons, it provides space to relax and enjoy. Access to the coast is important to support this service. Watching the sea has mental health benefits
10. Water supply	Low	The overall maritime climate provides a cooler climate that stimulates rainfall. The majority of drinking water comes from boreholes.
11. Waste treatment	Medium	Sewage is discharged directly to the sea in Jamestown Bay. The marine environment dilutes this waste. Domestic refuse was previously dumped at sea but is now sent to landfill on the Island.
12. Renewable energy	None / Low	There is no marine renewable activity at present.
13. Desalination	Low	Is this an ecosystem service, although does depend on seawater?
14. Salt production	None / Low	Has taken place historically, but not at present.

Service / benefit	Assessment of significance	Rationale and/or comments
15. Nature watching	High	Included in tourism and recreation above.
16. Access / Transport	Medium	The sea in general provides access to St. Helena for the delivery of fuel, materials, food, and other resources. Some cultural sites on St Helena are only accessible by the sea.
17. Coastal hazard protection	Low	Sea cliffs prevent risk to population from wave energy. Marine vegetation also has a role in reducing wave energy.
18. Climate regulation	Low	The location of St. Helena in cooling trade winds offsets tropical location.

3.2. Identification of pressures and sensitivity to change

Workshop participants were asked the question, “How sensitive is each ecosystem service/benefit to change? Participants were also asked to qualify what might be the potential causes of change (positive and negative). A subjective scale of ‘significance’ was provided to guide respondents when considering the degree to which the ecosystem service/benefit is sensitive to change:

- **High (3):** The benefit is sensitive to external pressures and change in its significance will be large
- **Medium (2):** The benefit is sensitive to external impacts and change in its significance will be small. *Or* the benefit is robust and change in its significance will be large.
- **Low (1):** The benefit is robust and change in its significance will be small.

Workshop participants were able to identify ‘potential causes for change’ (pressures) and assign a sensitivity rating for the majority of ecosystem services (Table 2)

Table 2. Causes of change to the benefits / services

Service / benefit	Potential causes of change	Sensitivity
Carbon capture	<ul style="list-style-type: none"> • Climate change. 	Low (but limited data)
Commercial fishing	<ul style="list-style-type: none"> • Increased demand for local produce may encourage over-fishing. • Better stock assessment may generate better control on catches. • Over-fishing may reduce fish stocks. • Increased population generating increased demand for food. • Increase in health benefits from more fish in diet (trend is not towards fast food). 	High

Service / benefit	Potential causes of change	Sensitivity
	<ul style="list-style-type: none"> • Better control over export planning and business value. • Climate change may affect availability of key migratory species (up or down). • Over-fishing. • IUU fishing, Particularly around seamounts • Pollution and reduction in water quality. • Increased prices available on world market due to better access. • Foreign licensing. Catch may change due to favorable licensing for external / foreign fishing initiative. • Changes in available fish stocks. • Fishing regulation regime might affect fishing effort by inshore fleet. • Fishing methods might change. • St. Helena is dependent upon the existence of favorable ocean currents for a successful commercial fishery. Temperature affects fish stocks, including abundances in cool and warm waters. An increase in sea temperature could increase productivity, but productivity depends as much on mixing as it does on temperature. • Pollution from homes and boats affects bait catches for commercial fishing. • Storm water discharge is increasing as the island becomes more built up. Need to consider how this affects nutrients in the sea. • There is a risk from oil pollution. There are no facilities to deal with an oil spill. 	
Sport fishing	<ul style="list-style-type: none"> • Pool of clients may change in the future (fewer local people) • Increased regulation may affect demand. • Storm water discharge is increasing as the island becomes more built up. Need to consider how this affects nutrients in the sea. • There is a risk from oil pollution. There are no facilities to deal with an oil spill. 	High (medium)
Tourism and recreation (combined)	<ul style="list-style-type: none"> • Expected large increase in visitor numbers – estimate x3 current numbers (roughly 60-80 tourists per week/flight. Currently about 60 every 3 weeks via RMS. • Greater demand for marine tourism. • Unregulated tourism services (too many operators). 	High (very very)

Service / benefit	Potential causes of change	Sensitivity
	<ul style="list-style-type: none"> • Safety issues. • Positive economic development opportunities. • Conflict of interests between uses due to increased numbers of people and activities (e.g. jet-skiing, swimming, snorkeling, sports / commercial fishing). • Increased visits to offshore islands which will disturb seabirds. • Increased income for tour operators. • Increased nature watching trips will disturb target species which may result in loss of income for tour operators. • Caps on tourist numbers may support environmental protection but reduce financial opportunities. • Tourism offer to be based on quality not quantity. • There may be increased pressure to see the target of nature watching – pressure on vessels to go out more. • Licensing system for recreational boat fishing may reduce demand for it. • Degraded habitat due to overuse. No fish left, very scanty area. Boring dives. • Requirement for more tour operators. • Demand for a greater variety of water sports / marine based activities. • Too many tourists wanting to access the sea – scares mega fauna, ruins trips if there are too many operators / boats, bad reviews. • Conflict between tourism activities and local uses and traditions. • Theft of natural ornaments and heritage items (e.g. from wrecks). • Environmental accreditation scheme for marine tour operators. • Storm water discharge is increasing as the island becomes more built up. Need to consider how this affects nutrients in the sea. • There is a risk from oil pollution. There are no facilities to deal with an oil spill. 	
Sand mining	<ul style="list-style-type: none"> • Increased sand extraction due to increased demand for new buildings, particularly post-airport and in light of development proposals. • More income for sand mining companies. • Loss of marine habitats. 	Low (but limited data)

Service / benefit	Potential causes of change	Sensitivity
	<ul style="list-style-type: none"> Quantity of extraction is uncertain as is its impact on the seabed. Aggregate from crushed glass decreases demand for sand extraction. New and different methods of construction may reduce demand for sand – particularly wooden structures. 	
Tradition and culture	<ul style="list-style-type: none"> Change in lifestyles due to economic growth. Increased cultural activity due to interest from tourism. Walking trails being removed or blocked so people cannot fish where they used to. Related to coastal development and access changes. Changes in lifestyle. Younger people not interested in learning about traditional ways of fishing. Skills dying out. Resort development at the coast. Rejection of traditional culture by youth. Outside influences and a broader range of lifestyle choices undermine traditional activities and culture. Technology promotes loss of culture. Include traditional marine activities in the school curriculum. Pressure from outside to include other cultures in traditional activities. Migration of local people off the island dilutes local culture. With improved income, the appeal (and need) for traditional activities (e.g. rock fishing as a form of food supply) is reduced. The erosion of traditional culture is partly a practical consequence of no longer needing to do 'traditional' activities. Rock fishing has changed from a subsistence activity to a relaxation activity. 	High
Heritage	<ul style="list-style-type: none"> Increased pressure on heritage resources (e.g. through greater visitor numbers). Lack of resources to put in place effective heritage protection measures. National Trust of SH has limited resources to do this. 	High
Spiritual	<ul style="list-style-type: none"> Development of the coastline may reduce access to coast which may reduce spiritual uses. End of RMS. Modernization of the island. 	Medium (High)

Service / benefit	Potential causes of change	Sensitivity
	<ul style="list-style-type: none"> • Infrastructural change – driven by tourism – but infrastructure needed by residents too. • Busier lifestyles. • Destruction of key locations and environments through – for example: major pollution incident, rock fall, disease, human destruction. • Nowhere to easily sit and be spiritual with the sea. • More people focused wharf in Jamestown will increase well-being value of the waterfront. 	
Water supply	<ul style="list-style-type: none"> • Pollution – including sewerage. • Current debate about future of sewerage treatment – new sewage treatment plant, or extend the pipeline to move the sewerage further offshore. • Impact of pollution on inshore activities. • There is a risk from oil pollution. There are no facilities to deal with an oil spill. 	Medium
Waste treatment	<ul style="list-style-type: none"> • <i>No comments received during workshop.</i> 	Low
Renewable energy	<ul style="list-style-type: none"> • Island demand for cheap energy sources. • Growing human population. • Desired reduction of reliance of fossil fuels imported by sea. • Desired reduction in risk from fossil fuels (e.g. oil spill). • Potential risk to ruin views due to renewable infrastructure. 	Medium
Desalination	<ul style="list-style-type: none"> • <i>No comments received during workshop.</i> 	Medium
Salt production	<ul style="list-style-type: none"> • NA 	
Nature watching	<ul style="list-style-type: none"> • <i>Within tourism and recreation.</i> 	
Access	<ul style="list-style-type: none"> • NA 	
Coastal erosion protection	<ul style="list-style-type: none"> • NA 	
Climate regulation	<ul style="list-style-type: none"> • <i>See carbon storage.</i> 	
Transport	<ul style="list-style-type: none"> • NA 	

3.3. Exposure to risk

The framework presented in Table 3 presents a rating that combines the workshop participants scoring for the subjective assessment of the significance of the ecosystem service to St Helena with the subjective rating for the sensitivity of the ecosystem service to pressures (positive and negative) (Table 3)

Table 3. Significance and sensitivity of marine ecosystem services of St. Helena

	Assessment of significance	Sensitivity of service	Exposure to risk
Service / benefit	A	B	A+B
Commercial fishing	High	High	6
Tourism	High	High	6
Nature watching	High	High	6
Tradition and culture	High	High	6
Heritage (built heritage)	High	High	6
Spiritual	High	Medium	5
Sport fishing	Medium	High	5
Recreation	Medium	High	5
Water supply	Low	Medium	3
Waste treatment	Medium	Low	3
Renewable energy	Low	Medium	3
Access / Transport	Medium	Low	3
Salt production	Low	Low	2
Carbon capture	Low	Low	2
Raw materials (Sand mining)	Low	Low	2
Coastal hazard protection	Low	Low	2
Climate regulation	Low	Low	2

The ecosystem services of commercial fishing tourism, nature watching, tradition and culture and heritage (built heritage) are considered by workshop participants to be at the highest risk of ‘change’ as St Helena moves towards a new future which involves increasing access to the global population and markets. Some key points were raised at the workshop with regards as to how to deal with the complexity of change over the coming years. Key policy questions raised by the workshop participants associated with ‘change’ include:

- How to make cultural and traditional activities a selling point for St Helena?
- How to forge links between education and culture?
- How to generate ‘whole population’ benefits?
- How to make learning ‘Grandad’s skills’ a business opportunity?
- How to overcome the chicken and egg situation regarding managing heritage (and all other) features for tourism before the income from tourism has been received to pay for the management/protection?
- How to deal with the threats of not managing the benefits properly?

- When, how and what to regulate?
- Is it possible to identify win-win scenarios for environment, society and ecology?
- How to understand weaknesses in the ecosystem and to know its vulnerabilities?
- What is the value of the marine environment as an 'asset'?
- How to trade-off between competing uses?
- How to retain the 'benefits' for the local population versus foreign investment?

4. CONCLUSIONS

The first ecosystem services assessment workshop convened on St Helena has revealed that there is a high level of awareness of the links between the marine environment and ecosystem service benefits realized by the local population. Clear pressures have been identified along with a prioritization of ecosystem service benefits that require immediate attention before the influx of new visitors that will arrive with the opening of the airport in 2016. Stemming from the workshop is an overarching message from participants to instigate the research and management measures to protect local access to resources and the cultural and spiritual ties to the ocean. It was also clear from the workshop that there are certain ecosystem services that are of high significance to the people of St. Helena and but which are at high risk of change.

The second phase of this project commencing in March 2016 will be to begin a process of ecosystem valuation in order to further this process to:

- Determination of the critical pathways (and interactions) between the ecosystem and the ecosystem service benefits for those ecosystem services identified as being at most risk from change.
- To provide baseline values monetary and non-monetary where possible
- To identify sustainable use thresholds for future management.

5. ANNEX 1: WORKSHOP PLAN

Workshop Plan Monday 28 September 2015

Timing	Element of the workshop
9:00-10.00	Introduction <ul style="list-style-type: none">• Liz to welcome everyone and give a brief overview of the Darwin+ project.• Then handover to SF to welcome everyone to the workshop. Give a brief overview of the aim of the day. Thank you for giving up your time. Introduce myself.• Before we get into the detail of the workshop, it would be helpful to know everyone's starting point today.• Name, Role, 3 words that connect you to the sea, what you want to get from the workshop.• After introductions, SF to give an overview of ecosystem services in a very overview kind of way.
10.00-10.20	Break
10.20-12.00	How, if at all, is the sea important to St. Helena? <ol style="list-style-type: none">1. Ask people to do this individually and write answers on cards. Stick them on to the board. Agree our terminology: call each important factor a BENEFIT. Ask them also, to identify which part of the sea the benefit depends on. This might be difficult for some benefits, but for others it will be possible to identify specific species and/habitats. But as specific as you can.2. Place benefits down the middle of the board and the link to the sea on the left. Leave space on the right. Once all the cards have been pinned up, go through the list filling any gaps.3. As workshop about what would be a good unit of measurement for each benefit. How would we know if the benefit is changing? Do this as a full group discussion. Ask also who would be a good person to talk to about this some more.<ul style="list-style-type: none">• What data is available?• Who holds the data?4. Significance rating. Give each participant three imaginary ticks. Indicate which of the benefits on the board is most significant. Come up to the board and give a tick.
12.00-1.00	lunch

Timing	Element of the workshop
1.00-3.00	<p data-bbox="370 279 651 312">Sceptic and advocate</p> <p data-bbox="370 348 1414 552">To get us back in the swing of things, let's have a warm up – mentally that is! An exercise called sceptic and advocate. Sceptic says that the sea is not important to St. Helena – worst thing ever! Advocate thinks the sea is the key to the sustainable management of the marine environment. Pair up with a person opposite you and adopt one of the roles – for 5 minutes try to persuade the other person that your viewpoint is correct.</p> <p data-bbox="370 588 1446 686">SF to note the main points each side states on a flip chart paper and put up on the wall. This is useful for thinking about some of the advantages and disadvantages of ecosystem services.</p> <p data-bbox="370 793 1192 827">What might cause the benefits provided by the sea to change?</p> <p data-bbox="370 863 1446 995">Work in small groups to discuss this. One representative of each small group to report back to the entire group. Identify which benefits are likely to change and why. What is the cause of the change? Then indicate which are most likely to change. Discuss the following two questions at the same time:</p> <ol data-bbox="402 1031 1446 1848" style="list-style-type: none"> <li data-bbox="402 1031 1446 1402">1. Is there anything that might cause the benefits to St. Helena from the sea to change? Change can be positive or negative. The causes of changes to benefits could be changes to the marine environment, or changes in use patterns, rules, laws, equipment, market, technology, new opportunities, etc. This will indicate the sensitivity of benefits to change. Go through the list and think about what might cause the benefits to change and why. The causes should be realistic and relevant to the future of St. Helena. For example, an increase in the benefit related to whale watching may arise from increased tourist numbers. The benefits related to seafood may decrease as ocean acidification becomes more serious. There could be general points, but try to relate them to specific benefits. <li data-bbox="402 1438 1446 1848">2. How sensitive is each benefit to change? – either positively or negatively? Once each group has gone through the list, identify the sensitivity of the change. Use the following framework: <p data-bbox="467 1577 1430 1848"> HIGH: Benefit is sensitive to external pressures and change in its significance will be large MEDIUM: Benefit is sensitive to external impacts and change in its significance will be small. <i>or</i> Benefit is robust and change in its significance will be large. </p>

Timing	Element of the workshop
	<p>LOW: Benefit is robust and change in its significance will be small.</p> <p>Questionnaire.</p>

5. ANNEX 2: SCEPTIC AND ADVOCATE EXERCISE

Arguments that the sea is not important to St. Helena (sceptic):

- Value of marine products is decreasing.
- Management is nonsense as the ocean is a free resource.
- Humans can get other food (not just fish).
- The sea is dangerous.
- Terrestrial ecosystems are more important.
- Travel by land and air is more convenient than travel by sea.
- The land is just better.

Arguments that the sea is important to St. Helena (believer):

- The sea provides important livelihoods.
- The sea provides relaxation and brings people into equilibrium.
- The sea contains endemic species.
- Provides food – tasty food!
- Culture and romance.
- Island culture.
- See more of the sea.

6. REFERENCES

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