



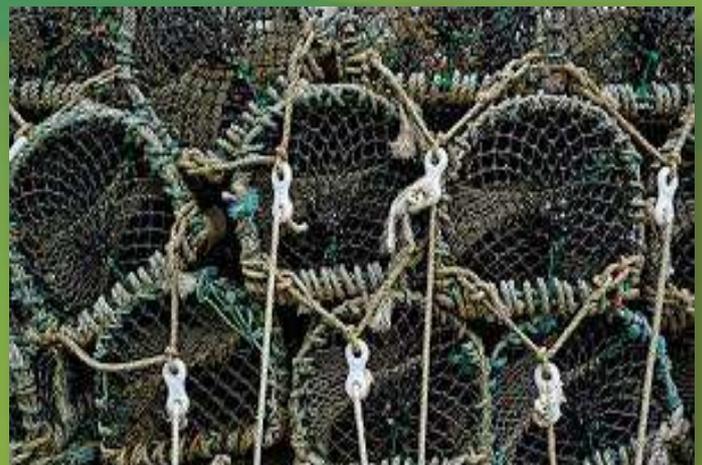
A LONG TERM VISION FOR THE NORTH DEVON MARINE PIONEER PROGRAMME

WORKSHOP REPORT

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North Devon Yacht Club, Instow

Report prepared by: Tara Hooper, Plymouth Marine Laboratory



Summary

The workshop was well attended, with 27 stakeholders present who represented a range of interests. The participants were asked to describe the main assets of, challenges to, and opportunities for, North Devon's marine area, to define the core values that should be reflected in management approaches, and to propose a series of goals for consideration under the Marine Pioneer Programme. Participants were also asked to imagine alternative futures in order to define storylines that described how drivers and activities affecting the marine environment would change under these different world views.

Several themes emerged repeatedly. North Devon's natural environment is highly valued and there is strong support for the continued protection and enhancement of biodiversity, with an particular emphasis on Marine Protected Areas. Understanding and managing the linkages between the land and sea was another important theme, particularly related to improving water quality and developing strategies for climate change mitigation. Challenges in communication, coordination and integration across activities were also recognised. The fishing industry has a high cultural value and an important role in tourism, but the sector requires support if it is to continue, particularly in terms of improving local markets for seafood. The need to maintain and improve sustainable fishing practices is also widely recognised, and solid foundations already exist through strong local organisations, voluntary measures already in place, and good working relationships with statutory agencies.

Existing partnerships between different stakeholders and a long history of collaborative working generally was another recurrent theme. The local community more widely, with its coherence, existing network of community groups and willingness to engage in voluntary conservation activities, was considered to be a significant asset. There was a strong desire amongst workshop participants to see more local decision making, including more local representation on decision making bodies and the development of regional fisheries management plans. To meet economic development challenges, workshop participants supported increased sustainable tourism and re-invigorated marine industries. The opportunities, but also the potential impacts, of new sectors such as aquaculture and renewable energy were also identified. Repeated reference was also made to the world class research base, and the opportunities provided by research programmes that were developing around the Pioneer.

1. Participation

Twenty seven stakeholders participated in the workshop, supported by eight representatives from the partner academic institutions. Participants represented a diverse group of interested parties:

- local fishermen and consultants (North Devon Fishermen's Association, Seascope);
- recreational users (Ilfracombe and North Devon Sub-aqua club);
- local projects, fora and Non-Governmental Organisations (Coastwise, Appledore Sustainable Fish, Lundy Field Society, Devon Maritime Forum);
- regional and national statutory agencies (Devon and Severn Inshore Fisheries and Conservation Authority, Natural England, Marine Management Organisation)
- larger Non-Governmental Organisations (National Trust, WWF, Devon Wildlife Trust)
- local councils and designated areas (North Devon Council, Torridge District Council, North Devon Coast Area of Outstanding Natural Beauty, North Devon Biosphere Reserve).

2. Important Features of North Devon's Marine Area

2.1 Method

The workshop began with three short, linked exercises in which participants worked individually. For each task, participants were given five minutes to write down their answers to a particular question. The three questions were:

- *Task 1: Assets*
What is it about North Devon's marine area that you value and want to maintain?
- *Task 2: Challenges*
What are the issues having a negative effect on North Devon's marine area?
- *Task 3: Opportunities*
What is going well and can be built on to maintain and improve North Devon's marine area?

There was no limit to the number of responses each participant could give, but they were asked to record each response on a separate sticky note. This was to facilitate a second stage, in which workshop facilitators grouped the responses to each question into themes. Participants were then asked to prioritise those themes that should be addressed by the Pioneer programme. To prioritise the 'Assets' themes, participants were given coloured stars that represented their first, second and third preferences. Each rank was converted into a score (first = 8, second = 4, third = 1), and summed to provide a total for each theme. For the 'Challenges' theme, participants were asked to allocate green dots to those challenges that should be prioritised, and red dots to those deemed out of scope of the Pioneer programme. These were again summed to provide a total weighting. No prioritisation was undertaken on the 'Opportunities' theme, as the purpose of this exercise was to identify the range of local strengths that could support any future Pioneer activities.

2.2 Assets

The five assets that scored most highly when ranked by the group were:

- 1) Species and habitats
- 2) Water quality
- 3) Sustainable fishing practices
- 4) Research
- 5) Mixed economy

In the following summary, the themes are indicated in *italics*, with the score from the ranking exercise given in parentheses. The description of each theme summarises key points from the text provided by participants on individual sticky notes. The themes are rarely discrete, but interact with one another and so the summary seeks to make some logical groupings. There are multiple possible interactions (with, for example, the seascape supporting both tourism and wellbeing of local people), which affects both the options for grouping the themes and also how the total ranking scores should be interpreted.

The importance to workshop participants of North Devon's marine *species and habitats (112)* was strongly emphasised by the much higher ranking score given to this theme. Participants valued the variety of habitats and made particular reference to estuarine habitats, including saltmarshes and mud flats, and their role in providing ecosystem services and habitat for birds. Reefs, rock pools and dunes were also mentioned specifically, as were fish nursery areas and wider fish ecology and fisheries interactions. Overall, the species and habitats of North Devon's marine areas were perceived as special, biodiverse and relatively unspoilt.

With its role in conservation and sustainable resource use, the *governance and protection* (8) of the marine area was a related theme. The strong and novel management techniques employed locally were valued (although not always specified), particularly marine protected areas (MPAs) of all types. The designation of the Biosphere and its role in the governance of the land-sea interface was also considered important by participants, as was protection given to individual species. *Lundy* (9), and particularly its Marine Conservation Zone (MCZ), was also valued.

Water quality (25) was only proposed as an asset by two participants, although the high score given in the ranking exercise suggests that the wider group also values the way that, to quote one participant, “Clean water supports many marine activities e.g. beach use, safe shellfish production.” The long history of marine *research* (17) and the current opportunities to participate in programmes such as fisheries surveys were also valued by participants as an asset supporting marine management.

Attempts to implement and ensure the continuation of *sustainable fishing practices* (23) and the active, long term involvement of local fishermen in these, were considered very important by the group, particularly efforts related to rays, with longlining and potting also mentioned. More widely, the role of the *fishing industry* (8) was also valued for providing a food source and for the cultural value derived from the continuation of a traditional industry.

Fishing was one component of North Devon’s *mixed economy* (16). *Tourism and recreation* (5) (particularly surfing, as well as sailing and swimming) was also highlighted as an asset, with the role of recreation, conservation and industries such as Babcocks in providing employment also mentioned. The local economy was perceived as diverse, balanced, and sustainable. A further asset was a newer economic sector, *renewable energy* (8), with reference made to the potential for exploiting tidal currents as well as wind and solar.

Assets that support tourism include the local, family-friendly *beaches* (1), the *accessibility* (5) of the coast and sea (particularly the South West Coast Path, and footpath and cycleway links), and the *seascape* (5). This was described as unspoilt, dramatic, distinctive and nationally recognised (through the Area of Outstanding Natural Beauty designation). The area’s *attractive villages* (0) and wider *maritime heritage* (4), particularly ship building, fishing and sailing were also valued. Access and recreational activities were highlighted as assets that are also relevant to the *health and quality of life* (2) of local people. In this theme, participants further identified assets including the fresh sea air, the rural feel, remoteness and tranquillity of the area, as well as people’s sense of place and connection to the sea. Beyond individual wellbeing, strong emphasis was placed on the social fabric of *local communities* (8), which were described as real working places, with a welcoming nature that were fundamental to local history and culture. *Community-environment links* (1) were also highlighted, including engagement with designated areas and the MPA process as well as the role of marine wildlife as a focus for community awareness. It was also noted that social connections are supported by a further asset of *facilities* (0) such as shops, cafés and pubs.

Sympathetic development (0) was identified as an asset, presumably referring to planning process which sought to maintain the rural feel and heritage, as was North Devon’s *strategic location* (0) and sea-borne interactions with the Bristol Channel, Wales and Ireland, although it was not clear whether this referred to movements of species or to human interactions such as fishing and sailing.

2.3 Challenges

2.3.1 Priorities for the Marine Pioneer

The five challenges that received the highest weighting from the group were:

- 1) Lack of awareness
- 2) Lack of funding/investment
- 3) Agricultural and sewage run off
- 4) Fisheries policy
- 5) Marine litter

As before, the themes are indicated in *italics*, with the group weighting given in parentheses.

Participants identified *lack of awareness (12)* of the environmental impacts of different activities, and a general lack of knowledge of the benefits of the marine environment, as a key challenge, highlighting that a lack of understanding of the environmental designations meant that people were not engaged in their protection. *A lack of funding and investment (11)* particularly for MCZ management, coastal communities, and the local fishing industry was a further major challenge, with the reliance on public funding and the economic challenges of austerity identified as important factors in this theme.

Agricultural run-off and sewage pollution (10) was identified as a challenge due to the risk to water quality and hence impacts on shellfisheries. Concerns were also raised about the impacts that pharmaceuticals entering the marine environment could have on fish and people. On the issue of pollution more widely, *marine litter (9)*, including a specific mention of plastic waste, was also considered to be having a negative effect on North Devon's marine area.

Quotas, the impacts of foreign vessels and damage caused by certain bottom gears were some components of the challenge presented by *fisheries policy (10)*, with participants also concerned that management was increasingly reactive at European, national and local level. Reference was made to local fishermen not being listened to, but also that the industry needed to adapt and to not always blame other organisations for the challenges in the sector. The general *decline of the fishing industry (7)* was seen as a further challenge, including the inability to maintain a local supply chain.

Brexit was identified as a particular challenge for fisheries policy, but participants also expressed significant concern about *economic and political uncertainty (8)* more widely. Within a related theme of *limited economic development (8)*, participants described challenges associated with the relative economic poverty of the area, the lack of local jobs particularly for young people, and the seasonal nature of the economy with its high reliance on tourism. It was also suggested that the economic challenges faced by people limited their ability to engage with environmental issues.

In defining the challenge of *conflict and lack of coordination in management (7)*, participants referred to competing interests and the need to balance blue growth (particularly coastal tourism) with environmental protection, and also to better integrate the latter with fisheries management. There were concerns about inconsistency in planning policies and priorities for the marine area, no coherence in estuary management, and a lack of coordination and communication between different stakeholders. *Lack of data (6)* was seen as hampering decision-making, and some participants also identified an *unwillingness to change (2)* as a barrier to progress.

Climate change (8) was perceived as a further significant challenge, with the associated impacts of sea level rise on habitats, and increased flooding, storminess, coastal erosion, sea water temperature and ocean acidification. Although the replacement of fossil fuels is a priority in tackling climate change, the *impact of low carbon energy (4)* is of concern locally. Particular reference was made to the impacts of tidal barrages and lagoons as well as to visual impacts and the risks associated with Hinkley Point C. The *change in species (1)* already occurring (including decline in numbers and the spread of non-native species) was also perceived to have negative impacts.

2.3.2 Themes beyond the scope of the Pioneer

The remaining challenge themes received a priority weighting of no more than one, and participants were more likely to categorise these as outside the scope of the Pioneer. For these themes, the score reported in parenthesis represents the number of participants who considered the theme to be beyond the remit of the programme.

The challenge associated with *changing demographics (9)* concerned the different priorities of second home owners and the aging population. North Devon was also considered to be in relative *isolation (7)*, particularly in terms of the transport links, but this theme also included reference to economic and social challenges and the perception of being overlooked by central Government. The issue of geographic isolation and a poor supply chain was also a factor in the *lack of demand for local seafood (4)*, which was further affected by the seasonality of fish stocks. *Unsustainable development (4)* was identified as putting pressure on habitats and ecosystem services and disturbing wildlife. A further theme related to the consequences of population pressure was *erosion from over-use (5)*, with particular reference made to impacts on the coastal path and sand dunes.

2.4 Opportunities

The Pioneer programme itself was widely viewed as an opportunity for *new management approaches and policy influence*, allowing ambitious thinking; bringing funding, resources and specialist input; increasing the national focus on North Devon; potentially improving coordination between different projects and programmes; and challenging the Government to think, work and fund differently.

In identifying the available resources that could support the Pioneer going forward, a recurrent theme was the *strong, engaged community*, with its coherence, existing network of community groups, capacity for volunteering, and willingness to engage in conservation activities including beach cleans and citizen science projects such as wildlife monitoring. The existing practice of *partnership working* was also perceived positively, for example between the different organisations involved in skate and ray fisheries work, and was seen as a good foundation for improved collaboration between national and regional statutory agencies and local organisations. *Links to the terrestrial sector* were also identified as an important opportunity, including reference to the design of adaptations to sea level rise; work on agricultural run-off and catchment sensitive farming; and interaction with South West water and terrestrial planning authorities. Opportunities for developing common work plans and source to sea models of Governance were identified.

Reference to specific sectors and approaches included the role of *Marine Protected Areas* in helping to protect natural capital, with opportunities including existing good practice in the role of users in managing MPAs, and the existence of a cluster of MPAs in North Devon and the wider region. *Locally led fisheries management* was also viewed positively, particularly the local

ownership of vessels and management of fisheries, the role of the North Devon Fisherman's Association in bringing fishermen together, and the potential to build on existing voluntary schemes including the ray box and minimum size limits. Opportunities for wider *fisheries development* included new local boats and the investment in Appledore fish dock, with support needed to improve the local supply chain and local marketing, particularly through development of a strong sustainability branding.

A working fishing industry was also seen as important for *recreation and tourism*, for which the environment was also identified as a key driver. The opportunity for developing a sustainable, natural capital focused model of coastal tourism growth with greener marine tourism and infrastructure was identified, and suggestions were made that wildlife tourism could be enhanced (particularly boat trips), the Lundy code for divers and users of the marine environment to protect wildlife should be extended, and facilities for water sports could be improved. Strong local employers (such as Babcocks) and self-employment were seen as opportunities for *economic development* more generally, with the potential growth of aquaculture, increased aggregated extraction (where sustainable) and better utilisation of Bideford port cited as further examples. *Marine renewable energy* was also viewed a sector that could provide opportunities for new economic growth, particularly the potential within Bridgwater Bay and for tidal current energy.

Participants noted an appetite for *data and research* to provide evidence to inform decision making, with the biosphere designation already providing a research focus. Specific opportunities included local roll out of iVMS and the I-BASS project as means of increasing research on local fish to support local management, as well as the designated MPAs requiring monitoring of feature conditions, hence filling some data gaps. The fish education projects in local schools started by a local community group were provided as examples of *education and publicity* programmes that could be built upon, and participants saw the value in more positive publicity for the coastal and marine area to improve the community's connection with the sea and to support the growth of managed tourism. An idea for a TV series to show the hardships of an active modern fishing community was also proposed. A need for *funding, grants and capital investment* was identified, but crowdfunding was the only source for this that was specified.

3. Developing a Vision

3.1 Method

The first step in the visioning exercise was also a short task in which participants were given five minutes to write down their individual response to the question:

- What are the overarching, core values that should be reflected in the management of, and activities in, North Devon's marine area?

As before, the sticky notes were later grouped into themes.

The second activity was a group exercise to define goals for the Pioneer programme. Participants were asked to make these suggested goals ambitious but specific, and to consider the pathway for achieving that goal, particularly in terms of:

- i) the assets already available to support reaching the goal;
- ii) the obstacles preventing the goal being achieved;
- iii) what is needed to move forward; and
- iv) the indicators that should be measured to determine successful progress towards the goal.

A pro-forma table was provided (with column headings Goals, Assets, Obstacles, Needs and Indicators) to facilitate the process.

After the tables had been completed, a summary of the common themes for Pioneer goals was presented to all the workshop participants, who were asked to weight the importance of these goals by allocating ten sticky dots across the goals presented.

3.2 Core Values

Nine themes were identified within the core values defined by workshop participants. In addition, some overarching concepts were suggested, particularly that the management of North Devon's marine area should be ambitious and world class. Terms such as variety, beauty, clean, healthy, productive and rich were used to define the *biodiversity and conservation* theme, with calls for the marine environment to be maintained and improved and to be celebrated locally, with the provision of lots of opportunities to access the coast and water. The concept of *sustainability* featured strongly as a core value, with the need to balance social, economic and environmental issues, the need for fairness and equity, and the potential to build on the historic and cultural values as well as the natural beauty of the area. Sustainability was frequently used to describe values connected to *fisheries*, with workshop participants looking to the Pioneer programme to "champion a leading sustainable fishery", protect the diversity of fish stocks and minimise adverse effects on wildlife. The role of sustainable fishing supporting a strong tourism sector was again advocated. The importance of *managing climate change* to protect coastal communities was highlighted, with reference to reducing ocean acidification and maximising the carbon storage potential of habitats.

Within the wider *community* theme, community engagement and leadership were identified as core values, with strong, self-reliant and healthy community, a broad business base and more people involved in the local marine environment. A further ambition was that planning and development recognise the aspirations of the whole community, particularly those of young people. Participants also expressed hopes for *innovation and job creation*, including the exploration of new opportunities such as marine renewables and the potential for more environment-related jobs for young people. Participants valued the *sense of place*, including the strong identity, uniqueness, tranquillity, and natural beauty of the area.

Workshop participants valued local and inclusive *governance*, that gives people access to the decision making process and allows local interpretation within a national framework. There was also expression of support for an "environment first" framework that recognises how the environment encompasses society, of which this economy is in turn one component. Repeated reference was made within this theme to integration: of high level marine outputs with marine plans; between marine and terrestrial plans; and of planning and strategy more widely. The need for clear, defined targets in order to measure what success means was also expressed. A strong evidence base for conservation, management and climate change strategies was a key component of the *research and education* theme, which also included reference to ensuring the public have confidence in management approaches and the wider value of educating children and young people as well as raising the awareness of volunteer groups in order to support practical action.

3.3 Goals

The following sections describe the goals identified by the workshop participants and their views on the assets, obstacles, needs and indicators for each. Where different groups suggested similar or related themes, these have been consolidated. The number in parentheses after the title of each goal is the weighting given by the workshop participants.

Goal 1: Improving local fisheries management and seafood sales (45)

High level aim: A viable and sustainable fishery for an optimised local economy

Specific objectives: The objectives within the fisheries management goal were for the integration of fishery and environmental management, a local fisheries improvement plan, areas designated for fishermen, and a better understanding of local markets for seafood, leading to increased sales of locally caught fish.

Assets: Good will and cooperation on management, including existing management measures such as the Ray Box, voluntary minimum landing sizes and MPAs, were identified as important assets, as was the current health of the fish stock. Other strengths were the local research base, and the available infrastructure, particularly the fish quay and processing facilities at Appledore and the harbour fish shop at Ilfracombe. The social and cultural value of fisheries and the sector's role in producing local wealth and supporting tourism were also factors. Seaweed production was also considered an asset.

Obstacles: The fisheries sector is perceived as undervalued in social and cultural terms, and existing national and European policy was seen as a major obstacle, particularly the quota system, "blunt policy instruments" and working with the devolved administration in Wales. Overfishing, the activities of foreign vessels, entrenched views and a lack of understanding between the public, fisheries and the environment sector were also cited as creating problems. Limited business opportunities and transport routes, and a lack of local facilities for seafood sales were further obstacles, as was the lack of consumer flexibility on species availability and the lack of investment in education and marketing of local seafood.

Needs: Locally determined policy, better regional management and clear management structures, as well as improved communication with fishermen and integrated working are needed to deliver improved fisheries management. Reference was made to quotas and days at sea as specific management measures that require re-evaluation. More research is needed, particularly to better understand natural stock fluctuation. Sustaining the fishing industry also requires support, training and work experience for young fishermen. Better transport links and improvements in the local supply chain are required in order to increase local seafood sales, although a key factor here is also to the need to develop a bigger range of sustainable fish that is attractive to consumers. A subsidy for local sales was also suggested, as was the possibility of the local authority funding the promotion of local seafood and education projects. The need for better education and improved links with existing education projects generally was emphasised.

Indicators: Environmental, social and economic indicators were proposed, including the size and health of fish stocks and the sustainability of catches; the local economic return on catches and the number of jobs in the sector; as well as the quantity, diversity, and value of fish and shellfish being sold locally. It was also suggested that behaviour change and the number and impact of education projects should be monitored.

Goal 2: Robust protection of biodiversity (33)

High level aim: To protect the natural beauty and tranquillity of marine area for the local community and the economy, including maintenance of healthy and functioning estuarine ecosystems to protect ecosystem services and allow full utilisation of natural capital

Specific objectives: To have the best managed MPAs in the UK, and to ensure adequate assessment of the impacts of terrestrial activity on coastal and marine areas.

Assets: The existing MPAs, which protect a range of species and habitats, and the strength of community and institutional interest and support were listed as key assets to support delivery of

this goal, as were the national landscape designation, current landscape character assessments, and the existing recreational zoning scheme. Knowledge of species distributions, potentially damaging activities and the sensitivity of different species to different impacts (as presented on the MarLIN website) were also seen as important.

Obstacles: In terms of processes and governance, effective biodiversity protection is hampered by a lack of funding and insufficient research and monitoring, as well as by a lack of awareness and enforcement of rules, inadequate public buy-in and limited capacity to ensure development decisions reflect local values and environmental externalities. The features-based model for selecting MCZs was also considered inadequate. Ineffective use of existing information (such as sensitivity assessments) and the absence of effective communication between terrestrial and coastal projects were further obstacles. Achieving the goal of robust biodiversity protection is also hampered by the impacts of human activity such as agricultural run-off, local litter pollution, disturbance by recreational activities and inappropriate development, and by the habitat loss resulting from sea level rise.

Needs: Successful biodiversity protection requires national policy to take account of local needs and to provide the framework for a complete national MPA designation process. Supportive farming policies and catchment management are required (including developing better land management skills), together with appropriate acknowledgement of downstream impacts as part of the Environmental Impact Assessment process. Overall, integrated management is necessary, the decision making system should be informed by natural capital and social equity, and supported by increased capacity and better mechanisms. Community engagement could be enhanced by better communicating the benefits of MPAs and using citizen science programmes for monitoring. Environmental change must be better understood, and the process of prioritisation could be supported by, for example, reinvigoration of the Nationally Important Marine Features list. All of these factors require appropriate resources.

Indicators: Suggested indicators include tranquillity; landscape change; temperature; species distributions and the continuous presence of rare and sensitive species and habitats.

Goal 3: Increased Local Decision Making (32)

High level aim: To ensure effective governance at all levels.

Specific objectives: To increase regional management and local decision making, leading to devolved powers.

Assets: Current strengths included the District Councils' joint local plan and local agencies including the North Devon Fishermen's Association, Tav Torridge Estuary Forum, Biosphere Reserve and Inshore Fisheries and Conservation Authority, which would be supported by new projects such as SWEEP to resource local engagement.

Obstacles: Concerns were raised about cross-sector integration and the appropriate agency to take responsibility for coordination, and also the lack of influence nationally. Resourcing was cited as a further challenge, as was the cost to fishermen of attending meetings.

Needs: The need for local coordination was again emphasised, as was the requirement that all sectors were included in the process. Participants felt that local representation on the Inshore Fisheries and Conservation Authority and the appointment of an Estuary Manager with statutory powers would be beneficial, and that a new Fisheries Local Action Group and coastal fund was needed to provide financial support.

Indicators: Suggested indicators for this goal included the diversity of communities represented in the decision making process, the number of local representatives on decision making groups, and the distribution of resources.

Goal 4: Define and implement a response to climate change (14)

High level aim/Specific objective: To define and implement a response to climate change

Assets: The stated assets were a world class research base, public and political awareness of the consequences of climate change, and the options for offshore wind and tidal energy. Existing policies such as the Shoreline Management Plans and the National Trust's Coastal Adaptation Strategy were also listed as important resources.

Obstacles: Threats to the implementation of an adequate climate change response included the complexity of the issue, scepticism at local, national and international scales, conflict with biodiversity, and a lack of investment.

Needs: Local community energy projects and increased carbon sequestration were advocated, with the further need for supportive Government policies and an increase in subsidies and resources for renewable energy. Research and modelling, including worst case scenario assessment, was also required, as was coordination of a local response within a UK-wide strategic policy.

Indicators: Local mitigation plans and the number of local marine renewable industries as well as the size of the zero carbon economy could potentially be measured.

Goal 5: Job creation in marine industries (13)

High level aim: To develop a sustainable economy with vibrant marine industries.

Specific objectives: To generate highly skilled jobs, re-invigorate boat building, and increase employment

Assets: The local research capability was again listed as an asset, along with the existing industries such as Babcocks and Bideford port, Petroc further education college, the tidal current demonstration zone, and the resource of young people who would like to remain in the area.

Obstacles: Retaining young people was, however, also identified as a major obstacle, as was the current economic landscape and future uncertainty, a lack of investment and infrastructure, and resistance to change. The reduction in long term monitoring programmes and the location of research bases in Exeter and Plymouth were also seen as an obstacles to increased local employment in marine monitoring.

Needs: The requirements for creating jobs in marine industries include understanding the carrying capacity of the natural capital and ensuring that the natural environment is included in all growth planning. A supportive policy framework, and changes in policy, would also be required. Further needs are affordable housing, good infrastructure (including broadband), and skilled labour, with education investment, apprenticeships and local training required to upskill the local community.

Indicators: The primary indicators for the success of this goal would be the number of local jobs and apprenticeships created, measures of wealth (including linking GDP to natural capital) and of wellbeing and health, and demographics. Success in marine monitoring would see longer datasets, successful reporting and the development of a reputation for research capability.

Goal 6: Develop sustainable aquaculture (11)

High level aim: To develop a sustainable and productive aquaculture sector

Specific objectives: To cultivate shellfish and seaweed and also to utilise mussel spat for bioremediation.

Assets: The primary assets to support aquaculture are the wild mussel beds in the Taw Torridge; examples of successful cultivation such as Porlock Oysters; salmon and trout habitat; and the Upstream Thinking programme to improve water quality.

Obstacles: Poor water quality remains a major obstacle, however, as does the accumulation of microplastics in shellfish, and the threat of invasive, non-native species. Social obstacles include conflict with other fisheries as well as traditions and vested interests.

Needs: A viable aquaculture industry requires investment and consistent high water quality. Byelaws, spatial planning and sufficient resources are also needed for effective management. Research and river restocking would support opportunities for finfish aquaculture.

Indicators: The level of investment, weight and value of landings, number of jobs and indicators of water quality and other environmental parameters are all possible measures of success.

Goal 7: Reduce marine litter (11)

High level aim/ Specific objective: To reduce marine litter.

Assets: Engaged and aware local people, as well as existing programmes such as beach cleans, Fishing for Litter, and local recycling partnerships were suggested as important assets.

Obstacles: The quantity of litter, the accessibility of the coastline, and the international sources of the waste are likely to hamper achievement of this goal.

Needs: Identification of the origins of marine litter would allow the waste to be reduced at source, and a better understanding of recycling options is also required. Legislation on, for example, microplastics and wet wipes, would also be beneficial.

Indicators: The quantity of litter on beaches and the amount collected and recycled by the fishing industry could be monitored, as could the ecological implications of reduced litter such as monitoring seabird survival.

Goal 8: Sustainable tidal stream energy (5)

High level aim/ Specific objective: To harness sustainable tidal stream energy

Assets: The energy resource within rivers, the tide and waves is the primary asset, but factors such as the Devon Environmental Business Initiative champion could also support development of a marine renewable energy sector.

Obstacles: Uncertainty about appropriate locations is one obstacle.

Needs: Increased research and consultation would help to reduce uncertainties.

Indicators: The development of a successful industry could be measured by the level of investment, the number of new projects and the amount of power generated.

Goal 9: Sustainable coastal tourism and leisure (2)

High level aim: To develop sustainable tourism based on natural and cultural assets.

Specific objectives: To develop a marine-based tourism sector, increase leisure activities, encourage engagement with the natural environment while ensuring appropriate management and the provision of facilities, access, and parking.

Assets: The list of assets to support sustainable tourism and leisure was considerable, and included the natural beauty and wildlife, Lundy, working harbours, beaches, the surf, and the AONB and National Park designations. Access and rights of way, particularly the SW coast path and the Tarka Trail were also valued. Watersports facilities, activities such as the fish trail in Ilfracombe and the presence of lifeguards were further assets, as were the existing rules for recreational users.

Obstacles: The development of sustainable coastal tourism was hampered by a lack of understanding of the role of the natural environment, and declining resources for environmental management as well as insufficient communication between land and sea organisations, and inconsistent funding. Marketing was deemed poor, leading to a lack of awareness of the facilities beyond those such as campsites and hotels. The remoteness of the area, limited public transport and the costs of fares and parking were also perceived as obstacles to tourism and leisure development. The short season, restricted parking and traffic congestion were identified as further problems, as were a lack of education and the disturbance caused by jet skis.

Needs: To promote sustainable tourism, marketing, tourism management, monitoring of the importance of natural and cultural assets, and education around sustainability all need to be improved. Participants also felt that better coordination was required, particularly to improve out of season opportunities, and that funding should be made available for coordination. Tourism activities should also be better linked to marine assets, through, for example, trails and increased interaction with the fishing industry. It was also suggested that more tourist centres, a tourism academy and attractions such as museums and an aquarium would be beneficial, and water safety would be promoted through better education for all users and the requirement for boat rentals to be subject to permits. Increased engagement of local people with the natural environment would need a change in public perception, which would be supported by more activities in schools; other ways to inspire children and families to explore, enjoy and understand the environment; and green prescriptions from GPs to encourage coastal exercise.

Indicators: Possible indicators for successful development of the tourism and leisure sector include the number of visitors, jobs, new viable business, marketing campaigns and events as well as the turnover and economic value of the sector. The proportion of sustainable businesses could be monitored together with indicators such as the number of visitors arriving by modes of transport other than cars, and the reduction in traffic congestion. Monitoring the number of businesses open in the shoulder and low seasons, and the number of out of season visitors would allow assessment of the success of attempts to increase year-round tourism. People's level of enjoyment and the reduction in boating accidents could also be monitored.

4. Scenarios

4.1 Method

The third component of the workshop was generating a set of storylines that describe possible futures from the marine and coastal perspective. The starting point for these storylines was the scenarios generated by the National Ecosystem Assessment (NEA)¹ in 2011, which have internally consistent logic and reflect a broad range of societal view points and interests, thus providing a useful foundation from which a set of storylines could be developed that responded to current regional, national and international issues and are specific to marine management.

¹ Haines-Young, R., Paterson J., Potschin M., Wilson A., and Kass G.. 2011. "The UK NEA Scenarios: Development of Storylines and Analysis of Outcomes." Chapter 25 in: *The UK National Ecosystem Assessment Technical Report*. UNEP-WCMC, Cambridge.

Three NEA scenarios were used at the workshop:

- *Green and Pleasant Land*: Continued expansion of global free-market but also further increases in global environmental standards.
- *National Security*: Focus on home-grown production and sustainable use due to short supply of global resources.
- *Local Stewardship*: Global free-market enterprise slows down; further increases in global environmental standards.

Additional details of the scenarios, as described within the NEA report, were provided to participants.

In defining the marine-specific storylines for these scenarios, participants were asked to consider drivers including: demand for sea food and recreational activities; new markets and consumer behaviour; the strength of fisheries and marine protection legislation; land management actions such as catchment management and managed retreat; as well as the expansion of marine renewable energy and other industries requiring marine space. Participants were then asked to think about the consequences of the drivers in terms of the effects on: fish imports/exports, fishing effort, species harvested, and the development of aquaculture, as well as pollutant inputs, cultural identity, leisure activities, and the possible development of novel strategies to address problems. When considering the use of different fishing gears, participants were also asked to consider whether the different scenarios were likely to lead to any improvements in gear selectivity or to affect discard rates.

The workshop participants were divided into three groups, one group per scenario, with representatives of different interest groups divided as evenly as possible between each scenario. Each group was given a set of pro forma tables in which predefined variables were listed. The tables included columns for recording narrative details about how and why these variables would change under the scenario as well as indicating the direction and magnitude of the change. A categorical scale was used (Table 1), which included a qualitative description and approximate proportional size for the change.

Table 1. The scale used for the direction and magnitude of change for different variables under each scenario

| Decrease | Increase | Scale |
|----------|----------|------------------------|
| - | + | A bit (< 15%) |
| -- | ++ | A fair amount (15-50%) |
| --- | +++ | A lot (>50%) |

The results from the workshop will be used as inputs for ecological modelling and wider assessment as part of the Marine Ecosystem Research Programme (MERP). During this process the likely outcomes for key ecosystem services under the different storylines will be evaluated, and optimum solutions for these ecosystem services derived.

4.2 Summary results

The results of the scenario exercise are summarised in Table 2.

Table 2. Summary of the direction and magnitude of change for different variables under each scenario

| | Green & Pleasant Land | National Security | Local Stewardship |
|--|-----------------------|-------------------|-------------------|
| Fisheries (General) | | | |
| Proportion of locally landed fish that is exported | --/--- | -- | --- |
| Quantity of fish imported into the UK from overseas | + | --- | --- |
| Employment rates (number of crew per vessel) | + | -/+ | ++ |
| Overall fishing effort: Pelagic | + | --- | + |
| Overall fishing effort: Demersal | -- | -/+ | + |
| Overall fishing effort: Shellfish | ++ | - | + |
| Fisheries (Level of activity by different gears) | | | |
| Beam trawling | ? | -- /+ | ? |
| Otter trawling | + | ++ | ++ |
| Crab/lobster potting | ++ | -/+ | - |
| Fisheries (Target species) | | | |
| Crab | ++ | -/+ | + |
| Lobster | ++ | -/+ | + |
| Whelk | 0 | -- | + |
| Rays | + | - | + |
| Squid | + | + | ? |
| Bass | --- | + | + |
| Aquaculture/shoreline harvesting | | | |
| Wild mussel harvesting | ++ | ++ | + |
| Periwinkle harvesting | ++ | + | + |
| Cockle harvesting | ++ | + | + |
| Purple laver harvesting | + | + | + |
| Quantity of aquaculture: Total | + | ++ | ++ |
| Quantity of aquaculture: Mussels | + | ++ | +++ |
| Quantity of aquaculture: Oysters | + | ++ | +++ |
| Aquaculture products as a proportion of seafood sales | + | + | +++ |
| Proportion of aquaculture products sold to the UK market | + | ++ | 0 |
| Tourism, leisure and recreations | | | |
| Marine leisure tourism: domestic | +++ | 0 | ++ |
| Marine leisure tourism: international | + | - | --- |
| Recreational activities: coastal path access | +++ | ++ | +++ |
| Recreational activities: wildlife watching | +++ | +/- | ++ |
| Recreational activities: sea angling | ++ | ++ | ++ |
| Recreational activities: diving | +++ | -- | + |
| Recreational activities: powered watercraft | ++ | -- | - |
| Environmental protection and pollution | | | |
| Spatial extent of marine protected areas | + | ? | - |
| Strength of protection within MPAs | ++ | +++ | ++ |
| Quantity of marine litter | -- | -- | --- |
| Quantity of nutrients entering the sea | --- | ++ | --- |
| Other marine industries | | | |
| Marine energy: offshore wind | 0 | ++ | 0 |
| Marine energy: wave | + | ++ | + |
| Marine energy: tidal current | 0 | +++ | +++ |
| Marine energy: tidal barrages/lagoons | 0 | +++ | + to +++ |
| Aggregate extraction | | + | + |
| Shipping | + | --/+ | + |

5. Data inventory and evidence gaps

During refreshment breaks, participants were invited to complete an inventory of data sources that could support Marine Pioneer activities and to highlight gaps in evidence which should be prioritised when commissioning future research.

There is an ongoing project to collate marine data, which will be relevant to the Pioneer, and specific recent and continuing studies include:

- Seasearch recording and mapping of marine species and habitats
- Taw Torridge mussel survey
- Immature Bass Acoustic Stock Surveillance (I-BASS)
- Blonde and Thornback ray modelled tracks and report
- Taw Torridge crab tile survey
- Lobster tagging (Lundy)
- Marine Conservation Zone assessment
- Severn Estuary European Marine Site fisheries activity, biotope and condition assessment
- Atlantic Array offshore wind farm environmental assessment
- Coastal Creature Project (marine wildlife survey)
- Marine Management Organisation Marine Information System

Few participants identified evidence gaps. It was, however, suggested that to support any meaningful local fisheries management, more research is needed on:

- i. Distribution and movement of fish species and correct geographical unit for management
- ii. Local stock assessment (e.g. bass and rays)
- iii. Local nursery areas

6. Next steps

The workshop participants responded positively to the invitation to form the Marine Working Group to support the Pioneer and wider activities related to North Devon's marine area. Further meetings will be convened, the first of which will be in the summer. The results of the MERP modelling will also be reported back to the group in the autumn.