Appendix 2. North Devon Marine Natural Capital Plan - Action Plan

Table A*1. Potential actions that will deliver natural capital and ecosystems services enhancements*

Food production and clean water - fisheries enhancement projects | Meets policy: PL02, PL07, PL10							
Description	**Project examples**	**Partners**	**Investment**	**Type of return**	**Deliverability**	**Source / value of return**	**Critical policy**
Medium term (0-10 years) Using research to complement and define suitable adaptive management that would reduce pressure on fish stocks and intertidal sediments and provide viable and sustainable fisheries.	Short term (0-7 years): Research (fish stock structure, distribution and critical habitats) based on Fisheries Research and Management Plans (FRMP), initially for skates and rays, squid, herring, bass, whelk and then any other species identified.	Devon & Severn IFCA, North Devon Biosphere (BR).	Average £100k per year over 7 years with front loading of funding (to formalise the partnership) and set up research until return on investment can support further activities.	Better understanding of research needs in the Bristol Channel (benefits to wildlife and developers).	Requires formalisation of fisheries science and managers partnership (short term (0-3 years) to ensure continued buy in of fishing industry. Fisheries that have been identified for potential management in the short term (0-5 years) are herring, as well as crab and lobster.	Fishing industry, once upturn in income is seen. Currently based on 2018 landings to ND ports[1] a 2% annual return would yield ~ £31,500. Tourism and food businesses in port areas (e.g. add a pound to a bill). Return from investment in added value infrastructure projects (such as smokers). Public funding will be needed to support this initially (Maritime and Fisheries Fund, Local and Regional Authority, etc). Potential for sponsorship by fisheries sector businesses. Return on payments for ecosystem services (dependant on policy changes).	Alignment of harvesting rules and enforcement across 6nm 'barrier' in territorial waters. ICES stock assessments need to consider local stocks when identified through research. Requirement for access to higher level data that maps onto natural capital. Payments for ecosystem services.
	Short term (0-5 years) Setting up effort and/or spatial and temporal management measures with fishermen resulting in reduction of fishing effort, seasonal fishery closure, for lobster and crab (potentially including payments for ecosystem services).	Fisheries, science, and managers partnership (FSMP).		Increase in revenues for local fleet (due to increased yield and catch values), providing a sustainable and viable fishery for small inshore fishing fleet. Increase in stocks of fish, reduction in pressure on habitats, and reduction in management costs through local involvement. Possible uplift in local expenditure (e.g. accommodation, restaurants, and fishery-related tourism etc). Better understanding of critical fish habitats in the Bristol Channel (benefits to wildlife and developers).		
	Short term (0-5 years) Support delivery of the Herring project including scanning of seabed habitats and measures to manage sustainable herring fishery.	Blue, IFCA, (Swansea University).					
	Long term (5+ years): Investment in new more sustainable fishing gear and fishing infrastructure (storage etc), Marketing of sustainably caught fish and added value (fish smokery, etc).		Specific gear and infrastructure will need to be identified through short-term work.	Return in investment of added value business. Increase in income without increase in fishing activity – fish stocks maintained /enhanced. Possible uplift in local expenditure (e.g. accommodation, restaurants, and food-related tourism etc).	Long term investment will be needed as scale of stock recovery is unquantifiable (+5 years), so defining timescales over return in investment may be difficult.		

[1] UK sea fisheries annual statistics report 2018 https://www.gov.uk/government/statistics/uk-sea-fisheries-annual-statistics-report-2018

Food production and tourism – enhancement of clean water | Meets policy: PL03, PL04, PL05, PL06							
Description	**Project examples**	**Partners**	**Investment**	**Type of return**	**Deliverability**	**Source / value of return**	**Critical policy**
Providing diversification opportunities for commercial fishing industry through development of sustainable aquaculture, and mussel harvesting linked to improvement of water quality in estuary, and coast.	Short term (0-5 years): investigation of potential for aquaculture to be used for bioremediation (using nature to clean up nature) should include suitable locations for aquaculture	Commercial interest, BR	Feasibility study £20,000			Public funding Sponsorship and crowdfunding	Government payments to landowners for land management should take 'full account of their impact to estuaries, coastal waters and the sea'. Introduction of taxes on single use plastics
	Long term (+5 years) dependant on feasibility study: increase in sustainable aquaculture in estuary	??	Will need to be identified through short-term feasibility study on Aquaculture for bioremediation	Increase in income for aquaculture businesses If used for bioremediation increase in aquaculture and mussel harvesting productivity (less closed periods, reduction in depuration costs)	Improvements to water quality are long term (+5 years), as water quality is affected by many factors, especially in the estuary.	% return on investment for new aquaculture businesses. Public funding through business support and grants	
	Long term (+5 years): increase in sustainable mussel harvesting (extent of beds and condition)	??	??	Increase in mussel harvesting business productivity (less closed periods, reduction in depuration costs) Mussel spat as a product Enhancement of water and reduction of pollution issues		% return on investment for mussel harvesting businesses. Public funding through business support and grants.	
	Upstream land management to reduce run off and pollution delivered through Landscape Pioneer strategy and catchment management plan	Natural England (NE), BR	Delivered though Landscape Pioneer Strategy and land-based plans	Possible uplift in local expenditure (e.g. accommodation, restaurants, and coastal tourism etc) enhancement of water and reduction of pollution issues	Through landscape pioneer New Environmental Land Management Scheme (NELMS) funding for pilot in North Devon in place.	Nutrient trading is an option but it requires investment to deliver.	
	Short term (0-5 years) and ongoing: reduction of marine plastic through supporting fishing for litter type projects, marine plastic recycling initiatives, and nurdle research.	Plastic Free North Devon, FSMP.	Costs related to marine plastic[2] projects from £7k initial outlay to unspecified costs for projects to land (and monitor) marine litter from fishing and recreational boats, and nurdle research and collection.	Possible uplift in local expenditure (e.g. accommodation, restaurants, and coastal tourism etc). Enhancement of water and reduction of pollution issues.	Some short-term activities include reduce/mitigate marine litter through nurdle research (0-3 years).	Public funding through business support and grants. Sponsorship and crowdfunding.	

[2] as identified in Plastic Free Northern Devon consortium strategy and action plan

Tourism and recreation – reducing impact on wildlife							
Description	**Project examples**	**Partners**	**Investment**	**Type of return**	**Deliverability**	**Source / value of return**	**Critical policy**
Sustainable use of the estuary and coast by residents and visitors, Boating tourism, wildlife watching and non-powered recreation all strongly linked to enhanced biodiversity.	Short term (0-5 years) introducing codes of conduct and interpretation to reduce pressure on wildlife.	NE, BR, community groups and fora	Engagement with communities and businesses can be met through coordination role. Interpretation boards and publications £5k per annum for 5 years.	Added value to tourism businesses that promote tranquillity and wildlife of North Devon as an attraction (reduced risk). Increase in use of accredited businesses and income. Reduction of scouring of seabed and marine flora. Reduction of wildlife disturbance. Corporate/social responsibility met.	Can be started as soon as marine coordinator is in place, within 5 years. Some work has been done (e.g. Estuary wildlife disturbance study) that has identified potential projects.	Coastal tourism businesses (either through voluntary donation or 'tourism tax') Publication of area specific (wildlife) guides that can be sold to produce revenue. Philanthropic donations and charitable trusts. Public funding. Crowd funding.	
	Short term (0-5 years): introduction of eco-moorings in sensitive sites	Lundy, ??	Eco-moorings cost plus installation.		Some work has been undertaken at Lundy, which could be replicated in other areas.	Return on mooring fees and fees for access to key sites (such as diving, water sports).	
	Short term (0-5 years): wildlife accreditation schemes linked to UNESCO Biosphere branding opportunities	BR, local boat owners	Accreditation scheme: annual costs £7k including training for skippers, ongoing support, and publications		Short term: 0-3 years, can be started as soon as marine coordinator is in place. Some work has been done with skippers of charter boats within Biosphere but needs longer term investment.	Coastal tourism businesses, either through voluntary donation or 'tourism tax' although this idea will need investment to realise potential as a sustainable finance mechanism. Charter boat contributions, through training, etc.	

Climate change - carbon storage and natural flood management. Meets policy PL05							
Description	**Project examples**	**Partners**	**Investment**	**Type of return**	**Deliverability**	**Source / value of return**	**Critical policy**
Identify natural solutions to problems brought about by climate change including reducing carbon emissions and enhancing flood defences.	Medium term (0-10 years): saltmarsh restoration and maintenance of extent of freshwater habitats.	BR, EA.	The direct cost is around £35k per hectare. There is the potential for 50 to 80ha of new saltmarsh in Taw Torridge Estuary = £1.75m to £2.8m. Annual maintenance costs are around £14k to £22k per year.	Reduction in need for hard structure flood defences and associated maintenance. Reduction of flooding and impact on property and costs. Reduction of flooding impact on high quality agricultural land (£867,600) in Marine Natural Capital Plan coastal area that interacts with medium to high risk flood zones[3]. Reduction of carbon emissions. Corporate and social responsibility met.	Feasibility study for saltmarsh and identification of sites completed, work can progress, if funded, in next 5 years.	Carbon sequestration benefits of new saltmarsh areas for sites less than 15 years old (4 $tCO2\ yr^{-1}$) and established sites (2 $tCO2\ yr^{-1}$). At 20 years mature sites will no longer sequester carbon[4] but will provide flood defences that have lower maintenance costs than hard structures. Carbon value of £/t CO2e when 1.) given value of the cost of mitigating emissions and 2.) value given to measure the long-term damage by a tonne of carbon[5] For **saltmarsh** is 1.) £2,270.55 2.) £12,672.17. For littoral rock and other hard substrata (with **seaweed and plant communities**) is 1.) £1,838.49 2.) £10,260.80. For Infralittoral rock and other hard substrata (with **seaweed and kelp communities**) is 1.) £2,808.59 2.) £15,675.06. Resource user fees (access to recreation) although this may require additional funding to develop. Coastal and marine biodiversity/net gain payments.	Requirement for access to higher level data that maps onto natural capital Government payments to landowners for land management should take 'full account of their impact to estuaries, coastal waters and the sea and the need to protect and enhance these' Blue carbon code needed to identify marine carbon savings Coastal and marine development should be included in any new biodiversity net gain obligations on developers. (Section 106) Payments for ecosystem services to landowners Blue carbon code needed to identify marine carbon savings
	Short term (0-5 years) Feasibility study to determine potential for seaweed (macroalgal mariculture)	Commercial interest, BR	£20,000 for feasibility study		Seaweed mariculture feasibility study needed short term.		
	Medium term (0-10 years): Introduction of seaweed farm	Commercial interest	Dependant on feasibility study Set up of mariculture business from £25,000[5]	Reduction of carbon emissions Return on investment	Long term mariculture development would be determined by the feasibility study but could be released before the 5 year review and report on the plan (2025)	Carbon value of £/t CO2e when 1) given value of the cost of mitigating emissions and 2) value given to measure the long term damage by a tonne of carbon[5] For littoral rock and other hard substrata (with **seaweed and plant communities**) is 1) £1,838.49 2) £10,260.80 For Infralittoral rock and other hard substrata (with **seaweed and kelp communities**) is 1) £2,808.59 2) £15,675.06 % return on investment to mariculture business	
	Support and finances for delivery of landscape Pioneer Natural Capital Strategy and Catchment Management Plan Including land management to reduce land-based flooding events	NE, BR	?????	Reduction of management costs	Through landscape pioneer New Environmental Land Management Scheme (NELMS) funding for pilot in North Devon in place. more funding may be needed though	Payments for ecosystems service for farmers	

[3] Rees, S.E., Ashley, M., Cameron, A. 2019. North Devon Marine Pioneer 2: A Natural Capital Asset and Risk Register. A SWEEP/WWF-UK report by research staff the Marine Institute at the University of Plymouth

[4] Katrina J. Davis, Amy Binner, Andrew Bell, Brett Day, Timothy Poate, Siân Rees, Greg Smith, Kerrie Wilson & Ian Bateman (2019) A generalisable integrated natural capital methodology for targeting investment in coastal defence, Journal of Environmental Economics and Policy, 8:4, 429-446, https://doi.org/10.1080/21606544.2018.1537197

[5] Costs taken from https://www.greenoceanfarming.co.uk/buy-a-seaweed-farm.php

***Table A**2 Actions that will support the governance of the Marine Natural Capital Plan.*

Marine communication and engagement. | Meets policy PL01							
Description	**Projects examples**	**Partners**	**Investment**	**Type of return**	**Deliverability**	**Source / value of return**	**Critical policy**
Targeted marine engagement and communication across partners and local communities and development of citizen science.	Short term (0- 5 years): Coordination officer.	BR,	Officer cost £50k a year including overheads, expenses, and engagement.	No fiscal return but potential for officer(s) to identify sources of sponsorship for marine partnerships and coordination, as well as identifying shared resources to reduce costs.	This is a long-term role that would support delivery of the Marine Natural Capital Plan and investment identified above. Once funding is in place for 5 years, there is potential to generate revenue to continue role and funding for Estuary officer.	Development of partnerships and shared resources reducing management cost (science, MPA, fisheries, etc). Sponsorship. Crowd funding.	
	Long term (5+ years) Estuary Officer.	??	As it is not evident whether this officer will need to be full or part time, indicative pro rata costs are £50k a year including overheads, expenses, and engagement.				
	Short term and ongoing: communication activities including wildlife watching guides, cookbooks, films, virtual reality and other media, as well as developing and supporting citizen science projects, such as monitoring wildlife disturbance, working with anglers, divers and surfers.	BR, local groups and communities, Plastic Free North Devon.	£10k per year communication activities for 5 years but may need front loading of funding until new revenue streams are identified				
Monitoring and evaluation | Supports delivery of policy PL01, PL08, PL09							
Description	**Projects examples**	**Partners**	**Investment**	**Type of return**	**Deliverability**	**Source / value of return**	**Critical policy**
Ensuring that the aims and objectives of the plan are being met. Drawing all information into one place and providing useful, transparent updates on progression of the plan to inform adaptive management.	Short term and ongoing: monitoring support for regulatory bodies and Marine Natural Capital Plan objectives.	Local regulators, BR,	Management monitoring 1FTE cost £50k per year + cost of ecological monitoring up to £100k a year.	No fiscal return but excellent ecological / natural capital / social capital returns through adaptive management.	It is a key aspect of the Marine Natural Capital Plan and should be factored into every investment case/project identified in the plan.	Predominantly public funding. Some aspects can be met through other funding identified in cases above.	Requirement for access to higher level data that maps onto natural capital. Increase in statutory orgs monitoring timescales and resources/funding.
	Short term 1-5 years: compilation of a Biosphere database (to add to the 'digital Biosphere').	BR	Database marine contribution - £1.5k per year.			Payments for data analysis services.	