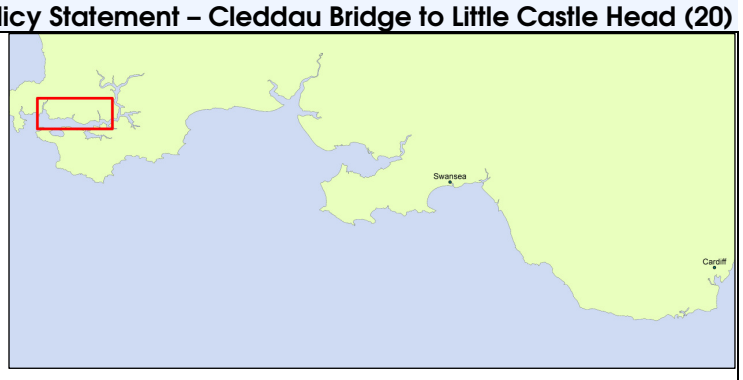
Cleddau Bridge to Little Castle Head (20)



Recommendations:

Long Term Plan

This frontage comprises the northern bank of Milford Haven (Daugleddau) from Cleddau Bridge to Little Castle Head. The majority of the shoreline has been developed, but geology remains the main control on the overall shape and form of the estuary. The residential areas/ ports, at Milford Haven and Neyland, and various industrial developments are the key features along this shoreline, but the estuary itself has a high environmental value.

The plan is to continue to manage the risk of coastal erosion and flooding to areas where there are large residential areas, key infrastructure and assets, such as at Milford Haven and Neyland, whilst allowing natural processes to continue where the shoreline is undeveloped. There are limited opportunities for managed realignment due to the geomorphology of the estuary and in general there are poor littoral linkages between the various stretches of shoreline, which means that existing defences are unlikely to be having a wider impact on the natural evolution of the estuary.

Location (Policy Unit)		Preferred SMP2 policy and preferred approach to implementing the Plan		
		0-20 years	20-50 years	50-100 years
20.1	Cleddau Bridge to Neyland Marina	Allow the coast to evolve and retreat naturally through **no active intervention**, assuming that the Cleddau Bridge and associated structures are retained. Due to the limited socio-economic value of assets at risk along this frontage, public coastal erosion and flood risk management funding is unlikely to be available to maintain/ upgrade existing defences. It is recommended that suitable adaptation measures are implemented to reduce the risk of flooding to residential and non-residential properties and assets (such as improved flood warning, flood protection measures, flood resilience measures or relocation of assets). Private landowners may wish to fund maintenance/ upgrading of existing defences or adaptation measures subject to obtaining the necessary consents, licences and approvals.		
20.2	Neyland Marina to Hazelbeach	**Hold the line** by maintaining existing defences to continue to manage the risk of coastal erosion and flooding to residential properties, amenity and industrial facilities. In the medium and long term it may not, however, be socio-economically viable to provide public coastal erosion and flood risk management funding to upgrade existing defences, in response to sea level rise. Coastal erosion and flood risk to properties and other shoreline assets is likely to increase over this period. Adaptation measures may therefore need to be developed and implemented along this frontage to reduce the risk to properties, assets and local access routes, funded from other sources. Further more detailed studies are required in this area to develop a suitable approach.		
20.3	Hazelbeach to Newton Noyes Pier	The policy is to allow the coast to evolve and retreat naturally through **no active intervention** to maintain the landscape and environmental value of this undefended coast. The risk of coastal erosion to the LNG depot and oil storage facility would need to be monitored, and this policy would not preclude intervention works, if required, to reduce the risk of erosion to these assets and potential contamination of the Haven.		
20.4	Milford Haven (Newton Noyes Pier to Fort Hubberston)	**Hold the line** through maintaining and upgrading existing defences to continue to manage the risk of coastal erosion and flooding to residential properties, amenity and industrial facilities. The proposed development at Blackbridge, at the eastern end of this frontage, may involve advancing the existing line to the east of Castle Pill. However the scheme is at an early stage of development and will be subject to further more detailed studies in order to confirm the layout of the development, identify any potential opportunities, constraints and impacts and to obtain the necessary consents, licences and approvals to enable the development to proceed.		
20.5	Hakin to Gelliswick Bay	Allow the coast to evolve and retreat naturally through **no active intervention**, which will maintain the landscape and environmental value of this undefended frontage.		
20.6	Gelliswick Bay	There are limited assets at risk and limited socio-economic justification for public coastal erosion and flood risk management investment to upgrade existing defences beyond their current residual life. The short term policy is therefore to **hold the line** through maintenance of the existing defences for as long as possible, to allow time for alternative adaptation measures and an exit strategy to be developed, assessed and implemented which may involve abandonment or relocation of assets. The risk of coastal erosion and flooding will increase over time.	Once the defences are no longer viable, they will be allowed to deteriorate and fail, the policy will change to **no active intervention**, and the coast will be allowed to evolve and retreat naturally.	
20.7	Gelliswick Bay to Sandy Haven east	Allow the coast to evolve and retreat naturally through **no active intervention**, which will maintain the landscape and environmental value of this undefended coast. The risk of coastal erosion to the LNG terminal would need to be monitored, and this policy would not preclude intervention works, if required, to reduce the risk of erosion to these assets and potential contamination of the Haven.		

20.8	**Sandy Haven**	The policy is to allow the coast to evolve and retreat naturally through **no active intervention**. Due to the limited socio-economic value of assets at risk along this frontage, public coastal erosion and flood risk management funding is unlikely to be available to maintain/ upgrade existing defences. This would not, however, preclude maintenance of existing defences by private landowners, as these are not thought to be having a significant impact. Any change to these defences would, however, be subject to obtaining the necessary consents, licences and approvals, and would need to demonstrate no detrimental impact on the conservation interests within the estuary. Increased risk of flooding over time to the local minor access road at the inshore end of this inlet.

A review of the impacts of the preferred SMP2 policies on coastal evolution and behaviour is provided in Appendix E: Policy Development and Appraisal, Section E1.3.

Policy sensitivities and key uncertainties (further detail is included in Appendix K)

Policy unit 20.4 - the frontage includes harbour structures, which are not covered by public funding of coastal erosion and flood risk management; therefore, this policy is sensitive to the future strategy for these structures. There are also potential development plans for the Blackbridge area which could involve advancing the defence line. However the scheme is at an early stage of development.

Policy unit 20.6 – the timing of the change in policy will depend upon how long it is possible to maintain existing defences and on the development, assessment and implementation of suitable adaptation measures.

Changes from present management / SMP1 policy[1]

In general, the overall aim for the coastline is unchanged from SMP1. However, there are a number of small differences:

Policy unit 20.1 – SMP1 proposed a long-term policy of hold the line, which has been changed to no active intervention due to the lack of socio-economic assets. However, under this policy, it is assumed that the Cleddau Bridge and associated structures would be maintained.

Policy unit 20.5 – the SMP1 proposed a long term policy of hold the line. This has changed to no active intervention, as there are limited socio-economic assets at risk due to the anticipated low rates of future coastal erosion.

Policy unit 20.6 - the SMP1 policy was hold the line. It is not thought likely that it would be possible to justify public coastal erosion and flood risk management funding in the future, therefore the recommendation is to hold the line by maintain existing defences for as long as possible, moving to a policy of no active intervention once defences fail.

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(this is a summary of impacts, for full details see **Appendix G SEA Report**)

Issue	Appraisal
Receptor: Property, population and human health The key settlements along this frontage are Neyland, Milford Haven and Hakin, although there are also small developments at Llanstadwell, Hazelbeach, Gelliswick and Sandy Haven, along with a number of isolated properties. The developed areas of the frontage typically include defences to manage the risk of coastal erosion and flooding except at the oil storage facility and LNG terminals.	
Will SMP policy maintain coastal settlements and manage the impact of coastal flood and erosion?	+ The plan will continue to manage the risk of coastal erosion and flooding to key settlements. – Due to the limited socio-economic value of assets at risk between Cleddau Bridge to Neyland Marina and at Gelliswick and Sandy Haven, public coastal erosion and flood risk management funding is unlikely to be available to maintain/ upgrade existing defences. Therefore these defences would be allowed to fail, resulting in an increased risk of coastal erosion and flooding to a limited number of properties.
Will SMP policy directly increase the actual or potential coastal erosion or flood risk to communities?	– Along the majority of this shoreline, the recommended policy is to continue to manage the risk of coastal erosion and flooding. There will, however, be an increased risk of coastal erosion and flooding between Cleddau Bridge to Neyland Marina and at Gelliswick and Sandy Haven as defences fail.
Is SMP policy sufficiently flexible to take account of dynamic coastal change?	+ The SMP policy recognises dynamic coastal change, with policies of no active intervention along much of the undeveloped frontage. – Where there are significant assets at risk from coastal erosion or flooding, there would be ongoing maintenance and upgrading of defences, subject to the availability of funding and obtaining the necessary consents, licences and approvals.
Could there be a detrimental impact on the fabric of coastal communities?	+ Along most of this shoreline, there will be no impact on coastal communities as the risk of coastal erosion and flooding to key settlements continues to be managed. – Small communities between Cleddau Bridge to Neyland Marina and at Gelliswick and Sandy Haven will be at increased risk of coastal erosion and flooding following failure of existing defences. Although there are limited assets at risk, this could lead to loss of community assets, difficulties in insuring properties and depreciation in property values.
Receptor: Land use, infrastructure and material assets As well as the residential settlements, there are a number of key industrial assets along this frontage, including LNG terminals, oil storage facility and Milford Haven docks. Assets within Milford Haven include industrial areas, residential facilities and tourism assets.	
Will SMP policy maintain key industrial, commercial and economic assets and manage the impact of coastal flooding and erosion?	+ The risk of coastal erosion and flooding to key assets within Milford Haven and other developed areas will continue to be managed. Although the recommended Plan for the coastline at the LNG terminals and oil storage facility is to allow the coastline to evolve naturally through no active intervention, the risk of coastal erosion to these assets would be monitored and intervention would be undertaken as required to reduce the risk of erosion to these assets

[1] The SMP1 documents should be referred to for more details as unit boundaries do not always align with SMP2 policy units and the policies refer to different time periods.

Cleddau Bridge to Little Castle Head (20) (this is a summary of impacts, for full details see **Appendix G SEA Report**)	
Issue	**Appraisal**
	and potential contamination of the Haven.
Will the SMP policy ensure critical services and infrastructure remain operational, for as long as required?	+ SMP policy would continue to manage coastal erosion and flood risk to key infrastructure. – There will be an increased risk of coastal erosion and flooding to local services between Cleddau Bridge to Neyland Marina and at Gelliswick and Sandy Haven, including the Pembrokeshire Yacht Club at Gelliswick, as defences fail and sea level rises. x No risk to Herbrandston Sewage Works due to its location inland. + It is assumed that the Cleddau Bridge and associated structures would be maintained in order to retain the A477 strategically important highway link.
Will there be an impact on marine operations and activities?	+ It is assumed that dock structures at Milford Haven would continue to be maintained and operational. These are not covered by flood and defence funding, and are the responsibility of the relevant port authority.
Will SMP policy impact coastal flooding or erosion on agricultural activities?	– Risk of loss of small areas of cliff top agricultural land, although this would be dependent on future rates of coastal erosion. Areas lost would not be expected to be significant.
Will the SMP policy ensure that MoD (Qinetiq) ranges remain operational?	x There are no MoD (Qinetiq) assets along this shoreline.
Receptor: Amenity and recreational use Although parts of Milford Haven are a popular tourist destination, there are limited amenity facilities along this frontage. The shoreline west of South Hook LNG terminal is in the Pembrokeshire National Park and the Pembrokeshire Coast Path follows the shoreline along much of its length. There are tourist and recreational facilities at Milford Haven and the Pembroke Yacht Club at Gelliswick.	
Could the SMP policy have an impact on tourism in the area?	+ The risk of coastal erosion and flooding to tourist amenities and facilities in Pembroke will continue to be managed through maintenance (and upgrading, if justified) of existing defences. + The remainder of the undeveloped coastline will be allowed to remain undisturbed, thereby maintaining the natural landscape, which is an element of the tourist interest. – Risk to facilities associated with the Pembroke Yacht Club following failure of existing defences at Gelliswick.
Will SMP policy affect coastal access along, or to, the coast?	– There is a small risk to the coastal footpath, due to cliff erosion or localised cliff falls. This risk is expected to increase over time. There is potential for the footpath to be relocated or realigned slightly inshore, if there is sufficient notice.
Receptor: Historic environment There are a range of Scheduled Monuments along the coastline including the American War of Independence Redan at Bath House, Neyland, Fort Hubberston SM and South Hook Fort. There are also a number of listed buildings in developed areas. Local archaeology includes wrecks and evidence of historic fish traps on the foreshore.	
Will SMP policy maintain the fabric and setting of key historic listed buildings, cultural heritage assets and conservation areas?	– There is a risk of erosion of cliff top Scheduled Monuments, although the risk is considered minimal and is dependent on future rates of coastal erosion, which re likely to be low. As these are located on undeveloped frontages, the recommended policy is to allow continued natural erosion. – Foreshore wrecks and historic fish traps are at risk of erosion or submergence. The level of risk is dependent on future rates of coastal erosion and sea level rise. + The risk of coastal erosion and flooding to listed buildings within developed areas would continue to be managed.
Will the SMP provide sustainable protection of archaeological and palaeo-environmental features or ensure adequate time for monitoring, assessment and mitigation measures to be devised in response to ongoing and future erosion.	● Along currently undefended sections there is no intent to provide new defences, as this would not be socio-economically justified and are not considered to be sustainable. However, since rates of coastal erosion tend to be low this should allow time for monitoring, assessment and mitigation measures to be developed, assessed and implemented, where appropriate. + In developed areas, the Plan is to manage coastal erosion and flood risk which would reduce the risk to historic and archaeological assets.
Receptor: Landscape character and visual amenity The shoreline west of South Hook LNG terminal is within the Pembrokeshire Coast National Park, noted for its spectacular landscape of rugged cliffs, sandy beaches, wooded estuaries and wild inland hills. Further east, the landscape is more industrial in nature.	
Will SMP policy maintain a range of key natural, cultural and social features critical to the integrity of the coastal landscape?	● For much of this shoreline there is no proposed change from existing policy, therefore there will be minimal change to the existing landscape, particularly in the short term. – A policy of no active intervention between Cleddau Bridge to Neyland Marina and at Gelliswick and Sandy Haven may adversely affect the visual landscape locally, as defences deteriorate and fail. The only requirement to remove the remains of defences would be if they represented a health and safety risk.
Could SMP policy lead to the introduction of features which could be unsympathetic to the character of the landscape?	+ There is no intent to provide any additional defences.

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Issue	**Appraisal**
Receptor: Biodiversity, flora and fauna Pembrokeshire Marine Special Area of Conservation (SAC) and Milford Haven Waterway SSSI cover the length of the coastline.	
Will SMP policy enable a sustainable approach to habitat management?	+ There are no new defences proposed in currently undefended areas, therefore this is considered a sustainable approach to natural evolution of the coastline and its habitats.
Will SMP policy maintain or enhance any international, national or local sites of natural conservation interest?	● There could be natural loss of cliff top and cliff face habitats, designated as part of many of the designated sites, but the low erosion rates means losses are likely to be small. Newly exposed cliff faces could be colonised by interesting new species. ● As sea level rises, there would be natural intertidal narrowing, leading to submergence and loss of habitat, particularly where resistant cliffs prevent retreat.
Will SMP policy accelerate intertidal narrowing (coastal squeeze) and will this affect designated habitats?	– There may be intertidal narrowing, i.e. coastal squeeze, between Neyland and Hazelbeach, at Milford Haven, and in the short term between Cleddau Bridge to Neyland Marina and at Gelliswick and Sandy Haven where localised defences would not be maintained but would be expected to remain effective for some years. + The plan is to allow the greater part of the coast to evolve naturally, with no artificial backshore constraints. In places natural intertidal narrowing may still occur as the resistant cliffs may not retreat at the same rate as the sea level rises. This is dependent upon future rates of sea level rise.
Will there be a net loss of BAP habitat within the SMP timespan as a result of SMP policy?	● Subtidal mixed muddy sediment would be retained in the short, medium and long term. + Extension of the intertidal habitat between Hazelbeach and Newton Noyes Pier in the short, medium and long term. ● Retained maerl beds in the short, medium and long term due to the natural evolution of the coastline. + Extension of seagrass beds between Gelliswick Bay to Sandy Haven in the short, medium and long term.
Receptor: Earth heritage, soils and geology Pembrokeshire Marine Special Area of Conservation (SAC) and Milford Haven Waterway SSSI cover the length of the coastline.	
Does SMP policy work with natural processes and enhance or maintain natural features?	+ The plan is for no active intervention along undeveloped lengths of shore, working with natural coastal processes. Along developed frontages there are few exposures and therefore maintaining or upgrading existing defences would not aversely affect designated features.
Will SMP policy maintain or enhance the visibility of coastal geological exposures, where designated?	+ Where the shoreline is currently undefended, there is no intention to construct new defences, unless the oil storage facility or LNG terminal assets are at risk (which is unlikely due to the low rates of coastal erosion within the Haven) therefore geological exposures in the cliffs will be maintained, which will retain much of the geological interest. ● Sea level rise may, in the long term, reduce visibility of foreshore exposures, and lead to submergence of sea caves.
Receptor: Water There are numerous coastal, freshwater, transitional (areas of water near river mouths, which are partially saltwater but are influenced by freshwater) and groundwater bodies in the SMP2 area that have the potential to be affected by SMP2 policies.	
Will SMP policy manage the risk of pollution from contaminated sources?	+ The plan is to manage risk of contamination through maintaining existing defences in Milford Haven, and undertaking intervention if necessary at the oil storage facility and LNG facilities.
Will SMP policy adversely affect water bodies in the coastal zone?	● The Milford Haven Outer and Milford Haven Inner water bodies will not be significantly affected as a result of primarily NAI. Where HTL is proposed this coincides with resistant geology such that limited retreat would otherwise naturally occur, so the HTL policy would have minimal consequences for the biological quality elements and WFD objectives are not at risk. ● The Cleddau and Pembrokeshire groundwater body and river water bodies will be unaffected.

Impact colour key	+ Positive	● Neutral	– Negative	x Not applicable

Cleddau Bridge to Little Castle Head (20)						
ACTION PLAN						
Action	**Action Ref**	**Policy Unit**	**Action Description** (to be approved)	**Potential source for funding** (subject to approval)	**Responsibility** Lead partner * (supporting partners)	**When by** (subject to funding)
. Studies for Scenario Area	1.1	All	Develop a long term sustainable plan for the Pembrokeshire Coast Path to identify sections which are currently at risk from coastal erosion/ flooding and those which are likely to be at risk in future under a range of future climate change/ sea level rise scenarios. Develop adaptation/ mitigation measures to maintain a continuous coastal footpath.	WAG	PCC/ PCNPA	0 to 20 years
2. Studies for Policy Units	2.1	N/A	To inform future management and the development of the second generation CFMP (current downstream boundary of the CFMP is at the Cleddau Bridge) it is recommended that a study of the current and future risk of flooding to properties, assets and land upstream of the Cleddau Bridge from various sources is undertaken to include a range of future climate change scenarios. This work is outside the boundaries and scope of the SMP2	WAG	EAW (PCC)	0 to 20 years
	2.2	20.1	Between Cleddau Bridge and Neyland Marina engage local communities and affected parties in developing suitable adaptation measures for properties and assets at risk following failure of existing defences.	WAG	PCC (EAW)	0 to 20 years
	2.3	20.2 and 20.4	Undertake a scoping assessment to identify when a feasibility study of the upgrading/improvement options to existing defences needs to be carried out and/or identify the criteria/factors that would trigger the feasibility study. The timing of this feasibility study will be influenced by factors such as existing frequency of flooding, type of receptors at risk, depths and velocity of flooding and residual asset life. Consider alternative funding options where it is not possible to justify public investment in coastal erosion and flood risk management.	WAG	PCC (EAW)	0 to 20 years
	2.4	20.2	Further detailed studies are required in this area (existing condition/ residual life - with and without maintenance, potential modes of failure of existing defences, value of assets at risk, in addition to consideration of various future sea level rise prediction) to develop a suitable long term approach with coastal erosion and flood risk management. Consider alternative funding options where it is not possible to justify public investment in coastal erosion and flood risk management.	WAG	PCC (EAW)	0 to 20 years
	2.5	20.4	The proposed development at Blackbridge, at the eastern end of this frontage, may involve advancing the existing line to the east of Castle Pill. However the scheme is at an early stage of development and will be subject to further more detailed studies in order to confirm the layout of the development, identify any potential opportunities, constraints and impacts and to obtain the necessary consents, licenses and approvals to enable the development to proceed.	Private developer	Private developer	0 to 20 years
	2.6	20.6	At Gelliswick Bay develop suitable adaptation measures for properties and assets at risk, following failure of existing defences. Community engagement will be undertaken to identify alternative coastal erosion and flood risk management options (including wide ranging adaptation options) and alternative funding options where it is not possible to justify public investment in coastal erosion and flood risk management.	WAG	PCC (EAW)	0 to 5 years
3. Strategy			-			
4. Scheme work			-			
			-			
5. Monitoring (data collection)	5.1	All	Undertake beach and coastal defence asset monitoring to inform future studies and SMP reviews. In particular, cliff erosion rates and asset condition should be monitored. This information should not only be used in future coastal management, but also to assist in stakeholder liaison by use of data in public education campaigns.	WAG	PCC (Wales Coastal Monitoring Centre)	0 to 100 years
	5.2	20.3 & 20.7	Set up a specific programme to monitor the risk of coastal erosion to the oil storage facility (20.3) and LNG terminals (20.3 and 20.7).	WAG	Coastal Group (Private asset/ landowners, Wales Coastal Monitoring Centre)	0 to 100 years
	5.3	All	Extend current beach profile monitoring programme which is currently undertaken between Lavernock Point and St Govan's Head to cover this shoreline and provide information to the Wales Coastal Monitoring Centre for	WAG	Coastal Group (Wales Coastal	0 to 100 years

			storage and analysis. Use beach profile data to identify the future risk of undermining and overtopping of existing defences,		Monitoring Centre)	
	5.4	All	Undertake periodic defence inspection, including condition assessment and photographs, Confirm defence crest levels.	WAG	PCC (Wales Coastal Monitoring Centre)	0 to 100 years
	5.5	All	Undertake further studies, and associated modelling, to better understand sediment regimes in the SMP area and inform future coastal management.	WAG	Coastal Group	0 to 20 years
	5.6	All	Monitor risk to the coastal footpath and investigate potential re-routing of the path where appropriate.	WAG	PCC	Ongoing
6. Asset management	6.1	All	Ensure that extents of public and privately owned defences are defined and mapped to inform future management decisions.	WAG	PCC (Wales Coastal Monitoring Centre)	0 to 20 years
	6.2	All	Undertake an appraisal of asset inspection and beach profile monitoring data to assess the existing and future risks of undermining and overtopping of existing structures.	WAG	PCC (Wales Coastal Monitoring Centre)	0 to 20 years
7. Communication	7.1	All	Undertake consultation with the local community, key stakeholders and general public during the development of alternative solutions and whenever appropriate to ensure an acceptable approach is developed and adopted.	WAG	PCC (PCNPA)	0 to 20 years
	7.2	All	Undertake monitoring and management of Action Plans to ensure SMP policies are put into practice.	WAG	Coastal Group	0 to 100 years
8. Interface with planning and land management	8.1	All	Continue with risk-based improvements to flood risk maps to provide an appraisal of likely future projected sea level rise.	WAG	EAW	0 to 20 years
	8.2	All	Ensure SMP policies and flood and erosion risks are accounted for in the next revisions of land use plans in order to help manage residual risks from coastal erosion and flooding, and to inform future planning decisions.	WAG	PCC planning/ PCNPA	0 to 20 years
	8.3	All	Establish an officer working group in order to consider the possible effects of sea level rise on the transport infrastructure of Pembrokeshire in order to identify specific vulnerabilities and possible mitigation. The group should identify the timescale for such impacts under a range of sea level rise values from 0.5m to 2m and make recommendations as to mitigation and adaptation measures.	WAG	PCC/ PCNPA	0 to 20 years
9. Emergency response	9.1	20.2 & 20.4	Development, monitoring and review of emergency response plans to prepare for storm events which are likely to exceed existing defence standards of protection or lead to failure of existing defences (for example following breach or overtopping).	WAG	PCC	0 to 20 years
10. Adaptation/ resilience			-			
11. Flood forecasting and warning	11.1	All	Continue with risk-based improvements to flood risk maps and inundation modelling to provide improved flood warning service.	WAG	EAW	0 to 20 years
12. Habitat creation and environmental mitigation	12.1	All	Welsh Assembly Government instructed Environment Agency Wales to scope out the scale of potential coastal habitat gains and losses for Wales. The scoping exercise was completed in February 2011 and identified potential options for implementation of a National Habitat Creation Programme for Wales. How this programme is to be delivered and funded has yet to be decided.	WAG	TBC	Ongoing
* Note: It is recommended that the lead partner/s investigate the potential for local partnerships and alternative sources of funding.						