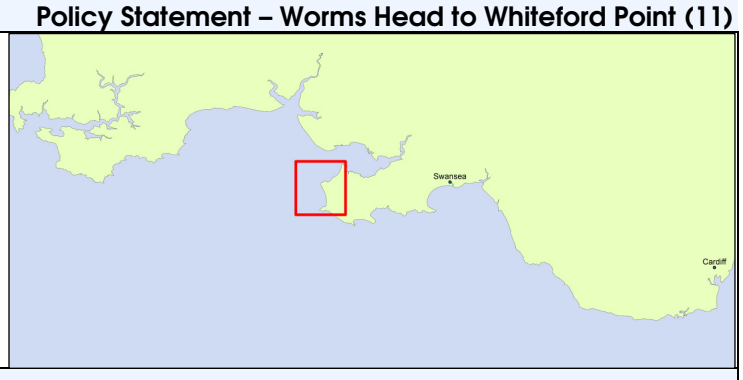
# Worms Head to Whiteford Point (11)




**Recommendations:**

**Long Term Plan**

The Gower Peninsula is a nationally important area in terms of landscape and environmental interest, therefore the plan is to allow this predominantly undeveloped coastline to continue to develop naturally. There are few socio-economic assets at risk from coastal erosion or flooding along this frontage and the recommended approach is for relocation of assets rather than defence construction.

| Location (Policy Unit) | | Preferred SMP2 policy and proposed approach to implementing the Plan | | |
|---|---|---|---|---|
| | | 0-20 years | 20-50 years | 50-100 years |
| 11.1 | Worms Head to Hillend Burrows | Allow this undeveloped shoreline to evolve naturally and retreat through a policy of **no active intervention**, to conserve ecological and landscape value. | | |
| 11.2 | Hillend Burrows to Burry Holms | **Managed realignment** to enable this largely undeveloped and extensive dune system to respond and evolve naturally, whilst allowing habitat management and implementation of measures to control the impacts associated with recreational/ amenity use, as required. | | |
| 11.3 | Burry Holms to Twlc Point | Allow the shoreline to evolve naturally and retreat through a policy of **no active intervention**, to conserve ecological and landscape value. | | |
| 11.4 | Twlc Point to Hills Tor (Broughton Bay) | **Managed realignment** to allow the largely undeveloped and extensive dune system to respond and evolve naturally. This will enable habitat management and introduction of measures, as necessary, to control the impacts associated with recreational/ amenity use and also to manage the risk of coastal erosion to the trunk sewer which runs along the cliff top. This could involve removing existing defences. | | |
| 11.5 | Hills Tor to Whiteford Point (Whiteford Burrows) | To allow this largely undeveloped extensive dune system to respond and evolve naturally, policy is **managed realignment**. This will enable habitat management and introduction of measures, as necessary, to control the impacts associated with recreational/ amenity use. | | |

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)**

All - although these policy options are unlikely to change, rates of dune recession east of Burry Holms could be affected by changes in the Loughor Estuary and associated low water channels. Further studies would improve understanding of these changes.

Policy unit 11.4 - the risk of coastal erosion to the trunk sewer along the cliff top needs to be monitored and suitable mitigation measures adopted as required.

**Changes from present management / SMP1 policy[1]**

These policies concur with both current management of the frontage and policies recommended by SMP1. However, defences have been constructed at the Broughton Bay caravan park. Under a policy of managed realignment these would be allowed to fail or removed. Although this would result in increased risk of coastal erosion and flooding to the park, continuing to maintain these private defences will be detrimental to the natural functioning of the dunes with adverse impacts on the landscape and associated environmental 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.

| **Worms Head to Whiteford Point (11)**<br>(this is a summary of impacts, for full details see **Appendix G SEA Report**) | |
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| **Issue** | **Appraisal** |
| **Receptor: Property, population and human health**<br>This frontage is largely undeveloped. Rhossili village is the only significant settlement, although there are a number of isolated properties. The majority of the coast is undefended, apart from a localised length of rubble revetment at Broughton Bay caravan park. | |
| Will SMP policy maintain coastal settlements and manage the impact of coastal flood and erosion? | x There are few assets at risk along this frontage. Rhossili village is set back from the coast on high ground, inshore of resistant rock cliffs and is therefore not at risk from coastal erosion or flooding. |
| Will SMP policy directly increase the actual or potential coastal erosion or flood risk to communities? | – There are no defences along the majority of this frontage. Increased risk of coastal erosion and/or flooding at Broughton Bay, as existing defences are allowed to fail, or are removed. |
| Is SMP policy sufficiently flexible to take account of dynamic coastal change? | + The SMP policy recognises dynamic coastal change, and enables the coast to evolve naturally throughout. |
| Could there be a detrimental impact on the fabric of coastal communities? | x There are no coastal communities at risk.<br>– Failure of the defence at Broughton Bay would result in increased risk of coastal erosion/ flooding to the caravan park. |
| **Receptor: Land use, infrastructure and material assets**<br>In addition to the village at Rhossili, which includes a visitor centre, pubs and residential properties, there are a number of camping and caravan sites. There is also a trunk sewer which runs along the cliff top in Broughton Bay. | |
| Will SMP policy maintain key industrial, commercial and economic assets and manage the impact of coastal flooding and erosion? | – Potential risk of flooding and erosion to assets at the camping and caravan sites at Hillend and Broughton Bay. There is a National Trust holiday property at risk of coastal erosion on the soft slopes at the southern end of Rhossili Bay. This risk is likely to increase as sea level rises. |
| Will the SMP policy ensure critical services and infrastructure remain operational, for as long as required? | x There is no major infrastructure along this section of coast.<br>– There is risk to the access road to the National Trust holiday property and associated infrastructure, and infrastructure in Broughton Bay associated with the holiday parks. However, these assets would be lost at the same time as the property they serve.<br>+ There is a potential risk to the trunk sewer at Broughton Bay, although under the the recommended policy coastal erosion risk would be monitored, and mitigation measures implemented as required. |
| Will there be an impact on marine operations and activities? | x There are no large scale marine operations along this frontage. |
| Will SMP policy impact coastal flooding or erosion on agricultural activities? | x There are no agricultural activities along this shoreline. |
| 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**<br>This frontage includes a number of caravan and camping sites at Hillend and in Broughton Bay and is a popular tourist designation. There is a National Trust visitor centre on the cliffs at Rhossili. The Gower Peninsula is a popular tourist destination for its beaches and natural landscape. The coast is heavily used for a range of activities including bathing, walking and surfing. | |
| Could the SMP policy have an impact on tourism in the area? | – Increased risk of coastal erosion and flooding to camping and caravan sites at Hillend and Broughton Bay, which would increase over time, particularly as existing defences within Broughton Bay fail or are removed.<br>● Increased risk of sand blow if the dunes at Hillend campsite at Llangennith become more mobile in response to sea level rise.<br>+ The remainder of the coast will be allowed to remain undisturbed, thereby maintaining the natural landscape, which is key to the tourist, amenity and recreational interest.<br>+ Beach retreat or narrowing may occur as sea level rises, potentially affecting recreational use. |
| Will SMP policy affect coastal access along, or to, the coast? | – There is a small risk to the coastal footpath along parts of the coast, 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.<br>– In the long term, the causeway to Worms Head may become permanently submerged, as a result of sea level rise. This is not considered a direct impact of the proposed policy. |
| **Receptor: Historic environment**<br>There are a number of Scheduled Monuments including Rhossili medieval church and Burry Holms Camp, as well as listed buildings which include Rhossili Old Rectory (now a National Trust holiday property). Local archaeology includes remains associated with a medieval church and settlement, including human remains eroding from the cliffs, peat exposures and the wreck of the Helvetia on the foreshore at Rhossili. | |
| Will SMP policy maintain the fabric and setting of key historic listed buildings, cultural heritage assets and conservation areas? | – There is a potential risk of erosion or submergence of locally important archaeology, including the wreck of the Helvetia. The level of risk is dependent on future rates of coastal erosion rates and sea level rise.<br>– There is risk to the cliff top Scheduled Monuments, although risk is low due to the resistant nature of the cliffs. Risk is expected to increase over time. The Old Rectory listed building is at risk of erosion, and this risk will increase as sea level rises. |
| 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 of coast there is no intention to provide new defences, since this is considered unsustainable and there is no socio-economic justification. However, erosion rates tend to be low which should allow time for monitoring, assessment and |

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| **Issue** | **Appraisal** |
| | mitigation measures to be devised, where appropriate. Similarly the risk of coastal erosion and flooding to assets on the foreshore and in the intertidal zone would not be reduced, but there is likely to be time for appropriate measures to be developed and implemented. |
| **Receptor: Landscape character and visual amenity**<br>This frontage is part of the Gower Area of Outstanding Natural Beauty (AONB), designated for its classic landscape and range of landforms, and is also part of the Gower Heritage Coast, with a wide range of habitats, historic assets and geological exposures. | |
| Will SMP policy maintain a range of key natural, cultural and social features critical to the integrity of the coastal landscape? | + Allowing natural coastal evolution along the majority of the frontage will enable the character of the coast to be maintained.<br>● As sea level rises, there is a risk that the causeway to Worms Head could become permanently submerged. |
| 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. |
| **Receptor: Biodiversity, flora and fauna**<br>The cliffed frontage at Worms Head is designated as part of the Limestone Coast of South West Wales SAC. The coastline is also designated as part of the Carmarthen Bay and Estuaries SAC, SPA and Ramsar site and from Hills Tor eastwards, Whiteford Burrows is part of the Carmarthen Bay Dunes SAC. There is also a range of nationally important sites including Gower Coast NNR, Rhossili Down SSSI, Whiteford Burrows, Landimore Marsh and Broughton Bay SSSI and Whiteford Burrows NNR. | |
| 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 habitats and areas of woodland, which comprise many of the designated sites, but the low rates of coastal erosion mean that losses are likely to be small. Newly exposed cliff faces could be colonised by interesting new species. Ongoing coastal erosion of the cliffs is likely to maintain bird breeding habitats.<br>● As sea level rises, there would be natural intertidal narrowing, leading to submergence and loss of habitat, particularly where resistant cliffs prevent retreat.<br>● The risk of coastal erosion of the soft slopes that are designated as part of Rhossili Down SSSI could lead to loss of vegetated habitat. However, there would be no risk to the central ridge due to its elevation and the resistant nature of the geology.<br>● Whiteford Burrows dune system is likely to maintain its overall integrity although there could be foredune erosion as sea level rises, and localised patterns of erosion and accretion. This could lead to changes in habitat.<br>+ Failure or removal of existing defences in Broughton Bay may enhance the designated site by allowing the local area to revert to natural coastal processes. |
| Will SMP policy accelerate intertidal narrowing (coastal squeeze) and will this affect designated habitats? | + The plan is to allow the coast to evolve naturally, with no artificial backshore constraints. In places natural intertidal narrowing may still occur as the resistant cliffs or dune systems may not retreat at the same rate as sea level rises. This is dependent upon future rates of sea level rise. Failure or removal of existing defences in Broughton Bay would enable natural coastal retreat in this area. |
| Will there be a net loss of BAP habitat within the SMP timespan as a result of SMP policy? | + Extension of Sabellaria alveolata reefs due to realignment of the defences in land at Hillend Burrows.<br>– Loss of clay exposure with paddock evidence.<br>+ Extension of intertidal habitat through realignment of the defences. |
| **Receptor: Earth heritage, soils and geology**<br>This frontage comprises a range of sites designated for earth heritage and geology. The cliffed frontage at Worms Head is designated as part of the Limestone Coast of South West Wales SAC. The coast is part of the Carmarthen Bay and Estuaries SAC, SPA and Ramsar site. Three SSSIs are designated for earth heritage and geological interest, namely, Gower Coast: Rhossili to Port Eynon SSSI, Rhossili Down SSSI and Whiteford Burrows SSSI. | |
| Does SMP policy work with natural processes and enhance or maintain natural features? | + The policy for these designated areas is for natural coastal processes to continue, allowing natural features to be maintained or enhanced. |
| Will SMP policy maintain or enhance the visibility of coastal geological exposures, where designated? | + There is no intention to build new defences along the undeveloped coast where these sites are located, therefore geological exposures in the cliffs will be maintained. The intention to allow existing defences within Broughton Bay to fail also is likely to enhance the status of the shoreline in this area.<br>● Natural sea level rise may, in the long term, reduce visibility of foreshore exposures, and lead to submergence of geological interest in caves, designated as part of the Limestone Coast of South West Wales SAC.<br>● There is risk of natural erosion of the soft slopes designated as part of Rhossili Down SSSI. This risk is expected to increase as sea level rises. |
| **Receptor: Water**<br>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? | + Risk of coastal erosion of the trunk sewer on the cliff top at Broughton Bay will be monitored and mitigation measures will be developed and implemented as required. |

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| **Issue** | **Appraisal** |
| Will SMP policy adversely affect water bodies in the coastal zone? | + The Carmarthen Bay and Loughor Outer water bodies will both experience largely natural coastal processes as a result of the combined NAI and MR policies, with some improvement in biological quality elements where MR is proposed which would allow the development of further dune wetland habitats within the largely undeveloped dune systems from Burry Holms to Whiteford Point. This will support WFD objectives.<br>● The Carmarthen Carboniferous Coal Measures and Gower Carboniferous Limestone groundwater bodies and the single river water body will be unaffected. |

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| Impact colour key | + Positive | ● Neutral | − Negative | x Not applicable |

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| **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) |
| **1. Studies for Scenario Area** | 1.1 | All | Review current and future risk of future coastal erosion and/ or localised cliff falls to the coastal footpath to inform the maintenance of a long term sustainable route along the south coast of the Gower Peninsula. | WAG | City and County of Swansea | 0 to 20 years |
| **2. Studies for Policy Units** | 2.1 | 11.2 to 11.5 | Undertake study to investigate the future evolution of the Loughor Estuary to confirm impacts of future climate change on estuary development and the dune systems, including consideration of recent report into the Burry Inlet - Development of a morphodynamic model of the Burry Inlet to inform future management decisions (Robins, 2009) - and its conclusions. | WAG | Coastal Group (CCS, CCC & EAW) | 0 to 20 years |
| | 2.2 | 11.4 | Engage with existing asset owners in developing a management plan for Broughton Bay and Hillend caravan park and camp site (which should consider removal of existing defences if they're shown to have an adverse effect) to identify the risk of coastal flooding and flooding from other potential sources (ie. surface water flooding, run-off from adjacent agricultural areas) and to develop suitable mitigation measures. | WAG | City and County of Swansea (Private landowners) | 0 to 20 years |
| **3. Strategy** | | | - | | | |
| **4. Scheme work** | | | - | | | |
| **5. Monitoring (data collection)** | 5.1 | All | Undertake beach and coastal defence asset monitoring to inform further studies and future SMP reviews in particular dune evolution and cliff erosion rates should be monitored. This information should not only be used in future coastal management, but also to assist in stakeholder liaison by way of a long term public education campaigns. | WAG | City and County of Swansea (Wales Coastal Monitoring Centre) | 0 to 100 years |
| | 5.2 | 11.4 | Monitor risk of coastal erosion to trunk sewer on cliff top within Broughton Bay to inform future management decisions. | WAG | City and County of Swansea (Dŵr Cymru Welsh Water) | 0 to 100 years |
| | 5.3 | All | Continue with existing beach profile monitoring programme and provide information to Wales Coastal Monitoring Centre for storage and analysis. Use beach profile data to identify the future risk of undermining and overtopping of existing defences, | WAG | Coastal Group (Wales Coastal Monitoring Centre) | 0 to 100 years |
| | 5.4 | 11.4 | Undertake periodic defence inspection, including condition assessment and photographs. Confirm defence crest levels | WAG | City and County of Swansea (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 | City and County of Swansea | 0 to 100 years |
| **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 | City and County of Swansea (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 risk of undermining and overtopping of existing structures. | WAG | City and County of Swansea (Wales Coastal Monitoring Centre) | 0 to 20 years |

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| **7. Consultation** | 7.1 | All | Undertake consultation with the local community, key stakeholders and general public during the development of suitable mitigation measures and whenever appropriate to ensure an acceptable approach is developed and adopted. | WAG | City and County of Swansea | 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 | City and County of Swansea planning | 0 to 20 years |
| **9. Emergency response** | | | - | | | |
| **10. Adaptation/ resilience** | 10.1 | 11.2 and 11.4 | Development, monitoring and review of emergency response plans to prepare for storm events which are likely to breach the dunes and lead to flooding of caravan parks and camp sites. | WAG | Private (caravan and camping site) owners | 0 to 20 years |
| **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. | | | | | | |