Tidal Thames Catchment-based Pilot Project

Context

The catchment of the Tidal Thames flows from Teddington, in the west, to the Thames estuary near Southend-on-Sea, in the east. The water surface area for this length of the Thames is 248km^2 (Environment Agency, 2011). Flowing through London, the tidal Thames is affected by the most densely populated urban area in Europe and is subject to a wide range of environmental pressures.

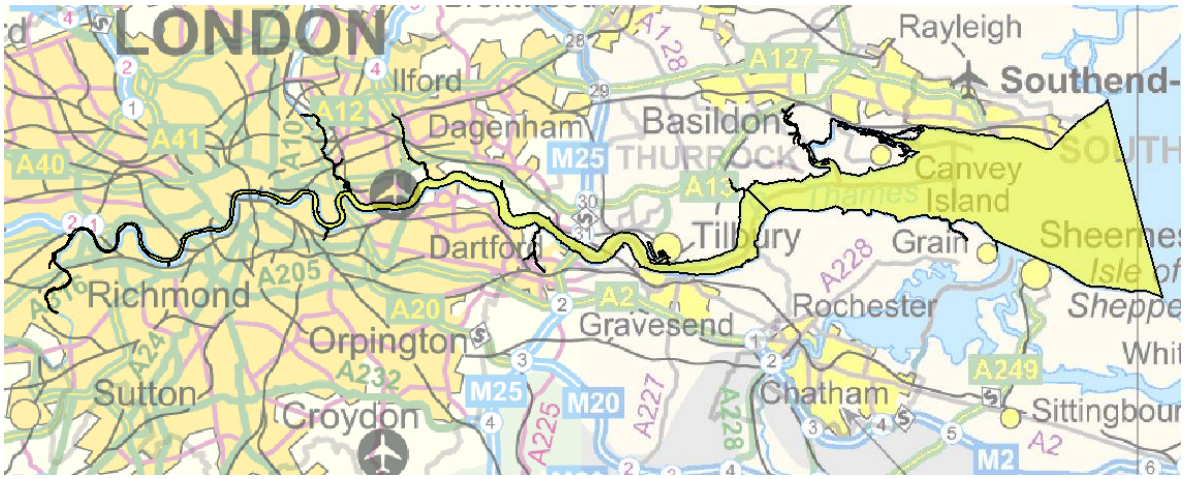

Figure 1. Tidal Thames Catchment-based Pilot Project area

Through central London the tidal Thames is constrained by the Thames Embankment which results in a 7m tidal range and strong currents. These factors can create an inhospitable environment for wildlife living in or by the river, or using it as a route from the North Sea to the watercourses of the Thames River Basin. The estuary of the tidal Thames is one of the most ecologically diverse in England and Wales and plays a major role in supporting North Sea fish stocks (Environment Agency, 2009a).

While water quality has in general improved significantly since the 1960's there are still challenges to be addressed. The main challenge centres on the impacts of storm discharges from the five major sewage treatment works which serve London and from the combined sewer network.

Current Status

The River Basin Management Plan Thames River Basin District (Environment Agency 2009b) divides the tidal Thames into three water bodies – Thames Upper, Thames Middle and Thames Lower[1]. All three have been designated as Heavily Modified Water Bodies (HMWB) and are therefore assessed for their chemical status and ecological potential. The designation as HMWBs also impacts the process by which these water bodies are given their overall classification – if a HMWB's flow conditions are regarding as failing then the decision

[1] Thames Upper water body: Teddington to Cremorne Gardens. Thames Middle water body: Cremorne Gardens to Stanford-le-Hope. Thames Lower: Stanford-le-Hope to Estuary (Former Seaward Limit)

as to how to classify the water body does not take into account any of the ecological elements. The classification decision is made on the basis of the mitigation measures and the chemical elements. Figure 2 lays out the Classification Decision Tree for HMWBs. Both the Upper and Middle Thames water bodies have flow conditions which are regarded as failing (Tidal Regime – Freshwater Flow: Does not Support Good) and their classification therefore does not take into account ecological elements.

Table 1 summarises the current status/potential of each of the three water bodies within the tidal Thames catchment.

Water body name	Current Overall Potential	Current Tidal Regime - Freshwater Flow status	Current Mitigation Measures Assessment status	Current Chemical Status	Current Ecological Potential
Thames Upper	Moderate	Does not support Good	Moderate	Good	Moderate
Thames Middle	Moderate	Does not Support Good	Moderate	Fail	Moderate
Thames Lower	Moderate		Moderate	Fail	Moderate

Table 1. The current status/potential for each water body within the tidal Thames catchment.

Objectives

The objective of this project is to pilot on the tidal Thames a catchment-based approach to delivering integrated river management which balances environmental, economic and social demands.

The output from this project aims to be the start of an effective, deliverable and sustainable Catchment Management Plan, developed in consultation with stakeholders. There are a wide variety of stakeholders who have an interest in the tidal Thames: boat operators from tug boats to dredgers to ferries; recreational rowers, kayakers and sailors; houseboat owners; walkers and joggers; tourists; riverside residents; local authorities, commercial and statutory organisations and the Port of London Authority; river related and wildlife charities and spectators. Thames21 and Thames Estuary Partnership (TEP) will engage stakeholders and utilise their experience, concerns and expertise to develop a Plan that is owned by the community of the tidal Thames.

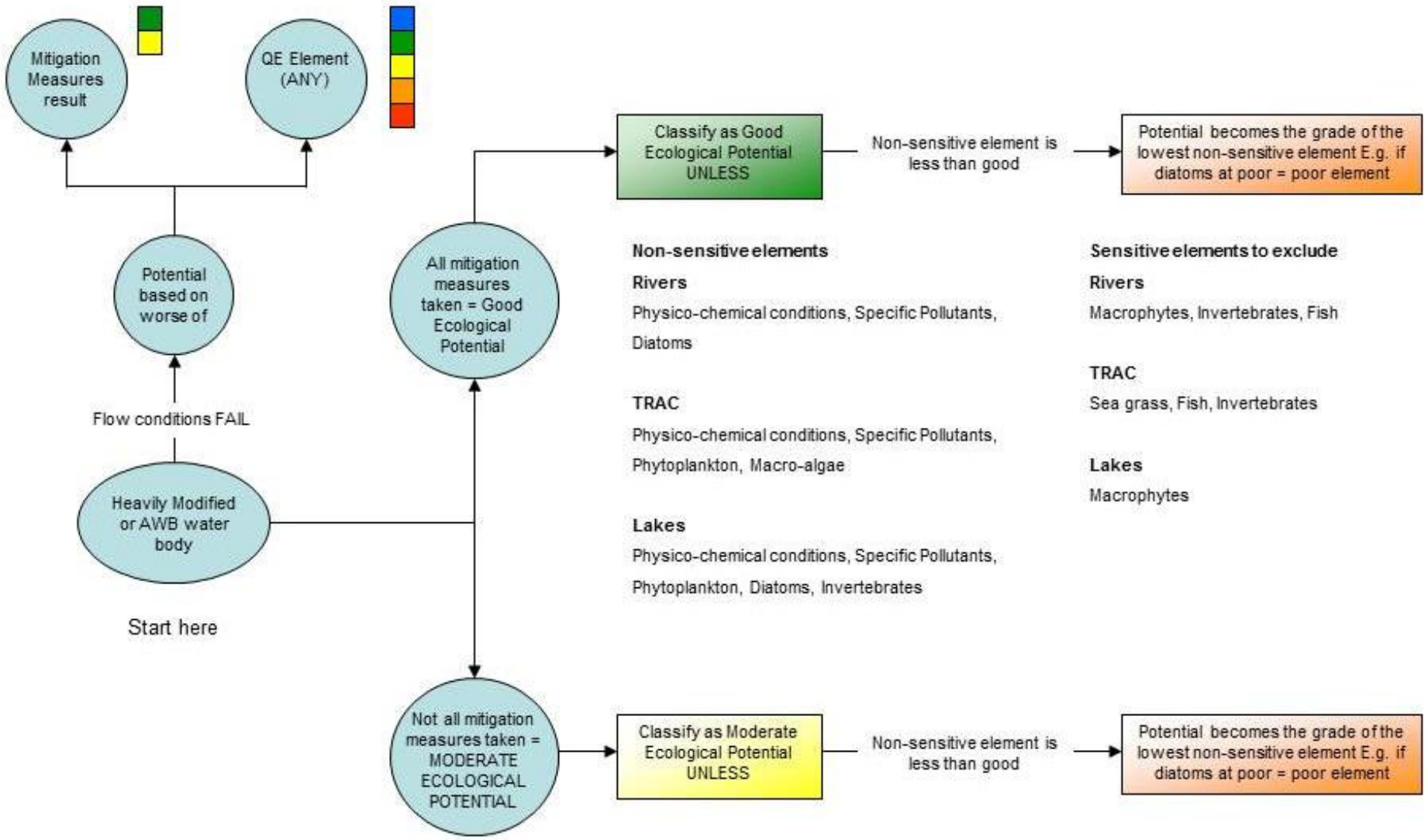

Figure 2. Classification Decision Tree for Heavily Modified Water Bodies (HMWB) and Artificial Water Bodies (AWB)

Initial views of pressures

The River Basin Management Plan Thames River Basin District (Environment Agency 2009b) identifies the elements for each water body which will fail to achieve good status/potential by 2015. These elements form the basis for our initial view on the pressures faced by the tidal Thames in the context of the Water Framework Directive (WFD). These pressures are summarised in Table 2.

It is important to highlight that the information available for the tidal Thames (a transitional water body), on the elements and mitigation measures used to classify the water bodies, is much less advanced than the information available for freshwater rivers. The Environment Agency (EA) has already focused on developing detailed measures for freshwater rivers and is now starting this process for transitional water bodies – this pilot project will feed into this process. However what this does mean is that at the start of this project there is very little specific information readily available about the pressures on the tidal Thames from the current EA Water Framework Directive documentation.

Engagement History

Thames21 and TEP combined have 36 years experience in stakeholder engagement. TEP engages with local authorities, national agencies, industry, voluntary bodies, local communities and individuals. Thames21 engages with grassroots community groups, local residents and environmental volunteers. Thames21 and the TEP both recognise that there many differences between the stakeholders in west and east London and that their concerns and interests relating to the river are likely to be quite different. Working together Thames21 and the TEP can involve and bring together this huge variety of stakeholders and interests in the tidal Thames.

The tidal Thames catchment is an extremely busy area with a long history of engagement for consultations with some if not all of the various stakeholder sectors who will need to be involved with this pilot project. Past water consultations include The Thames Estuary Management guidance, Recreational Use of the Thames, Enjoying Water EA Report, State of the Thames Estuary, Tidal Thames Habitat Action Plan, Thames Strategy East planning supplementary guidance for the London Plan, Natura 2000, Thanet Wind Farm, Gunfleet Sands Wind Farm, DP World London Gateway Port, Balanced Seas MCZ Project for the South East and the ongoing Thames Tunnel consultation. Current and upcoming consultations include MMO Marine Planning and the Thames Estuary Airport.

Stakeholders who take an active part in consultations are often the same individuals representing their sector time and time again. As a result, many stakeholders may suffer from consultation fatigue, information overload and possibly a reduction in earnings for those wishing to attend daytime meetings but are not retired. Most of these stakeholders will expect the Catchment Pilot team to be aware of and familiar with information given previously and will want to see an integrated management plan for the catchment taking into account all other management needs for the area. Failure to do so in the past has disillusioned many sectors resulting in distrust of the majority of regulatory bodies.

Thames Estuary Partnership (TEP) and Thames21 have a strong history of engagement with stakeholders along the tidal Thames. Both organisations have an awareness of previous

consultations across the catchment, the information that stakeholders have previously shared and are trusted by stakeholders to act on their consultation in the best interests of the river. Through this we hope that input into this new consultation will be more enthusiastic!

In addition, as part of this pilot project Thames21 is planning to run pop-up workshops across the catchment which will aim to engage local residents and interest groups who get involved in Thames21's practical activities and have never previously been consulted with regard to the Water Framework Directive. As the Thames runs through London, such a densely populated urban area, it is critically important to engage all river users, including the communities living along the Thames, if this pilot catchment project is to be a success. In identifying the current status of the water bodies along the tidal Thames the issue of flow in the upper and middle sections has been highlighted as a key issue. This is just one example where local community engagement is likely to be very important as we will need their co-operation and active participation if we are to see to change behaviour with regard to water use.

Table 2: Summary of the current issues and pressures contributing to the WFD status of 'moderate' in the Tidal Thames Identified by the Environment Agency and taken from the River Basin Management Plan

WFD Pressure		Thames Upper: Teddington – Cremorne Gardens	Thames Middle: Cremorne Gardens – Stanford-le-Hope	Thames Lower: Stanford-le-Hope – Haven Point & Warden Point
Tidal Regime: Freshwater Flow	Current knowledge	• Abstraction of freshwater above Teddington Weir • Possible solution: Thames Water/EA Lower Thames Operating Agreement review and investigations; change in consumer consumption		
	Initial Thoughts	• Help with Thames Water Communications		
Dissolved Inorganic Nitrogen	Current knowledge		• Contributes to estuarine eutrophication usually as a result of runoff from farmland	
	Initial Thoughts		• Engagement with farmers within project area and pilot projects upstream. • Catchment Sensitive Farming Initiative & Nitrate Vulnerable Zones – Natural England • Changes in land use (possibly planting of appropriate vegetation for nutrient uptake) • Papers by Mark Trimmer Queen Mary University London (QMUL) • Carl Sayer (UCL) suggested talking to Penny Johns at Reading University who researches estuarine eutrophication in freshwater reaches of the River Thames above Teddington • Rivers Trusts may have further information	
Dissolved Oxygen	Current knowledge		• Low levels of dissolved oxygen in the water column usually as a result of sewage (Combined Sewage Outflows) • Possible solution: Thames Tunnel	
	Initial Thoughts		• Help with Thames Water Communications	

WFD Pressure		Thames Upper: Teddington – Cremorne Gardens	Thames Middle: Cremorne Gardens – Stanford-le-Hope	Thames Lower: Stanford-le-Hope – Haven Point & Warden Point
Benzo (ghi) perelyene and indeno (123-cd) pyrene	Current knowledge		• This is thought to be a result of road run off specifically from diesel fuel	
	Initial Thoughts		• Carl Sayer (UCL) suggested talking to the Highways department about where road run off goes within the city and checking with them about what's happening in the freshwater reaches of the River Thames – apparently in rural areas they take a short cut by cutting into the side of the roads and allowing runoff straight into the rivers/streams. • TEP – Dredging Liaison Group – QMUL & British Geological Society (BGS) to do research on contaminants in sediment specifically tributylin. • This measure is part of the EA's on-going investigations on the Tidal Thames (March 2012)	
Tributylin compounds	Current knowledge		• Associated with the marine industry – paint to protect hulls from encrusting organisms. Now banned for vessels under 25m long under various bits of legislation.	
	Initial Thoughts		• Engagement with recreational sectors through Royal Yachting Association and Thames clubs for canoes, kayaks, anglers etc; Engagement with Port of London Authority (PLA) & Thames ports • TEP – Dredging Liaison Group (DLG) – QMUL & BGS to do research on contaminants in sediment specifically tributylin. • This measure is part of the EA's on-going investigations on the Tidal Thames (March 2012)	

MITIGATION MEASURES – THAMES UPPER, MIDDLE AND LOWER Discussions for investigations into the specifics for the mitigation measures will be taking place over the summer – dates to be confirmed.		
Operational & structural changes to locks, sluices, weirs, beach control	Current knowledge	**Pressure:** Bank & Bed reinforcement / in-channel structures: Dams, sluices, weirs, gravel traps, locks and tidal barrages. Includes all types of locks, including locks in a state of disrepair, and weirs associated with locks. (Also consider impacts associated with hard bank protection and sediment management). **Impacts:** Loss of biological continuity - interference with fish population movements. Loss of sediment continuity - build up of sediment upstream, reduced bedload downstream. Alteration of bathymetry; Disruption of tidal flow and interaction; Alteration of natural sediment dynamics - loss of continuity; Destruction and alteration of benthic habitats; Mobilisation of contaminants; Increased turbidity; Loss of faunal nursery, refuge and feeding areas; Disruption of habitat connectivity/continuity - interference with fish population movements **Notes:** Changes to the operation of for example sluice gates leaving open for longer if possible to allow greater river continuity. If sluices are present near weirs and it is not possible to remove the weir, look at the option of opening the sluice permanently/removing the sluice instead of building fish/eel passes. Can include altering timings of pumps to allow eel passage during eel migration season. Can also include adding a notch to a weir rather than full removal. May require Environmental Impact Assessment (EIA).
	Initial Thoughts	• Need further information from EA about specific areas otherwise this may be one to engage with Local Authorities and local communities/organisations
Preserve and where possible enhance ecological value of marginal aquatic habitat, banks and riparian zone	Current knowledge	**Pressure:** Trampling and erosion of riparian zone. Bank & Bed reinforcement / in-channel structures; Hard bank protection (for example piers, slipways, other launch sites, marinas and other infrastructure) e.g. Steel piling, vertical walls and gabion baskets. Includes hard bank protection in a state of disrepair. **Impact:** Loss of riparian zone / marginal habitat / loss of lateral connectivity / loss of sediment input/loss of wave energy absorption. Loss of sediment continuity (lateral) - build up of sediment in the channel **Notes:** This Mitigation Measure is closest to habitat restoration rather than mitigation and should consider margins, banks, riparian zones and in-channel habitats. This includes undertaking native aquatic planting adding plant plugs or planted coir rolls in aquatic margins, banks and riparian zone. This measure can also include bank restoration/rehabilitation (reduce hard-banking and recreating a natural profile). This measure is in direct mitigation to hard bank protection, but do look for wider opportunities to extend as necessary throughout the water body.

	Initial Thoughts	• Thames21 - Project Habitat. A two year research project with Kings College London that examined structures and flood defences of the River Thames through central London to assess the riparian habitat they support naturally. The project also assessed the opportunities to use river walls and other artificial structures (e.g., jetties) to improve habitat by installing walls resigned to be more complex, or by adding modifications to existing walls. • Imminent internal EA proposals for future work may be made available to pilot projects • Engage with Local Authorities to discuss future development/regeneration plans on river edges to see if habitat can be created at the same time as riverside development which will lead to engagement with industry and construction and NGOs on the river and tributaries • Links with TE2100 and Parklands Gateway • Thames Landscape Strategy Hampton to Kew, Thames Strategy Kew to Chelsea and Thames Strategy East
Managed realignment of flood defence	Current knowledge	**Pressure:** Bank reinforcement **Impact:** Coastal squeeze; Disruption of tidal flow and channel interaction; Disruption / alteration of estuarine process dynamics; Modification of sediment dynamics; Disruption of natural habitats; Loss of faunal nursery, refuge and feeding areas **Notes:** This measure is focussed on the coast; the fluvial context is covered by the Mitigation Measure on set-back embankments. This can involve retreating flood defences/bunds in a landward direction enabling coastal waters to breach a site and create new salt marsh habitat. Any lost freshwater habitat on a protected site needs to be compensated for through habitat creation elsewhere. Managed realignment projects are usually managed by National Environment Assessment Service (NEAS)/National Capital Programme Management Services (NCPMS) and regional habitat creation staff. Inter-tidal habitat provides good flexible, sustainable and cost effective defence against climate change / sea level rise if given sufficient space. Given sea level rise predictions it should always be considered against the short term protection afforded by structures. EIA may be required.
	Initial Thoughts	• EA - Managed realignment projects are usually managed by NEAS/ NCPMS and regional habitat creation staff. • Thames Landscape Strategy – would be first port of call for Upper Thames • Shoreline Management Plans – EA, Natural England (NE), County Councils and Local Authorities
Remove obsolete structure	Current knowledge	**Pressure**: Bank & Bed reinforcement / in-channel structures; Dams, sluices, weirs, gravel traps, reclamation and capital dredging **Impacts:** Loss of sediment continuity (longitudinal) - build up of sediment upstream, reduced bedload downstream. Change in wave energy or direction; change in water quality resulting from changes in flows; direct or indirect habitat loss; disruption of habitat continuity or connectivity. **Notes:** If a structure is deemed obsolete and no longer holds a purpose see if it can be removed and the river restored. If it cannot be removed see if it can be altered to improve lateral and longitudinal connectivity, look to include fish/eel passes. For rivers this measure only occurs in direct response to dams/sluices/weirs/pumping stations and bank and bed reinforcement.
	Initial Thoughts	• Need further information from EA about specific areas otherwise this may be one to engage with Local Authorities and local communities/organisations

		• TEP – examples for thought include: the obsolete dolphin mooring structures – these were suggested for removal but found to have created habitat and so were not removed in the end.

MITIGATION MEASURES - THAMES MIDDLE ONLY		
Indirect / offsite mitigation (offsetting measures)	Current knowledge	**Pressure:** Bank reinforcement, channel dredging, tidal river alteration (e.g. channelisation), locks /sluices/tidal barrage, beach control structures **Impacts:** Coastal squeeze; Disruption of tidal flow and channel interaction; Disruption / alteration of estuarine process dynamics; Modification of sediment dynamics; Disruption of natural habitats; Loss of faunal nursery, refuge and feeding areas; Alteration of estuarine processes; Alteration of natural sediment dynamics; Alteration of bathymetry; Loss of morphological diversity and habitat; Disruption / alteration of natural tidal and sediment dynamics; Destruction and alteration of benthic habitats; Mobilisation of contaminants; Increased turbidity (periodically) **Notes:** This Mitigation Measure is about offsetting due to impacts of hard defences, dredging, tidal barrages/impoundments and disruption to tidal and estuarine processes that result in habitat loss. This involves compensating for impacted habitat and estuarine processes to ensure both biological continuity but also to mitigate climate change. The offsetting needs to be undertaken in the same water body in order to contribute to Good Ecological Potential in that water body.
	Initial Thoughts	• TEP – Link with biodiversity offsetting project coming up through the Greater Thames Marshes Nature Improvement Area from match funding with Thurrock Council (Essex CC) which they would like to develop early as possible • Need further information from EA about specific areas otherwise this may be one to engage with Local Authorities – planning local development/regeneration links with industry and construction and local communities/organisations

MITIGATION MEASURES - THAMES LOWER ONLY		
Sediment management (e.g. trickle recharge, sediment bypass; water column recharge; beneficial placement) -	Current knowledge	These sediment management Mitigation Measures are related to navigation not Flood and Coastal Risk Management (FCRM). **Pressures:** Bank reinforcement, channel dredging, tidal river alteration (e.g. channelisation), locks /sluices/tidal barrage, beach control structures **Impact:** Coastal squeeze; Disruption of tidal flow and channel interaction; Disruption / alteration of estuarine process dynamics; Modification of sediment dynamics; Disruption of natural habitats; Loss of faunal nursery, refuge and feeding areas; Alteration of estuarine processes; Alteration of natural sediment dynamics; Alteration of bathymetry; Loss of morphological diversity and habitat; Disruption / alteration of natural tidal and sediment dynamics; Destruction and alteration of benthic habitats; Mobilisation of contaminants; Increased turbidity (periodically) **Notes:** This Mitigation Measure is about offsetting due to impacts of hard defences, dredging, tidal barrages/impoundments and disruption to tidal and estuarine processes that result in habitat loss. This involves compensating for impacted habitat and

Indirect / offsite mitigation (offsetting measures)		estuarine processes to ensure both biological continuity but also to mitigate climate change. The offsetting needs to be undertaken in the same water body in order to contribute to Good Ecological Potential in that water body. **It is recommended that all sediment management Mitigation Measures (FCRM, ports etc) should be combined under this overall Mitigation Measure as splitting them out just causes duplication and confusion.**
	Initial Thoughts	• TEP – DLG – PLA are reviewing their strategies for dredging due to the contaminant issue raised above and they would be the key stakeholder. NE would probably be involved too due to the Natura 2000 sites in the outer estuary and their involvement in dredging strategies
Structures or other mechanisms in place and managed to enable fish to access waters upstream and downstream of the impounding works.	Current knowledge	**Pressures:** Impoundment. Bank & Bed reinforcement /in-channel structures Dams, sluices, weirs and gravel traps **Impact**: Loss of biological continuity - interference with fish population movements. Adverse impact on the movement of salmonids between habitats important in their life cycles, that are upstream and downstream of the impoundment. **Notes:** This Mitigation Measure involves considering whether the impoundment is really required and where possible removing a structure to enable fish/eel passage, installing fish or multi-species passes to enable passage of fish/eel, or alternatively modify structure to allow fish/eel passage.
	Initial Thoughts	• Institute of Fisheries Management (IFM) would be good as a starting point particularly Steve Colclough
Bank rehabilitation / reprofiling	Current knowledge	**Pressure:** Boat Movement; Surface water disturbance and turbulence created by passage of hull (Also consider impacts associated with on-line moorings and sediment management) **Impact:** Bank Erosion / loss of marginal, riparian vegetation (boat wash) **Notes:** This Mitigation Measure is only for inland navigation pressures, there is no requirement from FCRM to implement it. But Mitigation Measure does have to be considered as part of hydromorphology investigations, ideally in conjunction with all other Mitigation Measures.
	Initial Thoughts	• Links with TE2100 (TEP and EA)
Increase in-channel morphological diversity	Current knowledge	**Pressure:** Channel Alteration - Realignment / re-profiling / regarding **Impact:** Loss of morphological diversity and habitat **Notes:** This is an important Mitigation Measure that includes a range of techniques and a variety of possible outcomes. This Mitigation Measure can be delivered across a wide continuum depending on the current condition of the channel and how far restoration can be taken without affecting the use. Ideally the Mitigation Measure will result in naturalised process and be sustainable, but in some rivers, this may not be possible or effective. At the lowest end of the continuum, this Mitigation Measure can involve: installing in-stream devices to increase morphological diversity e.g. riffle construction, bar construction, boulder

		placement, deflectors, two stage channel, installing large woody debris, narrowing over-widened channels, meandering low flow channels in over-widened watercourses, and creation of bays to provide slack water habitat. At the upper end of the continuum, this Mitigation Measure can involve: improving the channel processes so that the morphological diversity is sustainable, this can be achieved by identifying both the type of diversity the channel should have and establish why those habitats don't exist. Implementation must be through the removal of the reasons for the habitats are not being there (e.g. sheet piling, impoundment, channel size / shape) and designing a new sustainable channel which uses natural processes to maintain it. If this is not possible then installing devices may be appropriate. Geomorphological improvements should take account of the system enabling the channel to develop its own diversity; this is a more sustainable approach than using engineered measures.
	Initial Thoughts	• Links with habitat restoration and creation. Carl Sayer (UCL) may have some ideas as he has much experience in freshwater river restoration projects in Norfolk through meandering techniques – not sure if these are appropriate for the Thames but he may have some contacts and ideas we could pursue.
Removal of hard bank reinforcement / revetment, or replacement with soft engineering solution	Current knowledge	**Pressure:** Bank & Bed reinforcement / in-channel structures - Hard protection e.g. Steel piling, vertical walls and gabion baskets. Includes hard bank protection in a state of disrepair. **Impact:** Loss of riparian zone / marginal habitat / loss of lateral connectivity / loss of sediment input **Notes:** This Mitigation Measure involves using soft engineering or bioengineering refers to the use of living and inert vegetation to stabilise banks by either binding together unstable bank material or by protecting the bank face from erosion due to weathering, fluvial scour or trampling by livestock. The technique covers both the construction of new soft bank face protection and the replacement of hard bank protection with a softer solution involving bank rehabilitation/ reprofiling. This needs to be considered in parallel with either re-alignment or channel shape changes to reduce erosion in vulnerable areas. On transitional and coastal (TraC) waters it can include the alteration/removal of rip rap.
	Initial Thoughts	• Thames21 - Project Habitat. A two year research project with Kings College London that examined structures and flood defences of the River Thames through central London to assess the riparian habitat they support naturally. The project also assessed the opportunities to use river walls and other artificial structures (e.g., jetties) to improve habitat by installing walls resigned to be more complex, or by adding modifications to existing walls. • Link with TE2100

Version of Table 2	**Prepared By**	**Date**
1.0	TEP for Your Tidal Thames	28/03/2012
1.1	TEP for Your Tidal Thames	15/06/2012

References

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