

The EU Water Framework Directive & Irish Ports



JE JACOBS

**Mott
MacDonald**

RPS

Marine Morphology Study

Kelly Garry (Jacobs / SWRBD)

Croke Park Conference Centre, Dublin

13th December 2007

www.jacobs.com

South West River Basin Project

Marine Morphology



Presentation Agenda

- **Study Aim**
- **What is Morphology?**
- **The Water Framework Directive & Morphology**
- **Pressures on Marine Morphology**
- **Further Characterisation**
- **Potential Measures**
 - **Preventing Deterioration**
 - **Restoration**

Marine Morphology POMs Study



- **Aim:** Provide a protocol to apply in the further characterisation and risk appraisal for morphology of transitional and coastal (TraC) waters
- **Output:** Decision-Support System consisting of a Data Store and Impact Assessment System
 - Further Characterisation
 - Regulation
 - Exemptions
 - Restoration

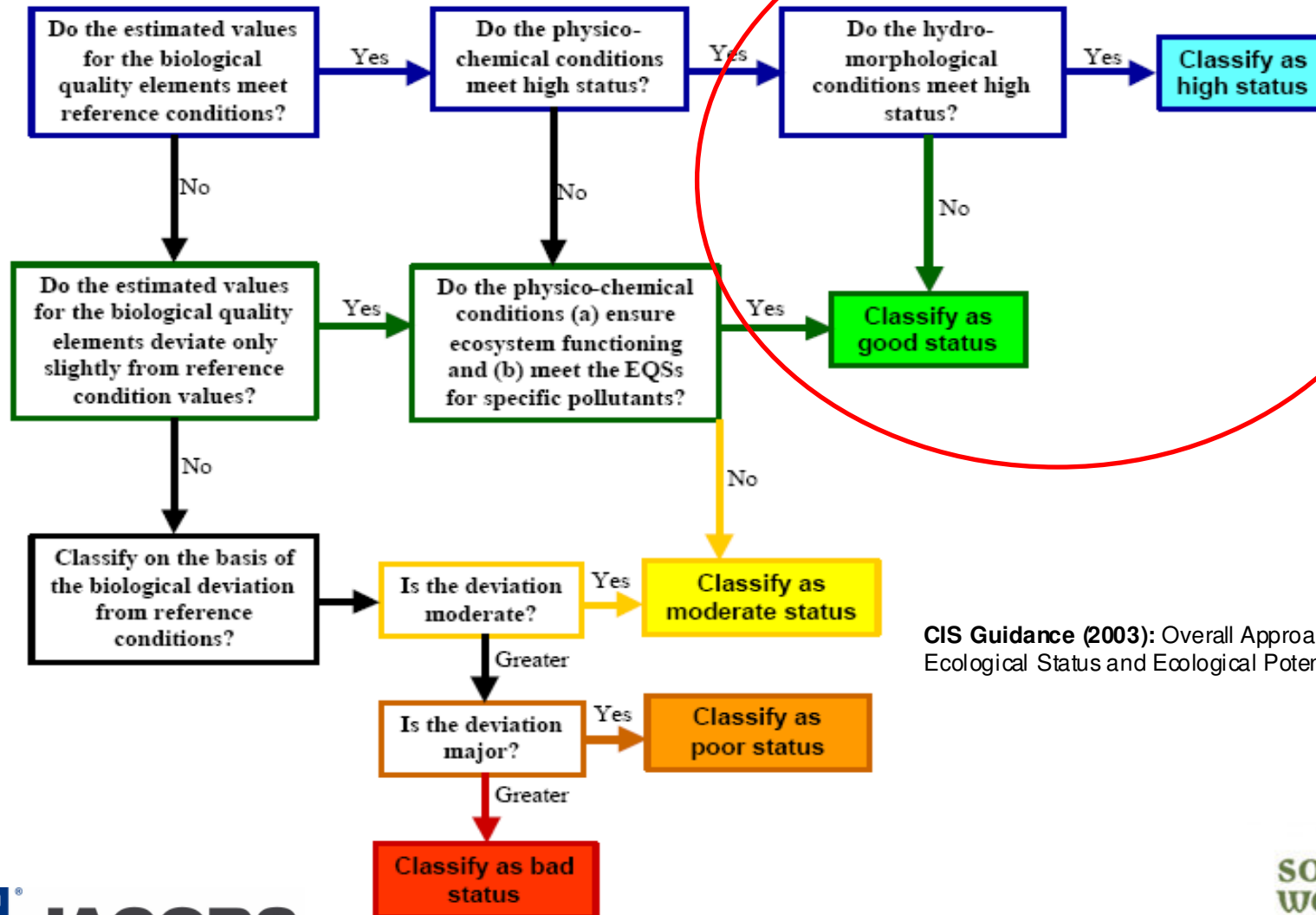
What is Morphology?

- Quality elements relating to the morphology of transitional and coastal (TraC) waters:
 - Depth variation
 - Structure and substrate of the bed
 - Structure of the intertidal zone
- The hydrological elements connected with these include:
 - Direction of dominant currents
 - Degree of wave exposure
 - Freshwater flow in estuaries

The Water Framework Directive (WFD) & Morphology

- The WFD aims at:
 - maintaining 'High Status' where it exists;
 - preventing any deterioration in the existing status of waters; and
 - achieving at least 'Good Status' by 2015
- Good Ecological Status (GES): Morphological conditions = *"consistent with the achievement of the values specified for the biological quality elements"*
- High Ecological Status (HES): Morphological conditions = *"totally or nearly totally to undisturbed conditions"*
- Presence of significant morphological pressures = driver for identifying a water body as a provisional Heavily Modified Water Body (HMWB)

The WFD & Morphology



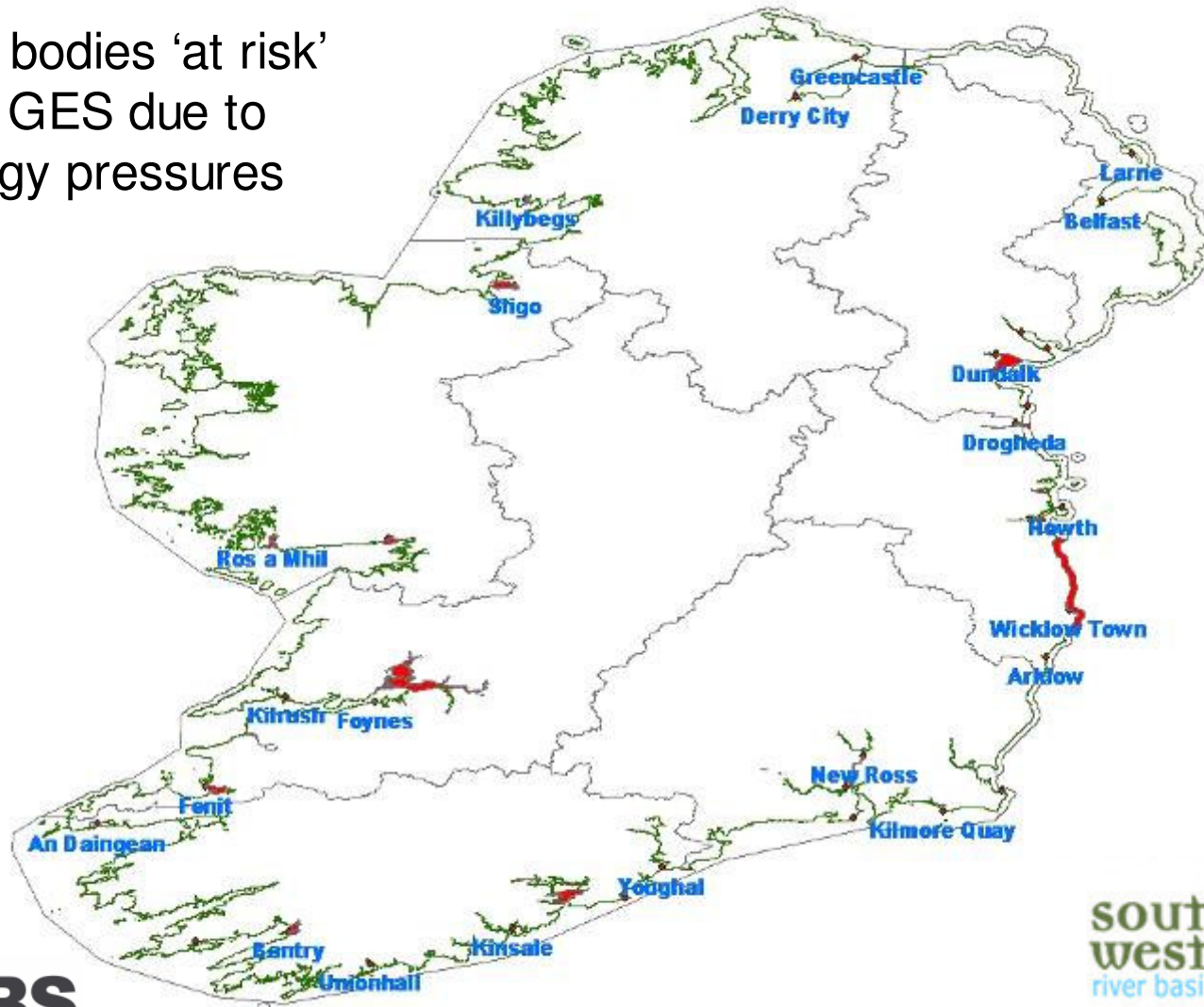
CIS Guidance (2003): Overall Approach to Classification of Ecological Status and Ecological Potential

Pressures on Marine Morphology

- Land claim
- Tidal channel realignment
- Dredging
- Disposal of dredged materials
- Other alterations to bed substrate
- Flow / Sediment altering structures
- Shoreline Reinforcement
- Flood defence embankment
- Restorative/Mitigation measures (?)

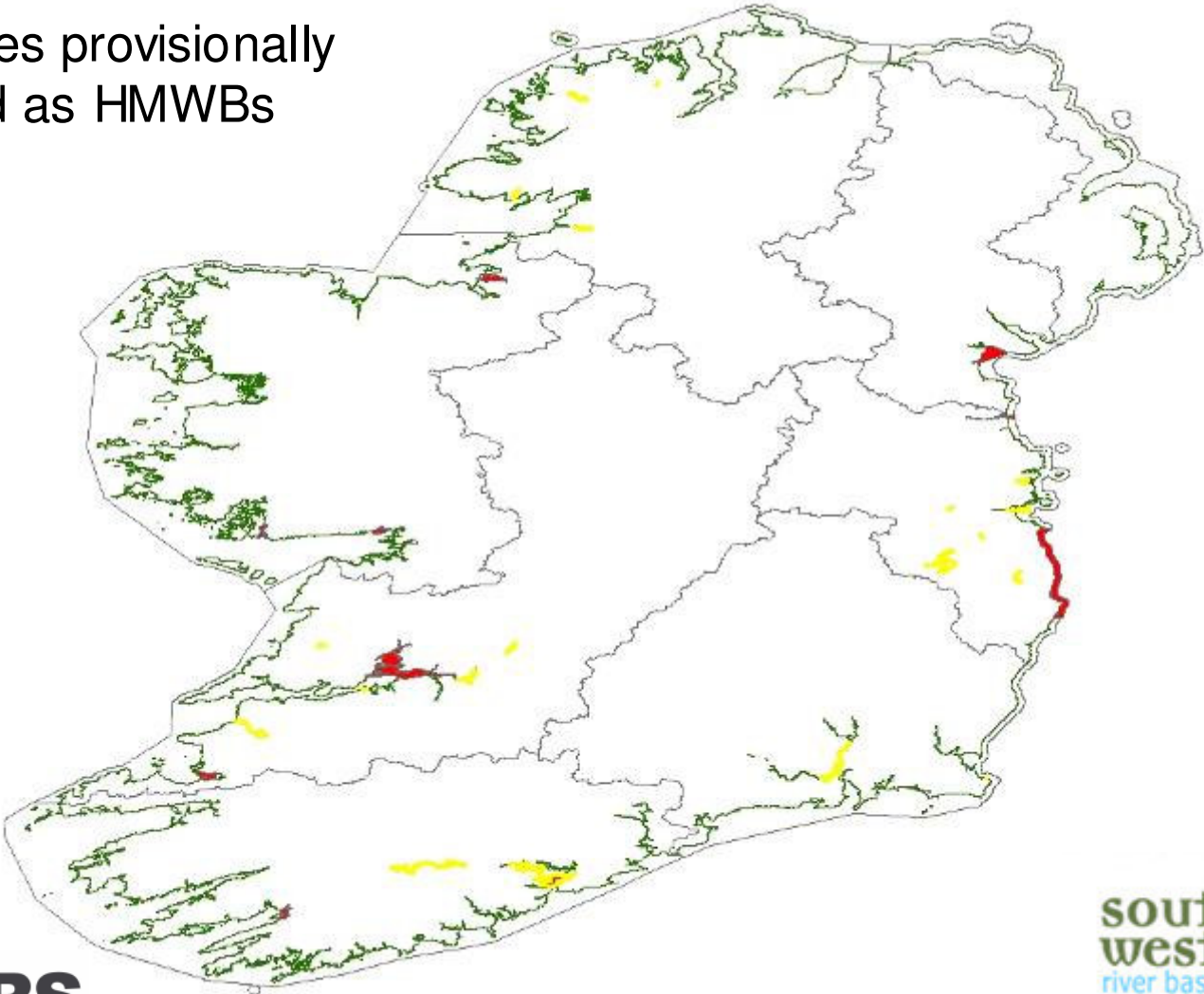
Pressures on Marine Morphology

TraC water bodies 'at risk'
of failing GES due to
morphology pressures



Pressures on Marine Morphology

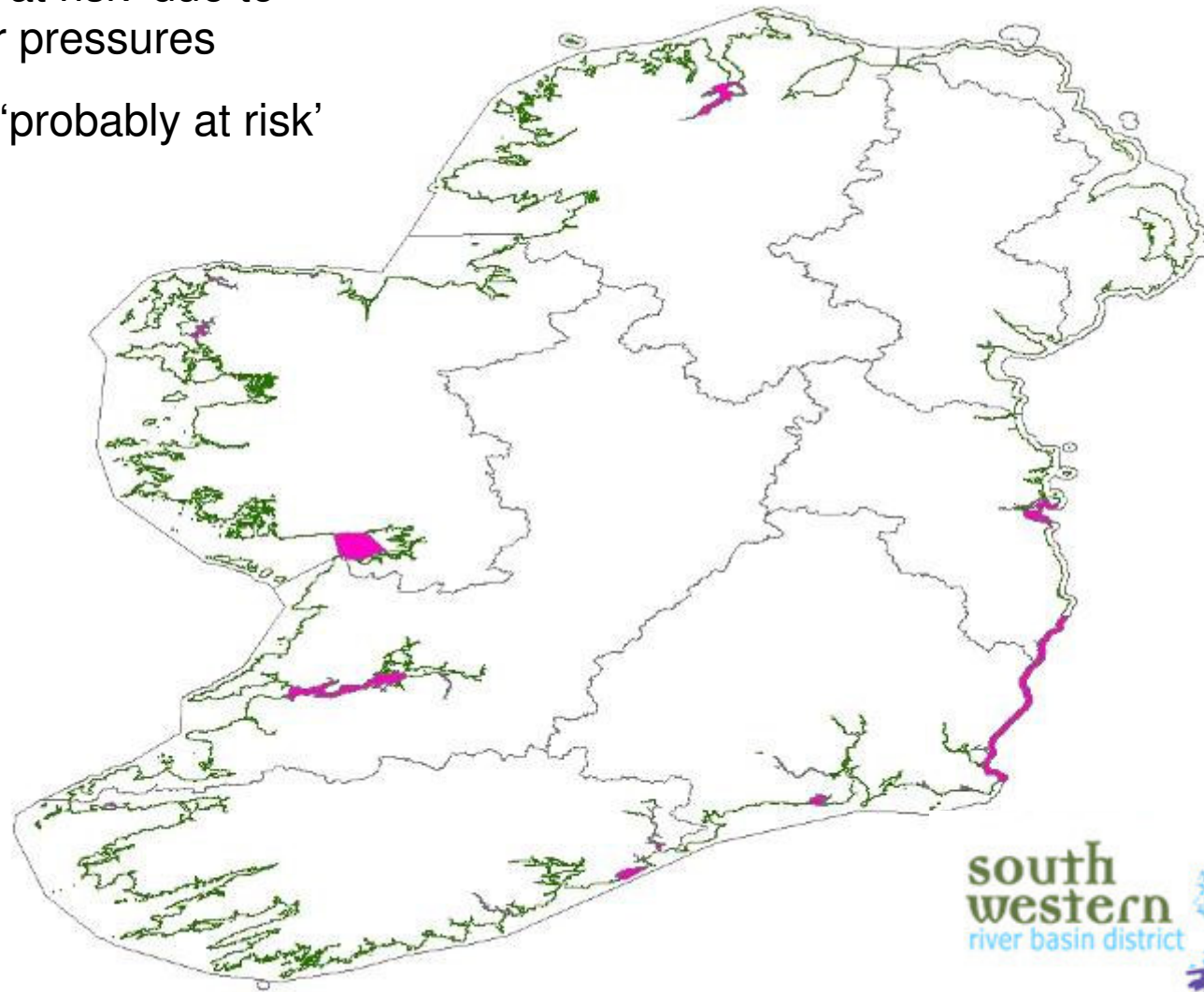
Water bodies provisionally identified as HMWBs



Pressures on Marine Morphology

TraC water bodies 'at risk' due to morphology & other pressures

TraC water bodies 'probably at risk'



Pressures on Marine Morphology

Non-pHMWB port related water bodies:

Morphology potentially 'at risk':

- Arklow
- Bantry
- Dingle
- Dundalk
- Galway
- Sligo
- Tralee
- Wexford
- Wicklow

Morphology & Other potentially 'at risk':

- Cork (adjacent water body)
- Dublin (3 adjacent water bodies)
- Dun Laoghaire
- Foynes
- Waterford

Non-HMWBs are required to achieve **Good Ecological Status**

HMWBs are required to achieve **Good Ecological Potential**

Further Characterisation

- **Step 1:** Further characterise the pressures & impacts for those water bodies identified as potentially at risk by providing an indication of risk to status class.



Further Characterisation

- **Step 2:** Identify suitable measures relating to morphology that seek to:
 - Prevent deterioration of quality elements
 - Maintain status/quality of these elements
 - Restore conditions of these elements so as to meet WFD objectives by 2015 (subject to exemptions)
- **Step 3:** Prioritise water bodies for which measures will be applied

Potential Measures

Prevent Deterioration:

- Decision Support Regulatory System
 - There are currently no environmental standards available to assess the ecological impacts of alterations to the morphology of TraC waters.
 - Where regulation occurs – decisions are largely based on expert judgement

Potential Measures

Prevent Deterioration cont'd:

| Pressures | Description | Potential Impact | Potential Mitigation Measures |
|---------------------------------------|--|--|--|
| Land claim | Enclosure of intertidal or subtidal areas within impermeable banks followed by infilling for use by | Disruption/alteration of coastal processes; disruption of natural sediment dynamics; Direct removal of sublittoral biodiversity | Reconsider location |
| | | | Indirect / offsite mitigation (offsetting measures) |
| Cost Effective & Technically Feasible | | | |
| Channel dredging | Removal or displacement of substratum by dredging or related techniques to create a new channel, to maintain navigation or flood conveyance, or for aggregate extraction | Alteration of bathymetry; Disruption / alteration of natural tidal and sediment dynamics; Destruction and alteration of benthic habitats; Mobilisation of contaminants; Increased turbidity (periodically) | Sediment management strategies (develop and/or revise) |
| | | | Indirect / offsite mitigation (offsetting measures) |
| Flow manipulation structures | Placement of boulders, deflectors, training walls, etc. for redirecting pattern of water flow | Disruption of tidal flow and interaction; Alteration of estuarine processes; Alteration of natural sediment dynamics | Modify structure design |
| | | | Create marginal habitats |
| | | | Indirect / offsite mitigation |

Potential Measures



Restoration:

| Pressure | Description | Potential Impact | Potential Restoration Measures |
|---------------------------|---|--|--|
| Bank reinforcement | Flood protection, erosion control, embankments; bank protection using gabion baskets or blankets, boulders, sheet | Coastal squeeze; Disruption / alteration of coastal process dynamics; Modification of sediment | Removal of hard engineering structures (e.g. naturalisation) |
| | | | Modify existing structures |
| | | | Bank re-profiling |
| | | | Managed realignment/Managed retreat |
| | | feeding areas | Restore aquatic and marginal habitats |
| | | | Indirect / offsite mitigation (offsetting measures) |

Cost Effective & Technically Feasible

Summary



Further Characterisation

- Help confirm those water bodies at risk due to morphological alterations
- Focus Programmes of Measures

Regulatory Decision Support for future modifications

- Regulatory screening tool to identify the risk that new activities could threaten WFD objectives
- A low risk suggests that there is no need for further investigation into morphology impacts
- A high risk suggests that further work may be required by the applicant to assess potential impacts or to define mitigation
- Intention is to promote efficient risk-based regulation

Identify where a regulatory exemption may be required

- Identify where there is a high risk of status deterioration