

**MORICAMBE BAY****Baseline Information**

**Start co-ordinate:** 314451, 556876      **Finish co-ordinate:** 316868, 557910

**Total length:** 23.0km

**Defended length:** 8.1km

**Earth Embankment:** 8.1km

**Saltmarsh:** 17.5km

**Environmental designations:**

- SSSI
- SAC
- SPA
- Ramsar
- AONB

**Monitoring carried out:**

- 27 beach profiles

**Site overview:**

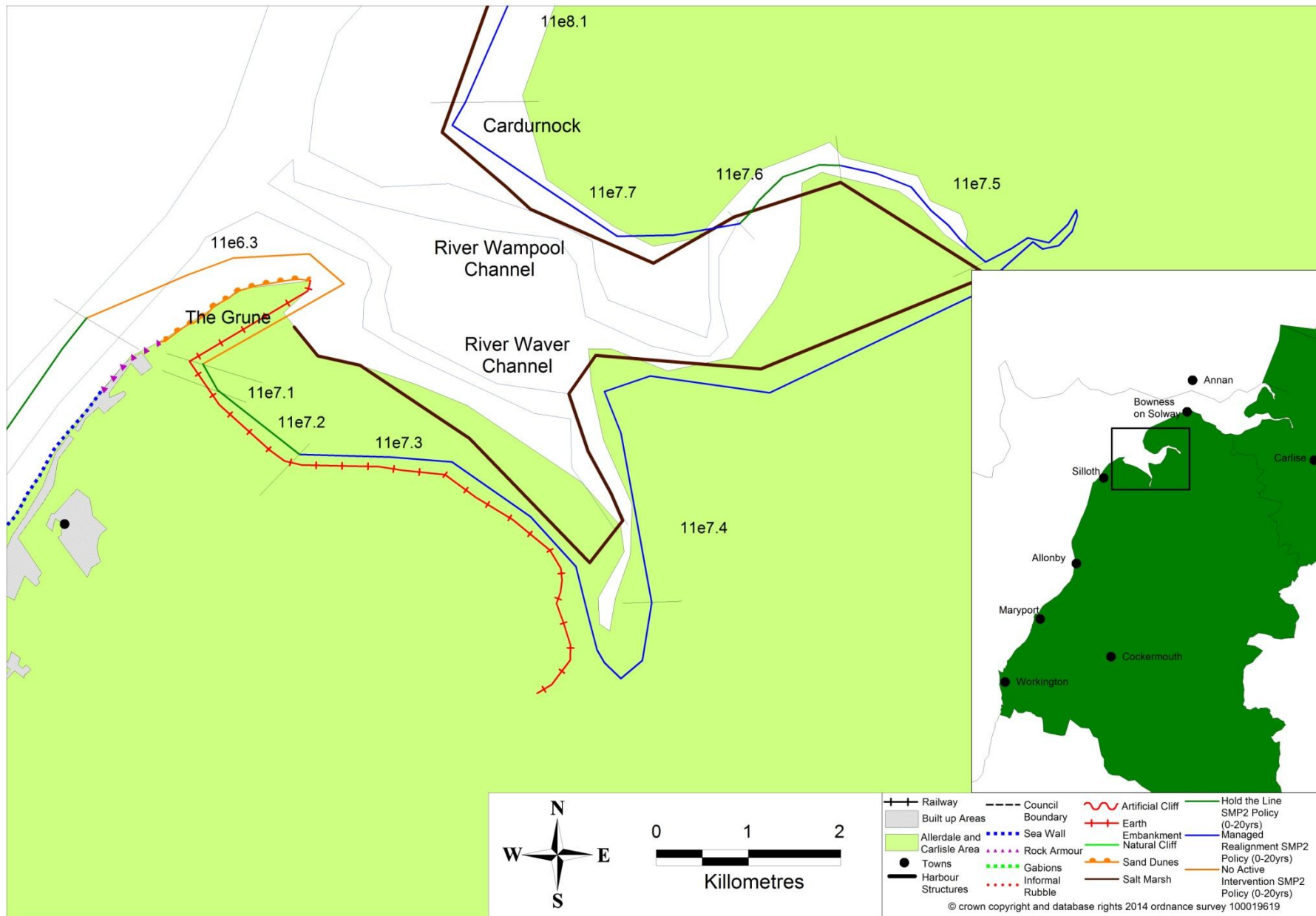
This section consists of a natural tidal embayment between the shingle spit of the Grune and the promontory of Cardurnock. This section includes a short section of dunes on the eastern side of the Grune. The remainder of the frontage is made up of saltmarsh. The rivers Waver and Wampool discharge into Moricambe bay in this section.

Earth floodbanks have been constructed along much of the western and southern shorelines (the landward edges of Skinburness and Newton Marsh) to provide flood protection to the low lying agricultural hinterland located to landward.

**The Current (SMP2) Policy:**

- **The Grune:** No Active Intervention in the short term (0-20yrs), medium term (20-50yrs) and long term (50-100yrs);  
**Skinburness (east):** Hold the Line in the short term (0-20yrs) and long term (50-100yrs) and Managed Realignment in the medium term (20-50yrs);
- **Skinburness to Wath Farm:** Hold the Line in the short term (0-20yrs), medium term (20-50yrs) and long term (50-100yrs);  
**Wath Farm Anthorn:** Managed Realignment in the short term (0-20yrs), medium term (20-50yrs) and long term (50-100yrs);
- **Anthorn:** Hold the Line in the short term (0-20yrs), medium term (20-50yrs) and long term (50-100yrs); and
- **Anthorn to Cardurnock:** Managed Realignment in the short term (0-20yrs), medium term (20-50yrs) and long term (50-100yrs).

The plan overleaf summaries the above information graphically:



**Summary of behaviour**

Moricambe Bay is sheltered from tidal and wave action by the shingle spit of the Grune and the promontory of Cardurnock. The bay is a sediment sink with sediment transported by the limited wave action, which penetrates into the bay. The low energy environment has provided conditions for development of extensive saltmarsh on the west and south fringes.

The following key points arise from analysis of the contemporary monitoring data:

**Offshore Wave Climate:**

- No relevant data available.

**Wind Climate:**

- No relevant data available.

**Sea Levels:**

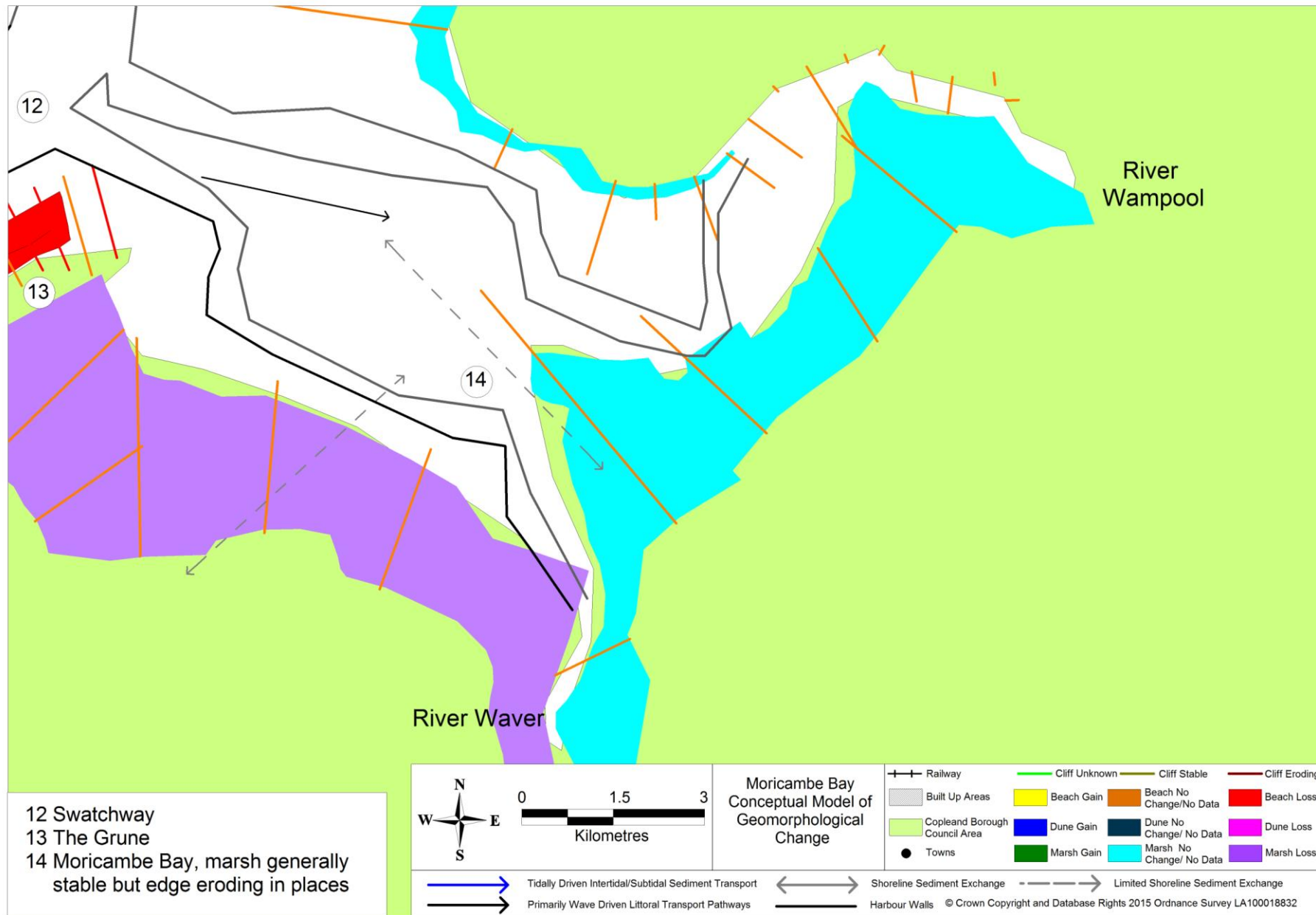
- Maximum tide level recorded at Workington in the last 20 years = +5.76 (m ODN) in February 1997, which equates to approximately a 1 in 50 return period; and
- The following predicted extreme tide levels apply (m ODN):

Return Period (years)	Workington	Entrance to Moricambe Bay
10	5.49	6.44
100	5.84	7.08
1000	6.18	7.79

**Foreshore & Shoreline Changes:**

- Most profiles cover saltmarsh only;
- Saltmarsh generally stable; and
- Based on comparison of profile in lee of the Grune, the edge of saltmarsh has retreated 180 metres since 2006.

This behaviour is illustrated graphically on the plan overleaf.



### **Risk Assessment**

The primary risks arising from the behaviour of coastal forcing processes (wind, waves and tides) and the reaction of the shoreline (beach and cliff changes, artificial defence conditions) across this frontage are:

- Overtopping and/or breaching of artificial defences causing flooding of the hinterland; and
- Erosion of marsh reducing natural protection and habitat loss.

The primary consequences of this behaviour are:

- Damage to and/or loss of agricultural land and associated property and infrastructure; and
- Damage to environmental habitats.

The table below shows the overall risk rating(s) that apply within this section of frontage. Overall risk is defined from the probability of conditions/behaviour occurring and the consequences the conditions/behaviour would have.

<b>Moricambe Bay Overall Risk Rating</b>					
<b>Policy Unit (11e)</b>	<b>Section of Frontage</b>	<b>Exposure</b>	<b>Probability Index</b>	<b>Consequence Index</b>	<b>Overall Risk Rating</b>
6.3	The Grune	Medium	Medium	Medium/High	Medium
7.1	Skinburness (east)	Low	Low	High	Medium
7.2	Skinburness to Wath Farm	Low	Low	Medium	Low
7.3	Wath Farm to Saltcoates including Waver to Brownrigg	Low	Low	Medium	Low
7.4	Newton Marsh	Low	Low	Medium	Low
7.5	Newton Marsh to Anthorn including Wampool to Normal Tidal Limit	Low	Low	Medium	Low
7.6	Anthorn	Low	Low	Medium/High	Low
7.7	Anthorn to Cardurnock	Medium	Low	Medium	Low

### **Current Behaviour**

Analysis of the monitoring data collected in 2015 provides the following key points:

#### ***Offshore Wave Climate:***

- No new data available for analysis.

#### ***Wind Climate:***

- No new data available for analysis.

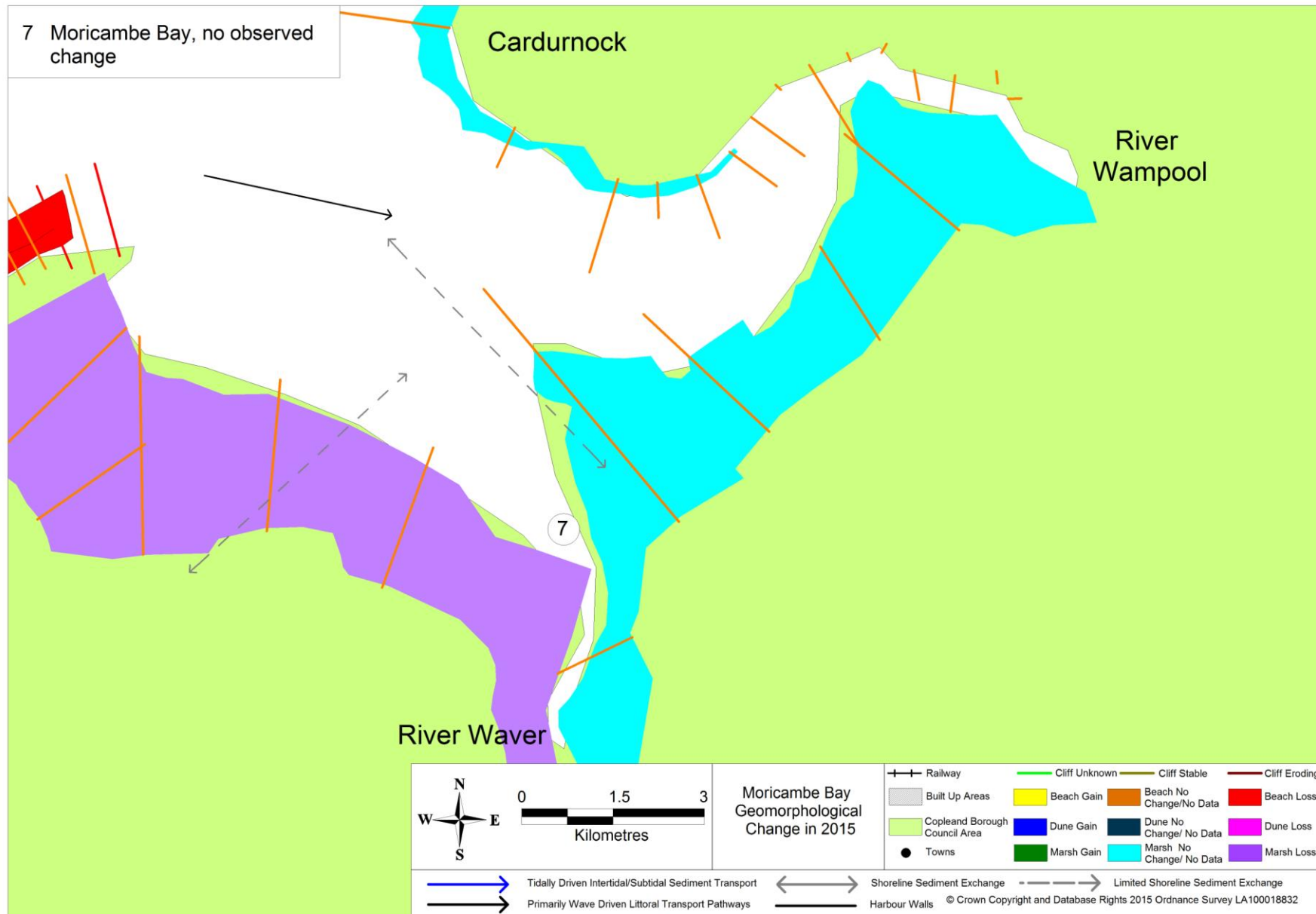
#### ***Sea Levels:***

- Maximum tide level recorded on Workington tide gauge = +5.164 (m ODN) on 22<sup>nd</sup> February 2015, equivalent to a level that would be expected to be exceeded once every 1 to 2 years.

#### ***Beach Changes:***

- Based on one of three profiles only recorded in 2015 – edge of saltmarsh in lee of the Grune retreated by 14 metres.

The plot overleaf summarises the results from the monitoring data analysis for this section in 2015.



**Uncertainties & Issues**

The following uncertainties have arisen from the data monitoring programme and analysis of the data collected:

- Quantities of sediment being moved into and within the bay;
- Changes in lower foreshore conditions between marsh edge and channels; and
- Changes in the overall area of the saltmarsh.

**Future Management Actions**

The following monitoring and management actions are recommended:

- Continue current monitoring regime;
- Improve additional remote sensing e.g. LiDAR;
- On-going monitoring of condition of artificial defence structures (EA responsibility); and
- Carry out remedial works to maintain integrity of defences, as required.

**Linkage(s) to Decision Making**

The monitoring provides information to support:

- Implementation of SMP2 policies, particularly; identification of timing for future capital works or capital maintenance works for artificial defences; and
- Habitat change.