



# National Strategy on Sea Defences, Flooding and Coastal Erosion: Evidence Report

Summary

06 June 2016





## Context

The Isle of Man Government is producing a National Strategy on Sea Defences, Flooding and Coastal Erosion in order to contribute to the economic, environmental and social resilience of the Isle of Man to current and future climate risks. The Strategy Evidence Report assesses three sources of flooding – from rivers, the sea and surface water together with coastal erosion - and identifies those areas at risk now, and in the future. The analysis has been carried out at a 1km grid scale with a consistent, scientific approach across the whole island. The grid squares with the most properties, community and public service assets, road and rail infrastructure and sites with environmental designations at risk of flooding and/or coastal erosion have then been prioritised. The final task was to help identify potential adaptation responses and provide indicative costs for developing and implementing these solutions.

The climate, geography and physical characteristics of the Isle of Man mean that it is prone to flooding as shown by recent events such as the coastal flooding of the Island's towns in the storms of early 2014, and the Island-wide flooding in December 2015. The Evidence Report has taken these events into account and lessons learned from them. The Evidence Report also complies with and should assist in the delivery of key policy imperatives related to climate change, planning policy, biodiversity, drainage and sewage management.

The Evidence Report's development was overseen by a Steering Group consisting of representatives from the Department of Environment, Food and Agriculture (DEFA), the Department of Infrastructure (DoI) and Manx Utilities. The Cabinet Office and Treasury also provided key inputs and Members of the House of Keys (MHKs), Government Ministers and other interested stakeholders were consulted at various stages in the development of the Evidence Report.

A high level approach has been taken to assessing risk that largely relies on existing modelling and data. Therefore, the results presented are not sufficiently detailed to be applied at the individual property level scale; further detailed studies are required for the areas identified at highest risk. In most cases, UK flood and coastal erosion risk management industry standards have been adopted to inform the assessment, although these have been customised to the Isle of Man context wherever possible. The detailed methodology, presented in Appendix A of the final Report, provides explicit references to the assumptions built into the risk assessment and Evidence Report development to ensure clarity regarding data and modelling certainty and confidence. It is essential that these assumptions are fully understood by those utilising the results of the risk assessment to ensure that future investment in adaptation responses is appropriate.

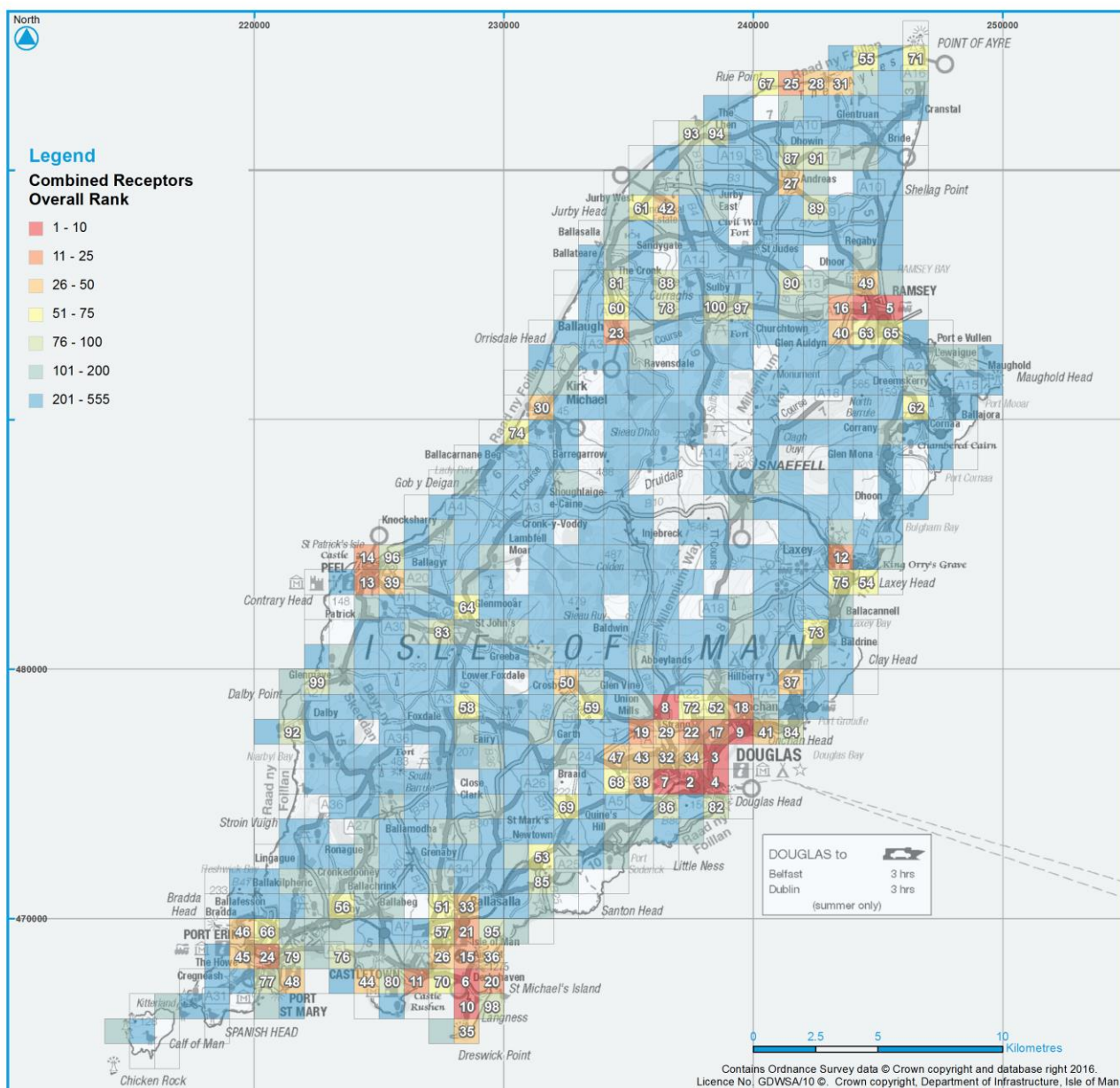
## Risk Assessment

The Evidence Report is based on a comprehensive Risk Assessment that has assessed the potential impacts of coastal, river and surface water flooding and coastal erosion on key economic, infrastructure, social and environmental assets. The methodology employed placed an additional weight on impacts for residential properties and vulnerable critical assets, such as hospitals and schools, due to the paramount importance of minimising risk to life. The approach taken was to divide the Island into a grid of 676 1 km squares and then identify a ranking relating to the severity of potential impact for each source of risk and each asset for each square. These were then combined to produce a comparative cumulative assessment of risk with the highest scoring grid squares (the top 100) identified as 'Hotspots' for further analysis.

The map overleaf shows the cumulative risk Hotspots: the darkest red areas are those at most risk, whilst the yellow and green are at lower risk, but still within the top 100. The squares that are not coloured represent areas for which no flood risk modelling information was available.



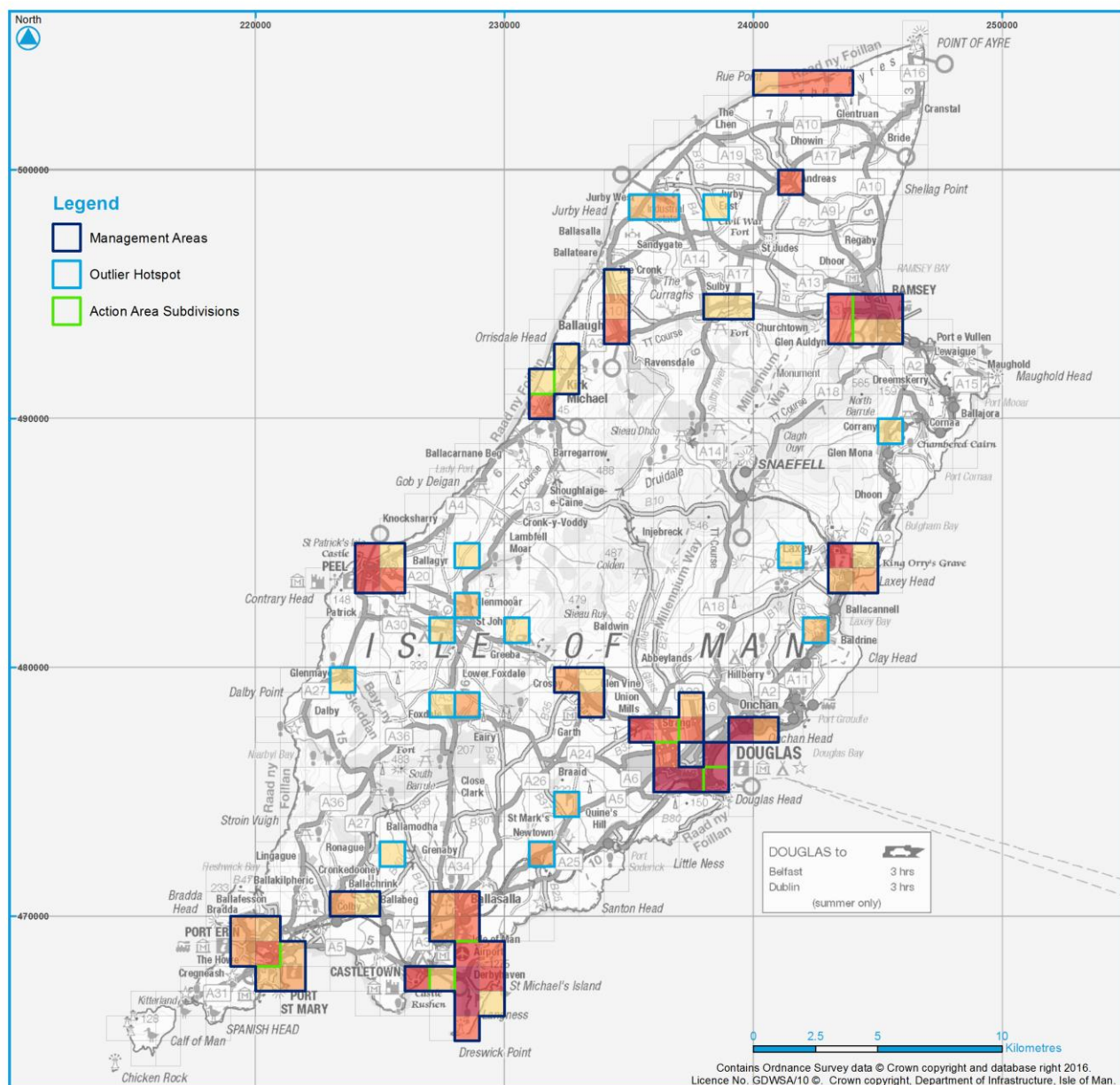
### Cumulative Assessment of Risk



The next step in the Evidence Report development process was to identify clusters of Hotspots to highlight where the key risk locations were situated. Clusters of three or more Hotspots were identified as Management Areas and additional analysis was undertaken within these areas. Management Areas were further sub-divided into Action Areas where there were multiple risk locations. Those Hotspots that sit outside the Action Areas were also assessed in detail.

The diagram overleaf shows the location of priority risk areas:

## Location of Priority Risk Areas



## Risk Assessment Results

The risk assessment revealed that for the priority locations at risk, shown in the map above, the following assets are at potential risk of flooding and/or coastal erosion, both now and increasingly, in the future as a result of climate change:

- 180 critical assets - 63 identified as highly vulnerable (e.g. schools and GP surgeries)
- 4,000 residential properties
- 32km Major (A and B) roads, 39 km Minor Roads and 6 km railway
- £900m economic costs over 100 years associated with the potential damage to residential and non-residential properties.



The Evidence Report identified 24 locations as being at high risk now and in the future. All of these locations require further consideration and potential intervention to manage the evident risk. 13 of the 24 priority locations were identified as being priorities for intervention in the near future (within the next 10 years); these are listed below (in alphabetical not priority order):

- Castletown
- Douglas (Douglas Bay; Douglas Harbour; Glass, Douglas, Dhoo, Middle River Confluence; River Glass; Upper Dhoo)
- Laxey
- Peel
- Port St Mary
- Ramsey (East and Coastal, and West)
- Sulby
- The Ayres.

The remaining 11 priority locations that require further investigation and intervention in the future are as follows:

- Andreas
- Ballasalla
- Ballaugh
- Castletown Bay
- Colby
- Glen Vine and Crosby
- Kirk Michael (Coastal, North, and South and Glen Wyllin)
- Langness Peninsula
- Port Erin.

### **Potential Adaptation Responses**

Recommendations were made for each of the above priority risk locations to help manage the identified risk. These range from ongoing monitoring to community resilience (awareness and property level protection) programmes, further investigations and potential schemes.

A high level, indicative assessment of the potential costs of further studies and flood and coastal erosion risk management schemes has identified that around £5.5m could be required for studies and £53.3m for schemes over the next 30 – 50 years. The Isle of Man Government and Manx Utilities are already developing schemes for a number of the areas at most risk. However, public sector resources should be focused on those areas at highest risk and where communities are least able to protect themselves. Ultimately, property owners are responsible for their own assets and risk cannot be completely eradicated in all locations. Where only a few properties are at risk, or risk levels are low, householders and businesses should consider resourcing smaller schemes to provide the required level of protection to ensure their own resilience.

### **Next Steps**

This Evidence Report represents the best use of the existing data to prioritise areas at risk, both individually and cumulatively, from coastal, river and surface water flooding and coastal erosion on a whole Island basis. As such, the ensuring Strategy will be of relevance to various departments in Government and Manx Utilities as well as interested economic, environmental and social stakeholders. The Strategy should be used to inform future investment and planning decisions at all scales. Planning policy in relation to flood and coastal erosion risk management may need to be re-visited and the evidence on which the Strategy is based should be used in making recommendations and decisions for planning permission.



This Evidence Report has been developed by a multi-partner Steering Group that has enabled holistic thinking across a range of agendas involving different government entities. It is important that the development of an Action Plan and ongoing development and implementation of the Strategy and Action Plan continues to be delivered through a cross-departmental approach.

The potential schemes that could be developed following this analysis may exceed the resources available to Government and therefore further prioritisation is required. An Action Plan should be produced identifying the key actions that need to be taken and Government departments should develop further policy guidance in relation to funding criteria, potentially linked to Return on Investment. It may also be appropriate for the Isle of Man Government to consider developing a funding approach in which external contributions are required to supplement Government investment in flood and coastal erosion risk management similar to the Partnership Funding Flood and Coastal Resilience approach in England.

The detailed analysis was undertaken on a Management and then Action Area basis in order to capture flood mechanisms related to wider river catchment processes. The intention was to identify holistic and strategic responses to strategic challenges as flood risk at specific locations cannot be investigated and addressed in isolation, up and down stream processes must be taken into consideration and addressed coherently. The Isle of Man Government and Manx Utilities should continue to develop, promote and implement catchment wide management approaches to maximise the impact of any interventions.

Once the analysis of Action Areas and Outliers has been finalised and an Action Plan is developed, it is recommended that a programme of community awareness raising and resilience is developed and implemented. This should help communities and businesses better understand their level of flood risk and the low cost solutions available that they can adopt themselves to improve their standard of protection within a short timescale rather than waiting for large structural defence schemes that may not be deemed appropriate to the location and cannot be justifiably funded from the public purse.

## Recommendations

The Evidence Report's recommendations are as follows:

- 1) The Strategy will be of relevance to various departments in the Isle of Man Government and Manx Utilities as well as interested economic, environmental and social stakeholders and should be used **to inform future investment and planning decisions at all scales**. Recommendations are provided for planning policy in relation to requiring sustainable drainage measures in all developments over a certain size, ensuring that flood risk is not increased elsewhere as a result of drainage and ensuring that areas subject to coastal erosion are not developed.
- 2) DEFA, DoI and Manx Utilities should take forward the analysis of prioritised risk locations (Action Areas and Outliers) and **develop an Action Plan for public consultation**. The key actions proposed are: ongoing monitoring, community resilience and awareness-raising, further studies and investigations and potential schemes.
- 3) **A Working Group should be set up with representation from various Government departments and Manx Utilities** to manage the Action Plan development and Strategy and Action Plan implementation ensuring that this is undertaken in an integrated and holistic manner aiming to achieve economic, environmental and social objectives.





- 4) Due to the significant challenge of surface water flood risk in many locations across the Island, Manx Utilities **should take account of the Strategy in discharging its drainage authority duties and implementing the Regional Sewage Treatment Strategy.**
- 5) The Action Plan and responses developed to manage the evident risks should be undertaken **through a catchment management approach** avoiding piecemeal intervention and ensuring that the management of risk in one location does not increase risk elsewhere.
- 6) **Low cost solutions working with nature through natural flood management measures should be adopted wherever possible** as these have the potential to reduce flood risk elsewhere and can achieve biodiversity and carbon benefits as well as helping to adapt to climate change.
- 7) The potential schemes that could be developed following this analysis are likely to exceed the resources available to Government and therefore further prioritisation is required. **An Investment Planning Tool has been developed to assist Government and Manx Utilities in deciding where public money is best invested.** DEFA, DoI and Manx Utilities, working with the Cabinet Office and Treasury, should develop policy guidance and funding criteria including a required Return on Investment; break-even (i.e. 1:1) is generally considered as the absolute minimum.
- 8) Once the analysis of Action Areas and Outliers has been completed and an Action Plan is developed, it is recommended that a **programme of community awareness raising and resilience is developed and implemented.** This will need to be managed sensitively to avoid creating unnecessary concerns regarding impacts on house prices and property insurance costs, but should assist communities in understanding the 'real' risk of flooding and coastal erosion to their properties and putting in place measures themselves to increase their resilience to this risk, now and in the future.
- 9) **The Risk Assessment that underpins the Evidence Report should be sustained as a 'living' database and updated on a regular basis** bringing in more robust datasets as these are generated. A number of detailed recommendations concerning the updating of datasets are set out in the full Evidence Report.
- 10) As the costs required to manage the Island's flood and coastal erosion challenges, now and in the future, are likely to exceed the resources available to the Isle of Man Government and Manx Utilities, it would be beneficial to **consider developing an approach in which Government investment for flood and coastal erosion risk management can be supplemented by contributions from other partners.** The Flood and Coastal Erosion Resilience Partnership Funding Policy in England provides an example of this type of initiative.

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