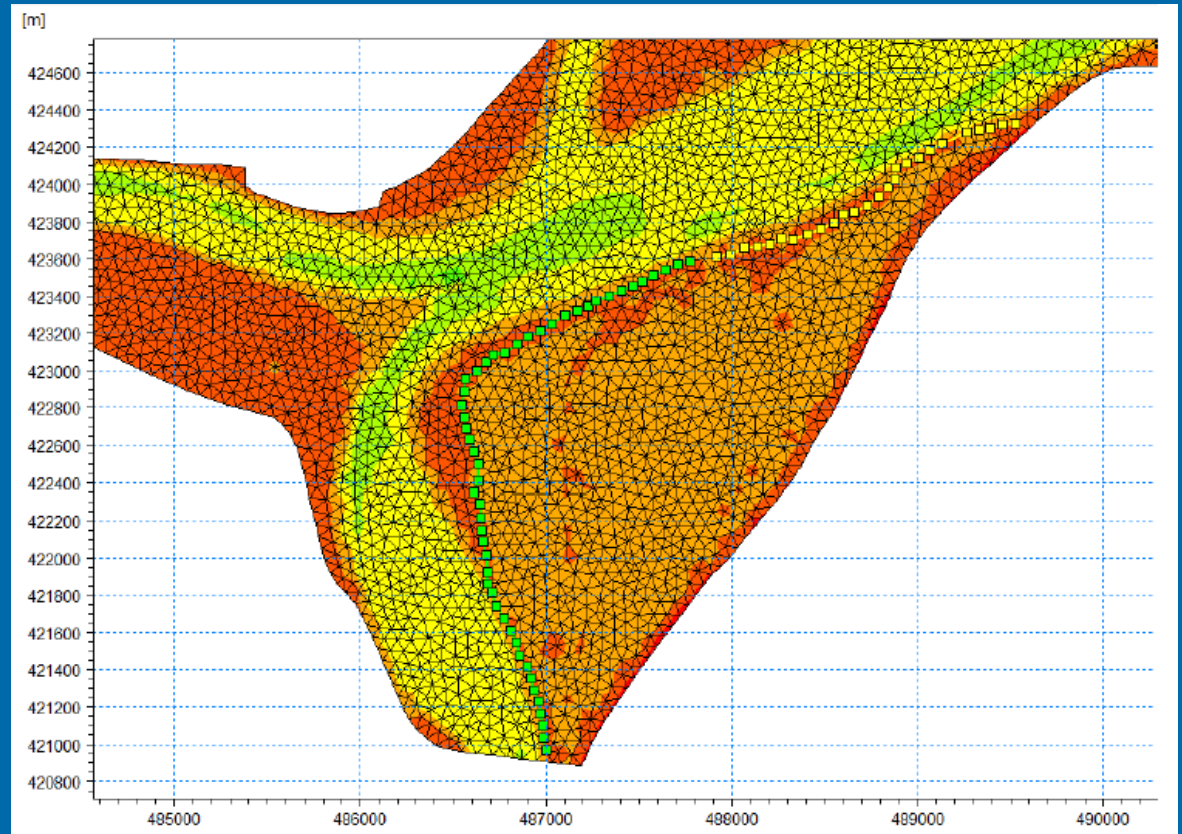


# Estuary & Open Coast Modelling Standards

What next..?



# To answer the question, what next? Its important to understand how:

- ➡ the Environment Agency deals with flood risk information
- ➡ how the organisation is set up to do this

# Environment Agency set up to deliver its responsibilities

- Statutory consultee to the planning system
  - (Avoid inappropriate development)
  - (Maintain the “Flood Map”)
- Category 1 responder Civil Contingencies Act 2004
  - (Plan for and respond to incidents)
  - (Maintain the “Flood Warning System”)
- Maintain existing “Flood Defences”
  - (Inspect, maintain & Improve)
- Grant-In-Aid/Partnership Funding for new schemes
  - (Traditional schemes and property level protection)

# The way we work

|                                  |
|----------------------------------|
| Home                             |
| Policies and procedures          |
| The way we work - work areas     |
| <b>Flood incident management</b> |
| ▶ Understand risks               |
| ▶ Prevent and mitigate           |
| ▶ Prepare                        |
| ▶ Respond                        |
| ▶ Recover                        |
| ▶ Post incident                  |
| ▶ Review outcomes                |

## Flood incident management

This diagram shows the steps we go through as an organisation to manage flooding incidents. Please click on any step below to find out more.



# Environment Agency is a two tier organisation reporting to Defra and operating in England only

## ➡ National responsibilities

(Directorate teams & once only operational teams)

## ➡ Area responsibilities

(Local teams with operational responsibilities)

# Our areas



## North

- 1 North East (NEA)
- 2 Cumbria and Lancashire (CLA)
- 3 Yorkshire (YOR)
- 4 Greater Manchester, Merseyside and Cheshire (GMC)

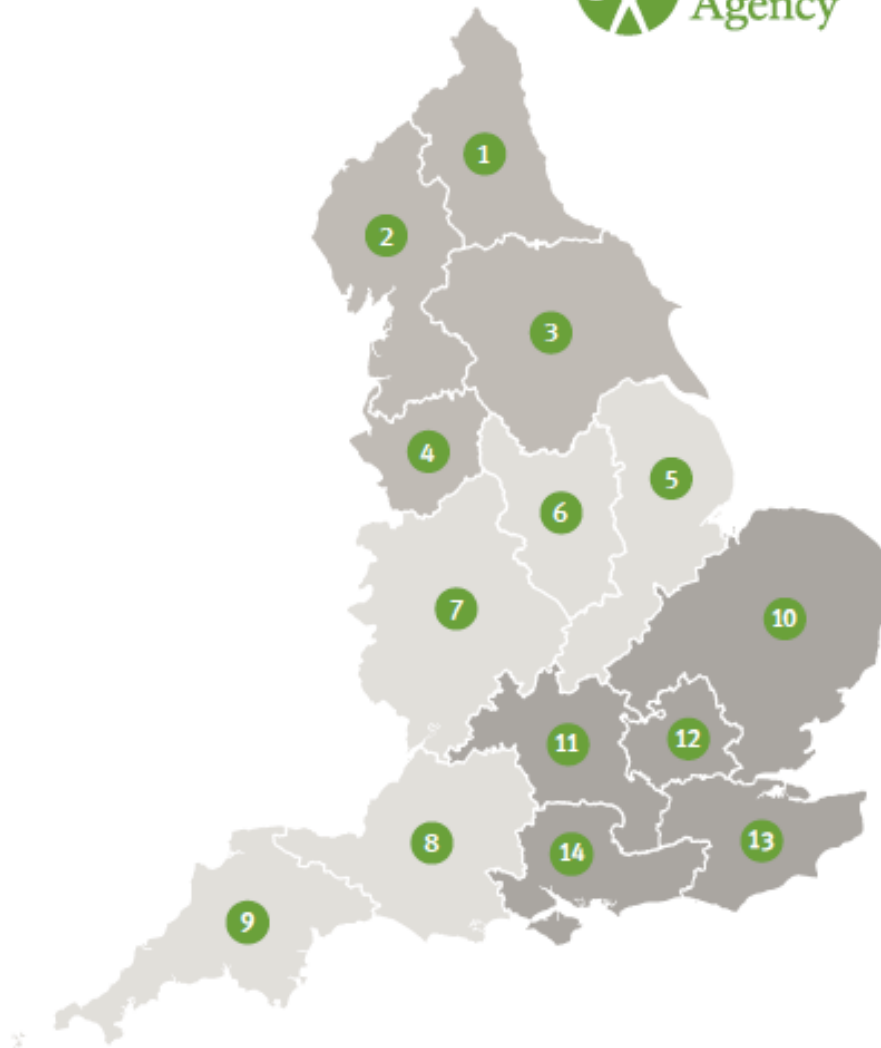
## West and Central

- 5 Lincolnshire and Northamptonshire (LNA)
- 6 East Midlands (EMD)
- 7 West Midlands (WMD)
- 8 Wessex (WSX)
- 9 Devon, Cornwall and the Isles of Scilly (DCS)

## South East

- 10 East Anglia (EAN)
- 11 Thames (THM)
- 12 Hertfordshire and North London (HNL)
- 13 Kent, South London and East Sussex (KSL)
- 14 Solent and South Downs (SSD)

NB: Greater London Environment Team operates as part of the South East



# Flood Risk managed in the Environment Agency

## National operational teams

EA Geomatics  
Modelling & Forecasting

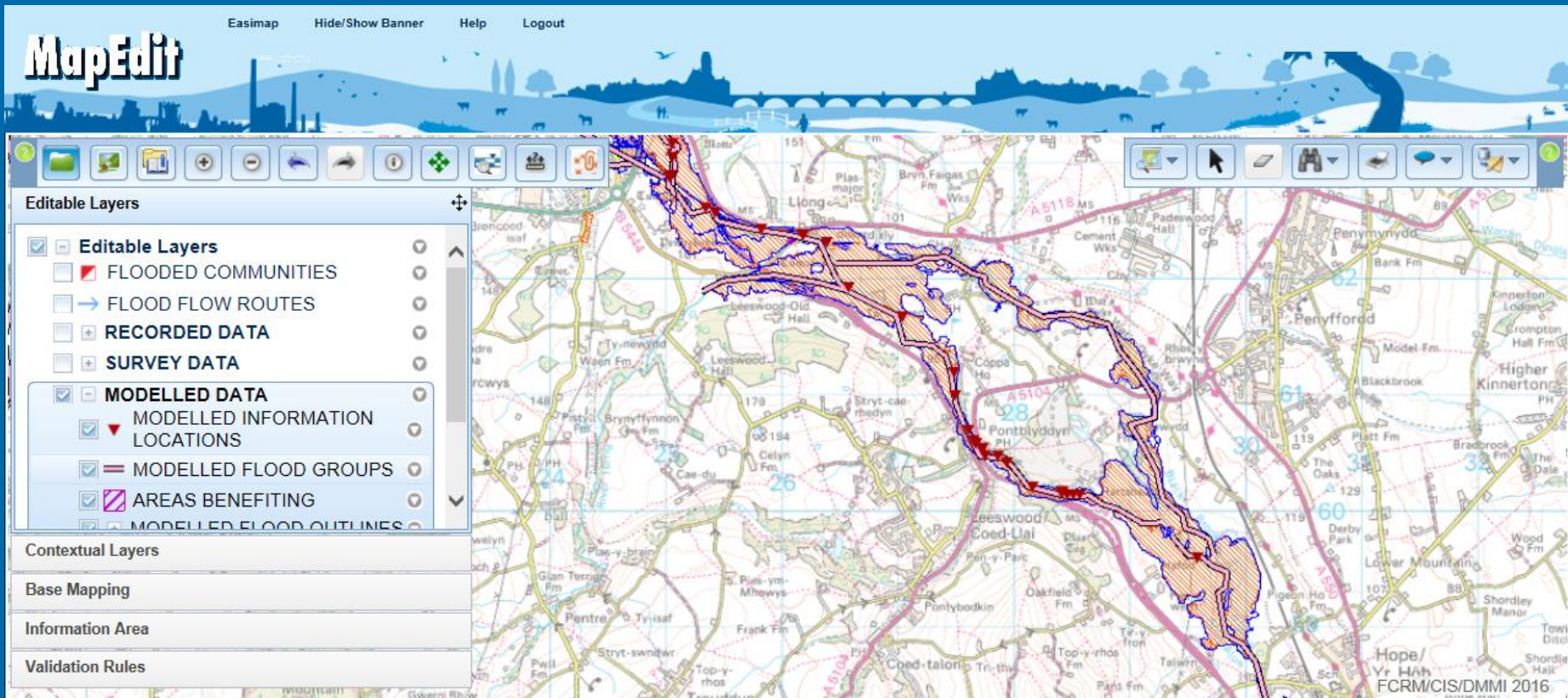
## Area operational teams

Partnerships & Strategic Overview  
Flood Resilience  
Asset Performance





# Modelled Data





## National baselining of coastal and estuary flood models

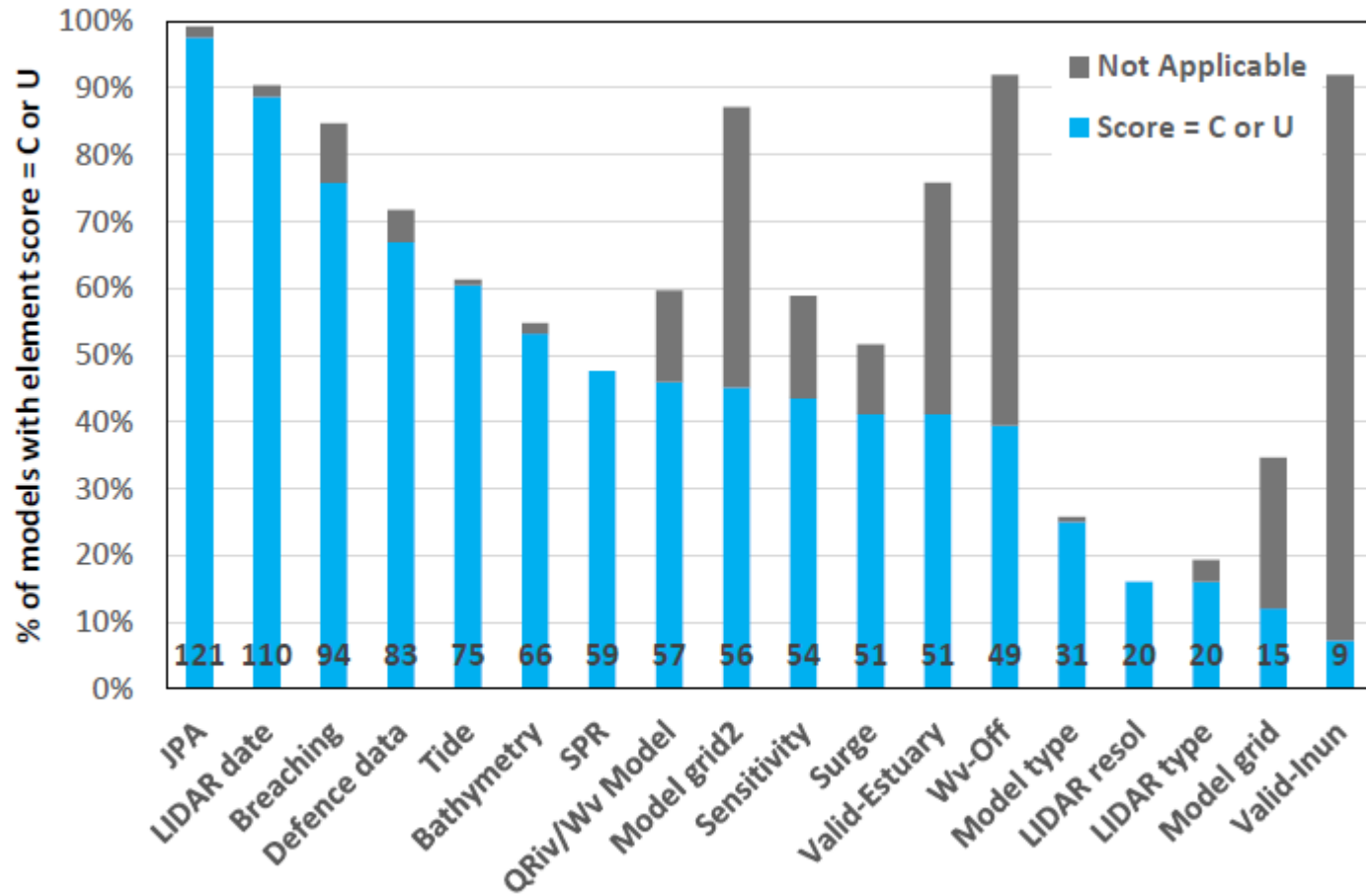


Figure 3. Percentage of models with element scores below target quality score ("B" score) – National.

# Non real time model issues

Table 9: Elements that are frequently below current standard and improvements required

| Element     | Description  | Improvement required to achieve "B" grade or better   |
|-------------|--|---|
| Breaching   | Breach scenarios considered.   | Breach scenarios should be considered and location of breaching determined based on site inspections, value of protected areas and local knowledge of past events   |
| JPA         | Joint Probability analysis used to select event combinations   | Analysis should be carried out using the JOINSEA method or better.  |
| Wv-Off      | Hourly time series of integral wave parameters (significant wave height, peak wave period and mean wave direction) offshore.           | Measured offshore wave data or UK Met Office hindcast wave data, validated with $RMSE^a) \leq 0.5m$ or $SI^b) \leq 0.25$ . The record length should be at least 20 years.<br>The Met office hindcast data can be validated by comparing the Met Office predictions with measured data (for selected storms) from the <a href="#">WaveNet</a> database or other sources. |
| Model grid2 | Model grid resolution for the inundation model, where the outputs of interest includes flow velocities (e.g. for hazard calculations). | Resolution should be 4 m or less.   |
| LiDAR date  | Age of LiDAR data for $\geq 80\%$ of area of interest  | Age of LiDAR data should be less than 5 years.<br>Alternatively, it should be documented that the changes between the modelled topography and the latest data is not significant for flood model outputs.   |

<sup>a)</sup> RMSE = Root Mean Square Error calculated using storm peak wave height data.  
<sup>b)</sup> SI = Scatter Index =  $RMSE\_peak\ Hm0 / average\ peak\ Hm0$

# Update 6 Year program

MF Allocation\_Needs Collated Return v11 - Excel

Hall, Niall

| Suppo | Area | RFC                        | Project Number | Activity | contributes to 300,000 properties | Project Title | M&F Business Outcome  | Activity                      | Project Overview a   | Project Overview b |
|-------|------|----------------------------|----------------|----------|-----------------------------------|---------------|---|-------------------------------|----------------------|--------------------|
| 36    | Yes  | Lincolnshire & Northampton | Northern       | MFC00010 | M                                 | Yes           | Tidal Hazard Mapping Review   | Planning advice               |                      |                    |
| 46    | No   | Solent & South Downs       | Southern       | MFC00068 | M                                 |               | Portchester - Paulsgrove Frontage, NaFRA rerun  | 2. Maintain and manage assets |                      |                    |
| 63    | Yes  | Devon & Cornwall           | SW             | MFC00180 | MF                                |               | Tidal Estuary Modelling - Fal Estuary, Cornwall   | Multiple Benefits             |                      |                    |
| 95    | No   | Solent & South Downs       | Southern       | MFC00384 | M                                 |               | Isle of Wight coastline, NaFRA rerun  | 2. Maintain and manage assets |                      |                    |
| 101   | Yes  | Devon & Cornwall           | SW             | MFC00462 | MF                                |               | Coastal Modelling - Devon and Cornwall Coastal Programme phase 2                            | 6. Multiple Benefits          |                      |                    |
| 102   | Yes  | Devon & Cornwall           | SW             | MFC00453 | M                                 |               | Coastal Joint Probability guidelines for Waves & Estuaries - Devon and Cornwall             | 6. Multiple Benefits          |                      |                    |
| 103   | Yes  | Devon & Cornwall           | SW             | MFC00491 | F                                 |               | Coastal Forecasting - Devon, Cornwall and Isles of Scilly Coastal Flood Forecasting Service | Incident management           | Forecasting and Warn |                    |
| 116   | Yes  | Wessex                     | Wessex         | MFC00622 | MF                                |               | Lower Stour   | 1. Incident management        |                      |                    |
| 131   | Yes  | Wessex                     | Wessex         | MFC00641 | MF                                |               | North Coast Wave Overtopping Flood Risk Assessment  | 6. Multiple Benefits          |                      |                    |
| 134   | Yes  | Solent & South Downs       | Southern       | MFC00644 | M                                 |               | Arun Tidal East Bank Model runs   | 6. Multiple Benefits          |                      |                    |
| 141   | Yes  | Wessex                     | Wessex         | MFC00652 | MF                                |               | Wymouth, Scarfont & Town  | Incident management           |                      |                    |
| 142   | Yes  | Wessex                     | Wessex         | MFC00653 | MF                                |               | Bradwater Revial, inc Huntworth Bus Pk  | 4. Planning advice            |                      |                    |
| 162   | No   | Solent & South Downs       | Southern       | MFC00677 | M                                 |               | Littlehampton NaFRA rerun   | 6. Multiple Benefits          |                      |                    |
| 165   | No   | Solent & South Downs       | Southern       | MFC00680 | M                                 |               | Emsworth to Littlehampton & Pogham Inland Banks NaFRA rerun                                 | 6. Multiple Benefits          |                      |                    |
| 184   | No   | Wessex                     | Wessex         | MFC00704 | F                                 |               | Tidal_Parrett_Moorland  | Incident management           |                      |                    |
| 183   | No   | Yorkshire                  | Yorkshire      | MFC00714 | MF                                |               | (Holderness Coast) Scarborough, Woodlands Vale Beck, Horneze - Stream and Foss Dike, E      | Planning advice               |                      |                    |
| 191   | No   | Cambridgeshire & Bedford   | Central        | MFC00716 | MF                                |               | Tidal River model review and update   | Planning advice               |                      |                    |
| 196   | Yes  | Essex, Norfolk & Suffolk   | Eastern        | MFC00725 | M                                 |               | Eastern Area Coastal Modelling  | Multiple Benefits             |                      |                    |
| 205   | Yes  | Wessex                     | Wessex         | MFC00737 | MF                                |               | Portsmouth (Portbury Ditch & Drove Rhyme)   | Planning advice               | New Model            |                    |
| 206   | No   | Kent & South London        | Southern       | MFC00738 | M                                 |               | East Kent Coast NaFRA re-run  | 6. Multiple Benefits          |                      |                    |
| 219   | No   | Wessex                     | Wessex         | MFC00755 | MF                                |               | Combech   | Planning advice               |                      |                    |
| 223   | No   | Kent & South London        | Southern       | MFC00758 | M                                 |               | Romney Schemes Modelling  | 6. Multiple Benefits          |                      |                    |
| 225   | No   | Wessex                     | Wessex         | MFC00762 | F                                 |               | Somerset_Coast_WSM  | Incident management           |                      |                    |
| 226   | No   | Wessex                     | Wessex         | MFC00763 | F                                 |               | Somerset_Coast_Burnham_Huntspill  | Incident management           |                      |                    |
| 237   | No   | Wessex                     | Wessex         | MFC00777 | F                                 |               | Tidal_Avon_Phil_Shire   | Incident management           |                      |                    |
| 238   | Yes  | Solent & South Downs       | Southern       | MFC00778 | M                                 | Yes           | Shorham Adur Tidal Walls Model runs   | 6. Multiple Benefits          |                      |                    |
| 251   | No   | Solent & South Downs       | Southern       | MFC00795 | M                                 |               | Southampton Water NaFRA Rerun   | 2. Maintain and manage assets |                      |                    |
| 271   | Yes  | Wessex                     | Wessex         | MFC00844 | MF                                |               | Piddie model request  | Planning advice               | New Model            |                    |
| 274   | Yes  | Wessex                     | Wessex         | MFC00848 | MF                                |               | Bristol Avon between Bath and Bristol   | Planning advice               |                      |                    |
| 284   | No   | Wessex                     | Wessex         | MFC00831 | F                                 |               | Somerset_Coast_Kingston_Wick  | Incident management           |                      |                    |
| 293   | No   | Kent & South London        | Southern       | MFC00905 | M                                 |               | Romney Marsh NaFRA re-run   | 6. Multiple Benefits          |                      |                    |
| 322   | No   | Wessex                     | Wessex         | MFC00944 | F                                 |               | Somerset_Coast_Clevedon   | Incident management           |                      |                    |
| 337   | Yes  | Wessex                     | Wessex         | MFC00969 | MF                                |               | Little Avon   | Planning advice               |                      |                    |
| 339   | Yes  | Wessex                     | Wessex         | MFC00973 | F                                 |               | Poolo_Harbour_West_Quay   | Incident management           |                      |                    |
| 344   | Yes  | Yorkshire                  | Yorkshire      | MFC00984 | MF                                |               | All of River Esk  | Planning advice               |                      |                    |
| 351   | No   | Wessex                     | Wessex         | MFC00995 | F                                 |               | Somerset_Coast_Uphill   | Incident management           |                      |                    |
| 380   | Yes  | Wessex                     | Wessex         | MFC01043 | F                                 |               | Preston_Beach   | Incident management           |                      |                    |
| 696   | Me   | Wessex                     | Wessex         | MFC01070 | F                                 |               | Swansea Coastal Assessment  | Incident management           |                      |                    |

Needs Identification | Technical Assurance Needs ID | Revenue Non-Modelling | Revenue Non-Modelling (2) | Sheet1

# Future

- ➡ Review the science behind the modelling standards?
- ➡ Include Real-Time modelling?
- ➡ Maybe look to include more time-bounded metrics?
- ➡ Look at standardising our own model reporting?
- ➡ Ask that FRA's consider reporting on these metrics?