

Broadland Futures Initiative

Minutes of the meeting held on 04 November 2024

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Attendees

Marie-Pierre Tighe (Chair)- Broads Authority, Giles Bloomfield- IDB, Rebecca Bromley- National Trust, Wendy Brooks- Norfolk County Council, Peter Doktor- Environment Agency, Kellie Fisher- Environment Agency, Vanessa Gouldsmith- Natural England, Kevin Hart- Norfolk Wildlife Trust, Fiona Hinds- Natural England, Andrea Kelly- Broads Authority, Philip Pearson- RSPB, Tom Say- Environment Agency, Charlotte Rivett- Norwich City Council, Yvonne Smith- Coastal Partnership East, Rob Wise- NFU, Kylie Moos (minutes).

1. Apologies for absence and welcome

Marie-Pierre Tighe (MPT) welcomed everyone to the meeting.

Apologies received from Mareth Bassett, Victoria Egan, Hannah Gray, Catherine Harries.

2. Update on technical work

Peter Doktor (PD) provided an update on the technical work that is being carried out by Jacobs.

Water Framework Directive and Historic Landscape Assessment

The Water Framework Directive (WFD) assessment methodology and historic landscape assessment have previously been shared with the Initiative Project Team (IPT) for review and the following changes will be made:

- Mapping of the WFD water bodies
- More information on the various sensitivity scores in the Historic Landscape Assessment.

The deadline for comment has been extended until the 8 November to allow all members of the IPT to provide their feedback on the two documents.

Andrea Kelly (AK) reported that the Freshwater Habitats Trust have been coordinating important freshwater areas which is an important national initiative for the BFI to be aware of.

Natural capital assessment methodology

- The initial draft technical report is being reviewed prior to issue to the IPT in late November 2024.
- Methodology aligns with Environment and Historic Outcomes Valuation (EHOV) guidance.
- Initial screening of action combinations; substantial alteration as to the location, extent, and/or quality of habitat because of the intervention?
- EVOH Level 1 assessment using EVOH-Lite tool; £ benefits for seven key ecosystem services.

- EVOH Level 2 where Level 1 would significantly underestimate; a bespoke approach quantified in biophysical and £ terms, based on Defra's Enabling a Natural Capital Approach guidance.

Salinity modelling

The work has been undertaken by HR Wallingford and the initial report was given in May 2024. The draft technical report is currently being reviewed by the project team before being shared with the IPT in early December 2024. PD presented a summary of the technical report.

The first section of the report focuses on collation, cleaning and checking of salinity monitoring data, fluvial flows, and tidal level data from various sources. HR Wallingford have also looked at individual salinity level events within a tidal cycle (High Water to High water (HW)) and the relationship between key variables.

Two approaches developed:

- Occurrence analysis; the probability of a salinity threshold being exceeded.
- Intensity analysis; predicts the max. and min. salinity levels in an event.

PD shared a map of the monitoring stations in the BFI area which includes both fixed monitoring points and locations where over times there has been regular spot monitoring. The focus has been on the fixed salinity monitoring points.

- The key variables include:
 - The high tide level at the start of the HW to HW cycle.
 - The low tide level in the middle of the preceding HW cycle (occurrence only).
 - The low tide level in the middle of the HW cycle (intensity only).
 - The average gauged flow rate upstream in the 24 hours preceding the HW cycle.
 - The month in which the HW cycle occurs as a proxy for seasonality.
- All the possible combinations of monitoring locations within the relevant river system are tested.
- Equations comprising the key variables are determined with different coefficients calculated for different combinations of monitoring location.

AK asked how the threshold of impact has been calculated and if the trigger is ecologically based or if it is determined by high and low salinity. There are detailed ecological studies which set out the thresholds of salinity which freshwater species can tolerate, and it is different for each one. PD responded, an ecological threshold was not used, but there were a number of thresholds that were used to differentiate brackish water and saltwater.

Phil Pearson (PP) reported that they had a similar experience to the Cantley example and experienced high flows depressing the salinity in the Mid Yare Valley.

PP asked if there was further context for the event profile at Cantley which showed that a relatively small tide increase resulted in a significant increase in conductivity coming up the river system. PD responded, the report uses the data to explain the relationship between factors such as tide level and salinity, but there will inevitably be an element of uncertainty.

- For the occurrence equation the average area under the curve (AUC) value is between 0.80 and 0.95 (where 0.5 is no predictive accuracy and 1.0 is complete accuracy). The predictive accuracy improves as the salinity thresholds increase.
- For the intensity equation the key variables on average explain 70% to 80% of the salinity behaviour.
- Wider spatial aspects were investigated to see if it is possible to predict away from fixed monitoring points, but it had relatively low success due to uncertainty about the timing of data collection.
- Predictive accuracy appears to be linked to the distance between flow, tide, and salinity gauges.

PD shared the intensity analysis which observed high conductivity and low conductivity during multiple tidal cycles of a saline intrusion event at Cantley. Conductivity is measured in microsiemens per centimetre ($\mu\text{S}/\text{cm}$). As a baseline, the North Sea is about 50,000 $\mu\text{S}/\text{cm}$.

- Predicted future tide levels and flows could be used in the equations to predict the future occurrence or intensity of salinity at the existing monitoring points.
- Predictions beyond the range of the current data should be treated with caution.
- The accuracy of the equations, including spatial relationships, could be improved with more data collection in various locations, but little guidance given concerning location.

AK recently gave a talk to the Broads Society and included the BFI. AK added, there was a lot of interest in the salinity report and asked if there will be a public summary which is accessible to the public alongside the technical report. PD agreed that a summary would be produced.

Hethal Innovation are working up an intern opportunity looking at early warning systems at monitoring stations. AK agreed to discuss this further with PD outside of the meeting. PD added, any opportunities to expand the monitoring network would be helpful, currently the modelling is tied to existing locations.

Rob Wise (RW) asked how the salinity model will be used in the context of BFI and if there will be a scenario analysis in the future. If there is going to be scenario analysis, who will be deciding what they look like. PD responded, the purpose of the model was to develop a tool that can be used to assess what the impact of climate change, rising sea levels and changes in fluvial flow would be on the salinity regime in the existing Broads system. The report is the about the development of the tool, the application of the tool will come at a later date once the different actions and action combinations have been identified.

At last week's Hickling meeting chaired by Steff Aquarone MP, there was a discussion around the Bure Loop Dredging Scenario report and it was mentioned how the dredging activity might have impacts on salinity. RW added, they could not see anything in the Jacobs report that referenced salinity and asked if the HR Walingford work has been applied to the Bure Loop Dredging Scenario report and to what extent has any calculation work been done on salinity in the context of the Bure Loop. PD responded, there has not been any calculations on salinity for the Bure Loop dredging scenario. One of the tidal locations in the salinity model is upstream from the Bure Loop and in principle, could be linked to the dredging scenario. The Bure Loop Dredging Scenario report states that salinity has not been investigated.

RW commented that they have heard several people discussing sea level rise creating pressure on groundwater saline intrusion and asked if this is being investigated. PD confirmed that this is one of the questions that is being put back to HR Walingford. PD added, in the Upper Thurne there is a contribution from saline groundwater that enters the system. Under normal conditions, salinity levels at Repps can be higher than at Acle Bridge further downstream, which is the reverse of the normal pattern and could be a causal factor that needs to be taken into consideration. RW asked if it is possible to predict what sea level rise will do to the salinity of groundwater in the Upper Thurne, and if the BFI going to be investigating this. PD responded, it is beyond the scope of this piece of work, but it is something that the BFI needs to think about. The 2021 salinity report also looked into the factors around the salinity inputs in the Upper Thurne, so it is something that the BFI is already aware of.

MPT asked if there is a timeframe for increasing data locations and if there are resources available. PD responded, Broads Angling Strategy Group have previously presented a project that uses new technology to add more points to the monitoring network, but unfortunately that is no longer taking place. PD added, additional data points in the upstream reaches of ecological sensitive areas would be beneficial if the resources are available. Fiona Hinds (FH) reported that the Norfolk Rivers Trust have a network of mobile monitoring units which are used in the catchment, particularly in the Wensum. PD estimated that data would need to be collected for a minimum of one year to show seasonality effects.

HR Walingford will be asked to provide a clear recommendation on the density and locations of data points required to improve the monitoring network. AK added, it is not just the rivers and channels that are of interest, but also the connected floodplains which would be a large piece of work. Partners are already collecting a lot of information and reserves are monitoring under their own management plans and required by Natural England, but all the monitoring needs to be integrated to help understand the baseline of the area. An integrated monitoring network should be scoped and costed so that the partnership can work together to look at funding.

PP agreed that a clear monitoring protocol is required and that Richard Cooper from UEA is interested in taking the citizen science approach on the Wensum into areas of The Broads e.g. Yare and Ant valley.

Socioeconomic scenarios

Jacobs are producing a technical report which investigates if the BFI should 'stress test' the appraisal results with different socioeconomic scenarios in addition to different climate change scenarios. [UK Shared Socioeconomic Pathways \(SSPs\)](#) describe alternative trajectories for societal development linked to climate change mitigation and adaptation.

- For each SSP are identified seven quantitative and six semi-quantitative indicators and their assumed trends through to 2100.
- In the appraisal process any flood risk management action (or combination of actions) may perform better or worse under different SSPs.
- The proposed approach is to weight the BFI objectives for different SSP.
- Each BFI objective has been assigned the most relevant SSP indicators.
- Depending on the future trend of the indicator each SSP is scored in the range -2 through to +2 in relation to the intent of the objective.
- The weights will reflect the scores e.g. if the economic situation deteriorates greater weight for those objectives (and hence actions) that support the local economy.

Wendy Brooks (WB) has previously worked on futures work for the national strategy and commented that all the indicators are applied to every objective and then they are scored differently because you are testing the deliverability of the objectives against different futures. PD agreed to follow up with WB outside of the meeting to discuss their previous experience on socioeconomic scenarios.

- Scoring/weighting activity has suggested a possible alternative approach where objective weights reflect the 'ideology' of the SSPs e.g. if greater emphasis on resource exploitation less weight on objectives that conserve resources.
- Project team has proposed we keep with the original 'stress test' approach.
- If desired different future values can be reflected through the EMF prioritisation of objectives for the longer-term.

RW commented that this piece of work will become the essence of some of the future decision making because the scenarios that are being envisaged will require trade offs which will be for the Elected Members to consider. Everyone will need to have a clear understanding of what the five different scenarios are, how realistic they are and how mutually exclusive or overlapping they consider them to be, for it to have any value. WB responded that they do not see socioeconomics assessment as part of the decision making trade-offs, it is stress testing objectives and providing a context in which the decisions are being made. It is not a decision making tool for members, but they do need to clearly understand the trade-offs, the interlinkages, and the wider implications.

GB commented, the importance of water resource when talking about socioeconomics has previously been alluded to, but there is a wider implication of contaminating a freshwater resource which may be in the floodplain as an abstraction point and that going up onto high

ground. The economics of ecosystems services is not well served and underestimates the value that it provides to society. The extent is vastly more significant than the land that is flooded by a fluvial or tidal event, it could be as large as tens of thousands of hectares in the Broadland area. GB added, the bottom line will be what is economically available and who is willing to pay for it, often it is reliant on government subsidy which is not sustainable.

GB went through a hypothetical scenario where a strategic washland is used for salt water and asked how long it would be before the land is recovered and what else is written off in the floodplain. For example, if there is a water extraction point in the floodplain, would the landowner no longer be able to access the water. GB added that they support the view of a strategic network of salinity monitoring points and estimated that at least five years of data is required for decision making. The BFI area is a multibillion area of economic value, and it warrants the investment.

WB commented that this is not just about flood restoration, but the future of the Broads, which will not be the same as the Broads of today. Members will need support in understanding the trade-offs and the decisions that they are making. GB added, they are cautious with trade-offs because within the BFI area, the baseline for some of the rarest species and habitats on the planet could be eroded.

Kellie Fisher (KF) reported there are internal discussions taking place at the Environment Agency regarding the multiple flood risk strategies that are thinking about landscape level change with climate change. It is noted that the challenge is greater when investment is across a mosaic of interconnected habitats that are all designated or priority habitats dependent on integrated flood risk management infrastructure. There is a system in place for making decisions on an asset by asset designated site by designated site basis, but for somewhere like the Broads, the same rules cannot be applied. KF and Amy Shaw who is the project sponsor for the Fens 2100+ project have escalated the conversation through the Delivery and Portfolio Board and the Strategy and Adapt Board. KF has asked what conversations are happening between the Environment Agency and Natural England regarding how to approach landscape level change with interconnected habitats reliant on integrated flood risk management infrastructure.

Bure Loop Dredging Scenario report

The IPT met in July to discuss the modelling for dredging scenarios in the Lower Bure and RW raised the point that not only do the overtopping heights need to be looked at, which might change as a result of doing any dredging work, but also looking at what the implications were for the volume of water that went over the walls and therefore the implications for what the IDB and EA pumping costs would be and the period of time under which land might remain flooded compared to a non dredged scenario. RW added that the suggestion was met favourably as being an important component of understanding the wider holistic costs associated with over topping and the suggestion was going to be taken away.

RW raised this again a week later when the NFU Vice President was visiting a farm looking at the work that the IDB were carrying out to remedy low spots with the Environment Agency,

and it was agreed that the suggestion was going to be taken away. RW raised the suggestion again at the Norfolk strategic Flooding Alliance on 25 September and never heard back from anyone. At last week's Hickling meeting RW raised this again with Aaron Dixie who committed that they would come back with an answer as to whether the calculations could be done. During the meeting David Kemp suggested that it could be done but it is not clear how much this would cost. RW acknowledged that the report is an ancillary piece of work that is not necessarily considered core to the BFI, but these sorts of impacts and decisions will be looked at by stakeholders and it is not simply a matter of current cost benefit treasury rules.

RW questioned why they were not sent minutes of the July meeting, and why the minutes that have been published online are brief, stating only that the IPT provided their technical views, and any questions raised today were taken back to the Jacobs technical team. The minutes do not refer to the suggestion that was made at the meeting. RW concluded, they hope that the suggestion is looked into and there is an acknowledgement that wider questions are very important to the conversation on flood risk management policy as part as adaptation schemes such as BFI and Fens 2100+, even if they are not part of current treasury rules.

KF responded, at the start of the July IPT meeting it was stated that formal minutes would not be taken due to the sensitivity of the report. The comments were taken on board, and this is why the Appendix C scenario maps were added. Maps were used instead of numbers on a spreadsheet so that they would be useful for members of the public.

Cubic meters over a period of time would not necessarily provide the consequences of potential overtopping. Volumes are not a metric that are generated as part of the modelling, and an overall volume calculation for the whole of the Broads would not necessarily be a useful exercise without further assessment. The Bure Loop Dredging Scenario report was a £13,000 piece of modelling work. We will now investigate whether overtopping volumes for individual locations and over discrete timescales could be provided.

KF thanked RW for their valuable contribution to the July IPT meeting and confirmed that the observations were taken away. KF added that going forward, if there is something that a member of the IPT would like to see on the BFI in more detail, then it is helpful for the project team to have clarity of that in writing.

AK suggested that the standard IPT agenda is reviewed to allow sufficient time for partners to provide detailed technical responses, when necessary, but also for the IPT to be updated with the overall strategy and complexities such as those that KF has reported in today's meeting.

3. Update on Elected Members Forum

Jan Davis was appointed as Chair, and Matthew Shardlow was appointed as Vice Chair at the Elected Members Forum (EMF) which took place on 14 October. Three decisions were on the agenda; about the process to combine individual Flood Risk Management actions, about the approach for engagement, and how coastal realignment should be incorporated into BFI. All three decisions were resolved unanimously.

One of the actions from the meeting was for Elected Members to be provided with a report which they would then share with their respective local authority and raise awareness about the BFI. A copy of the report was shared with the IPT and MPT asked there are any changes that need to be made. PD requested that in section 2.4 of the report, the wording regarding coastal frontages is amended. As officers for the local authorities represented on the EMF present today, WB and Charlotte Rivett (CR) were asked to review the draft report and provide feedback to MPT before it is sent to the EMF.

4. Proposed meeting dates

The IPT were provided with suggested meeting dates for 2025. Several members of the IPT were unable to make the first meeting in January and proposed a new date. The dates for 2025 were confirmed as the following.

Date	Time	Location
Monday 20 January 2025	11.30-1.00pm	Online
Monday 10 March 2025	11.30-1.00pm	Online
Monday 28 April 2025	11.30-1.00pm	Online
Monday 23 June 2025	11.30-1.00pm	Online
Monday 11 August 2025	11.30-1.00pm	Online
Monday 6 October 2025	11.30-1.00pm	Online
Monday 1 December 2025	11.30-1.00pm	Online

5. AOB

North Norfolk MP Steff Aquarone chaired the meeting at Hickling last week and reported that they had an intervention in the commons where the BFI was mentioned. It was agreed that once the BFI strategy is complete, the outcome of the BFI will receive a ministerial response.

AK gave a presentation to the Broads Society and shared slides on the BFI. The audience was between 50-60 people, and they were interested in the BFI and appreciated the information which is provided for Harnser.

6. Date of next meeting

The next meeting of the Broadland Future Initiative is 11.30am-1.00pm 20 January 2025.

Summary of progress

Outstanding actions	Meeting date	Assigned to
Review the draft EMF report and provide feedback to MPT	04.11.2024	WB/ CR