**“How to use” guide for the River Restoration Centre’s monitoring Protocol:**

**Key:**

* **Target/why –** What is the overall objective of the works which are to be monitored?
* **What –** What are you trying to observe from your monitoring? E.g. increased sinuosity and habitat heterogeneity through re-meandering and adding large wood / reduction in nutrient inputs by installing SuDS.
* **How –** What techniques are being used to collect data and what assessment methods are you using? E.g. electro-fishing monitoring diversity, abundance, density, length and age.
* **When –** When are you collecting data (month/season)? Duration/length of monitoring period, how many sampling repeats, how regularly?
* **Who –** Who is the individual and/or organisation responsible for monitoring? Will this be done by more than one organisation?
* **Data –** Do you have access to any pre-project data? E.g. monitoring data from the Environment Agency.
* **Cost –** Cost of monitoring. Are all costs in kind, or are there expenditures for e.g. external lab analysis.
* **Which WFD objective is this helping to achieve –** Which WFD quality element will be addressed by your works? If not WFD, does the work/undertaking aim to improve favourable conditions (for designated sites or species, e.g. SSSI/SAC/SPA/BAP) or does it relate to any other policy drivers (e.g. public engagement, socio-economics, flood management, ecosystem services)
* **Priority and confidence:**Priority: High/Medium/Low importance that your monitoring method can show potential improvement of the related WFD quality element; the favourable condition (i.e. designated site or species such as SSSI, SAC, SPA, BAP); and/or other policy drivers (e.g. socio-economics, flood management, ecosystem services).
Confidence: High/Medium/Low confidence that the monitoring is robust, suitable and has the potential to show what you are trying to observe within the CRF project time limit.
* **On target –** Are the monitoring tasks outlined running to schedule? If no, why not?
* **Reporting tool and reporting output –** How will your collected monitoring data be recorded and the analysis outputs reported?

| **Target/Why**What is the overall objective of the works which are to be monitored? | **What**What are you trying to observe from your monitoring? | **How**What methods are you going to use? | **When**What periods over the year and how often? (to indicate variability)And where if possible | **Who**Who is going to do this? | **Data**What existing data is available in addition to the monitoring being outlined here | **Cost**(can be in kind) | **Which WFD quality element is this helping to achieve?**If not WFD specify (e.g. SSSI, SAC, BAP or other policy driver) | **Priority**High/medium/low linked to WFD or other designation  | **On target**Are the monitoring tasks outlined running to schedule?(if no specify) | **Key reporting tool and reporting output** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Confidence** High/medium/low robustness of monitoring |
| **Will be different for each project – what is the project aim for the area being photographed?**  | A visual change in (please specify) as a result of (please specify) | Fixed point photography – (for methodology, refer to RRC’s Practical river monitoring guidance 2011)X number of photos (state if known) & if points indicated on map (Y/N) | E.g. before, immediately after and post works recommended (state dates if known, e.g. month and year) | Project team/ Volunteers | State if fixed point photography or any anecdotal/ ad-hoc photography prior to CRF | Through project/ In-kind | State which of the following, the FPP demonstrates: a) WFD targets, b) designated river or c) other e.g. social science targets | Priority: High (All CRF projects were encouraged to prioritise FPP) | Yes/ No | A time-series of fixed point photographsState if included in e.g. final report |
| Confidence: Please state (only grey if both confidence and priority are High) |

**Example of Fixed Point Photography:**

| **Target/Why**What is the overall objective of the works which are to be monitored? | **What**What are you trying to observe from your monitoring? | **How**What methods are you going to use? | **When**What periods over the year and how often? (to indicate variability)And where if possible | **Who**Who is going to do this? | **Data**What existing data is available in addition to the monitoring being outlined here | **Cost**(can be in kind) | **Which WFD quality element is this helping to achieve?**If not WFD specify (e.g. SSSI, SAC, BAP or other policy driver) | **Priority**High/medium/low linked to WFD or other designation | **On target**Are the monitoring tasks outlined running to schedule?(if no specify) | **Key reporting tool and reporting output** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Confidence**High/medium/low robustness of monitoring |
| Improved morphology on a significant part of the SAC/SSSI. 23/25 | Improvement of the form and function typical of a Norfolk chalk river (e.g. channel narrowing, restoring gravel bed, increasing sinuosity, increase in woody debris) | Fixed-point photography(substitute for morphological monitoring) | Every quarter and when work is undertaken | Pensthorpe Conservation Trust | Historical and pre-works pictures; have aerial pictures in addition as well. | In total: £23k | Morphology: moderate; target: goodImprovement of favourable condition (SAC/SSSI) | Priority: High | Yes | Comparing timeline of photographs. Final report (either in-house or by Atkins) |
| Confidence: High |
| Improve water quality of urban run-off from Fakenham and adjacent agricultural land. 25 | Reduction innutrient inputs through installation of SUDS - creation of reed beds on the floodplain to assist with control of run-off | Visual checks of drainage and signs of pollution. | Weekly monitoring of sites for pollution by visual checks.  | Pensthorpe Conservation Trust | Environment Agency records | Phosphate: good (also monitored to achieve SAC target)DO: high Diatoms: bad | Priority: Medium (subjective) | Yes – Atkins accessing SUDS viability. Discussing the situation with the Environment Agency project team at the next on site meeting | Water quality checks and fish survey by Environment Agency, standard data forms/sheets and reports provided.Comparison between pre and post works surveys. Monitoring data collected on forms, spread sheets and protocols (digital).Planning final report of monitoring results. To be produced either in-house or by Atkins. |
| Confidence: Medium (subjective) |
| Water quality monitoring (will discuss what is monitored, e.g. phosphates, DO). Also substituting diatom monitoring. | EA monitoring periods to be confirmed | Environment Agency | Priority: Medium(already good/high), but High as substitute for diatoms) |
| Confidence: High (but Medium as substitute for diatoms) |
| Improve fisheries, invertebrates and plant communities within the SSSI and SAC. 23/25 | River restorationand provision ofimprovedbackwater habitat will significantlyimprove fisherieshabitat andenhance fishpopulations. | Invertebrates –standard EA protocol, 3min kick (+1min hand sampling) - identification of taxa, abundance, community characteristics, BMWP, ASPT, family LIFE score and PSI | Summer 2013 and summer 2015 (monitoring might continue with RiverFly, to be discussed) | Pensthorpe Conservation Trust (Mark Ryland) | Pre works surveys and for fish surveys historical records by Environment Agency  | Invertebrates: moderateMacrophytes: no dataFish: moderate; target: improve (but maybe still moderate)SSSI/SAC target: lasting improvement in ecological condition | Priority: High  | Yes |
| Confidence: Medium (needs to be extended to show results)  |
| Macrophytes – standard EA protocol, rapid assessment + plot surveys and fixed-point photography. | Summer 2013 and summer 2015 | Pensthorpe Conservation Trust | Priority: Medium (no WFD data) |
| Confidence: High |
| Fish – PDC electro-fishing, catch depletion surveys at each reach + at reedbed. Identifying species, number of individuals, weight and length. | 29/08/13 and summer 2014/15 (to continue with EA routine survey) | EA | Priority: High |
| Confidence: Medium (within project time) |
| River corridor ecological survey | Summer 13/14/15 | Pensthorpe Conservation Trust | Priority: High (for SSSI/SAC target) |
| Confidence: High |
| Restore the connectivity of the floodplain and floodplain wetland habitats, including the restoration and creation of reedbed habitats. 23/25 | Significant, measureableand lasting improvementin ecological condition tosignificant part of Unit 48 of the River WensumSSSI/SAC and floodplain. | Protected species monitoring including water vole, bat, crayfish and otter | Pre-monitoring: water vole, bat, otter, crayfish (summer 2013)Post-monitoring: repeat in 2014 and 2015 | Pensthorpe Conservation Trust | Ecological surveys by Wild Frontier, pre works surveys by Pensthorpe Conservation Trust.  | Increase in BAP speciesImprovement of favourable condition for SSSI/SACMorphology: moderate, target: good | Priority: High (for BAP species) | Yes |
| Confidence: Medium (within project time) |
| Protocols will also be established to monitor colonisation of the new floodplain habitats, notably reedbed, for a range of indicator species. | Summer 2014, 2015 (to continue in following summers). Weekly monitoring of reed bed species and colonisation. | Pensthorpe Conservation Trust | Priority: High (for SAC target) |
| Confidence: High |
| Fixed-point photography (substitute for monitoring increased favourable condition for SSSI/SAC) | On-going - every season + before, during and after any works. About 30 points (but will increase this year). Points are GPS recorded and mapped. | Pensthorpe Conservation Trust | Priority: High (for SSSI/SAC target) |
| Confidence: High |