**RRC Catchment Restoration Fund 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.

| **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)NOTE- can use RRC update questionnaires as a start. | **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) & indicate if RRC have been provided with a map of points (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: Please state (only grey if High) | Yes/ No | A time-series of fixed point photographsState if any other analysis is being done |
| Confidence: Please state (only grey if High) |

* **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?

**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)NOTE- can use RRC update questionnaires as a start. | **Key reporting tool and reporting output** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Confidence** High/medium/low robustness of monitoring |
| **Improve in-channel habitat** | Increase number of suitable gravel spawning sites; gravel cleaning & weedingImprovement in in-channel heterogeneity | Electro-fishing and community-led redd ID counts @ atleast 10 sites in each catchment (Teign & Dart)Fixed point photography @ each project site where physical works are completed (woody material, habitat improvement)Baseline habitat walkover surveys on all failing Dart and Teign catchment waterbodies to identify opportunities to improve fish habitat | All pre and postElectrofishing, summer 2012, 2013, 2014Walkover surveys, January – April 2013 | Electro-fishing (WRT);Redd counts (Local volunteers and angling fraternity);Baseline habitat walkover surveys (WRT) | Existing data collected through other WRT projects; Environment Agency WFD data (e.g. existing electro-fishing sample sites which complement the CRF sampling sites). Historical redd records where collected. | Through project & in-kind support from volunteers | ‘Fish’ in all relevant failing waterbodies within both the Dart and Teign catchments | Priority: High | Yes | All electrofishing data (including EA data) uploaded to a GIS database. |
| Confidence: Medium (expected outcome within the timescale of the CRF programme) |
| **Reduce sedimentation and improve bankside habitat** | Reduction in mobilisation of sediments and heavy metals & siltation in riversMitigation or phyto-remediation of all substances which have an adverse impact on river biota prior to entering failing watercoursesFarm advice: fencing, alternative drinking and crossing points, gutters. | Diatom sampling to assess the remediation techniques @ 10 sites atleast 10 sites in each catchment (Teign & Dart)Fixed point photography @ each project site where physical works are completed (bankside coppicing, willow spiling, animal drinking points and fenced off areas)Database of farm advice and grants. Post farm advice surveys to farms planned for close of project. | Diatoms, Pre: Autumn 2012, Spring 2013,Post: Spring 2014 & Autumn 2014 | WRTWRT & University College London (diatom sample analysis) | Existing data collected through other WRT projects; Environment Agency WFD data | Through project & in-kind support from students | ‘Fish’, ‘Phytobenthos’, ‘Copper’, ‘pH’ and ‘Temperature’ in all relevant failing waterbodies within both the Dart and Teign catchments | Priority: High | Yes | Diatom analysis, indicator species. Report from UCL, uploaded to GIS database. |
| Confidence: High |
| **Ease barriers to fish migration** | Improvement in migration success of salmonids and other fish species in the Dart and Teign catchments | Electro-fishing and community-led redd ID counts @ atleast 10 sites in each catchment (Teign & Dart) | Pre and post at each site | Electro-fishing (WRT);Redd counts (Local volunteers and angling fraternity); | Other WRT projects; Environment Agency electro-fishing WFD data in addition to CRF sites | Through project & in-kind support from volunteers | ‘Fish’ in all relevant failing waterbodies within both the Dart and Teign catchments | Priority: High | Yes | Semi-quantitative electrofishing method (Crozier & Kennedy, 1994). All electrofishing data (including EA data) uploaded to a GIS database |
| Confidence: Medium (only 1 pre and 1 post) |
| **Reduce impact of pH on biodiversity** | Reduction in the adverse impact that acidified moorland (creates low pH levels) has on ecological health of waterbodies in the Dart catchment | pH acid feasibility study using data loggers in Dart catchment.Impact of trialled lime sand in ditches to buffer acid run-off / peaks in acid waters. Control and treatment site (1 liming site).Monitoring suite as agreed by project partners. Control and treatment will have comparable monitoring. | * Macrophytes, annually
* Invertebrates, Spring & Autumn
* pH, continuous (10 min interval, eight loggers
* Diatoms, Spring & Autumn
* Fish, Fully quantitative electrofishing, annually (Summer)
* Chemistry, twice a year
* Photography, river bed and substrate each site visit.
 | WRT, lead. Project advisory group: South West Water, EA, Dartmoor National Park, Duchy, fisheries association, Natural England. Water chemistry technical support from University of Plymouth. | 10 year partnership project with the Environment Agency on “Effects of pH on salmonids physiology & river biodiversity” and related data sets/ studies | Through project & in-kind support from fishermen, students. Donation from South West Water for post project monitoring beyond CRF. | Investigation into solutions to reduce ‘pH’ (a failure in multiple waterbodies within both the Dart catchment) | Priority: Medium (investigative only) | Yes | Monitoring point (treatment site) + Control, spatial and temporal analysis - See monitoring proposal for the liming trial. |
| Confidence: High |
| **Reduce road run-off from A30** | Assessment into the impact/s of the A30 road on the Teign catchment | * Conductivity data loggers in the Fingle brook
* Sediment sampling
* Water sampling for metal bioavailability
 | Summer 2013 – Summer 2014. Data loggers collecting data continuously for 1 year.Sediment and water sampling in winter and summer flows. | WRT and Plymouth University | Existing data collected through other WRT projects; Environment Agency WFD data | Through project & in-kind support from students | Investigation into solutions to mitigate or remediate substances which enter watercourses (directly) or indirectly, related to WFD failures. | Priority: Medium (investigative only) | Yes | Analysis of conductivity in relation to rainfall and spate events, spatial analysis.Model of the mobilisation of sediment and heavy metals into riversFinal report |
| Confidence: High |
| **Partners, stakeholders and public engagement** | Is any monitoring being done to assess turnout & response at:* community engagement volunteer surveys, e.g. redd counts
* community events
* partnership meetings
* Leaflets
* Notice boards
 | Attendance sheets/ sign in sheets, time sheets for in kind time contribution.Catchment Based Approach in this area will assess impact of DTRIP project by assessing previous partnerships and project works.Use visitor data from centres / reserves for assessing number of people viewing signs/leaflets. | Partnership Advisory Group meetings (Winter & Summer) and newsletters (Spring & Autumn).CaBa events to be announced in Spring 2014.Visitor numbers / people engaged obtained at end of project. | DTRIP Project officerCatchment hosts for CaBa | Building upon existing relationships within the catchmentsUse of data from Dartmoor National Park / Woodland Trust/ | Through project | Not WFD relevant but project specific | Priority: Low (secondary project objective) | Yes | Quarterly updates to project partnersStakeholder mapping.Visitor number data. |
| Confidence: High |