A collage of a person in a forest

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# Restoration Effectiveness Monitoring Packages Intro

We are producing a number of monitoring packages that will provide standardised field methods, data collection, and data analysis frameworks to help restoration practitioners monitor and assess how effective their restoration actions have been in meeting their restoration objectives. The focus is understanding the changes in habitat and/or biota that are attributable to your restoration actions.

These monitoring packages will drastically reduce the time and resources required to process data, generate communication materials (figures, tables, etc.), and statistically evaluate the impact of your restoration actions. With collection of standardised data, comparisons across similar systems or meta-analyses of restoration approaches will be possible, informing future restoration projects and providing benchmarks against which to interpret changes in your project.

The monitoring packages prioritise low-cost and low-tech approaches, which are anticipated to make monitoring more accessible, widespread, and should not need revision over time as technology advances. Although we target restoration of Pacific salmon habitat, many of the components assessed have value far beyond the perspectives of salmon.

### Monitoring Package Selection

You will select a suite of monitoring packages that reflect the objectives of your restoration project[[1]](#footnote-2). The monitoring packages are modular, allowing you to create customized monitoring plans that suit your project. Our packages:

* Align measurement with restoration objectives, rather than techniques. As such, they are applicable to form-based and process-based approaches;
* Focus on quantitative, objective, and repeatable data collection and analyses;
* Prioritise metrics with known relationships with salmon biomass and/or are associated with resilience to extreme events; and
* Assume a before-after-control-impact (BACI) format, but can be applied in other contexts.

### What the Monitoring Packages Provide

Each monitoring package will contain the following:

* Step-by-step field methods, including a 1-page field reference and more detailed reference materials;
* Field datasheets for recording data on paper or via survey software;
* A data entry form to prepare the field data for analysis;
* Data processing and analysis guidance, with step-by-step instructions; and
* Code (in R Markdown format) that will conduct the data processing, analyses, and produce outputs.

The outputs will be a combination of summary tables, figures, and statistical tests.

### What You Provide

If you follow the guidance, there will be minimal input required for data analysis for the majority of users (e.g., specifying locations of folders, selecting cut-off criteria, providing GPS coordinates). However, you will be responsible for:

* Developing *a priori* hypotheses and predictions associated with your restoration actions and the selected monitoring package metrics.
* Basic R and RStudio abilities. Many free online intro courses are available, and the software itself is all free. A few hours of learning should suffice to run our data analyses.
* Interpretation of data analysis outputs, first individually and then in context of one another, potentially including outputs of multiple monitoring packages.
  + Your *a priori* hypotheses and predictions will be the biggest help, but not all combinations of results can necessarily be foreseen.
  + The local, traditional, and scientific knowledge of you and your partners will be essential to understand the changes observed at your restoration site, and what constitutes success.

### What We Ask

We are in the process of producing more Monitoring Packages for you to choose from. If you find a package useful, please share it with others. Please get in touch with the authors (oliver.franklin@dfo-mpo.gc.ca and nicci.zargarpour@dfo-mpo.gc.ca) or your local DFO restoration staff if you have requests for additional packages.

The standardised data you collect can be highly valuable beyond your projects. Please share your data to the SHaRe (Salmon Habitat Restoration) System, so that others can conduct research and meta-analyses, or use your sites as guiding benchmarks. Together we can learn from and improve restoration efforts on a broader scale.

1. See the ‘Objective Interpretation Tool’ for guidance [↑](#footnote-ref-2)