About CHaMP Metrics

Columbia Habitat Monitoring Program (CHaMP) metrics relate to the quality and quantity of salmonid habitat and are primarily used to evaluate status and trend within ESA listed salmon populations in the Pacific Northwest. Metrics are also utilized to plan and monitor specific restoration actions. Additionally, metrics serve as inputs to in-stream habitat models currently being developed for CHaMP, including hydraulic, net rate energy intake (NREI), and habitat suitability models.

Metric Generation

CHaMP currently produces five different types of metrics based on the CHaMP Data Collection protocol (*CHaMP (Columbia Habitat Monitoring Program). 2014. Scientific protocol for salmonid habitat surveys within the Columbia Habitat Monitoring Program. Prepared by the Columbia Habitat Monitoring Program*.)

RBT: Metrics generated using the River Bathymetry Toolkit (RBT), a suite of GIS tools which processes the high resolution topo surveys of sites' habitat. Example: Site Wetted Area.

Aux: Auxiliary (Aux) metrics are generated from measurements and visual estimates of habitat features or conditions (independent of the topographic survey). Example: Conductivity.

Aux+RBT: Metrics integrating both RBT and Aux information. This usually means an area or length generated by the RBT is used to normalize Aux metrics. Example: Undercut Area Percent relies on measurements of undercuts (Aux data) and channel unit areas generated via the RBT.

Stream temperature: Metrics derived from summarizations of stream temperature data collected from data loggers. Example: Average Monthly Temperature.

Site-level GIS attributes: GIS-based metrics derived from generally available GIS layers that have been summarized and compiled for CHaMP sites. These attributes are not derived from CHaMP collected topographic surveys. Examples: Site Elevation and Stream Order.

Metric Spatial Scales

Metrics are summarized across a range of spatial scales. Habitat characteristics relate to fish at different spatial scales, and having a range of metrics provides flexibility to examine habitat at scales appropriate to a diversity of analysis questions.

Visit: Visit metrics encompass the entire site, and are the largest spatial scale metrics are summarized to. Each visit is a unique sampling event of a site, with an associated date, time, and crew.

Channel Unit Types: The CHaMP protocol uses three spatial scales to describe channel units: Tier 1, Tier 2 and Channel Unit Type. See the CHaMP protocol for specific descriptions of these types.

- **Tier 1:** Channel unit type:
  - Slow/Pool
  - Fast-Turbulent
  - Fast-NonTurbulent
  - Small Side Channel
- **Tier 2**: Metrics summarized for sub-categories of Tier 1 channel unit types.
  - Slow/Pool
    - Plunge Pool
    - Scour Pool
    - Dam Pool
    - Off-Channel Pool
    - Beaver Pool
  - Fast-Turbulent
    - Riffle
    - Rapid
    - Cascade
    - Falls
  - Fast-NonTurbulent
    - Fast-NonTurbulent
  - Small Side Channel
    - Small Side Channel

Channel Unit: The finest scale of metrics, summarized for individual channel units.

CHaMP Metric Quality Assurance

The CHaMP data processing workflow has quality control checks in place that manage most of the measurement data quality assurance, including validation checks on the topgographic, auxillary (data logger), and stream temperature data collection and processing. Once measurement data has been uploaded to champmonitoring.org, the five types of metrics are generated and crews review a targeted list of visit metrics for accuracy, and then repair measurement data to resolve metric issues. Once metrics have been approved (also known as "promoted") by the Crew Lead in champmonitoring.org, the approved metrics are reviewed by CHaMP quality assurance personnel to ensure data consistency across the program. Metrics that pass CHaMP programmatic quality assurance are then marked as "Released to the Public" and become available for download by non-CHaMP personnel.

CHaMP Analyst Metrics

A tremendous number of metrics are generated by CHaMP surveys. The CHaMP Development Team has selected a suite of metrics targeted for CHaMP status and trend and to be used for data analyses and model inputs. These are identified in a downloadable file (Metric Analyst List) . These "Analyst Metrics", meet most or all of these criteria:

- Reflective of habitat quality and quantity
- Limited redundancy

- Reviewed and validated by CHaMP personnel for consistency of data collection methods, minimized crew variability, calculation accuracy, and theoretical approach

Note that this list was developed primarily for CHaMP analysts and other metrics that may be of use or interest to others are available. These other metrics may be redundant of 'analyst' metrics, such as Thalweg Length, Wetted Centerline Length, and Bankfull Centerline Length, which are all measures of Site Length which are highly correlated (>99%).

Metric Accessibility

Metrics are available at champmonitoring.org and can be accessed in two ways:

- Spreadsheet /.csv format is available by selecting "Metrics" from the "Reports" tab.
- Microsoft Access Database /.mdb format is available by selecting the "Data Exports" tab.

Metrics for each spatial scale (Visit, Tier 1, Tier 2, Channel Unit) are available from either source.

Before downloading and analyzing data, review the "News and Announcements" section on the right side of the home page of champmonitoring.org as there may be information regarding scheduled releases of metrics and other pertinent details.

Metric Glossary

Metric definitions are available for download from the Metrics tab on champmonitoring.org, as a table in the Program Metrics database download, and as a general "Glossary" page on champmonitoring.org.

Metadata Documents

Multiple metadata resources are available:

- CHaMP sampling protocol: Describes the field protocol for collection of CHaMP data and is updated annually.
- CHaMP Quality Assurance Manuals: Describe the quality assurance review procedures (also available from "How To" section of champmonitoring.org)
    - CHaMP metrics
    - Stream Temperature
    - Side Channels
- Metric timeline
- Monitoring Methods
- Metric Analyst List (includes definitions and calculations)
- Online Glossary

Contacts

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