What will you remember about your data in 10 years?

Preserving project documentation for the long term

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Presented by: Jacque Schei (U.S. Geological Survey/PNAMP)

Co-authors: Jennifer Bayer (U.S. Geological Survey/PNAMP), Keith Steele (Sitka Technology Group), Matt Deniston (Sitka Technology Group), Russell Scranton (Bonneville Power Administration)
Pacific Northwest Aquatic Monitoring Partnership (PNAMP)

Communicate & Coordinate
Sustain Collaboration
Improve Data Access

- Partners & Participants
  - State, federal, and tribal NGOs, universities, etc.
  - Open, inclusive process
  - Voluntary participation
- Supported by partner funding and in-kind contributions

Learn more at: [www.pnamp.org](http://www.pnamp.org)
We need to have more thorough, consistent documentation available about our research & monitoring efforts to support multiple needs.
Online tool development to support project design and documentation

www.MonitoringResources.org

- Monitoring Methods
- Monitoring Explorer
- Sample Designer & Site Manager
- Metadata Builder (prototype)
- Monitoring Advisor
- Project Manager (coming soon)
More thorough, consistent documentation about programs & projects
- Project planning, implementation, reporting, transparency, accountability
- Regional & national – coordination, collaboration, data sharing, broad-scale assessments

Common terminology

Landing page for other tools (see apps at top)

Online system
- Automated transfers - reduce redundancy, entry
Welcome to Sample Designer.
Build your survey to exploit the benefits of being part of a master sample.

- Support development of statistically robust GRTS design using a Master Sample
- New: document non-GRTS designs
- Tools to help you visualize your design as you create
- Output shapefile of sample sites when you finalize your design

Learn about master samples and GRTS designs.
- Read about GRTS sample designs.
- Investigate the available master samples within the Monitoring Site Manager.

Build your sample design.
- Answer a few questions to see if this tool is for you, and to plan your steps.
- Select one or more master samples as the source for your sample design.
- Define your sample frame.
- If desired, add attributes for your sites, and add legacy sites.
- Create panels and define your sample’s stratification.
Design Document for Watershed Health and Salmon Recovery Study Design

Basics

The details of this Sample Design, including all the parameters used to generate it, are included below. Sample designs must belong to a Monitoring Project which may be associated with a Monitoring Program.

Description

Ecology’s Environmental Assessment Program’s Status and Trends Monitoring for Watershed Health and Salmon Recovery (WSHR) project collects data on river and stream health by region. Approximately 350 sites are sampled every four years.

Sampling Schedules for Watershed Health Monitoring explains the monitoring sites rotation, sample design, and contains the latest Candidate Site List.

Latest River and Stream Monitoring for Watershed Health explains where Ecology staff are working during the monitoring season.

WSHR also offers services to the public for objectively assessing watershed health. These include standard protocols for monitoring rivers and streams. Training on these protocols, the Washington Master Sample site set, and the STREAM database for managing stream habitat data.

Sample Design Parameters

- No legacy sites
- 6 Panels
- Is stratified

Start Year

2009

Monitoring Program/Project

- GRTS, probabilistic design support
- Define target frame based on master sample
- Stratify, add attributes, legacy sites
- Create panels
- Document design
- Export designs as shapefiles

Frame Definition

Frame

This sample design started with an initial frame of 551,044 sites based on its master sample. The criteria (based on the master sample’s attributes) were then used to refine the sample frame down to 67 sites.

Criteria Group 1

Is Target in CHAM P

<table>
<thead>
<tr>
<th>CHAM P</th>
<th>Is Equal To</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tucannon</td>
<td>1</td>
</tr>
</tbody>
</table>

Target Population

<none>

Legacy Samples

<none>

Panels

Panel designs can help address sampling objectives by increasing the total number of samples at a lower overall cost. A common panel structure involves one or more panels with a high revisit frequency (e.g., an ‘Annual’ panel), and other panels with a lower revisit frequency (e.g., a three-year ‘Rotating’ panel).

<table>
<thead>
<tr>
<th>Panel</th>
<th>Sampling Occasion (1 Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>Annual A</td>
</tr>
<tr>
<td>2</td>
<td>Rotating Panel 1 R1</td>
</tr>
<tr>
<td>3</td>
<td>Rotating Panel 2 R2</td>
</tr>
<tr>
<td>4</td>
<td>Rotating Panel 3 R3</td>
</tr>
<tr>
<td>5</td>
<td>Extra E</td>
</tr>
</tbody>
</table>

Stratification

This design uses the following attributes to create the stratification shown below. Each row in the table represents a stratum. This design’s panels are also shown in this table, even if it uses only a single, default panel.

Sample Attributes

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Values in Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restoration Status</td>
<td>0 Values: None Planned, Treatment, Treatment 1, Treatment 2, Treatment 3, Control, Control 1, Control 2, Control 3</td>
</tr>
<tr>
<td>Spatial Strata</td>
<td>10 Values: Mainstem, Treatment Reach 1, Treatment Reach 2, Treatment Reach 3, Treatment Reach 4, Treatment Reach 5, Control Reach 1, Control Reach 2, Control Reach 3, Control Reach 4</td>
</tr>
</tbody>
</table>
Welcome to MonitoringMethods.org, a tool to document and share information about Protocols & Methods.

Our Anatomy of a Protocol

“Protocol” is one of those terms that means many things to many people. Check out our definition to get a quick idea of what this application is about.

Recent Discussions

Below is a quick summary of recent discussions:

RECENTLY DISCUSSED:

“Review comments” on Method: 35
08/04/2014 09:06 AM by Jacques Schell

“Method Review- Minor suggestions” on Method: 35
07/30/2014 02:45 PM by Rebecca Scully

“Review” on Protocol: 1255
07/30/2014 02:22 PM by Rebecca Scully

Reply to “Method Review” on Method: 1255
07/31/2014 06:42 AM by Doug Hatch

“Method Review” on Method: 4229
07/28/2014 01:33 PM by Rebecca Scully

“Review” on Protocol: 413

Franz J. Hubacek, Emilio Ortiz, and Håkan Karlberg

How can we help you?

Not sure where to begin? Select the user type that best reflects your needs and get started.

Quick Stats

With a growing number of Protocols and Methods, it can be difficult to keep up.

AS OF AUGUST 5, 2014:

46 Protocols published out of 890
623 Methods published out of 1536
487 Metric Subcategories
METADATA BUILDER

Create ISO metadata record for datasets

Enter a title for the metadata record. The title should briefly describe the resource that was monitored plus the location and year of monitoring.

For monitoring that was conducted under funding from Bonneville Power Administration (BPA), the project number and contract number can indicate the project number and contract number.

Bonneville Power Administration (BPA)

If the monitoring was conducted as a Bonneville Power Administration project, select BPA project number from the drop down list. After the project contract field will appear.

Temporal Extent (date range covered by the dataset)

* Beginning Date: 02/15/2012
* Ending Date: 02/14/2013

Geographic Extent

Describe the geographic extent represented by the dataset. The extent will be described as a polygon that encompasses the area where data were collected. Use the map below to draw a polygon around the area where data were collected. The bounding coordinates of the polygon will be populated into the four fields below the map.

To draw a polygon, click on the map to create an initial point. Continue clicking on the map to points that encompass the area. Double clicking will close the polygon by connecting the first and last drawn points.

A text description of the geographic extent can also be provided.
METADATA IS A LOVE NOTE TO THE FUTURE
MONITORING METADATA EXCHANGE (MMX)

• Few organizations share location, site visit history, and protocol information in readily available, standardized machine readable formats
• Result = Poor coordination
• Solution = MMX
• Standardize and share the who, what, when, where, and how of data collection efforts
• Not talking about sharing raw measurements
MMX DETAILS

- PNAMP WG developed draft data exchange template to support

DATA COLLECTION EVENT

The Data Collection Event Class represents a collection of measurements or observations via one or more methods of a single protocol at a single site, at a specific time or continuously over a time range. The observations may be made by human observers or collected via remote sensing devices.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Data Type</th>
<th>Notes, Codes/Conventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provider ID</td>
<td>A unique identifier assigned to a particular data provider or aggregator to identify the source of the event record</td>
<td>GUID, Required</td>
<td>Assigned by PNAMP or other aggregator.</td>
</tr>
</tbody>
</table>

GEOGRAPHIC LOCATION

The Geospatial Location class describes a geospatial extent at which or in which observations are made. Can either represent a series of measurements taken throughout the extent or alternatively can represent the area that a single measurement is intended to represent. Unless otherwise specified, the horizontal datum is assumed to be NAD83.

<table>
<thead>
<tr>
<th>Field Name</th>
<th>Field Description</th>
<th>Data Type</th>
<th>Notes, Codes/Conventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geographic Location ID</td>
<td>Provider or collector assigned name or identifier for this location.</td>
<td>Text(256). Required</td>
<td>Can be a primary key from the provider</td>
</tr>
<tr>
<td>Discrete Points</td>
<td>Points must be specified as either geometries or as a X/Y and Spatial Reference System Identifier</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Point</td>
<td>Describes a single point at which observations were made</td>
<td>gml:Point, Optional</td>
<td>GML simple features profile, which includes a spatial reference identifier, is recommended; X/Y is an option if GML not available</td>
</tr>
<tr>
<td>X Coordinate</td>
<td>X coordinate for the point</td>
<td>decimal (19,6), Optional</td>
<td>If the point is not expressed as a gml geometry, the X, Y, and SRID fields are</td>
</tr>
<tr>
<td>Y Coordinate</td>
<td>Y coordinate for the point</td>
<td>decimal (19,0), Optional</td>
<td>If the point is not expressed as a gml geometry, the X, Y, and SRID fields are</td>
</tr>
<tr>
<td>Spatial Reference ID</td>
<td>Well known spatial reference ID</td>
<td>Text(16)</td>
<td>e.g. EPSG:4326</td>
</tr>
<tr>
<td>Lines and Linestrings</td>
<td>Reaches must be specified either geometries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line</td>
<td>Represents the linear extent over which observations were made</td>
<td>gml:LineString, Optional</td>
<td>GML simple features profile, which includes a spatial reference identifier. Could represent a reach, transect, thalweg, etc.</td>
</tr>
</tbody>
</table>
WHSR Site

Site Name: WAM06600-000988
Lat/Long: 48.604695,-121.963048

click for more...
Zoom to

Summary

WAM06600-000988

Lat/Long: 48.604695, -121.963048
Visit Count: 2
Visit Time Period: 7/1/2009 - 7/1/2013

Visit - 7/1/2009

Organization: Washington State Department of Ecology (WDOE)
Monitoring Program: (EAP) Environmental Assessment Program
Protocol: 1950
Data Repository: Environmental Information Management (EIM)
Download URI: Download
Sample Design: Watershed Health and Salmon Recovery Study Design
Funding Source:

Visit - 7/1/2013

Organization: Washington State Department of Ecology (WDOE)
Monitoring Program: (EAP) Environmental Assessment Program
Protocol: 1950
Data Repository: Environmental Information Management (EIM)
Download URI: Download
Sample Design: Watershed Health and Salmon Recovery Study Design
Funding Source:
TIME FOR CHANGE

We need to have more thorough, consistent documentation widely available about our monitoring programs and projects to support multiple needs.

Monitoring Resources can help
TIME FOR CHANGE

During 2008, the number of things connected to the Internet exceeded the number of people on earth.

These things are not just smartphones and tablets.

By 2020 there will be 50 billion.

Source: Cisco, Gigaom
TIME FOR CHANGE

RCC at University of Hawaii Manoa

Creating the Salmon ThermalScape:
1) Large sensor array
2) Small number of realtime, wireless sensors placed strategically across region

Correlations between wireless sensors & large sensor array leverage information across much larger areas

Porter et al. 2005; Porter et al. 2011

University of California

UNDERSTANDABLE
TRANSFORMATIVE

WHO
WHAT
WHERE
WHEN
HOW

Real Time
TIME FOR CHANGE

**Big Data**

**Landscape-Scale Analyses**

**Coordinated Projects**

LET'S SOLVE THIS PROBLEM BY USING THE BIG DATA NONE OF US HAVE THE SLIGHTEST IDEA WHAT TO DO WITH

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Thanks to the PNAMP partners and all participants who have provided feedback on Monitoring Resources.

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If you’d like additional information about any of the tools, please contact Jacque (jschei@usgs.gov; 503.201.0880)