



pacific northwest aquatic
monitoring partnership

OVERVIEW OF PNAMP'S MONITORING RESOURCES

JUNE 5, 2012

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JACQUE SCHEI, U.S. GEOLOGICAL SURVEY

PACIFIC NORTHWEST AQUATIC MONITORING PARTNERSHIP (PNAMP)

- ❖ What does PNAMP do?
 - Forum for monitoring programs
 - Collaboration
 - Coordination
- ❖ Participants
 - State, federal, and tribal
 - Open, inclusive process
 - Voluntary participation
- ❖ Supported by partner funding and in-kind contributions



ONLINE RESOURCES

- ❖ Tools to make it easier to:
 - Design and document
 - Collaborate
 - Discover data
- ❖ Started with Protocol Manager/Monitoring Methods, prototype for Master Sample tool
- ❖ Main PNAMP website - not part of this discussion



ONLINE RESOURCES

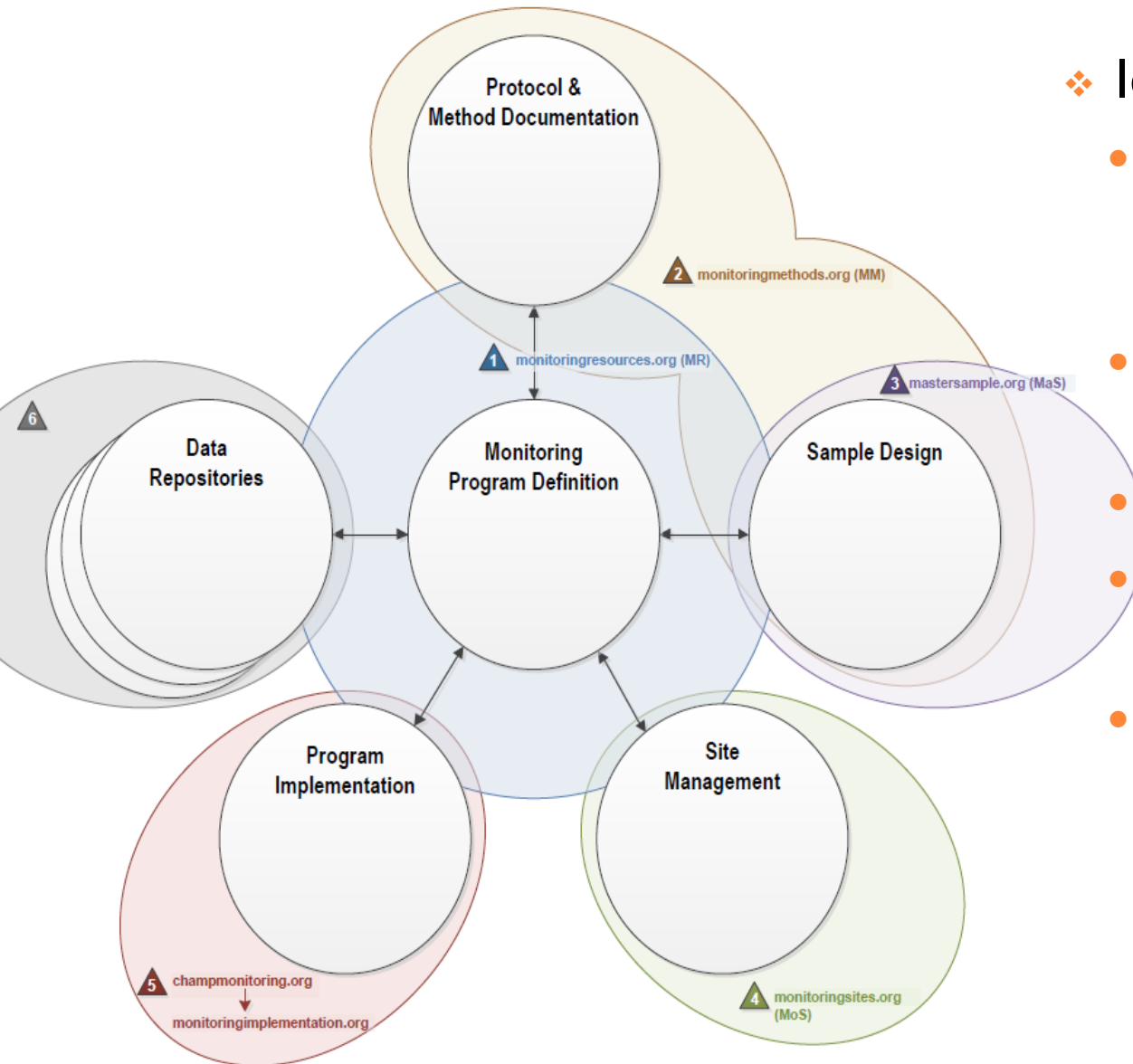
❖ Current state

- Existing: MonitoringMethods.org, Salmon Monitoring Advisor, prototype Master Sample tool
- Planned: Master Sample tool (Sample Designer), Site Manager, prototype metadata builder

❖ Ideal state

- Integration
- Common terminology, consistent documentation

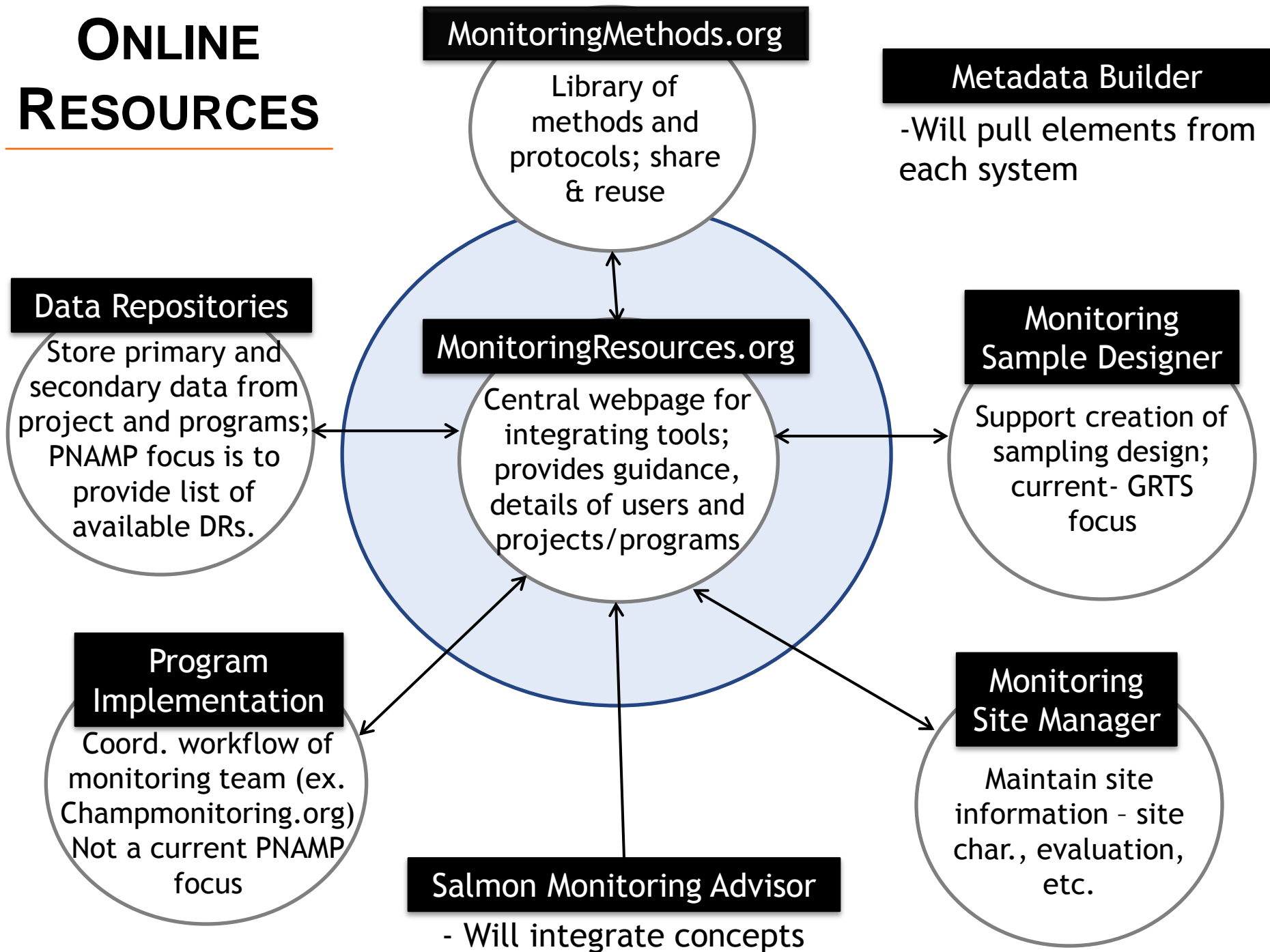
ONLINE RESOURCES



❖ Ideal state

- Integration - central homepage, single sign on
- Enter once, share many times
- Common definitions
- **Consistent** documentation
- Enough information to adequately assess monitoring

ONLINE RESOURCES



ONLINE RESOURCES SUPPORT

- ❖ Guidance from PNAMP SC & Leadership Teams
- ❖ User Testing Groups convened during development
- ❖ PNAMP staff time
- ❖ Software development - contract with private vendor
 - Sitka Technology Group



- ❖ Funding - multiple sources; described at end of presentation

MONITORINGRESOURCES.ORG

- ❖ In development, mock up of central homepage
- ❖ Provide underlying framework for single sign on
- ❖ Move common content from MonitoringMethods.org
- ❖ Integrate existing guidance into the ‘Learn’ menu

Monitoring Resources | Monitoring Site Manager | Monitoring Sample Designer | Monitoring Project Manager | Monitoring Methods

APPS | Join | Log In | Help

Monitoring Resources
sponsored by: pacific northwest aquatic monitoring partnership

Home | Monitoring Programs | Learn | Community | About

Learn how to design a monitoring program. Learn about regional monitoring programs, and to document and share info about your monitoring program. It also has tools to help you design and manage your program, analyze your monitoring data, and get data from other programs.

This site ties together many other partner sites that you may have used in the past.

Monitoring Resources

Document & Share Methods & Protocols | Manage Sites | Create Sample Designs | Manage Monitoring Projects

LEARN
how to design a monitoring program

DEFINE
your monitoring program

FIND
monitoring sites and data

CREATE
a Sample Design based on a Master Sample

IMPLEMENT
your monitoring program

DOCUMENT
and share monitoring protocols and methods

MONITORINGMETHODS.ORG

- ❖ Need for better, more consistent documentation of protocols and methods to support research and reporting needs
 - Pacific NW issues
 - BUT...basic need could be found anywhere and could be related to various topics
- ❖ USBR brought a tool to PNAMP for consideration years ago
 - Partner feedback led to current tool



MONITORINGMETHODS.ORG

- ❖ Need for a community forum
 - to discuss and vet methods, metrics and indicators, and study designs
 - to identify and make use of best practices
 - expand information in out-of date publications
 - to give access to information and help each other gain a better understanding of regional work



WHY?

- ❖ Good science - documentation
- ❖ Consistency > collaboration

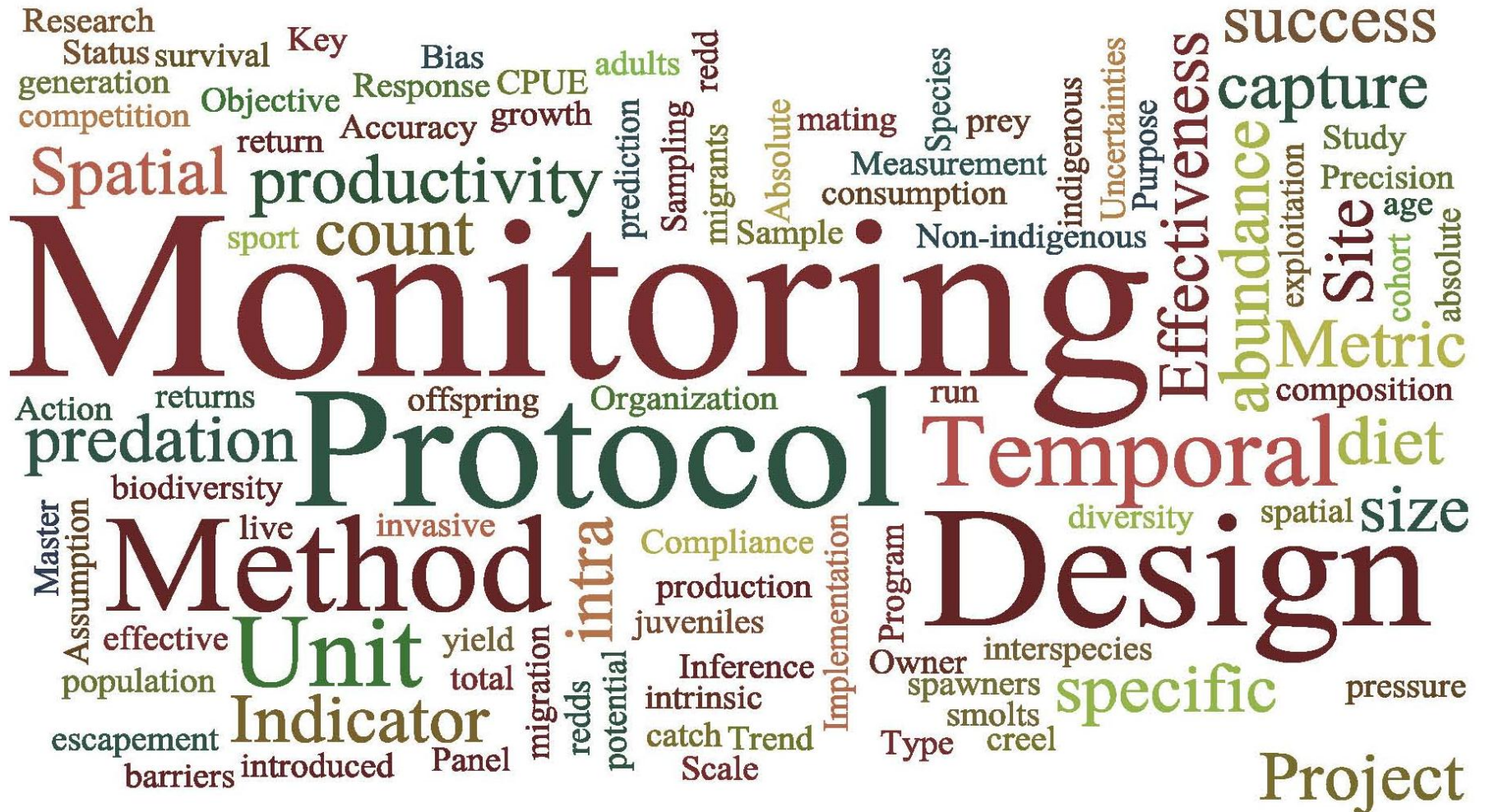
What kind and amount of documentation is needed:

- *to minimize uncertainty about utility of others' data?*
- *to promote collaboration and data exchange between programs?*
- *to help each other gain a better understanding of who's collecting what information, why and how?*

- ❖ Answers to foundational questions like these are not straightforward. . . but are critical to designing the system.
- ❖ Data may be useful to others; good documentation is key

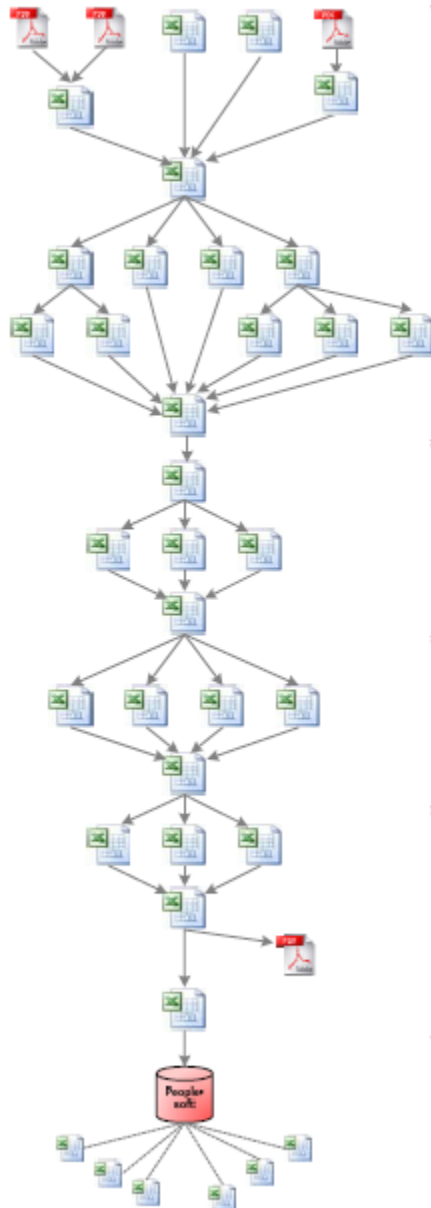
WHY?

- ❖ Terminology - Inconsistent use and disagreement about monitoring terms, definitions, and their relationships



Today's Review

Spreadsheet Mania



Entity

BPA & Council

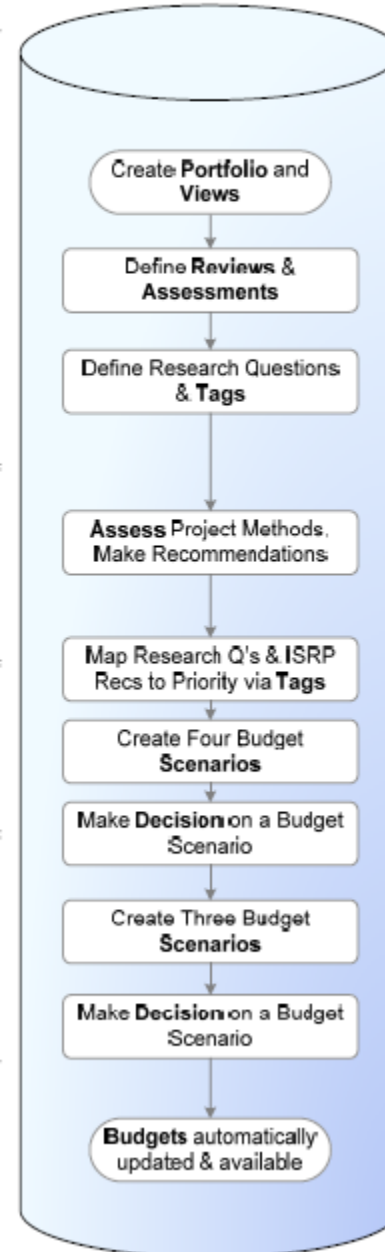
ISRP

Council

BPA

Tomorrow's Review

Taurus



MONITORINGMETHODS.ORG

❖ What:

www.monitoringmethods.org/

- Free, web application to document and discuss monitoring protocols, methods, metrics and indicators, and study designs

❖ Purpose:

- Promote consistent documentation
- Improve access to monitoring information
- Promote community discussions among a variety of users - insight and experience
- Streamline creation of metadata
- Help increase interoperability between data systems

MONITORING METHODS TEAM

Sponsors:



pacific northwest aquatic
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&

PNAMP Partners

STATE OF THE SALMON

KNOWLEDGE ACROSS BORDERS • ЗНАНИЕ СКВОЗЬ ГРАНИЦЫ • 国境を超えた知識

A JOINT PROGRAM OF
THE WILD SALMON CENTER AND ECOTRUST



Development Team:



Leadership Team & User Testing Groups from the following entities:

- | | | | | |
|---------|--------|--------|-----------|---------|
| ▪BPA | ▪NPT | ▪PSMFC | ▪USBR | ▪WDFW |
| ▪CRITFC | ▪NWHI | ▪PSP | ▪USFS | ▪YBFWRB |
| ▪EDS | ▪NWHI | ▪SFR | ▪USGS | |
| ▪EPA | ▪NWIFC | ▪TTECI | ▪WA Forum | |
| ▪NOAA | ▪ODFW | ▪UCSRB | ▪WA GSRO | |

Funders:



GORDON AND BETTY
MOORE
FOUNDATION

MONITORINGMETHODS.ORG GLOSSARY



Home 1. Goals 2. Design 3. Collect

You are here: Home → About the developers

Navigation

- Home
- 1. Goals
- 2. Design
- 3. Collect
- 4. Manage
- 5. Interpret
- 6. Report
- 7. Revise
- Resources
- About the developers

Related Terms

- Causal mechanism
- Metric
- Monitoring design
- Power
- Sample survey
- Status
- Survey Design

About the developers

Biographies of the developers

This Salmon Monitoring Advisor was developed through a series of workshops funded by a grant from the [Gordon and Betty Moore Foundation](#), a conservation organization based through the United States National Science Foundation (NCEAS) in Santa Barbara, California. The working group has extensive experience in a variety of government and academic settings.

- United States Environmental Protection Agency
- United States National Science Foundation
- Canada Department of Fisheries and Oceans
- Oregon Department of Fish and Wildlife
- Oregon Department of Environmental Quality
- State of the Salmon in Portland, Oregon
- Washington State Governor's Salmon Recovery Office
- Alaska Department of Fish and Game
- Pacific States Marine Fisheries Commission
- Simon Fraser University in Burnaby, British Columbia, Canada
- United States National Center for Ecological Analysis and Synthesis

Indicator

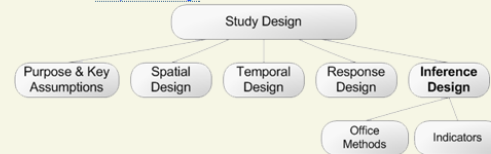
Value resulting from the data reduction of [Metrics](#) across sites and temporal periods based on applying the procedures in the [Inference Design](#). A reported value used to indicate the status, condition, or trend of a resource or ecological process; intended to answer questions posed by the [Objectives](#) of the [Protocol](#). Contrast with [Metric](#).

$$\text{Metric J} + \text{Metric K} = \text{Indicator X}$$

Per the Inference Design, Metrics are combined or reduced to produce Indicators

Inference Design

Component of the [Study Design](#) that defines the process of determining Indicator values based on [Metric](#) values observed at sites during specific temporal units over the course of the study. Contrast with [Response Design](#).



NOTE: monitoringmethods.org will not support detailed documentation of Inference Design; however users may add Data Analysis/Interpretation Methods to their Protocol that explain how Metrics are combined to produce Indicators.

Want to learn more? check out [salmonmonitoringadvisor.org](#)

Key Assumption

Something that is accepted as true or as certain to happen, without proof. When describing a [Protocol's Study Design](#) it is important to document its Key Assumptions. Examples:

- My frame is accurate
- Gear (smolt trap, seine, weir, etc.) is functioning properly
- Gear is calibrated

Master Sample

The full list of sites that would be sampled with a complete census used to generate a random sample of sites for a probabilistic study. These sites can be used for comparable, complementary monitoring among separate monitoring organizations and across geographic scales. A Master Sample retains the principle of randomization and spatial balance (see Larsen, D.P., A.R. Olsen, and D.L. Stevens. 2008. Using a master sample to integrate stream monitoring programs. JABES 13: 243-254).

PNAMP is currently working with the EPA and Oregon State University to develop a [Master Sample web application](#).

Measurement

A value resulting from a data collection event at a specific [Site](#) and temporal period. Measurements can be used to produce [Metrics](#) using a [Response Design](#).

$$\text{Measurement A} + \text{Measurement B} = \text{Metric J}$$

Per the Response Design, Measurements are combined or reduced to produce Metrics.

Method

A systematic, standard operating procedure for collecting data ([Measurements](#)) or analyzing data (deriving [Metrics](#) from Measurements). Method descriptions are part of the [Response Design](#). Methods must be: 1. described in documentation, 2. repeatable by others.

In monitoringmethods.org Methods have "State" - to learn more, see our [State Diagram](#).



METRICS & INDICATORS

Home

Browse

Create

Learn

Discuss

Home > Metric Subcategories

List of Subcategories for Metrics and Indicators

An important part of documenting a [Protocol](#) is identifying the [Metrics](#) and [Indicators](#) that its [Study Design](#) will produce. Since the list of specific Metrics and Indicators that researchers and scientists produce is rather long and changes regularly, this tool does not attempt to catalog them all. Instead, it strives to catalog the various types of Metrics and Indicators.

Our taxonomy for classifying Metrics and Indicators is: [Subject](#) -> [Category](#) -> [Subcategory](#).

Currently viewing 487 of 487 Subcategories

[Download](#)

ID	CATEGORY	SUBCATEGORY	DESCRIPTION	KEYWORDS
124	Disease/Pathogens/Parasite	Pathogen/Disease Type	The type of individual disease, pathogen, or parasite observed (viral, bacterial, fungal, parasitic).	virus, name, bacteria, whirling, IHN, VHSV, infection,
125	Disease/Pathogens/Parasite	Liver Disease	Collection of both levels and risk rates of liver disease.	hepatic disease, liver inflammation, liver function, netp
126	Disease/Pathogens/Parasite	Pathogen Values	The concentration of specified pathogens in a species over a given range or life stage.	disease, virus, infection, bacteria, bacterial, viral, whir
26	Disturbance/Restoration	Distribution of Non-wood Engineered Fis	Spatial extent of engineered habitat structures (excluding barriers, pools, and wood).	instream, frequency, complexity, per, kilometer, mile, b
28	Disturbance/Restoration	Disturbance Presence	The presence and proximity of various types of human land-use activities, or natural disturbances.	rangeland, farmland, farms, livestock, cattle, grazing, r
407	Disturbance/Restoration	Restoration Action	The presence and proximity of various types of human land-use activities, or natural events that restore the environm	rangeland, farmland, farms, livestock, cattle, grazing, r
457	Disturbance/Restoration	Area of Disturbance or Restoration	The area of various types of human land-use activities, or natural disturbances or restoration actions.	scale, acres, rangeland, farmland, farms, livestock, ca
458	Disturbance/Restoration	Length or Width of Disturbance or Resto	The length or width of various types of human land-use activities, or natural disturbances or restoration actions.	rangeland, farmland, farms, livestock, cattle, grazing, r
459	Disturbance/Restoration	Abundance of Disturbance or Restoratio	The number of various types of human land-use activities, or natural disturbances or restoration actions.	count, rangeland, farmland, farms, livestock, cattle, gr
436	Fish	Tissue Sample: Fish	The collection of a tissue or cells from fish species for analysis.	hatchery, wild, origin, genetics, DNA, age, aging, blood
507	Fish	Spawning/Nesting	Measurements of numbers of nests per fish, or of fish spawning events.	redds, mating, gravels, hatchery, wild, broodstock, stc
417	Fish	Species Type: Fish	The type of individual fish species observed, where species may range from species to a specific race.	subspecies, monotypic, hybrids, identification, stock, E
381	Fish	Mark/Tag Recovery	The act of recovering a mark or tag on a fish species.	PIT, radio, mark-recapture, tracking, telemetry, scannin
362	Fish	Abundance of Invasive Fish Species	The number (count) of individual fish by species within a particular life stage that are present within a specified area th	population size, distribution, estimate, sampling, survey
46	Fish	Abundance of Fish	The number (count) of individual fish by species or by species within a particular life stage.	return, run, prediction, escapement, effective, populati
47	Fish	Abundance of Fish Predators	The number (count) of individual fish by within a particular life stage that are present within a specified area that predat	pikeminnow, predation, population size, distribution, es

CONTENT

- ❖ Oakley, K.L., Thomas, L.P., and Fancy, S.G. 2003. Guidelines for long-term monitoring protocols. Wildlife Society Bulletin. 31(4):1000-1003.

Protocol: AREMP 2009 Field Season - Regional Interagency Monitoring for the Northwest Forest Plan

Below are the details for this specific [Protocol](#). The "Completeness" progress bar indicates how thoroughly documented it is – click the bar for details. Some protocols may also have anonymous ratings on a 3-star scale, which any logged-on user can provide. We ask that these subjective ratings be based on the documentation quality and not on opinions regarding the efficacy of the protocol's objectives or study design.

3.0/3.0 (1 votes)
Rate this

PROTOCOL DETAILS | COMMENTS & RATINGS | CHANGE LOG | PHOTOS, FIGURES & FORMS | REVIEWS | EDIT PROTOCOL

EDIT PROTOCOL

Basics & Objectives

ID: 2 State:

* Protocol Title:
Protocol Title should be concise, but informative, like the title of a paper. It may help to include some key terms from its Study Design.

Full Details: Upload File Use URL

Full web address (starting with "http://"). This is the place you'd send someone today who wants to know more about your protocol or your monitoring project/program.

Program:
Some Protocols are part of a [Monitoring Program](#), others are not. Sponsoring Org: US Forest Service (USFS)

PROTOCOL

- Study Design
 - Objectives
 - Personnel & Training
 - Study Design
 - METHODS**
 - Metrics
 - Indicators
 - Equipment & Budget

Basics & Objectives

BACKGROUND / RATIONALE

The Northwest Forest Plan, the Aquatic Conservation Strategy under the Plan's jurisdiction (AREMP or the monitoring plan) AREMP is to determine the condition of the watershed over time. A total of 250 watersheds are included in the program to assess watershed condition.

PROGRAM

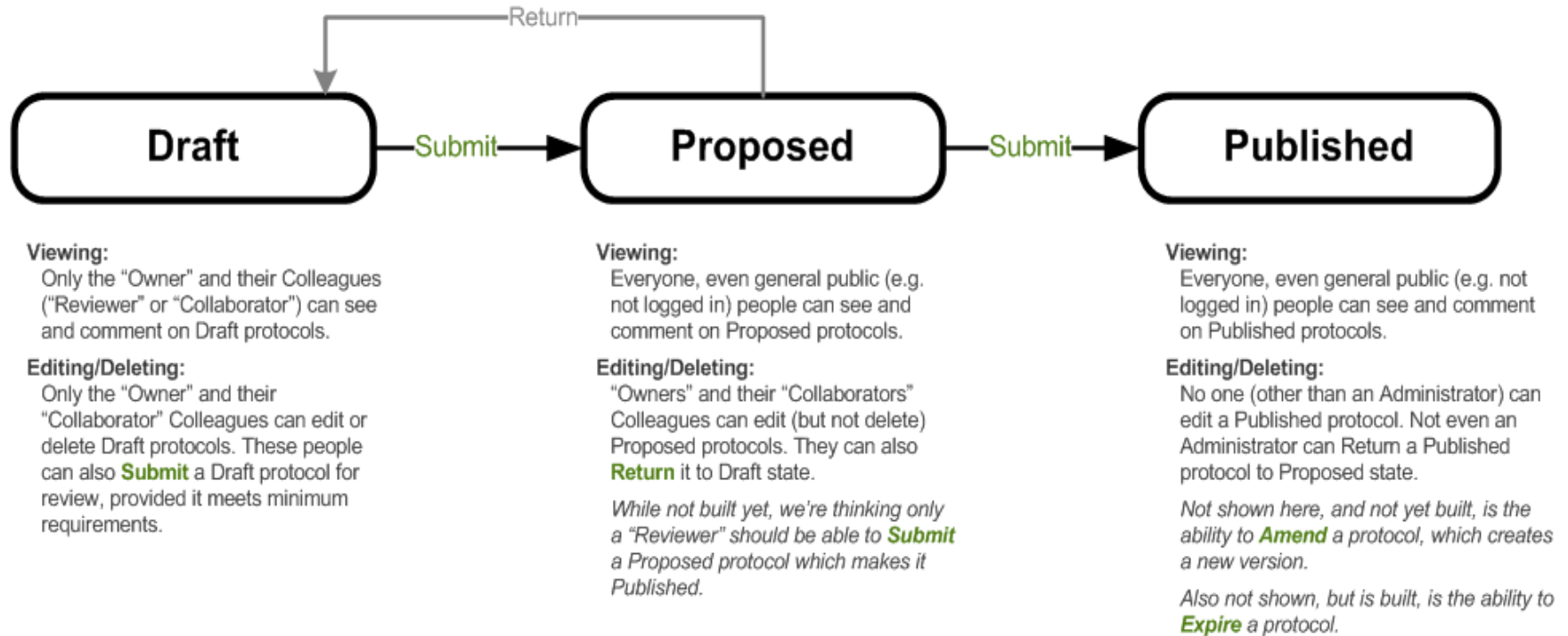
AREMP (USFS Aquatic and Riparian Effectiveness Monitoring Program)

OBJECTIVES FOR THIS PROTOCOL

- Is the Northwest Forest Plan meeting conditions on federal lands?
- Provide information for watershed managers on causes of unsuitable conditions.
- Provide a framework for watershed managers to measure and long-term monitor watershed conditions.
- Develop and validate decision support models to improve use of monitoring data, by reducing the number of attributes measured and long-term monitoring costs.
- and validate decision support models that are used to help watershed managers assess the condition of the watersheds that have been sampled.
- the condition of 250 watersheds within the Northwest Forest Plan by collecting information on upslope, riparian, and in-channel attributes within each watershed.

Owner:

CONTENT



❖ State Diagram

- Methods & Protocols

❖ Review Process

CONTENT

❖ Highlights

- Upload full details or link
- Upload photos, figures, forms
- Cloning - protocols
- Customize Methods
- Subscriptions, notifications
- Approve Methods for use in a Program

Method: Large Wood

METHOD ACTIONS
[Bookmark this Method](#)

Below are the details for this specific [Method](#). The "Completeness" progress bar indicates how thoroughly documented it is – click the bar for details. Some protocols may also have anonymous ratings on a 3-star scale, which any logged-on user can provide. We ask that these subjective ratings be based on the documentation quality and not on opinions regarding the efficacy of method's techniques.

☆☆☆ 0.0/3.0 (0 votes)
[Rate this!](#)

[Email](#) [Print](#) [Subscribe](#)

[METHOD DETAILS](#) [COMMENTS & RATINGS](#) [CHANGE LOG](#) [PHOTOS, FIGURES & FORMS](#) [REVIEWS](#) [EDIT METHOD](#)

Photos, Figures & Forms

To help others better understand and follow your Method, please upload photos, images, illustrations, diagrams, and/or data collection forms.

After uploading one or more photos, be sure to set one as the "key photo" (the one photo that best represents your Method).

[SELECT KEY PHOTO](#)




Figure 36. Large wood. Pieces numbered 1 are counted; pieces numbered 2 and 3 are not.

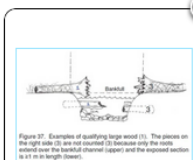


Figure 37. Examples of quantifying large wood (1). The pieces on the right side (2) are not counted (3) because only the ends extend over the bankfull channel (upper) and the exposed section is < 1 m in length (lower).

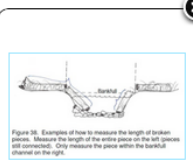


Figure 38. Examples of how to measure the length of broken debris. Measure the length of the entire piece on the left (pieces still connected). Only measure the piece within the bankfull channel on the right.

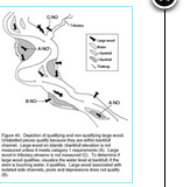


Figure 39. Is it one piece or two? Variations of touching vs. not touching along the bank.

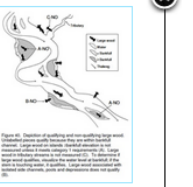


Figure 40. Diagram showing a cross-section of a stream with various debris types labeled: Log, Branch, Limb, Root, and Debris.

Figure 36 (~42 KB)

Figure 37 (~48 KB)

Figure 38 (~44 KB)

Figure 39 (~51 KB)

Figure 40 (~66 KB)

Upload

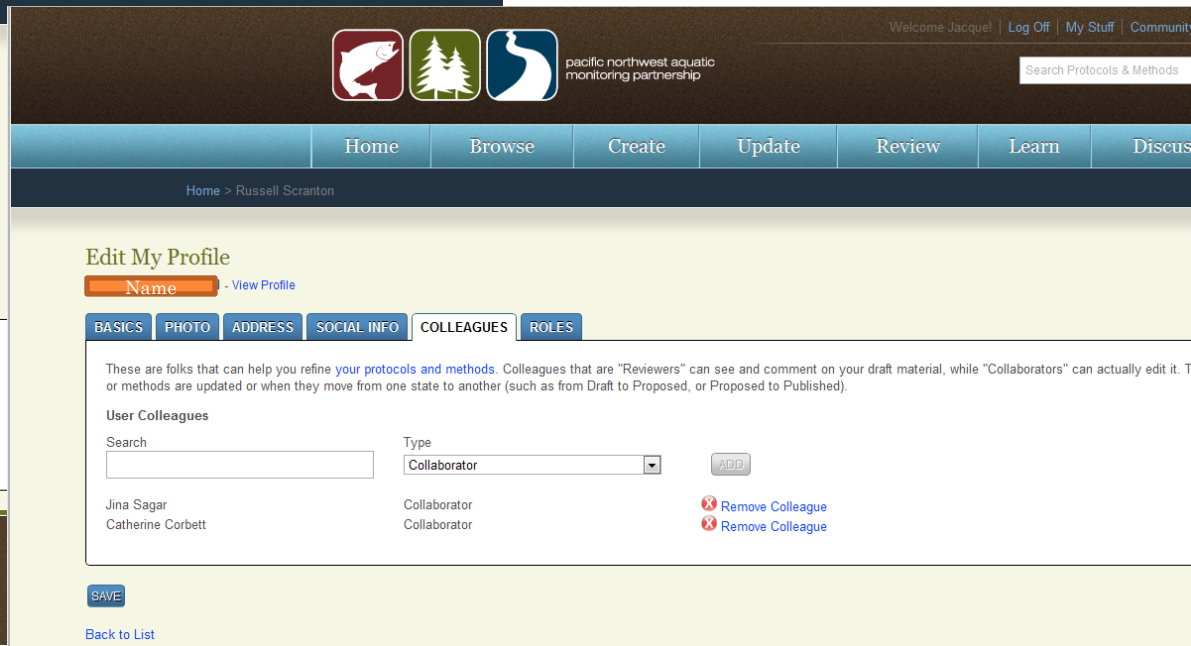
File: No file chosen

Caption:

Be concise yet still descriptive. Thumbnails above will display alphabetically by caption.

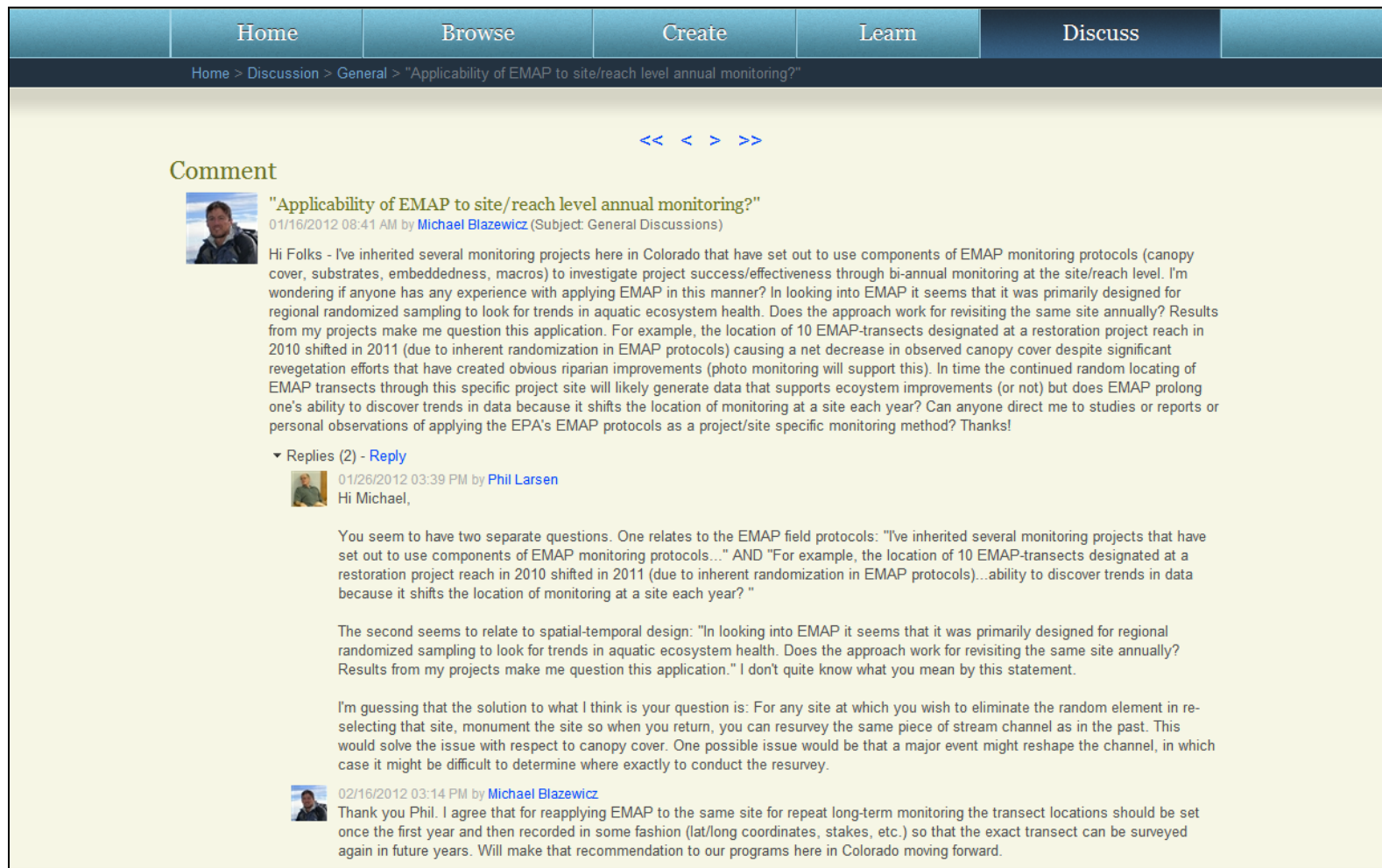
USERS

- ❖ 140+ Organizations
 - ❖ My Stuff
 - ❖ Profile
 - ❖ Colleagues
- ❖ Support variety of users
 - Scientist/Researcher
 - Program Manager
 - Policy Analyst
 - Others...



DISCUSSION BOARD

- ❖ Discussions documented and available online for future reference
 - Reach more practitioners; convenient



The screenshot shows a web interface for a discussion board. At the top, there is a navigation bar with buttons for Home, Browse, Create, Learn, and Discuss. Below the navigation bar, the breadcrumb trail reads: Home > Discussion > General > "Applicability of EMAP to site/reach level annual monitoring?".

The main content area features a comment section. The comment is titled "Applicability of EMAP to site/reach level annual monitoring?" and is dated 01/16/2012 08:41 AM by Michael Blazewicz. The comment text reads: "Hi Folks - I've inherited several monitoring projects here in Colorado that have set out to use components of EMAP monitoring protocols (canopy cover, substrates, embeddedness, macros) to investigate project success/effectiveness through bi-annual monitoring at the site/reach level. I'm wondering if anyone has any experience with applying EMAP in this manner? In looking into EMAP it seems that it was primarily designed for regional randomized sampling to look for trends in aquatic ecosystem health. Does the approach work for revisiting the same site annually? Results from my projects make me question this application. For example, the location of 10 EMAP-transsects designated at a restoration project reach in 2010 shifted in 2011 (due to inherent randomization in EMAP protocols) causing a net decrease in observed canopy cover despite significant revegetation efforts that have created obvious riparian improvements (photo monitoring will support this). In time the continued random locating of EMAP transects through this specific project site will likely generate data that supports ecosystem improvements (or not) but does EMAP prolong one's ability to discover trends in data because it shifts the location of monitoring at a site each year? Can anyone direct me to studies or reports or personal observations of applying the EPA's EMAP protocols as a project/site specific monitoring method? Thanks!"

Below the comment, there are two replies. The first reply is from Phil Larsen, dated 01/26/2012 03:39 PM. The reply text reads: "You seem to have two separate questions. One relates to the EMAP field protocols: 'I've inherited several monitoring projects that have set out to use components of EMAP monitoring protocols...' AND 'For example, the location of 10 EMAP-transsects designated at a restoration project reach in 2010 shifted in 2011 (due to inherent randomization in EMAP protocols)...ability to discover trends in data because it shifts the location of monitoring at a site each year?'"

The second reply is from Michael Blazewicz, dated 02/16/2012 03:14 PM. The reply text reads: "The second seems to relate to spatial-temporal design: 'In looking into EMAP it seems that it was primarily designed for regional randomized sampling to look for trends in aquatic ecosystem health. Does the approach work for revisiting the same site annually? Results from my projects make me question this application.' I don't quite know what you mean by this statement. I'm guessing that the solution to what I think is your question is: For any site at which you wish to eliminate the random element in re-selecting that site, monument the site so when you return, you can resurvey the same piece of stream channel as in the past. This would solve the issue with respect to canopy cover. One possible issue would be that a major event might reshape the channel, in which case it might be difficult to determine where exactly to conduct the resurvey."

MONITORINGMETHODS.ORG

❖ Current work:

- Method review for completeness
- Metric-method linkages
- Update Customize Method feature
- Add 'Implementation Notes' page
- Modifications to details of Data Repository list
- Added a new Reviewer Role - need to identify users who can provide reviews of 'Proposed' content when owner requests it be published
- Finish in June 2012

❖ Future

- Possible additional development depending on requests - complete versioning, review cycle business rules, etc.

MONITORING SAMPLE DESIGNER: BACKGROUND

- ❖ Many agencies interested in regional scale monitoring of stream networks/watersheds, using similar attributes and similar protocols
- ❖ Can't afford to monitor everywhere (i.e., can't census)
 - Monitor a representative set of sites - represent a region
- ❖ Collaborate/Integrate: Data from different sample surveys can be combined if certain design principles are followed
- ❖ GRTS: Generalized Random-Tessellation Stratified design
 - Incorporates randomization
 - Is spatially balanced
 - Creates ordered list of sites



MONITORING SAMPLE DESIGNER: BACKGROUND

- ❖ Oregon State University developed prototype
 - ❖ Prototype covered lower Columbia River ESU
 - ❖ Supported users in developing sample design, adding legacy sites, and basic statistical analysis functions
 - ❖ PNAMP - expand regionally
- ❖ Current contract with Sitka Technology Group to redevelop
 - ❖ Will develop Sample Designer and Site Manager
 - ❖ Looking for participants to review design concepts, give feedback as it relates to their own needs to help guide development

MONITORING SAMPLE DESIGNER

- ❖ In development - product expected November 2012
- ❖ Incorporate Master Sample prototype tool functions (support development of sample design, basic analysis), make tool regional
- ❖ Intended user group - knowledgeable about GRTS design

Monitoring Sample Designer
sponsored by: pacific northwest aquatic monitoring partnership

Home Explore Design Sample Evaluate Site Status Analyze Field Data Discuss About

Welcome to Sample Designer.
Build your survey to exploit the benefits of being part of a master sample.

Explore

Design Sample

Evaluate Site Status

Monitoring Sample Designer
sponsored by: pacific northwest aquatic monitoring partnership

Home Explore Design Sample Evaluate Site Status Analyze Field Data Discuss About

Home > Sample Designer > Create

Create a new sample design (Part 2 of 2)

Check all of the following that apply to your design. Using your answers, the STEPS TO BUILD YOUR SAMPLE DESIGN will be constructed in the box to the right. These steps will serve as your guide through the design process.

3. Tell us a little more about your intended design

- My sample design will include legacy sites or other sites that are not in a master sample.
- I will add attributes to the sites of my sample to help define the target frame.
- My sample design will have panels.
- My sample design will be stratified.
- I will add attributes to the sites of my sample to help stratify the sample.
- None of the above apply.

◀ ▶ Create Design

STEPS TO BUILD YOUR SAMPLE DESIGN

Basics
Prepare Your Sites
Import Sites
Add Attributes

Create Your Sample Design
Select Master Sample
Select Other Sites

Define Frame
Create Panels
Add Attributes
Stratify

Generate Sample Sites

MONITORING SITE MANAGER

- ❖ In development - product expected November 2012
- ❖ Sampling site management tool - import samples/legacy sites, add attributes
- ❖ Will work closely with Sample Designer - sites, master samples, sample designs (public and private) will be stored here

Monitoring Sites
sponsored by: pacific northwest aquatic monitoring partnership

Home Explore Sites Update Sites Discuss

Welcome to Monitoring Site Manager, where you can explore sites of master samples and monitoring projects, draw from master samples to design your own survey, and update this resource with your sites, attributes and evaluations.

Explore Sites

Find the sites that interest you.

- Learn about master sample sites — map boundaries, attributes, and design documentation. If you are a sample designer, select a master sample for your sample design and (if desired) create your initial survey frame here.
- Review the sample surveys of public monitoring projects. Explore their attributes, sample history and design documentation.
- If you are a sample designer, Monitoring Site Manager provides table displays, interactive maps, and export capabilities to help you review your sample sites or your legacy sites as you build your sample.

Update Sites

Add sites, and add attributes and site evaluations to your sets of sample sites.

- Upload new sets of sites with their attributes and field data.
- Upload attributes, site evaluations and field data to existing sites.
- Perform map-based site evaluations for your GRTS sample draw.
- Connect with GIS expertise to create and import the attributes you need (coming soon)

How can we help you?

New to this site?

Not sure where to begin? Select the use below that best describes you and we'll show you how to get the most out of the site based on your individual needs and interests.

Select

Monitoring Sites
sponsored by: pacific northwest aquatic monitoring partnership

Home Explore Sites Update Sites Discuss About

Home » Monitoring Sites » Available Master Samples

Available Master Samples

Explore the spatial extent of linear stream or area-based Master Samples on this page by panning and zooming to areas of interest. You may filter the list of Master Samples displayed on the map by entering all or part of the Master Sample name in the filter header or by choosing a particular Master Sample type in the "Sample Type" dropdown. Click the boxes to the left of the map to highlight the extent and display a design summary in the map footer. Clicking the Master Sample name hyperlinks will allow you to see detailed design documentation.

[reset filters](#)

Name	Sample Type
<input type="text"/>	Any

Showing 3 of 3 samples

- Columbia Basin Master Sample**
Type: Linear Master Sample
Source: US EPA
Sites: 551,046
Area: 738,710.060 km²
- Bonneville Reservoir Master Sample**
Type: Area Master Sample
Source: US Geological Survey
Sites: 134,346
Area: 120.910 km²
- Washington Statewide Master Sample**
Type: Linear Master Sample
Source: US EPA
Sites: 387,237
Area: 175,634.380 km²

Map data ©2012 Google, INEGI - Terms of Use

SITE MANAGER – EXPLORER FEATURE

- ❖ Explore sites - locate, find information about, and see regional monitoring projects displayed on a map
 - With continued support for entering and updating content, this tool will support many ‘inventory’ needs
 - Gather content via web services and manually

This page is designed to answer the question, "Show me the monitoring that's happening in my _____" (state, county, watershed, etc.) and variants thereof.

Monitoring Site Manager
sponsored by: pacific northwest aquatic monitoring partnership

Home Explore Sites Update Sites Community About

Home > Explore Sites > Monitoring Explorer

Explore Sites – Monitoring Explorer

Use the filters below to find where monitoring is planned or underway in your area of interest.

Sort by: Program Name | Project Name | Status reset filters

Monitoring Program or Project Name	Monitoring status	Data Types	Monitoring Type	State	Watershed (HUC #)	ESA-Listed Fish (Spawning Event)
Anderson's Grad Class OR Chinook Monitoring 100 Sites Planning more...	Planning or In-Progress	Habitat	Status & Trend	Washington	Any	Any
CHaMP South Fork Salmon 45 Sites In Progress more...						
Lower Columbia LC Lamprey Monitoring 120 Sites In Progress more...						
Phil's Graduate Class Seceach Public Lands 25 Sites Planning more...						

User is logged in

This page is a vision of what could be possible...
But there are lots of challenges to overcome to pull something like this off.

There could be numerous filter options. Will be tough to choose... ideally we can keep it simple and not have to support more complex querying (e.g. multiple selection for a given filter or more complex Boolean logic).

List on the left side is the list of all Monitoring Projects that match the filters set by the user. Entering text in the filter above would match keywords in the monitoring program or project name. Map only shows polygons for the monitoring projects that match the filter criteria.

The more filtering, the fewer polygons on the map. Note: Using distinct colors for each project like shown here is problematic in that it doesn't scale well when there are > 10 or so projects – we should be so lucky, right?

Ideally, user could select a monitoring program from the filtered list and the corresponding polygon would be highlighted on the map.

Clicking "more..." would take user to details of that Monitoring Program/Project.

For an example of a filterable map like this, see Sitka's Terramet project that they did for Metro.

SITE MANAGER – EXPLORER FEATURE

- ❖ Current effort is scoping exercise to develop requirements
- ❖ Requesting feedback from community
 - What information should be associated with sites?
 - What should user interface do - map sites, filter by A, B, C; advanced search? What do these things look like?
 - For more background information about this scoping exercise, see new report (on PNAMP website: <http://www.pnamp.org/document/3845>)

SALMONMONITORINGADVISOR.ORG

- ❖ Complete website transferred from NCEAS
- ❖ Educational resource - monitoring program design
- ❖ Integrate generic concepts into MonitoringResources.org
- ❖ Future - add topics beyond salmon



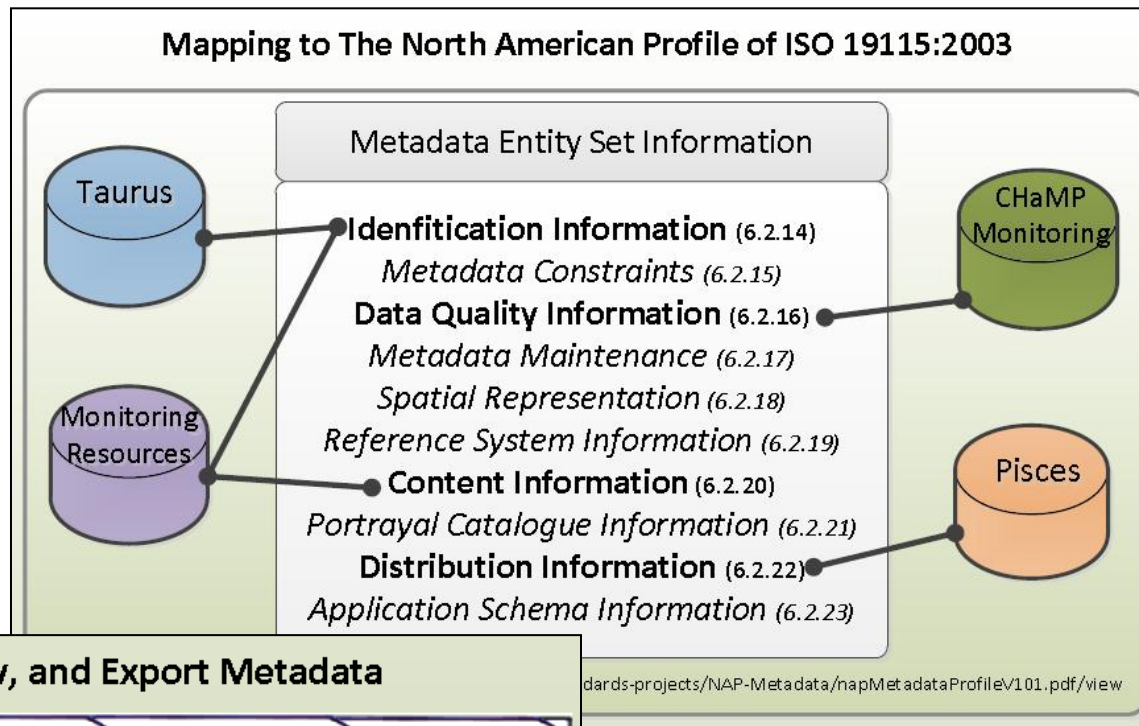
The screenshot shows the homepage of the Salmon Monitoring Advisor website. The header features a large image of salmon swimming underwater, with the text "SALMON MONITORING ADVISOR" overlaid. A search bar is located on the right side of the header. Below the header is a navigation menu with the following items: Home, 1. Goals, 2. Design, 3. Collect, 4. Manage, 5. Interpret, 6. Report, 7. Revise, and Resources. Below the navigation menu is a breadcrumb trail that reads "You are here: Home" and a set of links: ABOUT US, SITE MAP, ACCESSIBILITY, and CONTACT. The main content area is divided into two columns. The left column contains a "Navigation" section with a list of links: Home, 1. Goals, 2. Design, 3. Collect, 4. Manage, 5. Interpret, 6. Report, 7. Revise, and Resources. Below this is a "Related Terms" section with a small icon. The right column contains the main heading "Salmon Monitoring Advisor: Helping users to design and implement salmon monitoring programs" and a sub-heading "Overview". The overview text reads: "Designing monitoring programs for Pacific salmon is complicated. The number of technical references on sampling design, fish monitoring indicators, field protocols, and resource management goals can be overwhelming. To date, there is no comprehensive, technically rigorous framework to help practitioners, decision makers, and those who fund monitoring programs to deal with this complex array of information. Our goal is to fill this gap with a comprehensive design process that synthesizes a wide array of information into a web-accessible, systematic framework for designing monitoring programs."

METADATA BUILDER

- ❖ Pilot project - prototype tool development
 - Concept - support for development of a complete metadata record for datasets
 - Pull information from existing online resources into a metadata record template
 - Different organizations would need different web services
 - Not all elements will be found; users will need to fill in what cannot be accessed online
 - Develop prototype specific to BPA; pull elements from Pisces, Taurus, MM.org, etc.
- ❖ Seek review of prototype from PNAMP Metadata WG
 - Feedback on tool
 - Regional use
 - Costs

METADATA BUILDER

- ❖ Current work:
 - New ISO standard
 - Map fields to database information
 - Design concepts for Builder



User Interface – Capture, Review, and Export Metadata

1. Select Project 2. Identification Info 3. Content Info 4. Distribution Info 5. Data Quality Info 6. Share/Export

File: Metadata for the Walla Walla 2009 Monitoring and Evaluation Dataset Uniform Resource Identifier 139.458.684

Please Enter: Metadata Entity Set Information (6.2)

Contact (6.2.8) Date Last Updated

Please Select: Data Set Parameters

Project

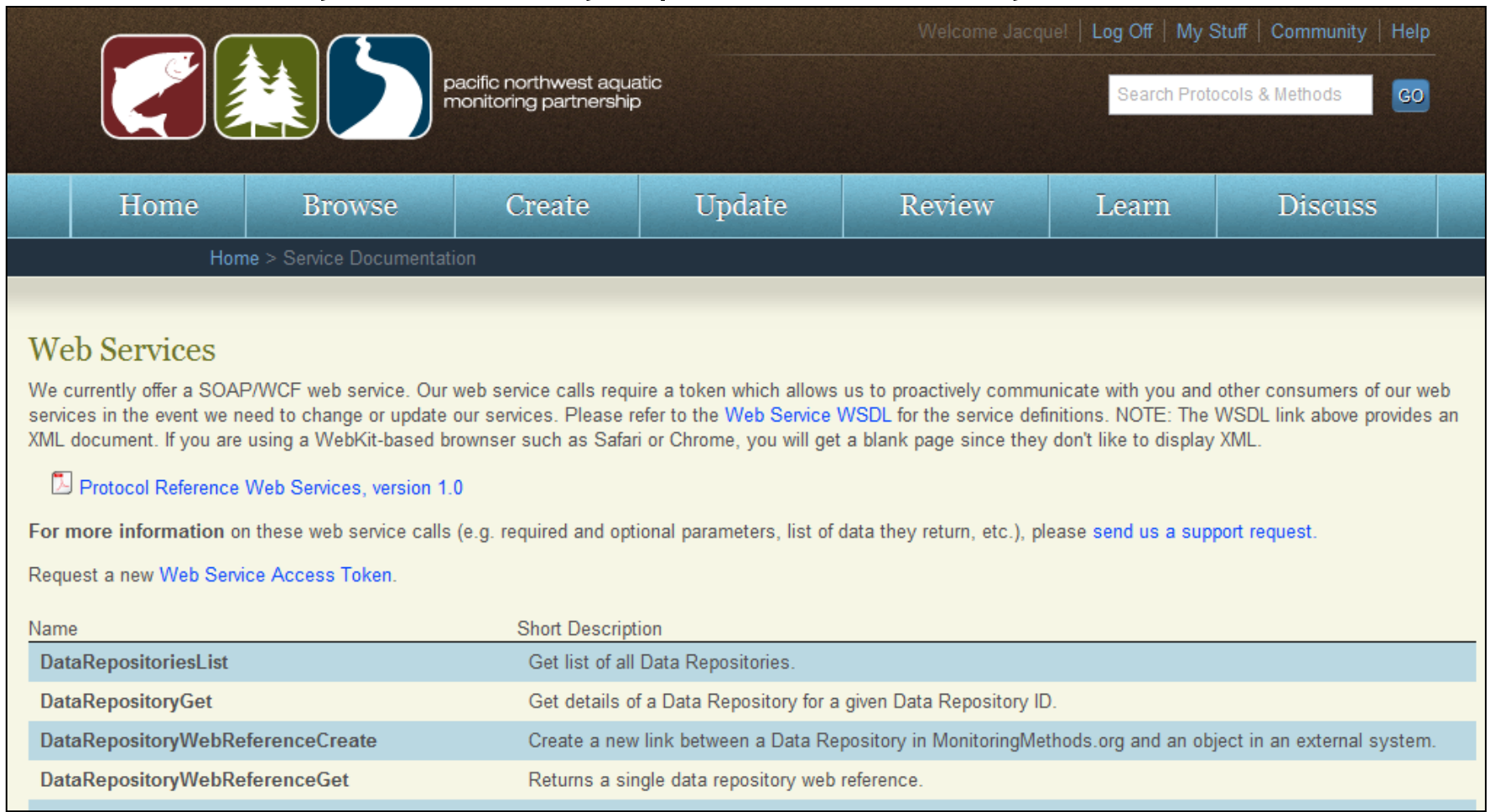
Protocol

Temporal Extent Beginning Ending

Metadata Standard (6.2.10) Version (6.2.11) Language (6.2.11) [configure](#)

WEB SERVICES WITH REGIONAL SYSTEMS

- ❖ Offer web services to exchange information - MonitoringMethods.org
- ❖ Encourage use of bi-directional web services
 - Content is dynamic - always up to date in both systems



The screenshot shows the MonitoringMethods.org website. At the top, there are three logos: a fish, two trees, and a bird. To the right of these logos is the text "pacific northwest aquatic monitoring partnership". Further right, there is a navigation menu with links for "Welcome Jacques!", "Log Off", "My Stuff", "Community", and "Help". Below the navigation menu is a search bar with the text "Search Protocols & Methods" and a "GO" button. Below the search bar is a horizontal menu with buttons for "Home", "Browse", "Create", "Update", "Review", "Learn", and "Discuss". Below the menu is a breadcrumb trail: "Home > Service Documentation". The main content area has a heading "Web Services" and a paragraph of text. Below the text is a link "Protocol Reference Web Services, version 1.0". Below the link is a paragraph of text. Below the text is a link "Request a new Web Service Access Token". Below the link is a table with two columns: "Name" and "Short Description".

Welcome Jacques! | [Log Off](#) | [My Stuff](#) | [Community](#) | [Help](#)


Search Protocols & Methods

[Home](#) [Browse](#) [Create](#) [Update](#) [Review](#) [Learn](#) [Discuss](#)

[Home](#) > [Service Documentation](#)

Web Services

We currently offer a SOAP/WCF web service. Our web service calls require a token which allows us to proactively communicate with you and other consumers of our web services in the event we need to change or update our services. Please refer to the [Web Service WSDL](#) for the service definitions. NOTE: The WSDL link above provides an XML document. If you are using a WebKit-based browser such as Safari or Chrome, you will get a blank page since they don't like to display XML.

 [Protocol Reference Web Services, version 1.0](#)

For more information on these web service calls (e.g. required and optional parameters, list of data they return, etc.), please [send us a support request](#).

Request a new [Web Service Access Token](#).

Name	Short Description
DataRepositoriesList	Get list of all Data Repositories.
DataRepositoryGet	Get details of a Data Repository for a given Data Repository ID.
DataRepositoryWebReferenceCreate	Create a new link between a Data Repository in MonitoringMethods.org and an object in an external system.
DataRepositoryWebReferenceGet	Returns a single data repository web reference.

WEB SERVICES WITH PROJECT TRACKING SYSTEMS

- ❖ Information from [MonitoringMethods.org](#) available via web services
- ❖ Bonneville Power Administration's [cbfish.org](#) - system for selecting and funding projects

Screenshot of portion of a proposal in [cbfish.org](#)

DELV-1: Okanogan River Basin-wide habitat and salmonid assessment

In 2004, the OBMEP began collecting data throughout the Okanogan River basin. Once 5 years of each data type needed has been collected, these data will be evaluated to compare subwatershed changes over time regarding salmonid habitat. Our analysis will leverage the new and improved EDT3 model to evaluate each of the hydrologic reaches within the Okanogan River Basin. The EDT3 model will provide limiting factors for each hydrologic reach and sub-watershed and a trend in estimated salmonid productivity. Further refinement of these outputs will be accomplished by breaking each limiting factor down to identify the specific input driving this result. Once the input variable driving the limiting factor has been determined, empirical data can be used to evaluate the most relevant metric for status and trend. The derived metric analysis, along with actual adult and juvenile salmonid data, will be used to determine progress toward restoration or degradation and used to focus recovery action efforts in the future. Results will be shared with the Upper Columbia Salmon Recovery Board through their Regional Technical Teams Data analysis workshop and incorporated into the implementation schedule created by the local watershed action teams. In addition to these very specific reports this deliverable will also cover small scale experiments needed to answer important local management questions that require minimal addition data be collected but represent important but yet undefined questions this program will be asked to answer.

Start: 2011 End: 2020

Budget: \$1,150,000

Associated Work Elements: [70. Install Fish Monitoring Equipment](#), [156. Develop RM&E Methods and Designs](#), [157. Collect/Generate/Validate Field and Lab Data](#), [160. Create/Manage/Maintain Database](#), [161. Disseminate Raw/Summary Data and Results](#), [162. Analyze/Interpret Data](#), [189. Coordination-Columbia Basinwide](#), [191. Watershed Coordination](#)

Protocols:

[OBMEP-habitat \(2003-022-00\)](#)

[OBMEP-Population estimates of adult summer steelhead spawners and distribution \(2003-022-00\)](#)

[OBMEP-rotary screw trap \(2003-022-00\)](#)

[OBMEP-snorkel, macroinvertebrate, temperature, and water quality monitoring \(2003-022-00\)](#)

DELV-2: Long-term salmonid data set

Since 2005, OBMEP has been building a long-term data set for evaluation of status and trend in the Okanogan River Basin. The biological component of this includes; standing crop estimates for salmonids and macroinvertebrates at all randomly selected habitat sites, juvenile out-migrant data collection at a rotary screw trap, and annual adult summer steelhead population estimates. In addition we assemble, and assist with data collection events lead by other agencies related to summer Chinook and Sockeye, rather than duplicating these data collection efforts. As this data set becomes more robust it will become the focal point for all data users interested in data related to salmonids in the Okanogan River Basin.

Start: 2011 End: 2020

Budget: \$4,000,000

Associated Work Elements: [70. Install Fish Monitoring Equipment](#), [156. Develop RM&E Methods and Designs](#), [157. Collect/Generate/Validate Field and Lab Data](#), [160. Create/Manage/Maintain Database](#), [161. Disseminate Raw/Summary Data and Results](#), [162. Analyze/Interpret Data](#), [189. Coordination-Columbia Basinwide](#), [191. Watershed Coordination](#)

Protocols:

[OBMEP-habitat \(2003-022-00\)](#)

[OBMEP-Population estimates of adult summer steelhead spawners and distribution \(2003-022-00\)](#)

Links to
[MonitoringMethods.org](#)
protocols



WEB SERVICES WITH PROJECT TRACKING SYSTEMS

Work Element Details

Select a work element: AK: 157. Monitor Habitat to determine natural production for fish *

Milestones | Location * | Metrics * | Focal Species * | RM&E Metadata * | Environmental Compliance *

Data Repository Name: [Don't see your data repository name?](#)
Select the repository that will store your dataset.

	Data Repository	Location	Contact
<input type="checkbox"/>	Status, Trend, and Effectiveness Monitoring (STEM	https://www.webapps.nwfsc.noaa.gov/stm/	N/A
<input type="checkbox"/>	ISEMP - Integrated Status and Effectiveness Mon	http://www	
<input checked="" type="checkbox"/>	StreamNet	http://www	
<input type="checkbox"/>	The North American Bird Banding Program	http://www	
<input type="checkbox"/>	Upper Columbia Habitat Work Schedule	http://uc.ek	
<input type="checkbox"/>	USACE Adult Fish Counts	http://www	
<input type="checkbox"/>	USGS Gauging Stations	http://nr.wa	

Protocol and Number of Sites: [Don't see your protocol or method?](#)
Select a protocol and specify the number of sites for this work element.

Display All Available Protocols

Name	Proposed Project Sites	Sites for this WE
(select a protocol)		0
(select a protocol)		
Ecological Interactions (1995-063-25)		
Genetics (1995-063-25)		
Harvest Monitoring (1995-063-25)		
Natural Production (1995-063-25)		

Methods:
These are the methods for the selected protocol.

Name
*** This protocol has no methods ***

Guidance:
[Protocols] are detailed plans that explain how data are to be collected, managed, analyzed, and reported. Protocols for BPA-funded work are documented at <http://monitoringmethods.org> and become visible in Pisces once submitted at that site. One or more protocols for the project associated with this statement of work may already have been submitted during the project proposal process. The list above defaults to show those protocols. If a protocol has been submitted for your project, and you do not see it on the list, try selecting Display All Available Protocols and type the first few characters of the protocol name. If a protocol hasn't been submitted for your project, and an existing protocol does not apply, click 'Don't see your protocol or method?' and login to <http://monitoringmethods.org> to enter a new protocol.

Check Spelling | Apply | OK | Close

- ❖ Bonneville Power Administration's Pisces - system that tracks contracts, SOWs, metrics, status
- ❖ Associate Protocol or Data Repository in MonitoringMethods.org with specific tasks in SOW in Pisces

WEB SERVICES

- ❖ Looking for other systems to connect with...some ideas mentioned so far include:
 - SOTR?
 - StreamNet
 - PCSRF
 - CRITFC Tribal Data Network?
 - Habitat Work Schedule
 - PRISM
 - Washington Department of Ecology EIM
 - JMX
 - ODFW Salmon & Steelhead Salmon Recovery Tracker
 - Others?

ONLINE TOOLS BUDGET OVERVIEW

- ❖ Prior to 2010, USBR supported development of Protocol Manager/Protocol Library
- ❖ 2010
 - Allocated ~\$104,000 (BPA funds) and \$60,000 (GBMF funds) to MonitoringMethods.org development
- ❖ 2011
 - Allocated ~\$80,000 (BPA funds) to additional MonitoringMethods.org development
- ❖ 2012
 - Allocated ~\$310,000 (BPA funds) to development tasks for MonitoringResources.org, Sample Designer and Site Manager (part of Master Sample tool redevelopment), Monitoring Explorer scoping, Metadata Builder scoping
- ❖ In all years, funds from BPA, NOAA, and USBR have supported PNAMP staff time to oversee projects

ONLINE TOOLS IN-KIND CONTRIBUTIONS

❖ Leadership team, user testing participants, & feedback rec'd from:

- BPA ▪CRITFC ▪LCFRB ▪NWIFC ▪UCSRB ▪USGS ▪WA GSRO
- CBFWA ▪CTUIR ▪LCREP ▪ODFW ▪USBR ▪WDFW ▪YBFWRB
- CCT ▪Ecotrust ▪NOAA ▪PSMFC ▪USFS ▪WSC
- CHaMP ▪EPA ▪NPT ▪PSP ▪UW ▪WA ECY
- Clark Co. ▪IDFG ▪NWHI ▪TTECI ▪USFWS ▪WA Forum

❖ 2009

- ~100 hours logged for meetings associated with Protocol Manager

❖ 2010

- ~100 hours logged for meetings associated with Monitoring Methods and the Master Sample tool

❖ 2011

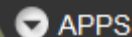
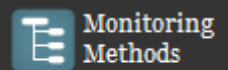
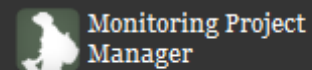
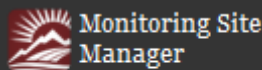
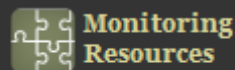
- ~100 hours logged for meetings associated with Monitoring Methods and the Master Sample tool redevelopment

❖ 2012

- ~35 hours logged for meetings associated with MonitoringResources.org, Sample Designer, and Site Manager

ONLINE TOOLS: WHAT'S IN IT FOR YOU?

- ❖ Improved communication
 - Collaboration & data sharing opportunities
 - Who's doing what, where, how?
 - Information discovery; best practices; interaction with peers
- ❖ Long term storage of content
- ❖ Associate info with data, next contract
- ❖ Support for:
 - Data management and sharing processes
 - Documentation for reports
 - Metadata record creation
- ❖ Potential to lead to more efficient use of limited funds



Join | Log In | Help

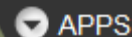
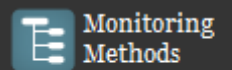
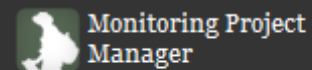
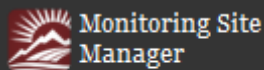
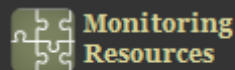


Monitoring Resources

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ONLINE TOOLS: FINAL POINTS

- ❖ PNAMP staff available to help
 - Training for MonitoringMethods.org, other tools as developed
 - Support for content entry
- ❖ Feedback - very important!
 - Frustrations, ideas, concerns = use to guide development
 - Help design/modify applications to support user needs
 - Example: "I would be more likely to come back to the tool if it did X, Y, Z for me"
 - Contact Jacque
 - Use Support/Help links on sites



[Join](#) | [Log In](#) | [Help](#)



Monitoring Resources

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QUESTIONS?

If you have any additional questions or comments, please feel free to contact us.



pacific northwest aquatic
monitoring partnership

Jacque Schei; jschei@usgs.gov; 503.201.0880

MONITORING METHODS TERMINOLOGY

(www.monitoringmethods.org/Glossary/)

- **Protocol** - A detailed plan that explains how data are to be collected, managed, analyzed, and reported, and is a key component of quality assurance for natural resource monitoring programs (Oakley et al. 2003*).
- A fully defined Protocol in [monitoringmethods.org](http://www.monitoringmethods.org) includes Objectives, Key Assumptions, Study Design, Methods, Personnel and Training considerations, etc.
- What constitutes a new protocol?
 - Different study designs
- What are good titles?
 - Concise, but informative, like the title of a paper.
 - Does not need to include specifics, but can (agency, project number, location, etc.)
 - *Adult Steelhead Escapement Monitoring in Joseph Creek*
 - *O. nerka Population Abundance Monitoring (hydroacoustics)*

* Oakley, K.L., Thomas, L.P., and Fancy, S.G. 2003. Guidelines for long-term monitoring protocols. Wildlife Society Bulletin. 31(4):1000-1003.

MONITORING METHODS TERMINOLOGY

(<http://www.monitoringmethods.org/Glossary/>)

- **Method** - A systematic, standard operating procedure for collecting data (Measurements) or analyzing data (deriving Metrics from Measurements). Method descriptions are part of the Response Design. Methods must be: 1. described in documentation, 2. repeatable by others.
 - What makes a good method?
 - Thorough description of one technique, **generic** so it can be shared
 - What is a good title?
 - **Generic**, identifies technique
 - Don't include specifics (agency, location)
 - *Channel Morphology: Bankfull Width*
 - *Redd Survey*
 - What constitutes a new method/customized method?
 - Changes in step-by-step procedures
 - Any change to an existing method should be documented.