

# Broadsheet for monitoringmethods.org – Project Overview & Deliverables

## Overview *(from Project Vision document)*

This project is intended to add value to monitoring and evaluation investments by building the necessary systems to:

1. Share, add, update, amend, review, approve, delete and retire field protocols and methods, metrics and indicators, and study/monitoring design options.
2. Facilitate discourse, knowledge sharing, peer-review, collaboration, and learning among practitioners; aid in the discovery, documentation, and use of best practices; and promote the adoption of standards by funders and managers.
3. Increase the interoperability of data systems and ability of agencies and tribes to exchange, share, and reuse monitoring data by providing detailed information about methods and assumptions used in collecting and analyzing field data.

## Customers

- BPA
- PNAMP (researchers and funders)

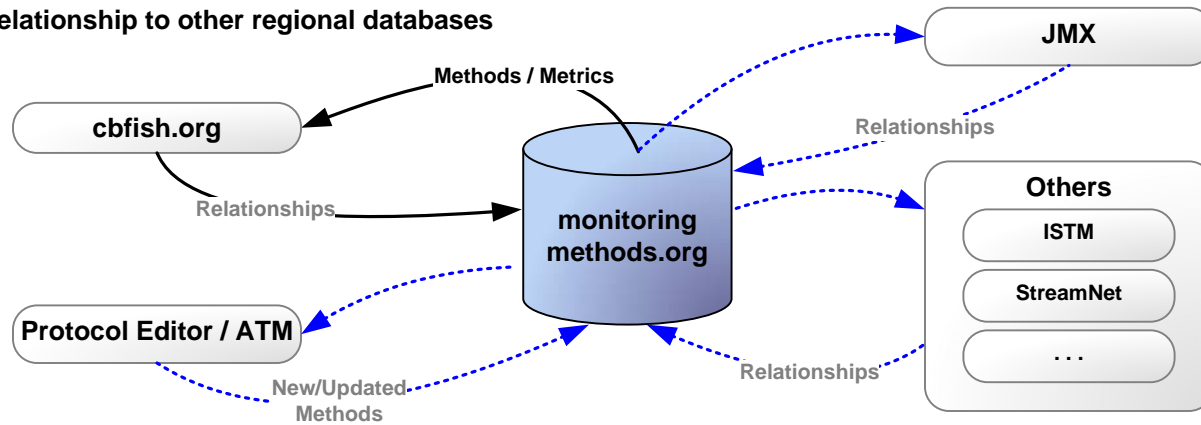
## Stakeholders

- Ecotrust's State of the Salmon
- Decision-makers: e.g. WA FoM, PSP, OWEB, etc.
- Researchers (universities, watershed councils, community stewards, consulting firms)

## Leadership Team

The real magic – because we are building a collaborative system in the period of a few months, the Leadership Team provides an absolutely critical function: **Timely guidance & objective advice about the scope/content of the system.** They will allow us to move fast and adapt as we go.

## Relationship to other regional databases



## Project Goals *(also from Project Vision document)*

- Contribute to specific business needs of regional programs such as the NPCC's Fish and Wildlife Program status review process and the Washington Forum on Monitoring's protocol recommendations.
- Provide insight to and experience with real-time constraints that practitioners and managers face in tracking and understanding the health of aquatic systems and fish populations.
- Provide a tool to support documentation of methods within projects.
- Facilitate information discovery among monitoring programs and practitioners.
- Provide a public online forum where users can discuss and share information about their monitoring programs.
- Promote coordination and collaboration between monitoring practitioners and management entities.
- Improve access to monitoring method information for any interested party.
- Streamline the creation and exchange of monitoring data documentation (aka, metadata).

## Deliverables

Phase I: Aug-Dec 2010	<ul style="list-style-type: none"> <li>• Development Server</li> <li>• First release of Admin App</li> <li>• Additional releases of Admin App</li> <li>• Database design</li> </ul>	Phase II: Jan - ? 2011	<ul style="list-style-type: none"> <li>• First release of Community Forum</li> <li>• Additional releases of Community Forum</li> <li>• Public Launch of Community Forum</li> </ul>
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## Guiding Principles for System Design

- **Maximize Structured Data** – will enable analysis and reporting required by regulators and desired by mgmt and policy folks.
- **Flexible Workflow** – while we want to carefully manage the “state” of core entities like Methods, we also need to build workflows and author business rules that are flexible enough to be easily changed since formal workflow processes are new for this domain and for our users – we will need to regularly adjust .
- **Iterative Design & Development** – we will learn as we go and adapt; therefore, our bias will always be to start with the simplest and least expensive option for supporting a user task, and only invest further when the real world feedback loop tells us we need to do more.
- **User Task Driven** – to help the project stay focused on the important stuff, we will ensure each piece of functionality ties back to a User Task that the core, if not Leadership, team has vetted and prioritized.

## User Profiles

For more: [http://projects.sitkatech.com/projects/pnamp/wiki/User\\_Profiles](http://projects.sitkatech.com/projects/pnamp/wiki/User_Profiles)

### Administrator

Responsible for system health and access. Serves as focal point for other users of the system, often coordinating other users to help with supervising the content and community input.

### Data Steward

Responsible for defining and promoting the use of standard/common data monitoring methods for one or more agencies or organizations. While the ultimate number of Data Stewards needing to use this web app is unknown, we anticipate a relatively small number (2-5) for the first few years.

### Policy Lead / Manager

Responsible for establishing and enforcing data management policies for a environmental services programs. Might occasionally review methods and determine a subset that are “Allowed” and/or “recommended” for their program.

### Scientist / Field Tech (POWER USER)

Frequent visitor to the web site. Initiates and leads discussions on specific content (e.g. a Protocol, Method, Metric, etc.), or of a more global nature (e.g. “Challenges with Habitat Monitoring”). Always logs in to the site when they visit it. Likely wants notifications when the community is active – for example, when a new comment is posted. Likely defines Protocols and authors Methods.

### Scientist / Field Tech (NORMAL USER)

Wants to view or reference methods they are using or want to use. Eventually these users may participate in reviewing/commenting on Methods and Metrics/Indicators. On some visits, they log in, on other visits they don't. Authors Methods, but probably does not define Protocols.

### Programmer

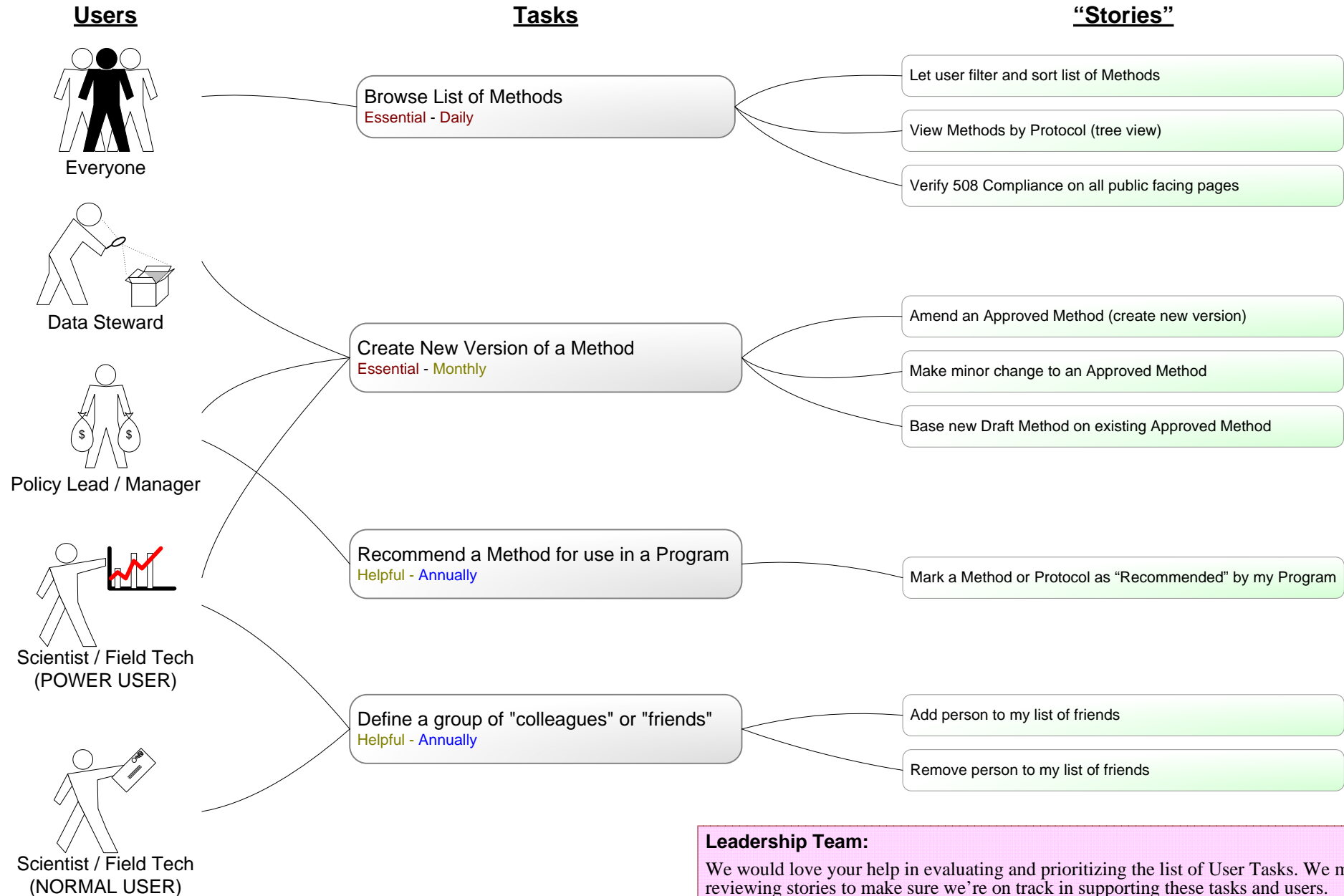
Wants to integrate standardized Methods and Metrics into an existing or new system. Needs to use application-programming interfaces (APIs) such as a web service to integrate their system with monitoringmethods.org content.

### General Public

Is curious about what we're up to.

# Broadsheet for monitoringmethods.org – A “User Task” Approach to Defining and Designing the System

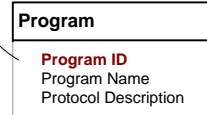
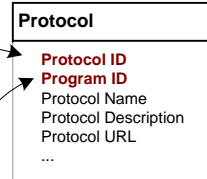
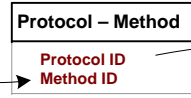
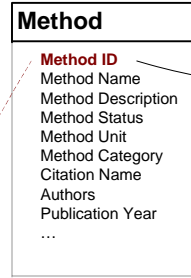
A User Task is simply an action or procedure that a person performs today, or that a person needs or would like to perform tomorrow. We like to focus requirements discussions on user tasks performed by one or more of the User Profiles as a way to ensure the system design is centered on helping people accomplish stuff they need or want to accomplish. Below are a few examples of User Tasks, and how they are decomposed into “Stories” or discrete chunks of functionality or features that the development team will build.



**Leadership Team:**  
 We would love your help in evaluating and prioritizing the list of User Tasks. We might also request some help in reviewing stories to make sure we’re on track in supporting these tasks and users.

# Broadsheet for monitoringmethods.org – High Level Data Model

## Methods and Protocols



Currently, we have ~770 Methods, about 400 of which were added as "Draft" Methods during a recent Council/ BPA solicitation of Research & Monitoring projects.

Model supports a Method being a member of multiple zero to many Protocols, but a Protocol must belong to one and only one Program.

At least for now, Protocols are simply collections of Methods.

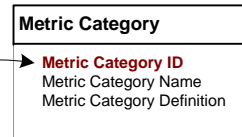
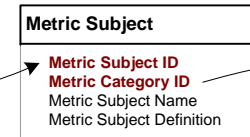
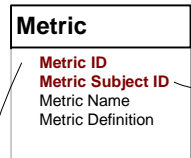
Examples of Programs today are PIBO, EMAP, ISEMP, etc.

Currently the only two choices for Method Category are "Data Collection" and "Data Analysis"

Currently there is no link between Methods and Metrics/Indicators... but we're working on that.

Also, there is no version tracking... we're also working on that.

## Metrics & Indicators

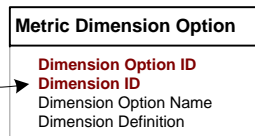
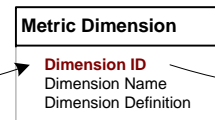
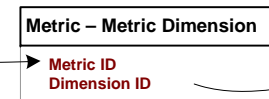


Metrics belong to one and only one Subject, and Subjects belong to one and only one Category.

Currently, we have 245 Metrics across 18 different Subjects, all of which fit into 4 different Categories.

Examples include Fish, Birds, Reptiles, Environmental Condition, Water Quality

Examples include Biological, Chemical, Physical, Economic, Social



Model supports a Metric having zero to many Dimensions.

Dimensions are helpful for describing the data being collected/analyzed.

Examples include Fish Life Stage and Fish Origin for Metrics like Abundance of Fish

## Study Designs

Study Design includes aspects such as Temporal Design, Spatial Design, and Response Design. These data structures (names and definitions) exist today in the cbfish.org database, but we will migrate them to monitoringmethods.org database.

We may also model additional Study Design Quality information (e.g. Replicate and Quality Controls descriptors) to support recent work by Tracy Hillman and Jennifer O'Neal.

## Key Terms

- Measurement** A value resulting from a field or lab data collection event based on a data collection protocol or method. Measurements are taken at a site at a point in time. Measurements can be used to create or derive Metrics or Indicators.
- Metric** A value resulting from the reduction or processing of field or lab Measurements. Metrics are often combined to derive an Indicator.
- Indicator** A reported value resulting from the processing of Metrics or Measurements across sites or time. A value used to indicate the status, condition, or trend of a resource or ecological process.
- Method** A systematic, standard operating procedure for collecting or analyzing data for one or more Metrics or Indicators. Methods may be organized into Protocols; the same Method may be included in multiple Protocols. Methods must be: 1) described in documentation, 2) repeatable by others.
- Protocol** A plan, including a set of data collection and analysis methods, to carry out a scientific study. Monitoring protocols, as described by Oakley et al. (2006), are detailed study plans that explain how data are to be collected, managed, analyzed, and reported, and are a key component of quality assurance for natural resource monitoring programs.
- (Monitoring) Program** ???  
A set of data collection and/or analysis Methods approved by an agency or organization that supports a mission, mandate, recovery plan, or research question. A Program with many Methods may choose to organize its Methods into Protocols; for example a protocol for a set of field methods and another for a set of analysis methods.
- Metric Dimension** An attribute of an Metric or Indicator that helps describe the data being collected or analyzed. For example, Fish Life Stage is a dimension of the indicator, Abundance of Fish, used to differentiate juvenile from adult abundance data.
- Metric Subject** A logical group or subcategory of Metrics and Indicators designed to help people browse and review. While some Metrics or Indicators could arguably fit under more than one Subject, in our list each belongs to one and only one Subject.
- Study Design** The analytic approach used to conduct a scientific investigation to support monitoring and research. Often contains Temporal, Spatial, and Response components. aka Sampling Design.
- Response Design** The aspect of a Study Design that evaluates the response of an experiment relative to a control or reference conditions; aka, Experimental Design, Inference Design. Examples include Analysis of Variance (ANOVA) Design and Before and After Control Impact (BACI).
- Spatial Design** The aspect of a Study Design that determines the physical location and arrangement of the study or sampling sites. Examples include Cluster Sampling and Simple Random Sampling.
- Temporal Design** The aspect of a Study Design that determines its frequency and/or duration. Examples include Complete Revisit Design and Repeating Panel Design.

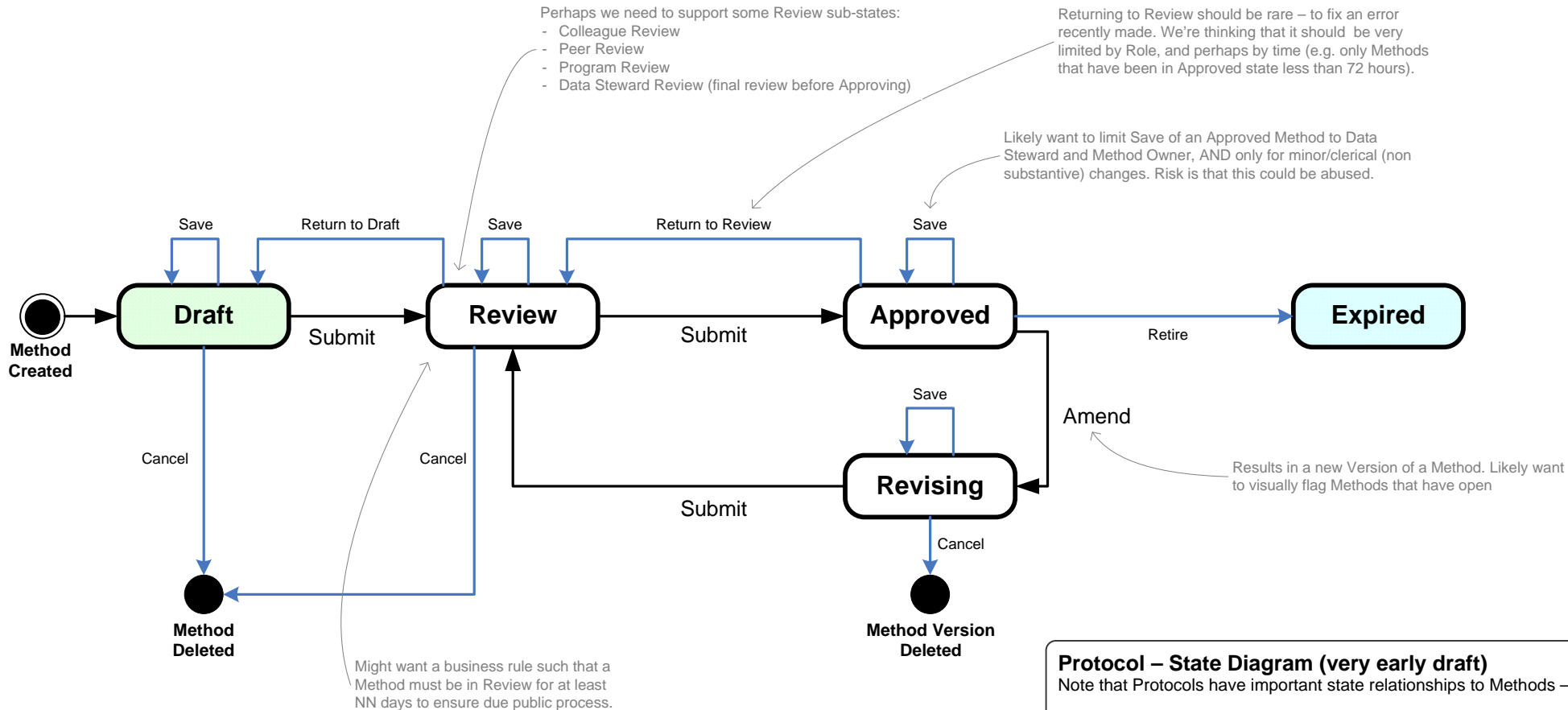
## Questions for Leadership Team

- While our current definition of Protocol is simply a collection of Methods, we're wondering if they shouldn't also have linkages to Study Design options, to regions such as subbasins or HUCs, to species or habitat types, to database schemas for actually collecting the data. Also wondering if they contain "meta" information about the Methods they contain such as sequencing or prioritization information.
- Our current list of Programs includes entities like EMAP, PIBO, and AREMP as well as entities like WA SRFB. The former set are monitoring programs, while the latter is a funding entity. Seems like these should be split into two entities, or at minimum we should add an attribute denoting some "Programs" as being funding entities, in which case they can do things like mark certain Methods and/or Protocols as "Allowed" and "Recommended."

# Broadsheet for monitoringmethods.org – Workflow for managing Methods (State Diagram)

This diagram illustrates the “life” of a Method. The darker/bolder lines represent the primary, common paths through the various states, the lighter blue lines are important, but we anticipate less frequent paths.

## Method – Proposed State Diagram



**Questions for Leadership Team**

1. Does this State diagram make sense? While the goal is to keep it as simple as possible (the more states, the more it is potentially confusing to users, and the more expensive it is to build and maintain), do you see any states missing? Any states we have that aren't necessary?
2. Should Methods be able to be ADDED or REMOVED from an Approved Protocol? Want kind of confusion might that cause if a Policy Lead (rep. of a Program) has “Allowed” all the Methods within a Protocol and then one gets added that isn't marked as “Allowed” or one is removed?
3. How should we handle the expiring of a Method that is a member of an Approved Protocol? Simply notify the Policy Leads that are the designated primary contact for the Program which has “Allowed” the Method?

