



## Environmental Decision Support

WBS: 1.4.1.505

**Hydropower Program**

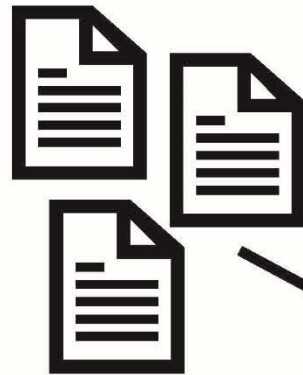
Wednesday, October 9<sup>th</sup> 2019

Brenda Pracheil, Ph.D.

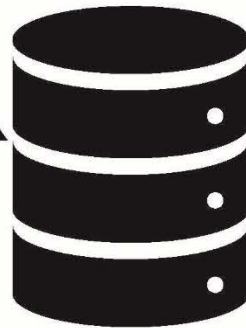
Oak Ridge National Laboratory

Project Summary	
<p>The Environmental Decision Support (EDS) project is the second phase of a strategic, long-term effort to summarize the best-available science for hydropower stakeholders by providing a transparent and consistent science-based methodology for determining which environmental impact studies to conduct during hydropower licensing. This project builds upon the Environmental Metrics for Hydropower (EMH) project (FY15-FY18), where the EDS Toolkit was created to help identify potential environmental impacts of hydropower development and operation. The EDS Toolkit:</p> <ul style="list-style-type: none"> <li>Aims to promote transparency among stakeholders by providing a template for understanding and communicating which environmental impacts have project nexus and may enable greater consistency in studies requested;</li> <li>Consists of a science- and regulatory-based Questionnaire used to summarize known information about project impacts and nexus, and a Guidance Document that provides context and technical directions for the Questionnaire; and</li> <li>Is informed by advisory boards that provide input and feedback on methods, content, and regulatory relevance.</li> </ul>	Project Information
	Project Principal Investigator(s)
	Brenda Pracheil
	WPTO Lead
	Tim Welch Corey Vezina
	Project Partners/Subs
	Kearns and West
	Project Duration
<h2>Project Objective &amp; Impact</h2> <p>Determining which environmental impact studies to conduct can be a time consuming and contentious part of FERC hydropower licensing. This project addresses the need for tools and products focused on reducing regulatory timelines while allowing for environmental impacts to be addressed and determined in a robust way. This project seeks to test and refine the science-based EDS Toolkit and will result in a revised and tested EDS Toolkit available for public use.</p>	<ul style="list-style-type: none"> <li>Project Start Date: October 1, 2018</li> <li>Project End Date: September 30 2021</li> </ul>

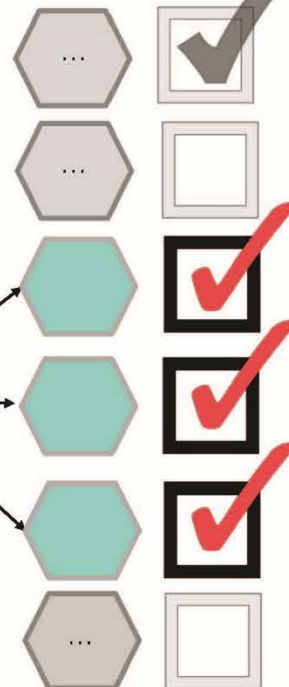
Extracted metrics from  
hydropower regulatory  
sustainability protocol,  
and peer-reviewed  
literature



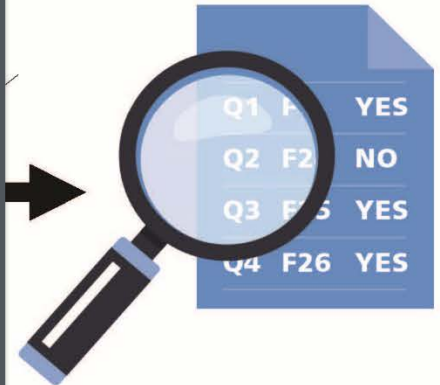
Created Environmental  
Metrics for Hydropower  
Database from metrics



Checklist of 51 River  
Function Indicators  
created from grouping  
database metrics



Prototype Questionnaire  
to assist stakeholders in  
determining hydropower  
impacts and which studies  
to conduct

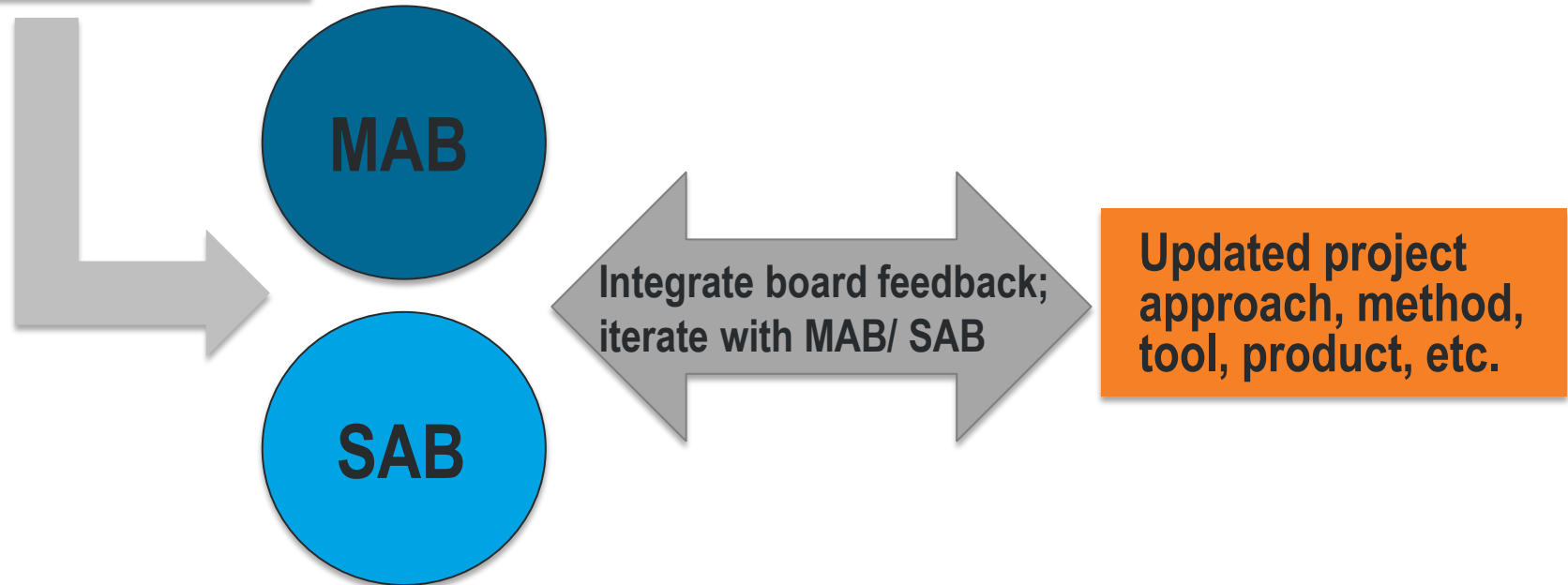


**The Questionnaire and accompanying Guidance Document  
form the EDS Toolkit that builds upon the EMH products  
above that are being refined and tested in the EDS project**

- **The EDS and preceding EMH project rely on iterative feedback from stakeholder advisory boards**
  - Mission Advisory Board (MAB)
    - Hydropower developer (e.g., power producers, utilities, manufacturers) and natural resource interest (e.g., regulators, agencies, tribes, NGOs)
    - Provide feedback based on the missions of their organization or stakeholder sector
  - Science Advisory Board (SAB)
    - Expertise in categories that form scientific basis for EDS Toolkit: Biota/ Biodiversity, Water Quality, Connectivity/ Fragmentation, Geomorphology, Water Quantity, Landscape/ Land Cover
    - Provide scientific feedback towards incorporating best-available science

The MAB and SAB provide guidance to the EDS project to inform approaches, tools, and products.

Initial project  
approach, method,  
tool, product, etc.



Project Team

Advisory Boards

Project Team

## Hydropower Program Strategic Priorities

Environmental R&D and Hydrologic Systems Science

Big-Data Access and Analysis

Technology R&D for  
Low-Impact  
Hydropower Growth

R&D to Support  
Modernization,  
Upgrades and Security  
for Existing Hydropower  
Fleet

Understand, Enable,  
and Improve  
Hydropower's  
Contributions to Grid  
Reliability, Resilience,  
and Integration

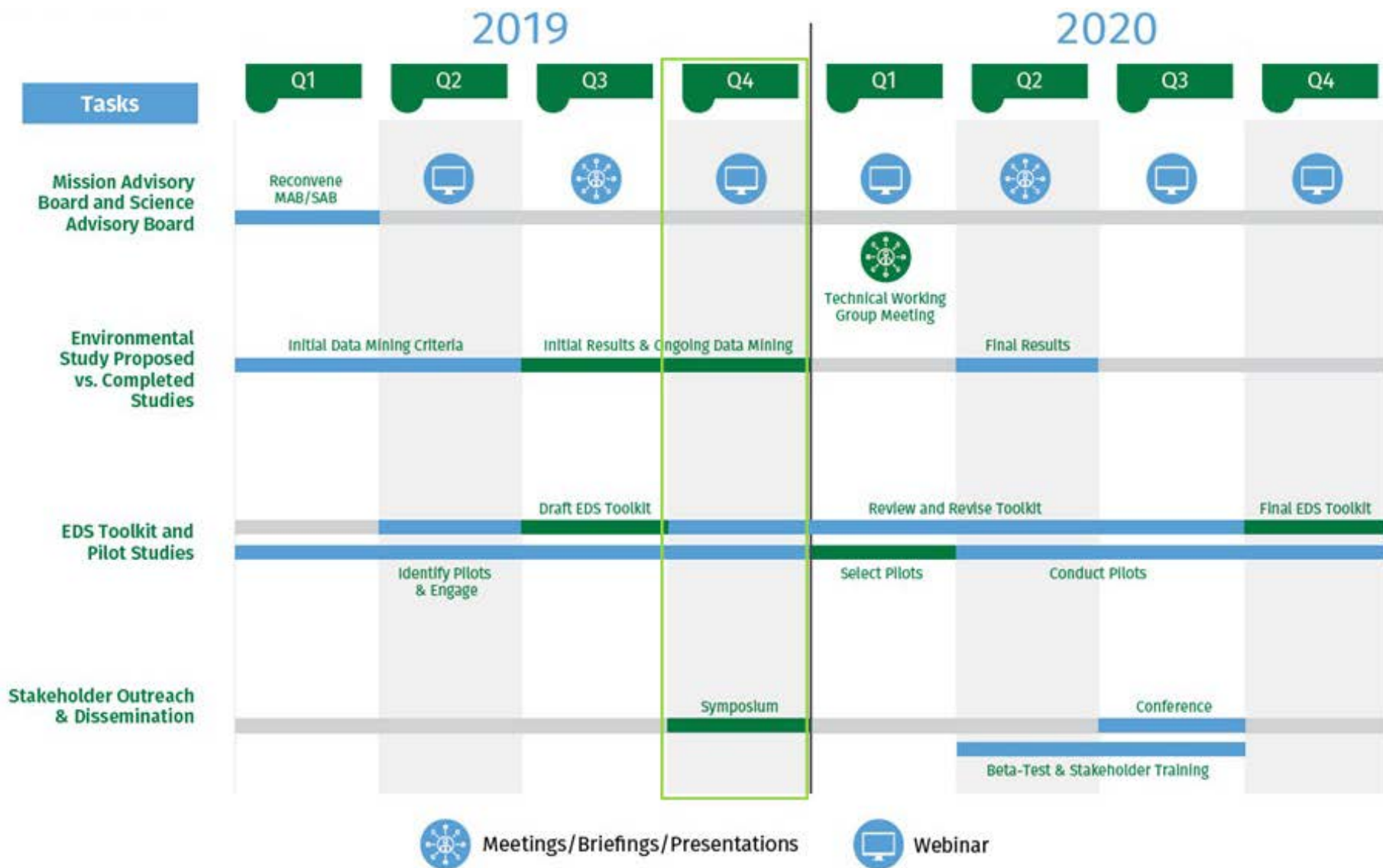
## Big-Data Access and Analysis

- Help industry to manage large, disparate and dissimilar datasets relevant for performance, operations, costs, maintenance, permitting, and environmental mitigation
  - Support comprehensive reviews of historical regulatory process drivers and outcomes
  - Identify information-mechanisms that could increase coordination among permitting agencies
  - Develop effective methods of communicating process complexities to non-technical stakeholders
- The EDS Questionnaire helps industry and other hydropower stakeholders inventory environmental data for determining what impact studies to conduct during licensing.
  - The EDS project is mining FERC documents to understand what proportion of studies proposed are completed. An evaluation of if patterns or trends in these data are present is being conducted. Information on the types and numbers of environmental impact studies stakeholders request in FERC licensing will be assessed based on historical information.
  - The EDS Toolkit summarizes information about project impacts to provide a way for stakeholders to compare what environmental information is known. This will aid stakeholder coordination by inventorying environmental assumptions incorporated into impact study requests.
  - The EDS Toolkit enables stakeholders to easily compare and communicate complex project impacts to technical and non-technical stakeholders using summary graphics and statistics provided by the Questionnaire.

# Project Budget

FY17	FY18	FY19 (Q1 & Q2 Only)	Total Project Budget FY17 – FY19 Q1 & Q2 (October 2016 – March 2019)	
Costed	Costed	Costed	Total Costed	Total Authorized
[\$K]	\$0	\$236K	\$236K	\$262.5K

# Management and Technical Approach



- **Project beneficiaries include:**
  - Federal and state regulators involved in collaborative licensing process (e.g. FERC, state water quality authorities)
  - Hydropower community stakeholders involved in collaborative licensing process (e.g., utilities, developers, consultants, NGOs)
- **Ongoing MAB/ SAB engagement during the project provides project team with feedback from a diverse group of stakeholders including feedback on:**
  - Applicability to mission space of MAB members
  - Scientific accuracy and robustness from SAB members
  - Regulatory relevance of project products and tools from natural resource agency and regulator members of MAB and SAB
- **Project results are being disseminated by:**
  - Publications in peer-reviewed literature
  - Webinars to groups like Federal Inland Hydropower Working Group
  - Conference presentations and symposia

- EDS Toolkit will be available on ORNL HydroSource webpage under “Environmental Information” tab



- Held kick-off webinar for MAB and SAB to introduce board members to EDS project
- Organized symposium on “Environmental Assessment for Hydropower Regulation” for joint 2019 American Fisheries Society/ The Wildlife Society meeting



- **Published peer-reviewed journal articles on scientific foundation for EDS project products**
  - E.S. Parish et al. 2019. Review of environmental metrics used to evaluate the effects of hydropower development. Applied Energy.
  - B.M. Pracheil et al. 2019. A Checklist of River Function Indicators for hydropower ecological assessment. Science of the Total Environment.
- **Published technical report on prototype EDS Questionnaire**
  - R.A. McManamay et al. 2019. Instruction Manual: River Function Questionnaire. ORNL-TM.

# Progress Since Project Summary Submittal

- Stakeholder boards suggested that Questionnaire needs a more user-friendly interface
  - Migrated Excel-based Questionnaire to Qualtrics software

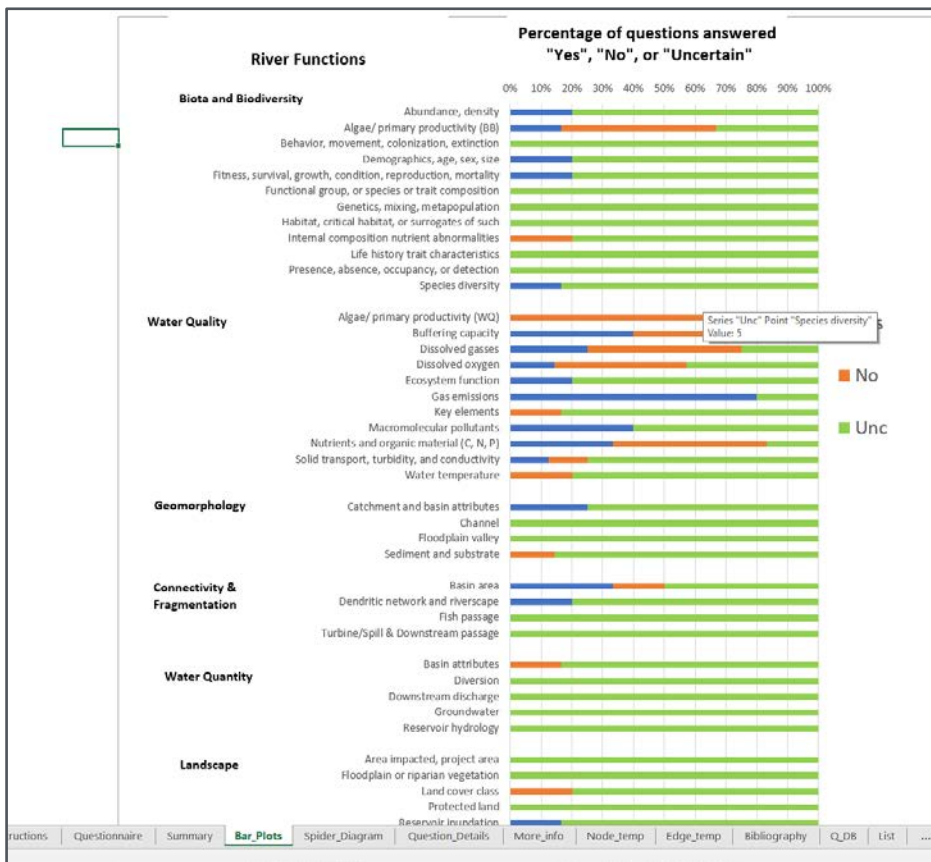
The image shows a screenshot of an Excel spreadsheet titled "007-000001-01 - final". The spreadsheet is organized into sections with blue headers. The first section is "Let's talk about the basin context." followed by "Project location and orientation". The next section is "What's going on upstream?" with questions Q. 117 through Q. 123. This is followed by "Regional water quality considerations" with questions Q. 124 through Q. 136. The next section is "Surrounding landscape and geology considerations" with questions Q. 137 through Q. 146. The final section is "Regional biological considerations" with questions Q. 147 through Q. 151. Each question has a corresponding answer column with options like "Yes", "No", "Uncertain", "Not applicable", and "Other".

Excel-based Questionnaire

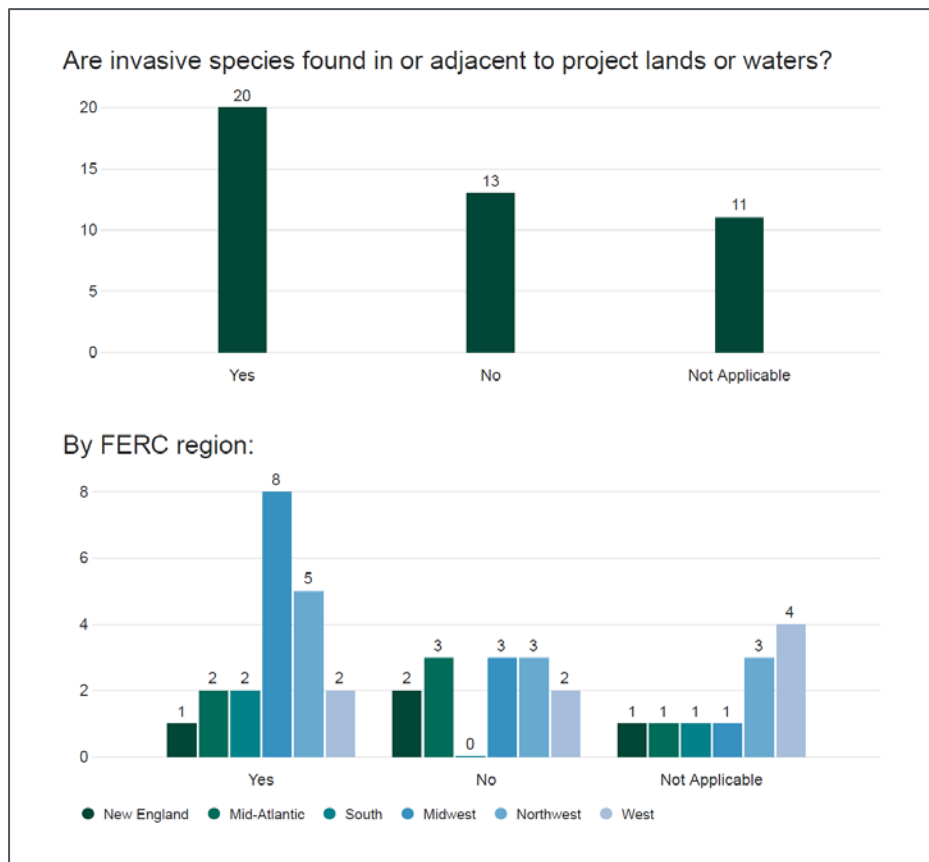
The image shows a screenshot of a Qualtrics-based questionnaire interface. The interface is clean and modern, with a blue header bar that says "OAK RIDGE National Laboratory". The questions are numbered and clearly displayed. Question 01 is "What project are you working on?" with a text input field. Question 02 is "What sector are you working in?" with radio button options: "Federal / regional Agency", "State / Local Agency", "Academia", "Non-governmental Organization", "Industry / Contractor", and "Public". Question 03 is "In what FERC region is the project you are looking to explore?" with radio button options: "New England", "Mid-Atlantic", "South", "Midwest", and "Northwest". On the right side, there is a mobile phone icon showing the questionnaire as it would appear on a smartphone.

Qualtrics-based Questionnaire

# Progress Since Project Summary Submittal



*Excel-based Questionnaire summary graphics McManamay et al. 2019*



*Qualtrics-based Questionnaire summary graphics*

Stakeholder boards suggested that Questionnaire question content, filtering, and order require additional refinement

- Planning external technical review of Questionnaire
- In-person meeting of external Toolkit review group in FY20 Q2

The image displays two versions of a questionnaire form side-by-side. On the left is a desktop version, and on the right is a mobile version shown on a smartphone screen. Both forms are branded with the Oak Ridge National Laboratory logo at the top. The desktop form includes three questions: 0.1. What project are you working on? (with a text input field), 0.2. What sector are you working in? (with radio button options: Federal / Regional Agency, State / Local Agency, Academia, Non-governmental Organization, Industry / Contractor, and Public), and 0.3. In what FERC region is the project you are looking to explore? (with radio button options: New England, Mid-Atlantic, South, Midwest, and Northwest). The mobile version shows the same questions but with a simplified layout and a 'Next' arrow between the two screens.

# Future Work

Fiscal Year Quarter		Milestone
FY19	Q3	Convene in-person MAB/ SAB meeting
	Q4	Migrate EDS Toolkit Questionnaire to Qualtrics software for testing
FY20	Q1	Convene in-person Technical Committee meeting; Revise Qualtrics version of EDS Toolkit Questionnaire based on Technical Committee feedback
	Q2	Convene in-person MAB/ SAB meeting; Revise EDS Toolkit Questionnaire based on feedback
	Q3	Draft Guidance Document for EDS Toolkit; Demo EDS Toolkit at an industry conference (HydroVision International or National Hydropower Association)
	Q4	Begin beta-release of EDS Toolkit
FY21	Q1	Begin pilot testing of EDS Toolkit
	Q2	Complete pilot testing of EDS Toolkit; Complete beta-testing of EDS Toolkit
	Q3	Incorporate feedback from EDS Toolkit pilot testing; Incorporate feedback from EDS Toolkit beta-testing process; Industry training session for EDS Toolkit at an industry conference (HydroVision International or National Hydropower Association)
	Q4	Final public release of EDS Toolkit

# Questions?

