1.5.1.605 – Scoping Study: Demonstrating Value of River Data Aggregation and Visualization Capabilities

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Project Overview

Project Summary

- Easier access to diverse types of "river data" is needed to facilitate basin-wide approaches to multi-objective river management and streamlining regulatory processes, yet significant challenges remain
- Gain a better understanding from stakeholders and lab researchers about factors affecting accessibility and usability of river data
- Demonstrate the values of accessible data through a series of "data stories" about complex river management scenarios across the U.S.

Intended Outcomes

- Inform WPTO hydropower strategy on future efforts aimed at improving access to river data and facilitating basin-scale planning
- Identify related initiatives being undertaken by other agencies/organizations
- Build broader interest within the community of river data users and producers to support efforts to improve accessibility and usability of river data

Project Information

Principal Investigator(s)

- Kyle Larson (PNNL), Dan Reicher (Stanford)

Project Partners/Subs

- Weiwei Mo (UNH), David Hart (U Maine), Debjani Singh (ORNL)
- Subs: Stanford University ($169K)

Project Status

Ongoing

Project Duration

- Project Start Date: October 2019
- Project End Date: September 2022

Total Costed (FY19–FY21)

$656K

Project Objectives: Relevance

Relevance to Program Goals:

Key challenges

Lack of access to information necessary to support decision-making

Addressing environmental impacts and hydrologic uncertainties

Accessibility/usability of data is a fundamental issue that has cross-cutting relevance to Hydropower Program goals

Scoping the issue and demonstrating value is a necessary first step to building internal and external support for…

Development of systems and standards to improve access to integrated water data

Improve capabilities to analyze multifaceted types of water data to weigh tradeoffs of multiple objectives at basin scales

Project Objectives: Approach

Approach:

Phase 1 (FY19-20)

Engage diverse cross-section of stakeholders to better understand challenges and needs regarding accessibility/usability of water data

Technical report describing complex landscape of "water data"

Stakeholder sentiments, key categories of data, critical national and regional level datasets, and related initiatives

Phase 2 (FY20-21)

Develop a series of interactive data stories that demonstrate the diversity and importance of water data to river basin management

Hold virtual workshop with engaged stakeholders to identify key challenges and benefits of improving access to water data

Project Objectives: Expected Outputs and Intended Outcomes

Outputs:

Two technical reports

(FY20) Results of stakeholder engagement and initial scoping investigation
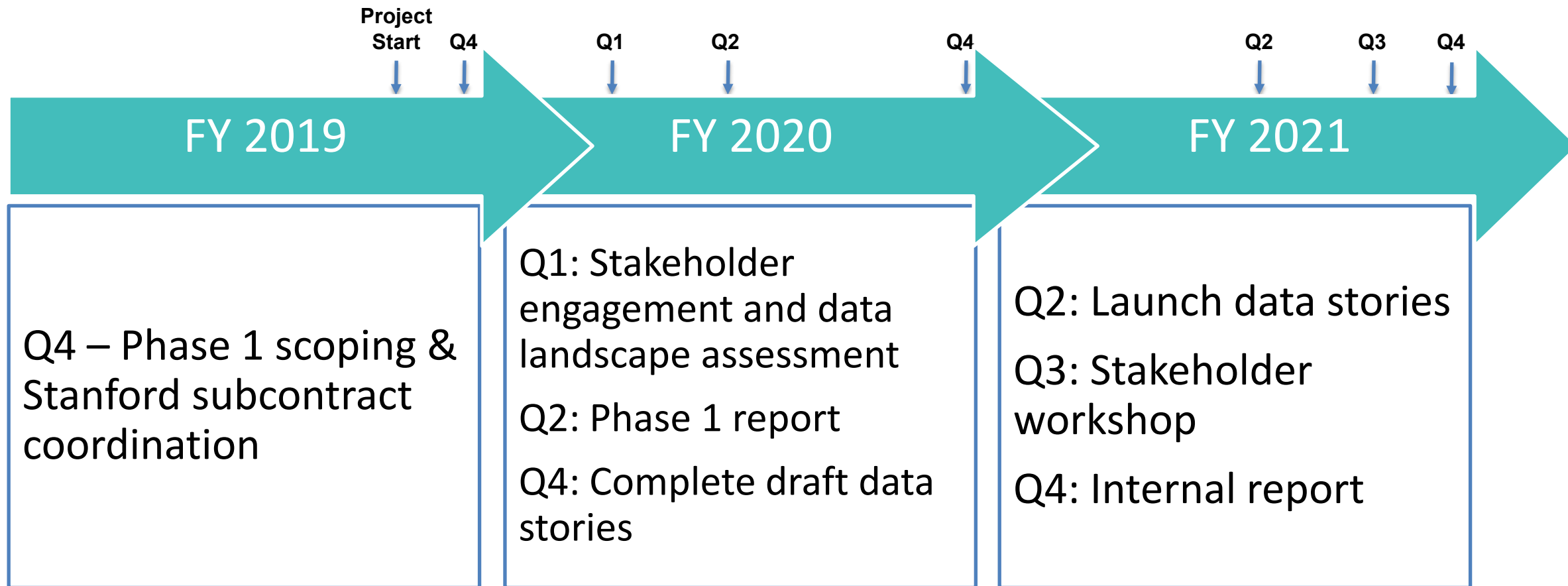
(FY21) Challenges and benefits of improving data accessibility and usability identified during May 2021 workshop

Five interactive, web-based data stories highlighting importance of data accessibility in select U.S. river basins

Outcomes:

- Inform WPTO hydropower strategy efforts aimed at improving access to river data and facilitating basin-scale planning
  - e.g., Intelligent Watersheds lab call
- Build strategic bridges with related initiatives
  - e.g., Internet of Water Coalition
- Build broader interest within the community of river data users and producers
  - e.g., Uncommon Dialogue

Project Timeline

Project Start | **Q4** | **Q1** | **Q2** | **Q4** | **Q2** | **Q3** | **Q4**

FY 2019

FY 2020

FY 2021

Q4 – Phase 1 scoping & Stanford subcontract coordination

Q1: Stakeholder engagement and data landscape assessment

Q2: Phase 1 report

Q4: Complete draft data stories

Q2: Launch data stories

Q3: Stakeholder workshop

Q4: Internal report

NOTE: There were no Go/No-Go Decisions for this project

Project Budget

FY19	FY20	FY21	Total Actual Costs FY19–FY21
Costed	Costed	Costed	Total Costed
$4K	$405K	$247K	$656K

End-User Engagement and Dissemination

- Outcomes are primarily intended to assist WPTO with development of longer-term strategies to address issues regarding access to river and water-energy data
- **External Engagement**
  - Insight of data consumers and producers is key to understanding the nature and scope of the issue
  - Engaged wide range of stakeholders (e.g., federal and stage agencies, Tribes, NGOs, universities, utilities) at multiple stages throughout project
  - Access to information disproportionately affects underrepresented or under-resourced groups such as Tribes
- **Dissemination**
  - *Two technical reports*
    - Larson et al. 2021. *Improving Discovery, Sharing, and Use of Water Data: Initial Findings and Suggested Future Work.* https://doi.org/10.2172/1778100
    - Reicher et al. 2021. *Improving the Discovery, Access, and Use of Water Data for Basin-Scale River Management: Phase 2 Workshop Report.* (Internal Report)
  - *Five online data stories*
    - *From Walleye to Wild Rice: How Data Are Informing Water Management in the Wisconsin River Basin.* https://arcg.is/1yevDi
    - Song et al. 2021. *Managing Dams for Energy and Environmental Sustainability: Exploring Mutually Beneficial Possibilities in the Connecticut River Basin.* https://arcg.is/1HqTyi0
    - Roy et al. 2021. *Hydropower in the Penobscot River, USA: The Data Behind the Dams, and Opportunities for Better Energy, Environmental, Social, and Financial Outcomes.* https://arcg.is/54iGz
    - Singh et al. 2021. HydroSource: A Platform for US Hydropower Data for Basin-Specific Applications. https://arcg.is/1q4CGb
    - Seagrist et al. 2021. *Potter Valley Project: A Look at Cross-Basin Decision-Making Informed by Water Data.* https://arcg.is/1TCS0H0
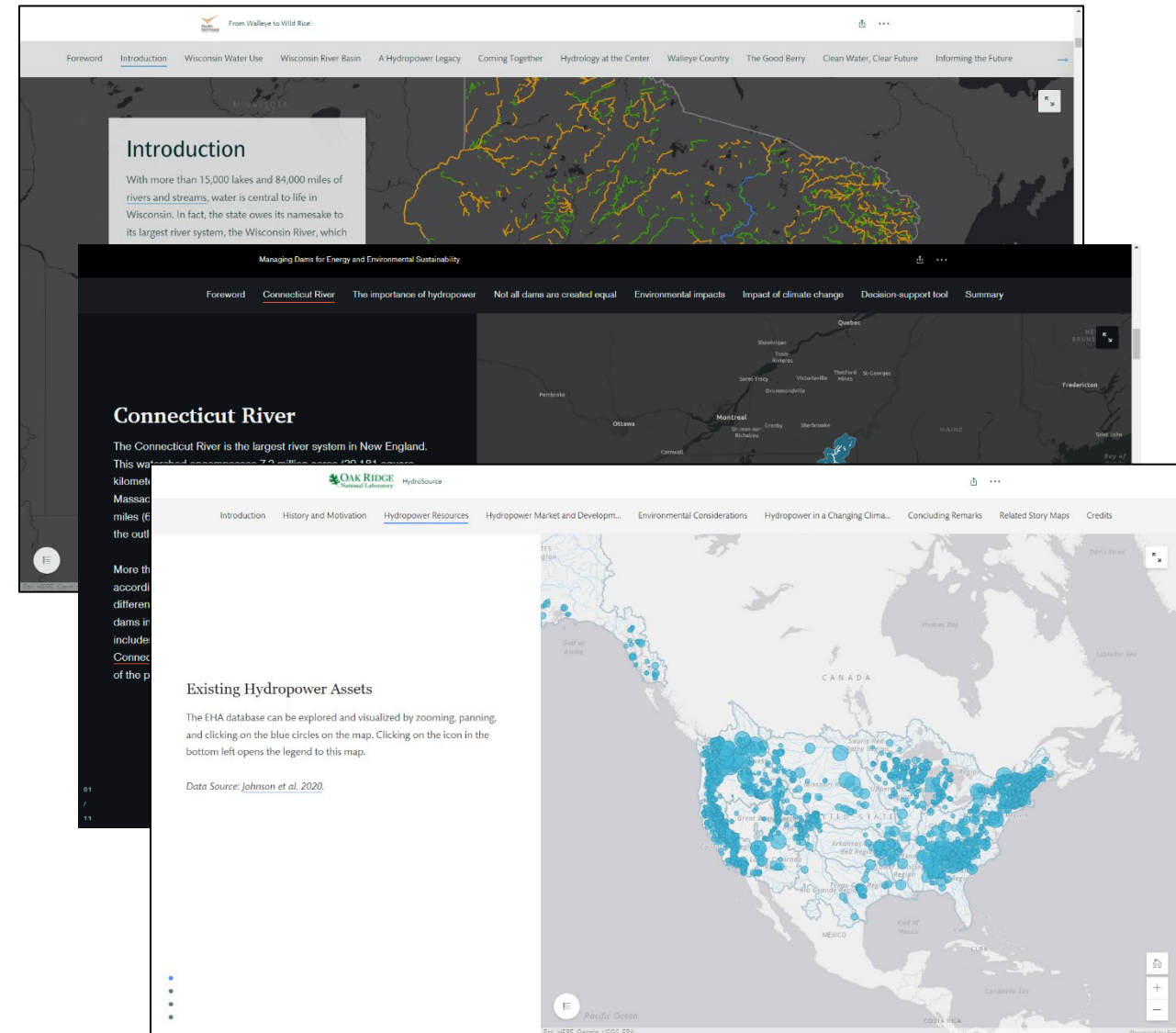
Performance: Accomplishments and Progress

Engagement with broad range of stakeholders

- Perceptions about data accessibility/usability vary across user groups
- Critical for raising awareness and building partnerships

Online, interactive data stories

- Convey complexity and importance of water data to a general audience

Future Work

FY22

 Investigate accessibility/usability of mission critical water data used or produced by PNNL in support of WPTO research portfolio

 Provide advisory support for emerging analytical needs identified by the Uncommon Dialogue Working Groups 3 & 5

  WG3: Increase Basin-Scale Decision-Making and Access to River-Related Data

  WG5 Advance Effective River Restoration Through Improved Off-Site Mitigation Strategies

 Investigate use of structured metadata for making lab-produced data Findable, Accessible, Interoperable, and Reusable (FAIR)

Q&A