

## 1.3.3.603 – Cybersecurity Maturity Landscape & Roadmap



PNNL-32053

### Toward a Resilient Cybersecure Hydropower Fleet: Cybersecurity Landscape and Roadmap 2021

Prepared for: Water Power Technologies Office

September 2021

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# Project Overview

## Project Summary

- The *Landscape* researched and painted a view of hydropower’s cybersecurity state and identified threats & gaps, current and emerging (1 decade).
- The *Roadmap* used that knowledge to prioritize threats & gaps, survey known and emerging solutions, and recommend near- mid- and long-term R&D investments.

### Project Vision:

*Within 10 years, the U.S. hydropower fleet shall be conspicuously modernized, well-maintained, and a cybersecure source of value for the nation.*

## Intended Outcomes

- Goal was to answer this question:

Where ought WPTO best invest R&D funds for highest impact and truly “move the needle” in hydropower cybersecurity?

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## Project Information

### Principal Investigator(s)

- Marie Whyatt, PM
- Darlene Thorsen, PI

### Project Partners/Subs

- none

### Project Status

Completed

### Project Duration

- Oct 2021
- Sep 2021 (not closed, follow-on possible)

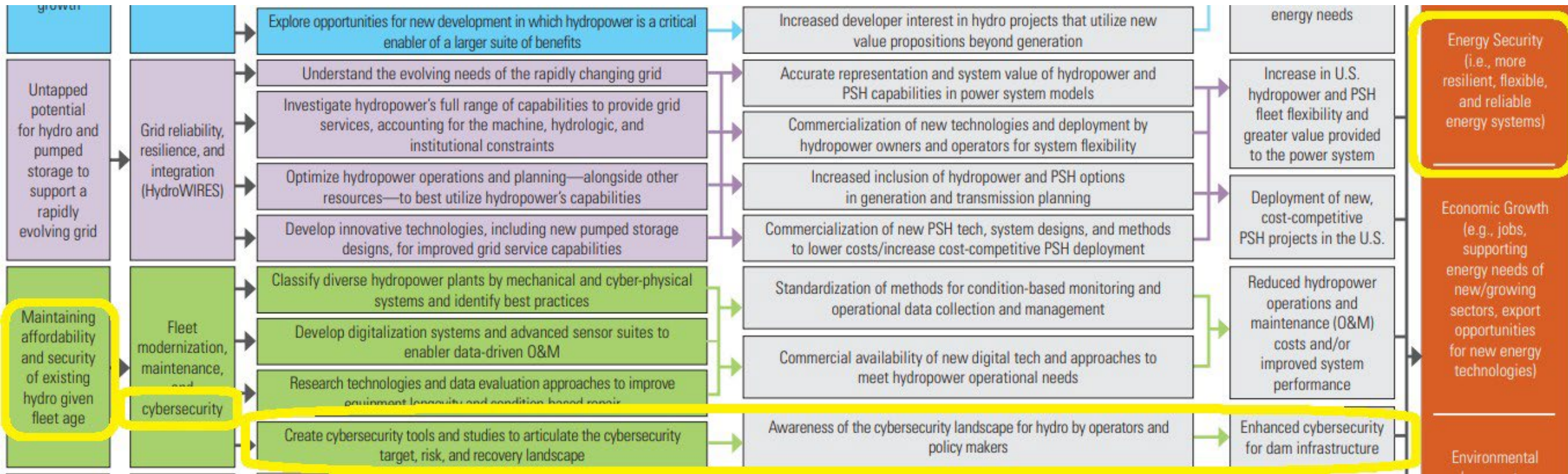
### Total Costed (FY19–FY21)

\$400K

# Project Objectives: Relevance

## Relevance to Program Goals:

- The Landscape & Roadmap was used verbatim in the latest WPTO FOA.
  - Mapping to Hydropower Program Goals and Objectives\*:



\* <https://www.energy.gov/sites/default/files/2022-03/wpto-mypp-hydropower-overview.pdf#page=10>

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# Project Objectives: Approach

## Approach:

- **Landscape phase:**
  - Chose PNNL staff having vast hydropower knowledge & experience
    - Dr. Kenneth Ham, Kyle DeSomber, Darlene Thorsen
  - Recruited PNNL Analyst with energy cybersecurity backgrounds, reviewed
    - U.S. government policies, guidances, roadmaps, frameworks (hundreds)
    - published threat intelligence\* documents (government & industry)
- **Roadmap phase:**
  - Reviewed entire corpus & “Racked and stacked”
  - Determined time horizons (0-3 years, 4-7 years, 8-10 years)
  - Aligned to DOE CESER Blueprint
  - “Sanity checked” with industry

\*Discovered cyber threat data for hydropower sector is sorely lacking, leveraged data from similar sectors, esp water/wastewater

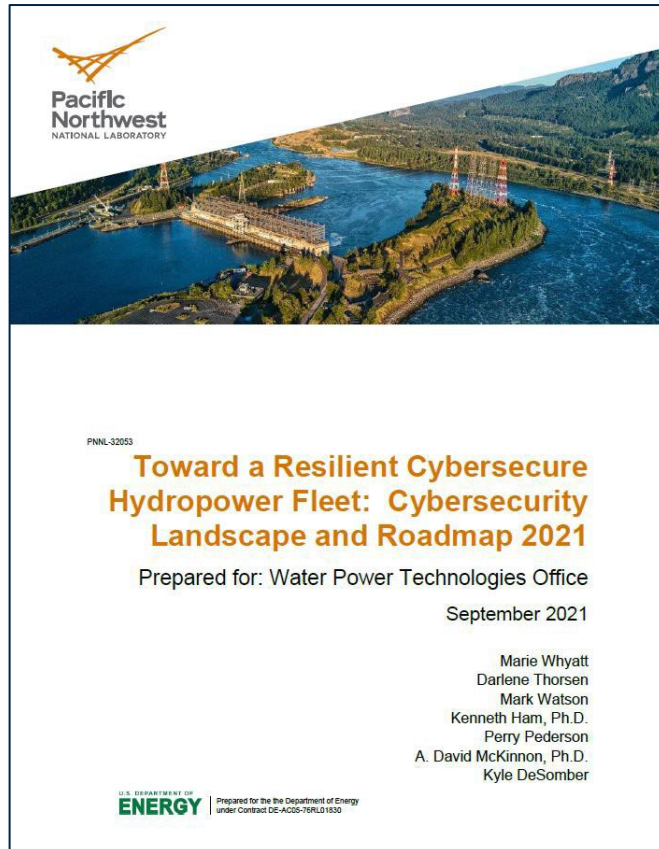
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# Project Objectives: Expected Outputs and Intended Outcomes

## Outputs:

- **September 2021 delivered:**



## Outcomes:

- **Immediate outcome:**
  - clear known cybersecurity posture (Landscape)
  - best-value 10-year R&D investments (Roadmap)
- **Long-term outcome:**
  - Guiding WPTO's program of research in cybersecurity

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# Project Timeline

- This **1-year** project was delivered **September 2021** on-time & within budget

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# Project Budget

Total Project Budget – Award Information
DOE
\$400K

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# End-User Engagement and Dissemination

- **Project team “sanity checked” results via lunch’n’learn & conferences**  
(NWA Small Hydropower Workshop, NWA Lunch’n’Learn)
- **Roadmap called out Training & Workforce Development need**
  - explicitly stated need to entice youth from diverse backgrounds
  - need to “see themselves” in hydropower careers
- **Cybersecurity Trainings follow-on especially targeted smaller hydropower**
- **WPTO remains the primary stakeholder**
- **PNNL believes all hydropower sector shall benefit via wise investments**

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# Performance: Accomplishments and Lessons Learned

- **The most important accomplishments over the life of the project are**
  - **WPTO has in hand a research-backed actionable roadmap**
- **Secondary accomplishment – follow-on project (Q1 FY22)**
  - **WPTO has in hand a starting point for enacting 1 of the 4 Roadmap goals (tiered, low-cost/no-cost cybersecurity trainings resources guide)**
- **Notable lessons learned are:**
  - **hard data for cybersecurity in hydropower is nearly nonexistent**
    - **needed if desire to establish metrics and measure progress**

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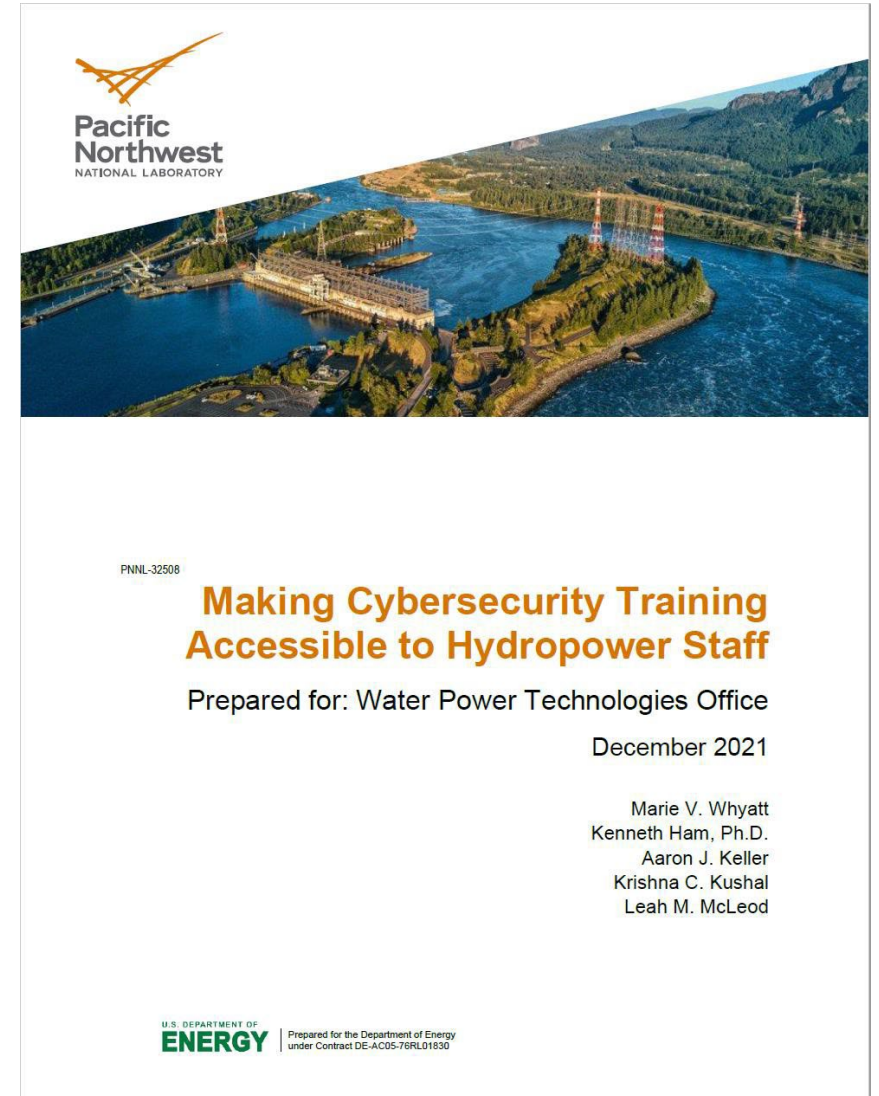
# Future Work

- Sufficient funds remained for no-cost extension (through September 2022)
  - WPTO tasked PNNL to lay groundwork for hydropower cybersecurity trainings

*Ultimate Goal: “A roadmap for smaller, poorly-resourced, time-constrained hydropower to identify and engage cybersecurity trainings for their facility staff.”*

- free or low-cost
- for clearly-defined hydropower “personas”

- In first-quarter 2022 delivered:  
“Making Cybersecurity Training Accessible to Hydropower Staff”



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# Q&A