Pumped Storage Hydropower Siting Study
PSH Siting Topics: Wildlife & Habitat, Geology, Access, and more

Date: **10/31/24**
Time: 9:30 AM – 12:30 PM PDT
Location: **Zoom online meeting**

Study website link: https://www.energy.wsu.edu/CleanFuelsAltEnergy/PSHSiting.aspx

Meeting Objectives

- Understand key pumped storage hydropower (PSH) impacts and opportunities related to terrestrial ecology, geology and soils, air quality, noise, viewshed, traditional cultural access, recreation, and public access
- Hear from attendees and promote discussion about the above topics
- Provide project update and overview of topics for upcoming PSH study meetings

Meeting Summary

Following an initial welcome and land acknowledgement, **Karen Janowitz, Washington State University (WSU) Energy Program,** introduced the study project team and reviewed meeting objectives. Participants took part in a brief icebreaker to orient them to virtual white boarding in Mural (used later for breakout sessions).

Karen then provided a brief overview of the study's goals and upcoming meeting plans, emphasizing that the study is not promoting any specific projects but aims to gather Tribal, agency, and stakeholder input on siting concerns. She made it clear that the study was mandated by the Washington State Legislature to support the state's commitment to 100% renewable or non-emitting electricity by 2045. During Karen's presentation, a participant [TB1]asked if pumped storage hydro (PSH) is considered short-duration or long-duration storage. Karen confirmed that it is long-duration storage.

At-a-Glance Information

Hosted by Washington State University Energy Program in partnership with the Office of Tribal Relations at Washington State University, Meridian Environmental, and Ross Strategic.

Approximately 58 participants joined the meeting.

Meeting participants represented a broad array of organizations and geographic locations.

Meeting slides and a video recording are available on the study website.

Presentations

Emily Grabowski, Washington Department of Fish and Wildlife (WDFW) presented on potential impacts of PSH projects on wildlife and habitats. Emily emphasized that WDFW looks at impacts in terms of habitat loss, disturbance, and mortality. DFW is also concerned about genetic health and the impact of invasives, both of which can be exacerbated by large energy projects. She noted that impacts can occur throughout the life of a project, from construction to operation.

Emily said the species most likely to be impacted by PSH-type projects are those that need upland habitat or shrub steppe habitat to survive. A specific example she provided is the Ferruginous Hawk, which relies on upland habitat and access to fresh water to maintain its breeding home ranges. WDFW has developed tools and resources for assessing impacts, which include priority habitat databases and field surveys.

During Emily's presentation, multiple participants posted information and questions in the chat, with topics ranging from the benefits of PSH to the impact of habitat loss to the importance of Programmatic Environmental Impact Statements. One participant asked if there are currently any studies that followed established pump storage projects over time, looking at a variety of impacts. Participants pointed to a recent study that reported on potential environmental effects of PSH[1] but noted they aren't aware of long-term studies.

After Emily's presentation, **Mike Manwaring, Stantec**, provided insights into the geological and soil considerations for PSH projects. He stressed the importance of understanding site-specific geology and hydrology of closed loop projects. Mike spoke of types of site suitability investigations, including geotechnical studies and mapping. He provided examples of projects and the costs associated with geotechnical investigations. Mike made it clear that the most suitable sites for PSH are those with stable slopes and low permeable soils. He noted that most sites need reservoir liners to prevent water leaking into the groundwater. He stressed that there are significant fluctuations in water levels over the course of daily operations for closed loop PSH, limiting recreation options or on-reservoir work options for most PSH sites.

A participant asked whether project designs consider Greenhouse gas emissions from reservoirs when considering costs/benefits. Mike responded that closed loop projects are always lined, so you don't get the GHG emissions situation that you find in natural ponds or human constructed reservoirs.

A participant's question about vegetation spurred discussion about intentional vegetation management. Mike said developers are required to replant native species and do as little damage as possible. He also addressed water availability and fire risk associated with closed loop PSH projects, as well as algae bloom potentials.

After a short break, **Mary Alice Fisher, Low Impact Hydropower Institute (LIHI)** discussed land use and PSH, covering air quality, noise, viewshed, and access. Mary Alice started with a basic introduction to LIHI.[2] She discussed how PSH construction and operational phases can generate dust, noise, and emissions. Additionally, she described visual impacts associated with PSH such as changes to the

[1] ***A Comparison of the Environmental Effects of Open-Loop and Closed-Loop Pumped Storage Hydropower***. **Department of Energy WPTO. April 2020. https://www.energy.gov/sites/prod/files/2020/04/f73/comparison-of-environmental-effects-open-loop-closed-loop-psh-1.pdf**

[2] See: https://lowimpacthydro.org/frequently-asked-questions/.

landscape and potential light pollution. Mary Alice stressed that best management practices can help mitigate some of these impacts. She emphasized that, when possible, project developers should:

- Engage early and often with Tribes, local communities, and governments
- Avoid sensitive and sacred areas
- Utilize previously developed sites
- Site and design to minimize footprint and accommodate pre-existing uses
- Enhance existing conditions
- Conduct risk assessments and develop avoidance/minimization plans for specific impacts

Discussion

Following the presentations, participants joined breakout sessions where they were prompted to answer questions about the effects of PSH on terrestrial ecosystems and land use. Using virtual sticky notes in Mural, participants were asked to respond to the following prompts:

- *What potential PSH impacts concern you most?*
- *What should PSH projects do to improve outcomes with respect to these topics?*

After approximately 5 minutes of individual reflection, participants discussed the issues, questions, ideas and thoughts that were put on the notes that had been placed on the boards. There was a single round of this exercise, lasting 30 minutes.

Key takeaways from the two breakout rooms are summarized below. The complete Mural boards are included as an Appendix.

Group 1

In reference to the question, "What potential PSH impacts concern you most?" participants identified the potential environmental and cultural impacts of PSH project development. They highlighted impacts on water quality and terrestrial ecosystems. Participants also discussed the maintenance of mudflats for migratory birds. They discussed how light, noise, and ground vibrations can alter wildlife migration patterns, affecting seed and pollen dispersal, and potentially inducing seismicity. Some participants noted how PSH projects could have a positive impact by intentionally creating new aquatic habitats. Participants also discussed the need to assess project benefits from a grid reliability perspective, including the potential that PSH could prevent the need to construct new transmission lines (which can cause habitat disturbance and loss).

When asked what PSH projects should do to address their concerns, participants had multiple suggestions. They said that projects should establish baseline habitat conditions and introduce native vegetation to mitigate noise, block light, and absorb vibrations while providing nutrients. Participants clearly identified the benefits of PSH projects compared to alternatives and discussed the possibility of multiple uses for PSH projects. They said it was important to ensure early and frequent communication with interested parties. Participants spoke of the need to engage Tribal partners and local agencies early in the siting process, to conduct required studies, and understand potential impacts.

Group 2

One of the areas participants focused on regarding, “What potential PSH impacts concern you most?” was native habitat loss and disturbance. Participants stressed the importance of overwintering habitats for birds. Participants also discussed the impacts of fences and how fencing might disrupt wildlife movement and habitat connectivity. Beyond fencing and habitat disturbance, participants were concerned about the impacts of human presence. They discussed the varying intensity of human activity and its impact on wildlife, with suggestions for controlled access. In addition to impacts on terrestrial ecosystems and wildlife, participants were concerned with cultural impacts due to PSH projects.

When considering what PSH projects should do to address their concerns, participants stressed that developers should avoid sensitive sites, especially culturally important sites. They recognized that this is only possible with early engagement with Tribes to understand and mitigate impacts on culturally significant areas. Participants also discussed the need to consider the cumulative effects of multiple renewable energy projects (e.g., solar, wind, and storage) on the same landscape. Specifically, participants stressed how these cumulative impacts can affect species and habitats over multiple seasons and generations.

After the breakout rooms, the meeting returned to plenary where facilitators provided brief summaries of the discussions in their respective groups. After the wrap-ups of the breakout rooms, Mike noted the human element in PSH and how that has become an important element in PSH planning.

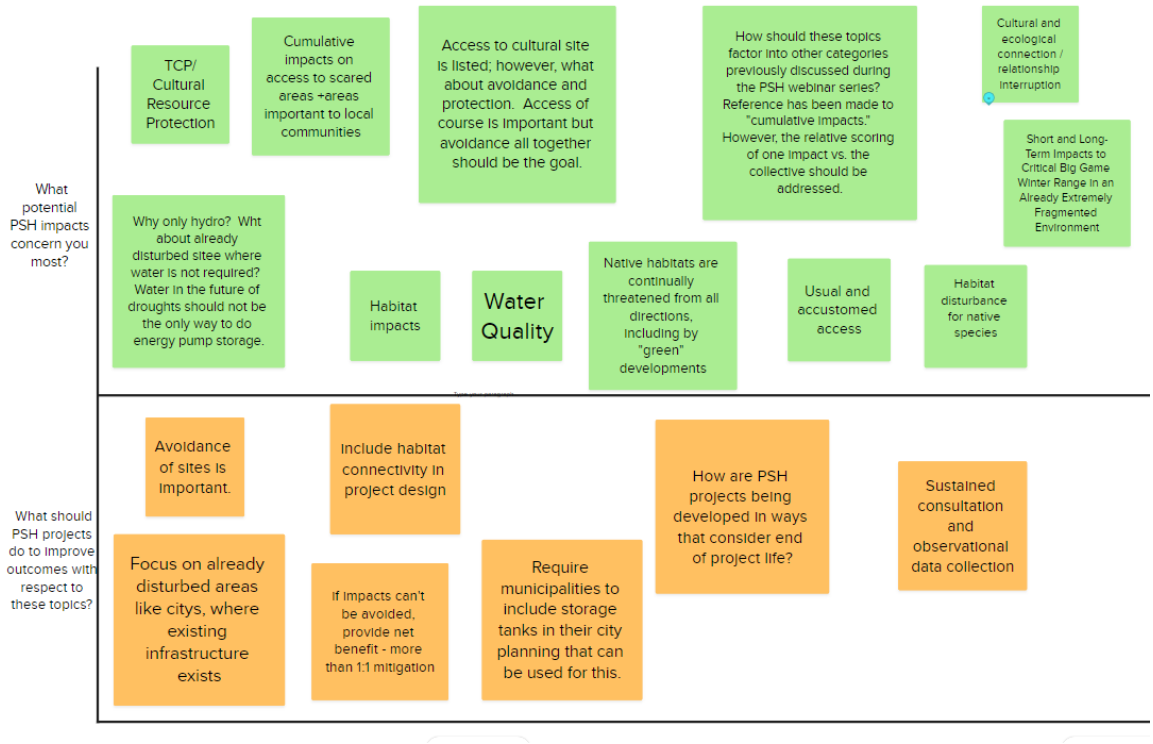
Future Meetings and Wrap-up

Karen wrapped up the meeting by discussing the next upcoming meeting, scheduled for December 4th, focusing on licensing and permitting.

Participants were encouraged to spread the word about the meetings among their networks. Karen provided the project website and contact information a second time. The meeting wrapped up at 12:30 p.m.

Appendix: Mural Board Responses

Group 1



Group 2