

Spirit Lake/Toutle-Cowlitz River System Level Collaboration
DRAFT NOTES Meeting Summary: July 8, 2021 | 9:30am - 12pm (via WebEx)
Facilitated by the William D. Ruckelshaus Center
(Chris Page (lead), Kara Whitman, Molly Stenovec, and Maggie Counihan)

Meeting Attendees:

Representing Sovereign State, Federal, and Tribal Governments.

Taylor Aalvik, Seth Russell, Joe Ben Walker, Erik White—***Cowlitz Indian Tribe***
Karl Ahlen, Christine Budai, Valerie Ringold—***US Army Corps of Engineers (USACE)***
Paul Anderson, Angela Elam, Grant Gordon, Nicole Grewe, Rebecca Hoffman, Sue Ripp, Chris Strebig (phone)—***US Forest Service (USFS)***
Amanda Gillen, Tom Hausmann—***National Oceanic and Atmospheric Administration (NOAA)***
Dave Howe, Kessina Lee—***WA Dept of Fish and Wildlife (WDFW)***
Jon Major—***US Geological Survey (USGS)***
Steve Ogden—***WA Dept. of Natural Resources (WADNR)***

Representing Local Governments.

Bill Fashing—***Cowlitz-Wahkiakum Council of Governments (CWCOG)***
Andrew Hamilton—***City of Kelso***
Lisa Hendriksen—***Port of Longview***
Jim Mallett—***Cowlitz County***
Axel Swanson—***Cowlitz County***
Steve Taylor—***Cowlitz PUD***
Dave Vorse—***City of Castle Rock***

Representing State Representatives and Elected Officials.

Carson Coates—***US Representative J. Herrera-Beutler's Office***
Sarah Kohout—***US Senator M. Cantwell's Office***
Bryan Stebbins—***U.S. Senator P. Murray's Office***

Representing other Interested Stakeholder Meeting Participants.

Gregory Baecher, John Boland, Samm Magsino, Basil Stumborg—***National Academies of Science, Engineering and Mathematics (NASEM)***
Lucy Brookham—***Cascade Forest Conservancy***
Steve Manlow, Molly Whitney—***Lower Columbia Fish Recovery Board (LCFRB)***
Susan Saul—***Public***
Dan Tormey—***Catalyst Environmental Solutions***
Dan Weinberg—***Public***

Meeting Purposes:

- Presentations with Q & A:
 - Gordon Grant & Jon Major: overview of The Dynamics of the System

- National Academies: Rationale & Vision for This Collaborative
- Review themes: potential shared vision for Spirit Lake/Toutle-Cowlitz River basin
- Discuss (emerging, draft) shared values
- Review group's suggested goals & outcomes for first phase of collaboration

Meeting Chat: [Appendix](#)

Introductions and Agenda Review: Chris Page reviewed the agenda and asked participants to introduce themselves in the chat. Chris then went over the meeting ground rules and recapped the June 2nd, 2021, meeting including future vision, benchmarks, practices, goals and outcomes.

Chris walked the group through the stages of collaborative decision making. Highlighting the assessment and planning stages (NASEM and Ruckelshaus Situation Assessment), organization and education (groundrules, operating procedures, purpose and outcomes, joint fact finding/history and context).

Presentation: Jon Major (USGS) and Gordan Grant (USFS, PNW Research Station). **"Spirit Lake – its blockage, its outlet, and the upper Toutle River basin"**¹ **Presentation of information from the 2017 report "The geologic, geomorphic, and hydrologic context underlying options for long-term management of the Spirit Lake outlet near Mount St. Helens, Washington"** The report and was provided to the NASEM Committee and used in the development of their report.

Summary of the presentation:

Spirit lake exists because it got formed, blocked, and morphed over millennia. The landforms exist because of the activity of this mountain. While history is continuously repeating itself in this area in many ways, the 1980 eruption fundamentally transformed the landscape. Following the eruption, sediment up to 150 ft. thick covered approximately 23 square miles. The lake surface level rose 200 ft., with pyroclastic deposits up to 120 ft. thick that are highly erodible and mobilizable with water. The lake level would need to rise to the elevation of the base of the pyroclastic sediment layer to breach the blockage.

Over time, historical eruptions created a lahar deposit (mudflow) along the Toutle River Valley all the way down to Castle Rock, with multiple deposits between 5-15 ft. that coincide in time with other eruptions/ landslides. These deposits represent multiple breaching of an ancestral Spirit Lake. The big question is what could happen if the lake breached the blockage and sent a catastrophic mudflow downstream?

There are limited ways to get water out of the lake. According to the presenters, there is no risk-free way. Alternatives fall into two main categories.

- Conduit-style outlet (tunnel, buried conduit), or
- Open channel across the blockage (engineer and open channel outlet)

How do we manage this hand we have been dealt? The triad of natural hazards (volcanic, seismic, hydrologic hazards) comes with episodic uncertainty.

¹ The slides did not through an agency process required for distribution. A lot of the material is contained in two technical reports available on the SLTCRSC project page at <https://ruckelshauscenter.wsu.edu/projects/current-projects/spirit-lake/>

The presenters asked, “If an outlet fails, what does it take to fill lake to critical elevation?” and stated that “The lake is not in imminent danger of collapse” and ascertained that the probability of a catastrophic breach is generally less than or equal to 10^{-5} . They have evaluated what it would take to get to a catastrophic failure, and the time:

- Average flow: would take 5 months daily flow;
- Flood of record: would need 8 record floods;
- Probable maximum flood (PMF): would take two PMFs.

From a hydrologic hazard perspective, , the probability is extremely low.

Problems with lake levels occur when the tunnel is closed for lengthy repairs, and that would be when the potential for breaching is substantially increased.

The presenters discussed the basic tradeoffs between the conduit-style and open channel options identified in their report. They also discussed the different degrees of vulnerability to regional hazards. Every alternative has risks, and tradeoffs and there is no risk-free way of getting water out of Spirit Lake. Also, solutions will have downstream impacts. This is a connected basin that is a volcanically perturbed landscape and one of the most sensitive landscapes in the world.

QUESTIONS AND ANSWERS/COMMENTS -

- **Q.** If open channel, where would it be, and if so, how do we mitigate the New Zealand mud snail going through whole basin. If conduit, where would this go? **A.** The actual design and sighting of alternatives has not reached the open discussion phase, as options are still being considered. Some reasonable estimates – reoccupy the Truman channel, the channel that evolved and eroded quickly as a consequence of pumping operations to maintain lake levels during tunnel construction. The conduit could be nothing more than a hard fix of the existing tunnel (unless there were more than one outlet). In terms of the implications. There are lots. Passage of fish, positive. Passage of invasives, negative. No one answer to how to defend against the negative while promoting the positive. For a conduit-style outlet, you could rehabilitate the current one or put one in another direction. There is no specific design yet for any one of the multiple options.
- **Q.** On the slide showing cross sections, where were those located? Why was there so much erosion over that ten-year period? **A.** Just to the north of the crater, then at the base of Johnston Ridge, the cross section on the Truman channel. Erosion took place while water was taken out of lake during the construction of the tunnel. Water was being pumped out of the lake at 180 cfs, about equivalent to the low flow that currently comes out of the tunnel. The maximum amount of water coming out is about 400 cfs. Can get 100s of meters of lateral erosion fairly rapidly. (Clarification: The erosion long the upper North Fork Toutle River, and along ‘Truman’ channel during pumping from the lake, was tens of meters in the vertical and hundreds of meters in the horizontal. So, tens of meters incision, and up to hundreds of meters lateral erosion). This is a combination of the pyroclastic sediments getting down into the debris avalanche material. They happened during storm events and can happen extremely rapidly. The landscape is demonstrating that it is still sensitive to the right kinds of storm events in terms of erosion.
- **Q.** Tradeoffs: is there any thought of adding in, as a tradeoff, the cost of maintaining the different options? Also, do we have awareness of sediment traveling downstream would redistribute with the different alternatives? **A.** Moving forward, cost is a tradeoff and needs to be considered. The water currently goes through the tunnel (max 400 cfs, average 300 cfs). An open channel, discharge would no

longer be regulated, so as the lake level rises, the discharge would increase. The exit discharges in the winter would likely be in excess to the 400 cfs. There will be potential ramifications depending on the outlet option chosen. We cannot think about the lake in isolation, must think about the basin.

- **Q.** What is the process for addressing issues with the authorities' structures along the river system? **R.** Environmental analysis will be used to make a decision (under NEPA, the National Environmental Policy Act) addressing the outflow of Spirit Lake. That analysis has not begun. Analysis so far has included data collection and assessing the status of knowledge. Regarding the mud snails: we discovered them, but there is no real understanding of how got or exactly when they got there, and do not have conclusions as to what will happen with them. Value of this overarching collaborative body is to look at this whole system—not the management of Spirit Lake, but the whole system and various ownerships and authorities and understanding each other's roles in the system.
- **Q.** Erosion from Coldwater Creek? If open channel, could there be a flow control to manage the cfs? **A.** Coldwater, the outlet is flowing across a bedrock notch, so the actual outlet is unlikely to incise much more. The channel downstream of Coldwater has now equilibrated to the outflow. **A.** There are many ways that things can be thought about; for the specifics of any outlets, the design is far down the road.
- **Q.** Do you have any erosion data on areas downstream of the Sediment Retention Structure (SRS)? **A.** We do not have recent data. We used to monitor this, but for the past decade, attention focused upstream. There are probably some spots with localized erosion, there are a few places where dredge is being reclaimed. The dominant erosion source is from farther upstream.
- **C.** Gordon Grant provided citations to two publications in the chat. Links to the publications can be found on the SLTCRSC Project Page at <https://ruckelshauscenter.wsu.edu/projects/current-projects/spirit-lake/>

ACTION ITEM: Ruckelshaus Center to post the paper to the project page. (COMPLETED).

- **Q.** Regarding the majority of the sediment, where is it coming from? **A.** The dominant sediment sources are along *the Lewitt(?)*, *North Fork channel*, dominantly bank erosion. There is a persistent inexorable eating away of the channel banks above the SRS. The banks are quite high, so for every foot it eats away, a lot of sediment erodes away.

NASEM Presentation: Gregory Baecher, Basil Stumborg, John Boland, Sammantha Magsino. "A Decision Framework for Managing the Spirit Lake and Toutle River System at Mount St. Helen's"

Samm Magsino opened the presentation explaining that they were there to help interpret the consensus study report. Gregory Baecher chaired the committee. The committee included 10 volunteers in geoscience, social science, and engineering who met over 18 months.

The issues include varying concerns, competing values, inadequate budgets, incomplete and outdated information. The report covers regional setting, institutional setting, natural hazards, engineered landscape, decision framework, implementation. The committee did not collect field data. For process: recommend a framework for technical decision making for long-term management of the Spirit Lake and South Fork Toutle River given the priorities of federal, tribal, state, and local interests.

John Boland discussed the history of controversy, the complexity of stakeholders, etc. The NASEM committee determined that the region was a prime candidate for a collaborative / participatory decision-making process. John explained what they mean by collaboration:

A decision-making process that incorporates the engagement, review, and advice of interested and affected parties. Decisions may be more like a recommendation if the collaborative does not have specific decisional authority. Clarifying decision rules is an important early step in developing a decision framework. Agencies are not giving up legislative or regulatory power but looking for solutions acceptable both for your agency and for others as well. Mutually satisfactory solutions allow each agency to satisfy its own decision-making process; they also retain the power to block potential solutions that do not meet their needs/mandates". Multiple examples are in the report, which speaks for itself. the NASEM committee encourages everyone to look at the report.

- Decisions considered in terms of impact on the entire system.
- The resulting decisions-and tradeoffs should be understood by—and acceptable to—all parties.

What happens without collaboration? Decision makers would pursue individual missions and objectives within own guidelines and constraints. Insufficient coordination would occur among agencies, with minimal engagement of interested and affected parties. In addition:

- Decisions by one entity may preempt or constrain later decisions by others.
- Opportunities for joint or synergistic benefits may be lost.
- Cost-saving opportunities through joint action may be lost.
- System-level results may be compromised.

Collaboration can help identify feasible solutions that are responsive to both system level goals and individual organization priorities. Negotiation and collaboration can help make solutions better by enabling tradeoffs that all agree on. Sometimes, in the absence of collaboration, tradeoffs can be hidden. Hidden tradeoffs are a problem. They can easily prevent solutions, due to suspicion and lack of trust. One purpose of collaboration is to bring tradeoffs out into the open.

Basil Stumborg has worked in similar situations to this, where overlapping agencies have different mandates and decision boundaries are not clear, so it is not obvious what piece of the problem to work on.

- Folks need to believe up front that we can do things better coordinating than alone, an openness to finding mutually beneficial solutions, and the creation of a common decision framework.
- A collaborative lead can be identified (for administrative purposes), or a group of agencies (consortium) can lead.
- Collaboration needs to be open to all interested and affected parties.
- The lead must be neutral when directing the process (this can be a neutral third party).

QUESTIONS AND ANSWERS/COMMENTS –

- **Q.** The Forest Service brought in NASEM and the Ruckelshaus Center, but is not willing to lead the full collaborative long term. What entity or entities would be best set to provide that leadership? **A.** Some early steps, like identifying common values and a decision framework are relatively straight forward.
- **Q.** What about leadership of the collaborative itself? **C.** The group itself needs to figure out how they want to structure it, so it works for the group. NASEM assumed at the start that Forest Service would take a lead role to get it going. Could use a neutral third party. **C.** The entity must be trusted. Could be a federal agency, but with a regional effort, the existing agency may not be the right entity to lead. Agencies can allocate staff time (in kind), and the group can use a neutral third party – that brings only

labor costs. **C.** There must be buy-in from all the agencies/participating parties, can agree to share the burden. Can use a rotating lead. Literally share the costs – with same personnel acting in the role of lead. None of that happens unless the agencies agree to be part of the process.

- **Q.** Some issues may be many voices at the table, some other issues, lesser voices. The more voices you get the harder consensus is to achieve. Is there an optimal number of voices? **A.** This model of participatory collaboration has a natural upper limit beyond which it gets hard to have good exchange of ideas. Work with interested parties for specific topics – settle one person to attend the meetings. No added value to have more people in the room to represent an interest. Between 15 and 20 participants to get synergistic benefits. Could use a caucus model.
- **C.** Greg Baecher explained that the NASEM committee is pleased to see Ruckelshaus Center involved. Their experience can help inform the direction forward. We have models of agreements, decision making, and roles and responsibilities that we can share with the group. **C.** Basil Stumborg: Collaboration requires a bit of a leap of faith. While it does have costs – muddling through without collaborating can have costs as well (but often treated as if there is not cost).
- **C.** Angie Elam explained that in her experience with the federal government, there is so much more power in a collaborative group, when they take that power and move forward to get attention – legislative asks, funding etc. and having a similar vision and strategy, it gets a lot of respect when you bring forward funding requests.

Transitioning from NASEM to Vision for the System, Shared Values, and Goals and Outcomes for Phase 1.

Chris Page discussed governance networks.

“Governance networks emerge because the capacity for addressing interrelated problems is widely dispersed and changes over time. Networks provide a means for these actors to make collective decisions, establish shared policies or priorities, improve coordination, and identify ways to work together productively to address complex, large landscape challenges...network governance requires leadership that advances the shared interests of the network, in contrast to simply gathering leaders of orgs that seem to have similar objectives”. Imperial, Johnston, Pruett Jones, Leong, & Thomsen, 2018. From a series on Network Governance in “Frontiers in Ecology”

Chris then shared the themes distilled from the previous meetings discussions.

Spirit Lake/Toutle Cowlitz River Whole System Vision Themes

- Holistic and systemic management focused on multiple benefits.
- Human health and safety via sediment management, flood prevention and protection
- Ecological restoration to provide:
 - Recreation opportunities
 - Ecosystem services and resiliency
 - Natural functions, fish and wildlife recovery
- Economic development, thriving communities.
- Research integrity and educational opportunities
- Collaborative approach to planning, engagement, and participation.
- “Would like to see something added about Planning for Seismic, volcanic and hydrological events

Values: What Values or Principles Might All the Parties Share?

- Managing for safety for downstream communities
- Using a holistic, systemic approach
- Considering multiple functions, multiple benefits
- Less frequent intervention via engineered structures in favor of natural processes
- Restoring healthy ecosystems
- Restoring local economic ecosystems
- Increasing access for recreation
- Maintaining access for research and education
- Securing sufficient funding for planning & implementation
- Maintaining a collaborative, inclusive approach

Goals/Outcomes: indicators of success for this phase Benchmarks/milestones (by when, for each?)

- Shared vision for the whole basin + set of common interests/values
- Structure, funding, and commitments for long term collaborative (including information needs)
- If commitments made to work together: recognition by U.S. Federal delegation, WA Legislature, WA Governor + funds for continued / long term collaboration.
- Report on existing metrics & what should be updated (e.g., flood protection levels)
- List/database of agency authorities, projects & timelines, legally binding agreements, roles & commitments
- Increased trust & understanding, stronger relationships, agreement to act with awareness of others' perspectives.

QUESTIONS AND ANSWERS/COMMENTS

- C. All these goals are good, and the vision, as long as everyone agrees on what the terms mean. Words like healthy, safety, and natural etc. all need to be well defined. People have different definitions or expectations for these things.
- C. In-person meetings will provide a lot more input. This is good practice. The goals make sense, and developing metrics and a timescale will be beneficial for this process.
- C. Valerie Ringold asserted that the Army Corps of Engineers have constraints as federal agencies as to what funding can be used for; it has to follow the agency mission and come at the direction of Congress. We cannot, as an agency, make a decision or be part of a policy decision process. We need recognition of the constraints of agency mandates. We can engage properly and be part of the process if folks know we are here within the constraints that bind the agency; for example natural fish passage at the SRS could occur only if Congress orders it.
- C. Suggest we add identification of collective issues and risk concerns to the list of goals.
- C. On the list of values: some are process, some are practical, some are part of the multiple benefits. Maybe work on nesting of the list, organizing of the list.
- C. Did not see reference to tribes in the Vision or Goals. I would put it to the group to think about an explicit mention of restoring tribal cultural and natural resources. This has typically been lost in historic planning processes.

ACTION ITEM: Reorganize the vision, values, goals, and metrics, also adding in potential inclusion of additional vision statement for tribal cultural and natural resources, send out for comment. (IN PROGRESS)

ACTION ITEM: Ruckelshaus to continue to build list /database of agency authorities, projects and timelines, legally binding agreements, roles, and commitments. (IN PROGRESS)

DRAFT

APPENDIX A: Meeting Chat

July 8, 2021 9:36 AM from Steve Taylor to everyone: Steve Taylor, Cowlitz PUD - Dir. of Regulatory and Regional Affairs

July 8, 2021 9:36 AM from Tom.Hausmann to everyone: Tom Hausmann

July 8, 2021 9:36 AM from Bill Fashing to everyone: Bill Fashing, CWCOC, Life Safety and economic issues for downstream communities

July 8, 2021 9:37 AM from Basil Stumborg to everyone: Basil Stumborg. BC Hydro (Canada). Participant in NAS study report.

July 8, 2021 9:37 AM from jjmajor to everyone: Jon Major, USGS Cascades Volcano Observatory

July 8, 2021 9:37 AM from Gregory Baecher to everyone: Gregory Baecher, NASEM and University of Maryland

July 8, 2021 9:37 AM from Dan Tormey to everyone: Dan Tormey, Catalyst Environmental, working on Spirit Lake Safety Improvement project

July 8, 2021 9:37 AM from Carson Coates Rep. Jaime Herrera Beutler to everyone: Carson Coates - Office of Congresswoman Jaime Herrera Beutler

July 8, 2021 9:37 AM from Tom.Hausmann to everyone: Tom Hausmann, NMFS, ESA listed salmon and steelhead populations

July 8, 2021 9:37 AM from Bryan Stebbins he/him, Senator Murray to everyone: Bryan Stebbins, SW Washington Director, U.S. Senator Patty Murray

July 8, 2021 9:37 AM from Taylor Aalvik to everyone: Taylor Aalvik, Cowlitz Tribe

July 8, 2021 9:37 AM from SMagsino to everyone: Sammantha Magsino, National Academies of Sciences, Engineering, and Medicine. I directed the NAS study committee that produced the report being discussed today

July 8, 2021 9:37 AM from Steve Ogden to everyone: Steve Ogden, WA Dept. of Natural Resources - DNR Managed Trust Lands

July 8, 2021 9:37 AM from Amanda Gillen to everyone: Amanda Gillen, NOAA

July 8, 2021 9:37 AM from Joe Ben Walker to everyone: Joe Ben Walker, Cowlitz Indian Tribe Archaeologist. We are interested in protecting Culturally Significant Natural Resources and Cultural Resources in the basin.

July 8, 2021 9:37 AM from Rebecca Hoffman - Gifford Pinchot NF to everyone: Rebecca Hoffman - Monument Ranger, Mount St Helens - Gifford Pinchot NF

July 8, 2021 9:37 AM from Erik White - Cowlitz Tribe to everyone: Erik White, Cowlitz Tribe

July 8, 2021 9:37 AM from Steve to everyone: Steve Manlow, Lower Columbia Fish Recovery Board

July 8, 2021 9:37 AM from KARL AHLEN to everyone: Karl Ahlen, USACE I am the PM on the MSH project

July 8, 2021 9:37 AM from Andrew Hamilton to everyone: Andrew Hamilton City Kelso

July 8, 2021 9:37 AM from Seth Russell, CIT THPO to everyone: Seth Russell, Cowlitz Indian Tribe, Tribal Historic Preservation Officer

July 8, 2021 9:37 AM from angela.elam to everyone: Angela Elam, Deputy Forest Supervisor, Gifford Pinchot NF. Interested in collaborative partnership for all issues throughout the Toutle-Cowlitz river system

July 8, 2021 9:37 AM from Valerie Ringold to everyone: Valerie Ringold: USACE Portland District, we have authorized Federal Projects/Missions in the basin. I am also representing Liza Wells as our agency POC, she is not able to attend today

July 8, 2021 9:37 AM from Brandon Robinson - CWCOC Staff Planner to everyone: Brandon Robinson - CWCOC Staff Planner - Long-term viability and success for downstream communities

July 8, 2021 9:37 AM from leekl to everyone: Kessina Lee, WDFW SW WA Regional Director

July 8, 2021 9:37 AM from Sarah Kohout, U.S. Senator Cantwell- SW WA Outreach to everyone: Good morning! Sarah Kohout, Southwest Washington Outreach Director for U.S. Senator Maria Cantwell. (Email: Sarah_Kohout@cantwell.senate.gov and phone 360-773-8418)

July 8, 2021 9:38 AM from Lucy Brookham to everyone: Lucy Brookham, Policy Manager for Cascade Forest Conservancy

July 8, 2021 9:38 AM from GrantG to everyone: Gordon Grant, USDA Forest Service, PNW Research Station; on-going engagement with the science issues surrounding long term evolution of the Mt St Helens landscape and its management

July 8, 2021 9:38 AM from John J Boland to everyone: John Boland, Johns Hopkins University/NASEM committee

July 8, 2021 9:38 AM from Dave Howe to everyone: Dave Howe WDFW

July 8, 2021 9:38 AM from Susan Saul she/her to everyone: Susan Saul, former Mount St. Helens Protective Association co-chair, currently citizen at large. Interested in how downstream decision may affect management of the Mount St. Helens National Monument and landscape

July 8, 2021 9:38 AM from Molly Whitney CFC to everyone: Molly Whitney, Cascade Forest Conservancy, Advocating for a transparent process that promotes public input, and protects habitat/species & research. Values downstream communities and potential safety concerns.

July 8, 2021 9:41 AM from Paul Anderson to everyone: Paul Anderson, USFS PNW Research, Science informing risk assessment and future engineering efforts related to Spirit Lake Outflow; Research to inform understanding of values held by various interests in the Toutle River drainage; Impacts of collaborative efforts on long-term research in the Mt. Saint Helens monument.

July 8, 2021 10:07 AM from Christine Budai to everyone: Chris Budai, Project Manager, USACE

July 8, 2021 10:10 AM from Sue Ripp to everyone: Sue Ripp, Gifford Pinchot National Forest, Project Manager

July 8, 2021 10:26 AM from GrantG to everyone: Here are the reports I mentioned:

July 8, 2021 10:26 AM from GrantG to everyone: Major JJ, Grant G.E., Sweeney K., Mosbrucker A.R.. 2020. A multidecade analysis of fluvial geomorphic evolution of the Spirit Lake blockage, Mount St. Helens, Washington. U.S. Geological Survey Scientific Investigations Report 2020-5027. :54p.

Grant GE, Major JJ, Lewis SL. 2017. The geologic, geomorphic, and hydrologic context underlying options for long-term management of the Spirit Lake outlet near Mount St. Helens, Washington. :151.

July 8, 2021 10:32 AM from Dave Howe to everyone: Thank you for providing that context Angie. Very helpful.

July 8, 2021 10:47 AM from SMagsino to everyone: Links to the report and other resources will appear as the last of our slide set.

July 8, 2021 11:22 AM from SMagsino to everyone: Free PDFs of the report are available here: <https://www.nap.edu/catalog/24874/>

A short video summarizing report findings is found here: <https://www.youtube.com/watch?v=4cJvpi5x1Hg>

A 4-page description of report highlights is found here:

https://www.nap.edu/resource/24874/Spirit_Lake_Report_Highlights_04.pdf

Contact:

Sammantha Magsino, Senior Program Officer

Board on Earth Sciences and Resources

National Academies of Sciences, Engineering, and Medicine

smagsino@nas.edu

July 8, 2021 11:36 AM from danny to everyone: you all have buried the last almost 1/2 hour in administrative issues and a lesson in collaboration. personally I'd like to head back onto the mountain

July 8, 2021 11:37 AM from angela.elam to everyone: goals and outcomes - identification of collective issues and risk concerns

July 8, 2021 11:44 AM from Dave Howe to everyone: Agree with Tom too.

July 8, 2021 11:44 AM from Erik White - Cowlitz Tribe to everyone: Well said Tom. Thank you!

July 8, 2021 11:45 AM from Basil Stumborg to everyone: apologies - but i have to drop off.

July 8, 2021 11:45 AM from Molly Stenovec to everyone: project page:
<https://ruckelshauscenter.wsu.edu/projects/current-projects/spirit-lake/>

July 8, 2021 11:46 AM from Molly Stenovec to everyone: And a doodle poll re: availability for August meeting: https://doodle.com/poll/3z6aq2ay5dta49f5?utm_source=poll&utm_medium=link

July 8, 2021 11:47 AM from Dave Howe to everyone: Can you send this doodle through an email as well? I can't fill it out in this platform. Thanks.

July 8, 2021 11:49 AM from Kara Whitman to everyone: just sent the doodle poll over email