

**Testimony of Lynn Budd
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**United States Senate Committee on Environment and Public Works Hearing
May 8, 2019**

Good morning Chairman Barrasso, Minority Ranking Member Carper, and distinguished members of the committee. Thank you for the opportunity to speak to you today about Wyoming's history with flooding, Wyoming's relationship with the U.S. Army Corps of Engineers, and your committee's work including the ongoing battle against aquatic invasive species.

My name is Lynn Budd and I am the Director of the Wyoming Office of Homeland Security. We are the homeland security and emergency management agency for the State of Wyoming and the State Administrative Agent (SAA) for preparedness, mitigation and recovery grants.

We support local jurisdictions in times of emergency and disaster through the coordination of state agency resources and facilitate assistance from our federal partners. In Wyoming, the most frequent natural disaster events that we face are flooding due to ice jams, spring runoff and flash flooding; less frequently, tornados, landslides and wildfires.

Today, our primary focus is to talk about our relationships with our federal partners, specifically the U.S. Army Corps of Engineers (Corps) as it pertains to flooding and other water related issues throughout our state.

Wyoming and the Corps; Spring Flooding Preparations

Wyoming works with three Corps districts, Omaha, Sacramento, and Walla Walla. As a headwater state our water passes through approximately two-thirds of the landmass of the lower 48 states and we take our stewardship of these waters very seriously. The Corps has been a valuable partner in this effort. In addition to the Corps we work closely with our partners at Natural Resource Conservation Service (NRCS), National Weather Service (NWS) meteorologists, Bureau of Reclamation (BOR), along with state and local partners.

When we think about spring flooding our focus starts in October as we begin monitoring snowpack levels across the state, the beginning of the water year. In addition to monitoring snowpack levels, we closely monitor seasonal weather developments as they develop throughout the year. Jim Fahey, National Oceanic and Atmospheric Administration (NOAA) hydrologist with NWS Riverton, tailors a flood forecasting outlook for Wyoming, and we hold a March flood planning summit with state and local partners to evaluate areas for enhanced preparations and possible state and federal support that will be translated into actionable plans.

Stream gauge data are critical to flood forecasting and flood prediction. Life safety and property protection decision-making relies heavily upon this critical information along with the immensely valuable scientific information which these gauges provide to both the public and private sectors.

The committee's inclusion of Section 1203(f) within America's Water Infrastructure Act (AWIA) directing expedited activities under Section 4003(a) of the Water Resources Reform and Development Act of 2014 is very timely.

This section calls for "restoring and maintaining existing mid and high elevation snowpack monitoring sites operated under the SNOTEL program of the Natural Resource Conservation Service; and operating streamflow gauges and related interpretive studies in the Upper Missouri River Basin..."

Not only do these SNOTELs and stream gauges need to be restored and maintained but additional equipment should be deployed. For example, in Teton County this winter there has been record snowfall on the valley floor. The SNOTELs used to gauge the snowpack are high in the Teton range (greater than 8,000 feet) and have been reading at or just above normal. However, on the valley floor where there are no SNOTELs, they have had an extraordinary winter with snowpack at an estimated 300% of normal level; areas are holding three to four feet of snow where there is normally one foot.

This situation makes it more difficult to predict the level of possible flooding. With a large amount of snowpack at lower elevations the soil will become saturated prior to snowmelt runoff and could exacerbate the effects of additional water coming from snowmelt in the high country. Additional stream gauges, coupled with additional SNOTELs, would assist local and state decision makers in flood potential prediction. Engagement of local expertise may also be critical in assessing and predicting associated events such as mass wasting or excessive soil movement.

Lack of funding curtails the establishment and maintenance of these networks at all levels of the federal, state, and local government. The network provides great information but is a mosaic of federal, state, and local contributors. Funding for maintaining the existing network is vital along with the expansion of the existing capabilities to include a more robust watershed assessment. Stream gauge funding at the federal level needs to be rethought. A clearer funding mission and expedited implementation would aid all users of this critical data.

Comparatively speaking the 2019 potential flood season is not set to be as severe as previous years according to the data to date. While we are early on in our flood snowmelt season, we are still monitoring additional snow accumulation, temperature forecasts, and any anticipated rain on snow events. This variability in the weather, including early spring thunderstorms causing flash flooding makes flood potential prediction quite challenging. Spring snowmelt flooding can occur from mid-April to July so continued funding and monitoring is key.

In the past decade we have worked closely with the Corps on more than 25 Technical and Direct Assistance projects throughout the state in all 23 counties including the Wind River Reservation. The Corps also works directly with local communities on civil works projects. These projects have included flood control measures before and during an event. They have also assisted with landslide and ice jam mitigation projects.

We frequently hear from our local partners their appreciation for the Corps' support and contribution to their communities; for example:

- the operation and maintenance of the federal levy projects in Teton county;
- the removal of Goose Island in the Big Horn River at Worland;
- ice jam flood fight assistance in the town of Greybull;
- Silver Jackets flood risk assessment for the town of Hudson;
- Section 205 Flood Risk Feasibility study on the Middle Fork of the Popo Agie River for the town of Lander;
- geotechnical and hydraulic flood risk assistance to the Boondoggle landslide on the upper Wind River;
- multiple deployments on the upper North Platte River at Boozer Creek in Saratoga; and
- Porcupine landslide on the Greys River in Lincoln County.

Opportunities for Improvement

When we think about opportunities for improved relationships between the Corps and Wyoming for addressing life safety issues, agricultural impacts and recreational/tourism needs, we can identify three possible areas for improvement.

Snake River System

Better communication may be utilized to assist local officials and residents in their understanding of the methodology used when evaluating water management strategies for Jackson Lake in the spring and early summer. It is worth noting that the availability of additional SNOTEL and stream gauge data is also a form of communication as the public has an avenue to inform themselves on current conditions.

While the releases are controlled by the BOR, when the reservoir level reaches the flood pool stage the water release is directed by the Corps. These triggers are defined within the dam's water control manual and provide no room for deviation. The potential for flooding of the Snake River can create fear in residents and property owners downstream.

In high flow years, there is a lack of public confidence that the Corps considers the impact of downstream tributaries when calculating Jackson Lake releases into the Snake River. This perception causes concern for life safety due to the possibility of levee and dike failure.

More effective communication could make a significant difference in the community's understanding of the natural spring flood cycle and will provide the Corps opportunities to build stronger relationships and confidence within the community.

Glendo Reservoir

We support the implementation of Forecast Informed Reservoir Operations (FIRO) in Wyoming as demonstrated at the Lake Mendocino reservoir in California (Attachment A). FIRO is a novel approach to reservoir operations, where data from watershed monitoring and modern weather and water

forecasting are used to help water managers selectively retain or release water from reservoirs in a manner that reflects current and forecasted conditions. With varying snow accumulations from year to year, use of FIRO will allow for more flexibility of storage and control of the reservoir water release. This allows for the holding of water when the downstream tributaries are already at capacity, and the conservation of water to extend the irrigation season for agricultural purposes and recreation with a constant focus on life safety priorities.

Big Horn Reservoir

Implementation of a regional sedimentation management plan in the Big Horn Reservoir will be very beneficial, as described in Section 1134 of the AWIA of 2018.

Recognizing sediment is having an impact on the capacity of this and other reservoirs, the removal of sediment ensures the restoration of active water capacity as originally designed. As reservoirs fill with sediment, the ability to successfully manage regular inflows as well as spring run-off is impaired creating impacts to life-safety, agriculture production and recreational opportunities.

As we identified the three actions outlined above, we recognize each can be implemented as described. However, when the application of these solutions are combined exponential benefits can be realized.

Funding the Fight Against Aquatic Invasive Species

With our office's dual mission of emergency management and homeland security, the protection of our water quality systems come to the forefront. Within our mission of critical infrastructure protection, including all 16 sectors, the Water and Wastewater sector is one of the top priorities in the State of Wyoming. The committee's visionary foresight to address aquatic invasive species in Section 1170 of the AWIA is much appreciated by the State of Wyoming.

Wyoming sits at the headwaters of the nation. Wyoming rivers flow downstream to the Missouri, Platte, Mississippi, Colorado, Snake and Columbia watersheds. Sitting at the headwaters of the nation's waterways, aquatic organisms that find their way into Wyoming waters would have a downstream ride to much of our nation. Given this geographic position, the exclusion of harmful aquatic species from Wyoming is important to more than half of the U.S. states and waterways.

Aquatic Invasive Species (AIS) are exotic, nonnative organisms can cause significant economic and biologic harm. Quagga and zebra mussels represent the most immediate and imminent AIS threat to Wyoming and are not yet in any Wyoming waters. However, these mussels are now found in Colorado, Utah, South Dakota, and Nebraska waters.

Impacts

AIS often attach to boats, equipment, and clothing used in the water, and can be easily transferred on these items from one body of water to another. Quagga and zebra mussels colonize in enormous numbers,

choking off water supply pipelines for industry and municipalities, fouling irrigation canals and diversion screens, and resulting in lost angling and water-based recreational opportunities. Once established in connected waterways, there is no practical way to eradicate these invasive mussels.

Prevention

The Wyoming AIS prevention program started in 2010 with legislation to allow for the interdiction of watercraft and other water conveyances (primary vectors for zebra and quagga mussels) and the establishment of program personnel and budget. The program focuses on preventing the spread of AIS to and within Wyoming through public outreach, watercraft inspections, and monitoring of waters.

This has been a team effort utilizing volunteers, state employees from the Wyoming Game and Fish Department, Wyoming Department of Transportation and the Wyoming Department of Agriculture. In addition, our federal partners have been instrumental to this fight including U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation and the U.S. Forest Service.

Challenges

The threat of new invasive species is ever present and the likelihood of them reaching Wyoming increases every year. Every water user in Wyoming and every other state that benefits from Wyoming waters will be impacted if these species make their way to a Wyoming water system. Increased support and partnerships with other agencies will help to further strengthen the Wyoming AIS Program and prevent impacts to water delivery, recreation, and native species.

The Wyoming AIS program is currently funded largely by boaters, sportsmen and soft (no long-term commitment) dollars. In spite of Wyoming's commitment in manpower, we are falling short in our ability to finance this fight adequately. The realized costs if zebra or quagga mussels infest Wyoming water, the impact will go far beyond our state boundaries.

Your committee's work and the designation of funding for the AIS battle in the Upper Missouri Basin can greatly strengthen Wyoming's ability to successfully fight off the spread of AIS, build a more informed and active public, and protect the waters that reach across two thirds of the lower 48.

Overall, Wyoming has a very strong relationship with the Corps. We have many years of experience cooperatively working together to protect the safety Wyoming's communities through a variety of flood control measures and civil works projects. As with any relationship, there is always room for improvement. The opportunities that I have highlighted here today are representative of Wyoming's highest priorities for such improvement. We look forward to continuing the development of new projects in order to better protect the residents of Wyoming and their property and to best ensure our commitment to caring for our wide-open landscapes.

The Corps approves major deviation for Forecast Informed Reservoir Operations effort

By Carol Coleman January 26, 2019

In January 2019, The U.S. Army Corps of Engineers, South Pacific Division approved a major deviation that allows for Forecast Informed Reservoir Operations-developed tools and concepts to be tested this winter at the pilot reservoir Lake Mendocino in the Russian River valley in northern California.

This request will allow a maximum of 3.8 billion gallons of additional water, enough to supply approximately 97,000 people for a year, to be stored in Lake Mendocino during the winter rainy season to improve water supply reliability and environmental conditions in the Russian River while continuing to ensure flood management capacity of the reservoir.

"This is a major step along the way in defining how FIRO can be implemented," said Cary Talbot, a division chief at the U.S. Army Engineer Research and Development Center's Coastal and Hydraulics Laboratory and program manager for ERDC's FIRO effort. "The goal is to incorporate forecasting safely in water management and support an update to the Lake Mendocino water control manual."

FIRO is a proposed management strategy that uses data from watershed monitoring and modern weather and water forecasting to help water managers selectively retain or release water from reservoirs in a manner that reflects current and forecasted conditions. Since 2014, a large interagency group consisting of experts in civil engineering, hydrology, meteorology, biology, economics and climate from several federal, state and local agencies and universities has been investigating how weather forecast information can inform water management decisions such that a better balance between flood risk management, water supply and ecological concerns can be realized and safely put into practice.

"The Corps changed their policy in 2016 to allow for forecast information to be used in water management," said Talbot. "But while this policy change opened the door, it didn't spell out how this was to be done. That's what FIRO is doing, defining the how."

The deviation request was submitted on behalf of the Lake Mendocino FIRO Steering Committee. The committee was formed to explore methods for better balancing flood risk management and water supply needs. Representatives from ERDC, Corps Districts, Sonoma Water, the Center for Western Weather and Water Extremes at Scripps Institution of Oceanography, the National Oceanic and Atmospheric Administration, the U.S. Geologic Survey, the U.S. Bureau of Reclamation and the California Department of Water Resources are participating in the committee.

"This is a unique situation," said Talbot. "There is daily interaction between all participating organizations generating multiple perspectives. From day one the research effort has been designed with the water management operators at the table."

Last year, members of the group filed the request to allow a 10 percent deviation from established flood risk management operating rules, which was supported by a Preliminary Viability Assessment that contained detailed modeling, analysis and scientific research, and demonstrated that FIRO can provide water managers the information they need, with adequate lead time, to selectively retain or release water from reservoirs.

"When it comes right down to it, the goal is to inform the reservoir operator to make better decisions to release or retain water," said Talbot. "FIRO has more flexibility. The more data they have, the better."

Lake Mendocino, located near Ukiah, California, is operated jointly by the Corps and Sonoma Water. The Corps manages the flood risk management operations at the reservoir while Sonoma Water manages the water stored expressly for water supply. Following a severe drought in California, Lake Mendocino was chosen as a pilot reservoir when Congress asked the Corps to conduct a research project investigating improving forecast capabilities to help with water management.

"The ability to leverage newer technology and knowledge base as it pertains to weather forecast enhances our ability to safely deliver the multiple missions at Lake Mendocino," said Nick Malasavage, chief of Operations and Readiness Division for the U.S. Army Corps of Engineers San Francisco District. "In particular, the steps we are now taking to further develop and incrementally implement the FIRO concept adds an additional tool to maintain our primary responsibilities for flood risk management."

With the success of the effort in Lake Mendocino, the committee hopes to effect change and put FIRO into action and expand to other areas of the country.

"Each reservoir is different and must be looked at individually," said Talbot. "We don't get to do a lot of research in water operations as most of the tools already in place are working well. The FIRO effort allows for investing into next generation water management tools and investigating how those tools might inform water managers to make better water management decisions."