Meeting Minutes
November 18, 2025

Hosted in-person at the Fremont County Annex Building in St. Anthony, ID and hybrid via Zoom

Attendance

- **27** in-person
- **43** via Zoom

Introductions and Community Building

Christina Morrisett, co-facilitator from the Henry's Fork Foundation, welcomed everyone to the hybrid meeting. The group went around with introductions and then called for a moment of silence before opening for announcements and community building.

Announcements

- Keith Esplin announced the upcoming Eastern Idaho Water Rights Coalition meeting on December 12 from 8:30am–1:30pm at the TAV auditorium at University Place, Idaho State University in Idaho Falls. Topics will include what folks are doing to meet the new settlement agreement. There will be panels from canal companies, the groundwater districts, and the surface water coalition. Contact Keith Esplin for an invitation at keithesplinh2o@gmail.com, if you have not received one already.
- Christina Morrisett announced that the next Henry's Fork Watershed Council meeting is our annual conference and will take place on Tuesday, December 16 from 9am–3pm. The theme is water considerations in a developing watershed.

Water/Irrigation Year 2025 Summary
Rob Van Kirk, Henry's Fork Foundation

Rob presented on Water Year 2025, defined as October 1, 2024–September 30, 2025, and Irrigation Year 2025, defined as November 1, 2024–October 30, 2025. Before launching into details, Rob shared the following key takeaways: it was warm and dry, water supply was lower than predicted, runoff was early, irrigation management in the Henry's Fork watershed was the most precise on record (with credit to Aaron Dalling at Fremont-Madison Irrigation District), carryover in Island Park Reservoir was greater than statistically expected based on water supply, and turbidity out of Island Park Dam was the worst on record.

Rob provided an overview of water management in the Henry's Fork Watershed. Water is stored in the headwaters. Henry's Lake and Island Park Reservoir are the largest reservoirs in the watershed and have an outsized influence on streamflow, water quality, and other processes due to their large surface area impoundment where there is relatively little water to store. These reservoirs provide water for irrigated farmland, located 60+ miles downstream where water is diverted from the river in the St. Anthony region. The Henry's Fork has three subwatersheds: the upper Henry's Fork (above Ashton), Fall River, and Teton River. The Teton River subwatershed is the smallest and is dependent on snowmelt from the Teton Range. The Teton River runs out of water relative to demand early in the season and thus needs the most supplementation from storage water. But there are no storage reservoirs on the Teton River. Thus, the Crosscut Canal delivers water from the Henry's Fork (where there are reservoirs) to the Teton River. Rob discussed the role of exchange wells in augmenting water supply in the Teton River during dry years. Exchange wells are another mechanism for augmenting flow in the Teton River. These wells were built after failure of Teton Dam and inject groundwater directly into canals and the Teton River itself.

Rob explained the water rights priority system relative to reservoirs in the Upper Snake River system, noting that Island Park and Grassy Lake (that belong to Fremont-Madison Irrigation District) have 1935 priority dates and American Falls has a 1921 priority date. Thus, Island Park and Grassy Lake cannot accrue any water until American Falls' water right (1.7 million acre-ft) is completely full. As such, all winter and during most of the spring, all the physical water being stored in Island Park Reservoir and Grassy Lake belongs on paper to American Falls. In Irrigation Year 2025, the system almost filled (~93%) and thus did not completely fill all water rights. Island Park Reservoir was only in priority for a short time in the spring.

In presenting climate data, Rob noted that 2025 was 1.8*F above average, the third warmest year in the last 37 years, and the eighth driest. There was never a point in time in 2025 where air temperature was close to average when you accumulate all the way through the water year. Spring 2025 was particularly warm. In terms of precipitation, April–September 2025 was the driest in the 37-year record and accumulated precipitation for Water Year 2025 was 84% of average. In terms of accumulation of snow water equivalent, we started behind and stayed behind. Snow water equivalent peaked at 92% of average and then melted rapidly, 2-3 weeks earlier than average. Rob emphasized: we had a modest snowpack that melted really early. Rob oriented the audience to his short-term drought index, noting that we started and finished the year below average. According to the U.S. Drought Monitor, the Henry's Fork watershed is in moderate drought.

Rob oriented the audience to the medium-term drought index. This index uses three years of accumulated watershed precipitation. The three-year time span is equivalent to the response time of the Yellowstone Plateau aquifers that feed the Henry's Fork headwaters and is also important to rainbow trout population generation time. In reference to this indicator, the Henry's Fork watershed has been in some flavor of drought for at least three years.

In terms of water supply, natural flow was 81% of average—ranking Water Year 2025 as the seventh lowest in the 37-year record. Natural flow peaked early and the snowpack was gone by early July. Rob's April-1 water supply prediction model overestimated streamflow, as did models produced by the Northwest River Forecast Center, USBR, NRCS, and Idaho Power. This was a universal experience around the Pacific Northwest: it dried out so quickly that all model predictions based on April-1 conditions overestimated streamflow. Rob's prediction overestimated by 13% at the watershed scale and 7% for the Henry's Fork specifically, which is rather good and not as bad as others. Rob's model was mostly off on timing, but did minorly overestimate magnitude as well.

In terms of a long-term trend, Rob presented streamflow between Henry's Lake and Ashton for 1930–2025. This dataset shows that we're returning to what was typical in the 1930s to early 1960s and emphasizes that the late 1960s–1990s were abnormally wet. Rob noted that the anomalous decades are relevant because they're what we're accustomed to in terms of reservoir system management, fishing experience. He noted that in a recent presentation where he showed this graph, an audience member said "well, they call it a desert for a reason."

Rob also presented diversion trends in the Henry's Fork watershed. In 2025, diversion was above the modern average (defined as 2001–present) in April and June due to warm and dry conditions, peaked in early July, and then fell below average in July and August as natural flow water rights priorities fell really quickly and three weeks earlier than usual. Some irrigators switched to storage water, which is more expensive. Craig Chandler (Water District 1) noted that some irrigators ran out of storage, so it wasn't across the board. Rob noted that once junior natural flow rates fell out of priority, diversion dropped. This typically doesn't happen until the third week of July, but this year it happened the first week of July, resulting in net diversion for the irrigation season slightly less than the modern average.

Rob oriented the audience to how the Henry's Fork system uses streamflow targets in the lower Henry's Fork to maintain head for canal diversions and maintain some minimum flow for aquatic life. Rob noted that draft from Island Park Reservoir starts right when streamflow falls to the 350 cfs target in the lower Henry's Fork, downstream of all diversions (created by Christina Morrisett as part of her PhD dissertation). Rob credited Aaron Dalling (Fremont-Madison Irrigation District) with requesting water in alignment with streamflow falling to the target. Rob said Aaron's management of Island Park draft relative to streamflow targets was "very consistent" and "the most consistent lower watershed flows we've ever had. Aaron was right on when we needed more water. He would ask when we didn't need it. He would cut it back and manage it very precisely." Draft of Island Park Reservoir ended when it rained on August 27, earlier than it normally would. After the rain event, flow in the lower watershed was 100–200 cfs above the target and remained there for the rest of the summer in a deliberate decision to send water to American Falls, which doesn't happen every year. But since American Falls got down to 3% full, USBR and WD1 decided to send Island Park that belonged to American Falls on paper to be physically sent downstream. As a result, ~10,000 acre-ft was sent from the Henry's Fork to American Falls.

Relative to Crosscut Canal management, Rob's predictions were good early on, but delivery was quite a bit lower than what Rob expected. This was because a fair amount of the need on the Teton River was made up with exchange well pumping, rather than sending water from Island Park Reservoir through the canal. Rob attributed his model prediction overestimation to the fact that exchange well pumping is only predicted when the capacity for the Crosscut is exceeded, or if he flips a switch in the model that says we're going to come up short in allocation on April 1. Fremont Madison's use of the exchange wells saved water in Island Park Reservoir. After orienting the audience to Island Park Reservoir operations for 2025, Rob noted that physical reservoir carryover (defined as how much water is left in Island Park at the end of September) was higher thean expected based on watershed natural flow. This is the eighth year in a row reservoir carryover has been higher than expected, with an average of 23,00 acre-ft / year in reservoir savings in the last eight years. Rob credited the precision water management program conducted by Fremont-Madison Irrigation District, U.S. Bureau of Reclamation, and HFF for this success. Rob noted that the program includes the lower Henry's Fork flow target (created by Christina Morrisett), infrastructure improvements throughout the watershed, predictive models, among other actions within a full suite. Such management improvements have resulted in 100 cfs more witner flow, 0.5*F cooler water coming out of Island Park Reservoir in the summer, and 17% less sediment delivery.

Rob presented data on water quality, highlighting the increase in turbidity ("a measure of how dirty the water looks") and water temperature in Island Park Reservoir. With 12 years of continuous water quality monitoring, turbidity at Island Park Dam in 2025 was the worst on record. Such high turbidity wasn't high enough to harm fish, but it did exceed the visual detection threshold for anglers and led to dissatisfactory fishing. Based on statistical analysis, there is a strong relationship between turbidity and watershed-wide water supply. You can predict turbidity in Island Park based on water supply. Rob explained that when the reservoir stays more full, we have lower turbidity, temperature, and sediment load. Rob these predictors, Rob estimated what turbidity below Island Park Dam would have looked like over the last 30 years and found that turbidity has been increasing systematically. Rob noted that Jack will talk about the mechanisms behind turbidity in his upcoming talk.

In terms of water temperature, Rob noted that temperature at Island Park Dam has been increasing steadily for the last 35 years or so. HFF's 12 years of water quality monitoring in the river has also recorded trends in water temperature. At the watershed scale, river temperature has been increasing faster than it is below Island Park Dam. According to HFF's 12-year network, turbidity is also increasing in places that have nothing to do with Island Park Dam. Fortunately, average dissolved oxygen levels are really high and current river temperature and turbidity levels are not going to kill fish or have an acute ecological effect.

In conclusion, Rob shared that over the last 40 years, it is warmer in the spring and summer, snow melts earlier, we get less streamflow per unit of precipitation (giving us lower water supply), irrigation diversion is lower (partially due to increased irrigation efficiency adopted in the 1970s–1990s), and water quality at Island Park Dam is worse (as a result of low water supply). In prompting the next three speakers, Rob asked: *Can we do anything about these water quality issues? Do we just have to live with this, or is there some way that we can address water quality issues?*

Q&A: Water/Irrigation Year 2025 Summary

- Craig Chandler (WD1) asked if there is any insight to why natural flow models overestimated flow, and if it was mostly a function of underestimating precipitation.
    - Rob shared insights from his attendance to the recent Northwest Water Supply Conference hosted in Boise, where the Northwest River Forecast Center, NRCS, HFF, and USBR models all overpredicted streamflow. Such overprediction was attributed to 1) how warm and dry it turned after April 1 and 2) decreased runoff efficiency. We're getting the same amount of precipitation, but less water is making it to streamflow because of higher evapotranspiration, so we're losing water out of the headwaters. Last

year, Rob noted, how soil moisture was highly depleted from the previous fall and snowmelt first goes into the soil, so we didn't get as much runoff. Rob said there was also some disagreement on the modeling methods and how to treat SNOTEL point measurements versus satellite-derived snowpack estimates. Rob shared that of those (himself included) who use point SNOTEL data, models have been trained on 40-50 years of data and the relationship between SNOTEL and how much snow is on the ground has changed. It could be due to changes with lower elevation snow no longer being present / missing from the snowpack.

- Jack McLaren (HFF) asked that if total water supply looks really similar to what it might have been in the 1930s, could there be any differences between the drought now and the drought from the 30s and what that might mean for water supply in the next couple years to decades.
    - Rob noted that he did not have an answer, but he assumes that the drought from the 1930s and 1940s was cooler. He is not sure if that is a good assumption. Global temperatures are increasing, but that doesn't necessarily tell us if the Dust Bowl drought was cooler than it is now. If it was cooler, that would have big implications for snowmelt, runoff timing, etc. In terms of what we can expect for the future, Rob wasn't sure. On one hand, Rob said that it's possible we're going to have 30 to 40 dry years, and then some wet ones again, but probably not next year. In terms of water resources, planning, infrastructure, and water rights accounting, Rob noted that we have the system that we have and need to be able to manage it within the water supply that we currently have. In the 1930s, Rob highlighted that Palisades and Island Park were not yet built, the Snake River was dry at Blackfoot, and the Henry's fork was dry downstream of Consolidated Farmers. Rob asked if we need more storage, as was discussed at the August HFWC meeting. The answer, Rob said, is that we could use more flexibility, but we can't fill the storage system we have in most years anyway. So if we build more storage, we're just storing American Falls water somewhere else. Building more storage might give us more flexibility, but it doesn't create more water. Rob wrapped up noting that it is our job to ask these questions, do the best we can, and think about how to adapt.
- Rachel Schmidt (American Rivers) asked if Rob had any information on reservoir evaporation.
    - Rob noted that Water District 1 calculates evaporation off of reservoirs and deducts them from storage allocation. On paper, Rob explained Island Park Reservoir's full allocation is 135,205 acre-ft, but once you subtract for evaporation, it's more like 129,000. Rob checked in with Craig Chandler for accuracy and Craig said it's usually about 2%. Beyond water rights accounting adjusting for evaporation, Rob characterized himself as finicky with evaporation calculations in his models. He doesn't count gain that happens on the reservoir from rain or snow as natural flow, but that Water District 1 accounts that water as bonus natural flow. Over the course of the year, Island Park Reservoir, Henry's Lake, and Grassy Lake gain more from direct snow and rainfall than they lose to evaporation during the summer. He hasn't done the math for Jackson Lake, but assumes its similar. American Falls is likely opposite, losing more to evaporation because they don't get much rain. Rob acknowledged that Rachel's question is

interesting because if evaporation rates are increasing, ice melts sooner, ice on is later, and we would lose more to reservoir evaporation. That said, Rob noted that reservoir evaporation is a tiny fraction of the total water budget in the Snake River Basin—which is different than what occurs in the desert southwest, where evaporation is 10–20% of the water budget.

- Russel Clark (HFF) asked for clarification on why April 1 is used for water supply prediction models and how April 1 may affect those predictions if that date were to change or be different.
    - Rob said April 1 is the magic date because that's when irrigation starts, with administrative irrigation season occurring April 1 through October 31 in most of the Upper Snake River Basin. Irrigators need a forecast of what's going to happen over the course of the year, and traditionally April 1 roughly coincides with peak snow water equivalent +/- a couple of weeks.

Island Park Reservoir: Threats and Solutions

Jack McLaren, Henry's Fork Foundation

Jack began his presentation asking, "What is Island Park Reservoir good for?" Jack noted that Island Park Reservoir is often considere the center of the universe when it comes to water management and ecology in the Henry's Fork watershed. Island Park Reservoir's authorized purpose is irrigation storage and supply infrastructure. But Jack noted the side benefits to the reservoir's primary use. For example, Island Park Dam was also retrofitted in the early 1990s for hydropower generation by Fall River Rural Electric Cooperative. Beyond that, Island Park Reservoir is (sometimes) "swimmable and fishable (noted as a term used in the Clean Water Act), housing recreational fisheries and recreational water sports both upstream and downstream. Fish migrate upstream of Island Park Reservoir. And the water coming out of Island Park Reservoir has a watershed-wide effect. Island Park Reservoir is also a beautiful place with aesthetics that have supported high property values and real estate development. Jack also argued that Island Park Reservoir has inherent value as a functioning ecosystem supporting great biodiversity, including waterfowl and a small native Yellowstone cutthroat trout population. Common loons, Jack's favorite bireds, migrate through the reservoir in April and May. Jack shared that the value in protecting Island Park Reservoir is not only a matter of economics, but comes down to what we should and shouldn't do as a society—highlighting a quote from conservationist Aldo Leopold (slide 5).

Returning to the topic of Island Park Reservoir being swimmable and fishable, Jack shares some of the challenges: summertime habitat squeeze, poor water quality exported downstream, harmful algal blooms, invasive species potential.

Jack provided orientation the habitat squeeze phenomenon. Fish habitat squeeze occurs when there is warming water temperature near the surface and low dissolved oxygen near the bottom of the reservoir. As things warm, grow, fall to the bottom, decay, use up oxygen, the band of habitable water for coldwater fish (that also need high oxygen) narrows. Jack noted this is not a problem unique to Island Park Reservoir, but is seen in reservoirs in the western United States and in U.S. temperature zones. Jack walked the audience through a graph demonstrating the fish habitat squeeze in Island

Park Reservoir from weekly vertical water column measurements in 2025 for temperature and dissolved oxygen.

Jack presented a graph depicting habitat quality in Island Park Reservoir based on dissolved oxygen and temperature combined, showing where in the water column a kokanee salmon would “literally cook” in July or suffocate in June/August. Jack noted that the narrowest band of sub optimal habitat occurs in July, limiting habitat to 1000 acre-ft in a 100,000+ acre-ft reservoir. Jack shared that these fish seek out refugia in groundwater springs and reservoir inflows, packing into small areas where juveniles probably get eaten by other fish.

In another graph, Jack depicted the relationship between minimum volume in Island Park Reservoir and the average amount of ideal habitat in a given summer. Jack concluded that in years when Island Park Reservoir stays more full, there Is more fish habitat, and more fish that return to spawn in subsequent years.

Looking at water quality downstream, Jack noted that we saw very high river temperatures in 2025. Jack showed a graph honing in on the period between July and August, and showed that water temperature just barely stayed within optimal ranges for trout. However, this did impact the fishing experience. Water temperatures were well above average earlier in the year and once the cool water near the bottom of the reservoir (called the hypolimnion) was totally exported downstream, warm surface water was passed downstream.

In addition to warmer water, turbidity was also extreme both in the reservoir and downstream in 2025. Turbidities approached 20 FNU and was the highest turbidity the HFF has recorded in the river during the summertime period. Rob Van Kirk (HFF) added that a density current in September 2020 had a brief period where turbidity in the river briefly got up to 25 FNU, but that summer 2025 indeed had the longest duration turbidity event within the HFF water quality record.

Next, Jack turned to harmful algal blooms in Island Park Reservoir—noting that an algae ratio of between 2 and 4 indicates a high probability of a cyanobacterial and potentially harmful algal bloom occurring. Although IDEQ and EIPH conduct official testing and make determinations for swim/recreation safety for any given water body, HFF did their own additional water quality testing on the reservoir in 2025. Only one HFF sample, taken in mid-July, detected toxins from algae. But additionally testing from IDEQ did not record detection. After mid-July, Jack noted that was a long period of intense green algae blooms in Island Park Reservoir. This was unusual, but green algae is not necessarily harmful—but it does make the water soupy, diminishing aesthetics and fishing experiences, and was a probably source of the highly turbid water moving downstream.

Jack touched on invasive species and how their introduction could make conditions in Island Park Reservoir worse, beyond what we are prepared for or can imagine. Jack shared a graph from the ISDA of the number of intercepted boats headed to Island Park Reservoir from infested waters, noting how these boats only reflect the number of honest travelers and how, depending on the watercraft, these boats are incredibly difficult (if not impossible) to fully decontaminate. Jack highlights that there is limited data and knowledge on this topic at this time, but it is a potential issue to be aware of and that the HFF is interested in studying more.

Jack concluded the threats section and presented solutions, namely: preventing poor water quality and containing poor water quality when it does occur. In terms of prevention, Jack noted that the two big sources of turbidity downstream are algae blooms and wake surfing. Wake surfing can stir up the bottom of the reservoir, particularly when there is exposed shoreline as water depth decreases with reservoir draft—something Jack noted he witnessed this summer. There is a lot of stirred up turbidity due to wake surfing activity on Island Park Reservoir in the afternoons and on weekends, particularly when families are trying to enjoy the last few recreational weekends before kids return to school.

Jack emphasized that his important point was that sometimes poor water quality in Island Park Reservoir isn't really anybody's fault. Wind, wave actions, storms, and increasing water residence time within the reservoir create these water quality problems. Jack echoed Rob in that we can't make more water. Instead, Jack asked: If we can't prevent poor water quality in Island Park Reservoir, how do we contain it? Jack noted that the hypolimnion is the key. The hypolimnion is a cool pool of clear, good quality water at the bottom of Island Park Reservoir that, when present, keeps water quality issues contained within the reservoir (and not exported downstream). A cool pool of water at the base of the dam (where the water is withdrawn) prevents warm water from making it into the river downstream. This dynamic is disrupted when the reservoir is drawn down a lot. In addition, when the reservoir is drawn low and without a hypolimnion, it is easy for algae and water stirred up from wake boats to freely move through the dam.

In a summary of solutions, Jack noted keeping water in Island Park Reservoir—a conservation project conducted through collaboration. Jack also introduced the idea of engineered solutions to maintain a hypolimnion in Island Park Reservoir. In closing, Jack shared that if we want to keep water quality in Island Park Reservoir beneficial for fish, wildlife, and the people who rely on the reservoir, we're going to need adaptive creativity and adaptive policy and management.

Note: Jack ran out of time and did not get to present his slides in their entirety. The full slideshow is posted to the HFWC online archive.

Q&A: Island Park Reservoir: Threats and Solutions

- Tanner Gardner (USFS) asked about the importance of maintaining the hypolimnion given the need to draw the reservoir down lower to meet downstream needs and what has been brainstormed to hypolimnion maintenance?
    - Jack referenced slides he did not yet get to, but shared that the first thing to do is try to keep more water in the reservoir in the first place. With less water used, the less reliance we have on using hypolimnion (located where the dam draws from the bottom of the reservoir). Other solutions include a variable elevation outflow structure to export water from any point in the water column, rather than be limited to the reservoir bottom. Jack brought up a slide with illustrations created by intern Teddy Montalvo, demonstrating that water quality conditions are really good in the spring under our current system. But in using reservoir bottom water, water quality deteriorates quickly for fish in the reservoir for fishing conditions downstream. A variable elevation outflow structures offers more flexibility in where water is drawn from within the reservoir. In the springtime, when surface temperatures are still plenty cold for fish downstream, you can take more water from the surface and leave the cool pool alone until it is needed in the summer and fall—

chewing into the hypolimnion more strategically and selecting the best quality water to optimize water quality downstream and in the reservoir. Lastly, HFF proposes active oxygenation like a big aquarium bubbler (or something along those lines) as decaying organic material in the sediments risk using up all the oxygen at the bottom of the reservoir—negating the nice, cold water saved for the hypolimnion. Jack characterized his response as overly simplistic, but emphasized that saving the high-quality water in the hypolimnion for use later in the year will be good for fish both within the reservoir and downstream.

- Melissa Muradian (Henry's Fork Foundation) asked about the time frame for releasing RFPs for the engineering solutions.
    - Jack shared that the Henry's Fork Foundation has funding to explore engineering solutions through the U.S. Bureau of Reclamation WaterSMART Aquatic Ecosystem Restoration Program to fund 60% design and planning. In theory, this work can support construction in the future. The timeframe is to have 60% designs completed by 2027 and then hopefully move forward with any alternatives or retrofits from there.

Hypolimnetic Oxygenation System Evaluation: Alternatives Analysis
Alex Gerling and Ricky Wood, Hazen and Sawyer

Note: Hazen and Sawyer is a consulting firm hired by the Henry's Fork Foundation to conduct the study presented today

Alex Gerling oriented the audience to the presentation agenda and noted that the project objective was to improve water quality and fish habitat in Island Park Reservoir by evaluating oxygenation, aeration, and destratification strategies. Alex shared some key definitions for the presentation, acknowledging the range of stakeholders in the group.

Alex shared temperature profiles of Island Park Reservoir. The reservoir starts off uniformly distributed, stratification starts to set up in June and into early July. As withdrawal of the hypolimnion occurs, stratification is disrupted and the reservoir becomes a uniform temperature from the surface to the bottom. Alex noted that as Jack said early, this is not typical of normal limnological conditions.

Alex shared dissolved oxygen profiles. Dissolved oxygen levels are low and some are reaching levels of hypoxia. Dissolved oxygen levels in a lot of the water column are falling below thresholds for fish habitat (5 mg/L) and for hydropower production (6 mg/L). In defining fish habitat purely by oxygen concentrations, available fish habitat that is defined as stressful increases late July through September—not leaving a lot of opportunity.

Alex introduced Carlson's Trophic State Index (TSI), a multi-parameter assessment of productivity and eutrophication that uses chlorophyll, total phosphorous, and Secchi disk data—considering food, light, and what is actually converted into biomass. Alex explained the differences between oligotrophic, mesotrophic, and hyper-euthrophic conditions following norms from the North American Lake Management Society. In general, Island Park Reservoir is experiencing that hypereutrophic status where we'd anticipate seeing really dense phytoplankton growth, oxygen depletion, and other ecological impacts.

In terms of nutrient concentrations, Alex shared that Island Park Reservoir experienced elevated nutrients (as anticipated under hyper-eutrophic conditions). There were particularly high nutrient concentrations for total phosphorous, a key macronutrient for phytoplankton and algal growth. Alex noted that Jack's team at the Henry's Fork Foundation collected phytoplankton and cyanotoxin data in 2025 and they are still waiting on those results, but in looking at historical data collected by IDEQ 2021–2024, there are very high, dense levels of *aphanizomneon* in Island Park Reservoir. These levels are well above what the EPA and World Health Organization define as harmful algal blooms (>25–30 million cells / mL), as well as elevated toxins during these times. Idaho Department of Health and Welfare has a recreational threshold of 4 mg/L of microcystin and historical data show exceedances of that threshold.

Ricky Wood presented on the basis of design. When sizing oxygenation systems, oxygen delivery rate is a key metric. To get an order-of-magnitude understanding of what oxygen delivery rate is for Island Park Reservoir, Ricky's team used a box model. The general idea is that there are three parameters that influence how much oxygen you need to deliver into the hypolimnion: sediment oxygen demand, outflow volume through the dam, and target dissolved oxygen concentrations. Sediment oxygen demand is the rate of oxygen depletion caused by biological degradation and chemical oxidation at the bottom of the reservoir, where the sediment and water interface. Hazen & Sawyer sent a subcontractor to estimate soil oxygen demand in Island Park Reservoir via field sampling in June 2025. This process required placing chambers on the bottom of the reservoir to measure how the oxygen drops over time. From this research, the subcontractor recommended soil oxygen demand of 1.15 grams/m^2/day. To estimate total soil oxygen demand, you select the area of the reservoir that you want to oxygenate and the multiply that by your sediment area.

Ricky noted that dam outflow is another source of oxygen depletion throughout the reservoir. If the bottom of the reservoir (where current dam outflow infrastructure sources water from) is being oxygenated, than that oxygen is lost to outflow. Additionally, if the entire water column is being mixed, then that increases the volume that needs to be oxygenated. As a preliminary analysis, Ricky's team used two outflow conditions: 1) average hydrologic flow through the dam during the summer months from the past 10 years and 2) maximum flow through the dam in the past ten years, where maximum flow is used to size the oxygenation system. For worst case scenarios, the analysis sought to maintain 5 mg/L of oxygen throughout the hypolimnion during maximum outflow (for oxygen delivery) and then used average flows for operations and maintenance. They key takeaway for this analysis was that hydrologic flows are likely to dominate oxygen depletion in the reservoir, specifically because water is drawn from the reservoir bottom. Sediment oxygen demand was small for this analysis. Ricky recommended a more extensive analysis throughout the entire reservoir to get a better sense before pursuing system design.

Ricky presented four main oxygenation system alternatives: diffused air/destratification, speece cone, free bubble oxygenation, and oxygen saturation technology. Diffused air is the only one of the system that uses atmospheric air, rather than pure oxygen. It also mixes the entire water column. Given how deep Island Park Reservoir is, and although air is a readily available resource, it would take a lot of energy to mix a 60–70 ft water column. A speece cone works by drawing water out of the hypolimnion, forcing it through a cone with oxygen, dissolvling oxygen into the water via the pressure differential, and then pumping that oxygen-rich water back into the hypolimnion. Oxygenation thus occurs within the system itself. Free bubble oxygenation dissolved oxygen into the water. As it is released, it floats up to the surface. This system requires depth to allow dissolved oxygen to fully saturate into the water column as it rises. Oxygen saturation technology is a newer technology and has limited field applications. It works similar to a speece cone—pulling water out of the hypolimnion, infusing it with oxygen, and driving it back into the hypolimnion. The key objective is super-saturating the water with oxygen, quenching the sediment oxygen.

In assessing which alternative to pursue, Ricky noted that the objective was to improve fish habitat in Island Park Reservoir. In order to assess how feasible each system achieves this objective, Ricky's team considered two main elements: oxygen source and diffuser type. Diffused air/destratification uses compressed air (readily available resource), but requires a lot of energy to mix the entire water column in Island Park Reservoir. Air is also only ~20% oxygen, so a lot of air would need to be infused into the system. All three other alternatives use pure oxygen, which can be acquired in two ways: 1) liquid oxygen delivered to the site and 2) on-site oxygen generation. Liquid oxygen equipment and maintenance can be outsourced to a third party. In contrast, on-site oxygen generation requires construction of a system to generate oxygen gas—requiring a large building footprint that tends to have more maintenance associated with it. This option is more cumbersome for large oxygen delivery rates.

Ricky oriented the audience to three main diffuser types: linear hose diffuser line (micropore), effluent canon (multi-port diffuser), and engineered slotted pipe (multi-port diffuser). Diffuser lines are used in diffused air and free bubble oxygenation systems. It is the lowest maintenance option given that you can bring it to the surface for maintenance. The two other diffuser types are used for speece cone and oxygen saturation technology. These diffuser types require divers to maintain, which is a substantial logistical constraint for system operation.

Free bubble oxygenation uses liquid oxygen and a diffuser line. Overall, this would be lowest maintenance option. This was a key consideration why Hazen & Sawyer recommend free bubble oxygenation of the four alternatives researched. Additionally, free bubble oxygenation is better designed for larger, deeper systems like Island Park Reservoir and the vendor has experience doing hydropower projects as well. Given that hydropower generation is part of Island Park Dam infrastructure, free bubble oxygenation is a little more feasible. It also doesn't require mixing of the water column and, in terms of keeping the hypolimnion intact, it has a variety of ecological benefits as well.

For the unselected alternatives, a speece cone is potentially viable, but more cumbersome overall. Oxygen saturation technology does not have a lot of field-verified options and perhaps isn't practical for larger delivery rates needed for Island Park Reservoir. Diffused air/destratification requires a lot fo energy to operate and would be difficult to size for the system.

Ricky shared additional recommendations relative to source water protection and management, as source water directly influences water quality in the reservoir and it is important to think about these systems holistically. Ricky noted that it is important to attack these problems from multiple angles and to consider driving factors behind them. To that end, Hazen & Sawyer recommended a few additional strategies for additional source water management that could work in synergy with an oxygenation system to help improve its effect on fish habitat. Ricky mentioned how there is a nutrient problem in Island Park Reservoir and septic systems for homes on reservoir shores may be a substantial factor if septic systems are leaking or not being properly maintained. Ricky noted it would be useful to engage with sewer system managers in Island Park for data collection. If that data is unavailable, then homeowner outreach is possible—asking how often they are maintaining their septic systems, what was the last time it was inspected, etc. In addition, creating an agricultural buffer (ex. fencing) between the reservoir and cattle could provide a mutual benefit to both the water quality and herd health. Agriculture and grazing can be a nutrient input into the reservoir and cattle drinking reservoir water that potentially has cyanotoxins presents a danger to the herd. Landowner outreach might be a way to assess if this option is feasible. Lastly, Ricky noted historic phosphorus mines in the region and how if any of those sites are un-remediated they could be impairing water quality in watershed tributaries, if not the reservoir itself. Hazen & Sawyer compiled USGS data on historical mines in Island Park and recommends visiting these sites and monitoring nearby streams to check for direct water quality impact.

In terms of source water management strategies, Ricky drew attention to the outstanding data collection conducted by the Henry's Fork Foundation. Such data collection helps inform what strategies are going to work best for the reservoir. Data collection is also helpful in assessing the impact of an oxygenation system, should it be implemented. Monitoring data can help us assess if we need to do more or if it is meeting the goal adequately. Ricky also noted recreation management, as motorized watercraft causes sediment resuspension (which Hazen & Sawyer observed on their site visit). When sediment comes to the surface, the phytoplankton an feed on nutrient-rich sediment—increasing the risk of a harmful algal bloom. A recent study from Minnesota demonstrated such a phenomenon can happen at depths up to 10 and 20 ft for wake boats. A regulation to designate no-wake zones and recreation zones could have the best impact. However, Ricky acknowledged, given the stakeholder environment of Island Park Reservoir that may or may not be viable. Educational science also has its place, connecting wake surfing to its impact on water quality. Given the risk of cyanotoxins to public health of recreators, Hazen & Sawyer recommends outside application of hydrogen peroxide. People often think of copper application, but copper has a blanket toxicity that will kill everything and give cyanobacteria a competitive advantage when thing start to grow back, potentially worsening the problem. Hydrogen peroxide, in contrast, selectively targets cyanobacteria and there is no residual accumulation as it breaks down in the water. Lastly, Ricky recommended a multi-level resource outlet (as Jack touched on). Such an outlet can help regulate temperature and maintain reservoir stratification, which is good for fish habitat. This would also lower the volume you need to oxygenation as the amount of oxygen lost to outflows is lower. Such an outlet so allows for a smaller system sizes and reduces oxygen-system maintenance.

Final conclusion: Hazen & Sawyer recommends a free bubble oxygenation system and coordinating with the vendor given the unique and complex system. Hazen & Sawyer also recommends additional study before completing a full 60% design. Oxygenation will have the best impact when paired with other strategies. If there are external nutrient loads, those should be reduced. If there is strong phytoplankton growth, that should be taken care of as well. Cyanobactera dominance is likely impacting the ecosystem—either by altering the food web, macrophyte habitat loss, contributing to DO depletion and turbidity. Strategies to address these issues in parallel with oxygenation are recommended.

Q&A: Hypolimnetic Oxygenation System Evaluation: Alternatives Analysis

- Christina Morrisett (co-facilitator) invited questions, but asked that the Henry's Fork Foundation be lowest priority since they have access to Hazen & Sawyer given their contract.
- Keith Esplin (Eastern Idaho Water Rights Coalition, via Zoom) asked how oxygen helps turbidity.
  - Alex Gerling answered that oxygen will indirectly help with turbidity by maintaining that thermal stratification (having a bound epilimnion and hypolimnion). There are a lot of factors that contribute to turbidity, mentioned by Rob and Jack in their presentations. Alex noted that, as Ricky said, there's not one silver bullet solution but other strategies that will have to be paired to complement the turbidity issues as well.
- Joshua Prettyman (Horrocks) asked if there was a temperature increase depending on the type of oxygenation method used.
  - Alex Gerling said the was no temperature increase to the hypolimnion, particularly for the Mobley engineering systems Hazen & Sawyer has worked with and recommends. They an share well-documented studies on this.

Hydrodynamic and Temperature Modeling of a Linked Reservoir-River System to Support TMDL Development

Noah Benitez-Nelson, Annear Water Resources LLC

The Henry's Fork river was recently classified by the Idaho Dept. of Environmental Quality (IDEQ) as an impaired water due to frequent exceedance of water quality criteria for coldwater aquatic life and salmonid spawning temperatures. Annear Water Resources (AWR) was contracted by IDEQ to develop a hydrodynamic and temperature model for both Island Park Reservoir and the river downstream.

Noah provided orientation to the model structure. AWR develop a linked model that takes the streamflow and temperature output from the Island Park Reservoir and sends it 10 miles downriver to the Henry's Fork at the confluence with Thurmon Creek. This 2-D model was developed in CE-QUAL-W2, a longitudinal, unsteady, finite difference model for hydrodynamics and water quality used in rivers, reservoirs, lakes and estuaries throughout the United States and beyond. This model uses reservoir inflow, hydrodynamics, and precipitation and outflows (ex. evaporation, groundwater losses, withdrawals) and calculates how much water is in the system: how much is entering, leaving, and the processes associated with that.

Noah provided orientation to the model inputs. AWR used the existing bathymetric data and temperature data collected by the Henry's Fork Foundation to develop a model grid for the reservoir. AWR also used meteorology from monitoring stations in the upper Henry's Fork watershed and built a few different regressions to identify conditions closest to the reservoir and river sites. Lastly, AWR used river flows from USGS and river temperatures from Henry's Fork Foundation sampling sites.

These models were developed to simulate hydrodynamics and water temperature between January 1 and December 31, 2023. To calibrate the reservoir model, AWR used data from HFF water quality sampling locations and the USGS streamflow gage downstream of Island Park Dam to compare model output with actual observed conditions. Given that there is no streamflow gage at the confluence of the Henry's Fork and Thurmon Creek, AWR tinkered with the data to develop a useful regression for hydrodynamic conditions. For temperature, the model output (simulation) is within at least 0.5*C of observed conditions, which AWR is pretty happy with.

Noah shared some challenges with the model calibration, such as matching reservoir thermal profiles at discrete sampling sites with the laterally-averaged cross-reservoir model segments. The model grid does not allow for specific temperature assessment at a given location, such as Trude Bay. But the model does output a vertical temperature profile across an entire segment. Local processes, such as spring inflow observed at Trude Bay, which leads to lower temperatures are averaged into the entire reservoir lateral segment.

Once the model was calibrated, AWR used it to run a few "toy scenarios." Noah noted that these are called "toy scenarios" because they're not meant to inform any management decisions or be indicative of climate forcing in the reservoir. Instead, these scenarios were designed to test what the model can do and what its potential utility might support. Toy scenarios included 1) changing air temperature by +/- 2 degrees C, 2) riparian shading, and 3) conserving the cold bottom pool in Island Park Reservoir for late summer releases. For the riparian shading toy scenario, AWR tested 0% shading, 10% shading, 100% shading (which would require covering the reservoir with a tarp, which Noah acknowledged as not feasible or favorable), and 75% shading on the river (which Noah acknowledged as "may or may not be feasible"). For the cold pool conservation scenario, AWR modeled an "imaginary" gate at the very top of Island Park Reservoir, with a model rule that required withdrawal through the gate when surface water temperature of Island Park Reservoir was < 68*F (the average limit of trout's comfortable temperature range). This imaginary gate was assigned a withdrawal elevation of 10 ft below the average reservoir elevation in 2023 and prioritizes using the hottest waters from the surface before using the coldwater pool. AWR ran the model for each scenario and compared the output to IDEQ temperature water quality standards for the Henry's Fork watershed.

For the scenario with a 2*C increase in temperature: an increase in air temperature did lead to an increase in water temperature flowing out of Island Park Dam. Noah noted that this is expected. This also leads to an early breakup in ice cover on Island Park Reservoir. For the scenario with a 2*C decrease in temperature: an decrease in air temperature led to a decrease in water temperature. In comparison to the baseline model, a 2*C decrease in air temperature moved the needle further on river temperature than the 2*C increase in air temperature. In the cooler scenario, there is less exceedance of the salmonid spawning criteria and no exceedance of the coldwater aquatic life criteria.

For the restoration scenario: the maximum restoration effort led to a change of 4*C in water temperature and longer adherence with the salmon and spawning criteria, no exceedance of the coldwater aquatic life criteria, and lower temperatures persisting throughout the entire simulation period.

For the coldwater conservation scenario: In the calibrated model, colder water is extracted up until May 15 and then that cold water is no longer quite as cold as the coldest has been extracted. Without the cold water pool, the actual water taken from the reservoir is warmer than the calibrated model. In switching back to the USBR gate outflow on May 15, the water exported to the river downstream was cooler. This scenario resulted in the greatest reduction in outflow temperatures and the lowest minimum outflow temperatures.

But cold water conservation resulted in the lowest temperature reduction at the furthest downstream point in the model (confluence of Thurmon Creek and the Henry's Fork). Instead, maximum restoration effort had the greatest impact in reducing maximum daily water temperature.

In summary, Noah noted that this effort provided a peak into the potential utility of the model for exploring future climate forcings and potential management scenarios. Noah also noted that AWR provided IDEQ options for hot to explore climate forcings and additional model tweaking.

Q&A: Hydrodynamic and Temperature Modeling of a Linked Reservoir-River System to Support TMDL Development

- Keith Esplin (EIWRC, via Zoom chat) asked if the new proposed gates near the reservoir surface would mean that the current hydropower system, which takes water from the bottom of the reservoir, would no longer be used much of the year.
    - Noah noted that this is one of the reasons AWR uses toy scenarios—because construction of a gate at the top of Island Park Dam would indeed negate some of the utility of the dam for hydropower generation. Depending on infrastructure that is actually designed and constructed, there would need to be linkage to the current hydropower system otherwise we would lose hydropower generation capability.
    - Jack McLaren (HFF) added that a movable or variable elevation outflow would accomplish [using surface water to preserve the coldwater pool] and would not obviate the ability to generate power at Island Park Dam. A variable elevation outflow still allows for power generation. Jack wanted to make it clear that HFF is seeking to do all this work in concert with, and not to reduce, any of the current uses of Island Park Reservoir. HFF is trying to create better conditions and fulfill all the currently permitted and authorized uses of Island Park Reservoir.

Community Building and Wrap Up

- The room returned to a circle and shared a moment of silence before Christina Morrisett (co-facilitator) invited announcements, questions, and reflection.
- John Moulton (Teton Basin Water Users Association) asked if there were any studies on how much water shade trees consume out of the river.

- Jack McLaren (HFF) answered that water consumption by trees is taken into account with most restoration projects these days. In order to accomplish 75% shading [on the Henry's Fork downstream of Island Park Dam] it would be like planting Doug Firs or redwood trees (not willows) which would be pretty substantial. But these are toy models meant to ask "what if" like a proto-sensitivity model to test how sensitive the system is to shade or a 2 degree temperature change. Jack emphasized that this work is just broad cuts at this point.
- Rob Van Kirk (HFF) added that he made an attempt to estimate evaporation, evapotranspiration from riparian vegetation (mostly cottonwood trees along irrigation canals). With plants that have been there for a long time, under equilibrium conditions, there isn't the initial update of water like if you plant new vegetation. Overall, evapotranspiration from plants along canals was very minor compared to seepage and delivery rates. On irrigation canals around here, the uptake isn't all that high given that canals leak so fast that it greatly outweighs evaporation from the canal surface or what plants might take up.
- Unnoted Attendee 1[1] added that Chris Hogue has done restoration studies that shows it all depends on the species, but for the most part you're not taking more water than you're already losing with cottonwood trees. That may not be the case for salt cedar.

- John Moulton (TBWUA) asked if putting oxygen into the reservoir would increase or decrease algae.
  - Jack McLaren (HFF) shared that oxygen can reduce algae in some systems. Low oxygen near the sediment surface can allow free phosphorus (orthophosphate) to be released from being bound in the sediments and, when that water turns over, that free phosphorous can become fuel for algae blooms. Based on the evidence Hazen & Sawyer presented, Jack noted that he did not think that was a huge issue in Island Park Reservoir. Instead, oxygenation is more for fish habitat in the reservoir and for downstream water quality (rather than to diminish algae blooms). Oxygenation in Island Park Reservoir likely wouldn't hurt in algae bloom reduction, but it will probably not be the primary mover.
  - Alex Gerling (Hazen & Sawyer) added that maintaining the thermal stratification would be a huge benefit to preventing nutrient mixing. Oxygenation won't hurt (in addressing algae blooms), but it is not the silver bullet for cyanobacteria management.
- Jan Naish (Journalist) asked if there is a layman-friendly study on the effect of wake boats? For context, Jan added that the Fremont County commissioners have been addressing this concern and have declared one no-wake zone. But their concerns have been pertaining to safety of recreators and property owners and [water quality] has not been part of the discussion. If they had this information, Jan wondered if it could tip things either for/against

[1] Apologies, the name of this individual was not recorded. If this was you, please reach out to council@henrysfork.org for correction.

wake boat management. Jan asked if easily understandable information could be presented to the Fremont County Commissioners to inform their wake-zone decisions for Island Park Reservoir.

  - Jack McLaren (HFF) shared that there are resources from the University of Minnesota that circulated on social media last year that he considers fantastic. There were underwater videos at 10-20 ft deep showing what happens when a wake boat goes over that location. It is an area of active research right now.
  - Christina Morrisett (co-facilitator) offered to add links to the meeting minutes in coordination with Jack. Pasted below:
    - From Minnesota DNR: https://www.dnr.state.mn.us/safety/boatwater/own-your-wake.html
    - Fox News report outlining the issue, research, and impacts: https://youtu.be/fp6gHrqJwo0?si=Pfx-nzTZQg0s7wTf
    - MPR News: https://www.mprnews.org/story/2025/07/29/study-raises-new-questions-over-minnesota-lakes-and-wakesurfing
    - The St. Anthony Falls field laboratory at the University of Minnesota is the best source for further technical information. They're an engineering, fluid dynamics, and geophysics lab so their interest is both about the environment as well as property protection and intelligent management. Their reports are dense and comprehensive.
    - HFF is working on a real-time map to show where wakesurfing can be conducted as water levels in Island Park Reservoir fluctuate.
  - Brandon Hoffner (HFF) added that the Henry's Fork Foundation presented to the county commissioners in March 2025 on the topic of wake surfing on Island Park Reservoir at some general level, and also presented to the Henry's Fork Watershed Council on this topic in Spring 2025.
- Bob Sherer asked if there is a need to count redds for rainbow trout on the Ranch or Log Jam.
  - Jack McLaren (HFF) said there were redd counts conducted in "redd alley" 100–200 yards downstream of Island Park Dam and it has been estimated that that is where a lot of the spawning activity occurs. No date specified, but referred to as "a long time ago."
  - Rob Van Kirk (HFF) said that if the question is if the trout population is limited by spawning success, the answer is no. The single limitation to the rainbow trout population [from Island Park Dam to Riverside] is outflow from Island Park Dam from December 1–February 28. There are hundreds of thousands of fry in this reach, but only 5–10,000 survive the winter based on the amount of water in the river. Spawning has never been an issue, and this fact is backed up by decades of research. In the Buffalo River, HFF has counted spawners ascending into the river to spawn, estimated the number of eggs produced in the Buffalo River, and captured outmigrating fry. This research has demonstrated that the Buffalo River alone produces far more fish to seed the Henry's Fork, but those fish are susceptible to the

same winter flow limitation in Box Canyon. Spawning is not a limiting factor. It's the survival of young fish.
    - Brett High (IDFG) added that counting redds is a less precise methodology for estimating production over the number of adult fish. Females create multiple redds and not every female spawns. Counting fish at the Buffalo River fish ladder is a more precise method for quantifying the number of fish in the river. Production is not the one big factor [for the size of the population].
- Brett High (IDFG) shared that the one thing that stood out in today's meeting was Hazen & Sawyer's characterization of Island Park Reservoir as hypereutrophic and the challenges that creates with turbidity in the river downstream. Brett referenced Rob's note that turbidity is not just hard substances and sediment, but detritus like dead algae too. Brett did not realize that hyper eutrophication was a big issue for concern.
    - Jack McLaren (HFF) added that that was a surprise for him as well. Old reports from the 1980s and 1990s, based off of total phosphorous alone, characterized Island Park Reservoir as on the border between mesotrophic and eutrophic for decades. And now to see it as hypereutrophic definitely represents a change in that ecosystem.
    - Russell Clark (HFF) asked for the definition of hypereutrophic.
    - Jack McLaren (HFF) shared that it eutrophy is a scale of productivity, so hypereutrophic means very or extremely productive in terms of algae growth. Mesotrophic is middle productive and oligotrophic means no productive. Jack noted that there isn't a linear relationship between how productive a system is in terms of how productive it is in terms of algae, fish, or bugs (it can be more of a bell curve). But when you're in the middle of productivity, you get the most fish.
    - Rob Van Kirk (HFF) added that Tyler King (USGS) gave a presentation to the HFWC in (maybe) 2022 that showed this eutrophy trend at Island Park Reservoir using remote sensing [satellite] data. This work has since been published. His data went through 2020 and showed that IPR has been heading in this direction for a while. So it doesn't include the last five years, which from everything we can tell, has gotten a lot worse.
    - Russell Clark (HFF) asked how some of the solutions discussed today address or affect the issue of hypereutrophy.
    - Jack McLaren (HFF) said that they wouldn't directly address the issue of hypereutrophy, for the most part. Hazen & Sawyer provided additional recommendations for directly treating algae and looking at nutrient sources in the watershed that provide the building blocks for hypereutrophy (if you want to change the trophic state of the lake). Jack noted that there is an element of nutrient increase occurring just due to climate—the same climate and hydrologic changes that are affecting the entire western United States. Realistically fixing water quality in Island Park Reservoir comes down to preventing poor water quality in the reservoir with the tools we know we have and then doing our best to contain whatever problems arise in the reservoir so it doesn't affect anyone else [downstream].

- Joshua Prettyman (Horrocks) asked if there is a correlation between the temperature of the reservoir and the degree of eutrophication—is the warmer temperature in the reservoir causing the hyper eutrophication? By lowering the average temperature of the reservoir, could that help?
    - Rob Van Kirk (HFF) said that changing the temperature of the reservoir would not change total phosphorous mass, but could slightly alter timing and the amount of phosphorous cycling. Legacy phosphrous in the sediment has been there for geologic time and that is not going to change. The best case is to keep that phosphorus in one state or another, and temperature has some bearing on that.
- Joshua Prettyman (Horrocks) asked Rob Van Kirk (HFF) what could be causing the 4% increase in turbidity that is being observed in the watershed, as reported in Rob's presentation.
    - Rob Van Kirk (HFF) said that it's tied to two things: 1) it is warmer in the spring and summer and 2) there is less water. Anything related to suspended sediment, productivity, nutrient concentrations, etc. is going to be made worse because the growing season is longer, warmer water can hold more dissolved solids, and there's less dilution. We are seeing these changes in parts of the watershed completely unaffected by Island Park Reservoir and Dam. So, watershed-wide factors are warmer, longer growing seasons and less water.
- Christina Morrisett (co-facilitator) acknowledged that the meeting went over time and wanted to respect folks' afternoon. In adjourning the meeting, Christina noted that the next HFWC meeting is the annual conference on Tuesday, December 16 and the theme is *Water Considerations in a Developing Watershed*. Christina invited ideas for speakers, panels, and panelists.