MONTANA OPERATIONS AT LIBBY AND HUNGRY HORSE DAMS

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Northwest Power and Conservation Council

Montana Fish, Wildlife & Parks

The Confederated Salish and Kootenai Tribes of the Flathead Reservation

Forward

This paper reviews the development and status of operations at Libby and Hungry Horse dams (Montana Operations), and related operations at Selis Ksanka Qlispe (formerly Kerr) Dam that affect Flathead Lake, the largest fresh water lake in the western United States.

This history describes how these operations evolved over time to address the dams' effects on the ecosystem, communities, and natural resources. It addresses operational changes responding to Endangered Species Act listings that occurred in 1991-2000, as well as biological opinions issued by the National Oceanic Atmospheric Administration (NOAA) Fisheries and the U.S Fish and Wildlife Service, and fish and wildlife recovery programs adopted by the Northwest Power and Conservation Council. It reviews current Montana Operations and recommends improvements to increase benefits from basin dam operations. A technical appendix contains a more detailed explanation of the current Montana Operations.

Credits and copies

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Flathead Lake

Executive summary

Located in northwestern Montana, Libby and Hungry Horse dams provide about 40 percent of U.S. water storage in the Columbia River Basin. During the last two decades, operations at these dams have changed to reduce their negative effects on ecosystem function and fish populations in the reservoirs and rivers immediately downstream of these Montana dams.

Prior to these changes, these headwater dam operations significantly altered the natural river hydrography by storing water during spring runoff to manage flooding, and then releasing water, primarily during the fall and winter, to produce electricity.

The Montana Operations allow the flows on the Kootenai River and South Fork of the Flathead, for the first time since dam construction, to better resemble a more natural river hydrograph during spring through fall, a period critical for a healthy aquatic community. Although these changes enhanced fisheries productivity, dam operations continue to change the magnitude and seasonality of the hydraulic cycles and so fail to achieve full ecological functionality, particularly associated with the riparian community.

Dam managers made these operational changes while maintaining effective local and system-wide flood risk management and providing multiple benefits from two of the Columbia Basin's highest elevation storage projects.

Benefits include:

- Hydropower production at both dams, and more importantly, all downstream dams

- Improved productivity in the Kootenai and Flathead rivers
- Assisting migration and recovery of endangered salmon and steelhead in the lower Columbia Basin
- Reducing winter drafts of both reservoirs, providing more stable reservoir ecosystems and increasing the likelihood of reservoir refill during summer, which is important for fish and wildlife, recreation, and other uses.

Future changes to the operation of the 14 federal multipurpose dams in the Columbia Basin, including Libby and Hungry Horse dams, could come from a comprehensive review by the agencies that manage dam operations and revisions to the Columbia River Treaty between the United States and Canada. As with the Montana Operations, the upcoming negotiations will likely expand on previous efforts to minimize harm to the ecosystem while ensuring the benefits from the dams.

History of operations at Libby and Hungry Horse Dams

Early dam operations (pre-1995)

Prior to the NOAA Fisheries ESA listings of Columbia and Snake River salmon and steelhead and U.S. Fish and Wildlife Service's listings of Kootenai white sturgeon and bull trout, both Libby and Hungry Horse dams were primarily managed to optimize power generation and for flood control. During this pre-listing period, operators often deeply drafted both reservoirs, increasing the likelihood they would not refill. In addition, harmful and erratic dam discharges often resulted from load following hydropower operations and flood management. Load following hydropower generation adjusts power output as demand for electricity fluctuates throughout the day. This causes rapid changes in river flows and water levels below the dams over a period of several hours. These operations, which drastically altered the natural river hydrograph, were harmful to resident fish and wildlife below and above the dams. They also hurt local economies and communities that rely on higher and more consistent reservoir elevations during the summer and fall.

Operational changes responding to the early ESA listings (1995-2000)

In response to the Snake River sockeye and Chinook ESA listings in 1991 and 1992, and related litigation, NOAA Fisheries issued a 1995 biological opinion (BiOp) that called for spring and summer releases from Libby and Hungry Horse dams to augment flows in the lower Columbia River. The agency designed the flows to aid the downstream movement of young salmon smolts. It called for a 20-foot draft from full pool at both Montana dams by the end of August, which adversely impacted resident fish growth during the critical period, summer and fall. Salmon managers shifted most of this draft into late August to increase late summer flows in the lower Columbia River for one of the ESA listed salmon, Snake River fall Chinook that migrate out of the system in June-August. The resulting unnatural pulse in dam discharge during late-August was extremely

Photo courtesy U.S. Bureau of Reclamation damaging to resident fish downstream of Montana's dams.

Prior to the release of the 1995 BiOp, Montana Fish Wildlife & Parks and the Confederated Salish Kootenai Tribes developed integrated rule curves for Hungry Horse and Libby dams, providing adjustable drawdown and refill targets based on water supply forecasts. Research and modeling showed that biological production in the reservoirs would improve by limiting maximum annual drawdown, improving reservoir refill, and maintaining the reservoirs at or close to full pool during the productive summer months. The Northwest Power and Conservation Council included the integrated rule curves in its amendments to its 1994 Columbia Basin Fish and Wildlife Program. Also that year, the U.S. Fish and Wildlife Service listed the Kootenai River White Sturgeon as endangered, followed by the bull trout listed as threatened in 1998.

In 1997, Montana filed suit against the U.S. Army Corps of Engineers and the Bureau of Reclamation for failing to use the integrated rule curves in their operation of Libby and Hungry Horse dams. In 1999, the Montana federal district court granted summary judgment in favor of Montana that these agencies violated the 1980 Northwest Power Act by not following the Council's plan as required by 16 USC 939b(h)(11)(A)(ii).

By the late 1990s, using the integrated rule curves as a starting point and working directly with Montana Fish Wildlife & Parks, Confederated Salish Kootenai Tribes, Idaho, and the Kootenai Tribe of Idaho, the Corps created the VarQ (variable discharge) flood control protocol. Operators now use the VarQ flood management strategy at both Libby and Hungry Horse dams to avoid drafting too much water for spring flood management in the mid-range water years.

Sturgeon photo courtesy Tony Grover

VarQ maintains the same benefits as standard flood control management, but releases less water, which improves the chance the reservoir will refill. When the reservoir fails to refill (due to error in water supply forecasts), the reservoirs fill closer to full pool than under the earlier Corps rules. Summer refill is important for local economies and vital to the reservoir and the basin-wide ecosystems.

The 2000 U.S. Fish and Wildlife Service and NOAA Fisheries Biological Opinions

In 2000, VarQ was included in NOAA Fisheries' BiOp for ESA-listed salmon and steelhead and the U.S. Fish and Wildlife Service's BiOp on bull trout and Kootenai sturgeon. Operators implemented VarQ on an interim basis at Hungry Horse and Libby dams by 2003, while a comprehensive environmental impact statement was being prepared. Operators adopted VarQ at both dams by 2009 after the environmental impact statement concluded that VarQ provided ecosystem benefits while maintaining the same benefits as standard flood control management. The Corps found that VarQ operations increase Koocanusa's reservoir elevation in winter (up to 45 feet higher depending on water supply forecast) and increases refill reliability.

The 2000 BiOps require dam operators to implement ramping rates to reduce flow fluctuations below the two dams. Ramping rates greatly reduce the hourly and daily swings in flows that are harmful to downstream resident fish.

The BiOps also require instream flow requirements for threatened bull trout in the river below each dam. The 2000 U.S. Fish and Wildlife Service BiOp, which was specific to sturgeon and bull trout, drafted Koocanusa Reservoir during late May through June to increase flows in the Kootenai River to help sturgeon move up to a more productive spawning area upstream from Bonners

Ferry, Idaho. Montana Fish Wildlife & Parks was integral in first formulating a sliding-scale, tiered flow pulse for sturgeon, based on reservoir inflow forecasts. This spring pulse extends into the reservoir refill period, so it would have made it difficult to achieve refill, if not for VarQ, which helps improve reservoir refill while providing a more natural spring pulse for Kootenai sturgeon, followed by stable or gradually declining summer river flows for bull trout rearing.

The combination of the spring pulse, and the late summer release of reservoir water to augment flows for lower river salmon, caused river flows to peak twice. This unnatural double peak floods and then dewaters the riverbed and banks, virtually eliminating riparian habitat and food organisms needed by fish and wildlife. It also occurred during the most biologically productive summer months, magnifying the ecological impact.

The 2003 Northwest Power and Conservation Council Mainstem Amendments

In response to the harmful effects of the double peak on Montana resident fisheries, the Northwest Power and Conservation Council adopted amendments to its Columbia River Basin Fish and Wildlife Program in 2003 to mitigate these impacts, while maintaining summer flows for downstream salmon. In addition to supporting VarQ, and tiered flows for sturgeon and flow requirements for bull trout, the Council's mainstem amendments eliminated the double peak and reduced negative impacts to resident fisheries:

- Summertime drafting of both reservoirs was extended through September 30
- The volume drafted was reduced to 10 feet from full pool during the wettest 80 percent of the water years
- In the driest 20 percent of the water years, the draft can increase to 20 feet from normal full pool (elevation 3560 at Hungry Horse and 2459 at Libby) by the end of September
- Most importantly, the summer operations strategy stabilized flows throughout the productive summer months (eliminating the double peak). This was achieved by making small changes in flows as the summer progresses and inflows to the reservoirs change.

2006 Libby U.S. Fish and Wildlife Service and 2008 NOAA Fisheries Biological Opinions

2008 NOAA Fisheries BiOp

It took five years before the federal agencies implemented the Council's mainstem amendments. They were finally included in the 2008 NOAA Fisheries BiOp on salmon and steelhead, ending nearly a decade of harmful double peak flows to resident fish in Montana.

By 2009, the full suite of Montana Operation measures was implemented at Libby and Hungry Horse dams. NOAA originally adopted the 2003 mainstem amendment measures as experimental in their BiOp. Since then, the Montana Operation has become routine and is no longer experimental.

Montana conducted research on resident fish productivity and growth as recommended by the Council's 2003 Fish and Wildlife Program, which was funded by the Bonneville Power Administration. Research showed that the more stable flows during the summer and early fall months were beneficial to the entire riverine environment. Organisms living on the riverbed are critical to a healthy ecosystem and were more prolific when the double peaking operation ceased and river habitat remained wet. The improved ecosystem conditions help resident fish populations, both threatened and non-threatened, to be more productive and abundant.

Researchers did not conduct experiments to assess potential impacts to Snake River fall chinook because independent scientific reviewers determined that the flow changes associated with flow augmentation below McNary Dam were too small to induce detectable or measurable biological responses in the targeted ESA species (see ISAB reports 97-3, 2004-2, 2003-1).

2006 U.S. Fish and Wildlife Service Libby BiOp

As a result of a 2008 settlement of a legal challenge by the Center for Biological Diversity to the U.S. Fish and Wildlife Service's 2006 BiOp on Libby Dam's impact on sturgeon, experimental spill tests were required at Libby Dam to see if it could trigger sturgeon spawning success in the Bonner's Ferry area. The settlement's spill test was designed to evaluate if increased spring spill would encourage adult sturgeon to migrate farther upstream to spawn in known suitable habitats located upstream of the Moyie River confluence. The experimental spill allowed up to 10,000 cubic feet per second to be released through the dam spillway during spring high flows (when side streams are also contributing to Kootenai River flows), in addition to the dam operating at full turbine output (27,000 cfs), for a total of up to 37,000 cfs discharge from Libby Dam. Operators conducted spill tests from 2010 to 2012.

Montana recommended limiting the spill test. High volumes of spill forces air into the water causing gas supersaturation levels that exceed Montana's water quality standards for total dissolved gas (110 percent), causing gas bubble disease that harms resident fish populations.

The experimental spill tests significantly exceeded Montana's TDG standards, requiring a temporary waiver of the 110% standard during the test. The experimental spills in 2011 and 2012 also coincided with very high spring flows in the Kootenai River. The test spills, along with the unusually high rain, resulted in some cropland saturation and flooding along the Kootenai River and surrounding Kootenay Lake, a natural lake on the Kootenai River that begins north of Creston, British Columbia. The experiment concluded that spill did not improve sturgeon spawning response or success.

Kootenay Lake, photo courtesy flickr.com/photos/dczwick

Present Montana operations

In the early 1990s, Montana began to address the impact of Libby and Hungry Horse dam operations on the ecosystem. This concern was based on historic reservoir operations that maximized hydropower output and implemented a strict form of flood management. Those operations significantly harmed resident fish populations with deep reservoir drafts, refill failures, and load following hydropower operations that destabilized flows downstream of the dams.

Starting with the 1995 NOAA BiOp, and continuing through a series of federal court-approved BiOps adopted by NOAA (for salmon) and the U.S. Fish and Wildlife Service (for Kootenai white sturgeon and bull trout), new measures were developed to maintain effective flood control, while mitigating the impact on ESA-listed and non-listed resident fish species and improving the likelihood of fuller reservoirs in the productive summer months.

Foremost among these measures is VarQ flood control, made permanent at Libby and Hungry Horse in 2009 with the completion of environmental impact statements by the U.S. Army Corps of Engineers and the Bureau of Reclamation. Libby and Hungry Horse dams are the only dams in the Columbia Basin that have implemented VarQ flood management operations. All other federal flood storage reservoirs in the basin use Standard Flood Management, although the Selis Ksanka Qlispe Dam uses operations similar to VarQ.

The measures in the U.S. Entity's Regional Recommendation on modernizing the Columbia River Treaty include support for VarQ at Libby and Hungry Horse dams and its emphasis on balancing ecosystem function with the multiple purposes of these large headwater storage projects.

Today, operators employ the sturgeon spring pulse, based on the tiered flow strategy, to encourage sturgeon migration upstream above Bonners Ferry to better spawning habitat. The Kootenai Tribe of Idaho is building a series of pools through the braided reach of the Kootenai River near Bonners Ferry to improve sturgeon passage upstream.

In 2016, this work resulted in the first documented adult spawning female to migrate into Montana. Whether the sturgeon spring pulse (and other measures) will be successful in encouraging sturgeon to successfully migrate and spawn is a question that the U.S. Fish and Wildlife Service will reassess when the Libby BiOp expires in 2018.

In 2016, the measures included in Montana Operations – the implementation of VarQ, controlled ramping rates, the spring tiered flow below Libby Dam for sturgeon, elimination of the double peak, instream flows for bull trout, 10 to 20 foot reservoir drawdown at the end of September – has resulted in greatly improved ecosystem function in the reservoirs and rivers downstream of these two headwater dams.

Despite these improvements, operations at these dams continue to have serious negative environmental, social, cultural, and economic impacts. The Libby and Hungry Horse storage projects devastated a very large landscape, inundating huge valleys, and disconnecting extensive riparian floodplains from river channels. High winter flows negate most of the riparian benefits associated with current operations at both facilities. Koocanusa Reservoir can still experience drafts of 80 to 122 feet, leaving miles of mud flats and steep denuded shorelines extending for 90 miles. Hungry Horse Reservoir refills are more consistent than Libby Dam refills because of how operators implement the sturgeon pulse on the Kootenai River.

Future potential changes to Columbia Dam operations

Both BiOps expire in 2018

The 2008 NOAA BiOp expires in 2018, and the 2006 U.S. Fish and Wildlife Service Libby BiOp was to expire in 2016, but has been extended to 2018 to coincide with the expiration of the NOAA BiOp.

Following a federal court order, the Action Agencies (Bonneville Power Administration, U.S. Army Corps of Engineers, and Bureau of Reclamation) are initiating a comprehensive environmental impact statement on Columbia River System Operations that they expect to finalize in 2021.

This EIS will look at alternative ways to operate the 14 federal multipurpose dams (including Libby and Hungry Horse dams) that operate as a coordinated system in the Columbia Basin. The last operational review on the federal Columbia dam system was in 1997, and a lot has changed in two decades.

Climate change science also signals that more change is coming: low elevation runoff is already commencing earlier; extreme weather events are becoming more frequent (Calgary 2013 flood and 2012 Kootenai River flood); and the Columbia Basin's climate and rivers are warming.

Columbia River Treaty changes

The Columbia River Treaty (CRT) authorized three dams in British Columbia (Mica, Arrow, Duncan) and Libby Dam in Montana. Under the terms of the Treaty, 8.95 million-acre feet of the new Canadian storage is operated first for flood control in Canada and the United States. This assured storage expires in 2024 and the U.S. Department of State has approved moving forward with treaty negotiations with Canada on revisions and modernizations to the treaty. The question of post-2024 flood storage arrangements with Canada is a central issue in upcoming negotiations, with direct implications for future Libby and Hungry Horse dam operations. (There are many other important issues at play in upcoming treaty negotiations, besides the issue of future assured storage in Canada.)

Transboundary concerns

When the United States began to alter Libby Dam operations in the mid-1990s to comply with BiOp requirements for salmon and Kootenai sturgeon, Canada complained that this was a violation of the Columbia River Treaty because it resulted in a loss of downstream power benefits to Canada.

While the United States disagreed with Canada's interpretation of the treaty, to resolve the matter, the United States agreed to the 2000 Libby Coordination Agreement, which compensates Canada for lost hydropower.

Later, Canada also objected to VarQ operations at Libby Dam because it also reduced hydropower output at downstream Canadian dams. VarQ and other Montana

Operation strategies also benefit fisheries and residents in the Canadian portion of Koocanusa Reservoir and Canadian fisheries on the Kootenai River below Libby dam. Fisheries include bull trout, westslope cutthroat trout, redband trout, burbot, and Kootenai white sturgeon, which Canada listed as a species at risk in 1990.

While again not agreeing with Canada's interpretation of the treaty, in 2013 the United States agreed to provide Canada compensation on a short-term basis as a supplemental agreement to the Libby Coordination Agreement. The Libby Coordination Agreement expires in 2024, but either country could terminate it on 30 days' notice. The VarQ compensation agreement could be similarly terminated on 30 days' notice.

There was also a concern by some in Canada that VarQ operations harmed river diking infrastructure upstream from Kootenay Lake. A 2012 study commissioned for the B.C Ministry of Energy and Mines, however, concluded that VarQ did not have a significant negative effect on diking infrastructure in British Columbia upstream from Kootenay Lake. Instead, it found that operating Libby Dam for load following significantly affected the diking infrastructure. By implementing ramping rates and other BiOp requirements in the late 1990s, operators discontinued load following operations.

The British Columbia communities most affected by the four dams constructed under the Columbia River Treaty formed the CRT Local Government Committee, and issued its recommendations to the British Columbia and Canadian Governments in 2013.

Their report refers to the reservoirs created by the four treaty dams as industrial reservoirs. It strongly supports options to reduce their negative effects and support ecosystem health as a priority in the treaty.

Montana has been a leader in ensuring that storage reservoirs are operated with equitable consideration to ecosystem function, reducing impacts to resident fisheries, and improving the likelihood of full reservoirs for recreation and multiple use. In that regard, Montana and the Local Government Committee share some common interests (see recommendations).

The NEPA EIS analysis should fully examine water quality issues affecting the Koocanusa Reservoir when evaluating operational alternatives. Montana is concerned about elevated levels of mining contaminants like selenium, nitrogen, and sulphate in the Elk River, a major tributary of the Kootenay that empties into Lake Koocanusa, affecting fish and wildlife health and recovery efforts. Of principal concern is selenium, an element that can kill fish embryos and aquatic insects, and other heavy metals that accumulate in the food web.

A 2008-2013 study found that all seven species of fish in Koocanusa Reservoir show increasingly elevated selenium levels. The five coal mines in the Elk River Valley are expanding and are expected to discharge additional contaminates into the ecosystem. Teck Coal is the world's second largest exporter of metallurgical coal. Montana has ongoing concerns that water quality standards for selenium and nutrients (nitrates) may have already reached unsafe levels. A 2014 report by researchers from Wake Forest University concluded that further increases in selenium contamination would likely cause the Elk River's valuable cutthroat trout population to collapse.

Water quality issues are of importance to both Montana and BC. A 2010 agreement between the governor of Montana and the premier of British Columbia averted a similar fate to the North Fork of the Flathead, the next valley to the east, and Montana's most pristine river. The North Fork River forms the western boundary of Glacier National Park from the international border to its confluence with the main Flathead River, above Flathead Lake. Following this handshake agreement between the two neighbors, the B.C. provincial government stopped mining in the North Fork drainage of the Flathead River and the U.S. Congress passed the North Fork Watershed Protection Act in 2014, banning mining and drilling on the United States portion of the North Fork drainage. It is a superb example of cross-border cooperation (see news articles 1, 2, and 3)

Recommended improvements to Libby and Hungry Horse dam operations

For more than two decades, incremental improvements have been made to Libby and Hungry Horse dam operations to reduce their harm to the ecosystem. More needs to be done to meet the ESA requirements and Northwest Power Act mitigation obligations. Areas for future improvements include, improved refill probability at Koocanusa Reservoir and modified river flows to promote natural regeneration of the riparian floodplain community.

Citizens on both side of the border would like to improve Koocanusa Reservoir's annual refill, while also avoiding spill over the dam and flooding of downstream communities. Refill is more complicated at Libby Dam than at Hungry Horse Dam because of the added operation measures to protect the endangered Kootenai white sturgeon. The better the sturgeon measures are implemented and integrated into the overall operations, the greater likelihood that Koocanusa's refill success will improve and more resemble Hungry Horse Dam's refill success.

Libby Dam recommendations

1. Sturgeon tiered flows and the VarQ discharge protocol should be modeled as one volume, as was originally designed by MFWP in 1996. When the mandatory VarQ discharge protocol is not merged with the volume released for sturgeon tiered flows, Lake Koocanusa refill is reduced to about **12% of all years**. This is a policy problem, not a modeling problem. The underlying cause is that the Corps has to consult with USFWS for the sturgeon operation, but not for the VarQ flood control operation, so the two operations have been modeled separately. As a consequence, the two release volumes are counted separately and additively. The consequence of the two release volumes being counted **additively** is that it increases spring discharges (increases the draft of the reservoir) and contributes to the lack of reservoir refill success.

2. Another recommendation relating to spring discharges and reservoir refill success are adjustments to the sturgeon tiered flows, so these tiers reflect the original intent of MFWP in 1996. The sturgeon tiered flows changed before the 2000 USFWS BiOp was finalized. The USFWS increased the volume in the highest tier, and they lowered the trigger points (inflow forecast thresholds) between the tiers. This causes two problems. First, the volume in the highest tier was originally designed to be less than the next tier down, because unregulated sideflows are high in wet years, and less storage needs to be released to meet discharge targets at Bonners Ferry. As currently implemented, the larger volume in the highest tier increases the chance that an unpredicted precipitation event will result in

premature refill and spill (increasing the risk of flooding at Libby, Bonners Ferry and Kootenay Lake). Second, lowering the thresholds separating the tiers, results in higher discharge volumes at lower water supplies, which further impacts reservoir refill. Therefore the original threshold amounts separating the tiers as proposed in 1996 should be considered for implementation. In addition, half of the sturgeon tiered flow volume should be released before the end of May (during high water years, existing tiers 4 and higher). This strategy would reduce the potential for premature reservoir refill, which results in spill and possible flooding downstream (such as the shoreline of Kootenay Lake).

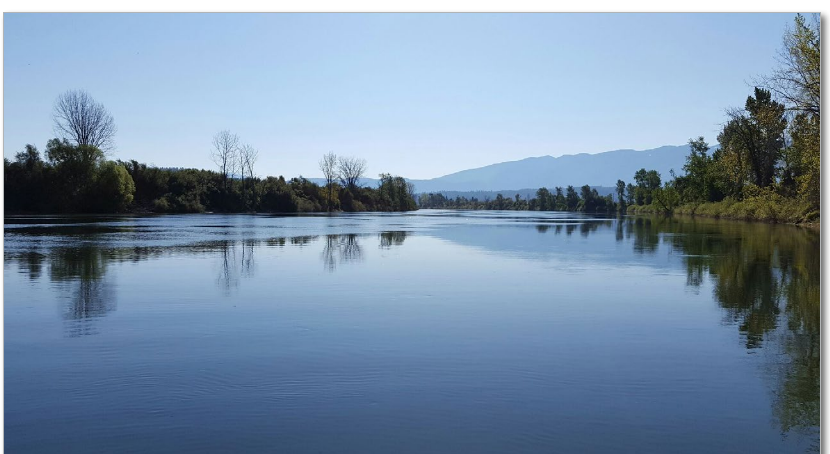
3. The variable end-of-December draft point at Libby Dam should be further relaxed in less than average water years. As currently implemented, when Libby Dam is drafted before January 1, and the inflows are less than predicted, the reservoir remains below the elevation targets, just to maintain the established instream flow requirements downstream. Conversely, if inflows exceed predictions, operators have over three months to compensate (release more water) before spring runoff commences. The Columbia River Treaty's Modeling Iteration 3E scenario adjusted the variable end-of-December draft point at Libby Dam. The current operation adjusts linearly from elevation 2426 in dry years to 2411 in wet years. Iteration 3E was designed to reduce drawdown to 2430 in dry years (and adjust to the original 2411 in wet years). Analysis showed that reservoir elevations could be safely increased by up to four feet (elevation 2430) in dry wateryears (driest 20th percentile). This would increase the effective volume of flow augementation during dry years.

4. Continue to implement stable or gradually declining Kootenai River flow after spring runoff. This operation is beneficial to fish and their habitat, and facilitates limited regeneration of riparian vegetation. Successful regeneration of riparian vegetation can be significant in years following a high spring runoff. However, much of that new growth is subsequently destroyed by high winter flows. Maintaining lowered winter flows in years following high spring runoff would aid in the establishment of riparian vegetation with positive benefits to aquatic and terrestrial communities and help achieve goals developed for operational mitigation.

Hungry Horse Dam recommendations

1. System modeling revealed that the current VarQ operations at Hungry Horse Dam can be improved in slightly above average and below average wateryears by further reducing reservoir draft and by using improved coordination among headwater storage projects. Improving reservoir refill probability during dry years will improve reservoir productivity and help meet reservoir storage criteria and biological constraints in the CSKT Water Compact.

2. The existing instream flow requirement at Columbia Falls adjusts from 3,200 cfs to 3,500 cfs based on water availability. Retain this sliding scale approach during summer and fall (mid-June through September), but increase this minimum flow in high water years to 5000 cfs and adjust linearly down to 3,200 cfs in the driest water years to benefit bull trout and other native fish species. Thus, during summer and fall, when reservoir storage is drafted for anadromous flow augmentation (10 to 20 ft from full pool depending on water supply), river flows should remain stable or gradually declining



Kootenai River near Bonners Ferry, photo courtesy Mark Don McInnes after the spring runoff and stabilize at a minimum of 5,000 cfs during high water years.

3. Maintain lowered winter flows in years following high spring runoff to aid in the establishment of riparian vegetation with positive benefits to both aquatic and terrestrial communities.

Recommendations for Libby Dam and Hungry Horse Dam

1. At Libby and Hungry Horse Dams, the trigger for summertime flow augmentation for anadromous fish recovery (10 or 20 ft from full pool depending on water supply) should be based on site-specific reservoir inflows (as originally designed), not flows at The Dalles. The dry year operation should be triggered by site-specific inflows because water supplies in the subbasins vary independently (can by higher or lower) than the mainstem Columbia River.

2. System modeling revealed that the current VarQ operation can be improved in slightly above average and below average wateryears by further reducing reservoir draft and by using improved coordination among headwater projects. Similar "sliding-scale" rule curves should be considered at other reservoirs throughout the Columbia Basin, where appropriate, so that dry subbasins are drafted less to preserve local ecosystem functions, and wet subbasins are drafted deeper for local and system flood control.

3. Montana supports continued use of VarQ (including improvements in implementation) at Libby and Hungry Horse dams to incorporate ecosystem function as a primary driver with flood management, hydropower and other multiple uses these large headwater storage projects provide, as recommended in the U.S. Entity's Regional Recommendation for modernizing the Columbia River Treaty.

4. Montana also supports the provision contained in the U.S. Entity's Regional Recommendation calling for a public process to assess potential changes to the current level of flood risk protection in the Columbia River Basin, including evaluating all cost-effective actions to manage high flow events especially in the lower basin, including reconnecting flood plains. Any changes in flood control management that may arise from this process could reduce the current flood management demands on Libby and Hungry Horse dams, with corresponding benefits to headwater reservoir operations and downriver ecosystems.

5. Revise the Dry Year Operation at Hungry Horse and Libby dams during the driest 20th percentile wateryears. Move the control point for triggering Dry Year Operations from The Dalles to the project-specific inflow forecasts for Hungry Horse and Libby dams. Amend the dry year protocol to adjust summertime flow augmentation incrementally based on observed water supplies. Replace the existing end-of-September reservoir draft targets with a sliding-scale discharge volume, shaped to mimic natural river flows. Forecasting error would then result in a verifiable deviation in reservoir surface elevation, as opposed to unnatural short-term fluctuations in river stage during the productive summer and fall months.

6. Experiment with modified winter flows that could promote survival of riparian plant communities that are establishing as a result of summer operations, but are subsequently being destroyed by high winter flows.

Technical Appendix: Detailed explanation of current Montana operations

Pre-Dam River Hydrology Compared to Post-Dam Hydrology

Prior to dam construction, the Columbia River and its tributaries flowed unimpeded. The natural flow regime for the Kootenai River was snowmelt-dominated, with a sustained peak in late spring (which peaked between late May through early June), followed by a gradual recession to base flow by September, and low winter flows. As illustrated by Figure 1, headwater storage projects, including Hungry Horse and Libby dams, upended this discharge pattern by storing water during the spring runoff to prevent flooding and releasing water to generate electricity, primarily during the fall and winter when flows were naturally low.

Under natural conditions, river flows during the low flow period were relatively stable and the shoreline affected by flow fluctuation (called the varial zone) was a narrower band than observed since flow regulation began. The nearshore habitat provides food and security cover for fish and wildlife. High and variable springtime river flows flushed fine sediments from river gravel creating spaces between the stones (called interstitial habitat) for insects and juvenile bull trout. High flows each spring maintained complex river channels and cleansed fine sediment from the riverbed gravel, improving conditions for fish spawning. Fine sediment flushed from the river bottom was deposited on the river margins providing a fertile medium for native riparian plants. Spring scouring and sediment deposition resulting from high spring flows are essential for seedbed preparation, particularly for cottonwoods. Riparian vegetation withstood annual flooding or reestablished seasonally, providing secure habitat along river margins and floodplains, reducing erosion of silt into the river. Deltas that form at the mouths of tributary streams were swept away annually, improving fish passage to critical spawning habitat in the headwaters.

Dam operations cause fluctuating or abnormally frequent high discharge events that disrupts this natural floodplain process. Unnaturally low spring water levels alter vegetation and habitats associated with riverine meanders, side-channels, and floodplain. High and variable winter flows scour recently established seedlings and limit the potential range of elevations for successful cottonwood and willow recruitment (Jamieson and Braatne 2001; Suchomel 1994).

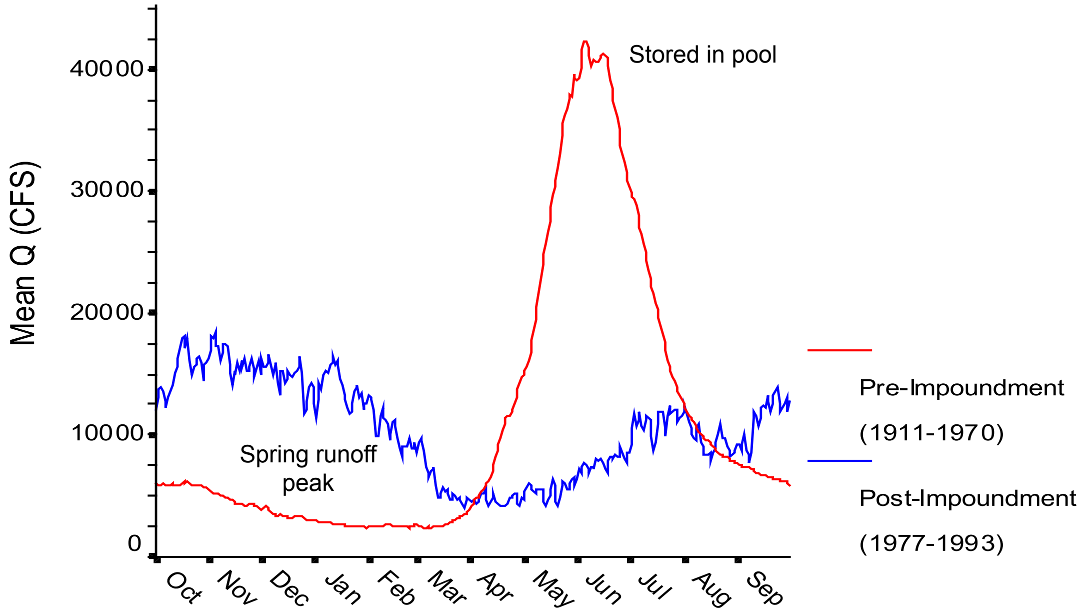


Figure 1. Example of flow regulation below headwater storage projects. These data compare mean daily flows in the Kootenai River prior to impoundment by Libby Dam (1911-1970) and regulated flows post-impoundment (1977-2001) in cubic feet per second (cfs). Spring flows were higher, and winter flows lower, prior to impoundment

Montana operations at Libby Dam

December draft

Each year, the operation of Libby Dam begins on October 1 and extends through September 30 (called the water year). The fall operation leading up to the December draft includes operating to instream flow requirements, restrictions on river flow fluctuations (ramping rates), and possible flood control limitations.

The Corps forecasts runoff volumes beginning in December. The Corps uses this forecast to determine the end-of-December elevation for Koocanusa Reservoir that they believe is sufficient to manage floods during spring runoff (typically peaks in late May or early June). In water years where the December forecast for April through August is greater than 5.9 million acre feet of water (MAF), the end-of-December draft elevation will be 2,411 feet, which equates to 2 MAF of evacuated storage space. When the forecast is between 5.5 and 5.9 MAF, the end-of-December draft target is less, based on a sliding scale between elevation 2,411 feet and 2,426.7 feet. If the December forecast for April-August is 5. 5 MAF or less, the end-of-December target elevation is 2,426.7 feet.

VarQ implemention

The VarQ reservoir elevation targets are recalculated each month as new Corps water supply forecasts become available and outflows are adjusted accordingly. VarQ stands for variable discharge. It adjusts the wintertime drawdown in proportion to the forecast inflow and then continuously regulates outflows in response to the observed inflows. If the VarQ operating procedures require discharges greater than powerhouse capacity, spill from Libby Dam will occur. Spill causes gas supersaturation in the Kootenai River downstream, which can harm fish and the insects fish eat. Montana's water quality standard is exceeded when dissolved gas is higher than 110 percent (called supersaturation). The intent is to adjust Libby Dam discharge to maximize reservoir refill probability and minimize the potential for spill.

After the winter draft, Libby Dam outflows are often reduced to 4 kcfs, the lowest instream flow requirement, to keep the reservoir as full as possible to accommodate upcoming needs: spring flow augmentation for Kootenai white sturgeon immediately downstream; salmon migration in the lower Columbia River during summer; resident fisheries requirements; summer recreation on Koocanusa Reservoir; hydropower production, etc.

Koocanusa Reservoir is drafted during January through March (into April if the start of refill has not been declared) according to the VarQ flood risk management storage reservation diagram. During the refill period from about mid-April through July, Libby Dam will release flow in accordance with VarQ flood risk management operating procedures at Libby Dam. During the refill period, adjustments can be made to reduce the VarQ discharge to protect human life and safety. During the final stages of refill, the refill date is adjusted to retain some storage space until inflows decline to within the maximum turbine capacity to avoid filling the reservoir prematurely, which would result in spill. The reservoir refills as close as possible to the full pool elevation, which occurs more easily during high water years.

Sturgeon tiered storage pulse (late Spring)

Libby Dam releases a pulse of water during late May through June to provide flows for Kootenai white sturgeon spawning in the Bonners Ferry area (called sturgeon tiered flows, which vary annually based on water supplies). Libby Dam provides water for sturgeon spawning and egg incubation using the tiered flow strategy described in the USFWS 2006 BiOp (Figure 2). The volume to be released for sturgeon is determined based on the May inflow forecast. The volume of water for sturgeon spawning is measured as the flow above the instream flow requirement of 4000 cfs for bull trout (and thus bull trout instream flows are also accounted for under this tiered flow approach). Annual implementation of this tiered-flow strategy begins when the USFWS determines benefits to conservation of sturgeon are most likely to

VarQ explained

VarQ is a modified flood risk management (FRM) operation first implemented in the early 2000s at Libby and Hungry Horse dams in Montana. In years when the seasonal water supply volume forecast is in the mid-range water years (80 percent and 125 percent of average runoff), VarQ allows more water to remain in the reservoir during early spring for multiple uses during the late-spring, summer, and fall. VarQ allows more reliable spring and summer flows for fish while also providing higher reservoir elevations in the summer. By design, VarQ does not compromise the flood risk management requirements, locally or for the Columbia system, and provides the same level of flood protection as was possible under the older flood protection procedure (standard FRM).

VarQ allows the Kootenai and Flathead rivers downstream of the dams to more closely mimic a spring rise and gradual decline in stream flows from summer through early fall, which benefits fish, wildlife, and their habitat. It allows more water to remain in Koocanusa and Hungry Horse reservoirs prior to the spring, reducing the likelihood of deep reservoir drawdowns and improving the likelihood of reservoir refill in summer. In short, it benefits both upstream and downstream ecosystems. In the Kootenai, this helps ESA-listed Kootenai white sturgeon that are found between Kootenai Falls and Kootenay Lake in British Columbia and whose survival is a priority for both countries. It also benefits populations of native bull trout, burbot, redband trout, and westslope cutthroat trout populations in the reservoirs and rivers downstream.

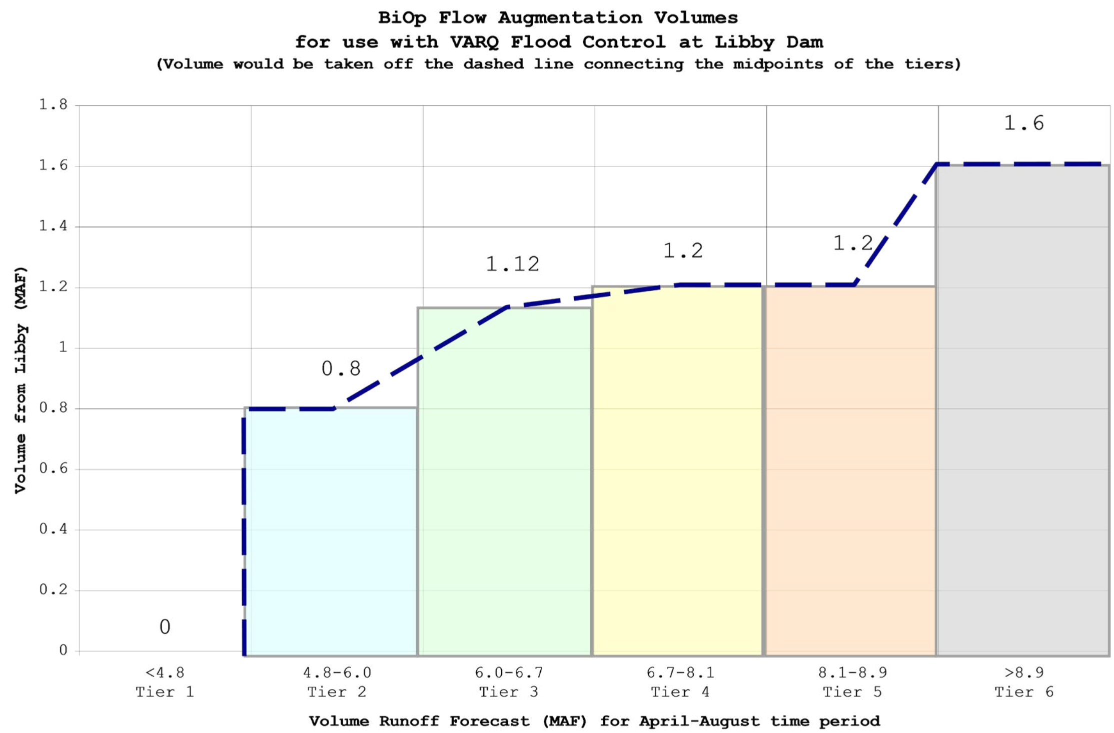


Figure 2. "Tiered" volumes of water for sturgeon flow enhancement to be released from Libby Dam according to the Libby May final forecast of April–August volume. Actual flow releases are shaped according to seasonal requests from the USFWS and in-season management of water actually available.

occur. Sturgeon flows are generally initiated between mid-May and the end-of-June to augment natural runoff from tributiaries entering the Kootenai River downstream of Libby Dam, consistent with the current version of the Kootenai River Ecosystem Function Restoration Flow Plan Implementation Protocol, the USFWS 2006 BiOp and applicable clarifications.

A selective withdrawal system, installed at Libby Dam in 1972, allows dam operators to control the discharge water temperature to benefit resident fish in the Kootenai River. Water temperature profiles in the reservoir are monitored near the dam starting in April and continue through fall to coordinate discharge temperatures and flow augmentation for sturgeon spawning and rearing. Selective withdrawal systems at Libby and Hungry Horse dams allow operators to control the dam discharge temperature and mimic the natural annual temperature cycle. Natural river temperatures increase fish food production and acclerate growth.

Implementation of 2003 Mainstem Amendments, ramping rates, and instream flows

Flows from Libby and Hungry Horse dams are planned in June for the remainder of the summer and through September 30. Summer operations are coordinated through a Technical Management Team (TMT) and dam operators who periodically adjust dam operations as the summer progresses to accommodate the substantial uncertainty in water supply forecasting. After the sturgeon pulse, flows typically remain stable or gradually declining during the July through September period. This improves river productivity for resident fish in Montana and Idaho, while flows are augmented for anadromous fish in the lower Columbia

River. It also helps promote regeneration of native riparian communities in the varial zone.

Montana's reservoirs are drawn down during summer, to the elevation targets called for by the NOAA BiOp. The intent is to augment flows in the lower Columbia River to speed the downstream migration of young ESA-listed Snake River fall Chinook salmon. Initially, this flow augmentation strategy attempted to maximize river flows during late August, which caused an unnatural double peak immediately downstream of headwater dams that harmed resident fish.

Since 2008, the Mainstem Amendments reduced resident fish impacts by modifying the summer drawdown (eliminating the "double peak") and by minimizing fluctuations in river flows. Ramping rates were implemented to limit the hourly and daily changes in water discharges from the dams. (2006 USFWS BiOp, shown in Table 1).

Typical Summer Operations (Non Dry Year): The summer draft at Libby and Hungry Horse dams is limited to 10 feet from full pool by the end of September in the wettest 80 percent of the water years.

Dry Year Operations. In the driest 20th percentile water years, Libby and Hungry Horse dams can be drafted to 20 feet below full pool by the end of September. The current Biop uses the lowest 20th percentile water years at The Dalles Dam, using the May final runoff volume forecast for April-August. If The Dalles forecast is less than 72.2 MAF, a 20 foot draft by the end of September is planned for both Montana reservoirs. The last two times Dry Year Operations were triggered were in 2010 and 2015.

Montana has argued that the target elevations for Libby and Hungry Horse reservoirs at the end of September are just that "targets." A specific elevation can be very difficult to achieve on a specific day due to uncertainties in weather, runoff volumes and inflows. Because of this, the exact elevations on September 30th are approximate. Recently, there has been less pressure to reach these targets exactly, which minimizes large changes in river flows during August and September, which adversely impact downstream fisheries.

Bull Trout Minimum Flows

Instream flow requirements to protect the river ecosystem below both dams and for threatened bull trout were adopted in the BiOps. Below Libby Dam, instream flows are set at 6,000 cfs to 9000 cfs from May 15 through September 30. The rest of the year the instream flow requirement is 4000 cfs. The ramping rates for Libby Dam are shown in Table 1.

Montana Operations at Hungry Horse Dam

As summarized above, many of the "Montana Operations" at Libby and Hungry Horse Dams are similar, except for sturgeon operations that are specific to Libby Dam. Operations specific to Hungry Horse Dam are now described.

Importance of VarQ at Hungry Horse Dam

VarQ improves conditions for ESA-listed bull trout and native westslope cutthroat trout in Hungry Horse Reservoir and Flathead River downstream, and also

Summer (May 1 - Sep 30)				
	Ramp Up		Ramp Down	
Flow	Hourly	Daily	Hourly	Daily
4-6 kcfs	2500 cfs	1 unit	500 cfs	500 cfs
6-9 kcfs	2500 cfs	1 unit	500 cfs	1000 cfs
9-16 kcfs	2500 cfs	2 units	1000 cfs	2000 cfs
16-QPHC	5000 cfs	2 units	3500 cfs	1 unit
Winter (Oct 1 - Apr 30)				
	Ramp Up		Ramp Down	
	Hourly	Daily	Hourly	Daily
4-6 kcfs	2500 cfs	1 unit	500 cfs	500 cfs
6-9 kcfs	2500 cfs	1 unit	500 cfs	1000 cfs
9-16 kcfs	2500 cfs	2 units	1000 cfs	2000 cfs
16-QPHC	5000 cfs	2 units	3500 cfs	1 unit

Table 1. Prescribed maximum ramp rates to protect resident fish and prey organisms in the Kootenai River in addition to minimizing levee erosion along the river. Rate of change may be less than stated limits

helps stabilize Flathead Lake elevations during dry years. Hungry Horse Dam isolated one of only a few remaining native species assemblages. The headwaters of the South Fork Flathead River contains about 50 percent of the remaining westslope cutthroat trout populations in Montana, and one of the strongest interconnected populations of bull trout in the United States.

Instream flow requirements below Hungry Horse Dam

The minimum flow in the instream flow requirements in the South Fork Flathead River immediately downstream of Hungry Horse Dam follow a "sliding scale" adjustment based on water availability (Table 3). This sliding scale balances the needs of the reservoir fishery with instream flow requirements downstream and was designed to prevent reservoir refill failure, which would affect the entire shoreline of the 42-km long reservoir. Flows downstream of Hungry Horse Dam improve food production and habitat availability in the affected 8.4-km reach before the South Fork joins the main Flathead River. This adjustment is based on the inflow forecast for Hungry Horse Reservoir for the period of April 1 through August 31. When this forecast is greater than 1.79 MAF, the minimum dam discharge is 900 cfs. When the inflow forecast is less than 1.19 MAF, the instream flow may be reduced to 400 cfs. When the inflow forecast is between 1.19 and 1.79 MAF, the instream flow requirement is linearly interpolated between 400 and 900 cfs.

In addition to the instream flow immediately below the dam, the Hungry Horse Dam discharge must maintain the established instream flow on the main Flathead River of 3200 to 3,500 cfs at Columbia Falls. The South Fork of the Flathead River joins the main Flathead River about seven miles upstream of the Columbia Falls gauging station. The sliding scale instream flow at Columbia Falls is also based on the water forecast, as described (Table 2). However, in the event of a flood emergency, the flow in the South Fork can be reduced to the physical minimum (145 to 300 cfs) (Marotz and Muhlfeld 2000).

The ramping rates applicable to Hungry Horse Dam are shown in Table 3.

Hungry Horse Apr–Aug inflow forecast (KAF)	Hungry Horse min flow (CFS)	Columbia Falls min flow (CFS)
< 1190	400	3200
1190 - 1790	Interpolate between 400-900	Interpolate between 3200-3500
> 1790	900	3500

Table 2. Minimum Flows at Hungry Horse and Columbia Falls

Flow Range (measured at Columbia Falls)	Unit Limit (daily max)	Unit Limit (hourly max)
Ramp Up Rates		
3200 - 6000 cfs	1800 cfs/day	1000 cfs/hour
>6000 - 8000 cfs	1800 cfs/day	1000 cfs/hour
>8000 - 10000 cfs	3600 cfs/day	1800 cfs/hour
>10000 cfs	No limit	1800 cfs/hour
Ramp Down Rates		
3200 - 6000 cfs	600 cfs/day	600 cfs/hour
>6000 - 8000 cfs	1000 cfs/day	600 cfs/hour
>8000 - 12000 cfs	2000 cfs/day	1000 cfs/hour
>12000 cfs	5000 cfs/day	1800 cfs/hour

Table 3. Daily and Hourly Maximum Ramping Rates for Hungry Horse Dam (as measured by daily flows, not daily averages, restricted by hourly rates)

LIBBY DAM FACTS

- Completed in 1973 by the U.S. Army Corps of Engineers (Corps), Libby Dam spans the Kootenai River 17 miles (27 km) upstream from the town of Libby, Montana, and 90 (145 km) miles from Glacier National Park.
- Libby Dam is 422 feet (129 m) tall and 3,055 feet (931 m) long. Its reservoir pool level is the third highest in the Columbia basin hydropower system (elevation 2459 ft at full pool), with only Hungry Horse and Kerr dams in Montana having even higher reservoir levels.
- The reservoir behind the dam is Lake Koocanusa. It extends 90 miles (145 km) upriver from the dam and has a maximum depth of about 370 feet (110 m). Forty-two miles (68 km) of Lake Koocanusa are in British Columbia, Canada (B.C.). Lake Koocanusa derives its name by using the first three letters from these words: Kootenai, Canada , and U.S.A.
- It is the only dam in the United States authorized under the 1964 Columbia River Treaty, and the last dam constructed under the treaty. The treaty also authorized construction of three dams in British Columbia (Mica, Arrow, and Duncan). Pursuant to Article 12 of the Treaty, the United States exercised its option to construct the dam for "flood control and other purposes." This same Article provides that all "benefits which occur in either country from the construction and operation of the storage accrue to the country in which the benefits occur." The Kootenai River contributes almost 20% of the total water in the lower Columbia River.
- Libby Dam holds back about 5 million acre feet of water in active storage, about the same amount as Grand Coulee Dam, the two largest storage reservoirs in the United States portion of the Columbia Basin. (Hungry Horse Dam holds back the third largest amount of U.S. storage water.)
- Libby's power house has five hydropower turbines that can generate 600 MW of capacity and has an average annual energy production of about 180 MW.
- Like Hungry Horse Dam, the water storage behind Libby Dam serves multiple purposes beyond flood risk management. As one of the United State's highest elevation and largest storage facilities in the Columbia Basin, its stored waters run through 17 downstream hyropower facilities (in both countries), support recovery of endangered downstream Kootenai white sturgeon, salmon, steelhead, and threatened bull trout, and support other water uses in the Columbia Basin.
- A selective withdrawal system was installed during the final phase of dam construction in 1972, which allows operators to manage the discharge temperature in the Kootenai River downstream to sustain native fish populations.

HUNGRY HORSE DAM FACTS

- Constructed on the South Fork of the Flathead River by the U.S. Bureau of Reclamation (BOR) in 1953, Hungry Horse Dam is about 15 miles (24 km) south of the west entrance to Glacier National Park and 20 miles (32 km) northeast of Kalispell, Montana.
- The dam is 564 feet (172 m) in height, and has the highest reservoir pool level in the Columbia Basin hydropower system (elevation 3560 ft at full pool). The dam includes the highest morning glory spillway (a giant cement funnel) in the world.
- The reservoir behind Hungry Horse Dam actively stores about 3.5 million-acre feet of water.
- The powerhouse has four turbines that can produce 428 MW of capacity. The average energy production is about 104 MW.
- Like Libby Dam, and as the highest elevation reservoir in the Columbia Basin, the water storage behind Hungry Horse dam serves multiple purposes beyond flood risk management. Its stored waters run through 20 downstream hyropower facilities (in both countries), support the needs of salmon and steelhead in downstream states, and supports other water uses throughout the Columbia Basin.
- A selective withdrawal system was installed in 1996, which allows operators to better control the water temperature of the dam discharge to help the ecosystem downstream.
- When authorizing the dam, Congress included a geographical preference for power users in Montana for electricity produced from Hungry Horse Dam. Central MT Electric Power Coop v BPA, 840 F.2d 1472 (9th Cir. 1988).
- Hungry Horse Dam operations also impact the level of Flathead Lake, the largest U.S. freshwater lake west of the Mississippi River, which begins about 40 miles downstream from Hungry Horse Dam.

FACTS ABOUT SELIS KSANKA QLISPE DAM AND FLATHEAD LAKE

- Hungry Horse Dam operations are coordinated with the operations of the Selis Ksanka Qlispe Dam (formerly Kerr Dam), constructed at the mouth of Flathead Lake. This concrete dam was constructed in 1938 by the Montana Power Company and is 205 feet high, with an installed capacity of 208 MW. In 2015, the Confederated Salish and Kootenai Tribes (CSKT) took over ownership and management of the dam through its tribally owned corporation Energy Keepers, Inc.

- It is the first major dam to be owned and operated by an Indian tribe in United States history. The Flathead Reservation includes the southern half of Flathead Lake, and all of western Montana is ceded aboriginal lands of the CSKT that are also subject to express reserved fishing rights at usual and accustomed places, and hunting rights on open and unclaimed lands (federal lands).

- Acting together, Hungry Horse Dam and Selis Ksanka Qlispe Dam control the level of Flathead Lake and their operations are coordinated to reduce impacts to resident fish, including the threatened bull trout. Scenic and pristine Flathead Lake is one of the major tourist and summer home destinations of Montana, and the West.

Impacts to the Ecosystem, Communities and Natural Resources

- All water in western Montana eventually flows northwest into British Columbia and joins the Columbia River before the Columbia enters the U.S.
- The construction of Libby and Hungry Horse dams provided enormous benefits to the region, especially for flood management and power generation.
- But these benefits also came with enormous impacts caused by the construction of the two dams (inundating a surface area of about 110 square miles), and the permanent flooding of prime fish migrating, spawning and rearing habitat, riparian habitat, timbered forests, and agricultural lands. On the Kootenai River, communities in Montana and British Columbia had to be relocated to accommodate Koocanusa Reservoir. Negative economic, social and environmental impacts (including cultural resource impacts to tribes) from dam construction continue into the future.
- Annual operations continue to cause downstream ecological impacts. Libby and Hungry Horse dams have altered downstream flow and sediment regimes by reducing the magnitude of peak flows, changing the timing of the hydrograph, and trapping sediments and nutrients in the reservoirs above the dams, causing ongoing impacts to primary productivity, riparian communities and their associated food webs. Riparian communities provide a critical ecological link between the aquatic and terrestrial populations, as well as supporting the highest diversity of terrestrial wildlife populations of any community type. The extent of these impacts are comparable to those of construction within the 100-year floodplain of the Kootenai (46,265 acres, 18,723 hectares) and Flathead (32,768 acres, 13,261hectares) rivers.
- The construction and operation of Libby Dam were primary factors contributing to the 1994 listing of the Kootenai White Sturgeon as endangered under the Endangered Species Act (ESA). Both dams also directly impact bull trout, a species listed in 1998 as threatened throughout the Columbia Basin. Dam operations also impact other species of special concern in Montana, including native westslope cutthroat trout, redband trout, and burbot.
- The South Fork of the Flathead River, upstream from Hungry Horse Dam, is the principal stronghold in Montana for genetically pure westslope cutthroat trout, containing 50% of their remaining populations in Montana. Cutthroat trout are Montana's state fish.
- The South Fork Flathead basin and Hungry Horse Reservoir is a stronghold for some of the most robust interconnected populations of bull trout in existence in the United States.
- The white sturgeon is the largest sturgeon species in North America, and is also the largest freshwater fish species in North America. The CSKT and the Kootenai Tribe of Idaho are partners in sturgeon and bull trout restoration. Both species have strong cultural ties to these tribes spanning thousands of years.
- In 2015, the Montana Legislature approved a negotiated water rights compact with the CSKT. A provision in the compact allows the CSKT to withdraw 90,000 acre-feet of water from Hungry Horse Reservoir. A biological assessment of such a withdrawal concluded that the biological impacts of the withdrawal are "either non-existent or minimal" in all but the driest 15-percentile water years, and the compact contains constraints to protect reservoir biology in those dry years.