COLUMBIA RIVER INTER-TRIBAL FISH COMMISSION

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October 22, 2021

Amanda Maxwell
Executive Director and Secretary
Utilities & Transportation Commission
State of Washington
P.O. Box 47250
Olympia, WA 98504
Sent to records@utc.wa.gov

RE: Docket UE-210220 Columbia River Inter-Tribal Fish Commission Comments on Puget Sound Energy RFP for Energy Resources

Dear Ms. Maxwell:

The Columbia River Inter-Tribal Fish Commission (CRITFC)[1] is providing comments on Puget Sound Energy's proposal to acquire resources to address the renewable energy requirement in Washington State's Clean Energy Transformation Act (CETA) that at least 80 percent of electric sales in Washington be met by non-emitting or renewable resources by 2030.

The Pacific Northwest is facing four critical issues:

- Many Columbia Basin salmon and steelhead populations are near extinction.
- The climate crisis will further reduce the survival of salmon and steelhead and damage every part of the region's economy and environment.
- Renewable resources will play a larger role in meeting future electricity needs. Under the right conditions they can reduce greenhouse gases and benefit salmon.
- Without proper integration and siting, renewable resources can make things worse for Columbia River salmon and other tribal resources.

CRITFC is updating its *Energy Vision for the Columbia River Basin*. A major theme is to ensure that renewable resources in combination with storage, reductions in peak demand, and increased energy efficiency can provide clean, adequate, reliable, affordable electricity and make things better for fish and wildlife and other tribal resources. The addition of energy efficiency actions and strategies to reduce the need for new transmission and distribution lines could save consumers hundreds of millions of dollars per year. However, without proper integration and

[1] The Yakama, Nez Perce, Umatilla, and Warm Springs tribes founded CRITFC in 1977 to protect the member tribes' treaty rights to take salmon and other tribal resources. In 1855, each of the four tribes entered a separate treaty with the United States in which they ceded title to a vast amount of land in the interior Columbia Basin while reserving rights to take fish and gather first foods. Numerous federal court decisions have affirmed these rights.

careful siting of renewable resources, we are concerned the future will be worse for Columbia River salmon and other tribal resources. A copy of the draft 2021 Energy Vision is attached to these comments.

The effects of intermittent resources on salmon and steelhead: The hydroelectric system in the Northwest currently helps integrate intermittent wind and solar energy. As West Coast solar power grows, energy planners assume that the Columbia River dams will help store some of this energy during daylight hours by reducing electricity production and keeping more water in the reservoirs for releases at other times. The dams would release the water and generate more electricity when solar power is not available—this is projected to occur for a couple of hours in the morning and about four hours after the sun goes down.

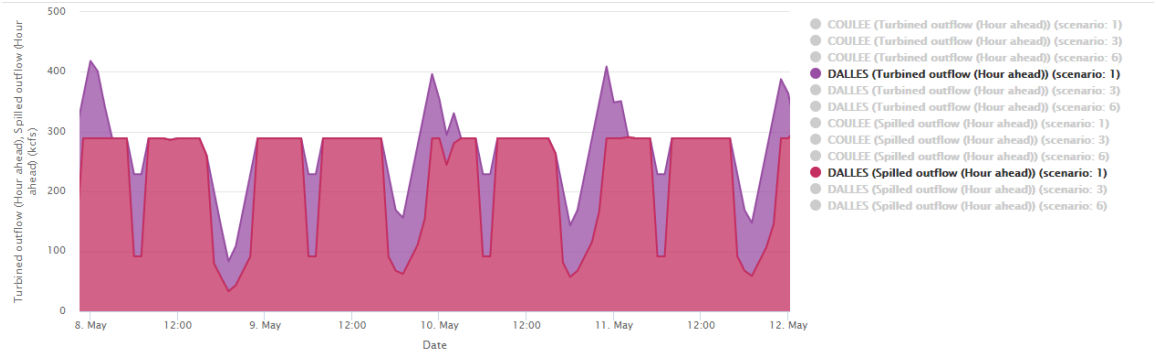
The WECC[2]-wide increase in renewables is changing historical patterns of market prices from when electricity prices were higher in the summer due to high air conditioning loads across California and the Southwest and lower prices occurred in the winter due to excess capacity in California and the Southwest. California solar development is now depressing summer wholesale market values during daylight hours. These conditions are expected to continue as California and the Southwest develop more solar to reduce greenhouse gases and meet renewable resources standards.

Preliminary analysis for the next Northwest Power and Conservation Council (NPCC or Council) Power Plan indicates that wholesale market prices are forecast to be low in the winter and spring, reflecting the impact of the Northwest's reliance on hydropower and increased renewables throughout the West. In prior years with a larger water run-off, the Northwest even experienced short periods of *negative* wholesale market prices during the spring when both hydropower and wind output created conditions of oversupply.

In the future, longer and more frequent periods of negative wholesale market prices are forecasted for not only the spring, but many hours during the winter, spring, and fall seasons. The summer month prices are expected to be comparatively higher, especially during the evening hours when the sun goes down and solar generation drops to zero. But even summer prices become lower over time on an average basis because the low prices midday decrease as more solar generation is added throughout the West.

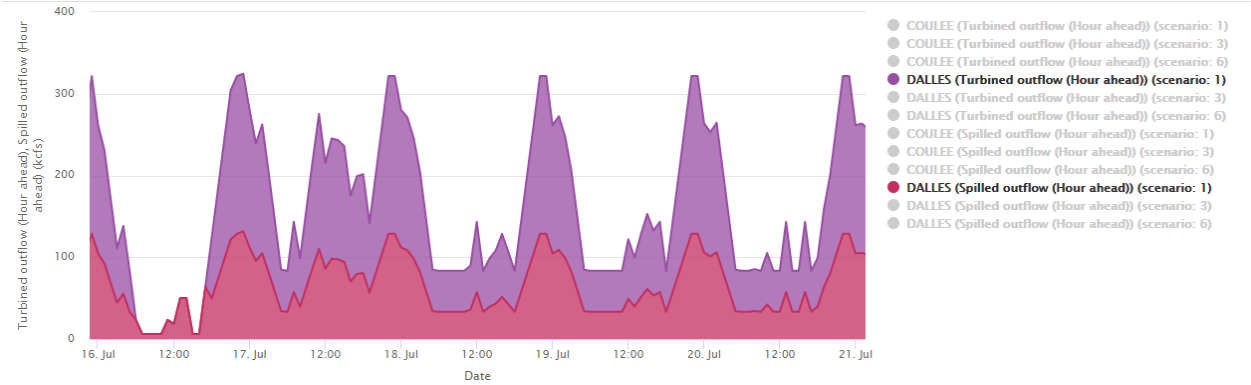
The NPPC analysis projecting flows at the Dalles Dam during five days in May 2023 shows significant fluctuations between 100 and 400 kcfs[3].

[2] Western Energy Coordinating Council (WECC) is comprised of 14 western states, 2 Canadian provinces, and northern Baja Mexico.
[3] NPPC Genesys run in May 7, 2021 email.



Adding additional intermittent renewable resources could have a significant effect on salmon migration. Once these resources are built, the cost of running them is very low because the fuel is free. As these renewable resources grow, they may create a surplus of electricity when they generate power. This is already affecting when Northwest dams generate power and impact how their reservoirs will operate. These changes could adversely affect salmon migration and survival. We are entering uncharted territory on river operations and need to proceed cautiously.

For example, a sampling of current GENESYS modeling analysis for a one-week period in July 2031 in the chart below indicates that Columbia River flows below The Dalles Dam could approach zero kcfs during daylight hours, presumably due to the solar energy produced at that time[4]. This would be a radical operational change compared to current conditions, with implications for water temperature increases, delayed adult salmon migration, treaty fisheries, and spill operations at other lower Columbia River dams, such as Bonneville Dam where spill is managed to set flow levels.



Specific Comments

Puget Sound Energy needs adequate electricity supplies: The first Tribal Energy Vision in 2003 included recommendations to avoid another energy shortage that damaged fish and wildlife and the economy. In 2001, a drought—in combination with the Bonneville Power Administration's (BPA) commitment to serve more power than it could generate and electric industry manipulation of the California energy market—resulted in a power shortage. BPA

[4] NPPC Genesys run in May 7, 2021 email.

eliminated protection measures as salmon migrated through the dams and significantly reduced funding for fish and wildlife restoration programs. The 2001 river actions resulted in significant losses of juvenile salmon. In 2001, just 6% of juvenile steelhead survived their in-river migration from Lower Granite Dam on the Snake River to Bonneville Dam; in most years the survival rate is 40% to 70%. These energy problems cost electricity consumers $4 billion.

Puget Sound Energy should reduce peak electricity demands: There are quantifiable benefits to reducing peak loads. For the electrical system, lower demand on peaks translates into fewer capital resources that are needed to serve loads. The grid can serve the same total energy needs with fewer generating plants and a smaller investment in new transmission and distribution lines over time if peaks are lowered. Line losses and ancillary services can also be reduced with lower demand. Cutting peak demand will reduce damage to salmon and steelhead migration and reduce greenhouse gas emissions.

Appendix E of the draft Energy Vision describes the high cost of the transmission and distribution system associated with meeting peak demand. For example, serving the highest 600 hours during a year (out of 8,760 hours) is estimated to cost between $0.50 and $1 per kilowatt hour, compared to the average costs residential customers pay of about 8¢ to 12¢ per kilowatt hour. These high transmission and distribution costs get averaged into everyone's electric bill.[5]

Reducing peak demand would also defer or eliminate the need for some new transmission and distribution systems. For example, BPA is planning to spend $730 million over the next five years to expand its transmission system[6]. Four investor-owned utilities have spent $6.8 billion over the past five years expanding their systems and other utilities are planning to expand their systems. These expansions will add significant costs and can adversely affect sensitive resources along power line routes[7].

The recommendations section of the draft Energy Vision describes actions that utilities should take to reduce peak demand, including energy efficiency, demand response, storage, electric vehicle charging, and changes in water heating and building heating and cooling.

The WUTC should adopt time-of-use pricing to reduce peak loads: The draft Energy Vision also includes recommendations for the region's public utility commissions to implement time of use pricing for all consumers based on the total costs of serving electricity needs.

Currently, all commercial, industrial, and agricultural customers served by investor-owned utilities in California are required to be on a time-of-use plan. Residential customers can choose to be on a time-of-use plan, by contacting their utility. The California Public Utility Commission states:

> If customers have energy usage that can be shifted from peak hours to off-peak hours,

[5] See draft Energy Vision Appendix E.
[6] BPA Integrated Program Review presentation, March 2, 2021.
[7] See draft Energy Vision See Section 3.10 and Appendix E for more information on transmission and distribution costs.

> they may be able to reduce their energy bill by switching to a time-of-use rate plan. For example, customers could run large appliances like dishwashers and washing machines at off-peak hours. Electric vehicle owners may also benefit from switching to a time-of-use rate plan if they charge their vehicles overnight.

According to the California Public Utilities Commission, time-of-use pricing encourages the most efficient use of the electric energy system and can reduce the overall costs for both the utilities and customers by sending price signals about the actual cost to serve loads at different times. Time-of-use rates vary according to the time of day, season, and day type (for example, weekday, weekend, or holiday). Higher rates are charged during the peak demand hours and lower rates during off-peak (low) demand hours. In California, rates are also typically higher in summer months than in winter months. The California Independent System Operator has prepared a detailed analysis of the time of use periods in California.[8] The California PUC states: "This rate structure provides price signals to energy users to shift energy use from peak hours to off-peak hours."[9] California has implemented a default time of use rate system that will provide valuable experience.

The WUTC should implement time-of-use rates to send an appropriate price signal that captures the dramatically different costs of using electricity during different times of the day.

Puget Sound Energy should acquire all cost-effective energy efficiency: Energy efficiency programs reduce both peak demands and year-round energy needs. Energy efficiency has been proven as a reliable resource in the Northwest with costs that are less than half the cost of new gas-fired power plants. These programs save consumers money and reduce the emissions of pollutants that cause climate change.

Energy efficiency also reduces the region's seasonal storage needs because energy savings closely track energy demand. The "flexibility" of energy efficiency is extremely valuable. Energy efficiency programs have no adverse effects on fisheries or other tribal resources.

The Northwest Power and Conservation Council's studies show that the cost to utilities of efficiency programs has been less than half of the cost of new generating resources. These resources reduce the region's costs of meeting additional electric energy demands and meeting needs associated with salmon restoration measures.

According to the Council, the region has saved 7,000 average megawatts since 1978 through energy efficiency programs, codes, and standards. That is enough electricity to serve more than five million homes. The U.S. Energy and Employment Report shows that over 100,000 people are employed in our region working with energy efficiency at utilities, the Northwest Energy Efficiency Alliance (NEEA), the Energy Trust of Oregon, state agencies, and at the many trade allies and contractors that work to implement programs and deliver efficiency services.[10]

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[8] http://www.caiso.com/market/Pages/ReportsBulletins/RenewablesReporting.aspx.
[9] California Public Utilities Commission, see https://www.cpuc.ca.gov/general.aspx?id=12194.
[10] 2020 Report: https://www.usenergyjobs.org/.

CRITFC recommends that utilities should maintain or expand the energy efficiency program targets that were in the Seventh Power Plan, with emphasis on weatherization programs for low-income households. Section 3 of the draft Energy Vision provides additional detail for this recommendation.

The WUTC should review and integrate policies to reduce greenhouse gases: Solar and wind development can significantly reduce greenhouse gas emissions. Lower costs, higher efficiencies, and current federal and state policies are driving an increase in these resources. The capital cost of renewable resources developed to meet state Resource Portfolio Standards (RPS) and/or clean energy standards is being recovered in rates, so when these resources produce power in excess of "native load need," they can be sold at very low, zero, and even negative costs. As a result of the federal Production Tax Credit, Investment Tax Credit, and Renewable Energy Credits, resource producers will pay others to take their electricity so they can get the credits. For all these reasons, they do not need to recover their capital cost "in the market." As a result, the forecasts of future wholesale ***energy*** prices for most hours of the day and for nearly all months of the year across the WECC will continue to be low. These low prices depress the value of energy efficiency's ***energy*** (kwh) savings which in turn increases the cost of energy efficiency as a source of ***capacity*** savings[11]. Therefore, while these tax policies, cost-recovery practices, and RPS are intended to promote the development of non-greenhouse gas emitting generating technologies, they have the unintended effect of reducing the amount of energy efficiency that is cost effective.

Even though some energy efficiency measures can reduce greenhouse gas emissions at a lower cost per ton than the cost of doing so with renewable resources, the existing incentives (tax credits, RECs) and electricity market structures make the energy efficiency measures appear more expensive. These policies may also not adequately address the high economic and environmental effects of transmission and distribution lines. Policies should address all of these issues in the development of an integrated set of least-cost options for reducing greenhouse gas emissions, whether that be energy efficiency or renewables resources or most likely a combination of these resources. Unfortunately, under the current policy environment the least-cost mix of resources to reduce greenhouse gases is not likely to be developed.

These policies and standards can also have unintended and negative impacts on consumers and tribal communities. Energy efficiency reduces consumer costs, provides energy and peak savings that are matched closely to energy needs, and provides local employment. Energy efficiency has other benefits that should be addressed in these policies, such as certainty, reliability, and insurance against heat domes and other extreme weather that can reduce some renewable resource production. Energy efficiency, along with other distributed energy resources such as batteries and demand response, can reduce the scale of renewable development needed to replace fossil fuel generation. Reducing the need for renewable resources helps avoid impacts to tribal resources associated with development of solar and wind farms and transmission lines to get their power to market. It also can reduce some large impacts to the operation of the dams and reservoirs that could hurt fish and wildlife.

[11] In the NPCC Seventh Plan energy efficiency was selected as a lower cost source of capacity than demand response because a portion of the cost of energy efficiency was offset by its energy savings value.

The WUTC should recognize the economic and environmental value of energy efficiency and distributed energy resources in offsetting the amount of renewable resources needed so the lowest-cost carbon reduction resource development path is selected. Simply increasing RPS requirements may not produce the best outcome because it does not consider whether there are lower cost carbon reduction resource strategies and strategies that better protect tribal fisheries and cultural resources.

The WUTC should ensure that the evaluation of renewable resources minimizes the fish and wildlife impacts associated with integrating the electricity so it is available when it is needed.

Puget Sound Energy should prioritize distributed solar generation: The costs of solar photovoltaic systems for homes and business have decreased significantly. These investments provide savings and certainty for the building owners. These systems have substantial system benefits because they do not require expanded transmission and distribution lines and thus avoid the environmental impacts of those developments. Solar systems with batteries provide storage and backup power to improve reliability. The Northwest Power and Conservation Council draft plan projects distributed solar systems will add about 1,000 megawatts of capacity and 200 average megawatts of energy by 2030. By 2045, the projection is about 5,000 megawatts of capacity and 750 average megawatts of energy.

Solar roof top and battery systems will be sited behind customers' meters. In this case, line losses and ancillary services to get the power to the load are miniscule. Also, the intermittency problem of solar power is diminished somewhat, because small photovoltaic systems will be spread over wide areas of the region. Passing clouds will affect only a small portion of the installations at any moment. Thus, predictability of solar will be enhanced.

These policies should consider Zero Net Energy standards similar to California for new and existing houses and businesses. The evaluation of the costs and benefits of these on-site solar systems should include the savings to the transmission and distribution system discussed in detail in the draft Energy Vision Section 3.10 and Appendix E.

Puget Sound Energy should acquire wind energy: The Northwest has been a leader in the adoption of wind power. Wind power is a low-cost source of power today, and it offers insurance against escalating prices in the future, because the "cost of fuel" is free. However, the intermittent production of wind power, and the difficulty in predicting when the wind will blow presents a problem with integrating wind into the system. Integration of wind is exacerbated under high-water, high-wind, and low-load scenarios. We believe that wind integration will be improved by use of various storage mechanisms discussed in the draft Energy Vision.

Siting wind projects can be controversial. The Washington Energy Facility Site Evaluation Council held eight days of adjudicative hearings and took public testimony on two separate days when considering the application for the Whistling Ridge Energy Development near Underwood, Washington, and adjacent to the Columbia River Gorge National Scenic Area. Ultimately the project was abandoned by the developer. Similar concerns are now facing a wind development

proposed for the Horse Heaven Hills near Washington's Tri-Cities.[12] Section 3.4 of the draft Energy Vision recommends a planning process for siting renewable energy development in the Northwest.

Puget Sound Energy should acquire solar energy: Solar power comes with the same integration problems that affect wind, and it comes with the same benefits of cost certainty throughout the life of the system. The capital costs of solar power have decreased significantly and there are growing opportunities to develop solar and battery systems to assist in meeting energy needs.

And, as discussed in the draft Energy Vision we recommend a process for siting industrial scale solar developments that may impact undisturbed lands that are valued by wildlife or tribal cultural resources.

Siting Renewable Resources: The projected growth in renewable resources could affect tribal First Foods, wildlife, and other tribal cultural resources. The Washington Department of Fish and Wildlife reports that there are currently 30 industrial solar projects proposed for Washington with a footprint of 49,000 acres, or nearly 77 square miles. Other states are facing similar development.

CRITFC is recommending that federal, state, and tribal governments work together on a regional plan for where renewable resources should be developed, where they should not, and to provide expeditious siting with clear and uniform standards across all political subdivisions. This effort could build on the 2013 criteria developed by the Department of the Interior for renewable resource development and the Council's Protected Areas for new hydroelectric dams. The attached draft Energy Vision has more details.

Puget Sound Energy should prioritize acquisition of wind power in Montana near its existing transmission: Puget Sound Energy owns approximately 700 MW of transmission that has been providing electricity from coal plants in Montana. CRITFC recommends that PSE prioritize additional wind energy projects near these transmission lines. Additional Montana wind projects would not create additional transmission line impacts or costs and would add diversity to the wind portfolio serving the region.

Puget Sound Energy should ensure adequate reserves to meet capacity and energy needs. The recommendations above should position PSE to reliably meet future electricity needs and reduce its impact on hydroelectric dam operations that kill salmon. CRITFC recommends that PSE participate in Grid West and the Northwest Power Pool Resource Adequacy Program to establish adequate reserves to meet both capacity and energy needs, especially in a low-water year.

In the near term, these reserves are likely to require having combustion turbines on standby. There may be opportunities to fuel these plants with biofuels that reduce the net carbon footprint.

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[12] "The thought of turning our beloved Horse Heaven Hills into a pin cushion for massive wind turbines breaks the hearts of most Tri-Citians." From the editorial board of the Tri-City Herald, https://www.tri-cityherald.com/opinion/editorials/article250063544.html

CRITFC recommends that PSE prioritize such opportunities. Additional near-term reserves are likely to be fueled by natural gas. While CRITFC strongly supports the long-term elimination of all fossil fuels to address the climate crisis, in the near term, there may be circumstances where the choice is burning some natural gas or shutting down river operations and killing migrating salmon. This has happened in the past with devastating effects to tribal resources. Therefore, CRITFC supports rate treatment for the costs associated with maintaining, staffing, fuel contracts and fuel storage, and other costs for these resources.

Conclusions

The Northwest is at a critical crossroads, facing challenges to the health of the planet and the future of iconic fish and wildlife. These challenges are especially important to tribal resources that have sustained our people since time immemorial.

One path leads to affordable, carbon-free energy that harmonizes with the ecosystem. This future would prioritize energy efficiency, renewable resources, new storage technologies, reductions in peak loads, and other strategies that are compatible with the needs of fish and wildlife. These efforts would reduce the impacts of renewable resource projects and transmission lines on tribal resources and save consumers money.

The other path creates conflicts between renewable resources and tribal resources and higher costs for consumers. Choosing the first path will require the courage to act, common-ground solutions, and a commitment of resources to accomplish the hard work ahead.

If you have any questions, please reach out to Rob Lothrop, at 503-238-0667 or via email at lotr@critfc.org.

Sincerely,

Aja K. DeCoteau
Interim Executive Director

Enclosure

—REVIEW DRAFT—

Energy Vision
for the
Columbia River Basin

June 29, 2021

Prepared by
Columbia River Inter-Tribal
Fish Commission

NOTE TO REVIEWERS:

We would welcome any comments on this draft. We are particularly interested in your thoughts or additional information on:

- The analysis in Section 2.
- The recommendations in Section 3.
- The costs and schedules for transmission and distribution projects being developed by northwest utilities and other organizations and the potential to reduce the need for expanding and upgrading these lines through energy efficiency, on-site solar, and other distributed generation technologies (see Section 3.10 and Appendix E).
- Studies on time-of-use rates and their effects on shifting loads from peak to off-peak time periods in Section 3.1.4.
- Updates on the analysis of the costs of meeting peak electricity loads in Appendix E.
- Criteria and process for developing a regional siting plan for renewable resources and new transmission lines (see Section 3.4 and Appendix F).

Please provide your comments to Ed Sheets at Ed@EdSheets.com and Rob Lothrop, lotr@critfc.org by August 31, 2021.

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Executive Summary

Introduction

The Pacific Northwest is facing four critical issues.

- Many Columbia Basin salmon and steelhead populations are near extinction.
- The climate crisis will further reduce the survival of salmon and steelhead and damage every part of the region's economy and environment.
- Renewable resources will play a larger role in meeting future electricity needs. Under the right conditions they can reduce greenhouse gases and benefit salmon.
- Without proper integration and siting, renewable resources can make things worse for Columbia River salmon and other tribal resources.

The first Tribal Energy Vision in 2003 included recommendations to avoid another energy shortage that damaged fish and wildlife and the economy. In 2001, a drought—in combination with aggressive Bonneville Power Administration (BPA) power marketing and electric industry manipulation of the California energy market—resulted in a power shortage. BPA eliminated protection measures as salmon migrated through the dams and significantly reduced funding for fish and wildlife restoration programs. These energy problems cost BPA's consumers four billion dollars.

The second Energy Vision in 2013 focused on reducing hydroelectric dam impacts on salmon and reducing costs for consumers. It included strategies to reduce peak demands that harm salmon migration and cost consumers hundreds of millions of dollars to run expensive resources and expand transmission and distribution systems. It also identified additional energy efficiency actions that could save hundreds of millions of dollars.

This draft Energy Vision comes at a time of extraordinary changes in the electric energy system.

- Several states have enacted standards and policies to reduce greenhouse gas pollution.
- Coal plants are phasing out.
- There are near-term concerns about whether there will be adequate electricity supplies.
- Significant increases in solar and wind energy are projected.

- Energy efficiency has improved.

- Major changes in the west coast energy market could damage salmon.

A major theme of this Energy Vision is to ensure that renewable resources in combination with storage, reductions in peak demand, and increased energy efficiency can provide clean, adequate, reliable, affordable electricity and make things better for fish and wildlife and other tribal resources. Without proper integration and siting, we are concerned the future will be worse for Columbia River salmon and other tribal resources. The addition of energy efficiency actions and strategies to reduce the need for new transmission and distribution lines could save consumers hundreds of millions of dollars per year.

Vision for Columbia River Resources and Energy

CRITFC and its member tribes envision a future where the Columbia Basin electric power system supports abundant and sustainable fish and wildlife populations, protects tribal cultural resources, and provides clean, reliable, and affordable electricity.

The goals for this Energy Vision are:

- Reduce damage to Columbia River's fish and wildlife, water quality, and cultural resources caused by the energy system.

- Replace fossil-fuel electric generation and reduce the reliance on fossil-fuels for transportation and other uses to address the climate crisis and protect river ecosystems.

- Harmonize energy and salmon operations to provide clean, adequate, economical, and reliable electricity while rebuilding the Columbia Basin's fish and wildlife.

- Provide increased protection for consumers and fish and wildlife against unanticipated events, such as those the region faced in 2001.

The Yakama, Nez Perce, Umatilla, and Warm Springs tribes founded CRITFC in 1977 to protect the member tribes' treaty rights to take salmon and other tribal resources. In 1855, each of the four tribes entered a separate treaty with the United States in which the ceded title to vast amount of land in the interior Columbia Basin while reserving rights to take fish and gather first foods. Appendix H provides a discussion of environmental management and first foods.[1]

[1] *Also available at* Quaempts, E. J., K. L. Jones, S. J. O'Daniel, T. J. Beechie, and G. C. Poole. 2018. *Aligning environmental management with ecosystem resilience: a First Foods example from the Confederated Tribes of the Umatilla Indian Reservation, Oregon, USA.* Ecology and Society 23(2):29. https://doi.org/10.5751/ES-10080-230229

The map below shows the Columbia River Basin in light brown. The ceded areas of the Yakama, Nez Perce, Umatilla, and Warm Springs tribes are shown in purple, green, brown, and blue with the current reservations in darker shades.

Numerous federal court decisions have affirmed these rights. Appendix A provides more detail on the treaty. Appendix B describes the Federal Action Agencies (BPA, the Bureau of Reclamation, and the Corps of Engineers) obligations to rebuild fish populations under the Northwest Power Act.

For the tribes and CRITFC to accomplish their mission, salmon, Pacific lamprey, and mussel populations need to be rebuilt. The dams on the Columbia and Snake rivers continue to be the main deterrent to anadromous fish restoration. Section 1 provides background and more detail on these issues.

Salmon and Steelhead Face Extinction

This update to the Energy Vision comes at a critical time because salmon and steelhead populations in the Columbia and Snake rivers are in a dire condition.

- Thirteen species are listed as either threatened or endangered under the Endangered Species Act.
- Currently, 42% of Snake River spring/summer Chinook populations have fewer than 50 fish. Populations this low are near extinction.
- By 2025, 77% of these Snake River chinook populations are predicted to have of less than 50 fish.
- Three stocks have recently triggered their NOAA early warning and significant decline indicators: Upper Columbia Spring Chinook, Upper Columbia Steelhead, and Snake River Steelhead.
- The total abundance of salmon and steelhead in the Columbia River is at or near the abundance when the first ESA listings were registered in the mid 1990s.

The Council's interim goal for the Columbia River Basin Fish and Wildlife Program is "Increase total adult salmon and steelhead runs of Columbia River origin to a 10-year rolling average of five million annually by 2025, in a manner that emphasizes increases in the abundance of the populations that originate above Bonneville Dam." Salmon and steelhead populations have averaged about one million fish over the past five years—we are nowhere close to achieving the Program goal.

CRITFC has developed detailed recommendations for near-term and longer-term river operation and configuration actions to improve fish and wildlife survival in Appendix C. CRITFC will pursue these actions in various decision processes. We believe the Council should address the recommendations on river operations and dam configuration during the development of the next plan. It is unrealistic to assume current operations and configuration will be the same over the next 20 years. It is important for the Council to analyze whether these assumptions are likely to increase the amount of energy efficiency resources that are cost effective.

Changes in the Electrical System can Help or Hurt Salmon

Addressing the Climate Crisis: several states and utilities have adopted plans to reduce greenhouse gases, and the federal government is considering several programs that would reduce these pollutants as part of the infrastructure and jobs legislation. Renewable resources in combination with energy efficiency can help the Northwest address the

climate crisis that is already damaging salmon, steelhead, and other tribal resources. It is critical to reduce greenhouse gas pollution and continue to increase energy efficiency to try to avoid the devastating effects we are facing.

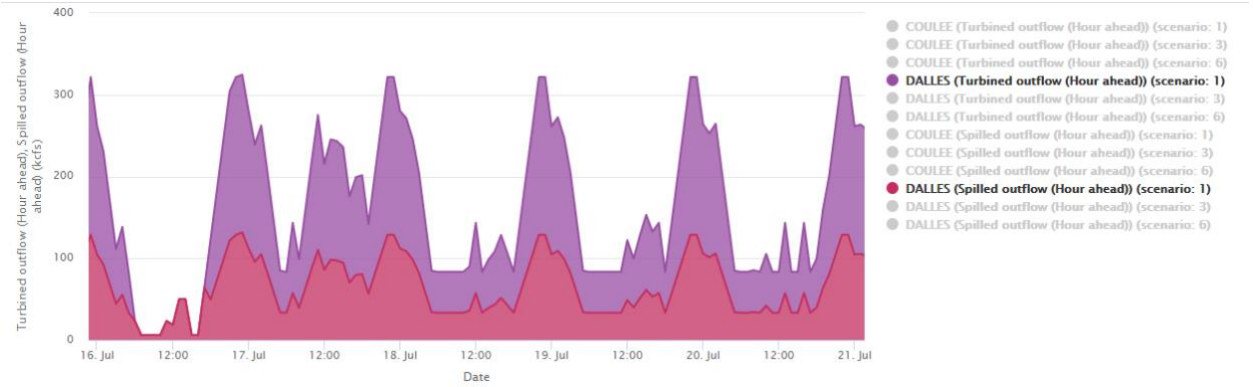
Renewable Resources: The costs of renewable resources have declined dramatically, and these resources will be the major source of energy in the future. According to the Northwest Power and Conservation Council (NPCC or Council), wind and solar currently supply about 10,000 MW of capacity in the Northwest. The Council projects that solar and wind projects will add approximately 5,000 megawatts of capacity in the northwest by 2027, growing to 14,000 additional megawatts by 2041. Renewable resources in combination with storage and reductions in peak demand can make things better for fish and wildlife and other tribal resources.

Without proper integration, we are concerned these new energy resources can make things worse for Columbia River salmon. Solar provides energy during daylight hours and wind energy production can vary during the day. Integrating electric energy production is complex; supplies must be matched with the changing needs every minute of each day and for 8,760 hours every year.

Our concern stems from the Council's assumption that the intermittent renewable resources coming online will be integrated with the power system using current fish requirements and the otherwise unconstrained flexibility of the hydroelectric dams and reservoirs.

The Council's preliminary analysis projects flows at the Dalles Dam during five days in May 2023 that shows fluctuations between 100,000 and 400,000 cubic feet per second over the course of a day. These large fluctuations at the dams and reservoirs are partially caused by surplus solar energy coming from California.

Adding large amounts of very low-cost solar and wind energy is projected to dramatically change the operation of Columbia and Snake River dams. For example, the figure below is from the Council's preliminary analyses for a one-week period in July 2031. It shows that flows projected at The Dalles Dam fluctuate dramatically and approach zero flow during daylight hours.



This would be a radical operational change, with implications for water temperature increases, delayed adult salmon migration, treaty fisheries, and spill operations at other lower Columbia River dams. In July 2015, low flows and high water-temperatures combined to kill several hundred thousand adult Sockeye migrating upstream through the Columbia and Snake River mainstem dams.

Fish and wildlife managers have been calling for higher flows in the spring and summer to help young salmon migrate from their natal streams to the ocean for more than 40 years. Imagine the challenges to a baby salmon trying to migrate down the Snake and Columbia if the rivers only flow for a few hours in the morning and evening while the rest of the day the river slows to store energy from solar projects. Rapid increases and decreases in flow have also been shown to stop or delay adult migration. The changes in flow projected in the Council analysis could make these migration problems much worse in future years.

Assuming the current "flexibility" of the Columbia and Snake River dams allows for full integration of solar and wind energy overlooks and conflicts with many resources concerns. And assigning zero costs for this "flexibility." is wrong. We know the cost is not zero. There is an existing horrific cost to salmon and steelhead populations and other tribal resources.

Reducing peak loads: Electric energy use spikes to high levels in the morning and late afternoon. Serving these peak loads causes fluctuations in river flows that hurt migrating salmon and steelhead. Meeting these peaks is expensive. Utilities operate their most expensive resources during these periods. We estimate utilities will spend more than seven billion dollars over the next five years to expand their transmission and delivery lines, a significant amount of which is driven to meet peak uses. The Energy Vision details actions to reduce peak demands that can save salmon and money. These actions are in Section 3 and the supporting analysis is in Appendix E.

Siting Renewable Resources: The projected growth in renewable resources could affect First Foods, wildlife, and other tribal cultural resources. The Washington Department of Fish and Wildlife reports that there are currently 30 industrial solar projects proposed for Washington with a footprint of 49,000 acres, or nearly 77 square miles. Other states are facing similar development.

CRITFC is recommending that federal, state, and tribal governments work together on a regional plan for where renewable resources should be developed, and where they should not, and to provide expeditious siting with clear and uniform standards across all political subdivisions. This effort could build on the 2013 criteria developed by the Department of the Interior for renewable resource development and the Council's Protected Areas for new hydroelectric dams. Section 3 and Appendix F provides a sample of criteria that could be considered in this process. Appendices G and H describe cultural resource and First Foods concerns.

Energy Efficiency: The energy efficiency targets in the next Council plan are likely to be significantly reduced because of the low cost of solar and wind energy. We are concerned that the region will regret any reduction in this valuable resource that has proven to be compatible with the river's ecosystems.

Energy efficiency programs reduce both peak demands and year-round energy needs. Energy efficiency has been proven as a reliable resource in the Northwest and has saved consumers over $70 billion. These programs have reduced the emissions of pollutants that cause climate change by an estimated 29 million metric tons. Energy efficiency also reduces the region's seasonal storage needs because the energy savings closely track energy demand. The "flexibility" of energy efficiency is extremely valuable. Energy efficiency programs have no adverse effects on fisheries or other tribal resources.

Sections 2 and 3 address all these issues in more detail.

Energy Vision Recommendations

Section 3 describes CRITFC's recommendations to create a future where the Columbia Basin electric power system supports abundant and sustainable fish and wildlife populations, protects tribal cultural resources, and provides clean, reliable, and affordable electricity.

- Section 3.1 describes actions to reduce peak electricity loads through energy efficiency, demand response, storage and demand flexibility strategies, and time of use pricing.

- Section 3.2 addresses actions to secure all cost-effective energy efficiency, ensure that utilities achieve energy efficiency targets, expand low-income programs, and improve energy management practices in commercial and industrial buildings.

- Section 3.3 focuses on renewable resources, including actions to review and integrate greenhouse gas reduction policies, and actions to promote wind and solar generation, and other renewable resources.

- Section 3.4 calls for a comprehensive plan for siting renewable resources to focus development where it is appropriate and avoid sensitive areas.

- Sections 3.5 recommends that BPA and utilities develop a plan to strategically site resources near loads to relieve congestion and reduce the need for new transmission lines.

- Section 3.6 recommends additional actions, beyond those described above, to address resource adequacy, including increasing the Northwest Power Pool reserve standards.

- Section 3.7 identifies changes in BPA rate policies, maintaining resources to meet fish protection operations, and other strategies to protect fish and wildlife and the economy during low-water years.

- Section 3.8 calls for a fresh look at the Columbia River Treaty and improved coordination of Canadian and U.S. hydroelectric and flood control operations in recognition of the major changes in the economics and availability of other renewable resources.

- Section 3.9 addresses the need to monitor changes in the west coast energy market to ensure that they address impacts on Columbia Basin Fish and Wildlife and other tribal resources.

- Section 3.10 recommends actions that would reduce the need for new transmission and distribution lines that could save consumers hundreds of millions of dollars.

- Section 3.11 recommends reducing reliance on fossil fuels and describes the tribes' opposition to transporting oil and coal through the region because of the dangers to fish and wildlife, cultural resources, and human health.

Tribal Leadership

The four CRITFC member tribes have each applied the concepts found in the Energy Vision to their day-to-day government priorities. These actions demonstrate their leadership in reducing damage to salmon and other fish and wildlife in the Columbia Basin, reducing emissions causing climate change and supporting a diverse and reliable energy resource mix that will lower energy costs and help recover abundant, harvestable salmon and other resident fish.

Each of the four tribes has participated in studies and feasibilities of all possible energy solutions which could meet their goals, and which conform to the tribal culture. The tribes have invested in personnel to manage and operate the chosen energy projects.

The significant changes in the environment, the energy industry, energy economics and markets, energy technologies, public awareness and government policy are bringing new opportunities for tribal energy actions. As describe in Appendix D, tribes are frequently community and national policy leaders in employing ideas and technologies to solve environmental and natural resource problems. In particular, the existential environmental problem of climate change requires tribes to consider "energy" in many new ways. Environmental sustainability takes on broader and more critical meanings.

Potential federal legislation to improve infrastructure may provide significant funding for energy efficiency and renewable resources and other actions to address the climate crisis. Congressmen Simpson and Blumenauer are working on a major initiative to help endangered salmon recover by breaching the four dams along the Lower Snake River

Dams and funding other restoration efforts. The initiative includes significant funds to replace the electricity the dams generate, mitigate for the effects of dam removal, and address the needs of farmers and ranchers and local communities that depend on the current operation of the dams.

Opportunities for Tribal Leadership

- Tribes can legislate Tribal Energy Codes to create reservation goals, policies, procedures, funding, and programs to assure that the Energy Vision is implemented within the reservation.
- Tribes can apply for and appropriately manage funding from federal, state, local and private sources to meet goals and to improve application of new and cutting-edge technologies.
- Tribes can use their political leverage and longstanding cultural wisdom to influence public opinion and government policy.
- Tribes can lead by example.
- Tribes can develop partnerships with private institutions, educational bodies, local governments, utility and energy industry players and others to further the Energy Vision and create buy-in by entities that may not otherwise be involved in improving the energy successes.
- Tribes can create local education programs for their own students and people and can work with outside educational entities to expand understanding of environmental/energy sustainability.
- Three of the four CRITFC Tribes are working to address the damages caused by the Hanford nuclear site.
- Intertribal organizations have a history of partnering with specific expert entities to address specific goals important to the organization.

Conclusion

The Northwest is at a critical crossroad, facing challenges to the health of the planet and the future of iconic fish and wildlife. These challenges are especially important to tribal resources that have sustained our people since time immemorial.

One path leads to affordable, carbon-free energy that harmonizes with the ecosystem. This future would prioritize energy efficiency, renewable resources, new storage technologies, reductions in peak loads, and other strategies that are compatible with the needs of fish and wildlife. These efforts would reduce the impacts of renewable resource projects and transmission lines on tribal resources and save consumers money.

The other path creates conflicts between renewable resources and tribal resources and higher costs for consumers.

Choosing the first path will require the courage to act, common-ground solutions, and a commitment of resources to accomplish the hard work ahead.

CRITFC and its member tribes are committed to working with other regional interests to lead the region to a brighter and healthier future. Our people and the resources that sustain them depend on it.

1. Introduction and Prologue: Visions of the Columbia River Basin

The 2021 *Energy Vision for the Columbia River Basin* identifies actions that can lead to affordable, carbon-free electric energy that harmonizes with the ecosystem. This future would prioritize energy efficiency, renewable resources, new storage technologies, reductions in peak loads, and other strategies that are compatible with the needs of fish and wildlife, while protecting tribal First Foods and cultural resources. These efforts would reduce the impacts of renewable resource projects and transmission lines on tribal resources and save money for consumers.

This section describes the tribes' energy vision and summarizes the goals and recommendations. Section 2 provides background on harmonizing fish and wildlife protections and energy production, the issues that led to the 2003 *Energy Vision for the Columbia River*, and the significant changes in the region's energy situation and the dire conditions of Columbia Basin salmon and steelhead. Section 3 provides the recommendations for the 2021 Energy Vision for the Columbia River. Nine appendices provide more detail.

1.1 Vision for the Columbia River Basin Resources and Energy

CRITFC member tribes envision a future where the Columbia Basin electric power system supports abundant and sustainable fish and wildlife populations, protects tribal cultural resources, and provides reliable and affordable electricity.

The Yakama, Nez Perce, Umatilla, and Warm Springs tribes each secured, by treaty, rights to take fish that pass their usual and accustomed fishing places. Numerous federal court decisions have affirmed these rights.[2] For more information on the treaties please see Appendix A. The four tribes founded CRITFC in 1977 to protect the member tribes' treaty rights to take salmon; CRITFC's mission is "to ensure a unified voice in the overall management of the fishery resources, and as managers, to protect reserved treaty rights through the exercise of the inherent sovereign powers of the tribes."

For the tribes and CRITFC to accomplish their mission, salmon and Pacific lamprey, and mussel populations need to be rebuilt. The dams on the Columbia and Snake rivers continue to be the main deterrent to anadromous fish restoration.

The people of the Yakama, Nez Perce, Umatilla, and Warm Springs tribes have always shared a common understanding—that their very existence depends on the respectful uaw

[2] E.g. Sohappy v. Smith, 302 F.Supp. 899 (D.Or. 1969), aff'd, United States v. Oregon, 529 F.2d 570 (9th Cir. 1976); Washington v. Washington State Commercial Passenger Fishing Vessel Ass'n, 443 U.S. 658 (1979); United States v. Winans, 198 U.S. 371 (1905); Confederated Tribes of the Umatilla Indian Reservation v. Alexander, 440 F.Supp. 553 (D.Or. 1977).

of the Columbia River Basin's vast land and water resources. Indeed, their very souls and spirits were and are inextricably tied to the natural world and its myriad inhabitants.[3] Among those inhabitants, none were more important than the teeming millions of anadromous fish enriching the basin's rivers and streams.

Despite some differences in language and cultural practices, the people of these tribes shared the foundation of a regional economy based on salmon. To the extent the resource permits, tribal people continue to fish for ceremonial, subsistence, and commercial purposes employing—as they always have—a variety of technologies.

Today, perhaps even more than in the past, the Columbia River treaty tribes are brought together by the struggle to save the salmon and by shared spiritual traditions such as the first salmon feast.

A Tribal Energy Vision for the Columbia River Basin

An *Energy Vision for the Columbia River* was originally prepared in response to the energy crisis of 2001. That year in response to drought conditions and manipulation of newly deregulated electricity markets, Federal agencies curtailed long-standing hydro power operations that had been adopted to protect migrating salmon through Endangered Species Act, Northwest Power Act and related processes. Resulting salmon mortalities were high. The Bonneville Power Administration also cut funding for fish and wildlife programs to address its financial problems that resulted from the 2001 circumstances, including lack of energy reserves and extraordinarily high-power prices.

CRITFC adopted the original Energy Vision in 2003. It called for a series of actions to avoid another energy crisis and lift some of the burden of the region's energy supply from the Columbia River. A decade later, we looked back on actions that were taken and proposed new actions in a 2013 update to the Energy Vision.

One of the most important aspects of restoring salmon and ensuring their resiliency to withstand energy and environmental catastrophes like that which occurred in 2001 is the continued investment of the region in fish and wildlife protection, mitigation, and enhancement. In this regard, the Bonneville Power Administration is an unrivaled leader.[4] This Energy Vision does not address discrete fish mitigation measures. Rather it is a vision for a long-term regional energy system that places a lesser burden on the fish and wildlife that depend on the Columbia River and its tributaries, while protecting tribal First Foods and cultural resources found in upland areas.

[3] In our stories, the Celilo Falls are the remains of the dam built by the five Swallow Sisters to block salmon from returning upriver. Coyote tricked the sisters, destroyed the dam, and the resulting flood left the falls and the rocky, contorted riverbed downstream. As punishment for keeping salmon from the people, Coyote ordered swallows to fly up the river each spring to announce the return of salmon. To this day, the migration of swallows marks the spring salmon migration.

[4] In 2008, the Commission and three of its member tribes signed a ten-year Fish Accords Agreement with BPA guaranteeing funding for discrete actions. The Accords provide funding for a significant number of projects to rebuild fish and wildlife.

The Columbia and Snake Rivers' dams are an integral part of the Northwest and West Coast power systems. Power generated from these rivers has been a cheap, dominant part of the power system, providing energy, capacity, ancillary services, system stability, and more. However, the low-dollar cost of hydropower does not fully reflect the huge economic, cultural, and environmental costs incurred by tribes and others.

These tribes based their living on resources of the rivers, including fish, wildlife, and water quality for thousands of years prior to the construction of the hydropower system. The costs to tribes of development of the Northwest's hydropower system represent a classic case of "negative externalities." Because tribal non-market resources have not been "priced", they often have been treated in energy planning as if their cost were zero and their availability limitless. They are not. Treating them in such a way is economic malpractice. More importantly it does not recognize the trust and treaty obligations that the United States carries with regard to the tribes. Appendices A and B describe these obligations in broad detail.

By careful energy planning and appropriate action, the region can use the Basin's river systems to supply energy services in a manner that better supplies ecological functions needed for fish, wildlife and water quality while reducing costs to ratepayers.

New challenges and opportunities are being faced by energy planners that did not exist ten years ago. And our understanding of climate change has advanced significantly. State of the art climate models predict future changes in the annual cycle of Columbia River flows and regional temperatures. Addressing climate change causes and response is a very high priority for the tribes. Among other things, the recommendations for low-cost energy efficiency and renewable resources in this *Energy Vision for the Columbia River Basin* should reduce the need for power plants that emit greenhouse gases.

The 2003 *Energy Vision for the Columbia River*[5] described solutions to address the conflict between peak power production and Columbia Basin salmon. Against the backdrop of fish problems associated with serving peak loads, the plan identified less harmful and less expensive ways to provide electricity for peak loads. A win-win combination. The 2013 *Energy Vision for the Columbia River*[6] was built on the recommendations made in 2003. The 2021 *Energy Vision for the Columbia River Basin* builds on these predecessors.

1.2 Goals of the 2021 Energy Vision for the Columbia River Basin

Appropriate planning of regional resources can provide the Northwest with a robust energy system that withstands most unknown future events and keeps costs stable, while

[5] https://www.critfc.org/blog/documents/tribal-energy-vision-for-the-columbia-river-2003/
[6] https://www.critfc.org/wp-content/uploads/2021/02/2013-Energy-Vision-Review-Draft-.pdf

protecting fish and wildlife. This *Energy Vision for the Columbia River Basin* has four goals:

1. Reduce the damage to Columbia River Basin's fish and wildlife, water quality, First Foods and cultural resources caused by the energy system.

2. Replace fossil-fuel electric generation and reduce the reliance on fossil-fuels for transportation and other uses to address the climate crisis and protect river ecosystems.

3. Harmonize energy and salmon operations to provide adequate, economical, and reliable electricity while rebuilding the Columbia Basin's fish and wildlife.

4. Provide increased protection for ratepayers and fish and wildlife against unanticipated events, such as those the region faced in 2001.

2. Background

2.1 Background and Purpose of the Energy Vision for the Columbia River Basin

The 2003 *Energy Vision for the Columbia River* made recommendations to strengthen BPA's financial health so emergency operations, like those experienced in 2001, would never happen again.

In 2001, several events combined to create a crisis in the Northwest. In early 2001, BPA committed to serving about 3,300 megawatts of load beyond its power supply. Low water conditions that year, in combination with the manipulation of the California power market caused power costs to serve this additional commitment to soar. A BPA report found that the additional cost was $3.9 billion.[7] This caused large rate increases for Northwest electricity consumers.

These increased costs created a risk that BPA would not be able to repay its annual debt to the U.S. Treasury. In 2001, BPA and Corps of Engineers made decisions to increase power production and cut costs, including a decision to eliminate river flows and spills at dams to protect salmon and to reduce funding for fish and wildlife projects designed to mitigate for damages caused by the Federal dams.

The 2001 river actions resulted in significant losses of juvenile salmon. In 2001, just 6% of juvenile steelhead survived their in-river migration from Lower Granite Dam on the Snake River to Bonneville Dam; in most years the survival rate is 40% to 70%.

2.2 Harmonizing Fish and Wildlife and Electricity Production

The 2013 Energy Vision focused on reducing the peaking at the Columbia and Snake River dams to improve fish and wildlife survival. The day-to-day and seasonal operations of the hydroelectric system to meet peak and seasonal electricity loads cause fluctuations in river levels that continue to kill salmon, resident fish, and other important fish species.

This update expands on this work and provides a more detailed description of the effects of the dams on tribal resources and recommendations for near-term and long-term actions (see Section 2.3.6 below and Appendix C). It also focuses on the need to expand energy efficiency, storage, reductions in peak demands, and on-site solar to ensure that new renewable resources do not create problems for fish and wildlife.

Hydropower is used to serve peak loads because dam operators can react to demand by quickly putting more or less water through the turbines to generate electricity. Serving peak loads with hydropower however kills millions of juvenile salmon every year.

[7] *What Led to the Current BPA Financial Crisis? A BPA Report to the Region*, April 2003.

During certain times of the year, so much water is drawn down to generate electricity that salmon redds (gravel nests where salmon lay eggs) are uncovered or dewatered and their eggs die. Daily fluctuations change river water levels and juvenile fish that feed and live near the shore can be stranded and die when water levels are reduced. Migration of fish is interrupted when flows decrease at night because there is less demand for electricity and therefore less water moving through the reservoirs behind the dams. The projected increases in solar power, without adequate batteries or other storage, could create migration problems during many parts of the day. Fluctuations in reservoirs hurt resident fish by dewatering habitat and food supplies and reducing nutrients in the reservoirs.

Additionally, the water held behind storage dams for power generation would, under natural conditions, be in the river aiding the swift and timely downstream migration of young salmon. Saving this water for winter and summer energy production alters the natural (or normative) river conditions that aid juvenile salmon migration and would help in the restoration of fish to harvestable levels.

Fluctuating reservoirs are also a significant source of methane gas—a powerful greenhouse pollutant and also carbon dioxide. A recent paper on global biogeochemical cycles shows that carbon dioxide from Pacific Northwest reservoirs represent about four percent of all carbon emissions in the region[8].

The recommendations in the 2021 *Energy Vision for the Columbia River Basin* are designed to reduce these problems while also saving money for ratepayers. The Northwest electricity system has relied on the Columbia Basin dams to serve peak loads. The assumption has been that running more water through the generators is a low-cost way to meet the peak. These assumptions have ignored the other costs of serving peak loads related to distribution and transmission of the electricity and its impact on salmon survival. Transmission and distribution lines also have damaged other tribal resources, including first foods and cultural sites.

Reducing peak energy use could reduce costs for new transmission and distribution lines. BPA plans to spend $730 million over the next five years on transmission expansions. CRITFC is working to compile costs for transmission and distribution expansions planned by northwest utilities and other organizations over the next five years. As this draft is distributed, we have identified costs for the four investor-owned utilities over the past five years that total $6.8 billion.

The economic costs of serving peak loads are significant. As described in Appendix E, the costs of transmitting and delivering peak electricity are more than 25 times higher than the generation cost of peak energy. The cost of delivering (transmission and distribution only) during the highest 15 percent of peak energy demand to consumers ranged from 79 cents to $1.19 per kilowatt-hour in 2013. The average northwest retail consumer pays between 8 and 12 cents per kilowatt-hour for delivered electricity. These

[8] Harrison, J.A., Y.T. Prairie, S. Mercier-Blais, and C. Soued, (2021) Year-2020 Global Distribution and Pathways of Reservoir Methane and Carbon Dioxide Emissions According to the Greenhouse Gas from Reservoirs (G-res) Model, *Global Biogeochemical Cycles.* https://doi.org/10.1029/2020GB006888.

peak delivery costs are more than ten times higher than the total-average electricity costs. The cost of serving the very highest peak load range from 80 to 120 *dollars* per kilowatt-hour—a thousand times higher than average consumer costs. All these costs get melded together so consumers do not clearly see the true costs of peak energy demands.

2.3 Dramatic Changes for Energy and Salmon

The electric energy industry has gone through an extraordinary transformation since 2013. Some of the changes will result in dramatic improvements in addressing climate change that will benefit salmon and other tribal resources and begin to address this existential threat. Some of these changes may have unintended consequences that need to be addressed. This section describes the major changes; the next section provides CRITFC's recommendations to harmonize energy response and the needs of fish, wildlife, First Foods, and cultural resources protection.

There is some very good news. Washington, Oregon, and California have enacted limits on greenhouse gases. A number of coal-fired power plants serving the West Coast have shut down or are scheduled to be decommissioned in the next few years. At the same time, the Northwest Power and Conservation Council is projecting a significant increase in low-cost solar and wind energy and reductions in electricity costs over the next twenty years.

Prior Energy Visions have also called for actions to reduce the impacts of the hydroelectric system on fish and wildlife by reducing peak loads and ensuring adequate energy reserve resources. The federal and state polices and significant reductions in the costs of renewable resources will likely mean a change in how the region's dams will operate. When low-cost solar and wind energy is available, dams may be asked to store water. Electricity may be called upon from the dams to meet peak demands for several hours in the morning and several hours in the evening after sundown. If these operations result in slowing river flows during long periods during the day and night, reducing water spilled for fish passage, or operating turbines outside peak efficiency, fish will be adversely affected.

2.3.1. Greenhouse Emissions Policies and Standards

Concerns about rising temperatures caused by greenhouse gasses have grown since the last Energy Vision. Climate change is causing significant damage to salmon and other tribal resources. This section describes state policies and laws designed to reduce greenhouse gas emissions[9].

[9] Eight states have set goals to achieve 100% clean, renewable energy. They are Washington, California, Nevada, New Mexico, Virginia, New York, Hawaii, and Maine.

The next two subsections discuss changes in policies and laws that are beginning to address the climate crisis and reductions in the number of coal plants in the northwest. The recommendations section addresses other issues to reduce reliance on fossil fuels in other energy sectors.

Washington: The Clean Energy Transformation Act (CETA)[10] passed in 2019 requires all Washington state electric utilities to reach a 100% clean electric supply by 2045. CETA's first milestone requires the utilities to eliminate coal-fired resources from their state resource portfolios by the end of 2025. The second milestone requires utilities to be greenhouse gas neutral by 2030 with the flexibility to use electricity from natural gas if it is offset by other actions. By 2045, utilities must supply Washington customers with electricity that is 100% renewable or non-emitting, with no provision for offsets.

Electric Utilities must adopt CETA by the end of 2021 with targets and plans. The Washington State Department of Commerce and Washington Utilities and Transportation Commission (UTC) play key roles on how to implement this law.

In 2021, Washington enacted a system of carbon pricing that sets limits on carbon emissions and establishes a system to sell emission credits and invest the proceeds a range of activities that include restoration of marine and fresh waters, forest health, renewable energy, and public transportation.

Oregon: In 2007, HB 3543 established the Oregon Climate Change Research Institute (OCCRI) to create science-based understanding for impacts, adaption, and mitigation. Oregon Laws 2007, chapter 907, section 1 (narrative form). It also set science-based climate emissions reduction goals for Oregon that include a reduction of carbon emissions to 75% below 1990 levels by 2050; however, there are indications the state is not on track to meet that goal.

In 2020, Oregon's governor issued Executive Order No. 20-04 directing executive agencies to take actions to reduce and regulate greenhouse gas emissions, this specifically emphasizes the disproportionate effects that tribes will face.

In 2016, Oregon passed the Clean Electricity and Coal Transition Act[11] to transition off coal-fired power while committing to increase renewable resources. The Oregon Public Utility Commission will work with Portland General Electric and Pacific Power to develop implementation strategies to double the amount of clean renewable energy by 50% by 2040. By 2030, coal-fired resources for electric companies must be eliminated. In 2020, Oregon's largest investor-owned utility, Portland General Electric (PGE), shut its only coal power plant. The state has adopted a goal of net-zero emissions by 2040.

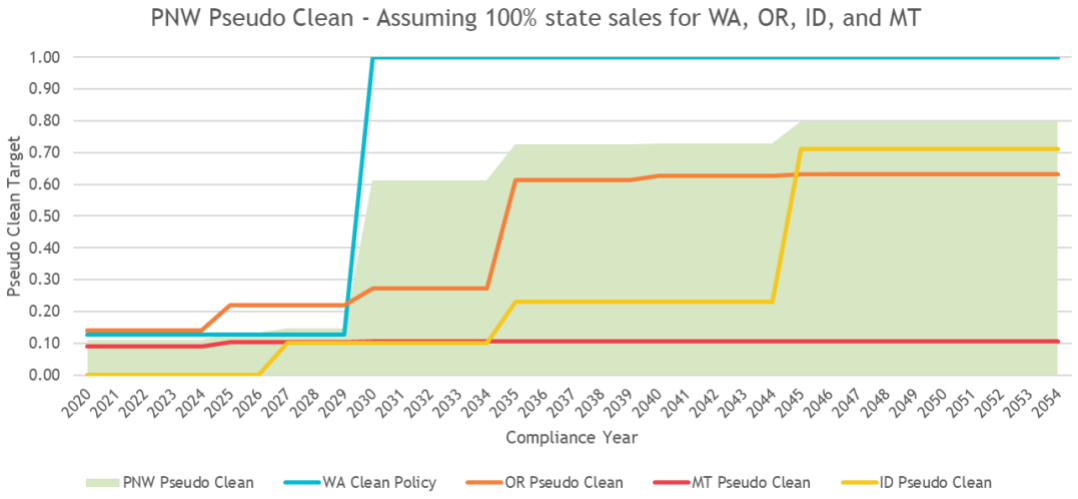
Idaho: The State of Idaho has not adopted clean energy goals or regulations. However, Idaho power has set a goal for 100% clean energy by 2045 with plans to invest in sources that "path away from coal."

[10] Chapter 19.405 RCW.
[11] Senate Bill (SB) 1574-b (2016).

Montana: Several of Montana's largest cities have adopted standards to reduce greenhouse gases, including Bozeman, Helena, and Missoula. NorthWestern Energy reports that it serves Montana with an electric portfolio that is 60% carbon free and has set a goal to have an electric energy portfolio that reduces carbon by 90% by 2045, compared to 2010[12]. In August 2020, the Montana Climate Solutions Council prepared recommendations to then governor Bullock that included actions to prepare Montanans for climate impacts; strategies to reduce greenhouse gas emissions; and programs to accelerate decarbonization and innovation.[13]

California: The 100 percent Clean Energy Act of 2018[14] (SB 100) requires California to have 50 percent of its electricity powered by renewable resources by 2025 and 60 percent by 2030, while ultimately working towards 100% zero-carbon electricity by 2045. California does not have any specific language for low-income communities but currently has multiple programs that serve low-income customers. The 2021 SB 100 Joint Agency Report is a first step to evaluate the challenges and opportunities in implementing SB 100. This includes assessments and associated costs for the transition. This report requires a yearlong series of public workshops and comment opportunities. It was required by statute to meet with the disadvantaged communities' advisory group, who advise the energy commission and public utilities commission on energy equity issues.

The Northwest Power and Conservation Council prepared a chart that shows the targets for carbon-free energy production in the northwest states.



[12] https://www.northwesternenergy.com/environment/environmental-commitment/environmental-report/carbon-reduction-vision.
[13] deq.mt.gov › Climate › 2020-09-09_MontanaClimateSolutions_Final.
[14] CA SB 100.

British Columbia: Almost all the electricity produced in BC comes from energy resources that do not depend on fossil fuels. Nonetheless, energy consumed in buildings, cars, and industrial operations represents nearly three quarters of the energy used and comes from fossil fuels. The legislated target for 2030 is a reduction of 25 million tons of greenhouse gases from the 2007 baseline. The CleanBC Plan[15] describes programs that will achieve 75 percent of that goal.

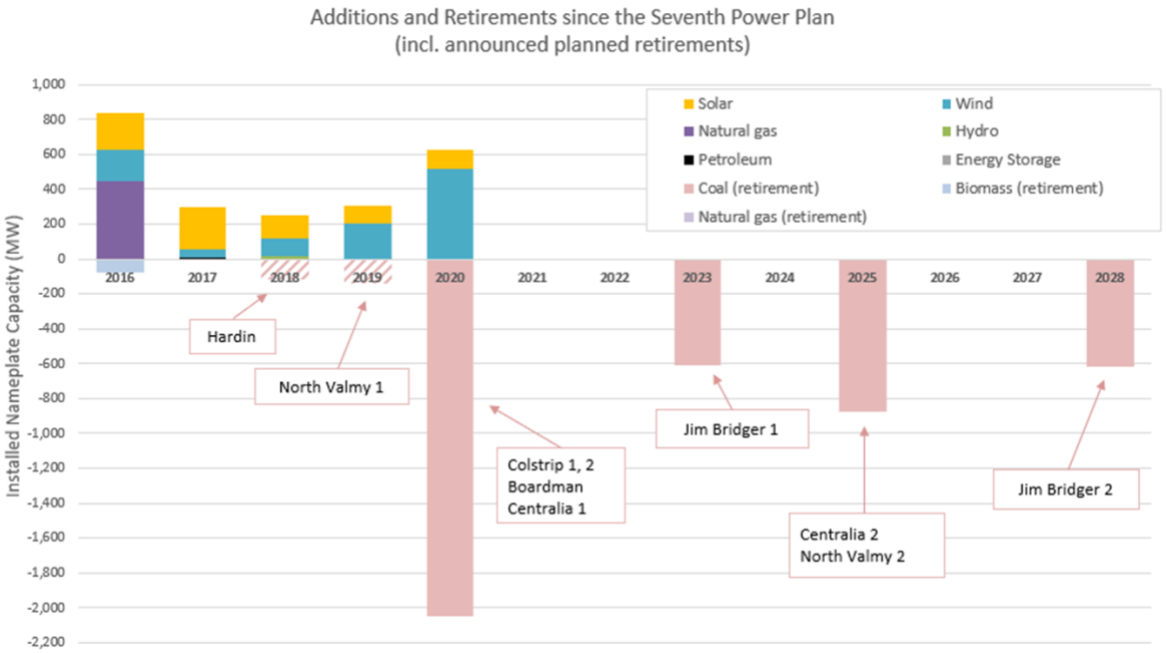
Federal Programs: The Biden Administration's proposed American Jobs Plan calls for hundreds of billions of dollars in investment to accelerate a clean energy transformation. It includes building electric infrastructure, like vehicle charging stations, and efforts to support renewable energy. The plan calls for a million new affordable, energy-efficient housing units and making existing structures more energy efficient. Hundreds of billions of dollars would go toward green energy industries of the future, such as advanced battery manufacturing.

In the Northwest, Congressmen Simpson and Blumenauer are working on a major initiative to help endangered salmon recover by breaching the four dams along the Lower Snake River and funding other restoration efforts. The initiative includes significant funds to replace the electricity the dams generate with renewable resources and energy efficiency, mitigate for the effects of dam removal, and address the needs of farmers and ranchers and local communities that depend on the current operation of the dams.

2.3.2. Coal Plants Are Phasing Out

One of the results of these state policies has been a significant reduction in the number of coal plants serving the Pacific Northwest—the current and estimated total retirements between 2018 and 2028 is 6,184 MW. The chart below is from the NPCC Project Database and shows when coals plants are expected to be retired. The future of Colstrip 3 and 4 and Jim Bridger 3 and 4 are uncertain; these four plants total 2,700 MW of capacity.

[15] https://www2.gov.bc.ca/gov/content/environment/climate-change.



2.3.3. Near-term Resource Adequacy Issues

Recent power blackouts in Texas and California have increased public concern about adequate electricity supplies. Electricity is an essential service and disruptions can threaten life and safety.

The recent problems in Texas were the result of extreme low temperatures and a power system that did not require utilities to weatherize their power plants or have adequate power reserves. Texas politicians tried to shift the blame to renewable resources—but the facts showed that the Texas renewable resources produced more energy than was projected during the cold snap. The Texas blackouts were caused by poor management practices and a deregulated electricity system that did not require utilities to have adequate backup power--renewable resources were not the problem.

California's blackouts during August of 2020 were much closer to home and occurred in a power grid that is connected to and relies on Columbia Basin dam operations. If not corrected some of the problems described below could be a sign of problems to come. The system in California relied on *average* load forecasts rather than forecasts for critical hours of the day (for example, the peak hours between 4 pm and 10 pm that occur every day during July through September). The California forecasts also relied on *average* estimates for wind and solar output. However hourly loads and resources vary greatly in California. As the sun sets, the energy from solar systems drops quickly, but the air conditioning electricity requirements continue—this created a high risk of shortages around 7 pm when net demand reached its peak. Given these known power system dynamics, the California Public Utilities Commission planning targets were badly outdated. They need to be revised. These revisions are likely to demonstrate a need for

improved forecasts, more resources, including energy efficiency, or a delay in retiring existing resources, to avoid future problems that could spill-over into the Columbia Basin.

Several resource adequacy studies in the northwest are also raising near-term concerns. Any electricity shortages can create problems for consumers and the economy. A paper by Randy Hardy and Larry Kitchen[16] and a study by E3 describe the retirement of the coal plants that serve the region and the effects on meeting peak energy demands, especially if there is a low-water year combined with a cold snap.

The NPCC monitors the adequacy of electricity supplies to meet loads and calculates a "loss of load probability" (LOLP). The current Northwest standard calls for the power supply to have sufficient resources (both generating and energy efficiency) to limit the likelihood of a shortfall to no more than five percent during a future year. In recent years, the NPCC analysis has shown LOLP in the 7 percent range. These planning studies are ongoing.

The March presentation of preliminary analysis by the Council staff at the NPCC meeting showed significant resource adequacy issues between 2023 and 2025 with LOLPs ranging from 27 to 32 percent. The projections show a potential shortage of 1,600 MW of peak shortage in the winter of 2023 (about 4% of peak load). A large snowpack or a warmer winter could lessen this near-term risk, but in any event, salmon protections should not be put at risk.

As new renewable resources are added, the NPCC projected LOLP drops to 1 percent in 2027 and 3 percent in 2031. The NPCC is continuing to analyze this issue and evaluate resource strategies to maintain resource adequacy. We address this issue in the recommendations section.

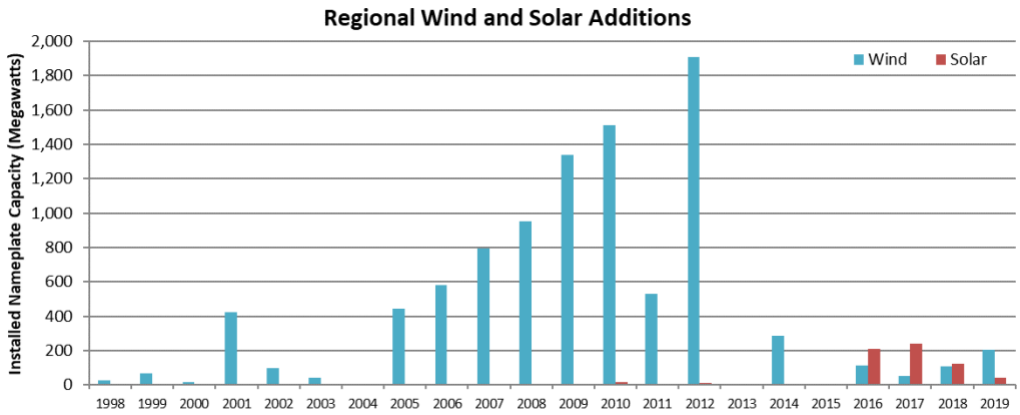
2.3.4. Significant Increases in Solar and Wind Energy

Wind Energy: Over the past twenty years northwest wind energy has grown from 110 MW to 9,417 MW—about 15 percent of the region's total capacity. On an annual basis, wind power is supplying 2,978 average megawatts of power for the region—about 9 percent of the total.

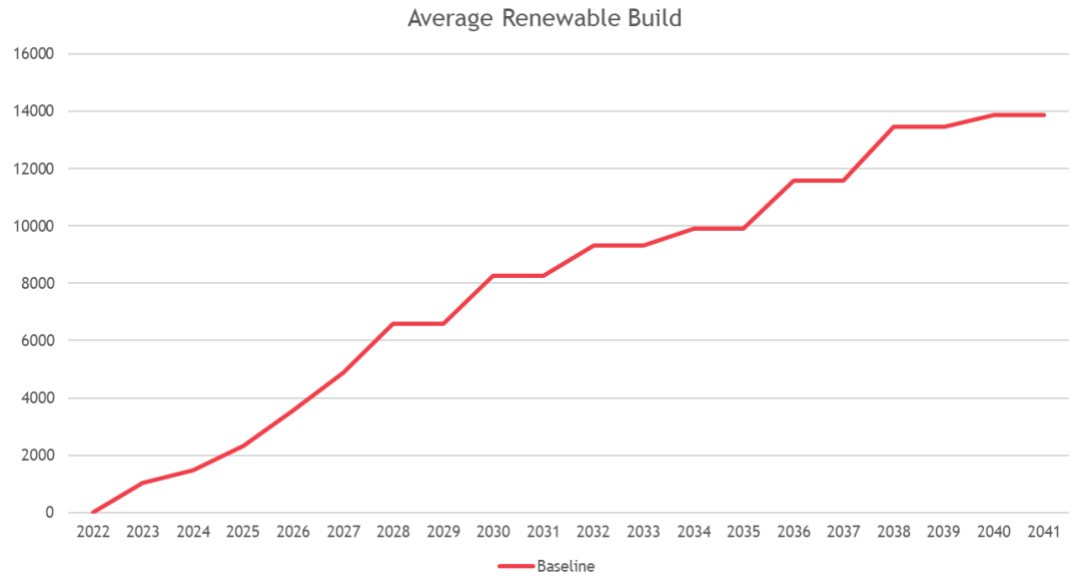
Solar Energy: Utility scale solar projects have grown from 9 MW in 2013 to 649 MW in 2019. These solar plants represent 1 percent of the installed capacity of the region's energy system. These plants provided 132 average megawatts of electricity in 2018.

The chart below was developed by the NPCC and shows wind and solar additions.

[16] *Future Northwest Capacity Shortages*, July 17, 2019

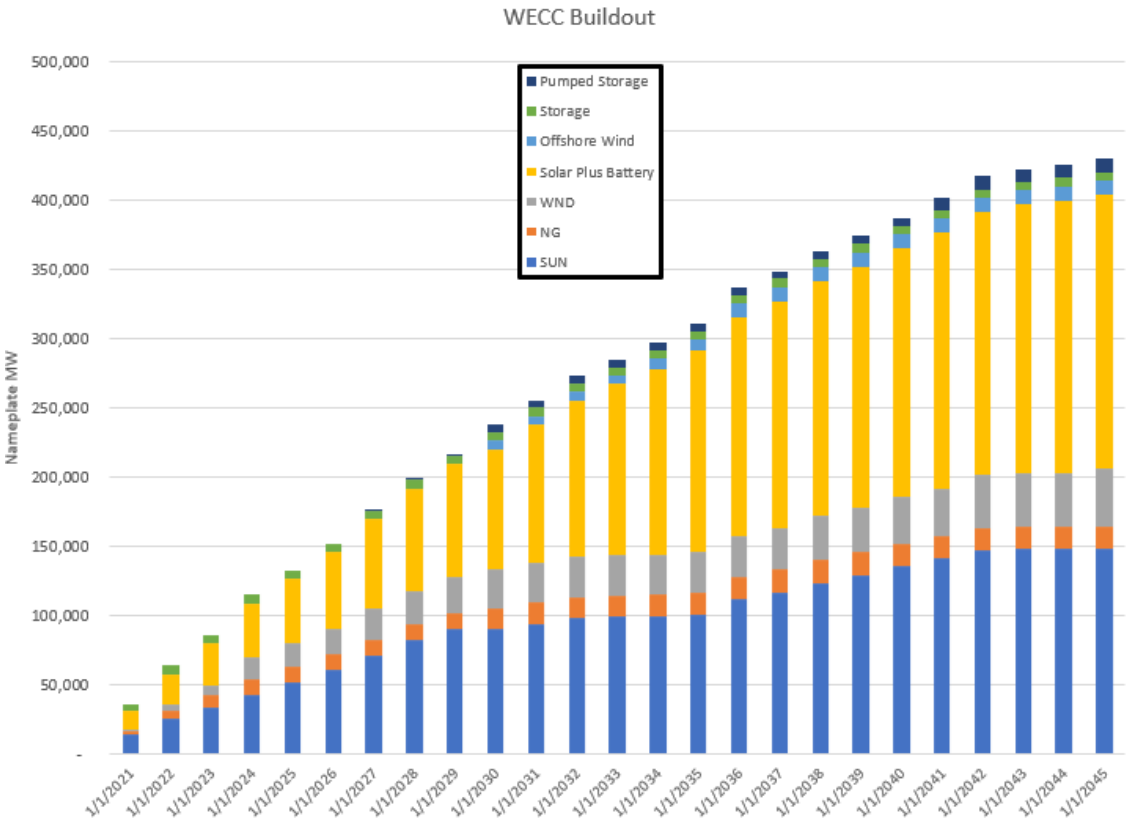


The Council projects a significant increase over the next six years. The chart below shows the Council's projections that renewable projects will add approximately 5,000 megawatts of capacity in the northwest by 2027, growing to 14,000 megawatts by 2041[17].

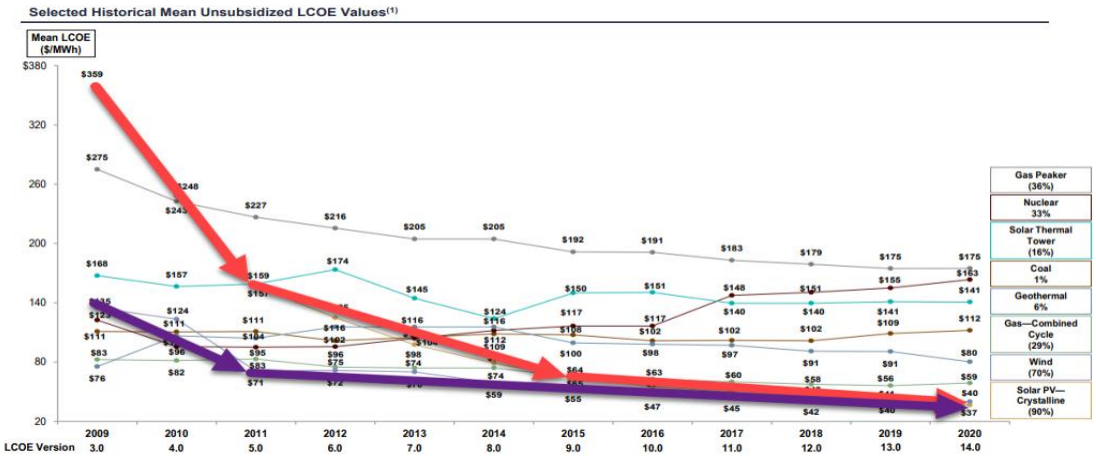


The growth of solar and wind plants in the western energy system is also projected to increase dramatically. The chart below is a projection by the Western Energy Coordinating Council (WECC).[18] It shows solar utility and wind projects will increase by 200,000 MW by 2028. Utility solar projects are projected to grow to 150,000 MW of installed capacity. Solar systems with batteries will add an additional 200,000 MW by 2045. It also shows wind projects increasing to 50,000 MW by 2045—for a total new renewable resource capacity of approximately 400,000 MW. For comparison, the current energy capacity of the WECC is 276,000 MW from all sources; this total includes 29,000 MW of wind and 23,000 MW of solar.

[17] Northwest Power and Conservation Council presentation, May 2021.
[18] Northwest Power and Conservation Council presentation. The WECC is comprised of 14 western states, 2 Canadian provinces, and northern Baja Mexico.



A major reason for this renewable energy growth is that the costs of solar and wind energy sources have decreased significantly over the past ten years. The Lazard investment bank publishes a yearly summary of generation costs. Their summary uses actual transaction data – not estimates – and is commonly viewed as authoritative. The most recent chart is below and shows costs per megawatt hour ($/MWh). The bold orange arrow shows the evolution of solar costs; the purple arrow shows wind costs[19].



[19] McCullough Research.

Likewise, the NPCC has found that the costs of residential solar systems have declined significantly. Capital costs ranged from $5,000 to $7,000 per kW in 2012 and are projected to be less than $3,000 per kW in 2022. The costs for commercial and industrial on-site solar systems have also dropped from a range of $4,000 to $6,000 per kW in 2012 to less than $2,000 per kW projected in 2022. These systems will supply electricity directly to the homes and business to meet their needs. This will decrease the demand for electricity from central station power plants. Any surplus power from these residential and commercial solar systems is sold to the local utility.

2.3.5. Energy Efficiency has Improved

Since 1978, energy efficiency has saved about 7,000 average megawatts in the Pacific Northwest. That is half the region's growth in demand for electricity, or enough power for five cities the size of Seattle. These efficiency improvements have saved northwest consumers over $70 billion dollars and the savings are growing at $5 billion per year.

The Northwest Power and Conservation Council's Regional Technical Forum estimates that from 2013 through 2019 the region has saved 1770 aMW of energy through its conservation programs. These savings have also reduced winter peak demand by slightly more than 3,200 and just over 2,000 MW of summer peak demand.

2.3.6. Major Changes in the West Coast Energy Market Could Harm Salmon and Steelhead

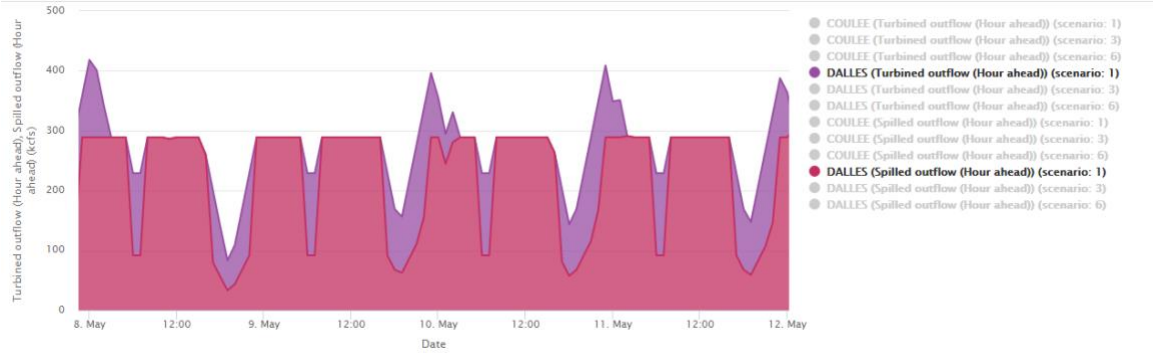
As West Coast solar power grows, energy planners assume that the Columbia River dams will help store some of this energy during daylight hours by reducing electricity production and keeping more water in the reservoirs for releases at other times. The dams would release the water and generate more electricity when solar power is not available—this is projected to occur for a couple of hours in the morning and about four hours after the sun goes down.

The WECC-wide increase in renewables is changing historical patterns of market prices when electricity prices were higher in the summer due to high air conditioning loads across California and the southwest and lower prices occurred in the winter due to excess capacity in California and the southwest. California solar development is now depressing summer wholesale market values during most of the day. "Selling excess energy south" from northwest solar development has become less financially attractive and will be even less so going forward as California and the southwest develop more solar to reduce greenhouse gases and meet renewable resources standards.

Preliminary analysis for next NPCC Plan indicates that wholesale market prices are forecast to be low in the winter and spring, reflecting the impact of the Northwest's reliance on hydropower and increased renewables throughout the west. In prior years with a larger water run-off, the Northwest even experienced short periods of ***negative*** wholesale market prices during the spring when both hydropower and wind output created conditions of oversupply.

In the future, longer and more frequent periods of negative wholesale market prices are forecasted for not only the spring, but many hours during the winter, spring and fall seasons. The summer month prices are expected to be comparatively higher, especially during the evening hours when the sun goes down and solar generation drops to zero. But even summer prices become lower over time on an average basis because the low prices midday decrease as more solar generation is added throughout the west.

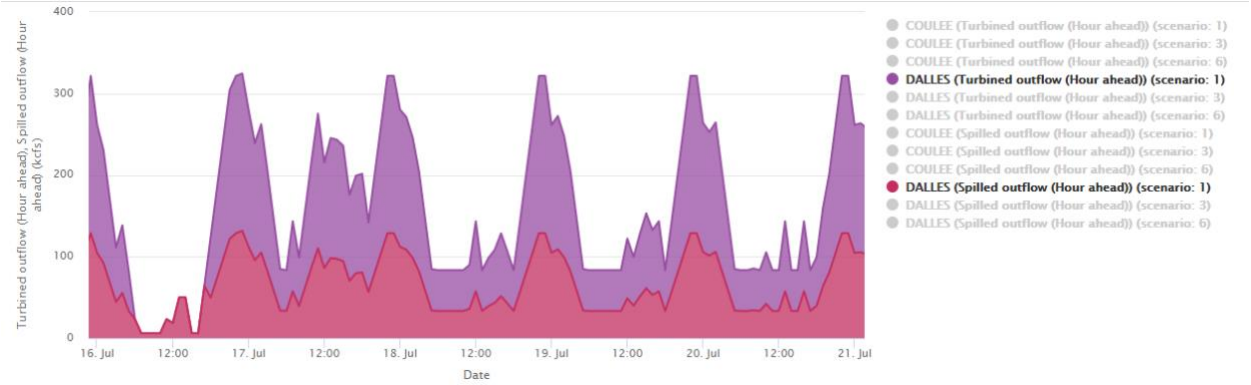
The NPPC analysis projecting flows at the Dalles Dam during five days in May 2023 shows significant fluctuations in flows between 100 and 400 kcfs[20].



Adding additional intermittent renewable resources could have a significant effect on salmon migration. Once these resources are built, the cost of running them is very low because the fuel is free. As these renewable resources grow, they may create a surplus of electricity when they generate power. This is already affecting when the dams in the northwest generate power and impact how their reservoirs will operate. As discussed further in Section 3 and Appendix D these changes could adversely affect salmon migration and survival. We are entering uncharted territory on river operations and need to proceed cautiously.

[20] NPPC Genesys run in May 7, 2021 email.

For example, a sampling of current Genesys modeling analysis for a one-week period in July 2031 in the chart below indicates that Columbia River flows below The Dalles Dam could approach zero kcfs during daylight hours, presumably due to the solar energy produced at that time[21]. This would be a radical operational change compared to current conditions, with implications for water temperature increases, delayed adult salmon migration, treaty fisheries, and spill operations at other lower Columbia River dams, such as Bonneville Dam where spill is managed to set flow levels.



2.3.7. Flex Spill Agreement Benefited Salmon and Power

In December 2018, the states of Oregon and Washington, the Nez Perce Tribe, Bonneville Power Administration, the Bureau of Reclamation, and the Army Corps of Engineers agreed to provide fish benefits, power system benefits, and operational feasibility for the 2019 and 2020 operating years. The Agreement provided higher spill to benefit fish migration during periods of lower power value and lower spill occurs during periods of higher power value.

Based on the evaluations of 2019 and 2020, the Flex Spill operation generally met or exceeded expectations for fish benefits by improving travel time and fish survival and increasing the number of salmon that were spilled passed the dams rather than going through the turbines. In 2020, the agreement resulted in a $5 million in net power benefits compared to the 2018 operating year. The agreement has ended but the Federal Action Agencies have decided to continue operations similar to those in the Flexible Spill Agreement moving forward.

[21] NPPC Genesys run in May 7, 2021 email.

2.3.8. Salmon Protections have been Weakened or Eliminated

While flex spill appears to provide salmon and steelhead significant benefits, the federal action agencies[22] that operate the mainstem dams have recently implemented other changes that reduce long-standing fish protections. The following changes to increase power system benefits put more risk on fish:

- Modification of winter draft limits at upper Columbia storage reservoirs shifts water away from migration season. For 40 years fish managers have sought to maximize the spring freshet for fish migration and the CRSO proposed action has the potential to reduce the amount of water protected for fish. The flex spill operation does less for upper Columbia stocks than Snake River stocks. Reducing spring flows in the upper Columbia will have a greater negative affect on upper Columbia fish that is not offset by spilling water at the Corp's Snake River dams.

- For the past 25 years the co-managers have requested that action agencies keep the mainstem reservoirs as low as possible to decrease travel time (smaller reservoir surface area results in faster evacuation time). The proposed action increases the opportunity to raise minimum operation pool (MOP) levels, which may slow fish travel times.

- In the fall and winter, it is advantageous for dam operators to shut down flow at the Snake River dams at certain times of day (zero generation) and allow water to pond for use at higher demand times. This can have a serious impact on migrating fish (adults and juveniles). Prior to the proposed action, the zero-generation operation was limited based on fish presence in the river and no zero generation before December 15. Now zero generation operations can occur as early as October 15 and have no constraints as to how many fish are in the river. Adult Snake River fall chinook are migrating through the end of November, steelhead are present year around and juvenile chinook can be present as late as November.

- Based on extensive research, the relationship between turbine operating efficiency and the mortality of fish passing through turbines is well understood. As a result, NOAA Fisheries has required, and dam operators now limit, turbine operations to within 1% of peak efficiency to prevent harm to migrating juvenile fish. Operating outside that range can cause cavitation and ultimately damage turbine blades. The proposed action creates additional allowances for operating turbines outside the 1% range during salmon migration periods.

[22] The Bonneville Power Administration, U.S. Bureau of Reclamation and U.S. Army Corps of Engineers recently adopted records of decision based on the Columbia River System Operations Proposed Action, Environmental Impact Statement and NOAA Fisheries' Biological Opinion. These decisions have been challenged in federal district court by the State of Oregon and a coalition of environmental groups.

- For nearly 25 years it has been recognized that load following, or power peaking, operations can be detrimental to both fish and fishermen. Fish managers have not observed power peaking operations in the Snake River for over 10 years, and maybe 20, except in pre-determined instances of turbine testing. In the winter of 2021, fish managers witnessed several consecutive days of power peaking at Dworshak Dam with daily outflow fluctuations of up to 9,000 cubic feet per second. This can damage salmon redds below the dam and move adult and juvenile fish out of the area.

- The historic models that evaluate hydro system operations are generally operated on a daily average basis. The new Flex Spill operation occurs within certain daytime hours. The action agencies have not proposed investment into updating the various models used to evaluate impacts and benefits of fish operations by creating hourly time steps in their models.

2.3.9. Salmon Populations are Facing Extinction.

Columbia and Snake River salmon and steelhead populations are in dire condition.

- Thirteen species are listed as either threatened or endangered under the Endangered Species Act.

- Currently, 42% of Snake River spring/summer Chinook populations have fewer than 50 fish.

- By 2025, 77% of these Snake River chinook populations are predicted to hit their quasi-extinction risk threshold[23] of less than 50 fish by 2025.

- Three stocks have recently triggered their NOAA early warning and significant decline indicators: Upper Columbia Spring Chinook, Upper Columbia Steelhead, and Snake River Steelhead.

- The total abundance of salmon and steelhead in the Columbia River is at or near the abundance when the first ESA listings were registered in the mid 1990's.

Recently, NOAA Fisheries and its Marine Fisheries Advisory Committee (MAFAC) convened the Columbia Basin Partnership Task Force to bring together diverse representatives from across the Columbia Basin to establish a common vision and goals for salmon and steelhead. The group found a strong sense of urgency was needed to implement immediate action if declines in salmon and steelhead were to be addressed.

[23] Quasi-Extinction is defined as 1) a population that is uncertain to persist; 2) there are not enough parents to successfully reproduce and perpetuate the population; and 3) the probability of recovery is low without substantial intervention.

The Task Force set Low, Medium, and High goals for 27 stocks of salmon and steelhead. The Low Goal set by the Task Force is nearly 25% fish more that recent total run size to the mouth of the Columbia River. Put another way, current populations are at 75% of the lowest goal set by the Task Force. The populations of Columbia and Snake River salmon and steelhead are at very dangerous levels for their continued existence.

BPA, utilities, and the NPPC are currently assuming they can use the "flexibility" of the Columbia and Snake River dams to integrate solar and wind energy. It appears that they are assigning zero costs for this flexibility. Yet we know the cost is not zero. There is a horrific cost to salmon and steelhead populations and other tribal resources.

Appendix C summarizes the alarming condition of salmon populations; describes the biological conditions salmon need; and near-term and longer-term actions that are needed to improve survival through the Columbia River System.

3. Recommendations for the 2021 Energy Vision for the Columbia River Basin

This section describes the recommendations for the 2021 *Energy Vision for the Columbia River Basin*. They promote low-cost resources for consumers, maintain or improve reliability, improve survival of fish and wildlife, and reduce greenhouse gas emissions. The region should actively promote and monitor implementation of these recommendations. The region's energy future is promising. CRITFC sees potential benefit for the region's energy system and the Basin's ecosystems in additional actions to reduce the burden of the region's energy system on the Columbia River and its tributaries and on tribal resources.

3.1 Reduce Peak Demand

Controlling energy demand during times of peak energy usage needs to be a priority for the region. Electric supplies must meet energy demand every second of the day. Electricity demand peaks in the mornings as individuals and business begin their day to heat or cool buildings and in the late afternoons when people come home and need to heat or cool their houses, prepare dinner, and turn on other appliances. These daily peaks get larger on very cold or very warm days because it takes even more energy to heat and cool buildings.

There are quantifiable benefits to reducing peak loads. For the electrical system, lower demand on peaks translates into fewer capital resources that are needed to serve loads. The grid can serve the same total energy needs with fewer generating plants and a smaller investment in new transmission and distribution lines over time if peaks are lowered. Line losses and ancillary services can also be reduced with lower demand. Cutting peak demand will reduce damage to salmon and steelhead migration and reduce greenhouse gas emissions.

Appendix E describes the high cost of the transmission and distribution system associated with meeting peak demand. For example, serving the highest 600 hours during a year (out of 8,760 hours) is estimated to cost between $0.50 and $1 per kilowatt hour, compared to the average costs residential customers pay of about $0.08 to $0.12 per kilowatt hour. These high transmission and distribution costs get averaged into everyone's electric bill.

Reducing peak demand would also defer or eliminate the need for some new transmission and distribution systems. For example, BPA is planning to spend $730 million over the next five years to expand its transmission system[24]. Other utilities are planning to expand their systems and spending by four investor-owned utilities over the past five years totaled $6.8 billion. These expansions will add significant costs and can adversely affect

[24] BPA Integrated Program Review presentation, March 2, 2021.

sensitive resources along power line routes. See Section 3.10 and Appendix E for more information on transmission and distribution costs.

As discussed above, the region is currently valuing the "flexibility" of the hydroelectric system at zero, but we know the changes projected for the system will have devastating effects on fish and wildlife. The evaluation of programs to reduce peak demand must address these impacts on fish and wildlife and other tribal resources.

Adopting technologies that allow for peak load control may have significant advantages for fish passage. Once in place to control peak loads, it is a small step to use them to shape loads on a continual basis. Shaping loads could then translate into reducing energy demand pressures that compete with salmon and steelhead. The flex spill agreement describes above is an example.

By 2030, according to one estimate, the United States will have nearly 200,000 megawatts of cost-effective load flexibility potential, equal to 20% of estimated U.S. peak load. That is three times the existing demand response capability, with savings for consumers from avoiding utility system costs estimated at $15 billion annually. This flexibility, largely in buildings, can help cost-effectively address several grid challenges, from growth in peak demand, to higher levels of variable renewable energy generation, to increasing electrification of transportation and other loads[25].

As energy systems acquire the general ability to control loads, we can envision a time when loads can be shaped to harmonize with hydro system configurations and operations needed for fish and wildlife.

3.1.1. Energy Efficiency Reduces Peak Demand

Energy efficiency programs continue to be among the lowest-cost ways to meet future energy needs. They have the added benefit of reducing peak demand. A well-insulated home or office requires less heat in the winter and less air conditioning in the summer. Energy efficiency is "fish friendly". It is the energy resource that has the least potential to damage tribal resources. The table below shows the NPCC analysis of the energy efficiency savings between 2016 and 2019. It shows that the total savings were 857 average megawatts. These programs resulted in 1,683 megawatts of peak savings in the winter and 1,042 megawatts in the summer.

[25] Hledik, R., A. Faruqui, T. Lee, and J. Higham. 2019. The Brattle Group. "The National Potential for Load Flexibility: Value and Market Potential Through 2030." https://brattlefiles.blob.core.windows.net/files/16639_national_potential_for_load_flexibility_-_final.pdf.

Capacity Savings by End Use - All Sectors Combined		
Year	(Multiple Items)	
Row Labels	**Sum of Winter MW Savings**	**Sum of Summer MW Savings**
Lighting	698.06	445.43
HVAC	519.19	145.70
Whole Bldg/Meter Level	185.24	133.75
Unknown	59.56	47.57
Process Loads	47.83	49.15
Electronics	45.71	37.14
Water Heating	44.68	25.12
Refrigeration	40.84	44.73
Motors/Drives	22.12	21.13
Compressed Air	14.88	14.77
Utility Transmission System	1.62	1.57
Food Preparation	1.31	1.23
Facility Distribution System	0.97	1.00
Utility Distribution System	0.67	2.91
Irrigation	0.60	70.97
Grand Total	**1,683.28**	**1,042.17**

These programs have the added benefit of matching electric energy growth. As the number of new homes and business are built and new efficient appliances are added, the energy and capacity savings increase.

3.1.2. Demand Response

Utilities should use demand response to manage system loads, reducing peak loads, ensuring reliability by encouraging customers to reduce demand during peak periods or shift loads from peak to off-peak hours. The NPCC 2016 Power Plan identified potential to reduce or shift peak demands. It found:

> The Seventh Power Plan assumes the technically achievable potential for demand response in the region is over eight percent of peak load during winter and summer peak periods by 2035. This assumption is based on the Demand Response Program Potential Study commissioned by the Council1 and feedback from regional stakeholders. This figure represents approximately 3,500 megawatts of winter peak load reductions and nearly 3,300 megawatts of summer peak load reductions by the end of the study period. In addition, the study identified additional potential for summer and winter demand response that could be available by the end of the study period to provide for load and variable generation balancing services[26].

[26] nwcouncil.org/7thplan, page 14-2.

The NPCC is in the process of developing its 2021 plan. CRITFC urges the Council to pursue demand voltage reduction and time of use programs. Innovators like OhmConnect are marketing their free demand response assistance as a way of reducing energy blackouts.[27] It should also evaluate traditional demand reduction programs that reduce demand during peak periods as an alternative to batteries or other storage devices.

Utilities should pursue demand response in residential and commercial buildings and other sectors. For example, Idaho Power and PacifiCorp are running air conditioning cycling demand response programs and irrigation pumping programs. These programs are designed to reduce summer peak demands, which may have fisheries benefits.

3.1.3. Storage and Demand Flexibility Strategies

CRITFC recommends an expansion of the Smart Grid pilot projects and urges BPA and utilities to give priority to storage of power, including batteries, electric vehicles, water heating and thermal storage, and green hydrogen storage.

A. Utility-Scale Batteries

California is implementing a pilot program to install 2,000 megawatts of utility-scale batteries to store electricity to meet peak demands. These battery systems store power from solar plants during the day and can provide four hours of electricity when the sun sets. Northwest utilities should monitor these pilot projects to determine the cost effectiveness and feasibility for storing the electricity from the solar and wind projects projected in the northwest.

The WECC projections show approximately 200,000 megawatts of solar and battery projects by 2045.

B. On-Site Batteries

On-site generation and home and business storage systems are becoming commercially available. For example, Tesla has a Solar Roof and Powerwall system to generate and store electricity for a house. The Powerwall also tracks National Weather Service alerts for severe weather and fully charges the battery in case of a power outage. The system also has time-based controls to use stored power when grid costs are expensive and net metering credits for excess solar energy sent to the grid.

[27] https://www.ohmconnect.com/about-us

C. Electric Vehicles

Electric cars and plug-in hybrid cars could be a win-win-win for consumers, the environment, and salmon if auto manufacturers build in timers that can control when the cars charge. If timers are not incorporated and used, electric cars can make things much worse for consumers, the power system, and salmon.

Electric cars can significantly reduce greenhouse gases and other air pollution and reduce dependence on foreign oil. If owners charge car batteries during off-peak periods (for example, between 10 pm and 5 am) or during hours of energy surpluses, these cars will not contribute to peak loads and will provide a base load that could be served by hydropower when energy supplies are often more than the demand. Rather than "turning the river off" during light load hours, increased flows can help migrating salmon.

Utilities should also test the feasibility of smart meters for electric cars that would use power from the car batteries during peak periods and charge the cars when there is surplus power. The car owners could get a discount on the electricity, and this could be a cost-effective way to meet peak and provide storage at a lower-costs than utility-scale batteries[28]. These efforts will require improvements in information sharing so charging can be scheduled during the optimum time to reduce environmental impacts.

The Energy Vision for the Columbia River Basin recommends that all electric and plug-in hybrid cars come equipped with a timer that allows the owner to charge the car during off-peak hours. Utilities should develop incentive programs or standards of service requirements for timers on electric car recharging systems. Utility rate structures that reflect the true cost of electricity at different times of the day will provide further incentives for the owners to use the timers and participate in smart-meter programs.

D. Hot Water Heaters

Time of day water heating technology is commercially available. Water pre-heated during light load hours, *e.g.* in the middle of the night, can last through the morning peak use period and more. This technology can be used in today's hot water heaters, and can be made more effective in replacement tanks, by increasing the size of the water tanks.

The conversion to heat pump water heaters will also provide benefits. The NPPC 7th Plan estimated that cost-effective conversions from electric resistance to heat pump water heaters would reduce peak demands by 1,250 megawatts during winter (Jan) and just over 1,850 megawatts in summer (Aug) by 2035. Peak demand reductions are possible even with these systems since they come with built-in demand reduction capability. The total potential will be smaller than conventional water heaters since the peak demands for heat pump water heaters are already lower than conventional water heaters.

[28] Clean Vehicles as an Enabler for a Clean Electric Grid: https://iopscience.iop.org/article/10.1088/1748-9326/aabe97

E. Space Heating and Cooling Stored in Buildings

Similar to storing heat in water for later use, heating and cooling effects can be stored in building mass, including mass that may have been added for this specific purpose. The technique of using thermal mass (*e.g.*, properly located rocks, concrete, or other material) to store heat and cold is ancient but may be coming back in style as Northwest universities include energy efficient building design courses in their renewable energy engineering programs.[29] Adding mass to residential buildings is being tested in regional pilots. Storage of heating and cooling in buildings to meet these needs through peak periods has theoretical possibilities for around the clock applications similar to hot water storage.

Commercial buildings generally have a high mass, so they can be pre-heated and pre-cooled by using off peak energy prior to the buildings being occupied in the morning. The potential for saving on transmission and distribution, generation, line losses, and ancillary services is very large.

Web-based thermostat controls can enable existing buildings to store energy for heating and cooling. These controls allow a utility dispatcher to pre-heat and pre-cool buildings thereby shifting the power consumption to an off-peak period. This is an example of using the thermal mass already in the building as a storage medium. Once the platform that enables these web-based controls is in place, all energy devices using these controls could be operated for energy management purposes.

F. Pumped Storage

Pumped storage sites use electricity during surplus or low-cost periods to pump water into a reservoir for release through a generator to meet peak loads. These projects have experienced significant economic and environmental challenges in the past. Large reservoirs can affect tribal fish and wildlife and cultural resources. For example, a project proposed near Goldendale, Washington would affect Yakama Nation cultural, archeological, ceremonial, monumental, burial petroglyph, and ancestral use sites. The reservoir fluctuations create greenhouse gas emissions. The project is opposed by the Yakama Nation.

[29] The University of Oregon has created an Energy Studies in Buildings Laboratory with programs in Eugene and Portland employing and educating students in building designs that address climate change needs of society. *See https*://esbl.uoregon.edu. The Oregon Institute of Technology was the first university in the nation to offer a renewable energy engineering degree including coursework in energy efficient building design. *See* http://catalog.oit.edu/preview_program.php?catoid=9&poid=2030.

The NPCC has identified approximately 7,000 MW of capacity for such projects at some stage of the planning and development process. There may be some opportunities for this technology, but projects need to address the siting criteria discussed in Section 3.4 of this document.

G. Hydrogen Storage

Renewable hydrogen can be used to store energy, compressed for a transportation fuel, or put in a pipeline for industrial purposes. This technology requires low-cost electricity, water, storage facilities for the hydrogen, and an energy or industrial use for the fuel. Douglas County PUD is exploring a project to use surplus electricity from its hydroelectric dam to create hydrogen through electrolysis—separating hydrogen from oxygen in water using an electric current. Renewable hydrogen would be produced using a renewable resource with no carbon associated with production or consumption of the fuel. The utility is researching a 2-to-3-megawatt renewable hydrogen pilot project. In 2019, the Washington legislature authorized public utility districts to produce, distribute and sell renewable hydrogen[30].

3.1.4. Using Pricing to Reduce Peak Loads.

More must be done to provide consumers with an accurate price signal for the cost of electricity at different times of the day and different months of the year. CRITFC calls on northwest utilities and utility commissions to implement time of use pricing for all consumers based on the total costs of serving electricity needs.

Currently, all commercial, industrial, and agricultural customers served by investor-owned utilities in California are required to be on a time-of-use plan. Residential customers can choose to be on to time-of-use plans, by contacting their utility. The California Public Utility Commission states:

> If customers have energy usage that can be shifted from peak hours to off-peak hours, they may be able to reduce their energy bill by switching to a time-of-use rate plan. For example, customers could run large appliances like dishwashers and washing machines at off-peak hours. Electric vehicle owners may also benefit from switching to a time-of-use rate plan if they charge their vehicles overnight.

According to the California Public Utilities Commission, time-of-use pricing encourages the most efficient use of the electric energy system and can reduce the overall costs for both the utilities and customers by sending prices signals about the actual cost to serve loads at different times. Time-of-use rates vary according to the time of day, season, and day type (for example, weekday or weekend/holiday). Higher rates are charged during the peak demand hours and lower rates during off-peak (low) demand hours. In California,

[30] SB 5588, Chapter 24, 2019 Laws, was signed into law on April 17, 2019.

rates are also typically higher in summer months than in winter months. The California Independent System Operator has prepared a detailed analysis of the time of use periods in California.[31] The California PUC states: "This rate structure provides price signals to energy users to shift energy use from peak hours to off-peak hours."[32] California has implemented a default time of use rate system that will provide value experience.

Northwest public utility commissions should implement time-of-use rates to send an appropriate price signal that captures the dramatically different costs of using electricity during different times of the day.

3.2 Energy Efficiency Resources

Energy efficiency programs reduce both peak demands and year-round energy needs. Energy efficiency has been proven as a reliable resource in the Northwest with costs that are less than half the cost of new gas-fired power plants. These programs save consumers money and reduce the emissions of pollutants that cause climate change.

Energy efficiency also reduces the region's seasonal storage needs because energy savings closely track energy demand. The "flexibility" of energy efficiency is extremely valuable. Energy efficiency programs have no adverse effects on fisheries or other tribal resources.

The Northwest Power and Conservation Council's studies show that the cost to utilities of efficiency programs has been less than half of the cost of new generating resources. These resources reduce the region's costs of meeting additional electric energy demands and meeting needs associated with salmon restoration measures.

According to the Council, the region has saved 7,000 megawatts since 1978 through energy efficiency programs, codes, and standards. That is enough electricity to power seven cities the size of Seattle.

These energy efficiency programs have saved northwest consumers over $70 billion dollars and those savings are growing at about $5 billion per year. The NPCC data shows that more than $8.5 billion has been spent by northwest utilities on energy efficiency programs—a significant portion of these funds were spent in the region, providing jobs and economic activity.

Most of the conservation to date is what can be referred to as "technical" conservation. That is, the region has improved building codes and used more efficient lights and appliances to run homes and factories. There is much more to be done in improving the technical efficiency of all energy using devices.

[31] http://www.caiso.com/market/Pages/ReportsBulletins/RenewablesReporting.aspx.
[32] California Public Utilities Commission, see https://www.cpuc.ca.gov/general.aspx?id=12194.

The region is just beginning to focus on what can be referred to as "behavioral" efficiency. Behavioral efficiency can be as simple as turning out lights when they are not being used. The NPCC 7th Plan included 42 average megawatts in the residential section and 205 average megawatts in the commercial and industrial sectors from improved operations and maintenance over the next 20 years. NPCC and utilities should continue efforts to save energy by changing behavior through information and education programs.

Smart Grid addresses behavioral controls by allowing the adoption of technology within buildings that can control loads to be only what is needed, or alternatively what individuals are willing to forego in exchange for compensation from the utility. For example, at the right level of compensation some people might be willing to adjust their thermostats up or down a degree or two, saving power and capacity on the electricity grid. Many commercial buildings are operating as though they are occupied continuously. This situation is exacerbated by triple net leasing, where nobody takes responsibility for how much energy is used. The potential for energy savings is large. [33]

3.2.1. Secure All Cost-Effective Energy Efficiency.

Energy efficiency continued to be the resource of choice for the region in the Northwest Power and Conservation Council's 7th Power Plan, adopted in February 2016. The Council estimated that over 4,000 average megawatts of conservation could be acquired cost-effectively over the 20-year planning horizon of the plan. The NPCC found:

> … energy efficiency consistently proved the least expensive and least economically risky resource. In more than 90 percent of future conditions, cost-effective efficiency met *all* electricity load growth through 2030 and in more than half of the futures *all* load growth for the next 20 years. It's not only the single largest contributor to meeting the region's future electricity needs; it's also the single largest source of new peaking capacity. If developed aggressively, in combination with past efficiency acquisition, the energy efficiency resource could approach the size of the region's hydroelectric system's firm energy output, adding to the Northwest's heritage of clean and affordable power[34].

The NPPC is evaluating how much energy efficiency to include in the next power plan. Preliminary analysis indicates that the amount will be lower, primarily because solar and wind energy costs are so low.

As the NPPC develops energy efficiency targets for the next plan, it should assume a higher penetration rate. The NPCC targets in the 7th Power Plan assumed that only 85 percent of the cost-effective conservation will be achieved. If the region could achieve 100 percent of these savings, it would save consumers an additional $300 million per

[33] PowerMand, a company that provides tools to remotely control HVAC use in buildings. It has seen savings in building as high as 50% of the total energy use, by simply operating HVAC systems to take account of unoccupied times.
[34] nwcouncil.org/7thplan, page 1-1

year[35]. If we assume these savings are phased in over the life of a 20-year power plan; the additional savings could total about $3 billion by 2036.

California has implemented a mandate for zero net energy (ZNE) buildings. These are energy-efficient building where the annual consumed energy is less than or equal to the on-site renewable generated energy[36]. The California goals are:

- All new residential construction will be zero net energy (ZNE) by 2020.
- All new commercial construction will be ZNE by 2030.
- 50% of commercial buildings will be retrofit to ZNE by 2030.
- 50% of new major renovations of state buildings will be ZNE by 2025.

Northwest legislatures, energy regulators, and utilities should consider similar building standards.

Building and retrofitting homes and business to be very energy efficient and adding solar or wind energy with a battery system has many advantages. With the right incentives, it would reduce consumer costs, reduce peak demand and energy needs at all other times, and reduce the costs of expanding transmission and distribution power lines. All these factors should be included in calculating the cost effectiveness of these programs.

Zero net energy homes and building also provide energy security. They provide insurance against droughts that limit electricity from the dams, wildfires that disrupt transmission lines, cold snaps and heat waves that drive up electricity demand, and other natural disasters that will become more common as the climate warms.

There is a great deal of business and public interest in energy efficiency that did not exist in prior decades. Customers are asking for green certifications and business are routinely marketing products with zero-carbon footprints. Congress and the Biden Administration are considering infrastructure programs to address the climate crisis and increase funding for these programs.

Other analysis indicates that there is likely additional energy efficiency available. We reviewed two papers that addressed this issue. The first, a paper entitled: *Beyond Supply Curves,* by Fred Gordon and Lakin Garth of the Energy Trust of Oregon and Tom Eckman and Charles Grist formerly at the Northwest Power and Conservation Council. It shows how new technologies, which are often impossible to forecast, have significantly increased the amount and reduced the cost of energy efficiency measures. For example, the high efficiency windows in the 2005 Council Plan were 12 percent more efficient than the assumptions used in the Council's 1983 plan. The paper also shows how the cost of compact fluorescent lamps dropped from the $12 per bulb assumed in the 1991 plan to $3 assumed in the 2005 plan.

[35] De-rating the energy efficiency that is achievable by 15 percent represents 600 average megawatts of low-cost power that were not included in the NPCC conservation targets for the 7th Power Plan. A simple calculation of the value (marginal resource costs minus cost of conservation[35] multiplied by 1000 average megawatts) shows that the value of this additional conservation is $300 million per year.

[36] See California Public Utility Commission: https://www.cpuc.ca.gov/zne/.

The second paper, by David Goldstein of the Natural Resources Defense Council, describes the methodologies that are "excessively conservative if the goal of policymakers is to meet aggressive climate change emission reduction goals." The paper documents the systematic biases that result in low potentials in energy efficiency. These include: 1) subjecting efficiency measures to a criterion of proof beyond a serious doubt; 2) assuming arbitrary realization factors less than 100 percent due to questions about social acceptance of energy efficiency; 3) implicit assumptions that a lack of research on the cost or feasibility of a measures means that is it excluded for a study; 4) a failure to consider system integration; 5) assumptions that once known efficiency measures are implemented, technological progress ceases and no further improvements are possible; and 6) reliance on projected costs of efficiency without looking at realized costs, which whenever data has been available has always been lower.

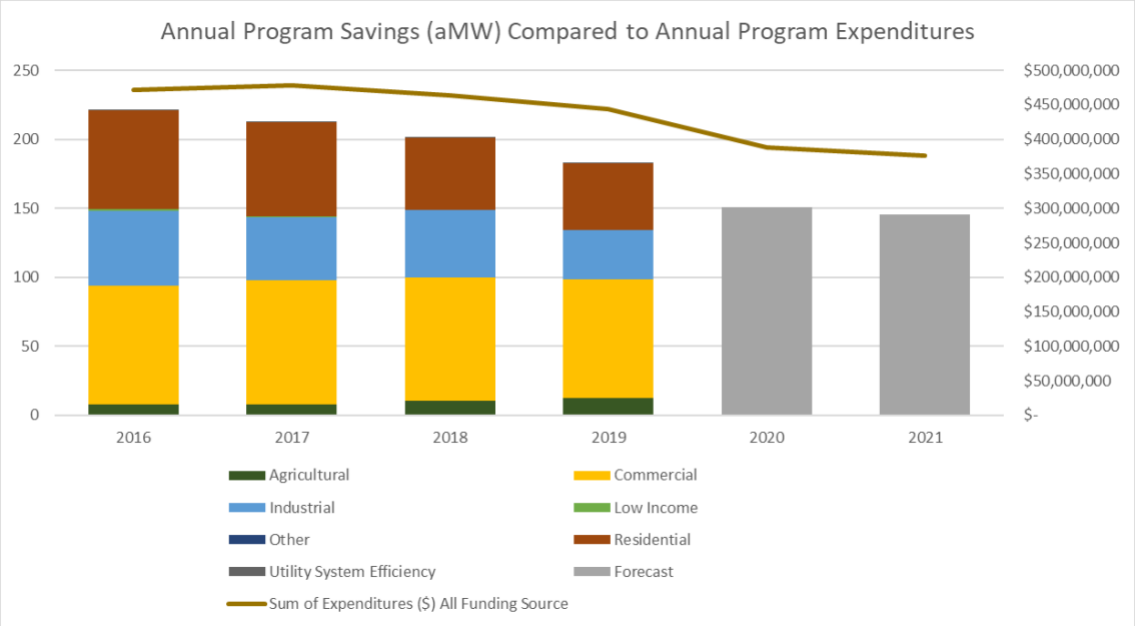
The challenge for the region is to set realistic targets for energy efficiency and ensure the flexibility to achieve higher savings as they become available. We call upon the region to do so.

The NPCC summary of achievements[37] shows the region ended up exceeding 6th Plan targets and is slightly ahead of 7th Plan goals – despite the impact of Covid-19 on programs. The table below shows the NPCC 5th, 6th and 7th Plan targets vs, actual achievements for all energy efficiency activities:

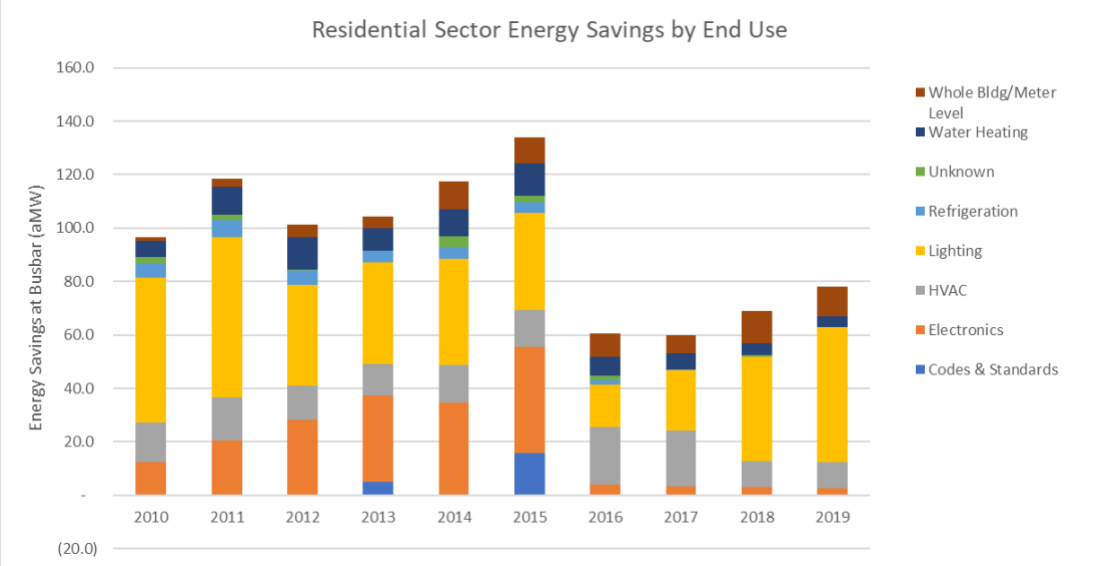
	Year	Cumulative Target (aMW)	Actual Achievements (aMW)	Actual Over/Under Target (aMW)	% Over/Under Target
5th Plan	2005	130	141	11	8%
	2006	265	293	28	11%
	2007	405	500	95	23%
	2008	550	735	185	34%
	2009	700	966	266	38%
	2010	900	1,223	323	36%
6th Plan	2011	1,120	1,503	383	34%
	2012	1,360	1,747	387	28%
	2013	1,620	2,009	389	24%
	2014	1,900	2,249	349	18%
	2015	2,190	2,492	302	14%
	2016	2,375	2,695	320	13%
7th Plan	2017	2,560	2,904	344	13%
	2018	2,790	3,133	343	12%
	2019	3,020	3,349	329	11%

[37] https://rtf.nwcouncil.org/about-rtf/conservation-achievements/2019.

While the region has made good progress in achieving the Council's conservation targets, savings for many programs are projected to decrease. The NPCC figure below shows total funding will decline by about $100 million between 2016 and 2021 and annual savings declined from approximately 225 average megawatts in 2016 to a projected 145 average megawatts in 2021[38]:

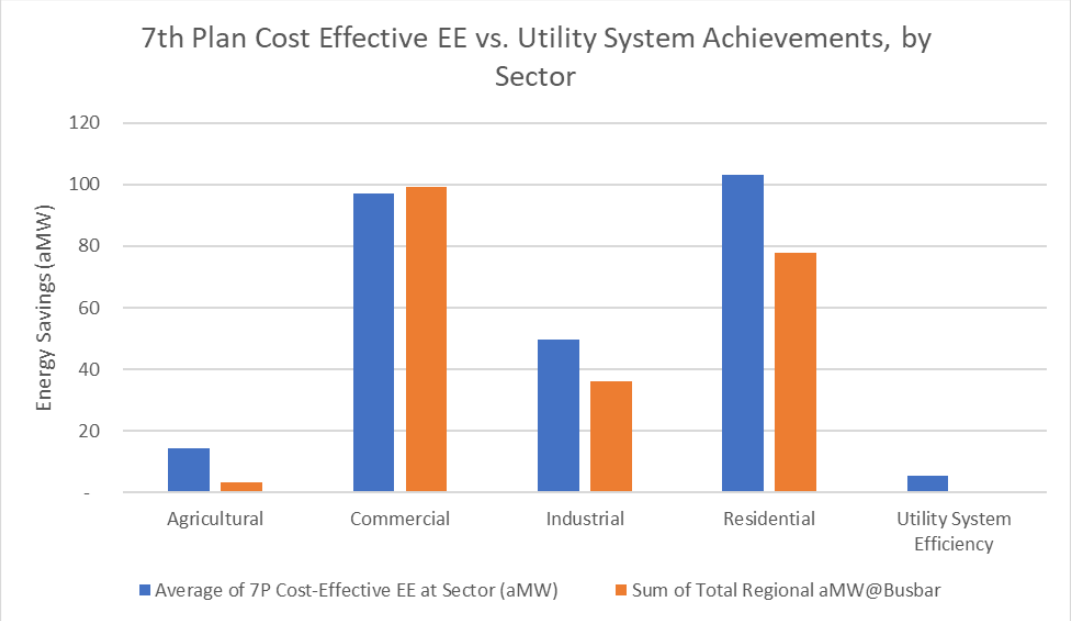


The reductions in energy savings have been significant in the residential sector[39]:



Utilities are not meeting NPPC goals in the agricultural, industrial, and residential sector.

[38] https://nwcouncil.app.box.com/v/2019RCPResults
[39] NPCC 2019 Regional Conservation Progress Report by the Regional Technical Forum.



After 30 years of experience, there are ample results in the Pacific Northwest to demonstrate that improving energy efficiency can reliably save energy. We also know that the Council's targets have been conservative. New technology has repeatedly made conservation more cost effective than estimated by the Council. Finally, the Northwest Power Act calls for energy conservation to be developed as a resource ahead of traditional resources.[40]

For all these reasons, the Council should address all the factors discussed above in setting conservation targets, set aspirational targets and work with BPA and utilities to try to exceed them.

3.3.2. Ensure that Utilities Achieve the Targets

We recommend that the Council, at a minimum, incorporate its conservation targets into Model Conservation Standards (MCS) pursuant to Section 4(f)(1) of the Northwest Power Act.

Many utilities in the Northwest are national leaders in implementing energy efficiency programs. We applaud their efforts. Some utilities have not embraced this proven, low-cost resource. The failure to achieve these targets means more resources and transmission and distribution lines need to be built and these actions will add costs and they present risk to upland resources like First Foods that the tribes are striving to protect. Failure to

[40] 16 U.S.C. § 839; 126 Cong.Rec. H9848 (Rep. Pritchard) ("[The Act] treats energy conservation as a resource, making it the top priority in meeting the region's energy needs. *NRIC and Yakama Nation v. Northwest Power Planning Council*, 35 F.3d 1371, 1378 (9th Cir. 1994).

meet efficiency targets also puts more pressure on the hydroelectric system that kills salmon and steelhead, and the construction will affect other tribal resources.

If some utilities do not make good progress on achieving the MCS, the Council should recommend a surcharge of 10 percent[41] on the power these utilities purchase from BPA. The 1983 and 1986 Power Plans recommended imposition of a surcharge for utilities that did not meet the MCS. The 1986 surcharge was set at 10 percent. The surcharge recommendation energized utilities to pass state building codes and implement other conservation programs, and BPA never needed to impose the surcharge.

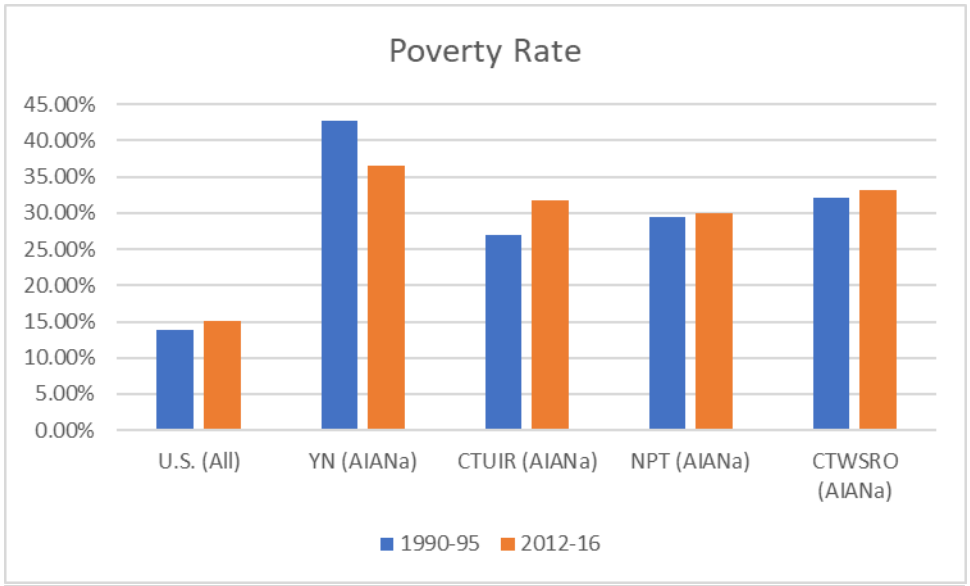
Implementing a surcharge under BPA's tiered rate structure presents challenges. For example, a utility facing a surcharge might consider giving up its Tier 1 allocation. We believe that BPA Tier 1 will remain a valuable power supply that comes with significant other services to meet load and is backed by a very reliable power supply. We believe utilities would likely choose to achieve energy efficiency savings and keep the benefits of Tier 1 power because it would be in the best interest of their customers.

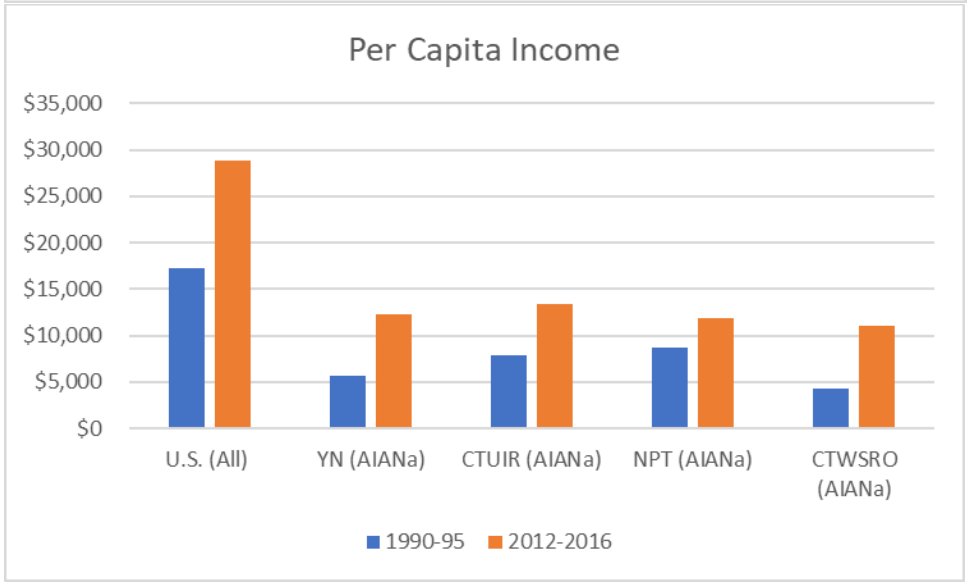
We also recommend that utilities have a safe harbor from a surcharge. For example, a utility could avoid the surcharge if it had: 1) well designed programs in place in all sectors; 2) offered funding to cover all the cost to the consumer of the energy-efficiency improvements; 3) had an effective public education program so all customers were aware of the programs; and 4) had committed sufficient funds to implement all requests for these services. CRITFC is seeking other criteria for safe harbor provisions that would effectively protect utilities that are making best efforts to achieve the targets.

3.2.3. Expand Low-Income Weatherization Programs

Tribal communities include many low-income people. Tribal poverty rates for Columbia River Treaty Tribes are still two to three times the national average. Per capita income is less than half the national average[42].

[41] Section 4(f) (2) of the Northwest Power Act authorizes the Council to recommend a surcharge of 10 to 50 percent for utilities that do not achieve the model conservation standards in Section 4(f)(1).
[42] The 1990-95 data (blue) were obtained from the 1999 Meyer Report, which presented information from the 1990 Special Tribal Run U.S. Census. The 2012-2016 data (orange) were obtained from the Center for Indian Country Development, which is a project of the Federal Reserve Bank of Minneapolis.





The Clean Energy Transformation Act[43] (CETA) in Washington requires utilities to ensure an equitable distribution of benefits from the transition to clean energy for all customers. The act also requires utilities to make programs and funding available for energy assistance to low-income customers.

Oregon requires that the total generating capacity of community solar projects be made available for use by low-income residential customers.

Given the long history of damage by the electric power system to the northwest tribes' resources, CRITFC recommends that energy efficiency and renewable resource programs give priority to tribal communities. We recommend that all homes and businesses be fully weatherized by 2025. We recommend that all homes and businesses should receive solar

[43] Chapter 288, Laws of 2019

panels and battery systems that provide zero net energy for tribal members—the energy efficiency and solar systems should meet all the energy needs of the building.

3.2.4. Energy Management Practices in Commercial Buildings and Industrial Facilities

Energy efficient commercial buildings and industrial facilities are also a source of great potential savings. Energy efficient lighting and appliances, of course, are a source of savings. But the biggest gains are related to heating, ventilation, and air-conditioning (HVAC) and improved energy management in industrial plants.

Because HVAC systems and smart thermostats are complicated, they need continuing attention to remain efficient and tuned to the tasks for which they are designed. All new buildings should go through a building certification process to assure that they are operating as they were designed and to assure that the operation is efficient.

Most commercial buildings rely on programmable thermostats that are not being maintained. Many buildings are operated as though occupied continuously. Better scheduling can result in 30-40% savings in many of these buildings. With Smart Grid technologies and strategies that enable one to essentially dispatch loads behind customers' meters, these savings can now be more easily captured. We recommend a concerted regional effort to do so.

The NPCC 7th Plan included 72 average megawatts of savings from existing commercial building commissioning. In addition, it included around 130 average megawatts of potential savings from plant energy management and integrated energy management in the industrial sector. These measures are also estimated to reduce winter peak demand by 219 megawatts.

3.3 Renewable Resources

3.3.1. Review and Integrate Policies to Reduce Greenhouse Gases

Solar and wind development can significantly reduce greenhouse gas emissions. Lower costs, higher efficiencies, and current federal and state policies are driving an increase in these resources. The capital cost of renewable resources developed to meet state Resource Portfolio Standards (RPS) and/or clean energy standards is being recovered in rates, so when these resources produce power in excess of "native load need" they can be sold at very low, zero, and even negative costs. As a result of the federal Production Tax Credit, Investment Tax Credit and Renewable Energy Credits, resource producers will pay others to take their electricity so they can get the credits. For all these reasons, they do not need to recover their capital cost "in the market."

As a result, the forecasts of future wholesale ***energy*** prices for most hours of the day and for nearly all months of the year across the WECC will continue to be low. These low prices depress the value of energy efficiency's ***energy*** (kwh) savings which in turn increases the cost of energy efficiency as a source of ***capacity*** savings[44]. Therefore, while these tax policies, cost-recovery practices and RPS are intended to promote the development of non-greenhouse gas emitting generating technologies, they have the unintended effect of reducing the amount of energy efficiency that is cost effective.

Even though some energy efficiency measures can reduce greenhouse gas emissions at a lower cost per ton than the cost of doing so with renewable resources, the existing incentives (tax credits, RECs) and electricity market structures make the energy efficiency measures appear more expensive. These assorted policies and RPS standards are not the only options available to ensure that the cost of climate change is considered (i.e., internalized) when evaluating electric generation options. Other alternatives, such as a tax on greenhouse gas emissions or caps on greenhouse gas emissions, could be used to facilitate the development of an integrated set of least-cost options for reducing greenhouse gas emissions, whether that be energy efficiency or renewables resources or most likely a combination of these resources. Unfortunately, under the current policy environment the least-cost mix of resources to reduce greenhouse gases is not likely to be developed.

These policies and standards can also have unintended and negative impacts on consumers and tribal communities. Energy Efficiency reduces consumer costs, provides energy and peak savings that are matched closely to energy needs, and provides local employment. Energy efficiency, along with other distributed energy resources such as batteries and demand response, can reduce the scale of renewable development needed to replace fossil fuel generation. Reducing the need for renewable resources helps avoid impacts to tribal resources associated with development of solar and wind farms and transmission lines to get their power to market. It also can reduce some large impacts to the operation of the dams and reservoirs that could hurt fish and wildlife.

A comprehensive review of renewable resources should also address the negative impacts on fish and wildlife. As discussed above, CRITFC is concerned about the assumption that the intermittent renewable resources coming online will be integrated with the hydropower system using current fish requirements and the otherwise unconstrained flexibility of the hydroelectric dams and reservoirs. For example, the analyses undertaken by the NPCC assume static fish constraints for the 20-year planning horizon of the Power Plan. At no time in the history of the Northwest Power Act have fish constraints remained static for a 20-year period. It is highly likely that fish constraints will be modified within this upcoming 20-year period.

[44] In the NPCC 7th Plan energy efficiency was selected as a lower cost source of capacity than demand response because a portion of the cost of energy efficiency was offset by its energy savings value.

CRITFC recommends that the Council consider a range of fish constraints in its analysis of the region's energy future and make a fully informed decision in adopting the Plan's requirements. Appendix C describes near-term and longer-term changes in the operation and configuration of the hydroelectric dams that should be evaluated.

The NPCC and federal and state regulators and policy makers must recognize the economic and environmental value of energy efficiency and distributed energy resources in offsetting the amount of renewable resources needed so the lowest-cost carbon reduction resource development path is selected. Simply increasing RPS requirements may not produce the best outcome because it does not consider whether there are lower cost carbon reduction resource strategies and strategies that better protect tribal First Foods and cultural resources.

3.3.2 Wind Generation

Utilities and BPA should continue to pursue wind, and the associated efforts to integrate wind power, consistent with the tribal concerns and protections for fish, wildlife, and cultural resources.

The Northwest has been a leader in the adoption of wind power. Wind power is a low-cost source of power today, and it offers insurance against escalating prices in the future, because the "cost of fuel" is free. However, the intermittent production of wind power, and the difficulty in predicting when the wind will blow presents a problem with integrating wind into the system. Integration of wind is exacerbated under high-water, high-wind, and low-load scenarios. BPA has led a regional effort to better integrate wind into the system. We believe that wind integration will be improved by use of various storage mechanisms discussed previously in this report.

Siting wind projects can be controversial. The Washington Energy Facility Site Evaluation Council held eight days of adjudicative hearings and took public testimony on two separate days when considering the application for the Whistling Ridge Energy Development near Underwood Washington and adjacent to the Columbia River Gorge National Scenic Area. Ultimately the project was abandoned by the developer. Similar concerns are now facing a wind development proposed for the Horse Heaven Hills near Washington's Tri-Cities.[45] Section 3.4 recommends a planning process for siting renewable energy development in the Northwest.

[45] "The thought of turning our beloved Horse Heaven Hills into a pin cushion for massive wind turbines breaks the hearts of most Tri-Citians." From the editorial board of the Tri-City Herald, https://www.tri-cityherald.com/opinion/editorials/article250063544.html

3.3.3. Solar Generation

The region should expand its efforts to promote solar energy. This could include support for cooperatives that can purchase photovoltaic panels at lower-cost bulk rates and provide technical assistance to homeowners, landlords, tribal governments, and others.

Solar power comes with the same integration problems that affect wind, and it comes with the same benefits of cost certainty throughout the life of the system. The capital costs of solar power have decreased significantly and there are growing opportunities to develop solar and battery systems to assist in meeting energy needs.

And, as discussed below we recommend a process for siting industrial scale solar developments that may impact undisturbed lands that are valued by wildlife such as pygmy rabbits and sage grouse, both of which have been considered for listing under the Endangered Species Act. Pygmy rabbits are listed under the ESA and a long history of sage grouse litigation continues concerning protective measures.[46]

3.3.4. Distributed Solar Generation

The costs of solar systems for homes and business have also decreased. These investments provide savings and certainty for the building owners. These systems have significant system benefits because they do not require expanded transmission and distribution lines and thus avoid the environmental impacts of those developments. Solar systems with batteries provide storage and backup power to improve reliability. The NPPC draft planning process projects distributed solar systems will add 2,322 megawatts of capacity and 230 average megawatts of energy by 2030. By 2045, the projection is 7,020 megawatts of capacity and 1,041 average megawatts of energy.

Solar roof top and battery systems will be sited behind customers' meters. In this case, line losses and ancillary services to get the power to the load are miniscule. Also, the intermittency problem of solar power is diminished somewhat, because small photovoltaic systems will be spread over wide areas of the region. Passing clouds will affect only a small portion of the installations at any moment. Thus, predictability of solar will be enhanced.

CRITFC recommends that states and local governments expand policies to promote on-site solar systems. These policies should consider Zero Net Energy standards similar to California for new and existing houses and businesses. The evaluation of the costs and benefits of these on-site solar systems should include the savings to the transmission and distribution system discussed in Section 3.10 and Appendix E.

[46] https://biologicaldiversity.org/w/news/press-releases/lawsuit-aims-compel-fish-and-wildlife-service-protect-bi-state-sage-grouse-2020-09-29/; https://biologicaldiversity.org/w/news/press-releases/court-halts-drilling-on-630-square-miles-of-federal-oil-leases-in-key-sage-grouse-habitat-2021-06-10/

CRITFC also recommends that state and local governments adjust building codes to require all new solar installations include a minimum of 50 percent of the nameplate of the system for a battery. Currently fire codes in some areas limit the size of a battery.

3.3.5. Other Renewable Resources

We focused on wind and solar above, but other renewable resources either at specific sites or with technological breakthroughs may be cost effective. Geothermal energy and biomass have been used successfully where the right conditions exist. And wave power, although in its infancy, may be cost effective in the not-too-distant future. Where these resources show promise, the promise should be explored, and implementation should be pursued when and where analyses show them to be ready for commercial production.

3.4 Develop a Comprehensive Plan for Siting Renewable Resources

CRITFC recommends the region prepare a thoughtful plan for where renewable resources should be developed, and where they should not. The plan should provide expeditious siting with clear and uniform standards across all political subdivisions that safeguard fish and wildlife and other tribal resources.[47]

In the mid-1980's, over 70 small hydroelectric facilities were proposed by private developers to the Federal Energy Regulatory Commission for licensing and development in the Salmon River Basin of Idaho. The National Wildlife Federation and the Nez Perce Tribe objected to initial steps in this development proceeding without a comprehensive plan of review. *National Wildlife Federation v. Federal Energy Regulatory Commission, 801 F.2d 150, 1507 (9th Cir. 1986).* The Ninth Circuit Court emphasized Congress' commitment to coordinated study and comprehensive planning along an entire river system before hydroelectric projects are authorized as a central feature of the Federal Power Act. This particular conflict and other similar conflicts over siting small hydro development in the Columbia Basin led to the regional policy adopted by the Northwest Power and Conservation Council and Bonneville Power Administration establishing "protected areas" where hydro project development is discouraged.[48] The current

[47] CRITFC's member tribes have ample experience with the devastating impacts of carbon free resources, such as the Columbia River Basin's system of dams that deeply impacted the tribes. These impacts have been documented in extensive surveys. https://www.critfc.org/wp-content/uploads/2014/11/circum.pdf Even contemporary projects like the $2 billion pumped storage project proposed near Goldendale WA pose impacts to tribal cultures and economies and can be expected to face stiff tribal opposition. Situated directly on a sacred tribal site, the proposed project directly impacts Yakama Nation cultural, archeological, ceremonial, monumental, burial petroglyph and ancestral use sites.

[48] For more information and for the formal Protected Areas provisions, see the 2014 Fish and Wildlife Program's Protected Area Strategy (Part Three, Section IV (A)(5)) and Appendix F to the Council's 2014 Columbia River Basin Fish and Wildlife Program, available at https://www.nwcouncil.org/sites/default/files/2014-12_1.pdf . A 2020 Addendum was added to the 2014

incentives for wind and solar developments are creating an analogous situation, where impacts of uncoordinated renewable resources development may permanently harm the Basin's water, fish, wildlife and cultural resources.

According to the Washington Department of Fish and Wildlife, 30 industrial solar projects are proposed for Washington with a footprint of 49,000 acres, or nearly 77 square miles. All but one of those projects is in the Columbia Basin. Facilities sited on shrub steppe compromise the function of sagebrush and grassland ecosystems and degrade habitat for deer, elk, greater sage grouse, ferruginous hawk, pygmy rabbit, and many other species. Developments also risk excluding tribal members from their traditional cultural foods and medicines, either through loss of the foods, loss of access to the foods, or both.

A siting plan should take a programmatic approach considering reasonably foreseeable impacts associated with such development. All affected tribes should be included during the early phases of siting, planning, and permitting processes by both state and federal governments. The plan could assess renewable resource sites and prioritize their potential for development. Potential esthetic, wildlife, and cultural resource impacts, all of which may bear upon site selection, and related issues, such as the need for new transmission, could be examined. The following examples demonstrate how such siting plans have been developed and what a plan could address.

- In October 2012, the Department of the Interior completed such a plan for development of solar energy on public lands in six western states. The Programmatic Environmental Impact Statement (PEIS) for solar energy development provides a blueprint for utility-scale solar energy permitting in Arizona, California, Colorado, Nevada, New Mexico and Utah by establishing solar energy zones with access to existing or planned transmission, incentives for development within those zones, and a process through which to consider additional zones and solar projects.

  The Solar PEIS establishes an initial set of 17 Solar Energy Zones (SEZs), totaling about 285,000 acres of public lands, that will serve as priority areas for commercial-scale solar development, with the potential for additional zones through ongoing and future regional planning processes. If fully built out, projects in the designated areas could produce as much as 23,700 megawatts of solar energy, enough to power approximately 7 million American homes. The program also includes a framework for regional mitigation plans, and to protect key natural and cultural resources the program excludes approximately 79 million acres that would be inappropriate for solar development based on currently available information.

Fish and Wildlife Program, but the text of the 2014 Program – including the Protected Area strategy - remains in effect. *See https://www.nwcouncil.org/sites/default/files/2020-9.pdf* .

- In January of 2013, the Department of the Interior completed a plan for renewable resource development in Arizona. The Restoration Design Energy Project (RDEP) is an initiative to identify lands that may be suitable for the development of renewable energy. The RDEP Record of Decision and Approved Resource Management Plan Amendments establish 192,100 acres of renewable energy development areas on BLM land throughout Arizona. These areas are near transmission lines or designated corridors, close to population centers or industrial areas, and in areas where impacts on water usage would be moderate. These lands also have few known resource impacts or have been previously disturbed, such as retired agriculture properties. These areas are available for solar or wind energy development. In addition, the Plan establishes the Agua Caliente Solar Energy Zone on 2,550 acres in western Arizona.

- In 1986, the Northwest Power Planning Council (now the Northwest Power and Conservation Council) adopted Protected Areas into the Columbia River Fish and Wildlife Program. These provisions protected 44,000 stream miles of habitat that was important for fish and wildlife. The provisions were recognized by the Federal Energy Regulatory Commission pursuant to its mandates under the Northwest Power Act. Protected Areas had the effect of avoiding disputes and wasted resources on sites that had significant fish and wildlife impacts and focusing development where it would not have negative impacts.

The need for such comprehensive planning was highlighted in a separate concurring opinion in the Whistling Ridge wind development proceeding before the Washington Energy Facility Site Evaluation Council in 2011. *Whistling Ridge Energy Project, Washington EFSEC Order No. 868 (October 6, 2011)***.** "Absent such a plan… economic considerations will be paramount and the broader public interest in protecting the environment could finish second. This is in no one's interest, least of all renewable resource developers" (James Luce, Chair).

The region would benefit from a comprehensive planning process that would guide renewable resource development and siting for wind, geothermal and solar technologies to favorable locations and outcomes for regional fish and energy needs. Common to each of the foregoing plans was the concept of developing criteria that would protect key resources by designating areas where development should be avoided as well as criteria that could guide development to areas where development could be incentivized.

Such criteria could stimulate innovations in renewable resource siting. For example, "low-impact" solar is designed to improve soil health, retain, water, nurture native species, and produce food. These projects preserve natural habitat, rather than leveling land and removing topsoil to use gravel or artificial grass.[49] The NPCC has also reported on dual purpose projects that integrate renewable projects such as livestock grazing, beehives, and certain crops. A National Renewable Energy Laboratory study identified over 25,000 man-made reservoirs that could be covered with floating solar systems to

[49] InSPIRE project stands for Innovative Site Preparation and Impact Reductions on the Environment. From NPCC June 2021 presentation.

reduce evaporation and algae growth and supply ten percent of U.S. power.[50] The criteria might also promote repowering existing sites to improve efficiency and output.

In the Columbia Basin context, the following criteria are offered as examples of criteria that could protect tribal interests on their ceded lands that comprise much of the interior Columbia Basin.

Summary of Recommendations:

Areas to avoid in siting energy resources development:

- Sites that would involve direct disturbance of tribal First Foods, including
    - Water
    - Salmon and culturally significant fish species bearing watersheds (e.g. Pacific Lamprey, suckers, white mountain trout, etc)
    - Ungulate (big game) calving, and critical feeding grounds and travel corridors
    - Cultural food plants and medicines
    - Berry fields
- Sites with high potential for direct disturbance of tribal archaeological and cultural resources as defined by the tribes
- Sacred sites
- Areas of tribal cultural use (e.g. cultural food gathering)
- Sites where birds of prey will be impacted
- Critical habitat areas (designated and proposed) for species under the Endangered Species Act of 1973 or under state sensitive species statutes.

Areas to incentivize for renewable resources development:

- Sites already disturbed by tilled agriculture
- Sites where ecological and energy benefits are complimentary, such as reducing irrigation demand by siting solar and wind development where ground water resources are depleted, and making complimentary arrangements to protect long-term agricultural interests
- Sites that do not require extensive new transmission resources
- Currently designated industrial zones
- Land areas outside the anadromous fish zone

[50] Floating Photovoltaic Systems: Assessing the Technical Potential of Photovoltaic Systems on Man-Made Water Bodies in the Continental United States, Spencer *et al*, Environmental Science and Technology, 2019, 53(3), pages 1680-1989.

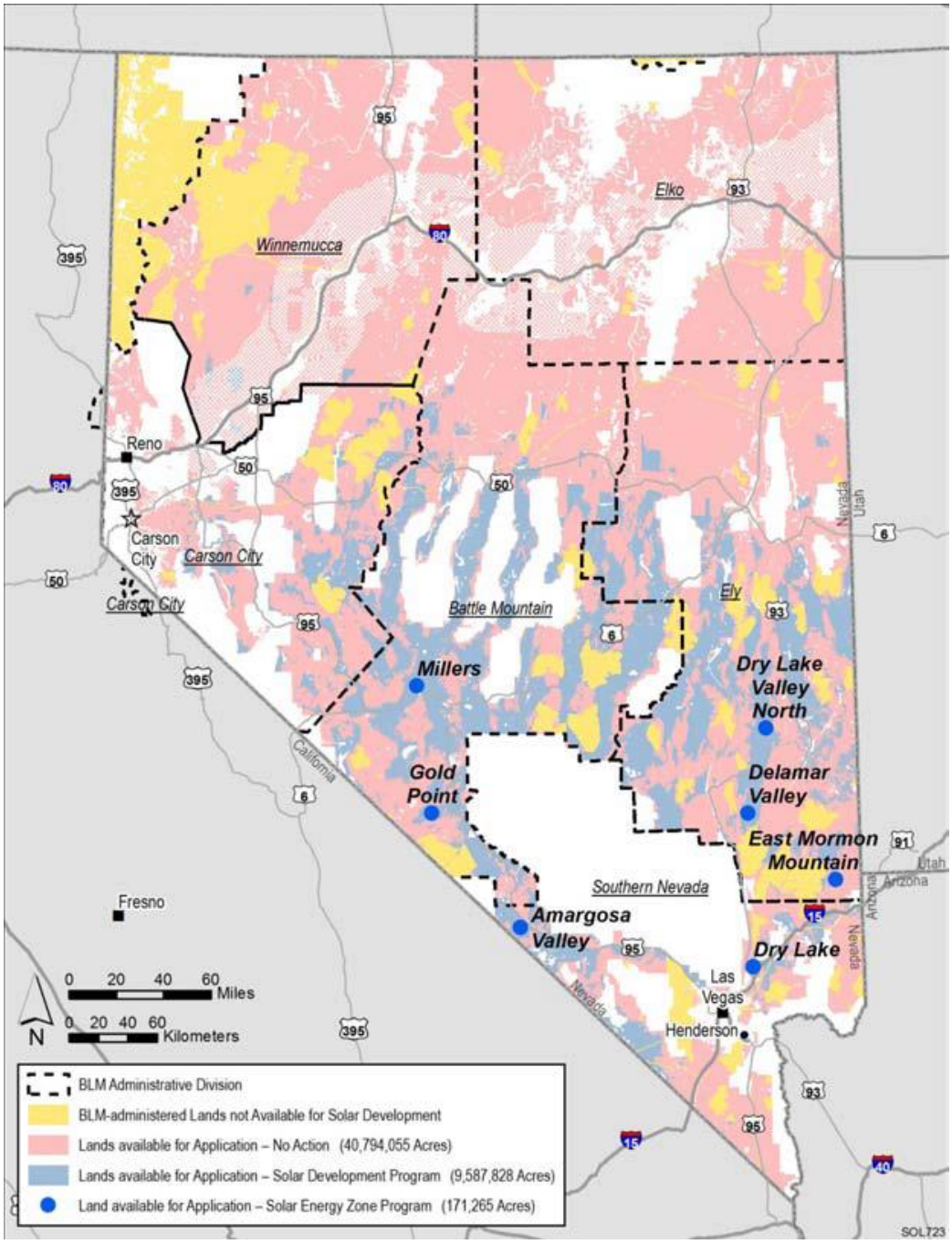
The BLM Draft Programmatic EIS for Solar Energy Development[51] had some similar criteria for solar development in the desert Southwest at Section 2.2.2.2, which applied to both action alternatives. An excerpt of the criteria in Table 2.2-2 is pasted below.

TABLE 2.2-2 Areas for Exclusion under the BLM Solar Energy Development Program Alternative

1. Lands with slopes greater than or equal to 5%.
2. Lands with solar insolation levels less than 6.5 kWh/m^2/day.
3. All Areas of Critical Environmental Concern (ACECs), including Desert Wildlife Management Areas (DWMAs) in the California Desert District.
4. All critical habitat areas (designated and proposed) for listed species under the Endangered Species Act of 1973 (as amended).
5. All areas where the applicable land use plan designates no surface occupancy (NSO).
6. All areas where there is an applicable land use plan decision to protect lands with wilderness characteristics.

These and other criteria were developed to address the potentially affected interests in the desert Southwest, including Arizona, Nevada, New Mexico, Colorado and portions of California. Some of the criteria are likely to be suited to the Columbia Basin. An excerpt from the DPEIS can be found in Appendix F. Numerous maps were developed by the U.S. Bureau of Land Management for the EIS that described areas for potential development. An example is shown below for the State of Nevada.

[51] Draft Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States, BLM and DOE 2010, *available* at https://solareis.anl.gov/documents/dpeis/index.cfm#vol2 .



Further discussion of the analyses is set forth in this Appendix.
https://solareis.anl.gov/documents/dpeis/Solar_DPEIS_Chapter_2.pdf#page=6

CRITFC recommends the federal government, state siting councils and the tribes immediately undertake a collaborative process for developing such a siting plan to protect Columbia Basin fish, wildlife, and cultural resources. Access to state and federal incentives for resource development should be contingent upon compliance with the plan's siting criteria.

3.5 Strategically Sited Resources

CRITFC recommends that BPA and the regions utilities develop a plan to strategically site generating resources. Strategically sited resources include those resources at loads, those that are sited within the grid to relieve congestion, and siting that protects fish, wildlife, and other environmental values.

Moving some generation closer to loads, in combination with reducing peak energy demands, will eliminate much of the planned costs for expanding the transmission and distribution system. Utilities must develop interconnection standards[52] that allow for safe operation of these local generators. Distributed generation can be deployed to eliminate the need for backup generation and transmission and distribution capacity.

Resources in the category of distributed generation include fuel cells, net-metered small renewable resources, and small wind farms. Owners of net-metered small renewable resources, including solar photovoltaic applications, can sell power back to the local utility at retail prices. Small wind farms of two to ten machines can be placed strategically within the grid and not necessarily where wind is the greatest, but where the combination of strategic placement and the wind resource yields the highest benefit to the electricity system. This benefit would show up as income to the wind developers and savings in transmission and distribution construction.

3.6 Resource Adequacy

The peak load reductions, energy efficiency, storage, and renewable resources recommendations above will all assist the region to provide adequate electricity supplies.

The Northwest Power Pool is updating its Resource Adequacy program. This effort is designed to address Pacific Northwest capacity shortfalls through 2030. If successful, the Northwest Power Pool Resource Adequacy Program will achieve electric system reliability while minimizing pressure on the existing hydroelectric system as the *de facto* fallback when the region is capacity short—with predictable adverse impacts on salmon. The program description states: "the capacity program will not initially focus on longer time-horizon of fuel-related issues (*e.g.*, dry water years), though we understand those issues are important."

CRITFC has recommended that a principal feature of the Adequacy Program should focus on a planning reserve margin (PRM), or reliability buffer, to guard against unanticipated reliability events and protect the region's natural and cultural resources. While individual utility PRMs have typically centered around 15 percent, the Resource Adequacy program should increase this buffer to 20 percent which would parallel what

[52] FERC has a NOPR to make interconnection standards simple and uniform throughout the country. See Standardization of Small Generator Interconnection Agreements and Procedures Advance Notice of Proposed Rulemaking, Docket No. RM02-12-000, issued August 16, 2002.

the CAISO has already recommended to help solve California's reliability problems. To augment these strategies and address near-term concerns, CRITFC has also requested the Northwest Power Pool address dry-water years to avoid the kinds of problems the region faced in 2001 (see CRITFC's letter in Appendix I).

Increasing the reserve standards would likely mean that utilities need to maintain some power plants on standby for potential shortages. While it is likely this would address near-term adequacy concerns, there are high costs associated with generating resources that may only run a few times a year or a few weeks during a decade. Recommendations on reducing peak loads, promoting energy efficiency and renewable resources, and other dry-year strategies, provides a range of other longer-term actions to keep lights on at lower long-term costs without damaging fish and wildlife and other tribal resources.

3.7 Additional Actions to Address Emergencies and Dry Year Strategies

3.7.1. BPA Rate Case

We recommend that BPA increase its probability of repaying the Treasury on time and in full, thus reducing the chances that BPA would get into a position where it might have to choose between meeting fish obligations and deferring a payment to the Treasury. The tribes continue to recommend that BPA's Treasury payment standard should be forward looking so BPA can adjust rates when it experiences added costs or lower revenues rather than waiting until its Treasury payment probability is reduced.

BPA has made changes in its rate structure to increase revenue to address emergencies. CRITFC continues to recommend that BPA expand the circumstances that could trigger the emergency provisions and increase the amount it could collect in these circumstances. Moreover, we were disappointed that BPA's stewardship obligations for fish and wildlife were not addressed on par with its power mission in its 2021 strategic plan. [link/more]

BPA has reduced in real terms funding available for its fish and wildlife program. It has also made changes that reduce fish and wildlife operations. CRITFC will continue to work to address these concerns.

3.7.2. Dry Year Strategies:

Maintain reserves to meet fish and wildlife obligations: As discussed above, increasing planning reserve margins, and increasing energy efficiency and renewable resource development will reduce risks to fish and wildlife and the region's economy during low-water years. Until these provisions are in place, the region may need to rely on existing thermal resources to avoid another year like 2001. We note that several natural gas-fired resources have been built during the past 20 years and coal plant retirements could be delayed slightly as a last resort. CRITFC strongly supports shutting

down these fossil fuel resources to address the climate crisis; however, ensuring robust fish and wildlife protections during a dry-water year is a higher priority.

[CRITFC is seeking comments on other dry-year actions that should be included in this document.]

3.8 Columbia River Treaty

The Columbia River Treaty between the United States and Canada in came into full force and effect on September 16, 1964[53]. The dual Treaty purposes were to optimize hydroelectric power production through the U.S, system and to provide coordinated flood control. Ecosystem function, including protection of fish and wildlife and other tribal trust resources are not currently a purpose of the Columbia River Treaty. The Treaty has no end date but may be terminated by either party providing a ten-year notice of an intent to terminate the Treaty. The first chance for either party to provide a notice of an intent to terminate the Columbia River Treaty was on September 16, 2014.

The United States and Canada initiated formal negotiations to modernize the Treaty in May 2018. U.S. negotiators are being guided by the U.S. Entity Regional Recommendation for the Future of the Columbia River Treaty after 2024 (Regional Recommendation), submitted to the U.S. Department of State on December 13, 2013, as well as by specific authorities developed by the U.S. Department of State as provided under statute. Canadian negotiators are being guided by the Columbia River Treaty Review B.C. Decision (B.C. Decision). Both documents recognize the need to address ecosystem function under the Treaty.

If the Columbia River Treaty is not modernized through negotiations before September 16, 2024, Canada will no longer be obligated to provide coordinated flood control management and protection to the U.S. After 2024, the U.S, will have to call upon Canada to provide flood control, which Canada interprets the Treaty to first require the United States to use all the storage facilities in the United States before calling upon any flood control from Canada. The U.S. will also have to pay Canada for operational and opportunity costs of providing flood control. The Canadian view that requires that the U.S. first utilize all of its available storage would put at risk several dam and reservoir operations developed to integrate ecosystem function into U.S. hydropower operations which would substantially impact fish and wildlife resources beginning in 2025.

[53] The U.S. Senate ratified the Treaty in 1961 but Canada did not ratify the Treaty until 1964, after an exchange of diplomatic notes on January 22, 1964, that provided how the Treaty's flood control provisions were to be implemented by the parties and that laid out the terms for the sale of the first 30 years of Canada's share of the downstream power benefits (Canadian Entitlement). These terms were adopted as part of the Treaty by protocol, which also included the specific details of the sale of the Canadian Entitlement. In 1963, Canada and the Province of British Columbia entered into an agreement regarding the implementation of the Treaty by the Province, that recognized the all the benefits of the Treaty were to be retained by the Province and that required the concurrence of the Province on any Treaty-related actions by Canada, including Treaty termination.

Importantly, Canada also believes that, pursuant to Treaty terms, the U.S. could not call upon Canada for this type of flood control assistance after September 2024 unless the flows at The Dalles Dam were expected to exceed 600,000 cubic feet per second (cfs); the U.S. Army Corps of Engineers notes that flood damages to areas below The Dalles Dam begin when flows exceed 400,000 cfs and that substantial damages occur downstream when flows exceed 600,000 cfs.

Based on the analysis prepared by the U.S. Entity (BPA and the Corps of Engineers), working with other federal agencies, the Columbia Basin tribes, and the States of Oregon, Washington, Idaho, and Montana (Northwest States), that this change in flood control operations at several dams and reservoirs throughout the basin would have significant effects on resident fish and cultural resources in the Grand Coulee, Hungry Horse, Libby, and Dworshak reservoirs. Refilling the deep draw downs in theses reservoirs will also further reduce the spring freshet for salmon migration. The tribes are concerned about the adverse impacts to resident fish and tribal resources in these reservoirs and reductions in migration flows for salmon and steelhead.

It is also possible that the flood control operations could change operations of the upper Yakima River storage dams (including Keechelus, Little Kachess, and Cle Elum lakes), and other storage reservoirs that could be drawn down significantly in late winter to early spring timeframe to prepare for the spring runoff. These potential operational changes should be expected at all reservoirs throughout the Columbia River basin above The Dalles Dam if the U.S. needs to call upon Canada for flood storage operations.

The Columbia Basin Tribes Coalition[54] developed a common views document in 2010 and are working together to avoid these damaging changes in flood control operations. During the development of the Regional Recommendation the Columbia Basin tribes worked with the U.S. Entity and Northwest states to explore ways to modify the treaty to improve conditions for salmon, steelhead, and resident fish and reduce flood control costs. The Columbia Basin tribes continue to coordinate with the U.S. negotiating team on these issues. Before the treaty's 50-year control of the river gives way to a new era, the progressive Regional Recommendation, which reflects the evolution of societal values that have occurred since 1964, must provide the framework upon which the negotiations with Canada proceed to conclusion to modernize the Treaty. A modernized treaty should provide equally for ecosystem requirements, hydropower operations and

[54] The Burns Paiute Tribes, the Coeur d'Alene Tribe, the Confederated Salish and Kootenai Tribes of the Flathead Reservation, the Confederated Tribes of the Colville Reservation, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes and Bands of the Yakama Nation, the Confederated Tribes of the Warm Springs Reservation of Oregon, the Cowlitz Indian Tribe, the Kalispel Tribe of Indians, the Kootenai Tribe of Idaho, the Nez Perce Tribe, the Fort McDermitt Paiute Shoshone Tribes, the Shoshone Bannock Tribes of the Fort Hall Reservation, the Shoshone Paiute Tribes of the Duck Valley Reservation, and the Spokane Tribe, with support from the Columbia River Inter-Tribal Fish Commission, Upper Columbia United Tribes and the Upper Snake River Tribes tribal organizations, have been working together to consider the effects and alternatives related to the Columbia River Treaty. In June 2018, the Yakama Nation announced that it would be speaking for itself on all issues related to the Columbia River Treaty from that point forward.

flood-risk management. Equal consideration of improved spring migration of salmon, seasonal flushing of the estuary, resident fish requirements and salmon passage at all historic locations are all needs of the Columbia River basin to include in a new treaty. The elements of this energy vision are intended to complement a modernized Columbia River Treaty.

To the tribes, it appears as though the treaty negotiations have focused on economic issues associated with sharing the several hundred megawatts of electricity generated through coordinating the Columbia River's flow at the border to optimize power generation through the U.S, hydropower system. While determining how – or if - these downstream power benefits of the Treaty, with Canada's 50% share of these benefits known as the Canadian Entitlement, continue under a modernized Treaty is important it cannot be a focus of the talks. CRITFC believes it is time to expand the discussion to address the new realities in the west coast energy system. Many thousands of megawatts of renewable resource generation are expected over the next 20 years and there are opportunities to coordinate and integrate those developments that provide win-win outcomes. For example, our analysis shows that 1 MAF of Mica storage capacity would firm 4,782 MW of wind over one year.

Taking a big picture view of the coordination of all the major hydroelectric dams in Columbia Basin could lead to the following priorities: (1) flood control, (2) ecosystem function (3) storage, (4) capacity, (5) energy. CRITFC will consult with Indigenous Nations in Canada on these issues.

3.9 West Coast Energy Market

California has an active Independent System Operator to coordinate electricity generation and distribution. California, BPA, and northwest utilities are discussing an expanded Energy Imbalance Market (EIM) to facilitate the sale of power between regions.

It may be possible that closer coordination between regions can improve reliability and address resource adequacy problems. However, California has experienced major power blackouts and CAISO is reviewing operations changes to improve reliability. It will be important to ensure that California planning and policy problems do not adversely impact the Pacific Northwest. It is also possible the importation of large amounts of solar electricity from California could harm salmon migration and survival as discussed above.

We ask the Pacific Northwest utilities, states and federal agencies to closely monitor these developments to ensure that they address impacts on Columbia Basin Fish and Wildlife and other tribal resources.

3.10 Reduce Expansion of Transmission and Distribution Lines

As discussed above and in more detail in Appendix E, there are significant economic and environmental costs associated with the existing and new transmission and distribution lines. Transmission lines also have been linked to starting wildfires. BPA is projecting a transmission expansion program that is budgeted at $730 million over the next five years. CRITFC was able to compile distribution and transmission costs from the past five years for four investor-owned utilities in the region that totaled $6.8 billion. The information did not have enough detail to determine how much of these funds were spent on activities that could be reduced or delayed if additional energy efficiency, on-site solar, and peak-demand reduction programs described in this document had been implemented.

If utility spending on transmission and distribution over the next five years is similar to the recent past, the total BPA and investor-owned spending could total $7.5 billion. Spending by municipal and public utilities would add to this total. If additional energy efficiency, on-site solar, and peak-demand reduction programs described in this document could reduce the need for of these expansions and upgrades by ten percent, it could save consumers approximately $750 million over the next five years. A twenty percent reduction could save about $1.5 billion on expansions and upgrades. Please see Appendix E for more information.

The magnitude of these transmission and distribution costs and the potential for savings for consumers and the environment should convince regional energy decision makers to focus on the benefits of reducing these economic and environmental costs. The construction costs are averaged into utility rates, so consumers do not see the magnitude. The environmental costs often fall on tribal resources (such a first foods and sacred sites), rural areas, and populations that are not represented in energy siting or ratemaking processes. Investor-owned utilities receive a rate of return on these investments; this may create an incentive to expand these facilities rather than pursue activities that reduce the need to expand these expensive assets.

BPA, utilities, utility regulatory, commissions, energy siting agencies, and the NPPC should consider these cost savings and other environmental, cultural, and tribal resources. impacts in evaluating the cost-effectiveness of actions to reduce peak demand, additional energy efficiency, and on-site solar.

[Note to reviewers: CRITFC has tried to find information on the costs for utility plans to expand transmission and distribution systems. The BPA expansion cost information was readily accessible and is detailed in Appendix E. We would appreciate any information reviewers can provide for other utilities or transmission consortiums on either future cost estimates or actual costs over the past five years. CRITFC is also seeking comments on the potential for reducing transmission and distribution costs in the future from actions to reduce peak demand, additional energy efficiency, and on-site solar.]

3.11 Reduce Reliance on Fossil Fuels

It is impossible to discuss energy without talking about carbon-based fossil fuels such as crude oil, coal, and natural gas. Their products and by-products include petroleum-based fuels (e.g., butane, diesel, kerosene, liquefied natural gas, liquefied petroleum gas, propane, fuel oil), crude oil, natural gas, various types of coal, and methane. From extraction, to conveyance, to consumption, and by-product waste treatment, fossil fuels dominate global energy markets and drive climate change and hazardous waste management. The extraction, transport and use of fossil fuels are generally incompatible with Tribal Nations' ultimate obligations to protect sacred First Foods and precious water.

The fossil fuels life cycle includes points of extraction, conveyance and import or export project siting such as receiver terminals, refineries, and power plants, and finally consumption, usually through a combustion process. At each step to fossil fuel use, the planet and its resources are harmed. While fossil fuel extraction is not a dominating issue in the Columbia River Basin, the region is a target for fossil fuel transport and export projects. The Basin also suffers from regional and global consumption effects, such as air deposition of mercury from coal plants in Asia.

Over the last century, there have been many developments in the Columbia River Basin that have manipulated river resources, leaving legacy pollution and damage with which the tribal communities have had to contend, and many are now forced to remediate. From the tribal perspective, these projects rarely benefit the region for more than the short term, if at all, and rarely, if ever, benefitted the tribes. These developments have placed undue burdens on the backs of the Region's salmon populations.

Fossil fuel extraction impacts indigenous people in the U.S. and Canada in significant and disproportionate ways compared to their non-Indigenous neighbors. Drilling, mining, and fracking pollutes air and water, destroys cultural and natural resources, and the projects create dangerous social and economic impacts. In Canada, oil sands bitumen extraction is the most polluted and polluting extraction process of any fossil fuel, creating toxic waste and hazardous by-products like petroleum coke. The oil sands are located on Indigenous Nations' territories and extraction has destroyed thousands of acres of natural homelands and habitat.

In the Columbia River Basin, fossil fuel projects include transport terminals, refineries (located on northern Puget Sound native lands), and gas and coal-fired generation plants. In the 1970s, proponents of transitional, throughput fossil fuel transport facilities focused on the Pacific Northwest as a gateway to important markets to export these products. The initial projects proposed importing crude for delivery to the Midwest[55].

[55] In 1977, Senator Warren Magnuson added an amendment to the Marine Mammals Protection Act to ban the construction of an oil superport inside Puget Sound that was designed to deliver crude oil to the Midwest.

In 2005 there were proposals to import liquefied natural gas (which were later reverted to developing export terminals when fracking in the United States became economical). Later coal companies eyed markets in Asia and rail lines that connected the Powder River Basin with the Pacific Northwest, and by 2012, crude oil companies were considering similar options, finding rail suitably cheaper than pipelines to export large quantities of Bakken crude and Canada oil sands (bitumen) crude. Bitumen's toxic by-product, petroleum coke, is also transported through the Columbia River Gorge.

Transport terminals usually include three separate components: the conveyance that serves the terminal, the terminal itself, and the marine vessels to export the product. These terminals are transitional facilities that cannot operate but for the other transport components. Typical conveyances include rail, barge, trucking, and pipeline. Of these options, rail is the component with the least amount of state, tribal, or federal regulatory oversight. In addition, many states and federal agencies are reluctant to comprehensively analyze the risks transport of fossil fuels poses to human health and the environment, leaving high consequence risks unmitigated. This poses an advantage to project proponents who, in the last decade, have rushed to propose dozens of fossil fuel-by-rail projects, particularly crude-by-rail and most recently, methane and liquefied natural gas by rail.

Export projects do not provide abundant energy to regional markets, but rather burden local resources, increase risks of catastrophic harm, and provide no benefit for affected tribes. Starting in 2010, dozens of fossil fuel transport projects were proposed for the Pacific Northwest, specifically the states of Oregon and Washington, and the province of British Columbia. Regional tribes and First Nations were forced to spend time and resources analyzing and unifying in opposition to this onslaught. Most of the projects failed to be permitted, due in large part to tribes' coordination with allies in the environmental community, groups such as "Power Past Coal," "Stand Up to Oil," and "Power Past Gas." In the landscape of these victories, a new term was coined, "the thin green line" of the Pacific Northwest.

Besides providing the tribes and public with the only regulatory means to evaluate projects, the terminals themselves can be a problem. In more than one case, terminal projects were proposed for locations impacting sensitive cultural resources, areas that provide salmon spawning or rearing habitat and other aquatic resources, or were situated such that they directly impeded tribal treaty fisheries. Most of the terminals lie near water bodies, such as the Columbia River, adding or expanding dock infrastructure that attracts predators – both avian and aquatic – that impact treaty fisheries. Finally, the terminals' operations that involve transfer and storage of fossil fuel products, and these terminal's proximity to water bodies, increases risks of spill and injury to the river.

The variety of conveyances that feed these terminals and refineries all pose unique risks depending on location and product. Fossil fuels are conveyed via pipeline, long-haul truck, rail car, barge, and marine vessels throughout the Columbia River Basin. Oil and natural gas pipelines are often highly destructive to natural areas when constructed and are notoriously leaky during operation. Natural gas pipelines have been proven to pollute

the air with methane, volatile organic compounds, and particulate matter. In British Columbia, a proposed pipeline would bring heavy oil sands crude over fragile habitat and to the Salish Sea for transfer to oil tankers. Marine vessels pose their own elevated spill risks and have been shown to impact Southern Resident orcas and tribal fishing.

Rail has been in the Columbia River Basin for a very long time, hauling materials and supporting the regional economy for over a century. In the Columbia River Gorge, the rail lines both sides of the river, the construction of which continues to directly – and often negatively – affect the hydrology and flow of the river.

The region has only two coal power generation plants, so the amount of coal traditionally hauled through the Columbia River Gorge has been minimal. When two excessively large-scale projects were proposed in the Pacific Northwest that would have substantially increased the number of coal trains severalfold, the tribes stood against these projects. Even with the smaller number of coal trains, many tribal fishers complained of coal dust in the windy Gorge. Coal dust contains arsenic and polycyclic aromatic hydrocarbons (PAHs), a known carcinogen. High levels of both contaminants have been found in the soil around coal piles, and arsenic can leach into water. Airborne coal dust has been associated with bronchitis, emphysema, and asthma. Burlington Northern Railroad estimates that each coal car loses 500 pounds of dust each trip, with each 100-car train potentially losing 50,000 pounds. With the specter of more coal trains, then, the tribes were adamantly opposed.

Meanwhile, in the Bakken fields of the Dakotas, the United States found itself in possession of excessive amounts of domestic crude. Oil companies looked west to markets in Asia and considered rail as the simplest form of conveyance to get the product to market. To this point, rail tanker cars had not been tested for light crude such as Bakken. In 2013, an oil train derailed in Lac-Megantic, Quebec and exploded, killing forty-seven people. In 2013, there were continual derailments and explosions, spilling more oil into rivers, lakes, and marine waters than in the previous forty years. New and retrofitted tank cars were developed that decreased the severity of the derailments, but nonetheless, spills occured on an annual basis. Along with greater risks of high consequence spill events, the increase in oil terminal proposals meant a sharp increase in rail traffic. Most oil trains are made up of over 100-120 cars, stretching a mile and a half. For the Columbia River, this meant long and numerous oil trains travelling both sides of the river, impeding tribal fishers' access and creating potentially dangerous conditions.

In the past, natural gas has been peddled as a clean-burning fuel less impactful to the environment than coal and crude oil, and a potential "bridge" fuel to move from fossil fuels to renewables. Riding this message, in recent years, the U.S. has become a global leader in natural gas extraction, mostly through fracking processes. However, fracking is extremely water intensive and toxic and has contaminated drinking water in communities across the country. When natural gas is conveyed in fracking, methane can leak into the atmosphere. Methane is an insidious greenhouse gas much worse than carbon dioxide. In sum, natural gas is not the appropriate bridge to decarbonization.

Overall, fossil fuel projects have no place within any plan to protect salmon or treaty resources. Mitigation is often unavailable or inadequate, and most projects pose risks of irreparable physical consequences to cultural and natural resources.

4.0 Conclusions

The Northwest is at a critical crossroad. We are facing challenges to the health of the planet and the future of iconic fish and wildlife. These challenges are especially important to tribal resources that have sustained our people since time immemorial.

One path leads to affordable, carbon-free energy that harmonizes with the ecosystem. This future would prioritize energy efficiency, renewable resources, new storage technologies, reductions in peak loads, and other strategies compatible with the needs of fish and wildlife. These efforts would reduce the impacts of renewable resource projects and transmission lines on tribal resources.

The other path creates conflicts between renewable resources and tribal resources, producing higher costs for consumers.

Choosing the first path will require the courage to develop common-ground solutions, and a commitment of resources to accomplish the hard work ahead.

CRITFC and its member tribes are committed to working with other regional interests to lead the region to a brighter and healthier future. Our people and the resources that sustain us depend on it.

Energy Vision Glossary

We have tried to minimize jargon and acronyms in the Energy Vision, but we have not always been successful. This glossary may help readers as they read the document.

Average energy refers to the amount a resource can produce over an entire year. For example, a wind farm might have a total capacity to generate 100 MW, but the wind blows during only a third of the year, so the total average energy would be 33 aMW.

aMW means average megawatts—for example, the amount of electricity generated or used on average over a year. For comparison, Seattle uses about 1,000 aMW during a year.

BPA means the Bonneville Power Administration

Capacity means the amount a resource can generate at peak production.

CTUIR means the Confederated Tribes of the Umatilla Reservation

CTWSRO means the Confederated Tribes of the Warm Springs Reservation of Oregon

Corps means the U.S. Army Corps of Engineers

Council means the Northwest Power and Conservation Council

Federal Action Agencies are BPA, the Corps of Engineers, the Bureau of Reclamation

GW means gigawatts—a thousand megawatts.

kcfs means thousand cubic feet per second of water flow.

MW means megawatts.

NPCC means the Northwest Power and Conservation Council

NPT means the Nez Perce Tribe.

Reclamation means the Bureau of Reclamation

YN means the Confederated Tribes of the Yakama Nation.

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Appendix A. The CRITFC Member Tribes' Treaty Rights

Since time immemorial the Columbia River and its tributaries were viewed by the Columbia River Basin tribes as "a great table where all the Indians came to partake."[56] More than a century after the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes and Bands of the Yakima Nation, and the Nez Perce Tribe signed the treaties which created their reservations, the tribes' place at the table has been subordinated to energy production and other non-Indian water development. Today, the Columbia River treaty tribes struggle for a very small fraction of their reserved fishing rights. The treaties -- the supreme law of the land under the United States Constitution -- promised more.

The Columbia River treaty tribes reserved the right to fish at all usual and accustomed fishing stations "in common with" the citizens of the United States. The fishing right means more than the right of Indians to hang a net in an empty river.[57] However, Columbia River runs of sockeye, coho, and spring, summer, and fall chinook have declined drastically since the mid-1800's.[58] Where once the Columbia produced annual runs of at least 10-16 million salmon, its runs are now diminished to tens of thousands. The devastation of fish runs is inimical to Indian treaties and the United States' trust responsibilities tribes.

The United States stands in a trust or fiduciary relationship to the Columbia River treaty tribes.[59] The trust relationship is a legal doctrine that embodies the many promises made

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[56] Seufert Brothers Co. v. United States, 249 U.S. 194, 197 (1919).

[57] Washington v. Washington State Commercial Passenger Fishing Vessel Association, 443 U.S. 658, 679 (1979).

[58] A run is the annual return of adult salmon and steelhead trout. Total runs include those fish that are harvested prior to reaching any dams. *See Generally*, U.S. COMPTROLLER GENERAL, HYDROELECTRIC DAMS: ISSUES SURROUNDING COLUMBIA RIVER BASIN JUVENILE FISH BYPASSES, H.R. Rep. No. 90-180, at 8 (1990).

[59] United States v. Mitchell, 463 U.S. 206 (1983); Nance v. Environmental Protection Agency, 645 F.2d 701 (9th Cir. 1981); Morton v. Ruiz, 415 U.S. 199, 236 (1974); United States v. Mason, 412 U.S. 391 (1973); United States v. Alcea Band of Tillamooks, 329 U.S. 40, 47 (1946); Seminole Nation v. United States, 316 U.S. 286, 296-97 (1942); Tulee v. State, 315 U.S. 681 (1942); United States v. Santa Fe Pac. Ry., 314 U.S. 339 (1941); Shoshone Tribes v. United States, 299 U.S. 476 (1937); United States v. Creek Nation, 295, 103 (1935); United States v. Candelaria, 271 U.S. 432 (1926); United States v. Panye, 264 U.S. 446, 448 (1924); Cramer v. United States, 261 U.S. 219 (1923); United States v. Nice, 241 U.S. 591 (1916); United States v. Pelican, 232 U.S. 442 (1914); United States v. Sandoval, 231 U.S. 28, 45-46 (1913); Choate v. Trapp, 224 U.S. 665, 675 (1912); Heckman v. United States, 224 U.S. 413, 437-38 (1912); Tiger v. Western Investment Co., 221 U.S. 286 (1911); Lone Wolf v. Hitchcock,

by the federal government to Indian tribes. The promises include but are not limited to protection of: tribal sovereignty and self-government; tribes from state interference; and, the protection of tribal people and tribal natural resources. The trust doctrine governs all aspects of federal government actions that in any way affect the tribes.

The trust doctrine sets limits on the exercise of federal power over Indian people.[60] Treaty language, which often speaks in terms of "securing" to tribe's lands and resources while promising to promote and improve tribal well-being, exemplifies the constraints on the exercise of federal power over Indian affairs.[61] Treaties made with Indian tribes (and that fact that treaties were made at all) are proof of the federal government's recognition of tribal sovereignty.[62]

Federal trust obligations are frequently analogize to common law trust principles.[63] Under common law trust principles, the trustee has a duty to administer the trust property solely in the interest of the beneficiary.[64] The Supreme Court has stated that the federal trustee has the "duty in administering the trust to exercise such care and skill as a man of ordinary prudence would exercise in dealing with his own property."[65] The United States has a duty to account to the tribes for its performance of treaty obligations.[66] If the federal trustee is negligent in its dealings with the tribes' property, it is liable for any losses.[67]

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187 U.S. 553, 564 (1903); Cherokee Nation v. Hitchcock, 187 U.S. 294, 305 (1902); Cherokee Nation v. Southern Kansas Ry., 135 U.S. 641 (1890); United States v. Kagama, 118 U.S. 375 (1886); Fellows v. Blacksmith, 60 U.S. (19 How.) 366 (1856); Cherokee Nation v. Georgia, 30 U.S. (5 Pet.) 1 (1831).

60 AMERICAN INDIAN POLICY REVIEW COMMISSION, FINAL REPORT at 4-5 May 17, 1977.

61 *See e.g.*, Treaty with the Tribes of Middle Oregon, June 25, 1855.

> That the exclusive right of taking fish in the streams running through and bordering said reservation is hereby secured to said Indians; and at all other usual and accustomed stations, in common with citizens of the United States, and of erecting suitable houses for curing the same; also the privilege of hunting, gathering roots and berries, and pasturing their stock on unclaimed lands, in common with citizens, is secured to them.

62 Worcester v. Georgia, 31 U.S. (6 Pet) 515, 538 (1832).

63 AMERICAN INDIAN POLICY REVIEW COMMISSION, FINAL REPORT 127 May 17, 1977.

64 *See* Manchester Band of Pomo Indians v. United States, 363 F. Supp. 1238, 1245 (N.D. Cal. 1973) (citing Restatement (Second) of Trusts § 170(1) (1959)).

65 United States v. Mason, 412 U.S. 391, 398 (1973), citing A. Scott, Trusts § 1408 (3rd ed. 1967). *See also* Coast Indian Community v. United States, 550 F.2d 639, 652-53 (Ct. C. 1977); Covello Indian Community v. FERC, 895 F.2d 581, 585 (9th Cir. 1990) (citing Assiniboine and Sioux Tribes v. Board of Oil and Gas Conservation, 792 F.2d 782, 794 (9th Cir. 1982)).

66 Navajo Tribe of Indians v. United States, 624 F.2d 981, 990 (Ct. C. 1980).

67 Coast Indian Community, 550 F. 2d at 653.

Canons of construction unique to Federal Indian law are manifestations of the federal government's trust relationship with Indian tribes. Courts rely on the canons of construction when interpreting treaties, executive orders, and statutes pertaining to tribes and in reviewing federal actions affecting Indian people. The following is a summary of the primary cannons of Federal Indian law:

1. Indian treaties must be interpreted so as to promote their central purposes;[68]

2. Treaties are to be interpreted as the Indians themselves would have understood them;[69]

3. Indian treaties are to be liberally construed in favor of the Indians;[70]

4. Ambiguous expressions are to be resolved in favor of the Indians;[71] and

5. A treaty is not a grant of rights to the Indians, but a reservation of those rights not granted away.[72]

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[68] United States v. Winans, 198 U. S. 371, 381 (1905).

[69] Washington v. Washington State Commercial Passenger Fishing Vessel Association, 443 U.S. 658, 676 (1979); Choctaw Nation v. Oklahoma, 347 U.S. 620, 630 (1970); Tulee v. Washington, 315 U.S. 681, 684 (1942); Jones v. Meehan, 175 U.S. 1, 11 (1899); Worcester v. Georgia, 31 U.S. (6 Pet.) 515 (1832); Seufert Bros. v. United States, 249 U.S. 194, 198 (1919); United States v. Winans, 198 U.S. 371 (1905). *See generally* FELIX S. COHEN, FEDERAL INDIAN LAW 221-225 (1982).

[70] Or phrased slightly differently, treaties must be read, not in isolation but in light of the common notions of the day and the assumptions of those who drafted them. Passenger Fishing Vessel Association, 443 U.S. at 676; Antoine v. Washington, 420 U.S. 194, 199 (1975); Choctaw Nation v. United States, 318 U.S. 423 (1943); Tulee v. Washington, 315 U.S. 681, 684 (1942); Alaska Pacific Fisheries v. United States, 248 U.S. 78, 89 (1918).

[71] McClanahan v. Arizona State Tax Commission, 411 U.S. 164 (1973); Carpenter v. Shaw, 280 U.S. 363 (1930); Fleming v. McCustain, 215 U.S. 56, 59-60 (1909); Winters v. United States, 207 U.S. 564 (1905). In *Winters* the Court stated:

> By a rule of interpretation of agreements and treaties with the Indians, ambiguities occurring will be resolved from the standpoint of the Indians. And the rule should certainly be applied to determining between two inferences, one of which would support the purpose of the agreement and the other impair or defeat it. On account of their relation to the government, it cannot be supposed that the Indians intended to exclude by formal words every inference which might militate against and defeat the declared purpose of themselves and the government, even it could be supposed that they had the foresight to foresee the "double sense" which might some time be urged against them. 207 U.S. at 576-577.

[72] United States v. Winans, 198 U.S. 371, 381 (1905).

The canons of construction reflect judicial recognition of the federal government's obligation to protect and enhance the tribal rights. Similarly, the canons provide guidance to federal agencies involved in the co-management of the Columbia River tribes' treaty fishery and water resources.

APPLICATION OF TRUST PRINCIPLES

The federal government and its agencies are subject to the United States' fiduciary responsibilities to tribes.[73] All federal actions and the implementation of federal statutory schemes affecting Indian people, land or resources must be "judged by the most exacting fiduciary standards."[74] The United States' trust obligations extend to all federal agencies that manage fisheries, water projects, hydroprojects, and federal lands.[75]

One of the more significant cases applying the trust doctrine to the management of tribal fishery and water resources is *Pyramid Lake Paiute Tribe v. Morton*.[76] In *Pyramid Lake,* the Paiute Tribe sought and obtained a federal court order enjoining diversions from the Truckee River upstream from Pyramid Lake, a desert lake located totally within the Paiute's reservation and fed only by the Truckee River.[77] The upstream diversions threatened the lake's quality and the upstream spawning of two species of fish upon which the tribe historically depended.

The Paiute Tribe's challenge arose in response to the Secretary of Interior's proposed regulation, which called for massive diversions from the Truckee River. The court found

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73 *See e.g*., Pyramid Lake Paiute Tribe of Indians v. United States Department of the Navy, 898 F.2d 1401, 1411 (9th Cir. 1991); Covello Indian Community v. FERC, 895 F.2d 581, 584 (9th Cir. 1990); Nance v. EPA, 645 F.2d 701, 711 (9th Cir. 1981), *cert. denied*, 454 U.S. 1081 (1981).

74 Seminole Nation v. United States, 316 U.S. 286, 296-97 (1942). *See also* United States v. Mason, 412 U.S. 391, 398 (1973).

75 *See e.g.,* Nance v. Environmental Protection Agency, 645 F.2d 701 (9th Cir. 1981); Covello Indian Community v. Federal Energy Regulatory Commission, 895 F.2d 581 (9th Cir. 1990); Pyramid Lake Paiute Tribe of Indians v. United States Department of Navy, 898 F.2d 1410 (9th Cir. 1990); Assiniboine & Sioux Tribes v. Board of Oil and Gas Conservation, 792 F.2d 782 (9th Cir. 1986); Cheyenne-Arapaho Tribes of Oklahoma v. United States, 512 F.2d 1390 (Ct.Cl. 1975).

76 354 F. Supp. 252 (D.D.C. 1972).

77 At issue was the Secretary of Interior's "judgment call" in recommending a regulation allowing 378,000 acre feet of water to be diverted from the Truckee River for irrigation purposes. If not diverted, the water would flow into Pyramid Lake, located on the tribe's reservation and historically the tribe's principle source of livelihood. The extensive irrigation diversions severely impacted the lahontan cutthroat trout and cui-ui, fish which tribal members had historically depended on. These fish were placed on the federal threatened and endangered lists in 1975 and 1967 respectively. *See generally* Carson-Truckee Water Conservancy District v. Watt, 549 F. Supp 704 (1982).

that the Secretary's self-described "judgment call" regarding the quantity of water to be diverted was an abuse of discretion. The court stated that the Secretary:

> misconceived the legal requirements that should have governed his action. A `judgment call' was simply not legally permissible.... The burden rested on the Secretary to justify any diversion of water from the Tribe with precision. It was not his function to attempt an accommodation.[78]

The court held that the Secretary of Interior violated his trust obligation to protect the Paiute Tribe's fishery.[79] Judge Gesell further held that a contract between the Secretary of the Interior and the Secretary of Agriculture that governed reservoir management could not be advanced as an obstacle to maintaining fish flows.[80] *Pyramid Lake* mandates that federal agencies both recognize and act in accordance with their fiduciary obligation to tribes.[81]

The obligations created by the trust doctrine extend to federal actions taken off reservation which impact life and resources on reservation. In *Northern Cheyenne Tribe*,[82] the federal district court of Montana declared that a "federal agency's trust obligation to a tribe extends to actions it takes off a reservation that uniquely impact

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78 354 F. Supp. at 256.

> The Secretary was obliged to formulate a closely developed regulation that would preserve water for the Tribe. He was further obliged to assert his statutory and contractual authority to the fullest extent possible to accomplish this result.... The Secretary's action is therefore doubly defective and irrational because it fails to demonstrate an adequate recognition of his fiduciary duty to the Tribe. This also is an abuse of discretion and not in accordance with law. *Id.* at 256-57.

79 *Id.*

> In order to fulfill his fiduciary duty, the Secretary must insure, to the extent of his power, that all water not obligated by court decree or contract with the District goes to Pyramid Lake. The United States, acting through the Secretary of the Interior, `has charged itself with moral obligations of the highest responsibility and trust. Its conduct, as disclosed in the acts of those who represent it in dealings with the Indians, should therefore be judged by the most exacting fiduciary standards.' (citing Seminole Nation v. United States, 316 U.S. 286, 297 (1942)).

80 *Id*. at 258. "The Secretary's trust obligations to the Tribe are paramount in this respect...."

81 *Id.* at 257.

82 Northern Cheyenne Tribe v. Hodel, 12 ILR 3065 (D.Mont., May 28, 1985) *aff'd on other grounds* 842 F.2d 224 (9th Cir. 1988).

tribal members or property on a reservation."[83] Not even the nation's need for energy development justified disregard of the federal government's fiduciary duty.[84]

The trust doctrine permeates every aspect of the federal government's relations with Indian tribes. The federal government and its implementing agencies owe a duty to not only recognize the impacts of their activities on the tribes, but also a duty to safeguard natural resources which are of crucial importance to tribal self-government and prosperity. In addition, the trust responsibility imposes an affirmative duty upon a federal agency to use its particular expertise to protect tribal resources.[85]

THE RIGHT TO TAKE FISH

The right to take fish is integral to the Columbia River tribes' subsistence, culture, religion and economy.[86] The Supreme Court recognized the importance of fish to the tribes early in the development of treaty interpretation:

> The right to resort to...fishing places...was a part of larger rights possessed by the Indians, upon the exercise of which there was not a shadow of impediment,

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83 *Id.* at 3071.

84 The court declared that:

> The Secretary's conflicting responsibilities and federal actions taken in the `national interest,' however, do not relieve him of his trust obligations. To the contrary, identifying and fulfilling the trust responsibility is even more important in situations such as the present case where an agency's conflicting goals and responsibilities combined with political pressure asserted by non-Indians can lead federal agencies to compromise or ignore Indian rights. *Id.*

85 Mitchell II, 463 U.S. 206 (1983).

86 NORTHWEST POWER PLANNING COUNCIL, COMPILATION OF INFORMATION ON SALMON AND STEELHEAD LOSSES IN THE COLUMBIA RIVER BASIN (March 1986).

> A significant dependence upon salmon is the single feature that most of the aboriginal groups in the Columbia River Basin shared.... inter-group trade made salmon available to virtually all inhabitants of the Columbia Basin....The annual salmon runs were accompanied by religious rituals and ceremonial rites such as the First Salmon Ceremony, believed to ensure the continued return of the salmon. The salmon also played an important role in Indian folklore, art, music, and mythology. The timing and distribution of the runs were major determinants of yearly patterns of group movement, the organization of households, the division of labor, the size of local groups, and the nature of social interactions among groups. Although the cultural value of the salmon to the Columbia Basin Indians cannot be quantified or adequately characterized, undoubtedly much of what is distinctive about the aboriginal cultures can be attributed to their relationship to the salmon. *Id.* at 29.

and which were not much less necessary to the existence of the Indians than the atmosphere they breathed.[87]

In 1855, separate treaties with the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes and Bands of the Yakima Nation, and the Nez Perce Tribe were negotiated with representatives of the United States government.[88] Retaining the right to continue traditional fishing practices was a primary objective of the Columbia River tribes during treaty negotiations.[89] Each treaty contained a substantially identical provision reserving to the tribes the right take "fish at all usual and accustomed places in common with citizens of the United States."[90] The fishing clause is the heart of the Columbia River tribes' treaties.[91]

The Columbia River tribes' treaty fishing rights were explicitly reserved. They are property rights and thus, if abrogated, require compensation under the Fifth Amendment of the United States Constitution.[92] Fishing rights are the communal property of the tribes.[93] The Columbia River tribes each reserved the right to take fish (l) within their respective reservations,[94] (2) at all usual and accustomed fishing sites on lands ceded to the United States government,[95] and (3) at all usual and accustomed fishing sites outside the reservation or ceded areas.[96]

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87 United States v. Winans, 198 U.S. 371, 381 (1905).

88 Treaty with the Yakima Tribe, June 9, 1855, 12 Stat. 951; Treaty with the Tribes of Middle Oregon, June 25, 1855, 12 Stat. 963; Treaty with the Umatilla Tribes, June 9, 1855, 12 Stat. 945; Treaty with the Nez Perce Tribe, June 11, 1855, 12 Stat. 957.

89 Tulee v. Washington, 315 U.S. 681, 684-85 (1942).

90 Treaty with the Tribes of Middle Oregon, June 25, 1855, 12 Stat. 963, Article I.

91 United States v. Washington, 443 U.S. 658, 664-69 (1973) (discussing the importance of reserving the right to access usual and accustomed fishing sites on and off reservation to the tribes during treaty negotiations).

92 United States v. Sioux Nation of Indians, 448 U.S. 371 (1980); Menominee Tribe v. United States, 391 U.S. 404 (1963); Three Tribes of Fort Berthold Reservation v. United States, 390 F.2d 686 (Ct.Cl. 1968); Confederated Tribes of the Umatilla Indian Reservation v. Alexander, 440 F. Supp. 553 (D.Or. 1977).

93 Whitefoot v. United States, 293 F.2d 658, 663 (Cl.Ct. 1961)(holding that tribal fisheries are communal property vested in the tribe and that compensation under the Fifth Amendment must be paid to the tribe where fishing stations are destroyed or taken.), *cert. denied*, 369 U.S. 818 (1962); Kimball v. Callahan, 590 F.2d 768, 773 (9th Cir. 1979), *cert. denied*, 444 U.S. 826 (1979).

94 United States v. Winans, 198 U.S. 371, 381 (1905) (stating "There was an exclusive right of fishing reserved within certain boundaries"). *See also* Puyallup v. Department of Game, 391 U.S. 392 (1968) [hereinafter Puyallup I].

95 Tulee v. Washington, 315 U.S 681, 684 (1942).

96 Seufert Bros. v. United States, 249 U.S. 194, 198-99 (1919).

OFF-RESERVATION TREATY FISHING RIGHTS AND TRADING

In negotiating their treaties, the Columbia River tribes reserved the right to access ceded aboriginal lands for a variety of reasons including the right to fish at their "usual and accustomed places."[97] The treaty right to fish off-reservation preceded the statehoods of Oregon, Washington and Idaho and was not subordinated to state law.[98] A state may not regulate treaty off-reservation fishing activity unless it can first demonstrate that the regulation is necessary for conservation of fish.[99] Furthermore, states may not restrict treaty fishing in a manner which favors non-treaty fishing or discriminates against Indians.[100]

In the seminal case *United States v. Winans,* the Supreme Court confirmed that the treaties made between Indians and the federal government preserved the tribe's right to fish at usual and accustomed places free from interference.[101] In *Winans*, a non-Indian obtained title from the state of Washington to lands bordering the Columbia River and including a usual and accustomed Yakama Nation fishing site.[102] The non-Indian denied a Yakama Indian access to his traditional fishing site by stationing a large fish wheel at the site. In a landmark decision, the Supreme Court held that a servitude existed

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97 *See, e.g.*, Treaty with the Yakima Tribe, June 9, 1855, 12 Stat. 951, Art. 3

> The exclusive right of taking fish in all the streams, where running through or bordering said reservation, is further secured to said confederated tribes and bands of Indians, as also the right of taking fish at all usual and accustomed places, in common with the citizens of the Territory, and of erecting temporary buildings for curing them; together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land.

98 United States v. Winans, 198 U.S. 371, 383 (1905).

> By the Constitution, as is now well settled, the United States, having rightfully acquired the Territories, and being the only Government which can impose laws upon them, have the entire dominion and sovereignty, national and municipal, Federal and State, over all the Territories, so long as they remain in a territorial condition.

See also Sohappy v. Smith, 302 F.Supp. 899, 908 (D.Or. 1969); Holcomb v. Confederated Tribes of Umatilla Indian Reservation, 382 F.2d 1013, 1014 (9th Cir. 1967).

99 Sohappy v. Smith, 302 F.Supp. 899, 907 (D.Or. 1969).

100 Department of Game of Washington v. Puyallup Tribe, 414 U.S. 43 (1973)[hereinafter Puyallup II]; Maison v. Confederated Tribes of Umatilla Indian Reservation, 314 F.2d 169 (9th Cir. 1963); Sohappy v. Smith, 302 F.Supp. 899 (D.Or. 1969).

101 United States v. Winans, 198 U.S. 371 (1905).

102 *Id.* at 372.

providing a right of access to Yakama tribal members across the non-Indian's land.[103] This servitude, part of the tribe's immemorial right, superseded the non-Indian's fee simple title to the land.[104] The reserved fishing right "was intended to be continuing as against the United States and its grantees as well as against the state and its grantees."[105]

Winan's most significant contribution to Federal Indian law lies in its articulation of the reserved rights doctrine: "the treaty was not a grant of rights to the Indians, but a grant of rights from them -- a reservation of those not granted."[106] *Winans* stands as an explicit recognition that Columbia River tribes retain an aboriginal fishing right that has resided with these tribes since time immemorial.[107] The *Winans* reserved rights doctrine is the law today.[108]

Recently in *Washington State Department of Licensing v. Cougar Den, Inc.*, the Supreme Court considered the applicability of state law to tribal member activity outside of Indian country. [109] Relying upon a provision in the Yakama Nation's 1855 treaty, guaranteeing its members "the right, in common with citizens of the United States, to travel upon all public highway" [110] the Court found Washington State's application of tax on fuel imported via highway by a Yakama tribal member preempted by the treaty. The court reiterated the canons of construction and concluded that the Yakama understood the treaty right to travel as including "the right to travel with goods for purposes of trade" and that "to impose a tax upon traveling with certain goods burdens that travel." [111]

Specifically, the *Cougar Den* court pointed out that the understanding of the phrase in the treaty was already laid out in detail in *Yakama Indian Nation v. Flores*, which included "in common with" means use without restriction and "[t]ravel was woven into the fabric of Yakama life in that it was necessary for hunting, gathering, fishing, grazing, recreational, political, and kinship purposes" and that "at the time, the Yakamas exercised free and open access to transport goods as a central part of a trading network running from the western coastal tribes to the eastern plains tribes." [112]

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103 *Id.* at 381.

104 *Id.*

105 *Id.* at 381-82.

106 *Id.* at 381.

107 *See* Sohappy v. Smith, 302 F. Supp. 899, 906 (D.Or. 1969), *aff'd* 529 F.2d 570 (9th Cir. 1976). *Accord* United States v. Adair, 723 F.2d 1394 (9th Cir. 1984).

108 *See e.g.*, Passenger Fishing Vessel, 443 U.S. 658, 678 (1979); United States v. Wheeler, 435 U.S. 313, 327 (1978); United States v. Adair, 723 F.2d 1394, 1413 (9th Cir. 1987).

109 Wash. State Dep't of Licensing v. Cougar Den, Inc., 139 S.Ct. 1000 (2019)

110 Treaty with the Yakama Nation, art. III, 12 Stat. 951, 953 (June 9, 1855, ratified Mar. 8, 1859, proclaimed Apr. 18, 1859)

111 139 S.Ct at 1012.

112 *Id.* at 1006, citing *Yakama Indian Nation v. Flores*, 955 F.Supp. 1229, 1247 (E.D. Wash. 1997).

STANDARDS OF FISH ALLOCATION AND CONSERVATION

The Columbia River tribes continue to rely on their right take fish from the Columbia River system for commercial, ceremonial and subsistence purposes. Historically, tribal groups managed and regulated fishing along stretches of the river. Traditional authority groups evolved into regional committees. For example, the Celilo Fish Committee presided over treaty fishing between Celilo Falls and John Day Rapids. The Celilo Committee determined who could fish when and had the authority to punish violators.[113]

With the development of non-Indian commercial fishing at the end of the 19th Century, the tribal fisheries faced unprecedented competition. Fishery habitat was simultaneously impacted by non-Indian activities including hydroelectric development, logging, mining, grazing, irrigation, and pollution.[114] Compounding the threat posed by over-harvesting and environmental degradation was the failure of state fishing regulations to accommodate tribal needs or to recognize tribal authority over fishing at usual and accustomed places. Operating under the Columbia River Compact of 1918,[115] Oregon and Washington set the location, time, and harvest ceilings for commercial fisheries in the Columbia River. The states allowed most of the harvestable salmon to be taken by non-Indians.[116] The combination of the decline of the fishery resource and discriminatory state regulation made the interpretation of the treaty right to take fish critical for the Columbia River tribes.[117]

CONSERVATION LIMIT ON TREATY FISHING RIGHTS

An early step in the definition of the Columbia River tribes' right to take fish occurred in 1963 when members of the Confederated Tribes of the Umatilla Indian Reservation sought declaratory relief from the state of Oregon's restrictions on tribal salmon and steelhead fishing on tributaries of the Columbia and Snake Rivers.[118] In *Maison*, the court held that the Umatilla's 1855 treaty reserved to them "those unimpeded fishing

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113 Interview with Delbert Frank, Tribal Council Member, Confederated Tribes of the Warm Springs Reservation of Oregon (on tape at the Columbia River Inter-Tribal Fish Commission).

114 NORTHWEST POWER PLANNING COUNCIL, COMPILATION OF INFORMATION ON SALMON AND STEELHEAD LOSSES IN THE COLUMBIA RIVER BASIN 23, March 1986; WASHINGTON OFFICE OF PROGRAM RESEARCH, UNDERSTANDING ALLOCATION 5, August 1988.

115 Columbia River Compact of 1918, ch. 47, 40a Stat. 515 (1918).

116 Passenger Fishing Vessel, 443 U.S. 658, 669 (1979).

117 *Id.* at 670.

118 Maison v. Confederated Tribes of Umatilla Indian Reservation 314 F.2d 169 (9th Cir. 1963).

rights which their ancestors had long enjoyed before the treaty."[119] The right to take fish unimpeded was qualified only by the need to conserve the fishery resource.[120] In order to demonstrate the necessity of conservation, the state must show "that there is a need to limit the taking of fish ...[and]... that the particular regulation sought to be imposed is `indispensable' to the accomplishment of the needed limitation."[121] The court further limited the state's authority to regulate treaty fishing rights by indicating that restrictions on treaty fishing were indispensable only where conservation could not be accomplished through alternative conservation measures.[122]

Also in 1963, the State of Washington filed suit seeking to confirm its regulatory authority over tribal fishing in Commencement Bay at the mouth of the Puyallup River.[123] In *Puyallup Tribe v. Department of Game of Washington,* 391 U.S. 392 (1968) (*Puyallup I*), the Supreme Court found that the State may not regulate the actual treaty right to harvest fish but may regulate the manner of fishing, the size of the take, and similar matters in the interests of conservation, "provided the regulation meets appropriate standards and does not discriminate against the Indians." Id. at 398.

The Supreme Court later provided further guidance concerning its finding in *Puyallup I:*

> [A]lthough, these rights "may . . . not be qualified by the State, . . . the manner of fishing [and hunting], the size of the take, the restriction of commercial fishing [and hunting], and the like may be regulated by the State in the interest of conservation, provided the regulation meets appropriate standards and does not discriminate against the Indians." The "appropriate standards" requirement means that the State must demonstrate that its regulation is a reasonable and necessary conservation measure, . . and that its application to the Indians is necessary in the interest of conservation.

Antoine v. Washington, 420 U.S. 194, 207 (1975) (citing *Puyallup I,* 391 U.S. at 398) (emphasis added).[124]

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119 *Id.* at 171.

120 *Id.* at 172 (citing Tulee v. Washington, 315 U.S. 681 (1942); United States v. Winans, 198 U.S. 371 (1905)).

121 *Id.*

122 *Id.* at 173.

123 Puyallup I, 391 U.S. 392 (1968).

124 Subsequent to Antoine, the Ninth Circuit determined that the exercise of tribal rights may be regulated in order to maintain a reasonable "margin of safety" against extinction. United States v, Oregon, 718 F.2d 299, 305 (9th Cir. 1983). See also United States v. Washington, 384 F. Supp. 312, 342 (W. D. Wash. 1974) (regulation limited to preventing demonstrable harm to actual conservation of fish, with conservation referring to species perpetuation), aff'd, 520 F.2d 676 (9th Cir. 1975), cert. denied, 423 U.S. 1086 (1976), reh'g denied, 424 U.S. 978 (1976); Sohappy v. Smith, 302 F. Supp. 899, 908 (D.Or. 1969) (state can regulate only if existence of fish resource is imperiled).

The issues addressed by the *Antoine* Court concerning when it is appropriate for the government to regulate tribal treaty rights may be outlined as follows:

1. Is there a conservation need for the imposition of regulatory measures?

2. If so, do the proposed regulatory measures meet "appropriate standards?"

    a. Are the regulatory measures a reasonable and necessary conservation measure?

    b. Is the application of conservation measures to the Indians necessary in the interest of conservation?

3. If it is necessary to apply the regulatory measures to the exercise of tribal treaty rights, are they being applied in a discriminatory manner?

Point 2b in this outline is critical, because this is where the determination is made when and if regulation of tribal treaty hunting, fishing, and gathering activities is permitted. Several courts have addressed this point. The Ninth Circuit Court of Appeals stated the following:

Direct regulation of treaty Indian fishing in interests of conservation is permissible only after the state has proved unable to preserve a run by forbidding the catching of fish by other citizens under its ordinary police power jurisdiction.

U.S. v. Washington, 520 F.2d 676, 686 (9th Cir. 1975), *citing Antoine v. Washington*, 420 U.S. 194 (1975). In other words, the courts have stated as part of the conservation necessity principle that the regulation of Indian treaty activities is only permissible if it is not possible to achieve the conservation measures by imposing restrictions on non-treaty activities that impact the treaty resource. The above scheme also demonstrates that the requirement that a regulatory measure be a "reasonable and necessary conservation measure" is only one of several prerequisites clearly set out in federal case law that must be met before the exercise of tribal treaty rights may be limited.

Although many cases have addressed attempted state regulation of tribal treaty rights, the legal principles apply equally to federal regulation. In *United States v. Bressette*, 761 F. Supp. 658 (D. Minn. 1991), the court applied the "conservation necessity" principle articulated in the *Antoine/Puyallup* cases when it considered the application of the Migratory Bird Treaty Act (MBTA) to the treaty rights of the Chippewa Indian Tribe to sell migratory bird feathers. *Id*. at 664. Indeed, the federal government argued in this case that federal regulation pursuant to the MBTA met the requirements of *Puyallup*. *Id.*

Regarding ocean fisheries, a district court found that the "conservation necessity" principle is applicable to regulation by federal government. *Makah v. Brown,* No. 9213, Phase I Subproceeding No. 92-1, No. C85-1606R, slip op. (W.D. Wash. Dec. 29, 1993) (order on five motions relating to treaty halibut fishing). Regarding the applicable standard which the Secretary must use to determine allocations to treaty and non-treaty fishers, the court held:

> In formulating his allocation decisions, the Secretary must accord treaty fishers the opportunity to take 50% of the harvestable surplus of halibut in their usual and accustomed fishing grounds, and the harvestable surplus must be determined according to the conservation necessity principle.

Slip op. at 6 (citations omitted) (emphasis added).

The court in *Makah v. Brown* noted that the federal defendants did not disagree with the application of the "conservation necessity" standard in principle. The court explicitly rejected the argument that "only state and not federal regulatory agencies are bound by the conservation necessity principle." Id. at 6-7.

Since rights granted pursuant to treaties are rights granted to the United States from the tribes and the tribes reserve all those rights not granted, *United States v. Winans*, 198 U.S. 371, 381 (1905), treaty rights should be afforded the highest priority possible. Further, treaties and other agreements made with Indians are to be broadly construed and ambiguities resolved in favor of the Indians. *See, e.g., Tulee v. Washington,* 315 U.S.681, 684-85 (1942) ("It is our responsibility to see that the terms of the treaty are carried out, so far as possible . . . in a spirit which generously recognizes the full obligation of this nation to protect the interests of a dependent people." (citations omitted)); *Carpenter v. Shaw,* 280 U.S. 363 (1930); *Winters v. United States,* 207 U.S. 564 (1908). The preservation of treaty rights is the responsibility of the entire federal government. *United States v. Eberhardt,* 789 F.2d 1354, 1363-64 (9th Cir. 1986) (Beezer, J., concurring) ("Cooperation among all agencies of the government is essential to preserve those Indian fishing rights to the greatest extent possible.").

Acknowledgement that treaty rights are to receive the highest protection possible leads to the conclusion that non-treaty impacts on treaty resources must be minimized to permit the fulfillment of treaty promises. In a decision concerning state regulation of off-reservation treaty fishing rights, the court noted that it must be demonstrated that the required conservation cannot be achieved by restrictions on non-treaty citizens, or other less restrictive methods. *Lac Court Oreilles Band of Indians v. Wisconsin,* 668 F. Supp. 1233, 1236-37 (W.D. Wis. 1987). Further, "To regulate Indian fishermen first, to apply the same regulations to them as to non-treaty fishermen, is to render the treaty rights nugatory." *United States v. Michigan,* 505 F. Sup. 467, 474-75 (W.D. Mich. 1980) (citations omitted). Finally, in *United States v. Washington,* the court stated:

> If alternative means and methods of regulation and necessary conservation are necessary conservation are available, the state cannot lawfully restrict

> the exercise of off-reservation treaty right fishing, even if the only alternatives are restriction of fishing by non-treaty fishermen, either commercially or otherwise, to the full extent necessary for conservation of fish.

384 F. Sup. at 342.

Thus, in cases decided subsequent to *Puyallup* and *Antoine,* courts have demanded a specific finding of necessity to regulate the Indians. If adequate conservation may be affected by regulating other users with lesser rights, it is not permissible to regulate a tribe's exercise of its reserved hunting and fishing rights. *See also State v. Tinno,* 497 P.2d 1386, 1397 (Idaho 1972) (McQuade, C.J., concurring specially) (treaty affords tribal members first priority to fish). When a treaty right is implicated, the specific impact of Indian activities under a treaty must be examined separately from activities of non-Indians. It is not appropriate to lump Indians and non-Indians together in a general assessment. Id. at 1396 (identical state regulation of non-Indians and Indians with treaty rights would provide essentially no treaty rights at all).

It is well-established that a key component of the tribes' right to take fish is their right to take fish at all their usual and accustomed fishing places. *See Washington v. Washington State Commercial Passenger Fishing Vessel Ass'n,* 443 U.S. 658, 667 (1979). The rules governing the exercise of the right to take fish apply equally to the right to take fish at all usual and accustomed fishing places. *United States v. Oregon,* 718 F.2d 299, 304 (9th Cir. 1983).

TREATY RIGHT TO A FAIR SHARE

Federal district courts in Oregon and Washington assumed and retained continuing jurisdiction over two suits initiated in the wake of *Maison* and *Puyallup I.* In 1968, fourteen Yakima Tribal members filed suit to enjoin the state of Oregon's interference with their off-reservation fishing rights.[125] Judge Belloni held that the treaties gave the Columbia River tribes "an absolute right" to the fishery and thus to a "fair share of the fish produced by the Columbia River system."[126] Although the court recognized the conservation standard, the court held that treaty fishing rights should receive co-equal

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125 Sohappy v. Smith, 302 F.Supp. 899 (D.Or. 1969)(Plaintiffs to the *Sohappy v. Smith* litigation included: Richard Sohappy, Aleck Sohappy, David Sohappy, Myra Sohappy, Clara Sohappy, James Alexander, James Alexander, Jr., Leo Alexander, Clifford Alexander, Henry Alexander, Andrew Jackson, Roy Watlamet, Shirley McConville, and Clarence Tahkeal. This case was consolidated with *United States v. Oregon,* Civil No. 68-513 (1969) initiated by the United States as trustee of tribes against the state of Oregon).

126 *Id.* at 911.

priority with conservation.[127] The court further defined the state's responsibility toward the tribes, holding that "restrictions on the exercise of the treaty right must be expressed with such particularity that the Indian can know in advance of his actions precisely the extent of the restriction which the state" may legitimately impose for conservation purposes.[128]

In subsequent proceedings, the court determined that a "fair share" meant a 50-50 division of the harvest.[129] The Ninth Circuit, in *United States v. Washington,* confirmed that "fair share" means a 50-50 division of the harvestable number of fish that may be taken.[130] Furthermore, the allocation percentage includes hatchery reared fish.[131] There are several reasons to include hatchery fish in the tribes allocation, including: (1) the lack of state ownership of the fish once released; (2) the lack of unjust enrichment of the Tribes; (3) the fact that hatchery fish and natural fish are not distinguished for other purposes; and (4) the mitigating function of hatchery fish.[132]

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127 *Id.*

> In determining what is an `appropriate' regulation one must consider the interests to be protected or objective to be served. In the case of regulations affecting Indian treaty fishing rights the protection of the treaty right to take fish at the Indian's usual and accustomed places must be an objective of the state's regulatory policy co-equal with the conservation of fish runs for other users.

128 *Id.*

129 Sohappy v. Smith No. 68-409 (D.Or. August 20, 1975) (Preliminary Injunction Order); Sohappy v. Smith No. 68-409 (D.Or. May 8, 1974) (Order Dissolving Temporary Restraining Order)

> The Indian treaty fishermen are entitled to have the opportunity to take up to 50 percent of the spring Chinook run destined to reach the tribes' usual and accustomed grounds and stations. By "destined to reach the tribes' usual and accustomed grounds and stations," I am referring to that portion of the spring run which would, in the course of normal events, instinctively migrate to these places except for prior interception by non-treaty harvesters or other artificial factors. (emphasis added)

See also United States v. Oregon, No. 68-513 (D.Or. August 10, 1976) (Temporary Restraining Order).

130 United States v. Washington, 384 F. Supp. 312, 343 (W.D. Wash. 1974), *aff'd* 520 F.2d 676 (9th Cir. 1975), *cert. denied*, 423 U.S. 1086 (1976) [hereinafter Phase I]. (In 1974, following *Phase I,* Washington intervened as defendant in *United States v. Oregon.) See* United States v. Oregon, 699 F.Supp. 1456, 1459 (D.Or. 1988).

131 United States v. Washington, 759 F.2d 1353 (9th Cir. 1985).

132 *Id.* at 1359.

> The hatchery programs have served a mitigating function since their inception in 1859. They are designed essentially to replace natural fish lost to non-Indian degradation of the habitat and commercialization of the fishing industry. Under these circumstances, it is only just to consider such replacement as subject to treaty allocation. For the Tribes to bear the full burden of the decline

After a decade of state defiance of federal court orders regarding Indian fishing rights, the United States Supreme Court granted certiori in the Washington state and federal cases to resolve the character of the Indian treaty right to take fish.[133] In *Passenger Fishing Vessel,* the Supreme Court endorsed the 50-50 allocation previously adopted in *Sohappy v. Smith* and *Phase I*.[134]

The Court explicitly rejected the Washington Game Department's suggestion that treaty fishermen be given only an "equal opportunity," to take fish with non-treaty fishermen.[135] The Court reasoned:

> That each individual Indian would share an `equal opportunity' with thousands of newly arrived individual settlers is totally foreign to the spirit of the negotiations. Such a `right,' along with the $207,500 paid the Indians, would hardly have been sufficient to compensate them for the millions of acres they ceded to the Territory.[136]

In rejecting the Game Department's argument, the Court relied on the principals established in six of its prior decisions which addressed the Indian treaty right to take fish. The Court found that: (1) by treaty, Indians have rights beyond those held by other citizens;[137] (2) state regulations of treaty fishing are only sustainable if they are necessary for conservation;[138] and (3) regulations must not be imposed in a discriminatory manner.[139]

In *Passenger Fishing Vessel,* the Court found that Indian tribes were guaranteed the right to harvest sufficient fish to ensure "a moderate living."[140] Moderate living needs are not being met.[141] Since 1964, the Columbia River tribes have not had a commercial fishery

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caused by their non-Indian neighbors without sharing the replacement achieved through the hatcheries would be an inequity and inconsistent with the Treaty.

133 Passenger Fishing Vessel, 443 U.S. 658, 662 (1979).

134 *Id.*

135 *Id.* at 682.

136 *Id.* at 657-58.

137 *Id.* at 681 (citing Seufert Brothers v. United States, 249 U.S. 194 (1918); Tulee v. State of Washington, 315 U.S. 682 (1942)).

138 *Id.* at 682 (citing Puyallup I).

139 *Id.* at 682-83 (citing Puyallup II).

140 *Id.* at 686

It bears repeating, however, that the 50% figure imposes a maximum but not a minimum allocation. As in *Arizona v. California* and its predecessor cases, the central principle here must be that Indian treaty rights to a natural resource that once was thoroughly and exclusively exploited by the Indians secures so much as, but no more than, is necessary to provide the Indians with a livelihood--that is to say, a moderate living.

141 United States v. Washington, 506 F.Supp. 187, 208 (W.D.Wash. 1980).

on summer chinook.[142] Since 1975, except 1977, the tribes have not had a commercial fishery on spring chinook.[143] Ceremonial and subsistence fisheries are currently a fraction of tribes' actual needs.[144] Such curtailment of tribal commercial, ceremonial and subsistence fisheries effectively undermines a tribe's opportunity to achieve a moderate standard of living.

In *United States v. Adair*, the Ninth Circuit stated that:

> Implicit in this "moderate living" standard is the conclusion that Indian tribes are not generally entitled to the same level of exclusive use and exploitation of a natural resource that they enjoyed at the time that they entered into the treaty reserving their interest in the resource, unless, of course, no lesser level will supply them with a moderate living.[145]

Few could reasonably argue that the tribal harvest presently yields a moderate living.[146] If a moderate standard of living can only be achieved by the "same level of exclusive use and exploitation" as at the treaty time, then *Adair* suggests that exclusive use by Indians should be permitted.

Although this reading of *Adair* appears to conflict with the 50-50 allocation standard and "in common with" treaty language, it is nonetheless consistent with the federal government's responsibility to protect the treaty reserved right to take fish.[147] Arguably,

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142 TECHNICAL ADVISORY COMMITTEE, 1991 ALL SPECIES REVIEW COLUMBIA RIVER MANAGEMENT PLAN 2 (May 10, 1991).

143 *Id.* at 6.

144 *Id.*

145 United States v. Adair, 723 F.2d 1394, 1415 (9th Cir. 1984) (emphasis added).

146 The Northwest Power Planning Council offered a conservative estimate that in the early 1800s a population of 50,000 to 62,000 Columbia Basin aboriginal peoples caught approximately 5 to 6 million fish annually, almost 97 fish per individual. COMPILATION OF INFORMATION ON SALMON AND STEELHEAD LOSSES IN THE COLUMBIA RIVER BASIN at 74. In 1990, the Yakama Nation, Umatilla Confederated Tribes, Warm Springs and Nez Perce Tribe, whose members number approximately 16,000, took only 77,000 fish, or under five fish per person. TECHNICAL ADVISORY COMMITTEE, 1991 ALL SPECIES REVIEW COLUMBIA RIVER FISH MANAGEMENT PLAN (May 10, 1991).

147 Tulee v. State of Washington, 315 S.Ct. 682, 683 (1942).

> In *United States v. Winans,* ...this Court held that, despite the phrase `in common with citizens of the territory', [sic] Article III conferred upon the Yakimas continuing rights, beyond those which other citizens may enjoy, to fish at their `usual and accustomed places' in the ceded area...It is our responsibility to see that the terms of the treaty are carried out, so far as possible, in accordance with the meaning they were understood to have by the tribal representatives at the council and in a spirit which generously recognizes the full obligation of this nation to protect the interests of a dependent people.")(emphasis added)(citations omitted).

because neither the government nor the tribes could have anticipated the dramatic decline in the fishery resource, strict interpretation of the "in common with" language is inappropriate. Indeed, in *Passenger Fishing Vessel*, the Court found that "neither party realized or intended that their agreement would determine whether, and if so how, a resource that had always been thought inexhaustible would be allocated between the native Indians and the incoming settlers when it later became scarce."[148]

Treaties must be construed as they would have been naturally understood by Indians.[149] There was no question at treaty time that Indians could harvest as many fish as they needed. The tribes' insistence during treaty negotiations that the treaties preserve their right to fish at usual and accustomed places is evidence of the tribes' intent to guarantee themselves and their future generations the right to harvest as many fish as they needed.[150]

Furthermore, tribes should not be asked to bear the burden of resource conservation when non-treaty development activities and fisheries are primarily responsible for the continuing diminishment of the fishery resource. Indian treaties must be liberally construed in favor of the Indians.[151] Thus, when state or federal actions threaten treaty fisheries, through environmental degradation, over-harvesting, or otherwise, those actions should be restricted before the tribal treaty harvest is reduced. As a party, the federal government is obligated under *United States v. Oregon* to protect and enhance tribal treaty fisheries. Likewise, courts have repeatedly recognized that states may assert their

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148 Passenger Fishing Vessel, 443 U.S. 658, 669 (1979).

149 *Id.* at 676.

150 *Id.* at 675-76.

> A treaty...is essentially a contract between two sovereign nations...it is reasonable to assume that they negotiated as equals at arm's length...When Indians are involved, this Court...has held that the United States, as the party with the presumptively superior negotiating skills and superior knowledge of the language in which the treaty is recorded, has a responsibility to avoid taking advantage of the other side. "The treaty must therefore be construed...in the sense in which [the words] would naturally be understood by the Indians." (citations omitted).

151 Tulee v. Washington, 315 U.S. 681, 684-85 (1942). *See also* Letter from Portland Area Director of Bureau of Indian Affairs to Merrit Tuttle of National Marine Fisheries Service (Sept. 10, 1991) (Discussing the listing of Snake River spring, summer and fall chinook.)

> Because the diminishment of the tribes' treaty reserved fisheries in the Columbia Basin has occurred as a result of other land and water management actions, the Bureau of Indian Affairs urges the National Marine Fisheries Service to ensure that, in the event of a listing, the allocation of the conservation burden to protect the various salmon runs does not further deprive the tribes of their treaty rights. In other words, NMFS must look to all other factors to protect the resource before regulating treaty fisheries and address those factors proportionately to the impacts they have caused.

police power to regulate the non-treaty harvest given reasonable circumstances while regulation of treaty fisheries may occur only when indispensable to conservation purposes.[152]

THE ENVIRONMENTAL STANDARD

The right to take a fair share of fish as set forth in *U.S. v. Oregon* is meaningless if there are no fish to be taken. Fish runs passing through usual and accustomed fishing sites are threatened by the Columbia River hydro-electric system and environmental degradation, including thermal pollution and sedimentation. The Columbia River tribes bargained in good faith for a substantive fishing right when they ceded millions of acres to the United States. The Supreme Court characterized the Indians' right to fish as a "right to 'take' -- rather than merely the 'opportunity' to try to catch."[153] The tribes reserved more than the right to "occasionally ...dip their nets into the territorial waters."[154]

Treaty Right of Access Imposes a Servitude Upon Land

In *U.S. v. Winans*, the Court described the tribes' reserved treaty right to fish at their usual and accustomed places as a servitude upon the land.[155] As described in *Winans*, the treaties reserved and recognized Native Americans' aboriginal "right in the land -- the right of crossing it to the river -- the right to occupy it to the extent and for the purposes mentioned."[156] Commentators have also suggested that treaty fishing rights impose an environmental servitude upon state and federal governments.[157] It is clear that in the realm of treaty fishing rights, the states, federal government, and tribes share the responsibility created by treaty to enhance and protect fish habitat.[158]

Non-Treaty Actors Must Not Impair or Destroy Habitat

In the *Confederated Tribes of the Umatilla Indian Reservation v. Callaway* settlement agreement,[159] the court ordered federal water managers not to manipulate the Federal Columbia River Power system (FCRPS) so as to inundate tribal fishing sites above the

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152 Tulee v. Washington, 315 U.S. 681 (1942); Maison v. Confederated Tribes of Umatilla Indian Reservation, 314 F.2d 169 (9th Cir. 1963); Holcomb v. Confederated Tribes of Umatilla Indian Reservation, 382 F.2d 1013, 1014 (9th Cir. 1967).

153 Passenger Fishing Vessel, 443 U.S. 658, 678-679 (1979).

154 *Id.* at 678-679. *See also*, Michael C. Blumm, *Why Study Pacific Salmon Law?* 22 IDAHO LAW REVIEW 629 (1985-86).

155 United States v. Winans, 198 U.S. 371, 381 (1905).

156 *Id.*

157 *See e.g.*, Gary D. Meyers, *United States v. Washington (Phase II) Revisited: Establishing an Environmental Servitude Protecting Treaty Fishing Rights*, 67 UNIVERSITY OF OREGON L. REV. 771, 784 (1988).

158 United States v. Washington, 520 F.2d 676, 685 (9th Cir. 1975).

159 Confederated Tribes of the Umatilla Indian Reservation v. Callaway, No. 72-211 (D.Or. August 17, 1973).

Bonneville Dam.[160] In addition to the threat to the tribal fishing sites, experts feared that the peaking proposal would adversely impact the migration of salmonid fish.[161] The court ordered the BPA and the Army Corps of Engineers to manage and operate the FCRPS's peak power system in a manner that did not "impair or destroy" the tribe's treaty fishing rights.[162]

Similarly, an Oregon federal district court enjoined the Army Corps of Engineers from constructing a dam and reservoir, despite Corps promises to mitigate the project's environmental impacts. In *Confederated Tribes of the Umatilla Indian Reservation v. Alexander*,[163] the court found that a proposed dam on Catherine Creek, a tributary to the Grande Ronde River in Oregon, would nullify tribal treaty fishing rights by inundating the tribes' usual and accustomed fishing stations and by preventing fish from migrating upstream.[164] Recognizing that only Congress can abrogate treaty rights and to do so it must act expressly,[165] the court found no express intent to abrogate the tribe's treaty rights.[166] In fact, the court noted that Congress was not aware of the treaty fishing rights at that location when it authorized the dam's construction.[167]

In 1985, the Ninth Circuit affirmed a federal district court order which required water to be released from a dam order to protect 60 spring chinook salmon redds from destruction.[168] In *Kittitas Reclamation District*, the Ninth Circuit held that it was not an abuse of discretion for the district court to consider the Yakima Nation's treaty fishing rights in its interpretation of a consent decree regarding water rights to which the tribe was not a party.[169] The tribe's treaty fishing rights would have been violated unless the Department of Interior's Bureau of Reclamation released water from three of its irrigation dams. *Kittitas* makes clear that the water and hydro-power managers are under an obligation to provide sufficient instream flows to protect treaty fisheries. To reduce instream flows below that which is necessary to preserve spawning grounds is inconsistent with the tribes' established treaty rights.

The issue of whether treaty fishing rights create an environmental right arose again, in *Muckleshoot Indian Tribe v. Hall*.[170] Pending trial on the merits, the Muckleshoot and

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160 *Id.* at 6.

161 *Id.*

162 *Id.* at 8.

163 Confederated Tribes of the Umatilla Reservation v. Alexander, 440 F. Supp. 553 (D.Or. 1977).

164 *Id.* at 555.

165 Menominee Tribe v. United States, 391 U.S. 404, 413 (1963).

166 Confederated Tribes of the Umatilla Indian Reservation v. Alexander, 440 F.Supp. 533, 555-556 (D.Or. 1977).

167 *Id.*

168 Kittitas Reclamation District v. Sunnyside Valley Irrigation District, 763 F.2d 1032, 1035 (9th Cir.1985).

169 *Id.* at 1034.

170 Muckleshoot Indian Tribe v. Hall, 698 F.Supp. 1504 (W.D. Wash. 1988).

Suquamish Indian Tribes sought a preliminary injunction to enjoin the construction of a marina which threatened usual and accustomed fishing sites in Elliott Bay Small Craft Harbor.[171] The tribes claimed that the Corps of Engineers had failed to adequately evaluate and mitigate the project's cumulative impacts on their treaty fishing rights.[172] However, District Court Judge Zilly found that it was unnecessary to decide the environmental issue.[173] Judge Zilly enjoined the construction of the marina finding it dispositive that the marina would substantially impair and limit tribal access to usual and accustomed treaty fishing sites.[174]

In *United States v. Washington (the Culverts Case)*, the court found Tribes understood that the Treaties would provide not only access to usual and accustomed fishing places, but also to sustainable salmon populations; thus, regardless of explicit language, the court of appeals would infer that promise.[175] The court recognized that the thousands of river miles not suitable for salmon habitat due to state culverts precluded sufficient salmon populations that would maintain a moderate living for the Tribes. [176] The court affirmed the district court's injunction requiring the state to remove or modify barrier culverts within a specified time frame. [177]

Tribal fishing rights are as valuable to the Columbia River treaty tribes as the air they breathe. In the Columbia River Treaties, tribes reserved to themselves a right they have practiced since time immemorial: the right to fish at all usual and accustomed fishing sites regardless of where these sites are located. The Supreme Court has determined that the tribes are entitled to fifty percent of each fish run destined to pass Indian fishing sites. This right is to be respected by the states and by the United States government as pursuant to the United States Constitution, the treaties with the tribes are the supreme law of the land.

The right to fish is meaningless if all or most of the fish are killed by the hydrosystem before they return to tribal fishing grounds. The Stevens' treaties off-reservation fishing and hunting rights is the principal component of the treaties to preserve a traditional way of life that is centered around the river and its resources. These treaties did not presume to reserve fishing and hunting rights, they guaranteed these rights both on and off the reservation along with regulatory control and co-management authority as established through the interpretation of the written word, otherwise known as the "canons of construction" and as further upheld in the courts. Indian treaties made under the authority of the United States "shall be the supreme Law of the Land; and Judges in every State shall be bound thereby...." U.S. Const. art. VI, cl.2 *construed in United States v. Washington*, 384 F. Supp. 312, 330 (W.D.Wash. 1974).

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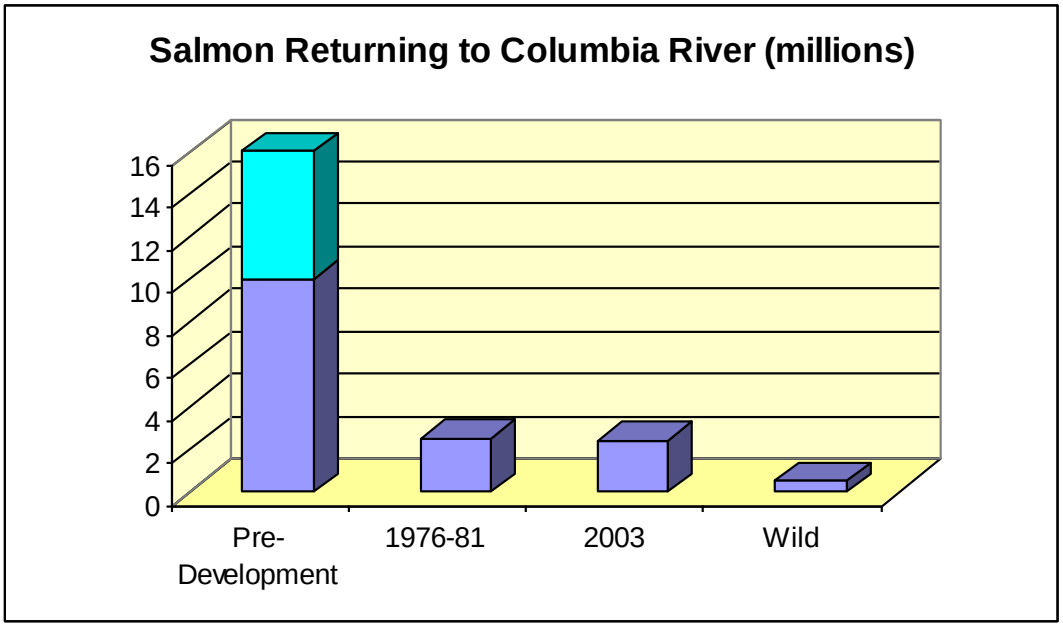
171 *Id.* at 1504.
172 *Id.* at 1516.
173 *Id.* at 1517.
174 *Id.* at 1516.
175 United States v. Washington, 853 F.3d 946, 965 (9th Cir. 2017).
176 *Id*. at 966.
177 *Id*.

Appendix B: Federal Fish and Wildlife Obligation Under the Northwest Power Act

Background

In the mid-1980s, the Northwest Power Planning Council (now called the Northwest Power and Conservation Council) conducted an exhaustive study of the historical size and current status of salmon and steelhead populations. The Council also made policy decisions on what share of the losses were the responsibility of the hydroelectric system. The Council also set a goal for the Fish and Wildlife Program.

The study examined all of the historical information on salmon runs and concluded that ten to fourteen million salmon and steelhead used to return to the mouth of the Columbia River every year. In 1976 to 1981, an average of about two and a half million fish returned to the Columbia, five hundred thousand were naturally spawning fish—eighty percent of the runs came from hatcheries.



The study concluded that salmon and steelhead populations had declined by seven to fourteen million and that natural salmon runs were less than five percent of historical levels.

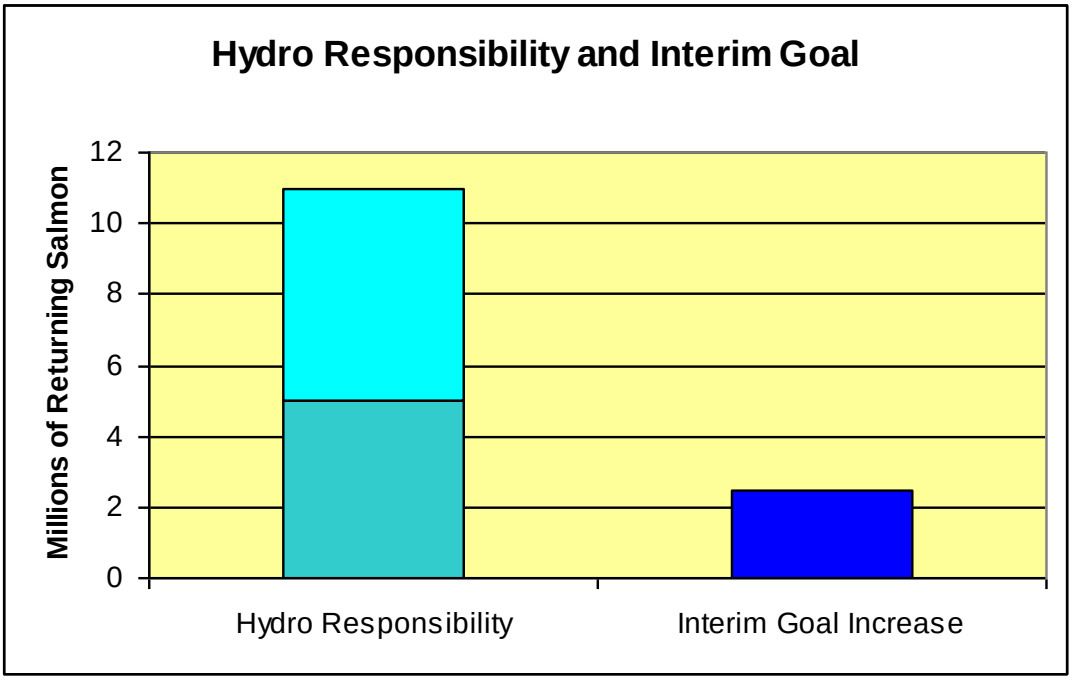
The Council concluded that the dams were responsible for five to eleven million of the fish losses. As part of the rationale for the conclusion, the study found that about four million fish had used the habitat that had been blocked by the dams and that the operations of the dams accounted for the loss of another four million salmon. The Council noted it did "not take into account the accumulation of hydropower-related losses

of salmon and steelhead year by years since hydropower development started. Such cumulative losses would be far greater than 5 to 11 million adult fish."[178]

In 1987, the Council set an interim goal of "doubling the runs." According to the NPCC, "Doubling means increasing the current run size of about 2.5 million adult fish to a run size of about 5 million adult fish, as a result of implementation of this Program. The current run size was based on the five year average prior to the NPCC's first Program in 1982[179].

The Council's program relies heavily on off-site habitat and hatchery measures to mitigate for the damage caused by the dams. The Northwest Power Act gave BPA statutory authority to fund these off-site measures to implement the NPCC Program.

The figure below shows that this interim goal was designed to rebuild salmon and steelhead runs to about one-half of the low end of the range of the hydrosystem's responsibility. The Council said it would reevaluate a higher goal once the interim target was achieved[180].



The tribes viewed the Program's 1987 doubling goal as a compromise that would allow BPA to focus on an achievable interim goal and leave BPA's ultimate responsibility to a future decision process.

[178] See 1987 Columbia River Basin Fish and Wildlife Program, page 39.
[179] Id., page 35.
[180] Id. Page 39.

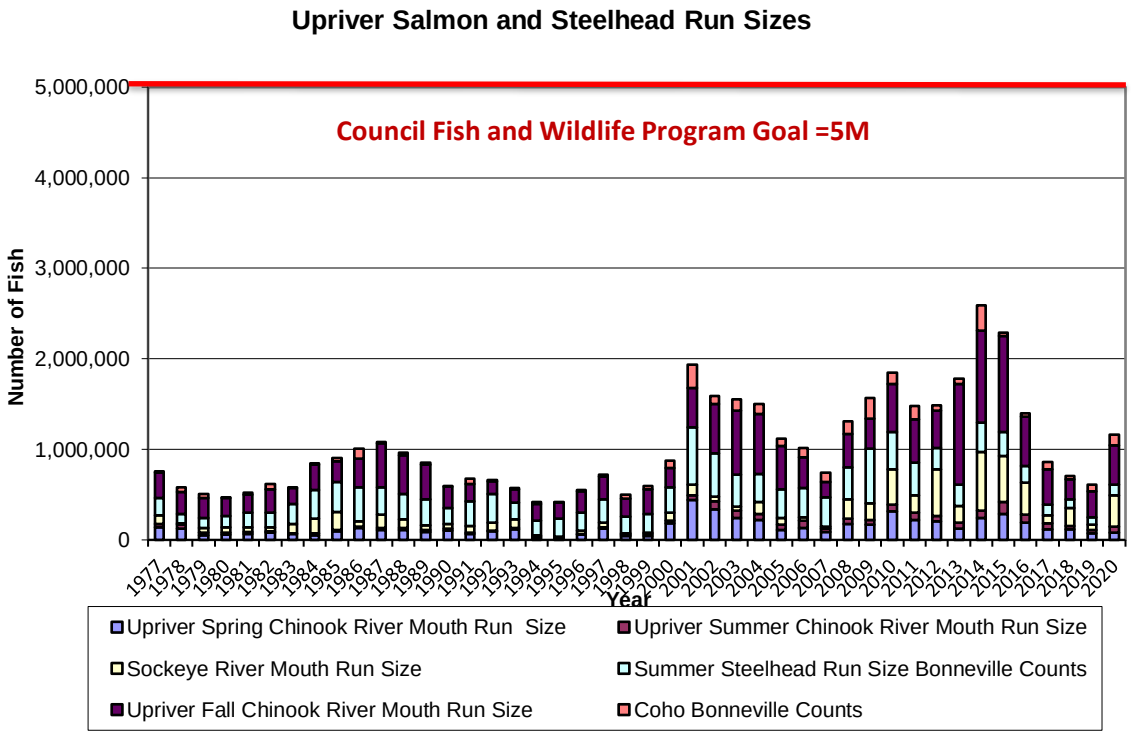
Biological Objectives of the Council Program

In the NPCC 2020 Program the interim goal was "Increase total adult salmon and steelhead runs of Columbia River origin to a 10-year rolling average of five million annually by 2025, in a manner that emphasizes increases in the abundance of the populations that originate above Bonneville Dam"[181].

The ultimate goal for the Federal government should be to address the requirements of the Endangered Species Act, the Northwest Power Act, and the Treaties, Executive Orders, and other commitments made to Indian tribes in the Columbia Basin. In the case of salmon and steelhead, the tribes seek to reach the dual goals of recovery and delisting of species listed under provisions of the ESA and the restoration of salmon populations to levels that provide a sustainable harvest sufficient to allow for a meaningful exercise of tribal fishing rights.

Progress in meeting the Biological Objectives

The figure below shows the salmon and steelhead run sizes above Bonneville Dam from 1977 to 2017 compared to the Council Fish and Wildlife Program goal.



[181] See of the 2020 Columbia River Basin Fish and Wildlife Program, page 11.

The Federal agencies responsible for implementing the Columbia Basin Fish and Wildlife Program (BPA, the Corps of Engineers, the Bureau of Reclamation, and the Federal Energy Regulatory Commission) are a long way from achieving the goals set in the Fish and Wildlife Program.

Appendix C. Changes in the Operation and Configuration of Hydroelectric Dams to Address the Crisis in Salmon Populations

Introduction

The salmon and steelhead populations in the Columbia and Snake rivers are currently in a dire condition.

- Thirteen species are listed as either threatened or endangered under the Endangered Species Act.
- Forty-two percent of Snake River spring/summer Chinook populations have fewer than 50 fish.
- By 2025, 77% of these Snake River chinook populations are predicted to hit their quasi-extinction risk threshold[182] of less than 50 fish by 2025.
- Three stocks have recently triggered their NOAA early warning and significant decline indicators: Upper Columbia Spring Chinook, Upper Columbia Steelhead, and Snake River Steelhead.
- The total abundance of salmon and steelhead in the Columbia River is at or near the abundance when the first ESA listings were registered in the mid 1990's.

In 2017, NOAA Fisheries and its Marine Fisheries Advisory Committee (MAFAC) convened the Columbia Basin Partnership Task Force to bring together diverse representatives from across the Columbia Basin to establish a common vision and goals for salmon and steelhead. The message from the group was that a strong sense of urgency was needed to implement immediate action if declines in salmon and steelhead were to be addressed. In its 2020 Final Report[183], the Task Force set Low, Medium and High goals for 27 stocks of salmon and steelhead. The Low Goal set by the Task Force is nearly 25% fish more than recent total run size to the mouth of the Columbia River. Put another way, the current populations are at 75% of the lowest goal set by the Task Force. The populations of Columbia and Snake River salmon and steelhead are at very dangerous levels for their continued existence.

Since time immemorial, tribal fishers have recognized the natural annual variability of salmon and steelhead abundance. The Columbia River Basin and ocean environment are highly dynamic ecosystems that are subject to random stochastic events, and salmon life history allows species to respond to this uncertainty and variation. However, the current fish and wildlife resources in the Basin are imperiled with a very uncertain future. It would be a grave mistake to plan for Columbia River hydro resources decades into the

[182] Quasi-Extinction is defined as 1) a population that is uncertain to persist; 2) there are not enough parents to successfully reproduce and perpetuate the population; and 3) the probability of recovery is low without substantial intervention.

[183] A Vision for Salmon and Steelhead: Goals to Restore Thriving Salmon and Steelhead to the Columbia River Basin, Phase 2 Report, October 2020, *available at* https://www.fisheries.noaa.gov/vision-salmon-and-steelhead-goals-restore-thriving-salmon-and-steelhead-columbia-river-basin .

future assuming that salmon and steelhead or other resources are stable and secure. While the variability in life history can be an advantage for changing conditions, stock status is so low that variability becomes a significant risk to the species perseverance.

Energy planners work with long lead times measured in terms of decades, assume energy production and consumption can be predicted and modelled decades in the future, and apply today's fish constraints to those future operations. However, assuming that today's fish constraints will be the same constraints for decades to come could be a grave mistake. Improved fish operations have taken decades to get in place, through court orders and incremental changes. Moreover, these operations have changed significantly in past years and are likely to change in the future.[184]

Since the current status of salmon and steelhead populations are still not improving, it is likely that additional constraints will be required in the future. Energy and related planning should anticipate a range of potential biological conditions and needed environmental actions and operational constraints over time. For example, a sampling of current Genesys modeling analysis for a one-week period in July 2031, indicates that Columbia River flows below The Dalles Dam could approach zero kcfs during daylight hours, presumably due to the amount of solar energy produced at that time.

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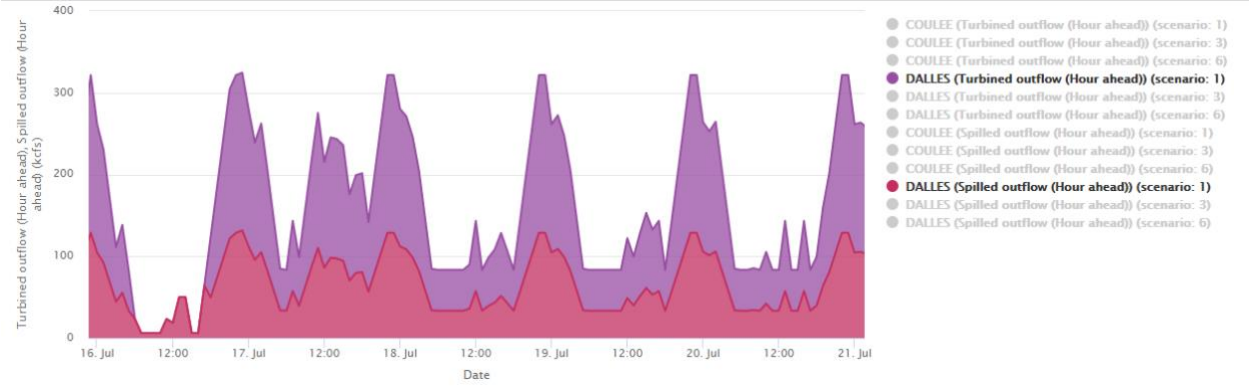
[184] A comparison of Fish Operations Plans (FOPs) from the Corps of Engineers for the last 15 years is illuminating. See http://pweb.crohms.org/tmt/documents/fpp/ for annual FOPs (included as appendices to their annual Fish Passage Plans). For instance, in 2005, under a Court Ordered Spill Injunction, spring spill shifted to 24-hour spill at all eight of the CRS projects, and spill was added in the summer at the Snake River projects (http://pweb.crohms.org/tmt/documents/fpp/2006/sections/E_BIOP_Spill.pdf). This was a major change in operations that lasted for 10 years. In 2017, another Court Ordered Injunction increased the 24hour spill to the 115% forebay and 120% tailrace maximum spill limits set out by state Total Dissolved Gas (TDG) Waivers (http://pweb.crohms.org/tmt/documents/fpp/2017/final/FPP17_AppE.pdf) . Under the Flex Spill Operations Agreement, finalized in 2019, spill was no longer tied to forebay monitors but allowed up to tailrace limits (at most dams) for 16 hours per day and then reduced to the performance spill levels for 8 hours (http://pweb.crohms.org/tmt/documents/fpp/2019/final/FPP19_AppE.pdf). In spring 2020, the tailrace TDG limit was increased from 120% to 125% at most dams. http://pweb.crohms.org/tmt/documents/fpp/2020/final/FPP20_AppE_FOP.pdf. The Flex Spill Operations Agreement expired when the 2020 BiOp for the CRSO was finalized, however the Proposed Action and BiOp have – at least initially- adopted the spill operations outlined in the Flex Spill Agreement with spill levels now caped at 125% TDG as measured by the tailrace monitors. However, future operations of the CRS projects are subject to modification through adaptive management, potential litigation outcomes, and ongoing negotiations of new Accord agreements.



This would be a radical operational change compared to current conditions, with implications for water temperature increases, adult salmon migration, treaty fisheries and spill operations at other lower Columbia River dams, such as Bonneville Dam where spill is managed to set flow levels.

Given the imperiled condition of fish stocks - impacted by Federal Columbia River Power System (FCRPS) dams and other important non-federal dams in the Basin, it is prudent to assume variations in hydro configuration and operation due to modified fish constraints going forward. The following section describes characteristics of the long-term biological health of key species and the short- and long-term actions needed to sustain these species.

Biological Background

Biological conditions

To naturally persist, a population must be able to reproduce and survive at a certain rate to sustain itself. The survival of a species requires parents producing sufficient numbers of offspring to sustain the reproductive potential of the population as a whole.

Various quantitative expressions describe the productivity of healthy salmon populations in tribal, state and federal publications and regulatory documents. For instance, the National Marine Fisheries Service has adopted several metrics for survival and recovery of ESA listed salmon and steelhead. Once such metric – typically known as replacement – describes a growth rate of 1.0, where one adult in the parent generation produces one adult in the generation of offspring. Currently, many populations of salmon and steelhead in the Basin are below replacement, and their population growth rates need improvement just to reach this measure. Moreover, some positive degree of productivity or population growth rate sufficient to buffer the population against stochastic events, such as droughts and heat waves, is necessary for the health of the species (i.e. a minimum growth rate of 1.01). Depending on context, fish biologists use multiple measures of growth expressed in terms of sustainable yield or lambda or spawner/recruit ratios.

In addition to reproductive rates, the overall size of the population is important to its long-term health. A large salmon population maybe able to persist through periods of low productivity. On the other hand, smaller populations are not as resilient. The combination of population size and productivity are used to define degrees of risk. Other characteristics used to measure species viability include diversity and distribution.

Temperature is one of the most important environmental influences on salmon health and productivity. Temperature influences growth, feeding, metabolism, embryo development, and the timing of migration, spawning, and rearing. Optimal temperatures for the protection of fish emphasize the highest survival and ability to perform key life function by life stage (McCullough, 2001). Temperatures at sub-lethal levels can block migration, stress fish, affect reproduction, and create disease problems (McCullough, 1999). Lethal effects from thermal exposure for most salmonids have been found to range from 23°C to 27°C (McCullough, 1999, 2001). The EPA guidance for state and tribal water quality standards recommends that the seven-day average of the daily maximum temperatures should not exceed 18°C where both adult migration and juvenile rearing occur during summer periods (EPA, 2003).

Another measure of biological health, or productivity, of salmon and steelhead in the Columbia Basin is Smolt to Adult Returns (SAR). Essentially, if 100 smolts are produced and migrate from their natal stream into the mainstem river, two would need to return to the stream, after migrating to the ocean and back, to reproduce. That would result in a 2% SAR. A smolt to adult return of 2% to 6% measured at tributary river mouths is generally accepted as minimally necessary to assure species viability and has been set as a goal by the Northwest Power and Conservation Council (2021 Addendum to the 2014 F&W Program). Currently, upper river stocks are experiencing less than 2% SARs and are on a downward trajectory. Studies indicate that survival through the hydro system can have a direct impact on this important metric.

The Comparative Survival Study (CSS) project has developed a metric that simply calculates the number of powerhouses that a fish passes through in its migration down through the hydropower system, known as PITPH, or powerhouse passage rate. For example, a Snake River smolt will pass eight dams on its migration to the ocean. If that smolt passes over the spillway at six dams, but passes through the powerhouse at two dams, its PITPH would be calculated as 2. A direct correlation between PITPH and SAR has been demonstrated that concludes that a decrease in PITPH results in an increase in SAR. Therefore, power operations that maximize spill provides the best opportunity to guide smolts through the spillway and increase SARs.

Ecosystem Functions to Support Biological Conditions

A broad blueprint for changing hydro operations for improved salmon and steelhead survival has been outlined in the NW Power Conservation Council's "Return to the River" (2000) report. Salmonid restoration throughout the Columbia River needs to address all natural and cultural ecosystems, which encompass the continuum of freshwater, estuarine, and ocean habitats. Salmonid fishes complete their life histories in

these habitats. Sustained salmonid productivity requires a network of complex and interconnected habitats created, altered, and maintained by natural physical processes in freshwater, the estuary, and the ocean. These high-quality habitats, which have been extensively degraded by human activities, are crucial for spawning, rearing, and migration of salmonids, maintenance of food webs, and predator avoidance. Life history diversity, genetic diversity, and population organization are ways salmonids adapt to their complex and connected habitats. Progress toward the restoration goals requires moving the system from the current, degraded state to the one that supports improved ecological conditions with regard to the most critical attributes for salmonids.

Like all river ecosystems, the Columbia River has three important spatial dimensions (Figure 3.3) (Ward 1989): 1) Riverine - a longitudinal continuum of runs, riffles, and pools of varying geometry from headwaters to mouth; 2) Riparian - a lateral array of habitats from the middle of the main channel through various side and flood channels and wetlands to flood plains and the uplands of the valley wall, including streamside vegetation and associated faunal assemblages; and 3) Hyporheic - a latticework of underground (hypogean) habitats associated with the flow of river water through the alluvium (bed sediments) of the channel and flood plains. These three interconnected habitat dimensions get reconfigured continuously by physical (e.g., flooding) and biological processes (e.g., salmon digging redds; beavers damming small streams and side channels on flood plains of larger rivers). Critical habitats for the various life stages of salmonids exist in all three dimensions. In a dammed river, the habitat is no longer modified and reconfigured on an annual basis and becomes stagnant and sedentary, losing productive capability and contribution to healthy flora and fauna.

In the Columbia River ecosystem, life history diversity should be substantial owing to the ecosystem's large size, its complex riverine physiography and geomorphology, highly variable flow regime, and complex oceanic circulation pattern. Improving ecological conditions and increasing salmonid production requires restoration of habitat diversity, which will enable re-expression of life history diversity.

High summer water temperatures in the Columbia River System are known to have detrimental outcomes on fish survival and recovery. For example, in the summer of 2015, low flow conditions combined with lethally high temperatures in the Columbia and Snake River killed all but 1 percent of the Snake River sockeye salmon run. Lower river passage survival relative to temperature can be seen in the following graph from a NOAA report on the 2015 sockeye passage season:[185]

[185] NOAA Fisheries, 2015 Adult Sockeye Salmon Passage Report, Sept. 2016, *available at* https://archive.fisheries.noaa.gov/wcr/publications/hydropower/fcrps/2015_adult_sockeye_salmon_passage_report.pdf .

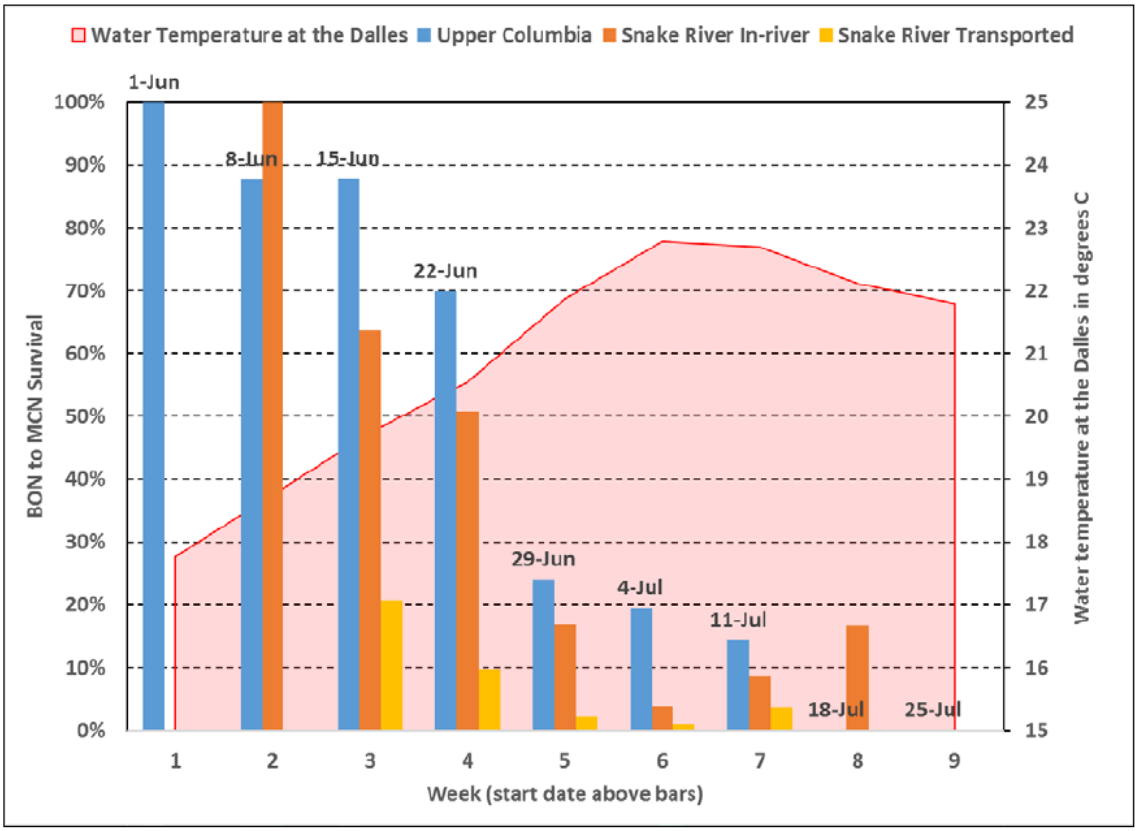
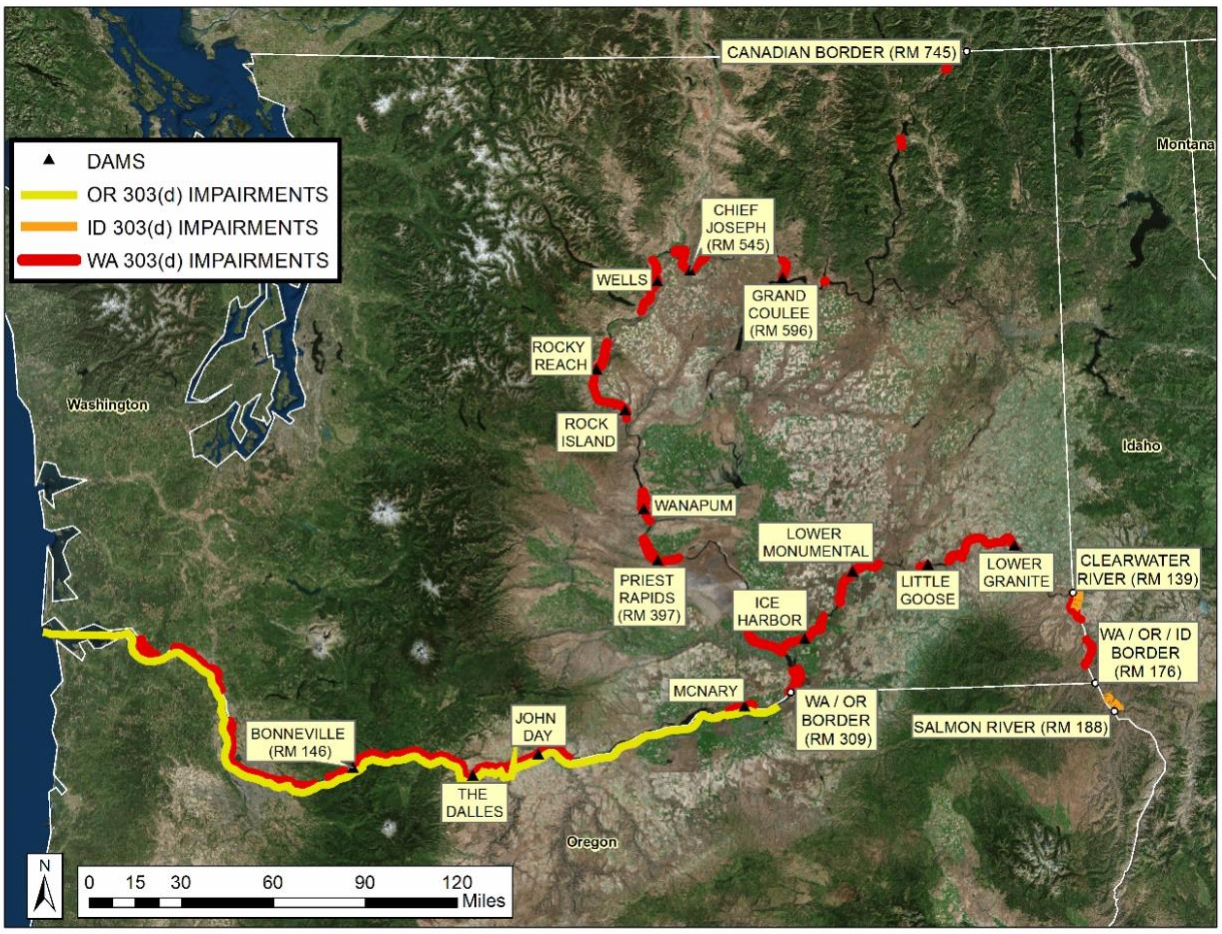


Figure 8. Weekly adult sockeye survival estimates from Bonneville to McNary dam in 2015 for Upper Columbia River sockeye salmon (blue bars), Snake River sockeye salmon that migrated inriver as juveniles (orange bars), and Snake River sockeye that were transported as juveniles (yellow-orange bars) with water temperatures (red line) at The Dalles Dam. Source: PITAGIS data and Columbia River DART.

Losses such as those experienced in 2015 will only be intensified by a warming climate. An analysis of temperature conditions in the Columbia and Lower Snake Rivers can be found in EPA's Total Maximum Daily Load (TMDL) for Temperature on the Columbia and Lower Snake Rivers (draft May 2020, final expected 2021). The geographic scope of the TMDL includes waters within the mainstem of the Columbia River from the Canadian border to the Pacific Ocean and within the mainstem of the Snake River in Washington from the confluence with the Clearwater River at the Idaho border to its confluence with the Columbia River. The following map shows current Clean Water Act impairments for temperature in the Columbia and Lower Snake Rivers.



The TMDL report is a detailed analysis of the sources of thermal impairment on the Columbia and Lower Snake rivers. The analysis points to the Federal Columbia River Power System as a primary source of thermal impairments. The TMDL makes clear that some significant changes to dam operations and alternative management of reservoir releases will be necessary to achieve temperature reductions and to limit the magnitude of impairments.

The current approach to salmon restoration in the Columbia River Basin is unlikely to achieve the salmon restoration goal of the Northwest Power and Conservation Council, which calls for a doubling of salmonid abundance without any negative effects on diversity. In fact, this approach is more likely to continue the present trends of salmon abundance decline, local population extinctions, and ESA listing proliferation. A major conclusion embedded in the Council's 2000 *Return to the River report* is the need to restore a greater degree of "naturalness" to the river than exists today (see also Poff et al. 1997). The standard and level of naturalness possible to be achieved remain under discussion with unattainable historical (pristine) conditions. An acceptable level of naturalness rests proximate to a completely natural river and farther from the river's

current developed state. The ecological and biophysical attributes of the river in the pre-development stage represent the norms under which salmon evolved in the Pacific Northwest. Management actions that restore these attributes and bring them into higher relief in the basin, thereby improving ecological conditions for salmon, should aid salmonid populations. Important factors emerge from an examination of the only truly robust fall chinook population in the Columbia River basin, the Hanford Reach fall chinook stock. This healthy population originates in a series of linked habitats that provide suitable adult spawning habitat, successful incubation of eggs, and various juvenile rearing areas that are immediately adjacent to the spawning areas.

Several actions could begin to rebuild habitat quantity and quality of the mainstem and tributaries: a) Reregulate flows to restore the spring high-water peak and revitalize the mosaic of habitats in alluvial riverine reaches; b) Reregulate flows to stabilize daily fluctuations in flow (caused by the practice of "power peaking" and lowering flows to store power from renewable resources) to allow food web development in shallow water habitats and reduce juvenile mortalities via stranding; c) Provide incentives for watershed planning that emphasize riparian and upland land use activities that support natural interactions between land and water, and insist on empirical evaluation of effectiveness of management practices; d) Couple seasonality of flow with spill rates over the dams that efficiently bypasses juveniles and adults around mainstem dams and behaviorally cue (rather than physically flush) the juveniles through the mainstem; and e) Restore mainstem habitats to more natural conditions which will reduce predation rates on migrating juvenile salmon.

First and foremost, all hydro system operations for both flood control and power generation should consider how those operations may impact salmon survival and how they may be implemented to resemble a more normative river hydrograph.

I. Columbia River System Actions

A. Potential Near-term Actions for the Columbia River System

1. Reservoir Operations: Storage Projects

Implement modified flood control during years with lower seasonal snowpack. Modeling has shown that modified flood control is important during low snow years when flood control is not as much an issue, but spring/summer flows are at risk from diminished runoff. During years of high snowpack, there is generally sufficient water for spring/summer migrations, but a higher flood risk that must be controlled by releasing more water during the winter. Modifying flows in low flow years allows more water to be shifted into the spring and summer and supports juvenile migration with shorter downstream travel times. Recent increases in gas waivers allows for more water to be spilled without causing Total Dissolved Gas (TDG) concerns. This increased capability should be considered when setting flood control targets. Increased flows during spring

migration coupled with increases in spill can help to reduce powerhouse encounters for migrating juveniles. Smolt to adult return rates (SAR's) are higher when the number of powerhouses that juveniles encounter is decreased.

More in-depth measures, such as Altered Flood Control, may be needed across the system.

Altered Flood Control (AFC), where all rule-curves for key Federal storage dams (e.g., GCL, HGH, LIB, DWR), BC dams (e.g., MCD, DCD, ARD), and one FERC dam (BRN) across all water year classes are changed, should be considered. The effective AFC operation is controlled mainstem river flood pulsing. There have been some peer-reviewed published studies showing the ecological benefit of controlled flood pulsing. The result is a more natural or "normative" hydrograph that is more in tune with the salmon's life cycle and accommodates the coming changes to basin hydrology due to future climate change impacts. Such a change in lower Columbia River flood risk exceedance may slightly raise the risk while still providing reasonable flood control protection.

The Corps of Engineers has yet to perform a badly needed flood risk assessment for the lower Columbia River; the last assessment was done in the 1970s. So, the question of what level of flood risk management should accommodate salmon restoration is unanswered. The Corps' trend in flood control operations since the 1980s is for an increasing diminished peaking hydrograph. Among other things, this reduces volumes of water needed for the Columbia River estuary plume. Any change to the Corps' flood risk management operations will need Corps buy-in and cooperation so that they are still meeting their congressional mandates. Various alternative flood control operations have been modeled out with the Council's GENESYS Hydro-model that show the absolute/differential values of mainstem river flow and project/FCRPS generation relative to a fixed standard, in this case, the 2000 Biological Opinion FCRPS operations (Dittmer 2006). Those previous analysis can be made available upon request. The GENESYS model is currently undergoing major renovations, including incorporating the new 90-year water year dataset. Council staff hope that a beta-test version of the model should be ready later in 2021.

2. Reservoir Operations: Passage Projects

Operate at Minimum Operating Pool.

Ensure that projects are operated at Minimum Operating Pool (MOP) throughout the migration season to reduce pool volumes and decrease water particle travel time which aids in decreasing migration time. A lower pool elevation creates more flow and more closely resembles a river environment.

Existing reservoir (pool) levels are set to MOP in the Snake but not at all the Lower Columbia projects. All Lower Columbia Projects should be restricted to MOP. There are current limitations to MOP in both the Snake and Columbia rivers due to other designated purposes of the hydro system.

In the Snake River, the Federal Navigation Channel must maintain a required depth at all flows; therefore, an elevated pool above MOP is necessary because of sedimentation. Until the Channel is dredged, or barges are required to lighten load requirements, MOP will not be implementable during periods of low flow.

In the Lower Columbia, John Day (the largest reservoir) is operated to only MIP (minimum Irrigation Pool) several feet higher than MOP. This is due to irrigation withdrawals not being deep enough. If the irrigation withdrawals are extended, then MOP could be achieved. Other restrictions at John Day are higher pool elevations to aid in predation management. At higher pool elevations avian predators are unable to nest on Blalock Islands. However, dissuasion could be used in place of elevating the pool to achieve the same result, allowing a return to lower pool elevations.

Lower pool elevations would also help reduce sedimentation plumes that form at the mouths of the tributaries creating shallow water habitat and reducing cold water refugees that migrants can take advantage of.

3. Mainstem Snake and Columbia River Dam Operations

Increase hours of expanded spill during peak passage periods.
Current operations have increased the spill limit at the passage projects to 125% Total Dissolved Gas (TDG) for 16 hours during the spring season. During peak passage periods this should be increased to 24 hours.

Allow for increased Total Dissolved Gas waivers year-round.
Historically, total dissolved gas (TDG) limit waivers, as set by the states of Washington and Oregon, have allowed spring and summer spill operations in aid of fish passage to exceed the statewide 110% TDG limit and reach up to 115% TDG in the forebay of each dam and 120% TDG in each tailrace. To support the Flex Spill Operations Agreement, the states removed the forebay TDG limit for spring 2019 operations, allowing operations to be curtailed only by the 120% TDG tailrace limit.[186] For 2020, the states raised the tailrace limits to 125% TDG for the spring passage season, allowing for even more spill at each dam.[187] These increases in TDG waivers should be enacted year-round and allowed for purposes other than fish passage to allow for more flexibility in water management and flood control operations. Current TDG waivers can hamstring operations and cause projects to be too cautious based on early seasonal forecast, leading to less water augmentation for the spring and summer time periods to the determent of juvenile outmigrants.

Reduce Power Peaking
Reduce Power Peaking at passage dams during emergence and migration periods to reduce stranding of fry and smolts. Power peaking can also cause temporary disturbance or oscillation in the water level that can confuse downstream and upstream migrants and

[186] For a more detailed explanation, see the Corps of Engineer's Fish Operation Plan for 2019 at 2, *available at* http://pweb.crohms.org/tmt/documents/fpp/2019/final/FPP19_AppE.pdf.
[187] *See* http://pweb.crohms.org/tmt/documents/fpp/2020/final/FPP20_AppE_FOP.pdf for more details.

increase travel time. This operation is currently implemented below Priest Rapids Dam with tremendous success for the Hanford Reach Fall chinook population.

Strictly limit periods of zero flow
Periods of very low or zero flow are currently allowed and are not based on biological triggers, such as the number of fish present in the river. Zero flows should only be allowed when biological triggers have been meet to ensure there is little to no risk to migrants. Constraints need to be integrated into the power operations to maintain minimum levels of flow when fish are present in the system.

Expand and modify periods of spill
Increase periods of spill outside the migration season to aid overshoots in the fall and spring, as well as to aid kelt migration during the early spring prior to the initiation of the spill season.

Currently spill starts on April 3 at the Snake River projects and April 10 at the Lower Columbia Projects. In recent years, the screen bypasses system has started up to a month earlier when downstream migrants have been present. This would indicate that spill should be started earlier by at least 10 days to two weeks. Climate change will continue to shift migration earlier and the start of spill will need to be modified accordingly. Early spill also helps overshoot adults that have gone past their natal streams and over a dam and need to migrate back downstream. Kelts, post spawned steelhead that are returning to the ocean, are also aided by spill, since they too are migrating downstream. Juvenile bypass systems are not designed for adults and injury and mortality can occur for these downstream migrating adults. Adult passage survival through turbines is also poor and the most injurious route for downstream migrating adults.

4. Other Hydro-Actions to Improve Salmonid Survival

Implement structural modifications at Grand Coulee to allow drum gate maintenance to occur regardless of flow year and reduce the required draft to perform the work.
This draft can have large impacts in early spring flows or put the region in the position to have to choose between spring and summer flows since it may preclude providing adequate flow during both time periods.

Operate Dworshak Dam on the North Fork Clearwater River to better mimic the spring freshet. Current flood control drafts occur early in the winter when there is little information on what type of flow year will be realized. This can easily lead to excessive deep drafts that make it challenging to achieve refill, let alone provide spring flow augmentation.

Install additional turbines at key projects
Install additional turbines at projects such as Libby and Dworshak to allow for more flexibility in moving water and reduce the risk of over drafting due to project limitations. This would allow the operators more time before selecting target elevations. This would allow for more climatological data to be considered to ensure that optimum reservoir operations are realized.

Reduce water withdrawals

Implement purchase agreements or utilize other means to reduce water withdrawals and leave more water in tributary rivers, especially in the late spring and summer months to aid both juvenile and adult migrants. More water left in the rivers will help to decrease travel time and buffer temperature increases. Additionally, under future climate scenario, flow for generation in the summer will be more valuable to the transmission system.

(i) Address thermal impacts associated with hydropower operations by implementation of a temperature reduction plan for the Columbia and Snake Rivers in accordance with the EPA temperature TMDL.

(ii) Develop a long- and/or short-term sediment budget model throughout the Columbia River Basin with specific focus on the Cold-Water Refuges (CWR) along the river. Such a model can aid in hydroplaning of the river locations with objectives of optimizing salmon survival.

(iii) Develop ecosystem rule curves highlighting target reservoir elevations to facilitate salmon survival in storage efficient as well as non-storage dams across the CRB.

Investigate Mainstem Dam Removal

Investigations should be conducted for removal of individual hydro projects on the Snake and Columbia rivers. The current dialogue on dam removal focuses on an "all or nothing" approach. Adequate investigation has not been conducted for each individual dam to determine the overall benefit or risk of removal for salmon and recovery and hydro operations, including lower Columbia River projects.

As part of the development of the TMDL for Temperature analysis, EPA used a one-dimensional computer model, RBM10, to assess various temperature impacts on the river including an assessment of the temperature impacts of dams by comparing daily average temperatures of a free-flowing model to the baseline condition. EPA's analysis also offers insights that supports the benefits of Snake River dam removal in order to preserve designated uses in the system.

- The free-flowing scenario results in a significantly cooler Lower Snake River by 1-2°C during the period when the Snake River currently typically exceeds 20°C (mid-July – mid September).
- The free-flowing scenario significantly reduces the number of days that exceed a daily average of 20°C.
- The cooler daily average temperatures in the summer and fall under the free-flowing scenario as noted above will result in cooler temperatures for a few migrating adult sockeye in July, for a significant number of adult steelhead in July, August, and September, and for a significant number of adult Fall Chinook in August and September.

5. Hydro Operations: Mid-Columbia

Juvenile survival through the hydro system is lower for yearling chinook and steelhead in the Mid-Columbia, relative to their Snake River counter parts (2020 CSS). Also, PITPH, which is the relative proportion of fish passing dams via their powerhouses, is higher for steelhead originating from the Entiat-Methow rivers than from elsewhere in the Basin.

This is important because CSS modeling has demonstrated that each additional powerhouse encounter by wild steelhead groups from the Snake River, Entiat and Methow rivers, Yakima River and John Day Rivers may reduce SARs by 21%. Similarly, each additional day of water transit time could reduce SARs by 14%.

Improved ecosystem-based functions, like additional fish flows during the spring freshet can decrease transit times through the system while reducing the number of powerhouse encounters by out-migrating smolts. Columbia River Treaty negotiations are therefore critical to the recovery Mid-Columbia salmon and steelhead stocks.

Improvements in lifecycle models and increased PIT tag detection in the mid-Columbia can work hand in hand to identify and target problems at a given life stage or problems at a more specific location on the Columbia River. For example, adding a spillway PIT tag detection system at the Wanapum project in Grant County would provide two valuable purposes. First, it would provide new insights into the survival of out-migrating juvenile smolts from Rocky Reach Dam to Wanapum Dam and from Wanapum Dam to McNary Dam. Second, it would improve the detection probabilities of smolts throughout the Mid and Lower Columbia River. While improvements in PIT detection can provide a better window to juvenile survival in the mainstem, improvements in life cycle models can provide additional clues to fish survival/mortality in the mainstem and tributaries.

B. **Potential Long-term Actions for the Columbia River System**

The following actions have been considered in many venues in the Pacific Northwest, in some cases for decades. For instance, a coalition of the basin's state and federal fish and wildlife agencies and Indian tribes put forward initial recommendations to the Northwest Power Planning Council in 1981 that included restoring the Spring freshet to aid juvenile salmon migrations to the Pacific Ocean. Similar recommendations were put forward to the Council by the members of the Columbia Basin Fish and Wildlife Authority in 1991. The science behind these recommendations has continued to accumulate. That science continues to point in the same direction, which underscore the efficacy of the following actions that would restore ecological functions and improve biological conditions for key species affected by the dams.

As the region and the West look forward to their energy futures, this planning should enable, and certainly not foreclose the actions described below so that they are available to address the needs of key species. Unfortunately, and all too often, the region's energy planning looking forward 30 or more years has been based on fish and wildlife commitments that assume a static future of actions, such as dam configurations and operations for fish and wildlife-based commitments that culminated from prior proceedings but were not necessarily forward looking. Future energy planning should recognize that in the long-term, hydro actions will continue to evolve. Here are some actions that are likely to be under consideration in the Region in the years to come. In addition, climate change will affect both fish and power and these effects should be analyzed together.

- Move the COE's annual systemwide "Control flow" for the Columbia River at The Dalles to 450,000 cfs (bankfull) and gradually ramp up to 550,000 cfs (flood-flow) to benefit spring/summer salmon passage.

- Secure three to five million acre-feet of storage in Canadian reservoirs,

- Secure one to six MAF from Upper Snake reservoir storage.

- Incrementally breach the four Lower Snake River dams. Dam removal should begin immediately with Little Goose and Lower Granite dams. Further investigation and study may determine the efficacy of removal of other mainstem dams, including lower Columbia River projects. Repair any mainstem corridor habitat.

- Increase spill at mainstem dams needed to achieve a PITPH of 1.0 or less, which would likely include spill to maximum TDG levels of 125%

- Permanently lower John Day Reservoir.

- During dry years (i.e. years with low snow pack) when downstream flood risk is diminished, implement ecological rule curves that store additional water in the upper reservoirs (primarily at Grand Coulee) to preserve adequate flows for migrating juveniles and adults during the spring and summer months.

- Improve adult and juvenile passage for Pacific Lamprey at the dams

- Implementation of EPA's 2021 TMDL for Temperature in the Columbia and Lower Snake Rivers which identified that the Federal Columbia River Power System is a primary source of thermal impairment. Significant changes to dam operations to limit thermal impairments are expected.

II. Climate Change Effects

EPA's TMDL report synthesized available records of river temperatures and estimated warming due to climate change that has occurred to date and warming that is projected to occur in the future (TMDL, Appendix G). EPA's reports evidence of a warming trend in river temperatures since 1960 that ranges from 0.2°C to 0.4°C per decade for a total water temperature increase to data of 1.5°C ±0.5°C.[188] As noted previously, lethal effects from thermal exposure for most salmonids have been found to range from 23°C to 27°C (McCullough, 1999, 2001).

[188] *Available at* https://www.epa.gov/columbiariver/tmdl-temperature-columbia-and-lower-snake-rivers.

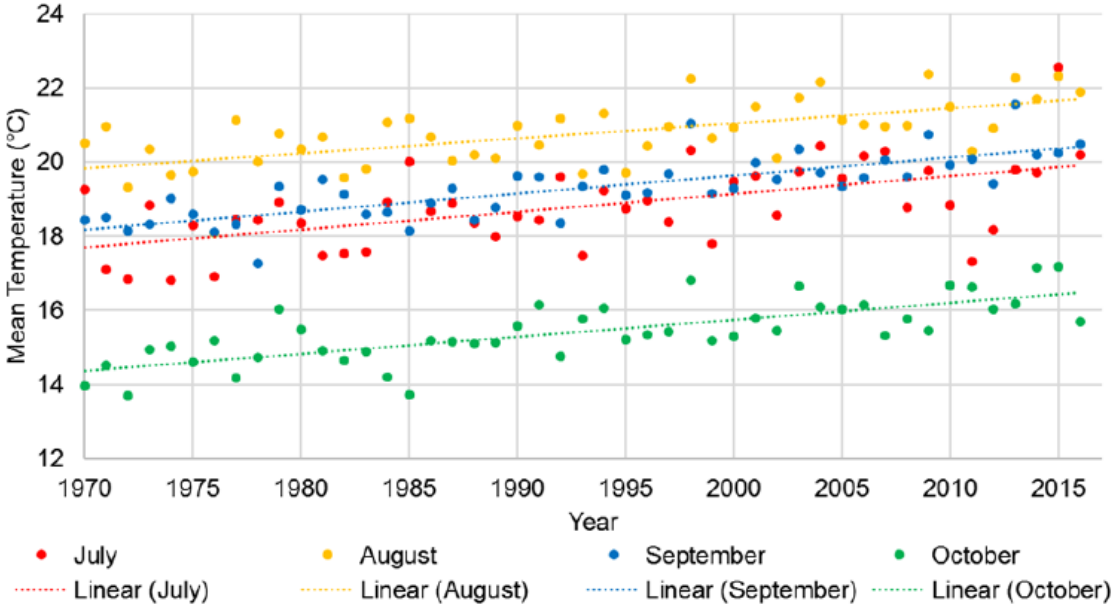


Figure 2-5 Trend in monthly mean temperatures at Bonneville Dam

The following climate change effects also need to be considered alongside potential Columbia River System actions:

i) Projected changes to river flow and temperature under future climate change scenarios (*readily available in recent scientific literature and policy documents, supported by regional modeling efforts*)

ii) Potential adjustments to hydro regulation (*discussed in the RMJOCII report recently published by the action agencies*)

iii) Considerations for Columbia River fish populations (discussed in recent scientific literature with primary effects being higher winter flows, an earlier spring freshet, lower flows and higher water temperature during the summer, with these effects varying by subbasin).

iv) Synchronous effects on energy demand (*discussed in recent presentation by the NW Power and Conservation Council, with the primary effect being a projected increase in summer energy demand for air conditioning and a projected decrease in winter energy demand for heating*)

Appendix D. Energy Activities of CRITFC Member Tribes and Future Tribal Energy Leadership Opportunities

Energy Activities of CRITFC Member Tribes

CRITFC developed a Tribal Energy Vision in 2003 and updated this vision in 2013. The four CRITFC member tribes have each applied the vision to their day-to-day government priorities. These tribal actions demonstrate their leadership in reducing damage to salmon and other fish and wildlife in the Columbia Basin, reducing emissions causing climate change and supporting a diverse and reliable energy resource mix that will lower energy costs and help recover abundant, harvestable salmon and other resident fish.

Each of the four tribes has participated in studies and feasibilities of all possible energy solutions which could meet their goals, and which conform to the tribal culture. Feasibility studies and other similar actions have included reviews of energy efficiency options, wind energy generation potential (and any negative project impacts), solar generation projects, biomass project feasibility using local forestry resources, reservation hydropower generation and management, agricultural practices to save energy, natural gas projects and other potential projects. All of the tribes have taken on some level of study or establishment of a tribal utility to give the tribe better ability to choose their own resources, control their power use, create jobs and provide essential, sustainable services to their reservations. Each of the tribes has invested in one or more personnel employed by the tribe to manage and operate the chosen energy projects.

Each tribe has had to consider the unique resources available on their reservation, and their unique political, cultural, and practical positions. These factors have included whether the tribe's reservation is in trust or has a checkerboarded land base (which impacts the tribe's jurisdiction over contiguous infrastructure), access to land with infrastructure for solar, whether a good wind resource is present in a place that does not have cultural impediments to development, whether there are existing hydro dams or hydro potential, and other similar factors. Each tribe has had to contend with different outside relationships with their various serving utilities, the ability to access outside commodities (such as natural gas), and their access to energy infrastructure.

Generally, the low cost of electricity in the region makes it financially more difficult for renewable energy and new projects with new infrastructure demands to compete with existing markets. The hiring and training of local qualified personnel also presents a challenge unique to these rural communities.

Three of the four CRITFC tribes (Nez Perce, Umatilla and Yakama) have been officially "affected" by the Hanford nuclear waste site under the Nuclear Waste Policy Act of 1982.

The U.S. Department of Energy Richland Operations Office is responsible for the cleanup at Hanford, which gives these three tribes a potentially different relationship with the U.S. Department of Energy and has other natural resource and partnership implications.

Each tribe has used available federal and other grants and technical assistance opportunities to assist in their energy planning, studies, projects, and decision-making efforts.

The following energy efforts are ongoing with the CRITFC Tribes:

Confederated Tribes of the Umatilla Indian Reservation[189]

General Information:
There are over 3000 tribal members, about half of whom live on the reservation. The Umatilla Reservation totals 172,882 acres that flank the Blue Mountains of northeastern Oregon. Of that total, 90,315.54 are trust acres (52%) and in Individual Indian/Tribal ownership, including trust and fee. 48% is owned by non-Indians. The Umatilla Reservation's electricity is served by the Umatilla Electric Cooperative (in most of the residential and rural areas of the reservation) and by PacifiCorp (in the commercial and governmental area). Cascade Natural Gas also provides natural gas service on the reservation.

Energy Governance and Planning:
CTUIR adopted an energy policy in 2009 to provide a long-term vision on the use of energy and the development of energy security and independence. Among the goals articulated in the energy policy are the desire to "Promote the development of clean and renewable energy sources…that build the CTUIR's energy independence…" and to "Develop strategies to protect the CTUIR and its members from rising cost of energy through conservation…" The energy goals of the CTUIR are also succinctly summarized in the CTUIR Comprehensive Plan, where it states the desire of the CTUIR to "…actively pursue the reduction of greenhouse gases to sustainable levels by striving to conserve energy and developing energy independence for the sustainability of the Tribal community and its environment." The CTUIR Energy Policy further indicates that solar PV is among the most promoted energy technology, as long as development efforts are consistent with natural and cultural resource values.

Because of the major changes in energy technology, regional energy markets, tribal lessons-learned from past projects and a changed view of the "costs" of energy (including the financial costs, environmental costs, cultural costs, and other costs), CTUIR is updating its energy planning and tribal codes related to energy.

The tribes have designated staff focusing on energy issues. The tribe established an Energy and Environmental Sciences Program within its Department of Natural Resources (DNR). That department assists the tribe in meeting its energy and environmental goals. The tribal commercial functions are managed by the Department of Economic and Community

[189] The information regarding the energy activities at Umatilla was gathered from a review of public sources, and from an interview with Bruce Zimmerman, Tax Administrator for the tribe.

Development (DECD), so a number of energy projects related to the tribal businesses are managed there. In addition, the tribal rights of way are managed at DECD in conjunction with the Land Management Department.

Various parts of the tribal code address energy related issues. CTUIR has adopted the Oregon Public Utility Commission's standards for net metering. The Land Use Development Code, which addresses zoning on the reservation, is going through an amendment process to clarify land related matters for residential and agricultural customers who want to take advantage of the existing utility net metering policies for small solar and wind. The code will also prohibit new wind unless it goes through a full tribal process and will limit other solar to 3 MW. These solar projects are proposed to be limited to industrially zoned lands. Any project larger than 3 MW must go through a more formal tribal approval process with various permits required.

Among CTUIR's business enterprises is Yaka Energy, a Section 17 corporation with an affiliated Nevada LLC. Yaka Energy is no longer operational. Yaka Energy focused on energy procurement and resale with a business objective to supply Fortune 500 companies, government agencies, investor-owned utilities and municipalities with energy commodities and energy marketing services. In addition to various energy marketing activities, a gas-fired powerplant was developed and fully permitted before the tribe decided not to move forward with the project in approximately 2006. With the decline in the economy and energy markets in 2009, this proved to be a good decision.

Outside Advocacy:
The reservation's geographic location has led to it being a major transportation and utility corridor with numerous interstate energy and other facilities crossing tribal lands. The companies with facilities on tribal lands include the Union Pacific Railroad (which has crossed tribal lands since 1881) and Williams Companies (Williams Northwest has had gas pipelines on tribal lands since the 1950s and currently operates a 30-inch high-pressure gas pipeline). Various high-voltage electric powerlines also cross the reservation, and both Umatilla Electric Cooperative and PacifiCorp have distribution facilities on the Reservation. Cascade has gas distribution facilities. All these rights of ways and service lines raise significant safety, environmental, natural resource, service, and financial issues for the tribe.

CTUIR has exercised their sovereignty through right of way negotiations to not only negotiate compensation for the use of their lands, but also to cover the costs of tribal services related to the rights of ways. Tribal services include law enforcement of trespass and illegal use of the lands, emergency response coordination with the energy and rail companies and tribal police, natural resources and ambulance services and administration of right of way uses. Third, the tribal right of way agreements govern all aspects of the right of way. The tribe now has numerous comprehensive right of way agreements.

These agreements have taken many years to develop and complete. In addition to compensation to the tribe for the use of tribal lands and resources, the provisions in the agreements include:

- A mandatory explicit consent to tribal jurisdiction and application of tribal law to the company's activities on reservation lands. If the company ever violates this agreement, the right of way is automatically void. In some instances when the tribe has presented this provision the company has left the table but then later has come back and accepted it. In one instance, a company refused to sign the agreement and moved the right of way off the reservation.
- Detailed list of facilities on the right of way with GIS coordinates which are incorporated into tribal GIS to pinpoint the location of every asset.
- Safety/emergency provisions. After one railroad right of way was negotiated and others were going through the process, a derailment incident occurred on the reservation. Within minutes, tribal police and emergency responders knew the exact location of the incident, the contents of every train car, the best route to access the site of the accident and had contact information for railroad officials. Because the emergency response worked so well between the tribe and Union Pacific, Union Pacific moved quickly to finalize all other pending agreements as beneficial not only to the tribe but to the railroad.
- Operational/environmental matters.
- A requirement for *annual* high-level meetings between the tribal leadership and the utility and company leadership, similar to a government-to-government meeting. Meeting locations alternate between the reservation and the company headquarters. They have been instrumental in developing good relationships.

Options studied:
Over the years the tribe has pursued many options for energy projects, such as the tabled gas marketing and generation project. As another example, the CTUIR Range, Agricultural and Forestry Department has considered a large-scale biomass project and ruled it out for the tribe's resources.

The Energy and Environmental Services Department is currently conducting explorations to determine the available geothermal resource. CTUIR is working with AltaRock Energy, Inc., HotRock Energy Research Organization, and the United States Geologic Survey (USGS). The project will determine whether a viable geothermal resource exists by studying the structural geology, rock outcrops, stratigraphy, and other signs of geothermal activity and will develop a conceptual model of the area and identify the best sites for future exploratory drilling.

Example Projects:

- The **Tamástslikt Cultural Institute** is more than just a museum, it celebrates the traditions of Cayuse, Umatilla and Walla Walla Tribes and is the centerpiece of the Wildhorse resort and casino. In partnership with PacifiCorp, Cascade Natural Gas and the Energy Trust of Oregon, a study was conducted to identify energy efficiency and cost savings. The study led to the construction of a 40-meter 250 kW wind tower which supplements the tribal power needs, various

energy efficiency activities, an efficient boiler, and covered solar parking structures.

- The tribes operate the **Kayak Public Transit System** which provides rural regional bus service southeastern Washington and northeastern Oregon with three fixed routes. Aside from providing a public transportation service, Kayak saves energy by providing a public alternative to single use automobiles.

- In 2018 the tribe installed the **Ántukš-Tińqapapt** or "sun trap" ground mounted 97 kW solar array. Over the anticipated 25-year lifespan (warranty) of the project, the tribes expect to save more than $450,000 in electrical utility bills and saving an almost 23-ton reduction in carbon dioxide emissions each year. The project also included LED lighting retrofit EEMs implemented across three tribal government buildings. The aptly named solar array supplies 100% of electric demand for three buildings—the Tribe's field station and the Kayak Public Transit Center bus barn and maintenance shop.

- Along with partners, CTUIR developed the **103MW Rattlesnake Wind Farm** west of Arlington, Oregon. Permitting began in 2002 and the project became operational in 2008. Permitting included a full Environmental Impact Statement. The wind farm spans 8,500 acres of ranchland that overlooks the banks of the Columbia River. The tribe sold the project to a developer and retains a financial interest in the project.

- **Yellowhawk Tribal Health Center** is the first tribal building in the state to enroll in Energy Trust of Oregon's "Path to Net Zero" offering for buildings approaching net-zero energy use. Once certified Net Zero, this building will generate as much energy as it uses over the course of a year—a path the Eastern Oregon Tribe can be proud to walk. This building is 60 percent more energy efficient than a standard building of its type, and the estimated energy savings are 646,000 kilowatt hours per year. That translates to nearly $58,000 a year in savings, which will be invested back into the community. The building is accomplishing these savings through a variety of features, including solar panels, LED lighting, high-performance insulation and windows, and an efficient heating and cooling system that recovers heat and energy from the air.

- CTUIR maintains numerous connections with **Bonneville Power Administration (BPA),** including managing the land rights for BPA facilities on the reservation. For example, when CTUIR developed, built, and manage a light industrial and commercial business park known as the Coyote Business Park. The Business Park involved the replacement of power support structures of the high-voltage line that crosses the site. BPA replaced 10-12 wooden "H-frame" structures, each about 60 feet tall, with 7 to 9 steel poles and one lattice steel structure each about 110 feet tall on the portion of its Roundup-LaGrande transmission line that crosses the business park site.

Yakama Nation[190]

General Land/Energy Information:
Roughly 10,000 people were enrolled members of the Yakama Nation in 2009 as descendants of the 14 tribes and bands of the Yakama Nation. The governance of the tribe is the responsibility of a 14-member tribal council, elected by a vote of the tribe's members. The reservation is 1.4 million acres in south-central Washington State. In 1963, most criminal and civil jurisdiction over tribal members was transferred from the tribe to the Washington state government under Public Law 280. The tribe started its own utility, and Yakama Power began service in 2006. Since its beginning Yakama Power has been actively pursuing utility expansion. While it has taken over much of the service to the

[190] The information regarding the energy activities at Yakama Nation was gathered from a review of public sources, and from interviews with Ray Wiseman, General Manager of Yakama Power.

reservation, Klickitat County Public Utility District and Pacific Power still provide electric service on some areas of the Yakama Reservation. The reservation is not served with natural gas.

Energy Governance and Planning and Outside Advocacy:
The Yakama Tribal Council effectively delegated most of its internal energy functions to its tribal utility beginning with its Council Resolution GC-04-98 in 1998 to research the opportunity of a tribal utility. Yakama Power is governed by its Board of Directors, which consists of 7 tribal council members. The Nation received a relicensing settlement from Grant Public Utility District in 2007, which supported utility start-up expenses. Now, Yakama Power not only provides electric service to most of the reservation, it offers 20 GW internet, land line and cell phone service to the reservation and security services and cable television to some customers through fiber optic systems. All fiber is tribally owned and receives lease revenue from a local wireless provider. Yakama Power has a full requirements contract for power from Bonneville Power Administration but also develops its own renewable energy generation. Yakama Power advocates for tribal utility issues among federal, state, and local entities.

The Yakama Nation continues to actively pursue its Treaty Rights and otherwise advocate for its tribal sovereignty, including in energy related matters. For example, the Nation litigated Washington State's imposition of fuel taxes on tribal purchases. In 2019, the US Supreme Court[191] confirmed that citizens of the Yakama Nation are not required to pay a fuel tax to the state of Washington. A treaty signed with the United States in 1855 pre-empts the tax.

Options studied:
Yakama Power is responsible for developing all renewable energy it serves to customers. They are currently studying solar with an expectation of four ground-mount systems producing up to 1.25 MW. Their vision statement says, "The Yakama Nation will research and develop energy efficiency and renewable energy through a diverse portfolio of renewable energy projects and programs to become increasingly self-sufficient and energy independent, to reduce costs and enhance tribal economic opportunities and minimize impacts of climate change. The Yakama Nation will promote sustainable energy projects while preserving and enhancing the cultural, traditional and environmental resources and protecting the rights as outlined in the Treaty of 1855."

The Yakama Nation has studied its wind resource and has decided against supporting large scale wind energy on its traditional lands due to the presence of cultural significant sites on most high hill and mountain tops where wind farms want to be sited for the continuous winds there. Yakama Power is considering smaller scale wind generators for areas that do not present these cultural or other concerns.

[191] *Washington State Dept. Of Licensing v. Cougar Den, Inc.*, 586 U.S. ___ (2019); 139 S. Ct. 1000; 203 L.ED. 2d 301.

The Yakama Nation has studied biomass energy. A 2010 study showed the cost of supply of wood fuel and transportation made the idea financially insecure with unknown future power market rates. The results showed that existing industries produce the cheapest supply of feedstock as a byproduct of their operations, while supplies harvested specifically for bioenergy were considerably more expensive. Fragmented land ownerships lead to the necessity of cooperation between owners and highlight the importance of a strong anchor supply close to the plant. Lastly, uncertainty in supply and cost parameters leads to larger ranges in available biomass, leading to reluctant investment in large plants.

Projects:

Xt'uuwit awa Tiinmami "Power to the People"

- **Yakama Power's** electric service to the Reservation (see their banner, above) is the most significant energy "project" undertaken by the Yakama Nation. Yakama Power's load has grown from about 3MW in 2006 to about 18MW in 2020. It started with the tribal campus, casino, and Yakama Forest Products with a condemnation of Pacific Power facilities. In 2010, additional customers were added after the transfer of 43 miles of BIA distribution lines serving irrigation pumps. Yakama Power bought out some of Benton Rural Electric Association's lines in 2011 which brought the load to 5.5 MW. Yakama Power also began serving Wapato Irrigation Project in 2011 bring their load to 6.8 MW. In 2013, additional Pacific Power facilities were condemned in White Seam to allow the utility to serve the rodeo grounds, FEMA homes and Totus Housing Project for a total of 7.4 MW. A third Pacific Power condemnation was filed in 2015 which added the Wapato Industrial Park, Apas, mamchut, Wolfe Point and others. In 2016 Yakama Power purchased the remainder of Benton Rural Electric Association's to bring the utility's load to 16.2 MW. A new bay was added in Pacific Power's Wapato substation to serve the new load. In 2018, Yakama Nation purchased the assets on Signal Peak road from Pacific Power bringing the load to over 17 MW. Yakama Power serves native and non-native customers.

  In 2019, utility revenues were over $13 million. Their rates were lower than competing utilities on the reservation, with all-in residential rates of $0.0726/kWh. Competing residential rates are almost $0.095/kWh (before taxes and fees).

One of Yakama Power's main missions is to provide employment for tribal members on the reservation. They developed a non-union Apprentice Training Program. Graduates from the program have included Yakama Power's electrical employees, plus 1 plumber and 2 HVAC professionals. Today, they employ 30 people, almost all Indians with all-Indian crews. Their employees are some of the few all-Indian utility crews. Employees include 4 apprentice linemen, 7 journeyman linemen, 1 apprentice meterman, 1 journeyman electrician, 1 apprentice electrician, 2 fiber service splicers and 1 fiber implementation technician, as well as management and office staff. The utility has a full array of utility trucks and equipment with a large shop.

Utility facilities include 4 metering points where Bonneville power is delivered, 9 distribution substations, 590 miles of distribution line, and 95 miles of 24.5 kV sub-transmission. They anticipate the need for a 115 kV line to be initially operated at 34.5 kV.

- **Wapato Irrigation Project** is a federal irrigation project originally built in 1868. It is maintained by BIA for seasonal irrigation; April through October, with 1,100 miles of canals to irrigate 176,00 acres on Yakama Reservation for tribal and non-tribal farmers and ranchers. While BIA still runs the irrigation project in coordination with the Yakama Nation Water Resources Program, the Yakama Nation received a transfer of Wapato's vintage electrical equipment from BIA in February 2008. The transfer included the transformers, generators, control systems, from Drops 2 & 3, and the 34.5 kV transmission line. The buildings at both drop sites are leased from BIA. The long-term plan is to revive all three generators in the irrigation project and add another three to generate about 8 megawatts. Yakama Power, along with Nation's Department of Natural Resources, the Tribal Council, US Department of Energy, the Wapato Irrigation Project (BIA) and Grant Public Utility District, began with an overhaul of the generator at pumphouse No. 2 (pictured above with local artist paintings on the turbine) near Harrah, which can now produce up to 2.5 megawatts, however transmission systems in the area limit the generation capability. Because Yakama Power's contract with Bonneville permits only smaller added projects, power produced is sold

to Grant County Public Utility District. Future plans include adding additional generation, including micro-hydro, to the project and expanding the Bonneville Power Administration substation and transmission facilities to accommodate the additional generation.

- The Nation negotiated a settlement with Grant County Public Utility District related to the Priest Rapids Dam which impacted the Nation. Under the agreement, the Yakama Nation, through Yakama Power became a Priest Rapids Project power purchaser along with Grant PUD's 22 existing purchasers. Grant PUD markets the power on behalf of the Yakama Nation. Through 2009, the allocation was 20 average megawatts (aMW), 15 aMW from 2010 through 2015, and 10 aMW in 2016 through the remainder of the agreement. Like other power purchasers, the Yakama Nation pays project cost for power received. In recognition of the value of this power allocation, Grant PUD received rights to 75 percent of the renewable energy credits for the first 75 average megawatts of any renewable generation project developed by the tribe. Grant PUD will also receive the first opportunity to jointly develop new generation projects.

Confederated Tribes of Warm Springs[192]

General Land/Energy Information:
The people of the Warm Springs reservation are Wascoes, Warm Springs Band (Tygh, Wyam, Tenino and Dock-Spus bands) and Paiutes who organized as a confederation in 1937 with a Constitution under the Indian Reorganization Act. In 1855, The Warm Springs and Wascoes (before the Paiutes moved there) signed the Treaty with the Tribes of Middle Oregon, which ceded 10 Million acres to the United States. There are over 5000 tribal members today, most of whom reside on the 640,000 acre reservation in north central Oregon. The Tribal Council has 11 members, 8 elected positions (representing three districts: Agency, Simnasho and Seekseequa) along with three lifetime chieftain positions representing the three tribes of the Confederacy (Wasco, Warm Springs and Paiute).

The reservation natural resources include cultural resources, rangeland (ranching and wildlands), agriculture (the tribal farm grows grain hay, alfalfa hay and orchard grass; vegetable, flower, grass legume and grain seeds), forests, rivers and lakes, fish and wildlife and birdlife. The reservation is bordered by the Deschutes River (with Lake Stimtustus behind Pelton Dam and Lake Billy Chinook behind Round Butte Dam), the Metolius River and Jefferson Creek. Crossing the reservation is the Warm Springs River and other creeks.

[192] The information regarding the energy activities at Warm Springs was gathered from a review of public sources, and from interviews with Jim Manion, General Manager of Warm Springs Power and Water Enterprises.

The tribal website states, "We ask, 'What impact will this have, both positively and negatively, seven generations from now?'" Natural resource considerations are paramount in all energy development options.

Energy Governance and Planning and Outside Advocacy:

Warm Springs Water and Power has been delegated many of the energy functions for the Confederated Tribes of Warm Springs. However, the Tribe maintains an active Natural Resources Department and a Public Utility Branch who manages water, wastewater, solid waste and maintenance of over 90 tribal buildings. The tribe manages a Low-Income Energy Assistance Program that offers assistance with electrical bills or wood. The tribe also manages a Public Transit program through the Planning Department.

Jim Manion, General Manager of the Warm Springs Water and Power Enterprise participated as a member of the Indian County Energy and Infrastructure Working Group, operated by the United States Department of Energy to bring government and tribal leaders together to collaborate and gain insight into real-time tribal experiences representing obstacles and opportunities in energy and related infrastructure development and capacity building in Indian Country.

Options studied:

Warm Springs Water and Power has actively been pursing renewable energy for the past serval years. They started with a resource inventory of reservation lands and compiled a list of potential resources. They assessed the two with the highest potential, wind and geothermal.

- Beginning in 2003, Warm Springs completed a wind energy inventory by installing met towers across the reservation. The study concluded that they do have a viable wind capacity factor sufficient to develop at the Mutton Mountain site. The environmental review identified birds of prey that could potentially be impacted, so the tribe has decided not to pursue a wind generation project at this time.
- The next was to look into geothermal, as the tribe has a known "warm spring" resource. Preliminary geothermal reconnaissance began in 1990. A Memorandum of Understanding was signed with a private company. While there was a promising resource in the southwest corner of the reservation, energy markets did not support the costs of the projects. Warm Springs Water and Power has conducted all necessary Geotech work along with subsurface work, drilling temperature gradient holes. The enterprise continues to explore funding options to drill a test production well to quantify the resource. Transmission access is a challenge for this resource as it is located in a remote and timbered landscape.
- Recently, Warm Springs Water and Power has started to advance the tribe's solar potential. They have identified a developer and are exploring access to the grid to build out a large-scale solar farm. We are considering a 100MW or larger commercial scale project if we can gain access to the grid. They recognize the need for new renewable resources over the next 5 years, and with the renewable energy

standards on the west coast, they believe this could be a valuable resource to develop.

Example Projects:

- **Warm Springs Power and Water Enterprises** is run by an Enterprise Board appointed by Council, and a General Manager. They manage the Tribes interest in the largest hydroelectric project within the State of Oregon as a co-manager with Portland General Electric (PGE) of the Pelton/Round Butte Hydroelectric Project located on the Deschutes River which borders the reservation. In 1955, the Tribes approved the building of the first powerhouse, the Pelton Dam and the second dam, the Reregulating Dam. The Tribes reserved the exclusive right to develop power generation at the Reregulating Dam if it was ever found to be economically feasible. In 1964, the Tribes approved construction of the third dam, the Round Butte Dam. It wasn't until 1979, when the energy market improved and federal law was passed allowing private developers to develop hydroelectric sites, the Tribes elected to exercise their option to construct a hydroelectric project at the reregulating dam. The tribes entered the energy generation business in 1982, with the completion of this hydroelectric plant, which was the first tribal sovereign to receive a Federal Energy license. Warm Spring installed a 19.5 MW Bulb Kaplan turbine in the last of a series of dams on the Deschutes River. In 2001, the federal license for this hydroelectric complex ended. The Tribes & PGE entered into a Global Settlement Agreement to form a partnership to jointly own the Pelton/Round Butte Hydroelectric Project. Today, the Tribes are a one-third partner in the project and have 100% ownership of the Reregulating Dam powerhouse, increasing the energy capacity to 170MW. By 2037, the tribes have an option to become the majority owner of the entire project. In 2021, the will be advancing the option to increase their ownership interest in the Pelton Project, taking the ownership interest to 49.9%. The partnership has proven beneficial to both Warm Springs and PGE, providing important revenue to the Tribes, and reintroducing salmon and steelhead above the project while providing carbon-free power to the grid that feeds Warm Springs and to the PGE grid.

- **Warm Springs Forest Products:** In 1970, three 3MW steam turbines were installed at Warm Springs Forest Products. In 2004, the tribe worked with state, federal and private firms to expand the biomass program to a 20MW cogeneration plant. In 2016, the tribe's forest products lumber mill shut down due to a reduced supply of logs, an aging plant and a changing economy.

- **Warm Springs Ventures** maintains a carbon offset venture that sells carbon offsets to major polluters. The tribal forest management plan for the 2,200 acres coincides with the practices called for by the carbon sequestration credit program.

- **Small-Scale Solar:** Sunlight Solar has completed two projects with the Confederated Tribes of Warm Springs. The first project was completed in 2010 on the Warm Springs Media Center building which houses the local radio station KWSO and newspaper SpilyayTymoo, the second is at the Warm Springs K-8 Elementary and includes a 213 solar panel, 58.565 kW system to power the school. Annually, the solar system is expected to save the school $4,000.

Nez Perce Tribe[193]

General Land/Energy Information:

The Nimiipuu people have always resided and subsisted on lands that included the present-day Nez Perce Reservation in north-central Idaho. Today, the Nez Perce Tribe is a federally recognized tribal nation with more than 3,500 citizens.

The current Reservation consists of 770,000 acres of which 124,000 are tribally owned. It was established by treaty with the United States government in 1868. Parts of five Idaho counties, Nez Perce, Lewis, Latah, Idaho and Clearwater Counties, are located within the reservation boundary. The cities of Lapwai and Kamiah serve as Tribal centers on the east and west ends of the Reservation. U.S. Highway 95 runs north and south through Idaho, and the reservation, and serves as a major interstate highway. Highway 12 runs east and west through Idaho's panhandle. Nez Perce Reservation lands consist of productive dry-land wheat farms that border on the Clearwater and Nez Perce National Forests. Beside arable hill tops and river bottoms, the reservation includes forested river canyons and steep, non-arable hillsides. The chief economic basis of this entire region is in agriculture and timber products.

The Reservation is currently served with electricity by Avista Utilities and by Clearwater Power Company. Natural gas service is probided in some places on the reservation by Avista. Although Idaho's electrical rates are among the lowest in the country, the Nez Perce Tribe's electrical bills are significant to the operating budget every year. Tribal programs are located in forty some buildings, in six counties, in two states. Ninety-five percent, or more, are heated electrically. The age of the Tribal office buildings located in Lapwai, Idaho vary from forty to over a hundred years old, and most have not been updated. The

[193] The information regarding the energy activities at the Nez Perce Tribe was gathered from a review of public sources, and from interviews with Stefanie Krantz, Climate Change Coordinator for the Nez Perce Tribe Water Resources Division.

tribe has expressed concerns over the reliability of existing power systems and maintaining a reasonable cost of service.

Energy Governance and Planning and Outside Advocacy:

The Nez Perce Tribal Executive Committee (NPTEC) has taken steps to provide specific energy leadership. They have established a Climate Change Subcommittee of the Council to address the ever-changing climate and natural resources, mitigation strategies, energy consumption, energy developments, environmental health, workforce development, and all efforts geared to going green, utilizing sustainable methodology, and having sustainable solutions for and on behalf of the Nez Perce Tribe. They have also created a full-time position of Climate Change Coordinator in the Water Resources Department of the Natural Resources Office. They are currently hiring a Climate Change & Energy Planner VISTA Member through AmeriCorps to assist in climate adaptation, policy, and resilience planning efforts.

The tribe has an active water utility run by a Water Utility Board. Their goal is to provide clean potable water for customers as well as maintain a reasonable rate structure that customers can afford. Water technicians operate and maintain the three water systems (North Lapwai, South Lapwai, and Kamiah) and the two sewer systems (Kamiah and North Lapwai) serving the Nez Perce Tribe. Water utility tasks include reading meters, water testing, repairs and planning future system upgrades.

In 2010, an Energy Committee was formed to guide the energy efficiency and energy development efforts for the Nez Perce Tribe. The committee consists of a diverse membership to ensure thorough planning. The members include a Grants Coordinator, Economic Development Planner, Environmental Planner, Construction Manager, and Energy Technician. The committee is recognized by the NPTEC and is invited to energy related discussions concerning the Tribe. The Energy Committee represents the government side of the Nez Perce Tribe, therefore it only works with not-for-profit projects.

The Energy Committee received a grant from Avista for a Strategic Energy Plan to ensure sustainable and environmentally responsible energy use. The goal of a strategic energy plan is to provide a roadmap to meet current and future energy needs in an economically, socially, and environmentally sustainable fashion. The steps taken in an energy plan depend on energy resource options, energy needs and forecasts, setting priorities and organizational structure. A consultant will be facilitating the final draft and facilitating tribal leadership, tribal programs and tribal community input through surveys and community meetings.

In an effort to prepare for changes to their homelands' ecology, the Nez Perce Tribe's Water Resources Division created a climate change adaptation plan for the Clearwater River Subbasin in 2011. The plan focuses on climate impacts to water and forestry resources, two areas of natural resource management that are both culturally and economically important to the Nez Perce Tribe. This plan will increase awareness of

climate change issues in their region and is also intended to aid the Tribe and regional organizations in integrating climate adaptation into existing and future management plans. Adaptation plan goals include:

- Creating partnerships to research local effects of climate change on water resources, forestry, and the economy.
- Including climate change adaptation assessment data, goals, and objectives into local and regional planning documents.
- Affecting a change in planning and zoning regulations along waterways and restoring the 100-year floodplain.
- Protecting and restoring water quality and quantity for human health and anadromous fish.
- Managing wildfire risk.
- Reducing and/or reinforcing infrastructure in landslide-prone areas.
- Developing ecologically connected networks of public and private lands to facilitate fish, wildlife and plant adaptation to climate change.

A 500kV Bonneville Power Administration ("BPA") transmission line crosses through the area and connects to the BPA Hatwai 500kV substation. A right of way was negotiated between the tribe and BPA in approximately 2013.

In 2014, the Nez Perce Tribe stopped energy companies from shipping "megaloads" of equipment and commodities through its reservation in Idaho from Alberta tar sands. After tribal protests, a federal judge halted further traffic, in part due to the state's failure to consult the tribe.

In 2019, The Nez Perce Tribe, Pacific Rivers and Idaho Rivers filed lawsuits against the Oregon Department of Environmental Quality to stop the relicensing of the Hells Canyon Complex of three dams along the Idaho-Oregon border operated by Idaho Power.

Options studied:

- In 2012, the Nez Perce Tribe Energy Committee selected TSS Consultants (TSS) to prepare a **Waste to Energy Feasibility Study** for projects on the Reservation. They studied utilizing sustainable and economically available waste sourced from the region located within and tributary to the Nez Perce Reservation. The projects would have been scaled to meet electrical and thermal energy needs of select community buildings included in the communities of Lapwai, Orofino, Kamiah and Kooskia. An energy load assessment of targeted buildings as well as a site review/waste resource assessment was completed. Because the economy of the Tribe and surrounding region has been tied directly to forest products manufacturing, timber harvesting and agriculture, forest biomass was included in the resource assessment along with other potential feedstocks including agricultural by products, tree trimmings, and municipal solid waste.
- **A Tribal Utility Prefeasibility** was completed in 2013, the Tribe requested Technical Assistance from the US Department of Energy for a Tribal Utility

Prefeasibility Study for selected areas of the reservation. Because the area included lands that were not held in trust, the study indicated that a tribal utility for the entire area could be difficult from a jurisdictional/regulatory point of view and that the area could be adjusted to include only tribal loads, or that the tribe could franchise current service to negotiate different service or rates.

- In 2019, a **Green Wastewater Study** feasibility study was conducted by the National Renewable Energy Laboratory to find if the tribe has options for greener wastewater treatment. NREL also identified some tribal housing as suitable for solar energy development.
- **Micro wind and microhydro:** As of August of 2020, the tribe is considering both small wind and micro hydro projects.

Example Projects:

- The tribe operates a Low Income Home Energy Assistance Program (**LIHEAP)** through an annual grant from the US Department of Health and Human Services and other funds. The program provides heating assistance and crisis assistance. Qualifications for the heating program depend on income, fuel type and the percentage of income used for energy. The crisis program considers factors such as medical conditions, children and elderly residents. Applications are online.
- The Water Resources program operates an **Energy Efficiency Initiative**. See: http://nptwaterresources.org/energy-efficiency/
    - As part of the stimulus plan in 2009, the tribe received $97,000 for energy efficiency. The tribe also received $508,000 as part of a Native American Housing Block Grant for new construction, acquisition and rehabilitation including energy efficiency and conservation, and infrastructure development.
    - In 2011, utilizing $67,000 of the U.S. Department of Energy's Tribal Energy Program funding, energy-efficiency upgrades were installed in five Nez Perce Reservation buildings that house a large portion of the Nez Perce Tribe's governing entities. The upgrades included replacing lighting fixtures and windows as well as adding insulation and motion sensors. As a result of the upgrades, the Tribe's electrical energy consumption is estimated to be reduced by 30%, thereby reducing the cost to operate the Tribal physical plant and freeing up funds for other use. The upgrades will also provide a comfortable working environment for Tribal employees and are expected have a minimum annual energy cost savings of nearly $14,000. In the first month after completion, a comparison between August 2011 and August 2012 (with an average temperature increase of one degree) electrical bills showed more than $1,200 in electrical cost savings to the Tribe. Based on this initial savings information, it appears that the project results may exceed the 30% savings goal that was initially set for the Tribe in these buildings.
    - The tribe is currently planning a recycling education program.
- The tribe provides solar panels on schools and a "**Solar 4R Schools**" curriculum to support STEM classes in its school districts. Solar 4R Schools provided a renewable

energy teacher training workshop to area teachers along with customized, durable science kits for four school districts valued at approximately $12,000. Teachers at each participating school will use these science kits alongside their multiple existing environmental stewardship and sustainability initiatives. Energy monitoring of their PV system and live solar energy data displayed at Solar4RSchools.org gives classrooms nationwide the ability to chart, graph and analyze the system's performance for educational purposes. The solar systems include a 4.48 kW solar array at the Lapwai School District and 4.48kW solar array at the Orofino School District.

- In February 2015 the Nez Perce Tribe completed a 10kW **Solar PV** demonstration system at the Tribal Hatchery Complex in Juliaetta, Idaho. It was funded by BPA and the Nez Perce Tribe. As a Renewable Facility, this project will function as an ongoing community education tool by teachers in four area school districts to supplement sustainability education for students throughout the Nez Perce region. Photo credit Clean Energy Bright Futures

- **New Solar Initiative:** In September 2020, the tribe, with RevoluSun, a Hawaii company, is installing additional solar with battery backup, including one for the Pineewaus Community Center, one for the waste-water treatment plant in Lapwai. RevoluSun will providing training for tribal members in the installation. In the future a rooftop solar system is planned for the fisheries office and the clinic.
- **Carbon Sequestration Program**: The Nez Perce Tribe's Water Resources Division received a grant and technical support from the Model Forest Policy Program (MFPP) of the Climate Solutions University (CSU). In the mid to late 1990's, the Nez Perce Forestry & Fire Management Division began developing a Carbon Offset strategy to market Carbon Sequestration Credits. The tribe planned to reinvest revenue from the sale of carbon to acquire previously forested lands and then replicate the process with additional afforestation projects (planting trees on land that was not previously forested). This effort would also contribute to the tribe's goal of acquiring former tribal lands. Subsequent carbon offset projects have included wildfire rehabilitation (restoration of forests heavily damaged by wildfire) and forest development (reforestation where past forest regeneration practices failed). This first trial afforestation project became known as the "Tramway Project". The purpose of this initial project, about 400 acres in size, was to establish marketable carbon offsets, develop an understanding of potential carbon markets, and cover the costs of project implementation and administration. Since the initial planting of the Tramway Agricultural Conversion / Afforestation Project, the Nez Perce have greatly expanded the program to include several other agricultural conversion projects as well as two additional types of projects, fire rehabilitation and forest development (defined earlier in the document). These projects are now separated into two different carbon offset portfolios, one portfolio containing only the afforestation (agricultural conversion) projects and the other portfolio

containing the fire rehabilitation and forest development projects. It is this second portfolio (approximately 65.3 % of the 3,375 total acres discussed earlier) that was committed to the CCX with the help of the NCOC. In July 2007, the Nez Perce Tribe signed a Contract with the NCOC and the CCX (for credits from 2003 –2010 on approximately 2,205 acres) and had the first actual sale in December 2007. The initial contract expired in December 31, 2010. Other projects are hoping to extend the carbon sequestration project, including a carbon cycle modeler which models the contribution of farmlands to carbon and a related sequestration through agricultural projects.

- **Biodiesel Production:** In 1986, the tribe built its first small crushing and mixing device for oilseed and modified a tribal vehicle to run on the fuel. In 2002 a feasibility study was done to expand the plant. In 2015, the tribe received a USDA grant to acquire biodiesel manufacturing equipment to produce and sell canola-based biodiesel. This project is no longer active.
- The tribe has used the Volkswagen settlement funds to consider older tribal vehicles to plug-in hybrid **Electric Vehicles**. There are currently two charging stations on the reservation.

Tribal Energy Leadership Opportunities

The significant changes in the environment, the energy industry, energy economics and markets, energy technologies, public awareness and government policy are bringing astonishing opportunities for tribal energy actions. As shown above, tribes are frequently community and national policy leaders in employing ideas and technologies to solve environmental and natural resource problems. In particular, the existential environmental problem of climate change requires tribes to consider "energy" in many new ways. Environmental sustainability takes on broader and more critical meanings. As such, new approaches to meeting a challenge of environmental sustainability are needed. Some suggestions for tribes to additionally implement energy policy and technology to meet the goals set in this Energy Vision are set forth here.

First, the way in which tribes, as sovereigns, address, or can address energy issues is expanding. Tribes have long recognized that "energy" is not just about meeting electricity needs at a reasonable cost, more efficient hydroelectricity and replacing fossil fuels with renewable sources. Meeting an ambitious Energy Vision requires application of the principle of environmental/energy sustainability to all walks of life. In particular, tribes can consider "energy" in the following expanded ways.

- Water as an energy resource. In addition to major ongoing work related to watersheds and river operations, tribes may consider local water pumping, water quality, irrigation infrastructure and techniques and other local uses of water and water infrastructure. Permitted and unpermitted uses and of tribal water rights can also be considered.
- Housing as a tool for meeting the Energy Vision and for improving quality of life for tribal members has often been overlooked. Housing on most Indian reservations

is known to be substandard and not culturally appropriate. Poverty leads to not only energy inefficient homes but structurally unsound and even dangerous situations. The energy costs of poor housing, both in inefficient use of energy and unsustainable building products are very often much higher than in urban centers. Further, the problem of overcrowding has led to health issues. Poor financing options limit the flexibility for tribes to build higher quality or newer technology homes. Rethinking all aspects of housing (both existing reservation homes and new construction) is a major opportunity for cutting edge improvements.

- ❖ Just as housing can be a tool for meeting energy goals, all tribal buildings and infrastructure can be improved to better assist in meeting the Energy Vision. Just as every new building's financing includes its HVAC systems, the financing for every new building could include its own energy sources. An analysis of buying energy features up-front against the cost of purchasing power or other energy sources long term can be made common practice to assure both lower costs and self-sufficiency.
- ❖ Education is the strongest tool there is for long-term improvement in energy use and energy systems. Tribal schools and tribal meetings can both provide substantial energy education to their members, and to third parties. Application of creative ideas for meeting an Energy Vision through schools and other gatherings is an opportunity. (For example, "Energy Bingo" for tribal elders where the prizes are energy efficiency products with information about each one described during the calling of numbers.)
- ❖ It is likely that there will be new funding in the coming years for infrastructure. Energy planning when infrastructure is considered can be a game-changer for how infrastructure is used and how goals can be met. (For example, roads with bicycle lanes, easily accessible electric charging stations, carpool and transit opportunities, new technologies for water and sewer systems, etc.)
- ❖ All the tribes have members who are allottees and most reservations have allotments both within tribal lands and on traditional territories. For the most part, these allotments have been underutilized and not considered during tribal planning or during creation of federal policies. With sometimes half of "tribal lands" being subject to allotments, can new policies or programs be created to assure that these lands are part of the sustainability solution?
- ❖ All the CRITFC tribes have strong agricultural (including forestry) cultures. How can the Energy Vision be implemented through better, or improved agriculture and forestry practices, partnerships, or programs?

"Consideration of energy" here means that tribes (and CRITFC) can attack energy related problems with many tools:

- ➢ Tribes can legislate Tribal Energy Codes to create reservation goals, policies, procedures, funding and programs to assure that the Energy Vision is implemented within the reservation.
- ➢ Tribes can apply for and appropriately manage funding from federal, state, local and private sources to meet goals and to improve application of new and cutting-edge technologies.

- Tribes can use their political leverage and longstanding cultural wisdom to influence public opinion and government policy.
- Tribes can lead by example.
- Tribes can develop partnerships with private institutions, educational bodies, local governments, utility and energy industry players and others to further the Energy Vision and create buy-in by entities that may not otherwise be involved in improving the energy successes.
- Tribes can create local education programs for their own students and people and can work with outside educational entities to expand understanding of environmental/energy sustainability.
- Three of the four CRITFC Tribes were impacted by the Hanford nuclear site. Can the resulting responsibilities and relationships be leveraged to improve tribal energy options?
- Intertribal organizations have had a history of partnering with specific expert entities to attack specific goals important to the organization. If CRITFC or any of its tribes determine that an energy idea could be pursued, a pilot project can be developed which can benefit the community as a whole (local, regional, federal, international). It can be initiated through partnerships and likely funded by third parties.

Some particular cutting-edge technologies and new issues are up and coming for tribal consideration. These include:

- Batteries: The decreasing costs of batteries, the need for energy storage and new funding sources will likely create new opportunities for battery use in the next ten years.
- Electric Vehicles and Vehicle Charging: The development of new electric vehicle technologies, their purchase by government agencies, their decreasing costs and the need for new charging stations will transform tribal gas stations, truck fueling, and electrical infrastructure and generation. Tribes can be on the transforming edge of this revolution. Tribes could consider contributions to and investment in electric car technology programs, as well as charging infrastructure.
- Microgrids: With the fragility of the larger grid, utility policy changes being considered to permit more distributed generation, and the development of more sophisticated utility infrastructure meters and controls microgrids are under development for many critical needs facilities (military, hospital, government, etc.) Tribes are leaders in new microgrids, often because they can set policies for on-reservation loads that do not need to wait for state utility policy to be approved. Tribes also have funding sources which encourage new technology uses. In the next few years, most tribes will likely develop at least one microgrid.
- Capacity: With the transformation of energy markets to finer points of cost allocation and added renewable energy opportunities comes the need to balance energy generation with capacity reserves. "Resource Adequacy" is already a "new" additional significant cost for utilities in California and a new line item for costs of doing business. "RA" is being addressed in most energy markets and rate setting processes. Needed generation or storage resources specifically to meet capacity needs are under consideration by most utilities and government utility

commissions. This change will impact the Energy Vision and maybe a point of consideration during next versions of the document.

Appendix E. Analysis of Meeting Peak Demands

E.1 Introduction

Section 3.1 above describes recommendations to reduce peak loads and includes recent information of the costs of expanding the region's transmission and distribution system. CRITFC is seeking additional information on those costs and the potential to defer or avoid some transmission and distribution costs by reducing peak loads, increasing energy efficiency, and promoting on-site solar and other distributed generation. CRITFC staff are interested in working with regional energy agencies and utilities to continue to update this important information.

Section E.1. provides new analysis of the high costs associated with building transmission and distribution lines. These high costs should be considered when evaluating the cost effectiveness of alternatives such as energy efficiency, on-site solar and other distributed generation options. CRITFC believes that a consideration of the full cost of generating or saving energy plus the cost to deliver it should lead to better resource decisions.

Section E.2 was developed for the 2013 *Energy Vision* to provide details on the high costs of meeting peak demands. CRITFC did not have sufficient resources to update this analysis with current costs; however, we believe that the general magnitude of the very high costs of meeting peak loads is still worth considering.

Section 2.3.6 and Appendix C provide details on the recent changes in the operation of the dams to integrate renewable resources. Those issues are not addressed in this Appendix.

E.1.A. Background Discussion

Historically, regulated utilities have priced power at the average cost of delivering that power to consumers; they have not varied the cost much by time of day or season of the year. But, power has more value when the demand for it is high and less when the demand for it is low. It also costs more to deliver power when demand is high because of additional, often higher-cost generators being called upon, higher line losses, and congestion in the transmission grid. Consumer electric rates that are the same throughout the day and throughout the year lead to economic distortions of resources were overlooked for a long time because the price of power was very low. This is no longer the case.

The value of the river system is distorted by this type of pricing strategy when hydropower operations on the river are designed to follow loads as they ramp up and down. These fluctuations in river flows kill millions of young salmon every year. Higher

prices when loads are high would dampen the peaks and the need for using the river system to follow them. In the 2003 *Tribal Energy Vision*, we called for a transition to time-of-day pricing of electricity.

From an economic allocation of resources perspective, the ideal pricing strategy would be to price power at its full cost at all times, with costs fluctuating throughout the day. Full costs would cover the cost of generating the power and the costs of the transmission, distribution, and support systems to deliver it. This pricing strategy would, over time, reduce costs and reduce the damage of river operations on fish and wildlife.

E.1.B. Current Use of the Hydropower System Hurts Salmon and Consumers

The day-to-day and seasonal operations of the hydroelectric system to meet peak electricity loads cause fluctuations in river levels that continue to kill salmon and other important fish species. The recommendations in this *Energy Vision for the Columbia River* are designed to reduce this problem while reducing costs for ratepayers. As described in more detail in below, the cost of delivering (transmission and distribution only) the highest 15 percent of peak energy to consumers ranges from 79 cents to $1.19 per kilowatt-hour—the average consumer pays about 8 cents per kilowatt-hour for delivered electricity, so these peak delivery costs are more than ten times higher than the total-average electricity costs. The cost of serving the highest peak loads range from 80 to 120 dollars per kilowatt-hour—a thousand times higher than average consumer costs. These high costs are melded into every consumer's electric bill. Reducing peak loads would also save an estimated $800 million per year in planned expansions of the transmission and distribution system.

Hydropower is used to serve peak loads because dams can react to demand by quickly putting more or less water through the turbines that generate electricity. Serving peak loads with hydropower kills millions of juvenile salmon every year. During certain times of the year, so much water is drawn down to generate electricity that salmon redds (gravel nests where salmon lay eggs) are uncovered or dewatered and their eggs die. Daily fluctuations change river water levels and juvenile fish that feed and live near the shore can be stranded and die when water levels are reduced. Migration of fish is interrupted when flows decrease at night because there is less demand for electricity and therefore less water moving through the reservoirs behind the dams. Fluctuations in reservoirs hurt resident fish by dewatering habitat and food supplies and reducing nutrients in the reservoirs.

Additionally, the water held behind storage dams for future power generation — for example, for summer peak loads to provide air conditioning — would, under natural conditions, be in the river aiding the swift and timely downstream migration of young salmon. Saving this water for summer energy production alters the natural (or normative) river conditions that aid juvenile salmon migration and would help in the restoration of fish to harvestable levels.

While changes in operations have lessened the frequency and severity of these occurrences, their effects are still significant.

E.1.C. Transmission and Distribution Lines Have High Economic and Environmental Costs

As discussed in Section 3 above, there are significant economic and environmental costs associated with the existing and new transmission and distribution lines. BPA is projecting a transmission expansion program that is budgeted at $730 million over the next five years. CRITFC was able to compile distribution and transmission costs from the past five years for four investor-owned utilities in the region that totaled $6.8 billion.

The information in the table below was compiled from information that investor-owned utilities file with the Securities and Exchange Commission in what is referred to as their 10K filings[194]. It shows data for the value of each utility's transmission and distribution system in 2016 and 2020. The change column represents the increase in each system. CRITFC was not able to find similar information for municipal and public utility systems.

Changes in Utility Plant for Transmission and Distribution Based on SEC 10K Filings

Millions $	Transmission			Distribution			TOTAL
	2016	2020	Change	2016	2020	Change	CHANGE
Avista	$ 683	$ 863	$ 181	$ 1,525	$ 1,979	$ 454	**$ 634**
PacifiCorp	$ 5,916	$ 7,654	$ 1,738	$ 6,414	$ 7,696	$ 1,282	**$ 3,020**
Portland General	$ 518	$ 970	$ 452	$ 3,351	$ 4,136	$ 785	**$ 1,237**
Puget Sound Energy	$ 1,308	$ 1,495	$ 187	$ 5,288	$ 7,029	$ 1,741	**$ 1,928**
TOTAL	**$ 8,424**	**$ 10,982**	**$ 2,558**	**$ 16,577**	**$ 20,839**	**$ 4,262**	**$ 6,820**

The information did not have enough detail to determine how much of these funds were spent on activities that could be reduced or delayed if additional energy efficiency, on-site solar, and peak-demand reduction programs described in this document had been implemented.

CRITFC found one data source that provided more some additional detail for Portland General Electric Company. The table below shows a breakdown by various distribution functions for 2016 through 2020 that total $1.5 billion[195]. For example, spending on distribution expansion or upgrades for capacity totaled $248 million between 2016 and 2020—about 17 percent of the total distribution spending. The expansions or upgrades for reliability and power quality totaled $372 million for the same period—about 25 percent of the total. Spending for new customer projects totaled $423 million—about 28

[194] The formats for the SEC 10K reports vary somewhat between utilities, the Utility Plant values are typically on pages 200-206.
[195] PGE distribution DRAFT_Baseline_requirements_version_0.xls Tab Baseline 4.1.e. https://portlandgeneral.com/about/who-we-are/resource-planning/distribution-system-planning

percent of the total. Combining these three spending lines totaled more than a billion dollars for one utility over the past five years.

Distribution spending dataset

	2016	2017	2018	2019	2020
Age-related replacements and asset renewal	$49,154,093	$84,237,345	$85,596,952	$87,070,673	$85,538,736
System expansion or upgrades for capacity	$32,435,392	$66,773,761	$81,983,583	$36,838,974	$30,067,022
System expansion or upgrades for reliability and power quality	$38,927,621	$51,202,075	$76,168,137	$121,503,276	$84,014,971
New customer projects	$50,409,001	$51,666,269	$60,052,182	$86,128,587	$174,938,843
Grid modernization projects	$8,935	$1,665,755	$2,672,200	$3,528,966	$4,922,836
Metering	$9,068,648	$7,480,460	$7,281,770	$11,915,666	$8,613,549
Preventive maintenance	$375,740	$4,494,525	$7,754,274	$4,870,319	$2,017,798
Grand Total	**$180,379,431**	**$267,520,189**	**$321,509,097**	**$351,856,462**	**$390,113,755**

If utility spending on transmission and distribution over the next five years is similar to the recent past, the total BPA and investor-owned spending could total $7.5 billion. Spending by municipal and public utilities would add to this total. If additional energy efficiency, on-site solar, and peak-demand reduction programs described in this document could reduce the need for of these expansions and upgrades by ten percent, if could save consumers approximately $750 million over the next five years. A twenty percent reduction could save about $1.5 billion on expansions and upgrades.

The magnitude of these transmission and distribution costs and the potential for savings for consumers and the environment should convince regional energy decision makers to focus on the benefits of reducing these economic and environmental costs. The construction costs are averaged into utility rates, so consumers do not see the magnitude. The environmental costs often fall on tribal resources (such a first foods and sacred sites), rural areas, and populations that are not represented in energy siting or ratemaking processes. Investor-owned utilities receive a rate of return on these investments; this may create an incentive to expand these facilities rather than pursue activities that reduce the need to expand these expensive assets.

[Note to reviewers: CRITFC has tried to find information on the costs for utility plans to expand transmission and distribution systems. The BPA expansion cost information was readily accessible and is reported below. We would appreciate any information reviewers can provide for other utilities or transmission consortiums on either future cost estimates or actual costs over the past five years. CRITFC is also seeking comments on the potential for reducing transmission and distribution costs in the future.]

Cost of Transmission Expansion and Upgrades						
Millions $						
	2021	**2022**	**2023**	**2024**	**2025**	**Total**
BPA Expansion	$ 124.2	$ 145.0	$ 165.0	$ 150.0	$ 146.0	$ 730.2
Avista						
PacifiCorp						
Portland General						
Puget Sound Energy						
Other						

Cost of Distribution Expansion and Upgrades						
Millions $						
	2021	**2022**	**2023**	**2024**	**2025**	**Total**
Avista						
PacifiCorp						
Portland General						
Puget Sound Energy						
Other						

Transmission and distribution lines have significant environmental costs. Transmission lines often damage tribal cultural and sacred sites, first foods, and fish and wildlife habitat. Transmission lines have been linked to wildfires in the West. Distribution lines affect local communities. These issues are discussed in more detail in Section 3.4, and Appendices F, G, and H.

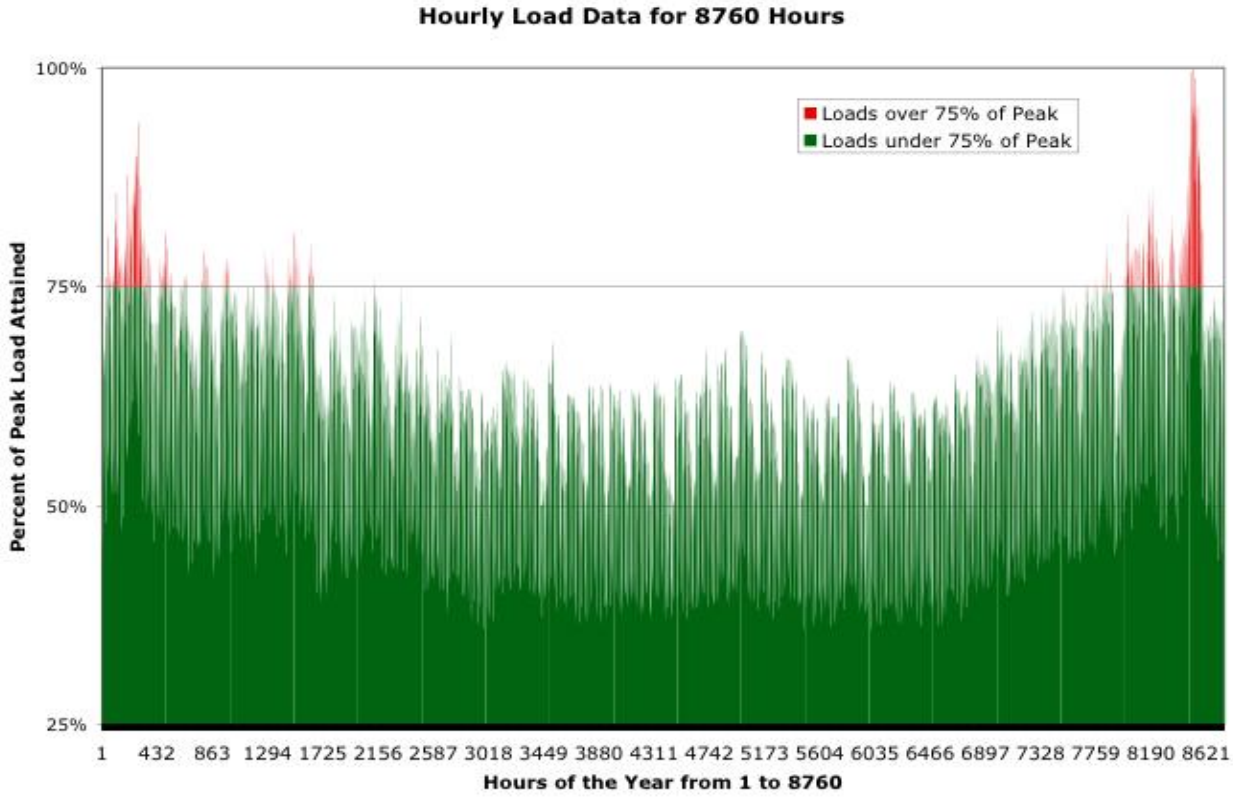
BPA, utilities, utility regulatory, commissions, energy siting agencies, and the NPPC should consider these cost and other environmental, cultural, and tribal resources in evaluating the cost effectiveness of alternatives that reduce the need for these lines.

E.2 The Costs of Serving Hourly and Seasonal Peak Loads

The hydroelectric system is used to serve peak loads because output from dams can be increased and decreased instantaneously by increasing or decreasing the amount of water going through the turbines.

In the Columbia River hydropower system, as is customary in most power systems, transmission and distribution lines were built to serve the highest peak load (the maximum amount of electric energy required during certain periods of time). Peak usage occurs infrequently and for short periods of time. Yet more than 25% of all capital in place, including generation capacity, transmission, and distribution is there to serve loads that occur about 6% of the time. Figures E1 and E2 below show the infrequent occurrence of the highest peak loads.

Figure E1. Hourly loads as a percentage of peak



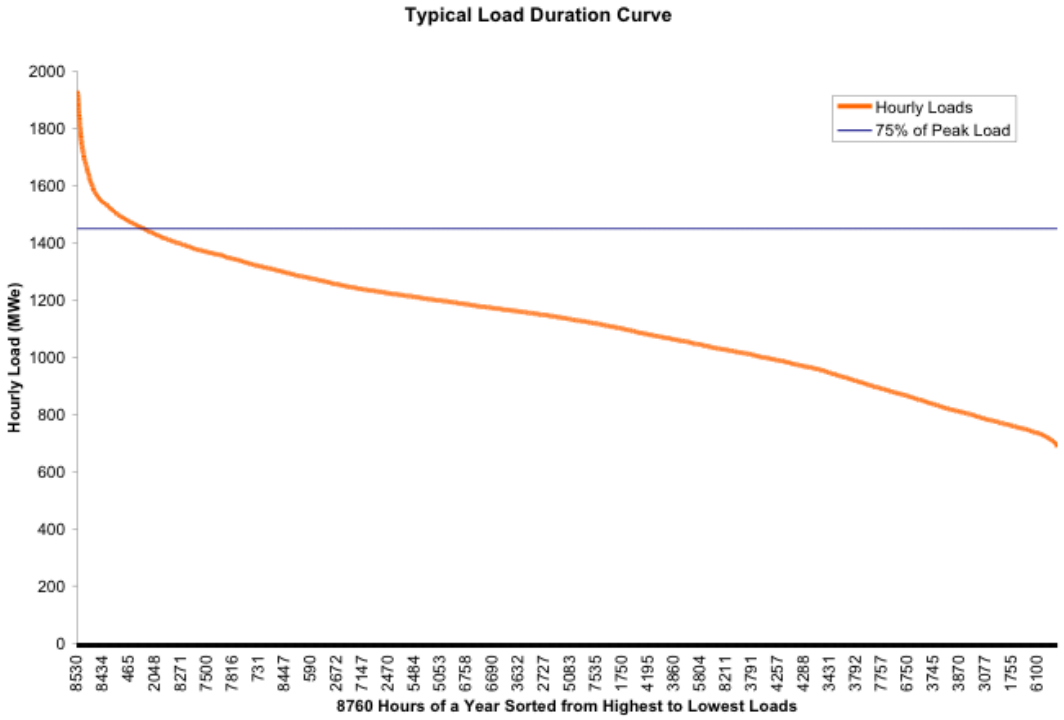
Proponents of using the hydropower system to follow peak loads argue that it is the lowest-cost option and that the fish killed in the process are an acceptable tradeoff. However, it is a myth that using the hydropower system in this way is a low-cost way to meet peak loads. The myth has been perpetuated by average-cost pricing of transmission and distribution systems. That is, all loads pay the same price for transmission and distribution, regardless of whether the transmission and distribution system is partially or fully loaded at time of use. Serving peak loads from any central station, distant plant (including hydropower) is expensive; it is far more expensive than other similarly reliable ways to meet peak loads.

Consider Figure A2, which contains a load duration curve for a typical northwest utility. The load duration curve is a simple structure that plots peak loads for each of the 8,760 hours in a year.[196] The loads, shown along the vertical axis, are sorted from highest to lowest-load hour; shown along the horizontal axis, the hour with the highest load is at the left of the horizontal axis and the hour with the lowest load is at the right of the horizontal axis. An arbitrary line has been drawn horizontally at 75% of the highest peak hourly load. To serve power needs in a conventional power system, a utility has to build or contract for transmission to serve its highest load, and it also must have an adequate distribution system to meet that peak load. A typical rate for transmission in this region ranges from $24 to $30 per kilowatt per year. That is, if a utility needs to transmit a

[196] For purposes of understanding, a sample load duration curve is derived in the Appendix.

kilowatt from a generator to load, it pays $24 to $30 per year, regardless of how many hours the kilowatt is transmitted. If transmitted for only one hour, the cost is $24 to $30 per kilowatt-hour!

Figure E2. Hourly load duration curve



Distribution costs are estimated to be three times transmission costs. Thus, the total cost of transmission and distribution can range from $80-$120 per kilowatt per year. Given this information, consider the line in Figure 1 at 75% of peak load. Loads at this level and above occur about 600 hours per year. If the cost of transmission and distribution to simply deliver energy to that portion of load at 75% of peak is $80-$120; the per-kilowatt cost is 13 to 20 cents![197] The peak hour of the year (1 hour at 100% of peak—the extreme left edge of the graph) has a delivery cost of $80-$120 per kWh**!**[198]

[197] $80-$120 kW/year divided by 600 hours per year equals 13-20 cents.

[198] Some will argue that T&D costs are sunk (the capital cost has been made and cannot be recovered) and the variable cost of more throughput (e.g., more power sold) is zero. There are two reasons why this is not the case. First, in the short term for non-transmission owning utilities, transmission costs are not sunk; they simply "rent" space on the lines. Second, in the long term, all T&D owners have planned expenditures at some time in the future. The planned expenditures have not been occurred, and delaying them, perhaps indefinitely, is worth a lot of money.

Table E1 shows the delivery costs per kWh for other loads that occur in the range of one to 600 hours per year. For example, loads at 85% of peak or higher, occur only 101 hours in a year, at a delivery cost of $.79 to $1.18 per kilowatt-hour.[199]

Table E1. Costs of Transmission and Distribution to Serve Infrequent Loads

Number of Hours	Percentage of Peak Yearly Load	Range of Transmission and Distribution Costs	
		$80/kWh	$120/kWh
1	100	$80.00	$120.00
21	95	$ 3.81	$ 5.71
43	90	$ 1.86	$ 2.79
101	85	$ 0.79	$ 1.19
209	80	$ 0.38	$ 0.57
600	75	$ 0.13	$ 0.20

The book value of transmission in the region is roughly $10 billion.[200] Thus, over $2.5 billion (25% of $10 billion) worth of transmission is being employed less than 6% of the time. Using the 3 to 1 ratio of distribution investments to transmission investments we used above, this means that over $7.5 billion worth of distribution is being used less than 6% of the time. Or, in sum, over $10 billion worth of capital invested in transmission and distribution sits idle for over 8100 hours per year.

Serving peak loads (e.g., those above 75% of peak load) with any resource is extremely costly to the power system and serving peak with hydroelectric power is devastating to salmonids and the aquatic environment on which salmon and other species depend. Even without considering the huge costs imposed on fish and wildlife from raising and lowering river levels to serve peak loads, alternative means of serving these loads are cheaper than buying power and transmitting it from distant generators.

It is important to note that the current transmission and distribution costs are embedded costs—reductions in peak loads will not make them go away. However, reductions in

[199] Note that these costs do not include the cost of energy, which has been over $1,000 per megawatt hour on peak as recently ago as 2001. Costs have come down dramatically since then to a range of $30-$50 per megawatt hour

[200] The book value of BPA's transmission is about $5.5 billion (BPA Annual Reports), up from about $4.5 billion in 2001. Avista, Idaho Power Company, Montana Power Company, PacifiCorp, and Puget Energy Services combined had about $3.8 billion of book value in their transmission systems in 2001 (See FERC Form 1 data for 2000.) In 2003, we estimated that other utilities in the region not under FERC's jurisdiction make up another $.15 billion to get us to our estimate of $8.5 billion. Adding the additional $1 billion of BPA investment to the estimate used in the 2003 *Energy Vision* would total $9.5 billion. Other utilities have made investments also. Because the analysis here is only used to show the order of magnitude of transmission costs on partially filled lines, we have rounded up to $10 billion, to reflect other investments that have been made.

peak loads may allow the current system to defer or eliminate future expansions. For example, BPA plans to spend $730 million to expand its transmission system over the next five years. These avoided costs should be considered in evaluating the cost effectiveness of energy efficiency, demand response, and other actions to reduce peak demand.

There are a number of benefits associated with controlling demand at peak. For the electrical system, lower demand on peaks translates into fewer capital resources that are needed to serve loads. The grid can serve the same total energy needs with fewer generating plants and a smaller investment in transmission and distribution lines over time if peaks are lowered. Line losses and ancillary services can be reduced with lower demand, as well.

Importantly, lower peak demands also help fish in the river. The river is ramped up and down to follow peak loads, and in so doing, smolts (juvenile fish) have been stranded on banks along the river, and redds (where salmon lay their eggs) have been dried out. Reducing peak loads will limit the number of hours in a year when the rivers have to be ramped up to meet peak demand, thereby, saving fish.

Looking forward, as we acquire the general ability to control loads, we can envision a time when loads can be shaped at all times to allow appropriate levels of spill and flow for fish migration through the river system. And, we should be able to get to this point at costs that are considerably less to the power system than in the past.

The Lawrence Berkeley National Laboratory has prepared a report entitled: *Grid-Interactive Efficient Buildings: An Introduction for State and Local Governments*[201] which describes grid-interactive efficient buildings, highlights trends, challenges, and opportunities for demand flexibility; provides an overview of valuation and performance assessments for demand flexibility; and outlines actions that state and local governments can take, in concert with utilities, regional grid operators, and building owners, to advance demand flexibility. This report also provides a sense of the potential for DERs coupled with controls to offset the need for conventional generation, transmission and distribution system solutions to meeting loads, so it (and many of the references it cites) could also serve as source material for updating Section E.3

E.2.1 Capital Cost Savings Identified

Suppose future peak loads could be lowered, for example to 75% of current peak load[202]. These loads would not have to be eliminated overnight because the transmission system, albeit stressed, has and can continue to serve regional loads at today's levels. Peak loads could be reduced on the transmission system gradually by using the resource options described below. The peak load reduction could be designed to avoid planned

[201] https://emp.lbl.gov/publications/grid-interactive-efficient-buildings

[202] In keeping with the theme of this report, this is not a prediction of what might happen soon, but rather a vision of what could be done with a regional focus.

transmission investment upgrades that are being driven by the need to serve growing peak loads. This schedule would allow the region to ensure that these actions are carefully planned and implemented correctly.[203]

With peaks at 75% of today's peaks, the capital earmarked for transmission and distribution upgrades to serve peak load growth could be available to invest in alternative technologies to serve peak loads. The savings would be committed to load management, conservation, clean distributed generators to serve those loads, and clean gas-fired or renewable central station resources sited strategically within the transmission and distribution system. These energy plants and strategies would be used to serve peak loads and to serve off-peak loads whenever market prices exceeded the variable costs of operating the specific plants and implementing the load management strategies.

The magnitude of planned transmission and distribution investments that could be eliminated or delayed is significant. As previously mentioned, a rough estimate of the book value of transmission used to serve regional load is about $10 billion. Because the book value has been depreciated and it was funded by low-cost government debt for the most part, the replacement cost of the transmission system would be much higher. In the 2003 *Energy Vision for the Columbia River* we assumed it would be $17 billion dollars. An inflation rate of 2% over the last 10 years would bring replacement value to about $20 billion.

Since the region's transmission system is now constrained during many hours, new investment will be needed to serve loads if load shapes do not change. The region would need to invest about 1% of the total value of the system per year to keep up with load growth.[204] Thus, about $200 million per year will have to be invested in transmission to serve peak load growth.[205]

Book value and replacement value of distribution systems in the region has been estimated at roughly three times that of transmission. Many of the actions we include in our plan will also save distribution investments. Distribution investments are also often very costly from a social perspective because they entail digging up city streets. Large capital costs are incurred along with social costs and economic losses associated with time lost in traffic jams and other even greater displacements.[206] The savings from deferring investments would be great and would allow for even more generation to be built, if necessary. If the region were to do away with transmission investments to meet load growth, it could also do away with the corresponding investment in distribution systems. Thus, an additional $600 million savings per year (three times that of transmission) could be realized through forgone investment in distribution.

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[203] This is the goal of BPA as it revamps its transmission planning function, using the Round Table as an advisory group. The Round Table did not meet for several years, but reconvened in April 2011.
[204] Based on an assumption of a 2% growth in peak loads. BPA had scheduled over $2 billion between 2002 and 2006. Only about $1 billion of that amount appears to have been spent.
[205] Of course, there will also be capital investment to maintain existing wires. This will be true for the distribution system also. That investment is separate from the investments to serve new load growth and generation interconnections addressed here.
[206] Reduced access to commercial ventures is an example.

E.2.2 Energy Costs

Historically, energy costs have fluctuated widely. In 2001, not long before we published the initial draft of the *Energy Vision*, prices in the Northwest spiked to as high as $1,000 per megawatt hour ($10 per kilowatt hour). In the spring of 2001, futures for summer power were selling for 50 cents/kWh. Utilities and BPA were buying power at 20-50 cents per kilowatt hour and selling power to end users at less than 2.5 cents per kilowatt hour. That reality left BPA with an acute financial problem, which had implications for the protection of fish and wildlife.

The risk of fluctuating prices still exists from a range of catalysts, such as disruptions in power production or the transmission system. The 2013 *Energy Vision for the Columbia River* has been designed with the recognition that we cannot predict future price excursions, and that prices could spike again; however, the recommendations in this report should help constrain future price volatility.

E.2.3 Transmission and Distribution Costs

Transmission and distribution costs have several components[207]. One is the capital cost of the installations, and a second is the cost imposed by congestion on the grid. At many times of the day, season, and year, constraints exist on parts of the transmission and distribution system. Historically, BPA and other utilities have dispatched resources to move power around these constraints. The costs of doing this have been melded into average costs that in turn have been included in an average total power cost. The value of the resources used to get around transmission constraints is not transparent.

The end user has not paid the true cost of using either the transmission or distribution systems. As we noted previously, the cost of transmission and distribution to serve peak loads is enormous, but these costs are spread over all ratepayers and all hours of the year. If the true costs of transmission capital and congestion were charged to end users, much of the crisis experienced in 2001 would have been averted because peak loads would have been lowered[208]. From an economic perspective, too much transmission is built to serve peak loads that are greater than they would have been if users paid the true price of the delivered peak power.

Today there are still calls for more transmission construction.[209] If one assumes that the trend toward deregulated markets continues, investors who build additional transmission will be at risk. Higher prices for energy and delivery at peak would drive users to look for other innovative ways to serve their peak loads, including shifting those loads to off-peak times when the prices of energy and delivery are lower. The advent of Smart Grid technologies and strategies that will enable devices behind customers' meters to compete

[207] Here we ignore line losses associated with T&D.
[208] Prices shot up because during peak loads generation was not always available to meet loads. This had the effect not only of increasing prices, but also led to rolling brown outs in parts of the West.
[209] BPA's book value of transmission was $5.5B in 2013 versus $4.5 in 2001.

with generation and transmission will exacerbate this movement. If this occurs, which we think it will, much of that new investment could easily be stranded.

The Lawrence Berkeley National Laboratory has also prepared a report entitled: *Determining Utility System Value of Demand Flexibility from Grid-Interactive Efficient Buildings*[210]. This report describes how current methods and practices that establish value to the electric utility system of investments in energy efficiency and other distributed energy resources (DERs) that reduce generation costs, and/or reduce delivery (transmission and distribution) costs can be enhanced to more accurately determine the value of grid services they provide. It contains seven recommendations for improving the methods used by utilities (and others) to determine the "avoided cost" of grid services so that DERs are fairly valued compared to conventional generation, transmission and distribution alternatives.

[210] https://emp.lbl.gov/publications/determining-utility-system-value.

Appendix F: Sample Criteria for Siting Renewable Resources

Introduction

Section 3.4 of the Energy Vision identifies criteria to address tribal resources in the Pacific Northwest. This appendix provides examples of other criteria that were identified by the Department of the Interior for the southwest

In October 2012, the Department of the Interior completed such a plan for development of solar energy on public lands in six western states. The Programmatic Environmental Impact Statement (PEIS) for solar energy development provides a blueprint for utility-scale solar energy permitting in Arizona, California, Colorado, Nevada, New Mexico and Utah by establishing solar energy zones with access to existing or planned transmission, incentives for development within those zones, and a process through which to consider additional zones and solar projects.

The Solar PEIS establishes an initial set of 17 Solar Energy Zones (SEZs), totaling about 285,000 acres of public lands, that will serve as priority areas for commercial-scale solar development, with the potential for additional zones through ongoing and future regional planning processes. If fully built out, projects in the designated areas could produce as much as 23,700 megawatts of solar energy, enough to power approximately 7 million American homes. The program also includes a framework for regional mitigation plans, and to protect key natural and cultural resources the program excludes approximately 79 million acres that would be inappropriate for solar development based on currently available information.

In January of 2013, the Department of the Interior completed a plan for renewable resource development in Arizona. The Restoration Design Energy Project (RDEP) is an initiative to identify lands that may be suitable for the development of renewable energy. The RDEP Record of Decision and Approved Resource Management Plan Amendments establish 192,100 acres of renewable energy development areas on BLM land throughout Arizona. These areas are near transmission lines or designated corridors, close to population centers or industrial areas, and in areas where impacts on water usage would be moderate. These lands also have few known resource impacts or have been previously disturbed, such as retired agriculture properties. These areas are available for solar or wind energy development. In addition, the Plan establishes the Agua Caliente Solar Energy Zone on 2,550 acres in western Arizona.

Sample Criteria for Siting Renewable Resources

The BLM DEIS for solar development had some similar criteria for solar development in the desert SW at Section 2.2-2, which is pasted below. These criteria were developed to

address the potentially affected interests in the desert Southwest. Some of them may be suited to the Columbia Basin.

TABLE 2.2-2 Areas for Exclusion under the BLM Solar Energy Development Program Alternative[211]

1. Lands with slopes greater than or equal to 5%.
2. Lands with solar insolation levels less than 6.5 kWh/m^2/day.
3. All Areas of Critical Environmental Concern (ACECs), including Desert Wildlife Management Areas (DWMAs) in the California Desert District.
4. All critical habitat areas (designated and proposed) for listed species under the Endangered Species Act of 1973 (as amended).
5. All areas where the applicable land use plan designates no surface occupancy (NSO).
6. All areas where there is an applicable land use plan decision to protect lands with wilderness characteristics.
7. All Special Recreation Management Areas (SRMAs), developed recreational facilities, and special-use permit recreation sites (e.g., ski resorts and camps).
8. All areas where solar energy development proposals are not demonstrated to be consistent with the land use management prescriptions for or where the BLM has made a commitment to take certain actions with respect to sensitive species habitat, including but not limited to sage-grouse core areas, nesting habitat, and winter habitat; Mohave ground squirrel habitat; and flat-tailed horned lizard habitat.
9. All ROW exclusion areas designated in applicable plans.
10. All ROW avoidance areas designated in applicable plans.
11. All areas where the land use plan designates seasonal restrictions.
12. All Desert Tortoise translocation sites identified in applicable land use plans.
13. Big Game Migratory Corridors identified in applicable land use plans.
14. Big Game Winter Ranges identified in applicable land use plans.
15. Research Natural Areas.
16. Lands categorized as Visual Resource Management Class I or II (and, in Utah, Class III^b).
17. National Recreation Trails and National Back Country Byways.
18. National Historic and Scenic Trails, including a corridor of 0.25 mi (0.4 km) from the centerline of the trail, except where a corridor of a different width has been established.
19. National Historic and Natural Landmarks.
20. Within the boundary of properties listed in the *National Register of Historic Places* and additional lands outside the designated boundaries to the extent necessary to protect values where the setting and integrity is critical to their designation or eligibility.

[211] https://solareis.anl.gov/documents/dpeis/Solar_DPEIS_Chapter_2.pdf#page=6

21. Areas with important cultural and archaeological resources, such as traditional cultural properties and Native American sacred sites, as identified through consultation.
22. Wild, Scenic, and Recreational Rivers, including a corridor of 0.25 mi (0.4 km) from the ordinary high- water mark on both sides of the river, except where a corridor of a different width has been established.
23. Segments of rivers determined to be eligible or suitable for Wild or Scenic River status, including a corridor of 0.25 mi (0.4 km) from the ordinary high-water mark on either side of the river.
24. Old Growth Forest.
25. Lands within a solar energy development application found to be inappropriate for solar energy development through an environmental review process that occurred prior to finalization of this PEIS.

Appendix G: Tribal Cultural Resources

In the past, non-Indian archaeologists had control of how tribal cultural resources were managed on tribal, federal, state, and private lands. Management decisions, often based on values other than protection of the resources, resulted in the destruction of sites important to tribes. The CRITFC member tribes each have cultural resources programs established to protect these important tribal resources.[212] For instance, the cultural resources program of the Nez Perce Tribe has the following mission:

> The mission of the Cultural Resource Program (CRP) is to promote the understanding and use of nimíipuu'neewit (traditional Nez Perce life-ways) as integral components of Tribal culture and regional management. The CRP fulfills its programmatic purpose by:
>
> - Assisting Tribal Leadership in treaty rights protection,
> - Documenting traditional and ancestral knowledge,
> - Integrating nimíipuutimpt within our Tribal community and infrastructure, and
> - Protecting sites, landscapes, and associated knowledge integral to the perpetuation of nimíipu'neewit through meaningful consultation
>
> The Cultural Resource Program consists of 4 major areas that work to fulfill these goals: Archaeology/Tribal Historic Preservation Office (THPO), Ethnography, NAGPRA, Language, and Hanford Cultural.

The following sections of this appendix provide a brief overview of tribal viewpoints concerning cultural resources and how they are recognized and valued.

Differences between Tribal and Non-Tribal Viewpoints Concerning Cultural Resources

This holistic, interconnected view of the world and all the resources in it is sometimes hard for nonnative people to understand. It is from the view that the Nez Perce interpretation of cultural resources arises. Federal and State legislation is designed to protect "Historic Properties". Historic properties are narrowly defined in federal law as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register including artifacts, records, and material

[212] https://www.nezpercecultural.org/what-we-do. https://ctuir.org/departments/natural-resources/cultural-resources-protection/. https://warmsprings-nsn.gov/program/cultural-resources/ https://www.yakama.com/programs/

remains related to such a property or resource". This definition differs greatly from the holistic belief of the tribes that water, air, animals, soil, rock, fish, birds along with those items included in the Federal definition should be considered cultural resources. While many of these items in themselves may not be adequately considered historic properties by narrow interpretations of federal law, they certainly contribute to the reasons that individual locations or items can be considered historic properties. They often provide the contextual link to the landform and the overall tribal cultural environment, which is vital to understanding a property's significance.

This context often divides the native and nonnative view of cultural resource protection. Tribal people believe that this holistic viewpoint is extremely important when addressing cultural resources. In fact, this was so important that the tribes protected key cultural activities such as fishing, hunting, and gathering in the treaties of 1855. This context is especially significant when dealing with the prehistoric cultural manifestations remaining on the landscape within the tribal traditional area.

It bears repeating that Tribes look at cultural resources differently than archaeologists do. Most generally, the tribes note that a cultural resource is any place that is valued by a tribe because of some sort of association with the tribe's ancestors. The tribes also point out that cultural resources can be either places or practices. The practices are centered around people's actions which may or may not require a special place. It is the 'action' that is special to the cultural tradition or lifeway. The places are physical locations on the land that are important because something special is done there (vision questing, medicine gathering), because special things are located there (important plants, herbs, animals), because people did something there in the past (lived, buried the dead, etc.), or because they are associated with traditions (origin places, etc.). These places are generally considered under the archaeologist's term "site" or "Traditional Cultural Property" (TCP).

Another important point is that cultural resources may be places where plants, animals, or minerals are found that are needed to maintain the ways of life passed down from the ancestors. Cultural resources significant to the tribes world-view include such things as the Indian people themselves, their communities, and their way of life; native elders with their unique information regarding their personal histories as well as tribal histories; clean air; clean water where salmon and other fish, eels, and other riverine resources so highly prized by the tribes for their traditional subsistence live; the root grounds providing a multitude of edible roots traditional to their dietary needs; and the berry patches, especially huckleberries.

Clearly, a crucial cultural resource for the Columbia River treaty tribes as well as other Northwest tribes, is the salmon. Many of the archaeological sites along the Columbia and Snake rivers show evidence of the antiquity of the relationship between tribal members and these fish. Should this relationship be broken by the extinction of the salmon, the loss to the tribes' culture would be immeasurable.

Cultural Dimensions of Socioecological Systems

The following analysis and the italicized language is adapted from: *Cultural Dimensions of Socioecological Systems: Key Connections and Guiding Principles for Conservation in Coastal Environments*, Melissa R. Poe, Karma C. Norman, & Phillip S. Levin. 2013 NOAA Fisheries, Northwest Fisheries Science Center, 2725 Montlake Blvd East, Seattle, WA 98112-2097, USA. This report describes five categories of sociocultural values. Following each italicized bullet is an expression of the cultural context in from a tribal viewpoint.

*(1) Cultural connections to ecosystems are rooted in meanings, **values, and identity**. Cultural ecosystem meanings and values are deeply rooted and define a person or community; they are implicit in senses of place and often form the basis of community, individual, and professional identities.*

Tribal context:

> There is so much to this word or this way, this Tamanwit. It's how we live. It's our lifestyle. There is so much that we as Indian people are governed by, through our traditions, our culture, our religion, and most of all, by this land that we live on. We know through our oral histories, our religion, and our traditions how time began. We know the order of the food, when this world was created, and when those foods were created for us. We know of a time when the animals and foods could speak. Each of those foods spoke a promise. They spoke a law – how they would take care of the Indian people and the time of year when they would come. All of those foods got themselves ready for us – our Indian people who lived by the land. It was the land that made our lifestyle. The foods first directed our life. Today, we all have these traditions and customs that recognize our food: our first kill, first fish, first digging, the first picking of berries. All of those things are dictated to us because it was shown and it directed our ancestors before us.[213]

*(2) Cultural dimensions of ecosystems are embedded in **local ecological knowledge** (LEK) and practice. Local knowledge is not simply "passed down" through generations per se, but continually regenerated through practical engagements with ecosystem components, articulated through language, local meanings, methods, and cultural practices and frameworks.*

[213] CTUIR Comprehensive Plan, 2010. https://ctuir.org/system/files/FinalCompPlan/pdf (quoting Armand Minthorn, *As Days Go By*, 2006).

Tribal Context:

> "When we were created we were given our ground to live on, and from that time these were our rights. This is all true. We had the fish before the missionaries came. ...This was the food on which we lived. ...My strength is from the fish; my blood is from the fish, from the roots and the berries. The fish and the game are the essence of my life. ...We never thought we would be troubled about these things, and I tell my people, and I believe it, it is not wrong for us to get this food. Whenever the seasons open, I raise my heart in thanks to the Creator for his bounty that this food has come."[214]

*(3) **Informal economics** must be considered in addressing negative impacts to tribal fisheries. Subsistence fishing and harvesting, for example, is a practice often motivated by food provisioning rather than catching or processing species for sale and income generation. Subsistence fishing includes personal or family-level consumption to meet or supplement household food needs, or procurement for others distributed through sharing, gifting, and bartering. Subsistence feeds bodily and spiritual nourishment and is linked to culture,*
LEK, social relations, and food traditions.

Tribal context:

> When God created Indians on the Earth, he gave us everything. Main thing was salmon and meat. And all the vegetables--the potatoes, celery--everything, you name it, that's what he gave to us. And that's what we were raised on.[215]

*(4) **Resource management and governance** institutions shape and are shaped by cultural dimensions of ecosystems. Mechanisms such as harvest controls (e.g., timing, location, species, quantities, and techniques), formal and customary rules of access to resources, and decision-making processes constitute governance.*

Tribal context:

> "In addition, the Treaty of 1855 does not expressly state that the Yakima Nation relinquished its jurisdiction over matters pertaining to fishing rights. As the treaty constitutes a grant of rights from the Indians to the Government, Winans, supra, 198 U.S. at 381, 25 S.Ct. 662, 49 L.Ed. 1089, any rights not granted must be considered retained by the Tribe. Here, the Indians qualified their fishing right

[214] Testimony of George Meninock before the Washington Supreme Court in 1913 at page 146 in Meyer Resources, Inc., "Tribal Circumstances and Impacts of the Lower Snake River Project on Nez Perce, Yakama, Umatilla, Warm Springs and Shoshone Bannock Tribes", April 1999 Https://www.critfc.org/wp-content/uploads/2014/11/circum.pdf [hereinafter *Meyer Report*]

[215] *Meyer Report* at 374.

> only to the extent of permitting citizens of the territory to fish 'in common' with them at 'usual and accustomed fishing places' off the reservation. Given this fact and the vital role of fishing in the Yakima culture, we conclude that the Yakima Nation did reserve the authority to regulate Tribal fishing at 'all usual and accustomed places', whether on or off the reservation."[216]

(5). ***Sociocultural health*** and ecosystem health are integrated. For a human community that is culturally attached to salmon changes to the trophic structure (or food web) within which salmon is embedded will have specific implications for cultural wellbeing in ways that aggregated ecological integrity measures may not reveal.

Tribal Context:

> Traditional activities such as fishing, hunting, and gathering roots, berries and medicinal plants build self-esteem for Nez Perce peoples - and this has the capacity to reduce the level of death by accident, violence and suicide affecting our people. When you engage in cultural activities you build pride. You are helped to understand "what it is to be a Nez Perce" – as opposed to trying to be someone who is not a Nez Perce. In this way, the salmon, the game, the roots, the berries and the plants are the pillars of our world.
> —Leroy Seth, Nez Perce Elder[217]

> In sum, there's a huge connection between salmon and tribal health. Restoring salmon restores a way of life. It restores physical activity. It restores mental health. It improves nutrition and thus restores physical health. It restores a traditional food source, which we know isn't everything - but it's a big deal. It allows families to share time together and builds connections between family members. It passes on traditions that are being lost. If the salmon come back, these positive changes would start.
> —Chris Walsh, Yakama Psycho-Social Nursing Specialist[218]

Conclusion

As can be seen from the foregoing, tribal cultural resources are broader in scope than the archeological resource focus that flows from federal laws such as the National Historic Preservation Act or the protection of human remains that is required by the Native America Graves Protection Act. Tribal cultural resources are sometimes thought of as the tangible representations of tribal history and culture that are a reminder of who tribal people are, where they came from and historic values.

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[216] *Settler v. Lameer*, 507 F.2d 231, 237 (9th Cir. 1974)

[217] *Meyer Report* at 5.

[218] *Meyer Report* at 5-6.

Appendix H: First Foods Appendix

Aligning environmental management with ecosystem resilience: a First Foods example from the Confederated Tribes of the Umatilla Indian Reservation, Oregon, USA

Quaempts, E. J., K. L. Jones, S. J. O'Daniel, T. J. Beechie, and G. C. Poole. 2018.

ABSTRACT

The concept of "reciprocity" between humans and other biota arises from the creation belief of the Confederated Tribes of the Umatilla Indian Reservation (CTUIR). The concept acknowledges a moral and practical obligation for humans and biota to care for and sustain one another, and arises from human gratitude and reverence for the contributions and sacrifices made by other biota to sustain human kind. Reciprocity has become a powerful organizing principle for the CTUIR Department of Natural Resources, fostering continuity across the actions and policies of environmental management programs at the CTUIR. Moreover, reciprocity is the foundation of the CTUIR "First Foods" management approach. We describe the cultural significance of First Foods, the First Foods management approach, a resulting management vision for resilient and functional river ecosystems, and subsequent shifts in management goals and planning among tribal environmental staff during the first decade of managing for First Foods. In presenting this management approach, we highlight how reciprocity has helped align human values and management goals with ecosystem resilience, yielding management decisions that benefit individuals and communities, indigenous and nonindigenous, as well as human and nonhuman. We further describe the broader applicability of reciprocity-based approaches to natural resource management.

Find full document at:

Aligning environmental management with ecosystem resilience: a First Foods example from the Confederated Tribes of the Umatilla Indian Reservation, Oregon, USA. Ecology and Society 23(2):29. https://doi.org/10.5751/ES-10080-230229

Appendix I: CRITFC Letter to the Northwest Power Pool on Resource Adequacy

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March 26, 2021

Frank Afranji, President
Northwest Power Pool
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Portland, OR 97220
Via email frank.afranji@nwpp.org

Dear Mr. Afranji:

We have reviewed the Conceptual Design document for the Northwest Power Pool (NWPP) Resource Adequacy (RA) program. This document describes a collaborative effort by all 17 Balancing Authorities (BAs) in the greater Pacific Northwest (PNW) area to establish a region-wide approach to address resource adequacy issues in serving the region's electricity demands.

We are writing to ensure that your process addresses important fish and wildlife protection considerations.

Background

The Columbia River Inter-Tribal Fish Commission (CRITFC) is comprised of the Yakama, Nez Perce, Umatilla, and Warm Springs tribes. These four tribes signed treaties in 1855 with the United States. Among other things, the treaties reserved the tribes' rights to take fish that pass their usual and accustomed fishing places. Numerous federal court decisions have affirmed these rights.[1] For the tribes and CRITFC to accomplish their mission, salmon and Pacific lamprey populations need to be rebuilt. The operations of the dams on the Columbia and Snake rivers continue to be a main deterrent to anadromous fish restoration.

CRITFC developed an Energy Vision for the Columbia River in 2003 to reduce the pressures of the Pacific Northwest's electricity needs on the Columbia River and its ecosystem, particularly salmon. The Vision was prepared following the West Coast energy crisis of 2001 when many salmon protection measures on the Columbia River were curtailed.

CRITFC updated the Energy Vision in 2013. That document included recommendations on reducing peak demand, increasing energy efficiency and renewable resources, strategically siting resources, and strategies to address emergency dry years. The Energy Vision noted that

[1] E.g. Sohappy v. Smith, 302 F.Supp. 899 (D.Or. 1969), aff'd, United States v. Oregon, 529 F.2d 570 (9th Cir. 1976); Washington v. Washington State Commercial Passenger Fishing Vessel Ass'n, 443 U.S. 658 (1979); United States v. Winans, 198 U.S. 371 (1905); Confederated Tribes of the Umatilla Indian Reservation v. Alexander, 440 F.Supp. 553 (D.Or. 1977).

"Appropriate planning of regional resources can provide the Northwest with a robust energy system that withstands most unknown future events and keeps costs stable, while protecting fish and wildlife."

The 2013 *Energy Vision for the Columbia River* had four goals:

1. Reduce the stress of new and changing energy demands on the Columbia River's fish and wildlife resources.

2. Lessen the demand for fossil-fuel generation that contributes to climate change.

3. Serve the energy demands of consumers more cheaply than they are served today to better capture the value of the Columbia River for the Northwest.

4. Provide increased protection for ratepayers and fish and wildlife against unanticipated events, such as those the region faced in 2001.

The day-to-day and seasonal operations of the hydroelectric system to meet peak and seasonal electricity loads cause changes in river conditions that continue to kill salmon and other important species. While changes in operations have lessened the frequency and severity of these occurrences, their effects are still significant.

Hydropower is used to serve peak loads because dams can react to demand by quickly putting more or less water through the turbines that generate electricity. Serving peak loads with hydropower kills millions of juvenile salmon every year. During certain times of the year, so much water is drawn down to generate electricity that salmon redds (gravel nests where salmon lay eggs) are uncovered or dewatered and their eggs die. Daily fluctuations change river water levels and juvenile fish that feed and live near the shore can be stranded and die when water levels are reduced. Migration of fish is interrupted when flows decrease because there is less demand for electricity and therefore less water moving through the reservoirs behind the dams. Fluctuations in reservoirs hurt resident fish by dewatering habitat and food supplies and reducing nutrients in the reservoirs.

Water held behind storage dams for power generation would, under natural conditions, be in the river aiding the swift and timely downstream migration of young salmon. Saving this water for winter and summer energy production alters the natural (or normative) river conditions that aid juvenile salmon migration and would help in the restoration of fish to harvestable levels.

A lot has changed since our work in 2013. Electricity disruptions in California, Texas, and elsewhere have increased attention on resource adequacy and grid integration issues. CRITFC is in the process of updating the Energy Vision, which we hope to complete in 2021. We have sought comments from regional energy experts on the scope of the new document and would welcome your comments. We have attached a copy of the 2013 document.

The 2021 update will focus on ways to reduce the impacts of the electricity system on fish and wildlife, including:

- Ways to reduce greenhouse gases that cause global warming;
- Appropriate siting of new technologies to help assure that tribal resources, such as first foods and cultural resources are protected;
- Integration of electricity in the western United States and Canada, including transboundary issues with Canada;
- The potential to increase the availability of energy efficiency, renewable resources, distributed resources, and smart grid technology to meet future energy needs; and
- Ways to reduce the risk of grid-caused wildfires, which have ravaged the Western States.

The Power Pool Resource Adequacy Program

Based on the Resource Adequacy Program Conceptual Design dated August 2020, we understand that you are currently in the detailed design phase of your process. We also note that the resource adequacy project will focus on capacity. The 2013 Energy Vision included a number of recommendations on reducing peak demand and addressing capacity issues. We expect this will be a major focus of our 2021 update.

We further note that the draft Resource Adequacy Program suggests that "the capacity program will not initially focus on longer time-horizon of fuel-related issues (e.g., dry water years), though we understand those issues are important." The 2013 Energy Vision included recommendations on dry-year strategy to address the kinds of problems the region has experienced in the past. We urge the Power Pool to expand its scope to include an energy resource adequacy program to address dry years that can adversely affect the northwest economy and its important natural resources, including salmon.

It is our understanding that this effort is specifically designed to address PNW 2020 - 2030 capacity shortfalls. If successful, the Northwest Power Pool Resource Adequacy program will achieve electric system reliability while minimizing pressure on the FCRPS/existing PNW hydro system as the de facto fallback when the region is capacity short (with predictable adverse impacts on salmon). A principal feature of this program should establish a planning reserve margin (PRM), or reliability buffer, to guard against unanticipated reliability events and protect the region's natural and cultural resources. While individual utility PRMs have typically centered around 15 percent, the Resource Adequacy program should increase this buffer to 20 percent which would parallel what the CAISO has already recommended to help solve California's reliability problems. This single change could also provide measures for a dry water year strategy as described in section 3.5.2 of the attached CRITFC's 2013 Energy Vision.

CRITFC recognizes that many conditions have changed since 2013 and is in the process of updating the Energy Vision. There may be better ways to maintain the reliability of the electrical system while protecting anadromous fish.

The actions described in the forward showing program conceptual design (Section 2) and the operational program conceptual design (Section 3) appear to include the traditional techniques to track and address resource adequacy. As CRITFC works to prepare its 2021 update of the Energy Vision, we are struck by the significant improvements in the costs of renewable resources and energy efficiency and the advancements in storage, microgrids, and demand management.

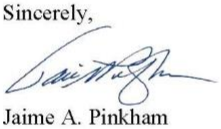
California's experiences have shown that these renewable and significant future distributed resources must be considered and addressed as resource adequacy programs are developed. There appear to be additional opportunities for interregional energy transfers. Given the importance of resource adequacy, the region's public utility commissions may also be willing to address time-of-use and other pricing techniques to address peak loads. We recommend the Power Pool expand its scope to address these additional ways to improve resource adequacy.

We believe it is important for the Northwest Power Pool to fully consider fish and wildlife protections as part of its resource adequacy program. We would like to see fish and wildlife protection incorporated into the goals and objectives and detailed analysis of your resource adequacy program. There may be ways to improve resource adequacy and also improve the survival of anadromous fish. There may be other alternatives that make things worse for these important tribal resources.

The Northwest Power Pool and its members have the expertise to evaluate these issues. We ask Pool's program to include a dry-year strategy, recognize new energy and policy opportunities, and address the effects on fish and wildlife in providing resource adequacy for the PNW.

We would also be willing to discuss ways to coordinate our update of the Energy Vision with the work you are doing. For questions and follow up, please contact Christine Golightly, Policy Analyst, via email at golc@critfc.org

Sincerely,



Jaime A. Pinkham
Executive Director

Cc: Bill Drummond, Board Chair, Northwest Power Pool, WKDrummond@comcast.net
Richard Devlin, Chair, Northwest Power and Conservation Council
John Hairston, Administrator, Bonneville Power Administration

Attachment