Northwest **Power** and **Conservation** Council

Council Meeting
Olympia, Washington
July 12 and 13, 2016

July 12, 2016

Council Chair Henry Lorenzen called the meeting to order at 1:30 p.m. All Council members were in attendance.

Reports from Fish and Wildlife, Power and Public Affairs committee chairs

Fish and Wildlife Committee

Council Member Jennifer Anders, Fish and Wildlife Committee Chair, reported that the Washington Department of Fish and Wildlife (WDFW) gave a presentation that talked about the use of pit tag data to model Lower Columbia River steelhead life cycle survival. This continues to be a valuable tool in understanding survival rates of steelhead in an area recognized by the Council as a stronghold. Second was a presentation on the effort to establish a network of native gene banks — areas where hatcheries should not occur to protect cross breeding between wild and hatchery stocks. Third, there was a briefing from fish managers at the Corps of Engineers and NOAA Fisheries, on real-time conditions and actions to reduce fish mortality. They described efforts to help fish passage and provided an up-to-date briefing on summer conditions. Water temperatures are monitored daily to prepare for short-term shifts in dam operations that keep water cooler at critical times. The good news is that conditions have been favorable this year, but they're keeping an eye out that conditions don't erode further.

Dr. Michelle Rube with NOAA reported on sea lion predation on adult Chinook salmon at the mouth of Columbia River below Bonneville Dam. Indications are that 2016 will be a record-breaking year for the number of sea lions observed. The committee received an update from the cost-savings work group. It has been in contact with NOAA and the all sponsors of the relative reproductive success projects (RRS projects). It is convening a one-day workshop in October to discuss how these projects fit with the overall program. So far, sponsor responses

have been positive. There also was an update on emerging priorities, including research plan revisions, development of salmon and steelhead objectives, a staff white paper (which evaluates fish passage at High Head Dam) and habitat assessment work above Chief Joseph Dam. Finally, they heard some insightful remarks from departing Council Member Phil Rockefeller.

Power Committee
Council Member Tom Karier, Power Committee Chair, reported that Steve Simmons, staff economic analyst, provided a look at the eight-year boom in natural gas supplies due to fracking and other advanced technologies to extract it, including horizontal drilling and imaging. Large supplies are keeping prices low and they should remain that way for the near future — even lower than what was in the Council's Seventh Northwest Power Plan.

Next was a study by Massoud Jourabchi, staff manager of economic analysis, looking at electric vehicles (EVs). I recommend that everyone take a look at his slide show. It's an eye-opening piece of work. Takes a look at the recent developments and future of EVs. Costs are going down significantly. Battery costs are dropping to a tenth of what they used to be. Plus, EVs are cheaper to operate and have far fewer repairs. Massoud did a cost-benefit analysis showing that EV investments are cost effective. Even without the carbon benefits, they are cost effective. To get there, a major investment of $3 billion in infrastructure is needed, but the savings is more than that. Plus, there's a regional benefit: Money spent on gasoline that now flows out of the region could be invested locally.

Phillip Popoff from Puget Sound Energy reported on their IRP process. It was interesting to see the similarities between regional planning and a utility-scale approach. Puget is exploring putting a value on loss of load. John Fazio reported on the interest in California trying to expand energy markets. But first, they have to apply a resource adequacy standard, which is a California requirement. They're looking at how to revise that standard to make it appropriate for other utilities.

Last was a discussion about the formation of the Demand Response Advisory Committee (DRAC). The Power Committee looked at the comments they received about its formation, and is recommending adoption of the DRAC.

Public Affairs
Council Member Jim Yost, Public Affairs Committee Chair, said the committee did not meet in Redmond and won't be meeting in Olympia. The Congressional staff trip in August was the only topic and that is coming together very well.

1. Panel presentation on salmon recovery in Washington.

Member Rockefeller began the session by stating that when we think about salmon recovery, we talk about the "Washington Way." He said that Kendall Farley, staff policy analyst, helped organize the panel, which was comprised of Jim Unsworth, director of Washington

Department of Fish and Wildlife; Jennifer Quan, government affairs director, WDFW; Kaleen Cottingham, director of the Washington Recreation and Conservation Office; David Troutt, chair of the Washington Salmon Recovery Funding Board; and Dave Fast, research manager of Yakama Nation Fisheries.

Troutt, who has managed the watershed for 30 years, shared why salmon recovery is important:

1. For the fish themselves. They're remarkable for what they go through, their migration, and connection between the ocean and the land.
2. We signed a treaty in 1854 that the native populations will be able to fish forever. For that to be meaningful, there has to be salmon, clean water and shellfish, or the promises are meaningless.
3. Endangered Species Act (ESA) laws, which force us to recover them whether we like it or not.
4. They're an economic driver in the region in tribal and nontribal communities.
5. Salmon equals jobs — be it for the fisherman, support industries, hotels, etc. Some communities are heavily dependent upon fishing. Because of poor returns this year, a lot of small communities are being heavily impacted by reduced seasons.
6. There are 127 different species dependent upon salmon.

Troutt said that 16 species of salmon, steelhead and bull trout are ESA listed in Washington State. "Washington is invested in salmon recovery," he said. "But where we aren't investing is in preserving habitat. We're losing it faster than we're restoring it. If we get ahead of this curve, the fish will respond. Although we've invested a tremendous amount, it's only 20 percent of the identified need to change the trajectory of loss. We need to find ways to increase that investment."

Kaleen Cottingham described the Washington Recreation and Conservation Office as a grant-giving agency — about $500 million per year. They have supported the Washington Way by creating a salmon recovery network. Each watershed has a role to play in salmon recovery, she said. The Salmon Recovery Board was responsible for funding the key projects. This board meets to give out about $20 million a year. She discussed the office's monitoring and reporting functions for Washington projects.

Cottingham said that finding funding for habitat restoration is going to be tough. "The Supreme Court asked that money be prioritized for education, and we have trouble with the general fund," she said. "We've tackled the easy projects. But now we're looking at big estuary projects, which are big, expensive and take years to get approval for."

According to Cottingham, whose agency produces the *State of the Salmon Report*, the results of recovery are mixed. They're seeing improvement in Hood Canal summer chum and Snake River Fall Chinook, and they might look to request delisting. They're also seeing increasing trends in the Mid-Columbia and in Snake River Spring Chinook. However, there are other areas where fish populations are low such as in the Lower Columbia.

However, there are other areas where they're low are in the lower Columbia and other places. Troutt pointed to wild steelhead in the Nisqually River. He said populations were as high as 6,000–8,000 fish in 1987, and then quickly declined to about 500. "It's a case where the environment wasn't supporting the fish," he said. "Without mitigation to restore the estuary and protect the floodplain, we would have lost that fish."

Jim Unsworth talked about Washington Department of Fish and Wildlife's work in salmon recovery, and discussed its statutory mandates. "We're responsible for commercial and recreational fisheries," he said. "I've never seen people more passionate about something as they are about fish."

He touched on efforts in hatchery reform, harvest co-management, habitat restoration (which is an entire cottage industry in Washington), reducing hydropower's impacts, and using the science of research, monitoring and evaluation.

Jennifer Quan added that WDFW are leaders in Hatchery Reform. It's a scientific redesign of hatcheries to ensure efficiency, compatibility and support for sustainable fisheries. She said that harvest management remains quite a puzzle. They have to set allocations at a national level, and then set them up at a regional level. Then they put ESA on top of that. "We monitor in real time," she said. "When we hit the quota, we can restrict or shut down those fisheries, but it's a lot of work. Another way is through the use of selective fisheries." She added that they also have a sizable enforcement program. On the restoration side, WDFW is administering fish-barrier removal from the mouth to the headwaters.

WDFW are collaborators on larger landscape projects, she said. They have worked with aerators and farmers to make sure we have the needs of salmon habitat. It also is engaged in estuary restoration in the Puget Sound and the Lower Columbia River. Estuary restoration is tricky, it takes longer, but there's a good payoff.

"We've had a lot of challenges on our hatchery programs and getting them through ESA compliance," Quan said. "We're seeing the need to have to reduce our production. Maybe we're reaching a ceiling on what we can safely produce."

David Fast, research manager for Yakama Nation Fisheries, reviewed the history of the Yakima Basin. They are looking at opening the tributaries as part of their salmon recovery tool kit. It includes habitat protection and restoration, nutrient enhancement, flow restoration, passage at the reservoirs and irrigation diversion dams. He discussed the Cle Elum Supplementation and Research facility. We designed it with the leaders and use natural broodstock, he said. It was a HSRG-approved hatchery before the HSRG ever came into being.

He discussed Yakima River summer run steelhead kelt reconditioning. Capture steelhead returning to ocean after completing the first spawning cycle. Most are female. They are held

and fed for six to eight months, then released in late October and mixed in with returning salmon. With Coho, the goal is to reestablish self-sustaining, naturally spawning populations in the Yakima River. Sockeye reintroduction at Cle Elum was discussed.

In 1985: 10,000 total fish came back; in 2014: 50,000 came back. At Cle Elum Dam, they are working on fish passage and have monitoring facilities at Rosa Dam. The Yakima also are working on Lamprey restoration.

Fast said they're concerned about the pace of recovery and that it's not happening fast enough. "The tribe I work for is committed to the process, but the patience is thinning," he said. "We may have to explore other lines to move things along."

Dan Rawding, of WDFW, said they have seen trends in smolt production, but in general across Puget Sound, they've seen declining production. In the Columbia Basin, conditions are flat or increasing.

Member Rockefeller asked that given the Washington motto, is it possible to extend the motto to other species such as bull trout? Cottingham replied that they weren't successful getting agreement to consider WDFW's model in the northeastern part of the state for bull trout.

Rockefeller observed that we've been building capacity, but we're struggling in the state with the major reductions in funding from NOAA.

Cottingham said that both the state legislature and federal partners have not wanted to fund the human capacity in this effort.

2. Council decision on Final 2021 Adequacy Assessment Report

John Fazio, senior power systems analyst, explained that adequacy is assessed by simulating the power system operation thousands of times using more than 6,000 different combinations of river flows, temps, wind generation and forced outages. They count how many simulations had at least one shortfall in supply. The supply is deemed adequate if the loss of load probability (LOLP) is 5 percent or less.

Fazio said that through 2020, the region is adequate. In 2021, when the region loses the Boardman and Centralia coal plants, the LOLP goes to 10 percent assuming a medium load forecast, existing resources, 121 MW of planned demand response, and the Seventh Plan energy-efficiency target of 1,400 aMW. The region would need 1,040 to 2,230 MW of new capacity.

Fazio said that there is a lot of potential new generation that could come on line, so we shouldn't be concerned. This is only an early warning. If we weren't doing anything in the region, we should be concerned, but there's a lot going on, he added. Plus, according to PNUCC, there is about 550 MW of planned (but not sited and licensed) new resources.

The adequacy assessment is performed every year.

However, as the Council was preparing to approve the adequacy assessment, the closure of Montana's Colstrip 1&2 plants by 2022 was announced. Member Karier proposed that, instead of releasing a report that would be outdated on the first day, staff was asked to rerun the report and present its findings at the next Council meeting.

Member Lorenzen asked about the impact of delaying the assessment's release. Fazio replied that it probably would have no impact. Ben Kujala, interim power division director, said that staff could pull together a new assessment by the next Council meeting, which will be in Montana.

3. Briefing on Bonneville Power Administration Energy Efficiency Plan

Richard Génecé, BPA's vice president of energy efficiency, and Allie Mace, energy efficiency planning and evaluation manager, laid out BPA's draft plan for meeting the Council's Seventh Northwest Power Plan energy efficiency targets. BPA's plan has a total forecast of 569 aMW in public power savings over the next six years. The estimated savings will be achieved with BPA and EEI-funded programmatic savings, utility self-funded programmatic savings, market transformation and momentum savings.

"We have 108 passionate professionals committed to pursuing energy efficiency," Génecé said, noting that BPA exceeded its Sixth Plan targets by 100 aMW. "Our plan's budget is flat. But considering the spending levels in the plan, in light of the rate pressure, and BPA's work to manage cost, a flat budget is a significant achievement."

Génecé added that BPA's ongoing Focus 2028 dialogue could result in a significant change to its program.

Member Lorenzen said he wanted to discuss role of the Council in establishing targets with BPA. In the past, it's been negotiated on the 42 percent. "I don't prejudge it, but it's something I'd like to take a hard look at it," he said.

Génecé replied that BPA Administrator Elliot Mainzer is committed to an examination of that question, and how BPA sets its energy-efficiency target. It could go up or down, relative to the 42%. "It's an open question we're starting to explore and we're doing that with the full participation of regional stakeholders," he said.

Allie Mace said there would be a public review of the draft plan this fall, noting that in the last plan, BPA didn't have a full public comment period. Then BPA will finalize its Energy Efficiency Action Plan this December. The plan looks out six years, but BPA plans to update it and revisit it every two years.

Mace said that BPA's program staff, technical leads and managers took a bottom-up look at

developing the strategies and setting the cost estimates. The plan's contents include savings and cost forecasts, sector savings, emerging technology, momentum savings, evaluation, and demand response, which is a new feature in the plan.

The key strategic themes are to:

- Identify and prioritize new technologies;
- Focus on delivery and making programs accessible and easy to use for BPA's customers; and
- Leverage regional efforts, including partnering with NEEA and other utilities to achieve goals.

Looking at different sectors, Mace said that in the last action plan, residential was 40 percent and commercial was 26 percent. That's shifting. Commercial has grown in opportunity and residential has decreased.

The total six-year savings by sector are:

Commercial	42 percent
Residential	32
Industrial	18
Agricultural	5
Federal	2
Distribution efficiency	1

After Mace provided an overview of energy-efficiency IPR budgets, Member Lorenzen asked how they would translate to cost per MWh. Charlie Grist, staff manager of conservation resources, said not very well; they would have to figure out the average measure life.

Member Lorenzen said, "We talk about conservation that's cost effective and I don't know if this shows cost effectiveness." Génecé replied that it's getting harder to achieve cost-effective energy savings. Many measures are more expensive now than what measures have been pursued in the past.

This is cost per first-year savings, Grist said. These are programmatic costs, Mace added.

Member Booth remarked he didn't think the question was answered, and that he prefers to put it in kWhs. Is it still 2-3 cents per kWh? Grist answered historically, the utility cost has been 2 cents. These are similar.

Member Booth said, but this is BPA's cost. Mace answered that is true, it doesn't include the cost of implementation, utilities' or infrastructure costs.

Grist projects that the costs of acquiring conservation will increase a bit as they go after harder-to-reach segments, such as commercial HVAC, etc.

Council Member Henry Lorenzen said that he hasn't heard of significant work identifying what cost-effective conservation potential is out there. "To what extent did BPA analyze the potential from its customers in developing a bottom-up approach?" he asked. Mace they haven't conducted their own cost-effective estimate. They looked at the Seventh Plan supply curves. Génecé added that it's a strategy built sector by sector, and the sector leads have an understanding about what the potential is on a sector basis.

Member Lorenzen that in the future, he would like to discuss how they go about determining cost-effectiveness by sector.

Council Member Bill Bradbury asked about demand response's role in the plan. Génecé said that while it is part of his department, it's shared among several different areas at BPA, including transmission and power.

Bradbury asked what the goal is for achieving demand response and what progress has been made. Génecé said they are aggressively pursuing it and determining how to commercialize it — moving it from the demonstration phase to implementation. They will be tracking it and will give the Council feedback on achievements.

Member Rockefeller asked what was the basis for concluding that the residential sector would be declining? Mace said it's looking at the market. Standards have been very aggressive in the residential area so there's not as much potential there.

Member Rockefeller asked Grist if that consistent with the Seventh Plan? Is there a reduction in potential? I don't think so, Grist replied. The potential is still evenly spread.

There's just a growth in the commercial share, Mace added, not so much a reduction in residential.

Member Karier remarked, "Richard, you said BPA exceeded its Sixth Plan target by 100 aMW, which is roughly 20 percent. In the Fifth Plan, you exceeded the Council target as well. So if you can exceed it by 20 percent, that's good. Our better role is doing the plan, keeping track of it and we have two-year milestones to check in. Twenty percent is more than enough. I appreciate your work on this. You're the experts in getting down to the details and budgets. Our role is more along the lines of regional value."

Génecé said he hoped that the Council would share their confidence that BPA will exceed the objective.

Member Karier asked about BPA's plans to develop cost-effective demand response program, and if BPA would be issuing an RFP around the effort. Génecé replied that it was something they'll lay out as they commercialize their approach to demand response

Member Yost said the Council is better positioned to make that mechanical calculation in energy-efficiency. “In demand response, everyone knows we’re better in knowing which customers to cut off,” he said. “BPA can’t do it anyway. They have to ask the individual co-ops to do it. We should be more specific about what we’re asking them to do and we should nitpick this a lot more.”

Member Anders said, “I detect a bit of sarcasm there. Should we become concerned that we ask for a certain target and they’re 16 percent short?”

Member Lorenzen said this continues to be of great value and we all have our roles to play in this area.

4. Member Rockefeller’s retirement.

Member Lorenzen said that one of the things he values is the opportunity to work with wonderful people, who are devoted to their work and who express their opinions forcefully. Then a melancholy time comes when someone is leaving the Council. For me, it’s a sad day, he said. Member Rockefeller was appointed by Washington Governor Christine Gregoire, he served as Council chair, and chaired the Fish and Wildlife Committee. He also helped the Department of Health, Education and Welfare in the fight against blacklisting students who protested the Vietnam War from receiving student loans. After Member Rockefeller’s service with HEW, he ran for public office, served three terms in state house and became a state senator (where he phased out the Centralia coal plant and had other environmental accomplishments).

Council Executive Director Steve Crow presented Member Rockefeller with a photo in recognition of his service to the citizens of Montana, Idaho, Oregon and Washington.

The Council adjourned at 4:54 p.m.

July 13, 2016

Council Chair Henry Lorenzen brought the meeting to order at 8:31 a.m.

5. Briefing on domestication selection and epigenetic mechanisms to reduce fitness loss in hatchery steelhead.

The most pressing issue facing artificial propagation is fitness loss, stated Dr. Barry Berejikian, NOAA’s supervisory research fisheries biologist and acting program manager for the Hatchery Reform Science Program. Fitness loss in hatchery salmon and steelhead means the capacity to produce offspring. When hatchery fish spawn, they don’t produce as many offspring as wild fish. Those effects are shown to be heritable. This can be a drag on those populations. It’s a headwind against all of the recovery efforts. These differences in fitness could be due to inherited genetic or epigenetic differences.

Hatchery fish produce less offspring than wild counterparts. A Hood River study showed that just having one hatchery parent decreased the fitness in males and females. These fish were all raised in the hatchery. The overall pattern, looked at over a dozen years, is that hatchery fish have lower-to-equal success. Culture is not the issue.

Member Anders asked if this in other locations and species? No, Berejikian replied, this is the only study done this way.

Potential causes of heritable fitness loss:

- Deleterious mutations
- Inbreeding depression
- Genetic drift
- Domestication selection: adaptation to the hatchery environment (this is what is being focused on).

The trait we're most interested in is growth rate, Berejikian said. We tend to release fish from hatcheries at the same age they go to sea. We release them at age one and shave off half their life span.

In 2008, the Fish and Wildlife service developed a program in the Methow River. They realized that they might have to grow them for a longer period of time.

Body size at the time of release from hatcheries influences downstream migration rate and survival in seawater challenges. Practical changes to hatchery practices show promise for reducing domestication selection. There was a discussion of body size and seawater survival.

Member Yost said that in fall Chinook in Idaho, clear water smolts that come down and stay in Lower Granite Pool have a higher survival rate than those that go out as yearlings. If they hold over and go out as two-year fish, the survival rate is higher. We don't know if that's genetic or environmental.

Berejikian said that steelhead fish that don't make it out aren't contributing. The mortality is very high. They're not showing the flexibility that the Chinook are showing.

Member Booth said prior studies have shown the struggles of steelhead. There have been studies that looked at SARS. The original stocks were imported from outside the basin. A theory was presented that because they were not native, there was a lack of fitness or ability to produce the same SARS. He asked Berejikian if he had a theory.

Berejikian replied that Hood River had stocks that were imported, traditional hatchery stocks. They showed lower fitness and survival. Studies we're concerned about are the stocks from the local population. The study weeds out imported stocks. What's concerning is how quickly that fitness loss occurred. It could be domestication mechanisms partnered with epigenetic mechanisms. We're trying to tackle this on both fronts.

Dr. Penny Swanson, NOAA's supervisory research physiologist and program manager for the Environmental Physiology Program, said that one reason they're interested in epigenetic mechanisms is how quickly this loss occurred. You'd think it would take a long time.

She discussed the nature of epigenetics:

- Genetics is the hardware and epigenetics is the software. Each cell type has the same hardware but different software. Environmental factors can modify that software. It can modify the function of the cell. It can also lead to pathological conditions, changing a normal cell to a cancer cell. If it happens when egg or sperm are formed, has potential to pass onto offspring.

Epigenomes are different than genomes:

- Dynamic
- Responsive to environment
- May or may not be heritable across generations
- Provides a mechanism for rapid adaptation to environmental change

The hatchery environment is different than natural environment. There's different water chemistry, stress, temperature, photo period, olfactory cues and nutrients.

Our study asked Are there discernible genetic and/or epigenetic differences between hatchery and natural origin steelhead in Methow River? They found that hatchery and natural-origin Methow River Steelhead cannot be genetically distinguished at the population level.

In summary, there are differences in DNA methylation between natural and hatchery origin steelhead in both cell types.

They still need to know:

- Does this happen in a single generation?
- How do these DNA methylation changes affect gene expression and ultimately fitness?
- What aspects of the hatchery environments influence DNA methylation?
- To what extent are DNA methylation patterns transgenerationally inherited?

Now they're splitting 20 families across two rearing environments: tanks and quasi-natural streams.

Member Rockefeller asked, "Is your theory that if you can mimic natural conditions then this susceptibility will be suppressed?"

Swanson said they're trying to see what aspects of the environmental conditions are having an impact. They are focusing on embryo incubation at those first, early periods.

The goal is to develop methods to improve hatcheries for the long-term health of natural salmon and steelhead populations. They want to minimize heritable fitness loss in hatchery populations and reduce negative impacts to natural populations. That way, existing management frameworks (e.g., HSRG) can be more effective and better contribute to recovery.

Member Karier asked, when you compared hatchery and wild populations, and found no genetic difference, did you look at random genes and chromes?

Genes are very large, very expensive to employ this technique, Swanson answered. We're headed that way. We can start with growth rate, but there's not a growth gene. So it gets complicated very quickly.

Member Smith asked when would they have results? Swanson said that they will probably have the data this summer. To drill down further will take several years of research.

Member Anders said that the Council's program recognizes that hatcheries are an important mitigation tool, and we encourage them to be HRSG compliant. How does this work inform on the work we do? That's a question for staff as we work on our research and what matters to us.

6. Presentation on research budgets and reporting as part of the Research Plan development

Member Karier discussed efforts to develop a new research plan by working with regional managers, independent science panels and BPA, as prescribed in the 2014 Fish and Wildlife Program. The review began with an update of how previous research funds were allocated to particular categories and critical uncertainties.

Member Karier said we need to revise the approach to research planning. They started with a review of the ISAB. They looked at what they've learned from past research. They identified new, future critical uncertainties and put them into new categories called "themes."

"We need to look at past research – not just jump into a new research plan," Member Karier said. There are three parts to a research plan: One is the critical uncertainties, or a list of questions. Our job is to think about budget priorities and allocating funds based on those, he said. That's going to be the toughest job.

Member Karier than described the need for an implementation plan. For example, when does the Council solicit new projects? When does the Council ask for final reports? When do we summarize our new learnings?

He then discussed distinguishing between research and monitoring. In monitoring, project

sponsors produce data and numbers. Research is trying to find answers. It should have a beginning and an end. “One category we came up with is action effectiveness,” Member Karier said. “Did planting trees on the side of the creek work? It falls under research rather than monitoring.”

Member Anders asked, are you assuming in the monitoring aspect that no analysis involved? It’s just data collection?

Member Karier said if there’s analysis and you’re answering a question, then it’s more research. If you’re just collecting data, then you should be in the monitoring category. When we ask projects if they have an end date, if it’s a monitoring project, they generally don’t. If it’s a research project, they probably don’t, but should.

Next there was an extended discussion about what constitutes monitoring versus research. Member Karier asserted it’s wise to keep monitoring and research separate.

Member Rockefeller said data has a number of outlets that could inspire research, populate an indicator or something else. It can be purposeful. Some projects depend on multiple years of data gathering, especially in a natural environment where there are multiple factors at play.

Member Karier replied it varies across the spectrum. It can vary between one season and longer. Most of the Council’s research, monitoring and evaluation (RM&E) projects don't have end dates.

Member Booth said, using the tree-planting example, monitoring can be valuable from a practical standpoint. But if your goal is to be more efficient with our budget dollars, maybe we need to do a research project to see if it’s beneficial. Maybe we need a control stream. But we don’t need to do it on every stream. For low-risk routing projects, let’s do it once and figure it out. Make it more programmatic. These monitoring exercises don't need to go on for years.

Member Lorenzen raised the issue of measurable benefit due to Judge Simon’s decision.

Member Karier said that this is the kind of discussion we haven’t had enough of. It fits into the budget priorities.

Performing an analysis of 186 projects, RM&E was extracted from projects with other purposes by using work elements. A total of 77 were purely RM&E, and 97 were partial RM&E.

The budget for RM&E in FY 2016 is $89,387,576. From 2004 to 2016, it is $1,036,594,988.

Fish propagation has been the priority in RM&E budgets for more than a decade, and continues to be in 2016. High spending on critical uncertainties doesn’t guarantee progress, Member Karier said. Medium progress has been made in fish propagation. How much do you

need to spend to answer the question … and can you even answer the question?

Member Karier said that current RM&E reporting is inadequate for adaptive management. The ISAB had a hard time reading through these reports. “Many reports appear to have been a bureaucratic afterthought …” said one review. “There is a general lack of data evaluation and results reporting,” said another.

Reporting has been addressed in fish and wildlife reporting since 2000. The Council has asked Bonneville to standardize its reporting.

There’s been low compliance among the largest RM&E projects as of May 2016. Many research projects don’t state hypotheses and uncertainties. Many RM&E projects don’t report end dates. Member Karier said they want a template used going forward.

Yet, fish and wildlife projects receive over $9 million to provide reports. Research reporting must improve if it is to be used for adaptive management, Member Karier said.

The next steps are to:

1. Work with BPA to improve compliance;
2. Encourage BPA to issue separate research contracts and separate research and monitoring work elements; and
3. Rely on combined RM&E budget data until reports can separate out research.

How do we set budget priorities?

By theme?

- Fish propagation 35%
- Tributary habitat 17%
- Hydrosystem flow and passage operations 13%
- Monitoring and evaluation methods 12%
- Population structure and diversity 11%
- Harvest 4%
- Mainstem habitat 3%
- Estuary, plume, and ocean 3%
- Predation 2%
- Wildlife 1%
- Climate change and human development 0%

Within themes?

- Are current projects producing desirable environmental and biological results?
- Identify future actions that may significantly improve biological results.

By projects?

- The information is critical and unknown.
- The project can provide that information.
- The cost of the project is appropriate.
    - Can the project use existing data?

Member Rockefeller complimented Member Karier, Patty O'Toole and Stacy Horton, staff policy analyst and biologist, on their work. As we look at the future course on the BiOp, judge didn't believe the data was there to back up the assertions. If we tightening it up, it will have a tremendous impact on operating the federal hydro system under ESA. One of the major agenda items is to implement a more rigorous program.

Council Member Pat Smith seconded Member Rockefeller's comments. Getting into these issues of what the actual benefits are on our habitat spending is a serious issue. We're not in charge of ESA, but we are in charge of what we fund and whether we're getting results from what we're spending. I hope we'll get better results from BPA on getting basic information.

7. Briefing on Seattle City Light electric vehicle programs, Brendan O'Donnell, Energy Planning Supervisor, Seattle City Light

Seattle's aim is to be carbon neutral by 2050 and one step towards that goal is the electrification of its transportation system, stated Brendan O'Donnell, Seattle City Light (SCL) energy planning supervisor. Analysis shows that electrification of passenger vehicles and light trucks would save $2 billion a year and save four million tons in carbon savings. SCL is a public utility and part of the municipal government with a lot of policy drivers in the organization, O'Donnell said.

He said that 25 percent of carbon emissions across the U.S. comes from public transportation. A third comes from electricity production, with the remainder from buildings, agriculture and industry. In Seattle, 65 percent of greenhouse gas emissions come from transportation. That's because SCL is about 94-percent hydropower, and it is a carbon-neutral utility.

While Seattle is booming, a look at SCL's load over the last 15 years shows that its load is actually declining. "There's been a tremendous achievement in energy efficiency, which is contributing to declining consumption," O'Donnell said. "But that shows an opportunity for transportation."

EVs in Seattle are big: it's the third-largest market in the U.S., all with little utility or government involvement. There's a real opportunity to further impact that, O'Donnell said.

A year ago, SCL began a strategic plan to analyze the market potential for EVs. They started by asking what the value of transportation electrification is to customers, what impact it would have on SCL's distribution system, and what role should SCL take it its growth.

Its team found that there is a net benefit for vehicle charging in its territory. Encouraging the adoption of EVs to 35 percent by 2030 will add an additional $58 million of ratepayer value, O'Donnell said. They found that SCL's distribution system could handle the increase in transportation load without capacity or service-related upgrades. They also determined there is a strong customer demand for SCL having a transportation program.

The benefits include a reduction in carbon generation, gasoline cost savings, and federal and state tax credits. The costs include the small amount of carbon through electricity generation, energy transmission and distribution costs, and the incremental cost of the vehicle itself.

When you do an analysis like this you're not trying to pinpoint the future, O'Donnell explained. You're trying to create different scenarios showing different versions of the future. A big part of this work is a range of different inputs. When cars charge, what is the cost when they charge, how much vehicle adoption will occur over time and other inputs.

Member Booth asked, "How did you value the reduction in carbon?" O'Donnell said how they price carbon is in its IRP. They anticipated a future cost. In the near term, it's roughly $10-$15 per ton, and is going to $40 in 2030. These are not the social cost of carbon, rather numbers just for SCL. Member Booth asked if the cost of infrastructure was included? No, it's not, O'Donnell replied.

He said there are two, key takeaways: From a one is the net benefit of $1,250 per vehicle. The cost of infrastructure is not included. The second takeaway is that the system upgrades needed are very small.

There are other uses that could be electrified, such as buses and forklifts. Anything that uses a battery instead of a fossil fuel has a benefit.

Overall, we can integrate a lot of vehicles over the next 5 to 10 years without a lot of cost, O'Donnell said.

SCL will focus on private charging stations at homes and businesses, and developing public charging networks.

SCL's next steps are:

- Public DC fast-charging pilot – 20 City Light-owned stations starting in 2017;
- Residential charging pilot – charging service with focus on grid services; and
- Clarify state legislative authority – allow greater flexibility in program design.

What opportunities are there in the fleet of SCL vehicles? O'Donnell said SCL has hundreds of cars with the potential to be electric. The goal is to move as many as possible. The problem is with a lot of charging stations in buildings. They want to address the availability of electric service and high-quality charging.

8. Panel on electric vehicles

Jeff Allen, executive director of Drive Oregon, moderated the panel. Drive Oregon's mission is to accelerate the growth of the electric vehicle industry through education, demonstration projects, grants and advocacy. He mentioned a major conference the next week with Portland General Electric. It's a good place to "test drive the future." Over 100 members representing the whole ecosystem are involved.

Steve Douglas spoke next. He's the senior director of The Auto Alliance, a trade association of 12 car and light truck manufacturers, representing about 75 percent of EV vehicles sold in the U.S. He has worked in California on these issues for the last 20 years. "I want to be crystal clear that automakers are 100 percent committed to the electrification of vehicles," he said. That includes plugin hybrid vehicles, battery electric, and fuel cell electric vehicles and light trucks.

What's new in EVs:

- Availability – there's increased numbers.
- Longer ranges are being offered — Later this year, Chevy Volt will unveil a car with 200-mile range.
- More body styles (SUVs, minivans, large cars, AWD)
- Manufacturers are providing charging incentives
- Financial incentives are being offered to promote sales
- Billions for R&D and future PHEVs, EVs, and FCVs.

But it's not enough, Douglas said. The auto industry can't change things by itself. There's still support needed from federal, state, local governments, utilities, NGOs, EVSE providers.

He described the vehicles they have and what's coming on the market. Member Lorenzen asked what energy is used for the fuel cell. Hydrogen, replied Douglas.

California is the largest market, Douglas said. We hit 3.2 percent in 2014 but then sales have sagged a bit. They had been swimming in the lake and now they have to swim in the stream. Rebates have ended and parking incentives have disappeared. HOV access has ended, which was rated a top incentive. Infrastructure is not keeping pace with electric vehicle sales.

What can utilities do?

- Infrastructure – utilities are the fuel provider for two of the three vehicles.
- Rates for EV charging (in CA it's wildly complex and in some cases a lot more expensive than gasoline).
- Incentives for home chargers

J.J. McCoy, senior policy associate with the NW Energy Coalition, said that his group just

passed a resolution to get behind vehicle electrification in a big way. When you think about EVs, most think about passenger sedans. But the category goes beyond that to delivery vans, forklifts and transit buses. From a power planning perspective, when you see a sedan, think 3,000 kW per year. But it's about 50,000-60,000 kW per year for passenger vans.

EVs benefit the grid: existing assets are below capacity during certain times of the day, which can be used by EVs.

- Off-peak charging. The Northwest region could electrify 2.8 million light duty vehicles without adding any generation or transmission assets if the charging is managed off peak.
- Flexible load. Most vehicles are parked 20 hours a day or more. We want to watch that we're not competing with peak hours. Potential alignment with variable renewable generation (e.g., noontime solar, overnight wind), load management (time of use) and demand response programs.
- Downward pressure on rates – Net new rate revenue from transportation electrification benefits all ratepayers: $1,250 for a passenger car, $120,000 for a transit bus, and 14,000 for a forklift.

EVs are energy efficient. Transportation is one of the most wasteful sectors of our economy. Two ways energy efficiency comes into play: Higher charging is more efficient than the wall-plug variety. It provides cross-fuel efficiency – you're selling more kWh, but it's substituting gasoline. The electric motor lowers end-use energy consumption substantially.

EVs have much lower carbon emissions. This is what gets me up in the morning, McCoy said. Looking at the full lifecycle emissions and going from a conventional car to batter-operated electric, there is a 40 percent, full lifecycle reduction in emissions.

Other benefits include:

Air quality – Emission reductions of nitrogen oxides, ozone, fine particulates, all of which impact air quality and human health.

Economic boost – Macroeconomic studies show that money saved on fueling and spent in pretty much any sector of the economy other than petroleum creates more jobs and economic activity in the local economy. Cost savings and economic gains are similar to gains from energy efficiency.

Fun – EVs have great torque, awesome acceleration, and operate very quietly. Most drivers who try electric never want to go back to a gasser, McCoy said.

Member Lorenzen said, "In Portland, they're encouraging infill development, but no parking. How will these people charge their vehicles?"

Allen replied that the opposition to EVs is from people who don't like cars. "I'm a recovering environmentalist myself. How do we plan for a future when most of the fleet is electric? It's

supposed to be 15 percent electric in a few years. Just as we accommodate bikes in the public right of way, we need to accommodate EVs and charging. It's about getting fast-charging stations integrated into the public space." He said he's working with Portland on their smart city proposal to do it. If someone gives them a bunch of money, they'll think it's a good idea, he added.

Allen said they also are doing work with electric-assist bicycles and buses. TriMet is looking at what it would take to replace its bus fleet with electrics.

There was a conversation about California rates vs. Pacific Northwest rates.

John Morris, CEO of Morris Energy Consulting spoke next. He has served as a nonvoting member of the Council's RTF. If utilities are willing to incentivize electric lawn mowers, they might want to incentivize electric vehicles, he said.

Morris discussed the trend line of Seattle City Light's load is going down. "It baffles me that as utilities, we aren't more engaged in the transportation sector. It doesn't seem that much of a stretch."

Utilities that have current and future offerings and incentives are Puget Sound, Avista and EWEB. Utilities that are engaged in education and outreach are Idaho Power, Seattle City Light and PGE.

Under Oregon Clean Fuels Program:

- Electricity counts as a clean fuel
- Electric Utilities are credit generators – An electric utility can generate credits, potentially for both residential and commercial charging stations.

Oregon policies are creating a unique "swim lane" for the utilities, Morris said. The Energy Trust Oregon would be a great place to facilitate the education awareness. It will be tough when utilities have different programs. You could have different offerings, depending on what side of the street you're on. If utilities have more like offerings, it will have more meaningful impact.

Morris said NEEA could play a role in the market transformation of the transportation sector:

- Transportation is the largest industry in the Northwest with the most carbon emissions, and it is the least energy efficient.
- We have an opportunity to address the transportation sector with decades of experience using the market transformation model to unlock long terms savings.
- Utilities can and should be at the center of this market transformation effort.
- It will require significant work with auto dealers, auto manufacturers, battery manufacturers and property owners. We have the track record and we can create deep savings in the transportation sector by working together.

Member Karier asked about the role of NEEA. It represents an interest in utilities playing a role, but I'm not quite sure which entity or how to participate, he said. NEEA is a group of utilities and states, but doesn't have auto dealers, manufacturers or battery manufacturers. Is there another entity to provide that political and research support?

Allen said that Drive Oregon has a utility workgroup. Any utility can participate. We talk about infrastructure and other issues brought up today. It has resources to support utilities and guide them through this thinking. If NEEA came to the auto manufacturers, came to them as a region. We approached Mitsubishi and GE on the Douglas heat pump as four states.

"Should we go to them or should they all be part of an entity?" Karier asked.

Drive Oregon has that breadth of membership, Allen said. It is part of the PEV collaborative and the Electric Drive Train association, which is a national trade organization focused on D.C. policy. This is all new, as the first models were introduced in 2011. He said they are making this up as we go along. There's an opportunity for the Northwest to create a model for other parts of the country. We have to demonstrate the path.

Member Rockefeller said, "Mr. Douglas, your frustration was palpable describing the number of new models and the stagnant sales. How long can the industry sustain sluggish sales? What would be the single most important thing that could be done?"

Douglas replied that what drives sales are incentives and infrastructure provided by utilities. Focus on installing that. You can't have that electric vehicle unless you have charging at home. People spend more hours at work than at home, so if you see them being charged at work, that helps create momentum. Multiunit dwellings and workplace chargers is the way to go.

Allen added, "What we've heard is that it's cash on the hood. Atlanta is the top EV market because they have a $5,000 rebate. Those incentives work. Infrastructure is second. Education is third. A lot of people don't know that you can go down and buy one today. If you had an appliance that was 88 percent more efficient than anything else on the market, wouldn't you want it?"

That's part of what's interesting, Allen added. With hybrids you do the cost analysis. If gas is cheap, you won't buy one. With electric cars, it's deeper. For most use cases it's only going to be cheaper if you drive a lot of miles and don't go very far. But you see the charging stations at workplaces such as Intel, HP or Nike, and there are 20 times more electric cars at workplaces that provide charging versus those that don't.

Northwest Power and Conservation Council Motion to Approve the Minutes of the June 14-15, 2016 Council Meeting

Member Booth moved that the Council approve for the signature of the Vice-Chair the minutes of the June 14-15, 2016 Council Meeting held in Redmond, Oregon.

Anders second. Motion carries without objection.

Northwest Power and Conservation Council Motion to Approve the Demand Response Advisory Committee Charter

Member Booth moved that the Council approve the Demand Response Advisory Committee charter as presented by staff and recommended by the Power Committee [with changes made by the Council members at today's meeting].
Member Rockefeller second.

Member Lorenzen asked Member Booth if he wanted to take up each one or vote on them in bulk? Member Booth replied that if they were all reviewed by the Power Committee, he was fine doing them in bulk.

Tina said the DRAC is a new charter. Member Karier said he reviewed it, made one change and supported adopting it.

Passed without objection.

Northwest Power and Conservation Council Motion to Approve the Renewal of Charters for Council Advisory Committees

Member Booth moved that the Council renew, for a period of two years, the charters as presented by staff and recommended by the Power Committee [with changes made by the Council members at today's meeting] for the following:

- Conservation Resources Advisory Committee
- Generating Resources Advisory Committee
- Natural Gas Advisory Committee
- Resource Adequacy Advisory Committee
- System Analysis Advisory Committee

Member Bradbury second. Motion carries w/out objection.

Northwest Power and Conservation Council Motion to Adopt the Fiscal Year 2018 Budget and the Fiscal Year 2017 Revised Budget

Member Booth moved that the Council adopt the Fiscal Year 2018 budget and the Fiscal Year 2017 revised budget as recommended by staff [with changes made by the Council members at today's meeting].
Member Rockefeller second.
Sharon Ossmann, staff Administrative Division director, said there were no comments on budget, and it reflects efforts to contain costs.
Passed without objection.

Public Comment
Scott Levy, from Bluefish.org, described meeting with BPA Administrator Elliot Mainzer and said that he gave the same presentation he had given to the Council. He said he spoke with Terry Flores who said that the Council could convene a forum of stakeholder groups impacted by dams. Levy mentioned a pipeline solution for transporting water, as well as barge traffic on the river and railroads.

The Council adjourned at 12:02 p.m.

Approved August ___, 2016

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Vice-Chair