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Chair
Idaho

W. Bill Booth
Idaho

Guy Norman
Washington

Tom Karier
Washington



Northwest Power and Conservation Council

Jennifer Anders
Vice Chair
Montana

Tim Baker
Montana

Ted Ferrioli
Oregon

Richard Devlin
Oregon

Council Meeting March 13 and 14, 2018 Portland, Oregon

Tuesday, March 13, 2018

Chair Jim Yost brought the meeting to order at 1:31 p.m. All members were in attendance.

Reports from Fish and Wildlife, Power and Public Affairs Committees

Fish and Wildlife Committee

Council Member and Fish and Wildlife Committee Chair Guy Norman reported on four agenda items:

1. Patty O'Toole, John Shurts and Tony Grover provided an overview of the schedule for the next amendment process and timeline. This would follow a report on March 23 from the Scientific Review Board, with the potential scenario for an amendment process that could begin in May. Staff went through the process steps associated with that. Shurts gave an overview of the 30-year history of 18 amendment processes that occurred during that period. This would be the 19th amendment processes.
2. Grover led a discussion on the six high-priority fish and wildlife goals for 2018, in particular issues that have regional policy implications, and rulings since the amended 2014 Fish and Wildlife Program.
3. Grover and BPA's Bryan Mercier led a discussion on the cost savings workgroup process, and the mechanistic approach that has led to the closing out of certain projects, establishing efficiency programs and establishing the budget for the cost savings workgroup.
4. Grover touched on the 2019 Fish and Wildlife Program emerging priorities.

Power Committee

Council Member and Power Committee Chair Tim Baker reported on six items.

1. BPA reported on the 2017 oversupply review and implementation of the oversupply management protocol (OMP), which was created in 2017. That was a challenging year as operations were facing flood risk, we had a serious rain event and 130% of normal volume. Looking back over 80 years, it was among the largest Bonneville has ever faced. Contributing to the difficulties was low loads, high winds and California solar was in full swing. Therefore, California had a limited appetite for exports. BPA implemented its OMP. Under it, non-hydro generation is displaced to protect aquatic life and maintain system reliability, because the hydrosystem is in a spill situation. BPA compensates generators for displacement-related costs. Previous times they implemented the protocol was a nighttime operation. This time, because of what was happening in California, there was displacement during the day. That presented challenges for Bonneville.
2. There was a report on I-137, the Washington Energy Independent Act. Glenn Blackman, with the Washington Department of Commerce, talked about implementing the act. Chair Yost used the term “excited” to talk about the presentation. I-137 is a process where IOUs, municipals, PUDs, and co-ops of a certain size are required to come in to State of Washington, present a 10-year plan of conservation potential, set targets based on what they see, and then go try to meet them. Every two years, they have to come in with a new 10-year plan. It’s interesting to look at how the various actors were doing. Everyone agreed it’s producing significant results. There are real penalties with not complying. This initiative is based on using methodologies that were used by this Council in the development of the 6th Power Plan, now they are using the 7th Plan. When it comes to energy efficiency, people watch at how this Council analyzes these issues.
3. There was an update to the irrigation paper: an estimate of power system value of conserved irrigation diversions. It’s not applicable in all cases, but in certain watersheds, if you can return irrigation water to the river, based on energy improvement, you’re going to generate additional revenue and it will have additional value to the system. The Regional Technical Forum is working on savings estimates for irrigation measures. The paper represents a starting point, and it will come to the Council tomorrow to release for public comment. The Power Committee is comfortable with the paper.
4. The committee looked at the marginal carbon paper. It has been improved through good staff work, through a stakeholder process and through consultation with the System Analysis Advisory Committee. There were continuing questions about how the paper would be used and the methodology, but staff confirmed that they addressed their concerns. It will come before Council to be released in final form. Study looks at avoided cost of CO₂ production across the WECC. Looks at lowest

cost, not lowest CO2.

5. A couple of action review items that are on the Council's agenda for tomorrow. Contract extension for load forecasting model. We have used up our contract funds, and we need to amend the contract for additional work. It's in the budget. The committee looked at it and is comfortable with it. There are improvements to the hourly load forecasting, enhancements to natural gas use forecasts, and improvements in estimating impacts of temperature extremes.
6. The Department of Energy put out a request for information on the value of hydro pump storage hydropower. They want to produce a techno-economic analysis of pump storage and asked for Council staff input. We sketched out a schedule for gathering draft comments for committee and Council review. The deadline for comments is April 6.

Public Affairs Committee

Council Member and Public Affairs Committee Chair Bill Booth said the committee met last month. Staff presented a review of the 2018 Public Affairs work plan. They also discussed options for the Congressional Staff tour in August. The committee plans to meet this afternoon.

1. Remarks by Elliot Mainzer, administrator and CEO, Bonneville Power Administration

Charlie Grist, manager of conservation resources, introduced BPA Administrator Elliot Mainzer. The following is a transcript of Mainzer's remarks:

Elliot Mainzer: Mr. Chairman, members of the Council, I really appreciate being here. It's good to see you all. Happy rainy continuation of spring here in Portland after three gorgeous days. I spent a little time looking at footage of the previous two times I came here — once was about three weeks after I became full-time administrator back in 2014 and then again in November 2015. There's definitely an aging process that goes on. It's about four years of human aging for every year of the administrator's job.

I promised myself that after we finished the strategic plan that I'd take a little break. I got a really nice week off last week down in the sun. I came home on a midday Saturday, on Sunday morning I woke up, and I have nine-year-old twins. We started out the morning coloring and drawing, we had basketball games and then it was Cub Scouts in the afternoon. By six o'clock that night, I was flat-out exhausted. And I realized that my exhaustion had nothing to do with being Bonneville administrator. It's all from raising nine-year-old twin boys. It's been a handful, but it's been really, really rewarding.

I've so appreciated the partnership with all of you, especially in the last few months ... the last year ... have been consequential. There's been so much that has happened.

I look back at the previous conversations we've had since 2014 and what's interesting to me is lots of common themes. I had the chance to meet Richard (Devlin) yesterday. Many of us are historians of the power business. What's interesting about the Northwest is one of my favorite sayings, that history doesn't repeat itself, but it rhymes. I think that there are these patterns in our industry. You go back to the 1990s, when we had the first big outbreak of competition, gas prices collapsed, Randy Hardy was administrator, there were radical transformations at Bonneville and the first big wave of customer diversification. Looking back to that era, there are lots of similarities.

But we also saw how that ended and how that went into power prices, the post-power prices era, and the regional dialogue contracts. We've seen such huge cyclicity in commodity prices and industry trends. But I do think that some of the forces we're dealing with right now — particularly the proliferation of cheap natural gas and all the new renewables coming online, relatively modest load growth, huge market transformation going on in the West, lots of new technology — I feel as though these trends are a little more enduring.

So, I tried to look at the things that are bedrock to BPA. As administrator, I inherited a lot of great stuff to work within the organization: lots of wonderful people, lots of history and lots of excellent developments over the years. As long as I've been at Bonneville, which is now about 16 years, we've always worked off this vision statement of Bonneville as an engine of the region's economic prosperity and environmental sustainability. We've also had a corollary to our vision and our mission that we are able to deliver on our public responsibilities through a commercially successful business. Those have always struck me as bedrocks, axioms of our reality.

When you look at what's been going on in the last few years, with the pressure on our revenue streams, the pressure on our cost structure, the changes in the industry, the collapse in wholesale electricity prices, I think that the commercial pressures on Bonneville have become much more significant than what we've experienced. I know you had Steve Kerns here a few weeks ago, talking to you a little about the market. I'm not going to go over all of that stuff, but some of the points he raised were quite accurate. There is a lot of pressure on the cost structure and there is a lot of downward pressure on wholesale electricity prices. I would say, to be frank, if there's an axis of nonchalance to panic, I think it's important that we don't get into a panic mode. I'm not in a panic mode. But I am in a very significant sense of urgency mode, and I do think the risks facing Bonneville are real. And I feel that even though we have 10 years left on our long-term contracts until 2028, the time for real action is now. When you look back at the conversations we've had over the last couple of years, what I feel good about today, in terms of taking you through the strategic plan, is that we've really tried to convert all of the thinking that we've done over the last couple of years into measurable actions, with clear metrics of the things that many of us agree are necessary for Bonneville to take on, in order to preserve its role in the region and achieve commercial success. I'm a bit of a believer in repetition. I spent time with pretty much all of you talking about our strategic plan and the process of developing it.

What I like about it is that it reflects a lot of excellent input from folks around the region. In particular, the states and the governors' offices, which was very important to me. Now that it's finished, I'd like to go through it. I'm going to go through each of the four sections. Along the way, I'll provide a few comments that get at the heart of the recommendations and material, and then we can open it up for questions and comments for each section, and move onto the next one with the goal of making sure that we end right at 2:45 p.m. I'll try to keep us on schedule. Feel free to interrupt me as we go through.

As you know, there are four, big strategic goals in our 2018–2028 Strategic Plan:

- 1) Strengthen financial health by meeting objectives for cost management, liquidity, debt utilization, debt capacity and credit ratings.
- 2) Modernize assets and system operations to leverage and enable industry change.
- 3) Provide competitive power products and services.
- 4) Meet transmission customer needs efficiently and responsively.

Acting on these goals is going to put Bonneville on a path to be more competitive and responsive to customer needs, modernize our assets and operations to leverage and enable agency change, and to actually deliver on our public responsibilities through a commercially successful business.

Goal 1: Strengthen financial health by meeting objectives for cost management, liquidity, debt utilization, debt capacity and credit ratings.

I think many of you know that I really have tried to bring significant business acumen and focus on core financial fundamentals at BPA. We're not an appropriated agency. Every dollar we spend taken is from our customers — our power customers and our transmission customers. That focus on the customer, the focus on commercial viability, and on that message that we've heard very loud and clear the last couple of years is to focus, first and foremost, on cost management.

The reality is that we signed the long-term Regional Dialogue contracts back in 2008 — take or pay agreements for 20 years — and Bonneville's rates have gone up 30% since 2008. I have heard it since the day I took this job: we've got to get ourselves off of this unsustainable rate trajectory.

I will tell you that today, with a PF (priority firm) rate of around \$36 per megawatt hour, with a market in the \$22–\$23 range, we're not strictly competitive on a pure price-point basis. I would say that I still think there's tremendous value in the product. When you unpack all the different elements of the Bonneville product — its carbon-free, dispatchable, firm, reliable, delivered components, and everything else that comes with BPA — I still think it's a tremendously valuable product. But if that spread opens up more, I think we will see some significant problems.

Frankly, we've done a ton of analysis. I'm not going to put it all on the table right now; some of it is proprietary and I'm not going to put a big target on my back. We've thought a lot about where we need to land the PF rate in the middle of the next decade, to keep the bigger utilities on board, who have some elasticity of demand, and to make sure that our smaller requirements customers still see us as a competitive offer.

We've done a customer-by-customer analysis — extensive work. We've used the Council's work, we've looked at gas curves and forward power curves, we've looked at the cost of new-build resources, we've looked at everybody's integrated resource plans. We really have scrubbed that. But one of the key conclusions coming out of that analysis is that we don't have the ability to continue to grow Bonneville's aggregate cost structure in real terms if we're going to maintain our competitiveness.

One of our first-and-foremost objectives in this plan is around improving our cost management discipline and holding our program costs at or below the rate of inflation by business line. Certainly, below would be better, but we're trying to draw a line. We can't be coming in with cost increases that are multiples of the rate of inflation, as we have for a number of rate periods. It's not acceptable any more. We've also changed our budgeting practices. We got a lot of feedback from folks, from customers and others, saying you can't come in every rate period and say, 'Hey, this is what we spent last rate period. Here's an escalation factor ...' We need to do a much tighter job budgeting strategically. Not only with respect to what we want to spend strategically, but in terms of our specific objectives. But it's also having a sense of where we have to land rates. And we are doing that now. As a matter of fact, I spent the whole morning today with our senior vice presidents and chief financial officer, combing through an extraordinary detailed analysis of our cost structure.

Again, we're starting with our own stuff. We're looking at our supply chain, our personnel costs, our IT, of course we're working closely with the Corps and Bureau, and Energy Northwest. But everything is really being evaluated. It extends to our fish and wildlife program, it extends to our energy efficiency program. We're really trying to be disciplined about our costs.

The other thing that's really foundational is we're trying to build greater financial resiliency. We can spend a lot of time on this, but at the end of the day, Bonneville, perhaps not surprisingly to some, is a very highly levered entity. We have about a 90% debt-to-asset ratio at BPA. Our power business line is actually above that and our transmission business line is on a trajectory to grow further. So, we have to take steps now. We've heard it loud and clear from the credit rating agencies to lower our debt-to-asset ratio. We're targeting for the agency, somewhere in the range of 75-to-80%. We've already had some good feedback on trying to tightening that up a little bit, putting ourselves on a special, more-specific trajectory over the next 10 years. But we do want to deliver. We're very, very highly levered relative to other utilities; one of the highest in the country to be perfectly honest with you.

There are certain reasons for that. But at the end of the day it's really starting to nip into our flexibility to adjust to a shock to the system.

The second thing is we want to take a close look at our debt capacity. I think you all know that we have a limited amount of federal borrowing authority, about \$7.7 billion. We've already used about \$5 billion of that. So, we've established a goal of maintaining sufficient debt capacity to fund our capital program on a rolling 10-year basis and preserve \$1.5 billion of available financing from the U.S. Treasury. This means we're going to have to look for additional sources of capital financing. We're going to spend a lot of time talking with the region, looking at everything from revenue financing and reevaluating our lease programs, talking to Energy Northwest and seeing if there are disciplined approaches to continuing leveraging the CGS (Columbia Generating Station) asset, etc., and trying to figure a way to increase our debt capacity. We are going to be retiring a lot of debt, but we're going to have to continue investing about \$900 million a year into the system.

So, we're going to need to have good access to borrowing markets, and we want to keep our costs as low as possible. It's a huge objective for us.

The third general area is liquidity. It's tough for me to point this out, but over the last decade, Bonneville has burned through about \$800 million of cash. That's due to a lot of issues, such as losses in the secondary market and trying to keep otherwise higher rate increases as low as possible. We are down close to zero in cash reserves in the power business line — that is an unacceptable position to be in. We set a modest goal of maintaining 60 days cash in each of the business units. Right now, the transmission side is well above that; power is right at the bottom. We have to take steps now. We've heard this loud and clear from the credit rating agencies, just to have the financial resiliency to ride through shocks to the system. You have to have a basic amount of cash. The industry average is about 270 days. We're not talking about big, expansive transformations. We're trying to do a minimum responsible level of financial management to get the balance sheet in better shape. And also, trying to maintain our high, investment-grade credit ratings. Some of you who participated in financial workshop last week heard from the ratings folks telling us how important it is to actually maintain that financial resiliency.

The financial elements are the starting point for the plan. They're the basic building block to a certain degree; some of the constraints we have to work with. I feel a tremendous responsibility as administrator to strengthen Bonneville's financial health and to try to take those steps. We'll continue to have a lot of interactions with the customers. The fine details of each of these areas will be discussed through workshops and will be settled in our rate cases, but it's a big part of the overall strategic plan.

Let me pause there and see if you have any feedback, thoughts or questions about the financial elements.

Council Member Richard Devlin: Thank you for the first part of the presentation and thank you for meeting yesterday. The bond rating agencies, the three primary ones, have all cited two primary issues: 1. volatility of the markets that you're in, and 2. your very substantial debt-to-asset ratio compared to the rest of the industry. One stated if you were not the Bonneville Power Administration, they would have recommended lowering your credit rating. One of the things in that debt side on the power side, are still the underlying debts that are being paid off for Projects 1 and 3. When I look at Columbia (Generating Station), it looks like there's an intent there to pay that off that debt before what would be a normal period of what they have set, which is to pay it off at the end of the current license year, which is 2044. For Projects 1 and 3, it looks a little bit unusual, in the sense that on Project 3, it looks like they're paying a substantial amount of principal and then going to paying interest for a number of years only. And then on Project 1, paying interest only for a number of years. It would start to question whether the intent is to actually pay them off during that maturity date. Because they set the maturity date of trying to retire both of those by 2028. Is there going to be more specificity once you get deeper into the finance plan? Because probably, although you face a lot of upward pressures on the transmission side, if you're trying to remain competitive in the long-term, getting the debt-to-asset ratio down in power is probably critical.

Mainzer: I take your basic point: that the power business line actually is on a relatively good glide path of reducing its total debt by about one percentage point every year. It's moving in the right direction. We're amortizing a little more than we're taking on in power. It's actually transmission right now that is on the upward slope. The questions you're raising about the nuclear debt are also very appropriate. We're going to be spending quite a bit of time talking with customers, talking with Energy Northwest board and talking with others about, 'Okay, we've had some great experience these past few years.' The regional cooperation debt was actually extraordinarily helpful, quite frankly. There are questions about working with a bundle of debt in a responsible way, versus working in a way where it looks like you're punting a can down the line or financing your groceries. We need to be careful that we're being disciplined, but at the same time, it's a huge obligation on our books, and it's provided some financial flexibility. We're trying to find that balancing point between leveraging it as a usable source of financial savings or getting it completely off the books.

Member Devlin: So, you are anticipating in the development of the remaining portions of the financial plan some more specificity?

Mainzer: Yes, much more.

Council Member Tom Karier: Thank you, Elliot. You mentioned that one of your focal points and concerns was about the large customers, and obviously if one of them were to find a better deal than Bonneville — that would be a disaster, a downward spiral. I was thinking about what happened in the mid-to-late 1990s, when Bonneville was facing rate competition. It wasn't so much the loss of big utilities, it was the customers of the large utilities. It was the industry. They were looking around. They didn't have the long-term

commitments utilities had. They had to survive the next year or two in their businesses. If they could get a deal — they didn't need 50% lower, if they could get 5 to 10% lower — I'm wondering if that's another danger.

Mainzer: It's not something that we're looking at down the horizon, it's happening now. I think the reason you had Steve Kern in here a couple of weeks ago, is he's one of the utilities that's feeling it most acutely with NORPAC up in Cowlitz. That's a dynamic that's for real. That's why I say for folks who don't think there aren't significant loads, whether it's a whole utility or a subset of the industrial/commercial demand, they're going to look to get off the market if we're not competitive. It's happening, it's for real. We are going to enforce our long-term contracts. They were negotiated in good faith through a regional process with a lot of transparency. We have no intention of walking away from them. But anyone who thinks there isn't a significant amount of load that could walk away, even if they're not looking for 20-year contracts, are not recognizing the reality that's in play right now.

Goal 2: Modernize assets and system operations to leverage and enable industry change.

An organization of our size and scope has to be really, really good at asset management. We have to be world class, literally the best. We have worked really hard in the past couple of years, including stealing an incredibly capable fellow from the Army Corps of Engineers, Bill Leady, who now reports to our chief operating officer as our new agency asset manager. We are making progress in administering an industry-leading asset management program. That extends across power, transmission, fish and wildlife, information technology and facilities. We're trying to put all of these categories on a consistent economic playing field so we can know the relative value of the different investments, so we can make good capital allocation decisions. We're trying to do a much better job of getting a better handle on asset conditions. And being willing to ask hard questions about certain assets and asking if they're economically viable. Those are the things we need to do to make sure we're making the right investments at the right time. We're making a lot of progress. But that is just absolutely essential to our strategic plan: the caring and feeding of this incredibly valuable hydroelectric system. The transmission grid is 15,000 miles of transmission lines, control centers, warehouses, and all the fish and wildlife facilities and IT. A lot of focus is on administering a world-class asset management program.

Another area that has been a major focus of mine, while I've been at BPA, is modernizing federal power and transmission system operations, and supporting technology. We have adopted the terminology around grid modernization. People ask what that means. For Bonneville, grid modernization means, for starters, that before you can even start talking about new markets, today on our hydroelectric system, we have huge opportunities to better automate, so we can participate in the sub-hour scheduling markets, that we can actually enable more dynamic transfer. We want to automate our processes and practices, get away from spread sheets and be able to work in a much faster moving system. We also need to have much greater visibility of what's happening on the grid. Things are moving faster,

they're moving in different ways. Flows are different than they were, even just five years ago. So, having that visibility on what's happening on the power system, in terms of your reserve obligations and your loads, and what's happening with transmission flows, is very important. And of course, accuracy: You really want to be able to forecast things as accurately as possible. So, if you want to get into new markets, or you want to be able to sell new products and services, you get a good handle of your inventory for both power and transmission. We can save a lot of money by investing significantly in these forms of grid modernization.

The other thing we're taking a look now, after sitting on the sidelines for a few years, is the Western energy imbalance market (EIM). We're now dotting the 'i's and crossing the 't's on our own business case for Bonneville participating in the energy imbalance market. We have developed a business case; I would say it's an affirmative business case. We have begun the process of sharing it with some of our customers and discuss what it means. In the coming months, we're going to be engaging further with our customers and other folks in the region. We're starting to sit down with the California System Operator to see what the terms of entry might look like for BPA, both in term of processes and costs, to sharpen that up and in the coming months and try to get ourselves to a decision node if joining the Western EIM is the right thing for BPA. I think we have some positive signs. It's obviously a complicated issue, there's lots of opinion, but BPA has always been a major player in the Western energy markets. And as we've watched Puget, Portland General and Idaho Power, and now Powerex, and the other investor-owned utilities in California getting into that market, it is important that we make a decision one way or another, and not sit on the sidelines. It's going to be an important issue and a core element of modernizing our assets and system operations. Any questions on that? It's probably nothing too unfamiliar to you.

Member Karier: That's new to me about Bonneville's potential for the EIM market. Are there special conditions that Bonneville would require being a PMA [power marketing administration] or is it just like Seattle or any other utility?

Mainzer: There will be certain specific conditions, I'm sure. We have unique statutory obligations. The way that we would unbundle the system to sell would be questioned. (There would be) metering requirements. Obviously, we're not going to take on a bunch of incremental FERC jurisdiction by participating in the market. We'll look at our transmission tariff, etc. There would be some special terms and conditions, I'm sure, but we don't see any fundamental red lights from a legal or statutory perspective that would prohibit us from participating. We've seen other PMA's participating, SPP, etc. We think there's some opportunity. But again, this is the first step of the conversation. We want to share information about what that business case looks like, conduct the due diligence, and come back to a decision node. I think it's important that we give people some visibility and understanding on how we see the economics playing out.

Council Chair Jim Yost: The utilities that you mention that are considering to join the EIM/CAISO market, those folks are going there with an idea of discussing the day-ahead

market, instead of just the within-the-hour market or have a provision to be able to do that when they all arrive down there. So, a day-ahead market to you would be advantageous, I would think.

Mainzer: It's certainly something we're going to want to look at. It's probably the kind of thing that could develop even quicker than when we were to get in to the EIM. If Bonneville elected to join the EIM, it would take us quite a while to get technologically enabled. But we will watch that as well. From a hydro-supplier's perspective, day-ahead is a better time step to a certain degree. It allows us to set up the hydro better. We'll address this in the next segment, but we've worked hard with the CAISO to get a flex capacity market up and running, so that we can sell hydro flexibility, and we've specifically tried to structure that on a day-ahead basis, so that our hydro operators can set the system up hydrologically to sell capacity. It's something we're definitely going to watch. I would say, if we take that first step into the EIM, that's the thing we're going to be focusing on first — getting into the sub-hourly, five-minute market.

Goal 3: Provide competitive power products and services.

Many of you have seen this graphic, I'm not going to spend a ton of time on it. I alluded conceptually to it at the beginning. But certainly, that is the trend we've been facing, the nominal priority firm rates and where the markets are going. I mentioned that the cost discipline, the management, is going to be really important, but we know we're not going to exclusively cost-manage our way out of this problem. We're going to have to look at the revenue side of the equation as well. And that's why we've been putting a lot of work into strategic Objective 3, which is to increase power revenues through new market opportunities for clean capacity.

Many of you know that our biggest foray into this was announced last week in our 200 MW transaction with Portland General. I wanted to thank the Council for laying the groundwork for that. The plan very clearly laid out that the region should make the best use of its existing resources. There's some good decisioning. I give a lot of credit to Maria Pope and her team for pivoting very quickly and looking at the market, to get our teams together and figure something out. I think it's a real win/win. That's exactly the kind of thing we want to be looking for. We'll be looking for two reasons: First of all, everyone knows we've taken huge hits in the secondary revenue market, just like every other hydro provider up here. With the cheap gas and the low load growth and the oversupply conditions, it's been a bloodbath for folks in the wholesale market. So, we're looking for opportunities to monetize clean capacity, whether it's up here or down in California, and to try and grow that market over the next five to seven years. That in itself is an important hedge for us in terms of a continued decline in spot prices, which could well continue. I'm wanting to make sure that, as we go into next contractual negotiations, that if we have significant diversification for BPA, that we've grown the demand curve for other products and services. Now these products and services are going to be subject to the same laws of competitive dynamics that the publics will be looking at, so we can't think that this is going to solve all of our problems. Quite

frankly, my goal is to try to resubscribe the federal power system to the public power utilities for the next round of contracts. If we turn around and resubscribe the hydrosystem, the firm capability to the publics for the next 20 years, that would be a massive accomplishment. That's our base case. But we want to make sure, that when we go out to resubscribe the system, that there's a long waiting list for others that might like a piece of the apple.

So, growing these markets — whether it's IOUs or looking at the other service providers, California flex capacity, and qualified community choice aggregators — we're going to be out there. We're going to compete for business. We're going to try and be a good business partner with dispatchable, clean resources that can play a major role in helping this region meet its carbon objectives and being a part of the clean energy economy. I think the federal hydrosystem plays a big role there. We're very, very active in this market and, quite frankly, as a federal agency, we don't lobby, we don't take explicit positions on bills in the states. But we're watching very carefully what's happening in clean energy legislation in the Northwest. It's very interesting to us.

We tend to believe that policies that decarbonize — if we're going to go down a decarbonization path just focusing on Oregon and Washington — we'd like want to see policies that have a place for the hydrosystem. And they're trying to accomplish these goals in a least-cost perspective. But watching what's happening in the carbon tax perspective is very interesting to us. We're also going to raise our hand when reliability issues need to be better understood, like we did recently up in Washington. We're trying to be very constructive. Our track record is that we've done a ton to help enable renewable resources in this region, we're going to continue to be that partner, but we want to support rational clean-energy policy that has a place for existing resources, which supports the kind of transactional activity we did last week.

The third area, which we know we could spend all day talking about, is prioritizing fish and wildlife investments based on biological effectiveness and mitigation for FCRPS impacts, and managing our fish and wildlife costs at or below the rate inflation, inclusive of new obligations and commitments. This is one of the toughest patches I find myself. These are very controversial, very important. But I honestly believe that we are facing a point where Bonneville doesn't have the capacity to just absorb higher and higher aggregate fish and wildlife costs. If we're going to take on new obligations, if we're going to be looking at spill on the river, and taking on new costs, we have got to be willing to work together to reprioritize our investment portfolio, to manage aggregate rate impacts. This is one of the areas where the Council and Bonneville have shared responsibility. We're going to have to work together. This is a tough conversation. But we've got to be willing to take a hard look at what we're spending money on, and make sure we're getting the biggest biological returns we can. And that we're willing to look at the portfolio of investment and make some changes away from things that are not consistent with where we're headed.

This is going to involve a lot of dialogue with the states, a lot of dialogue with the tribes. I have been transparent that I think there were some real benefits of the fish accords. I think

the relationship elements with the tribes are very important. Investing in tribal communities is a very important goal and responsibility for Bonneville and the other federal agencies. The relationships and partnerships with the states have been really valuable, but we've got to make sure that as we're looking at future rounds of investment that we're being disciplined, that we're being focused, that we're investing in things that are consistent with our longer-term strategy, and that we're willing to do the hard work of reprioritization.

Bryan Mercier, Lorri Bodi, my team, they're having to roll up their sleeves and work with many of you to figure out how to do this. I want everyone to know I support that work, and we're going to have to do it. I want to thank many of you. As we've worked with Washington State, Guy (Norman) has been an incredible asset to this conversation. Idaho, the partnerships, Bill (Booth), Tim (Baker) in Montana and Jennifer (Anders) ... all of you have been really helpful. And want to continue to find ways to reach out to Oregon and to get into a better place with the State of Oregon. I do not like the fact that we're still sitting there, fighting in court with Oregon. We have far too much in common with the state in terms of our long-term decarbonization objectives. So much work on energy efficiency. So many common, shared interests. And the fact that we're sitting there on opposite sides of this issue, it doesn't make me happy. It's something we have to take on, and all of us have to figure out how to bring all four states together around a long-term, sustainable strategy for the river. That's a big deal, a huge priority for me. I will be massively focused on that for the balance of my time at BPA, I'm sure.

The next one is Objective 3d in the plan, which has also been a challenging but important conversation, which is to ensure that our energy efficiency and demand response investments are aligned with the long-term needs of Bonneville and its customers. I spent about two years after becoming administrator getting up to speed on the energy efficiency program. This is obviously one of the most important issues; I know it's important to the Council. I've been schooled by Charlie (Grist) and the team many hours, about how this is important to the states, and the many accomplishments in energy efficiency are amazing. But I do think we need to take a solid business focus and pragmatic look at what makes the most sense for BPA to be investing in.

Kim Thompson was here several weeks ago and she articulated language I want to reiterate, because there's this concern that Bonneville is backing away from energy efficiency. That is not the case. I think that our meeting targets and performance speak to the fact that we're all in. I tend not to paint all of our public power customers with the same brush. Many, if not most of them are passionate about energy efficiency. They have asked for some more flexibility. They think there's some rigidities in our programs, and some concern about how west coast priorities sometimes get translated into the interior. I think those are fair concerns and we've tried to provide some self-funding flexibility and tweaks to the program. But I think many of them see the value. I have tried to continue to carry the flag for energy efficiency at BPA. And I will continue to do that.

But as Kim has said, we can't assume that Bonneville's long-term needs are a load-share based, carbon copy of the region's needs. It's appropriate for Bonneville to understand what is unique to our system, our customers and our obligations. The conservation potential assessment, DR (demand response) potential, barriers assessment, load-forecasting improvements and resource program enhancements are all vital tools in realizing Bonneville's strategy. I think our teams are working really well together. We're trying to drill in and understand what will deliver the most value in terms of extending the life of the federal system and delivering value to our customers. It's not walking away from energy efficiency. We're just trying to be knowledgeable and focused to get the biggest bang for the buck out of our investments. These are important conversations. Once the resource plan is out, we're coming up on the last couple of years of the Seventh Plan. We'll have some dialogue about what they mean. We'll work closely with you in a collaborative format. But let's have the conversation, let's see if these things tell us anything different than some of the assumptions we've been working on.

Member Baker: You touched on lots of reasons to like energy efficiency. When I think about it, and I hate to sit here and channel Member Karier (that sends off warning signals in the back of my head), it is about wringing more efficiency out of your system. When I think about the contract that you just signed with PGE, there must be a connection to the efficiency that you wring out of the system, the more space you create for yourself to do creative deals like that — that it gives you more room for that. I hope that when you say, "looking at the long-term needs of BPA," I hope you're thinking about your ability to free up resources to give you more flexibility to generate revenue in a challenging market.

Mainzer: Yes, I think that's true. We want to make sure that these revenue opportunities are covering the cost of investment. One of the things I really like about the Portland-style deal, and looking at others, is if we can see some increase in the value of clean capacity, and it can be monetized in a way that has a positive return, then incentives will really be there. When you're not getting that value out of it, the short-term economics are problematic.

Member Baker: That highlights the importance of the California market, and being able to provide resources into the California market at a price that reflects the fact that they are carbon free and clean.

Mainzer: We'd like to see similar opportunities materialize in our own backyard. That's the first place we go looking for transactions. California is part of it, but the value has to be there. I think you have to take the long view. We're also tied by our rate design, the way we administer the program. People can think about that coming into the next round of contracts. Is everything on a pro rata basis? Do you want to do that again? Look at what we do with the I-5 corridor. Portland/Vancouver and the southern side of that system is going to need a lot of demand response, a lot of load management. You're looking for places where we get return on investment and tangible customer value. That's what we're looking for.

The last point in this segment before we move to the last is modernizing the Columbia River Treaty, which has been far and away the slowest-moving initiative I've been involved with in my time as an administrator. The tweet that went out this morning about Tillerson (being fired) may not help in continuing to move things forward in the State Department. It's been very, very tough to get traction back there. Of course, with all the tariff issues and things like that, it's hard to tell how the Canadians will react. We were getting some really good momentum. We have our negotiator; the Canadians have their negotiator. We don't have the next meeting on the calendar yet, so we're watching very carefully. But certainly, to the extent to which we can get some economic rebalancing of the treaty, and can sort out the long-term management protocol and create some room in a disciplined fashion. I know this is a concern to others, but really try to find some room for some flow log and capture some the things we have been doing on the ecosystem side on a permanent basis will be helpful. We remain committed to the regional recommendation and we're hoping that this will get some traction. But it has been moving very slowly. We've had three delegation letters, countless visits to D.C. and it's still moving slowly.

Goal 4: Meet transmission customer needs efficiently and responsively.

It sounds so basic, but it involves a lot of change for a number of reasons. BPA's transmission side has been one of the most illustrious transmission providers in the country, if not the world. If you think about the number of things that have been invented by Bonneville over the years and in the region, with respect to high-voltage DC transmission, it's just an unbelievable network. For many years, it was a gold-plated system and it was very engineering-centric. In the commercial and customer side of the business, this notion of responsiveness and efficiency, and agility weren't big parts of the culture in transmission. Not surprisingly, our customers have been raising a lot more concerns about transmission services over the last couple of years. Some of them are experiencing economic development opportunities in their service territories. When you get Facebook or Apple, who want to bring jobs to these communities, they have to make sure they have transmission capacity. These companies show up on Monday and they want transmission capacity by Friday. Well, the transmission system doesn't work that way, so getting ahead of the curve and being able to respond to these requests, it gets back to being that engine of economic development. We want to enable these new loads, but you have to be able to get the transmission capacity available.

We know how incredibly expensive building new lines is. What you saw out of us last year, in the big decision around I-5, signaled a shift in our thinking about how to meet transmission service requests. You're not always just going to run to the big, new build as the solution. So, our first objective is to address load service, congestion new transmission service requests with flexible, scalable, cost-effective and efficient solutions. This opens up all kinds of opportunities for demand management and technology to help meet new transmission service requests.

I want to be really clear: this is not the end of transmission construction. We will continue to need a robust grid, not only for reinforcements, but there will continue to be opportunities and requirements to expand the system in certain places, and it will make sense. And I don't want people to think it signals the end of transmission construction.

But you want to have a deeper toolbox. You have to be willing to look at the non-wires alternatives on an equal playing field with the big builds. You need to be able to use dispatch, flow-control devices, battery storage where appropriate and economical, and the generating capability of the system to manage the transmission grid more efficiently and more responsively. That will be central to the way we run the transmission grid.

A second area is focused around transmission planning. The objective is to develop and implement policies, pricing and procedures for regional planning that incentivize grid optimization and efficient regional resource development.

This has two principal pieces: As states and regions look at attracting new economic development, if you're going to bring big loads in, there are places where it makes sense to site new loads because you can try to take advantage of existing transmission capacity and deliverability. Then there are going to be other places where it will be tough to get a new load in because of transmission congestion or other reasons or costs.

So, we want to be able to try to convey information to states and folks on the planning side about what makes sense in terms of location of generation resources and load resources, and do a better job getting ahead of that curve with our customers and with others as well. And also try to send price signals on where rational places are to be locating these new resources. We're also going to be working more closely with other utilities so we can plan the system, expand the system, and line up the subscription processes with transmission expansion and capacity enabled more efficiency. Anyone who gets in these long transmission queues to participate in RFPs gets themselves in all these "do" loops. The utilities want delivered power, they can't commit to delivered power unless they know they have a contract, they can't commit to a contract unless they know they have transmission ... so, just trying to get ahead of some of these loops in the transmission planning and subscription process.

In Montana right now, the process we're taking on to look at renewable resource development is a good test case on how you open up a region. Take advantage of existing capability or emerging capability, but also line up the commercial needs of the buy side with the commercial needs of the development side, to make sure the transmission developers are playing their role, but not getting themselves in a stranded cost perspective.

Objective 3 in this section meets the needs of network integration transmission service customers through clear business practices and streamlined processes. The open access transmission tariff serves load-serving entities — many of our public power customers and some of the IOUs under network integration transmission service. And we've struggled over the years to clarify the rules of the road for NT service, to do good, forward-looking

planning, to use those resources to help manage our grid more efficiently, and to make sure that folks can get their current and future needs met as efficiently as possible. It's been very important to our public power customers and we want to try and double down on that.

Finally, we've taken major strides to offer more standardized products and services by better aligning Bonneville's open access transmission tariff with pro forma and industry best practices. We've struggled over the years, we're not FERC jurisdictional. We don't have a pro forma tariff. We have tried to figure out the right way to strike a balance between being consistent with the pro forma (versus balancing our other statutory obligations) and we're saying to ourselves we think that most of the elements of the pro forma tariff can work for us. We don't want to be the exception to every rule. We want to provide clarity, to standardize our products and services, and to be more discipline around them. If we find things in conflict with our statutes, we'll call them out. If deviations are necessary we're going to take that on. But at the same time, we have to watch how the industry is evolving. So, if there are elements of the pro forma tariff that conflict with the emerging markets, we can adapt to those as well. But this is really an important initiative for Bonneville. I think it's really important to many of our transmission customers. It raises some tricky issues, but it's something we're really committed to taking on.

The last couple of things that I'll mention — I'm not going to get into detail — is if you had a chance to peruse the plan, we really tried to focus on a set of key performance indicators for the business that we're going to manage to: everything from safety and reliability, right down to our financial performance.

We're running a new quarterly business review format. We're transitioning it to be more like an investor-owned utility earnings call. I will be personally participating in those calls along with the other senior members of my leadership team every quarter, to give our customers in the region a handle on how we're performing on our key business indicators and meeting the goals of the strategic plan.

The other thing I'll do (it's been my biggest learning as administrator) is axiomatic. Any of you who have managed an organization probably know this in your sleep: A good business strategy achieves nothing without the people and culture to make that happen. Strategy's great, but culture eats strategy for lunch.

We put a tremendous amount of effort into culture at Bonneville. It starts with safety. I've talked about this before. I can't tell you how important it is. Everything starts with safety. If your employees have good safety habits, if they're willing to speak up when they see something that's making them nervous, that translates into everything else in your organization. It's just foundational to a utility or any organization. We have a big focus on management excellence, leadership, on diversity and inclusion, and more and more being a better, more responsive, more agile business partner as we focus on our commercial success.

So, those are the core elements of the strategic plan. My expectation over the next months is that this thing will become dog-eared and trashed as I carry it around everywhere I go. This is the central reference point for everything that Bonneville will be doing over the next five years. We'd like to get ourselves through 2023. My expectation is right around the middle of the next decade, that will be the time when things start heating up in terms of the next round of commercial negotiations. We want Bonneville to be positioned more competitively. We want customers to be confident in our capacity for cost management and financial strength. We want our many other valued partners to believe that we are meeting our commitments to be that engine of economic prosperity and environmental sustainability through a disciplined commercial organization.

Member Karier: I like how you started and ended the talk, and everything in between. But we all have a shared interest in Bonneville as the engine of economic development. Historically, that's what it's been. Our hope is it will be that in the future. It's a great source of low-cost, carbon-free power that is going to be essential in the long-term future of the West. Obviously, it has these capabilities for ramping up ramping down to balance large amounts of renewables. Essentially, it's a big battery. It stores power that's generated by wind or solar and bring it out later during peak. It has phenomenal capabilities that we don't get paid for. So, we have an economic problem now in those secondary markets. I think your first contract with PGE is a great milestone. The future should be more of those, more recognition of those values to the Northwest and in California if we need to. At some point, the West has to recognize that. We need to speed that up and I appreciate your efforts in trying to do that.

Thank you for your support on that. There are a lot of folks to make that happen. It's the right kind of partnership.

Member Anders: Thank you for coming, Elliot, it's always a pleasure to hear from you and your latest ideas. You talked a lot about costs and financial strategies to keep costs down, to keep Bonneville competitive. These are the things that matter to the utilities I speak to, of course. But I'd like to go back to opening, which was that holistic mission that is identified through the Northwest Power Act, and that is the engine of economic prosperity and environmental sustainability. Tom's question touched on this as well. Is there benefit in getting the region to not only focus on cost strategies, but on the values system that is important to all of us, not just on the power side, but on the fish and wildlife side as well? Are you looking at that and how do we as a region get that message across so that people do recognize that dual value?

Mainzer: Our actions speak to our commitment there. You could have folks in this situation talking about radically gutting fish and wildlife investments. I think they're valuable. I think that we have an obligation legally and morally to continue to work to support fish and wildlife restoration in this region, and to work with the tribes. We have huge treaty and trust responsibilities in that area. If you look at the kind of money we're spending, and intending to support for a long time, it's a lot of dollars. We're committed to continuing the

partnerships. But we think of it as a biologic investment portfolio. We're trying to maximize that value while working within some constraints.

So, if we're going to take on new spring operations, if that's going to be the new priority, then what can come off the list? What's of less value? Or what can we no longer afford? I think we are trying to use a value approach, and to look at it from a value maximization side. We see the fish and wildlife program as being central, when we're talking about environmental sustainability. That discipline and willingness to have that hard conversation about competitiveness and new constraints is where we have to go. This spring and summer, we're going to start having that dialogue as we start operations and take on new spill requirements. Our team and many in your states are beginning to take on this process of how to rebalance the portfolio, and how to get the biggest value out of it while working within some constraints. I think it's there. If you have ideas on how to elevate that conversation more prominently, to make sure everyone's engaged in it and willing to dig in, I'm wide open to suggestions.

Member Yost: I appreciate your advice today. It's extremely disappointing news you bring for those who, for decades, have considered BPA an open checkbook, and a bank to go withdraw from for every little request they had. Now, you're telling us the golden goose will no longer lay all the eggs they wanted — just a certain number a day. That's disappointing for those who wanted that handout. It's prudent that maybe we take better care of the goose.

2. Presentation by Chelan Public Utility District and Washington Department on Fish and Wildlife Upper Columbia Spring Chinook migration and passage

Tony Grover, Fish and Wildlife division director, introduced Lance Keller, Chelan County PUD, and Andrew Murdoch, Washington Department of Fish and Wildlife. Alene Underwood, Chelan County PUD fish and wildlife program manager, joined by phone. This presentation is to explain some issues raised in the ISAB review about spring Chinook in the Upper Columbia River.

Keller said that during the ISAB presentation to the Council, they made some correlations between juvenile spring Chinook emergence and spill at Rock Island. There was some inadvertent misinformation produced there. They came to present some site-specific data for Rock Island, because they have done some great things for spring Chinook in the Upper Columbia River.

There are two mainstem dams on the Columbia River: Rocky Reach and Rock Island. There is no juvenile fish bypass at Rock Island, so spill is a way to meet passage. There is a collaborative approach to ESA protection:

- 50-year agreement (signed 2002, approved 2004);

- A no-surprises clause;
- A unanimous decision-making body; and
- An adaptive approach and using the best available science to achieving no-net impact for salmon and steelhead.

Keller said they use a three-pronged approach to reaching no-net impact:

1. 91% combined adult/juvenile survival and 93% juvenile survival
2. 7% hatchery production
3. 2% tributary projects

Murdoch compiled a lot of the data for the ISAB review. He discussed an “infamous slide” that compared spring and summer Chinook migration. It shows that summer Chinook are doing well, while spring Chinook aren’t doing as well as they’d like. Murdoch said they started looking at cumulative migration time. They had not thought about comparing the two Chinook before. Looking at migration timing, there was a large discrepancy. They knew this because spring Chinook migrate out as yearlings and summer Chinook migrate out as sub-yearlings.

For the review, they look at them at a cumulative rate, but the migration of spring Chinook was a lot earlier than they understood before. The confusion began when the slide was misinterpreted as fish moving past the Rock Island Dam. It’s supposed to represent fish moving from the Wenatchee River into the Columbia River. The new slide removes reference to spill and adds titles and labels so they’re not misinterpreted in the future.

Murdoch said this information is still new to them. The fish are leaving early but we don’t know what effect it has, he said. It’s an area of uncertainty we’ll be looking at. The slide wasn’t supposed to represent fish moving through the hydrosystem.

Member Norman said, I may have started that dialogue. Your measurement is migrating outside the Wenatchee. Are these PIT tag fish or how is that measured?

Murdoch said they monitor them on a daily time step. They are able to estimate daily the number of smolts migrating past the smolt trap. The Wenatchee and Entiat smolt traps are very near the mouth of the rivers. It could be a matter of hours to a day for fish moving past the trap into the Columbia River. The point where they end up in the Columbia to further downstream is the area of uncertainty they want to focus on.

Member Norman said, so we’re uncertain if they’re spending time in the reservoir versus moving downstream.

Murdoch said that’s what we’re looking at. There’s lots of distance (15 miles) between the Wenatchee and Rock Island Dam. Generally, we see the fish at McNary Dam much later.

Member Booth asked, “You talk about the spring fish being yearlings and the summer being sub-yearling. Does that mean the summer’s over winter?” They head out a few months from each other, Murdoch replied. The summer fish are going out as fry into the Columbia in the middle of the summer, whereas the yearling fish are going out as yearling smolts.

Member Karier said he remembers this from the slide show. “I thought the idea was not just the different timing, but the spill hits the summer Chinook run more, so the spring Chinook doesn’t benefit as much from it. But you’re saying that just gets them into the river and they may be slow enough so they may hit more of that spill because there’s lower migrating to those dams. Is that part of what you’re saying?”

We’re still trying to figure that out, Murdoch said.

Member Karier added that it is possible that spill is not helping those spring migrants as much, and that might be a factor.

Murdoch answered that might be. The river conditions, when these two races enter the river, is much different. April versus May. What that means we don’t know. We’re working with PUDs to figure that out.

Keller said the misunderstanding is the data about the fish entering the Columbia got translated into the fish arriving at Rock Island Dam. We should have some data to show specific passage for spring Chinook at Rock Island Dam that should give some confidence that the fish are passing that dam, even in turbine routes, at very high survival. Murdoch presented a clarification slide, Keller said.

Keller discussed spring Chinook survival studies at Rock Island. They met all the survival standards for all three, migrating species. They had the option to reduce spill but they need three years of testing for each species. They determined they could reduce their spill to 10% of the average daily river flow. They met their last survival standard for that in 2010. They tested from 2007 to 2010.

Keller described the various testing methods used. He showed a map of the Rock Island operation and described the method for spill.

The three-year Rock Island project survival average is 93.75%. The combined adult/juvenile survival is 93.65%.

Keller discussed a graph showing a 10-year project survival achievement. The standard for survival average was achieved at both Rocky Reach and Rock Island for sockeye, spring Chinook and steelhead.

Member Norman said, I noted that the first detections were early April. But then contrast with 59% moving into the reservoir, is the monitoring occurring in March? Keller said it isn’t.

There's a clause in the ACPs that every 10 years, they can operate the facility outside the timeframe. We did that in 2014, but the Coordinating Committee was confident with the data we had on spring Chinook, that they chose not to run it prior to April 1. But they did that year run on the backside, past August 31 to ensure they were providing that 95% protection for summer Chinook.

Member Norman said, "I do note that there wasn't much of an increase from April 1 further into April. Andrew, you said there's rearing habitat in the reservoir."

Murdoch replied there is 15 miles of habitat between the Wenatchee and the Columbia. The fish are using the Columbia River for something before migrating downstream. This is all new data and there isn't anyone out there doing work in March except on the smolt traps, so we're trying to figure out what this all means.

Member Yost thanked the panel for coming to clarify the information and invited them to return.

3. Presentation on Snohomish County Public Utility District Integrated Resource Plan (IRP)

Elizabeth Osborne, Washington staff, introduced Anna Berg, Snohomish County PUD senior manager of power supply, and Garrison Marr, senior utility analyst.

Snohomish's IRP was completed in 2017. The PUD is located north of Seattle and has 360,000 customers. Over 80% of its power is from BPA.

Unlike some other utilities, it has load growth before conservation, Berg said. Referring to its load history, the PUD has bounced up after recessions, but it's seeing a decline in load after the great recession. Snohomish is the home of BOEING, the U.S. Naval Station, the Port of Everett and a lot of new multifamily construction. But there's still a reduction in load.

In addition to power from BPA, Snohomish contracts for 217 MW wind, and it owns 130 MW of nameplate capacity hydro. It has some biomass and biogas, and there is 11 MW of rooftop solar from its customers. Snohomish is proudly 98% carbon free, in part due to BPA.

Berg said that conservation achievements is their resource of choice. Since 2010, they have acquired 70 aMW. That is deferring our need for a future resource in "a mighty way," she said.

The guiding principles for their IRP include:

- Pursue all cost-effective conservation. They've been doing this since 1980.
- For load growth not met by conservation, they consider resource options that provide the optimum balance of environmental and economic elements.

- Comply with board policies and all applicable policies, regulations and state laws.
- Preserve PUD flexibility.

In considering future needs, Snohomish studied five scenarios:

1. Business as usual case with no carbon
2. Business as usual case with California carbon
3. Climate change
4. Low growth
5. High growth

The carbon costs range from low to high. They also tested sensitivities such as the impact of Snake River Dam removal and only using renewables. The timeframe tested was 2018–2037.

Berg discussed the different scenario assumptions and the range of impacts. They also evaluated electric vehicle adoption rates and indoor agriculture (cannabis) growth and distribution. She also reviewed possible market price impacts under each scenario.

Marr discussed the utility's planning standards that helped them establish resource need. Snohomish used to be a single-peaking utility with a winter peak. With the climate change scenario across the 20-year time period, that's started to change. It moves from a single capacity planning standard, to a probabilistic model they developed in-house. They developed monthly planning standards, similar to the 5% loss of load probability the Council uses. They also established a peak week measurement, which better reflects their hydro dominant supply. They found that the climate change scenario was relevant when they began to have a binding August constraint.

December is when Snohomish has had its peak load hour in 19 of the last 23 years. But in the climate change scenario, they're seeing more precipitation as rain rather than snowpack. That shows up as more resource production in their portfolio. When they consider their loads, they could be over-planning for a future under the business-as-usual scenario, he said.

They used an integrated portfolio approach to look at conservation potential, which can help them meet their capacity needs. They also analyzed demand response potential and found that these are the most cost-effective ways to meet December's peak needs. But in some areas, demand response isn't sufficient to meet those needs.

Berg reviewed their supply side options. What's different in our IRP is we didn't consider repowering wind projects, she said. They can produce more energy, cost differently and we didn't have the information to evaluate that. Instead, they looked at new wind. They didn't assume the Production Tax Credit would continue past 2020.

Berg told the Council that Snohomish's IRP includes further exploration of demand response and other low-cost, low-emissions alternatives for dispatchable, capacity resources.

Their short-term energy product is a seasonal product they could procure in the marketplace. "I heard Elliot's conversation," Berg said. "Perhaps there's a five-year capacity contract he might be willing to offer up to Snohomish to serve some winter needs. That would be a low-emissions capacity product for a five-year term."

It's intended to be a bridge to where conservation and demand response could address their near-term capacity need. As conservation builds, they're seeing the need for long-term capacity resources pushed out into the late 2020s.

On an annual energy basis through 2037, in every scenario, Snohomish doesn't have an energy need except in the high-growth case. That's based on average water. When there's a low-water year, they would have an energy need. but on a planning basis, they don't have an annual energy need, which changes the resources they look at. If there's a change in federal hydro operations that affect the BPA contract it purchases, that would make this analysis look different. But post 2028, the assumption is that BPA will be there.

Looking at the summary results, Marr said the headline is that conservation is the star of the show. In every single case, conservation is the single-largest resource addition for the portfolio. It's deferring our utility's need to make a near-term decision on a "steel in the ground" asset. In 60% of the scenarios, there's a modest, short-term capacity need, met by a contract for the market.

"We're also seeing, based on carbon policy and various load-growth trajectories, after conservation, there is a left-over capacity need that needs to serve a winter and summertime period. Conservation is serving to defer those decisions, sometimes five years out, and in most cases 10 years out or more."

"We're also acquiring so much conservation that our need for other resources is nonexistent," he said. Marr added that the utility will purchase RECs to meet the state's renewable goals. Looking to the future, a big mover for Snohomish is what carbon policies will look like. Marr went into detail about possible carbon futures.

Berg read Snohomish's proposed action plan outline:

Resource Strategies

1. Pursue all cost-effective conservation and further explore peak benefits.
 - a. Explore feasibility of demand response as a utility-scale capacity resource for the PUD.
2. Explore low cost, low-emissions alternatives for dispatchable capacity resources.
 - a. Continue evaluating battery and pumped hydro storage.

- b. Explore opportunities for addressing capacity as part of BPA post-2028 product discussions.
3. Ensure that customer-owned and distributed renewable strategies complement the portfolio strategy.
4. Develop a renewables compliance strategy that results in a least-cost EIA compliance approach.
 - a. Monitor alternate compliance options, actively participate in rulemaking.

Non-Resource Strategies

1. Expand short- and long-term resource portfolio modeling capabilities to assess cost and risk tradeoffs.
2. Conduct an internal survey about the IRP to determine how the reference document is used; validate key findings and incorporate into District's current process.
3. Continue to participate in regional forums and assess impacts associated with climate change, emissions, and regional power, capacity and transmission planning efforts.

Snohomish presents its IRP to its board on March 27. Its IRP goes to action agencies for review, there will be another public meeting with the board on April 27, with possible adoption in May.

Member Booth asked what increased temperature assumption is being used in the modeling for the 19 years looking forward?

Marr said it's based on the United Nations Intergovernmental Panel on Climate Change Assessment — a 4.5 representative concentration pathway. It's a total climate change of three degrees from 1970 to 2040. One degree has already occurred.

Member Booth observed that they are still under obligation to acquire more renewables. (Yes, answered Berg). "Wind is intermittent," Member Booth said. "If you were to value the resources out there and will have to regulate wind, you'll need more firm power in the future. You're not going to build anything. Wouldn't you value that firm power based on offset for not having to build a facility to regulate your wind? If you could get a firm commitment to fill those peaks, from Bonneville (assuming they have to meet their requirements to the public's first), wouldn't you be willing to pay a couple of times the going rate? A number that offsets your next, least-cost option, such as building a facility — a gas plant. Wouldn't your board be willing to take a look at that and want to contract for "X" out there into the future?"

Berg replied, "You might be a kindred spirit, I'm not sure. Number two on the action plan says to explore additional low-cost, low-emissions alternatives. I think there's a wide variety of those in the region without constructing. In the next two years, that's what we'll be looking at. To the extent it's mutually beneficial and can be done, it makes sense."

Member Both said, "The key is the value."

“We did the analysis and we know what the value is,” Berg said. “We know the cost of building a new, single-cycle turbine. We know in a carbon world what that comes with. We have some of those data points and that will help inform that conversation.”

Member Yost asked, “You’re looking at acquiring RECs instead of purchasing additional wind or solar?” “Yes,” Berg answered.

“Thank you,” Member Yost said. “It’s nice to hear what other utilities are doing in the region. It’s unique because you don’t report to public utility commissions, you report to boards.

Member Yost announced that the Executive Committee and Public Affairs Committee would meet following the meeting.

Chair Yost recessed the meeting at 4:07 p.m.

Wednesday, March 13, 2018

Chair Yost brought the meeting to order at 9:03 a.m.

4. Discussion of Fish and Wildlife Program Amendment issues and process

Tony Grover said the ISAB requested another couple of weeks to finish their report on the 2014 Fish and Wildlife program. This puts the request for recommendations to amend the program no earlier than May. The plan is to take a draft letter to committee in April for a response and give them a month to think about it. Then in the main meeting packet, it will have the committee’s input for Council consideration.

Also, there will be a four- to six-month period to prepare recommendations.

Patty O’Toole, program implementation manager, briefed the Council on the status of the program and the basin as they head into the next amendment process. The last program was amended in 2014. The Act requires that the Council asks for recommendations ahead of the new Power Plan.

In April, we’ll see a presentation from the ISAB review of 2014 program, O’Toole said. On February 12, the Regional Coordination Forum met. We had a conversation with them about upcoming amendment process and the 2014 program.

We request recommendations by formal letter to our most immediate cooperators and to an email list of 3,000 to 4,000. It attracts quite a bit of attention. Included are instructions on the amendment process and how they can send recommendations to us. We also might include

information about current events and key issues. It's a way to start some dialogue. We're working with the committee on a draft letter.

Today, we're talking about the state of the program and recent developments. It's about 35-36 years of the program's implementation. We have quantitative assessments of the losses of anadromous fish and wildlife attributable to the development and operation of hydropower in the basin. We have goals and objectives tied to those loss assessments. We have a significant amount of program planning that has occurred over several decades. It has a developed framework and scientific principles and have helped identify the appropriate strategies and actions to achieve our broader goals. We have implemented mitigation actions on the order of hundreds of millions of dollars a year. We've accomplished many things.

How much have we really accomplished? One area is the implementation of our wildlife mitigation strategy. It's a good time to assess the progress we've made. We've been working with wildlife managers in the basin and have shared an assessment with them. A technical assessment of losses and gains through the projects. That's something that might be right for this next amendment process to document to show how far we've come.

Finally, we've seen some improvement in abundance of some anadromous species, but overall numbers are below program goals. It is a good time to pause and think about our progress. Our overall abundance goal was five million fish by 2025.

We've been thinking about developments in the basin and working our way through the list. One is court-ordered spill, court decisions for the BiOp and what that's meant for habitat restoration, and how we think about and monitor the benefits associated with that. Council staff have been working with NOAA and Bonneville to develop a collaborative framework around that.

A new biological opinion is under development, accompanied by a new NEPA assessment, which is pretty broad and looks at mitigation actions similar to what our program does. We think it will be an important piece to track. The ISAB report on density dependence was issued a number of years ago around the number of natural fish, hatchery fish and capacity. We'll hear more about that in the recommendations.

The Columbia Basin Task Force, organized under NOAA, will be making recommendations to NOAA on common goals and objectives for salmon and steelhead. That's related to what we do in Fish and Wildlife Program. Tony Grover has been tracking that.

Finally, the 2018-2023 Strategic Plan for Bonneville seeks to prioritize fish and wildlife investments based on biological effectiveness and managing program costs at or below inflation.

This month, the committee broke down the steps of the amendment process. General Counsel John Shurts talked about requirements of the act and the administrative record. He will talk to the full Council about those items.

Member Norman said it might be useful for those who didn't attend meeting, to go through the schedule if we launched this in May.

It's hard to talk definitively about the schedule, O'Toole said. Some elements of the program are regimented once certain things happen. Once the Council calls for recommendations, we have to allow 90 days, but we might want to allow 120. Some requirements in the act say we have a year from the close of the period to when we implement a new program.

An example schedule might be:

Recommendations: May–September 2018

Comments: September–November 2018

Draft program: March 2019

Adopt amendments: September 2019

Adopt findings: November 2019

Everything hinges on when we close that recommendation period, O'Toole said. Then can develop a firm schedule. Something to be aware of, as you get into certain steps and phases, sometimes there's a need for longer work sessions and meetings. We'll know more in a couple of months.

Grover said, "I want to give you a sense of what you're looking at. Half of the members have been through this. How many recommendations will we get? (he indicated about a foot-high stack of papers). Then we put out a draft and get comments on the draft. It will be a lot of material to work through. Another burden is after we put out a draft document, we'll have hearings. A court reporter will attend. There will be consultations with tribal councils." He urged Council members not to just attend meetings in their own state, but to come to some adjacent meetings. It is a regional program.

Member Richard Devlin asked, "It's kind of an obvious question – BPA should be following the current Fish and Wildlife Program. It won't be replaced for two years. BPA is talking about a much faster process to talk about how the program might be modified. How can we react simultaneously with this?"

Grover said that in the history of this program, BPA doesn't work in a vacuum. It works with NOAA and other action agencies. In the new BiOp, BPA will pay attention to the existing program, and won't rewrite it in the BiOp. They won't set aside parts of the program because they can't. We may have an enhanced dialogue. We reached out to NOAA yesterday so there's no drift apart in thinking. We'll get a recommendation from BPA as well.

Bryan Mercier, BPA, said they will be consistent with the existing program until a new program is developed. “But the sequence and pace will be affected with some of the decisions we’re making,” he said. “As we decide over the next year with the new program, we’ll work to make sure it’s integrated. We try to meet our ESA and Power Act obligations consistently, and not try to have two separate mandates.”

O’Toole said she spoke with the Council about this last October. “This is an amendment process. We have a fully developed Fish and Wildlife Program. We’re not getting a sense that this is flawed in its framework or principles. The last couple of iterations of the program haven’t changed the core of it. We’ve improved its organization, added some detail and expanded some of the implementation detail. This might be a time when the core of the program doesn’t change again but focuses on an implementation plan. It could be a supplement identifying the key issues of the day. We don’t presuppose what might come in the door and we will respond to what we get. But we recognize it’s been a pretty steady program over time. It’s been important in BPA’s Strategic Plan to think about prioritization. Managers are thinking about priorities as well.”

Member Karier said that one of the processes is the collaborative process. “My understanding of that is to come up with quantitative biological goals for salmon and steelhead. That’s something’s that is called out in the Power Act and we’re supposed to do that. It’s supposed to be in the plan. It’s an issue that’s supposed to be put in and we’ve turned to the collaborative to do that. I was thinking about the timing of it. If recommendations are closing in September, it seems to me that we should have those recommended goals before we ask for recommendations, so people can add to it or replace it. If we close the recommendations before those even come in, it seems like it’s a false start — maybe one of the key elements of the program.”

Grover said that the Columbia Basin Partnership is due to submit its report to MAFAC about a year from now, a year from this last January. The last meeting of the partnership is the first couple of days this October. “Those of us who sit in the partnership are well aware that if we’re not all locked down by August or mid-September (at the latest) on what the agreement is between participants on what those objectives are, the process will have failed,” he said. “We need to see those numbers by no later than the middle of September. It’s highly unlikely at the very last meeting that they’ll be changing numbers around. It would be more wrapping words around those numbers. That’s the plan right now, and I’m pretty sure NOAA’s planning to stick to that plan.”

Member Karier said, “That doesn’t answer the question. It confirms the premise of the question that those recommendations are coming in after the deadline for our recommendations. Maybe it’s not a question; maybe it’s a comment. That seems like a deficiency in somebody’s planning.”

Grover said these are completely separate processes in the sense that NOAA's trying to achieve its own goals here with our support.

Member Norman said, "I'm supposed to clear this up. If the partnership did come to consensus on population objectives that were useful to this program, we'd have the latitude to extend this comment period."

Member Baker said the Fish and Wildlife Committee could have our General Counsel come in and give a presentation or walkthrough of the legal framework for this process. Looking at the schedule, I'm suggesting that with four new members, myself included, it would be helpful to see some of that discussion with the Council take place prior to May, he said.

Member Yost said they have discussed that. Steve Crow and John Shurts are working on a presentation for the full Council on Fish and Wildlife and the Power Plan. We will see that on the agenda soon.

5. Council decision on Project Review: Pacific Lamprey Conservation Initiative Columbia River Basin Projects

Mark Fritsch, project implementation manager, said there's a decision before the Council that has been reviewed by the Fish and Wildlife Committee. He introduced Christina Wang, U.S. Fish and Wildlife Service; Siena Lopez-Johnston, Bonneville Power Administration; and Steve Johnston, Pacific States Marine Fisheries Commission.

Fritsch said the project has a long history, since 1994, and the species also has an important cultural significance to Native American tribes.

Wang said the Pacific Lamprey Conservation Initiative has come a long way in the past five to seven years. She also will talk about the projects they are proposing for the pilot year of the cost-savings program. The intent is to address the critical emerging priority and support the efforts of the Pacific Lamprey Conservation agreement as outlined in the 2014 Fish and Wildlife Program.

The conservation initiative started in 2007 after concerns by the tribes. She said they now have specific regional plans that identify needs. Wang talked about the initiative partners, described the committee structure, and discussed regional implementation plans and criteria for how priority projects are chosen. She said they have an adaptive management framework. The regional implementation plans are available online at <https://www.fws.gov/pacificlamprey/PlansMainpage.cfm>.

The ISRP provided a review of the plans on November 28, 2017, and found that they met scientific review criteria.

The projects are:

- Adult Passage Improvement in Lower Yakima – \$40,000
- Translocating Adult Lamprey Past Mainstem Dams to Snake Basin – \$30,000
- Lower South Fork McKenzie River Floodplain Enhancement Project – \$150,000

Fiscal year 2018 proposed project costs, with distribution through PSMFC, total \$248,204.

Fritsch said the proposed funding is coming from savings from projects that have closed out or which have reduced their scope. He said many Members have been involved over several years and it is supported by the 2014 program. The lamprey program is embedded in the program as a conservation agreement. We also had a synthesis request as part of our RM&E categorical review, he said. That was delivered last year and went through ISRP review. In that review, the treaty tribes built on what that conservation agreement accomplished since 2012. It's truly a collaborative effort for the basin. To demonstrate a benefit at the end of this pilot year, we'll do a review to make sure everything was accomplished as stated. Funding for the out years will be dependent upon further Council recommendation.

Member Karier asked if the vote would be to recommend to BPA that they fund it. It's not a decision, but a recommendation, and BPA supports it?

Yes, Grover replied.

"My preference is to abstain from the vote," Member Karier said. "I support these programs, I think they're good projects, but I feel strongly by the way BPA contracts with projects in general — not just this one, but all projects. I would like Bonneville to focus on performance metrics when it does these contracts. This has to do with how they've done this historically. They've often merged monitoring, research and on-the-ground projects under one contract. It's hard to sort out what we're spending for monitoring and what we're supposed to get from it. Turns out, it's hard for some of the sponsors as well. They're not sure what Bonneville expects from the project. I've heard lots of complaints from project managers. I think all of these things need to be spelled out in the contracts. My plan is to write a letter personally to support this as well, along with the Council, but specifying that Bonneville needs to develop performance metrics that go into this that both identify what is expected of the work and what is not expected. Are they expected to monitor and determine if this is scientifically performing and measuring the amount of lamprey, or is this not a responsibility of the contract, or is it? If Bonneville were to start — at some point, they need to start doing this on every project as they renew them. So that's my plan. I would plan to abstain on the vote, but not because I don't support this particular project."

Member Ferrioli said the ISRP has reviewed this project and finds that it is appropriate and has merit. "I have expectations that there won't be additional concerns or considerations developed during the implementation of this project that may result from monitoring, or

course corrections as we move forward. I'm also sensitive to the idea that people develop a concern and that has the potential effect of delaying or derailing a project that we clearly recognize is a high-priority project. This is also a startup. It's not a quick process. If we started in 2014 with concerns, and we know it's a culturally sensitive issue, I think there's every reason to move forward quickly — as quickly as a glacial process ... as someone said, with all the speed of a manatee. I know this is an important project and what I hope we do is move forward relatively quickly, within our capabilities. I'm very gratified that this is paid for with savings from other projects. It seems like a great reprioritization of assets. But I'm worried about somebody developing an additional set of concerns as this project is being implemented."

Northwest Power and Conservation Council Motion to Support Proposal #2017-005-00, Pacific Lamprey Conservation Initiative Columbia River Basin Projects for Implementation

Member Anders moved that the Council recommend Bonneville implement Project proposal #2017-005, Pacific Lamprey Conservation Initiative Columbia River Basin Projects, conditioned as follows:

1. Funding at a level not to exceed \$248,204 for Fiscal Year 2018;
2. The project demonstrates benefit and value added through a performance review associated with the end of this first-year contract in November 2018; and
3. Further implementation in Fiscal Year 2019 will be based on the performance review and availability of funds as presented by staff and recommended by the Fish and Wildlife Committee.

Member Norman second.

The Members voted in favor with Member Karier abstaining.

6. Update on use of story maps for fish and wildlife information:

Nancy Leonard, fish, wildlife and ecosystem monitoring and evaluation manager, and Mark Fritsch briefed the Council on the completed story maps on fish and wildlife, as well as the maps they plan to have completed by the end of this year.

Leonard said they're using the map is because the tool allows them to use dense information and present it in a more user-friendly manner. It helps engage the public to want to learn more about what the Council does. It's a great improvement to their humongous database and advances their public engagement strategy.

Fritsch said this effort advances three areas of the 2014 program work plan:

1. program assets operation and maintenance (O & M);
2. compiling existing fish objectives; and
3. conveying program mitigation efforts.

The maps are a simple way to show where our investments have been in the past, and where hatcheries and screens are.

Leonard said they implemented the story maps in steps with plenty of check-ins. They're very aware of budget situation in the region and used Council staff time and internal funding as much as possible. There were small contracts for each phase.

Fritsch said this tool was used to develop an inventory for 1100 fish screens, 14 hatcheries (49 sites) and for wildlife lands. They used it to capture past decisions, host key documents and provide context information. It's a great starting point for people to learn a little more about what we do, he said.

Fritsch then reviewed the mapping website. It has three main sections: artificial production programs O&M, fish screens O&M and lands (coming later this year).

Member Booth said these maps were put together by the O&M Subcommittee. Certainly, on the hatchery side, they're very valuable with so much detail with the type of fish and other data. "When we started out, we didn't know how many screens there were and where they were," he said. "It took a couple of years and a lot of state-by-state work to identify all 1,154 screens. We had GPS coordinates that were off-kilter sometimes. In many cases, we didn't know who the responsible party was for taking care of that screen. So, this work has been valuable in advancing what we're putting together for the Asset Management Strategic Plan. Bonneville's intent is to go through and look at these screens and decide who initially funded them, who took responsibility for management, who's managing them now, who do they benefit, and what should be the ratepayers' role in continuing to take care of and fund those screens. And then ultimately, do an MOA with each of the sovereign entities that would then put the screens, for instance, in the hands of the State of Idaho. So, it would identify which screens Idaho would be responsible for (it goes for all states), and how the funding and maintenance over time would be handled. And where irrigation districts are mainly benefitting from these screens, there might be some opportunities for Bonneville to go in and negotiate with those entities as far as future care and maintenance. So, we've come a long way ... it's taken a lot of time. This was the number-one priority in the 2014 program, and here we are in 2018. It took a couple of years to get here, but now the next phase is this negotiation between Bonneville and the project managers. We're getting that through Idaho, and then it will move on to the rest of the sovereigns."

Member Karier said he agrees with Member Booth. "This is quite a bit of important work. Up until that assessment, we really didn't know where all the screens were, how many there were and what they were doing. This is a great thing to pull together. That leads to my question that now that we know where all the screens are and what they're doing, have we ever done an assessment about how much improvement and benefits they provide in saving fish? This is offsite mitigation and not a source of mortality from the dams. It's from irrigation and Bonneville should be getting credit for the fish it is saving by not putting them

in irrigation canals and irrigation pipes. I'm just wondering if there's ever been an assessment like that and, if not, maybe we should think about it."

Fritsch said there has not been an assessment. A couple of these principal projects have been ongoing since 1984. They are still core. There are preventing fish from entering the pipes and the ditches, so I think your point is spot-on.

Member Booth asked, "What would it take? Is the data out there? I like the idea a lot of coming up with some type of metric that shows the effectiveness and value of these screens."

Fritsch said that each entity and sovereign does it differently. "Some just have a screen tender. Some enumerate, some don't. They just maintain them. We might be able to get some information and build something, but it would take a lot of work."

Ferrioli commented, "I agree that the benefit needs to be quantified and connected with the actors. Aren't some of these screens mandated by water agreements with private operators? If you want to continue to irrigate, you're under an obligation to screen your improvement. Sometimes that's at the landowners' expense. There's this assumption that this is all BPA funded, or voluntary or programmatic to the recovery efforts by agencies. Some is mandated by state and federal law, some is paid by private landowners — not just the installation, but the operations and maintenance. If we're going to quantify the benefits, we can't put it all the column of BPA or Northwest Public Power or any particular entity. There's a lot of active players in this. There's a lot of offloaded expenses to the private sector."

Member Booth said, "You're right. That's some of the things we're still sorting out. A lot of these screens — I think all of them — were constructed using BPA funds. I'm not going to say all, I can't guarantee that. Let's take a rancher with an irrigation ditch and it entraps fish. In return for granting an easement on his property to install the screen, many screens in Idaho fall into this category. There has to be a gate, Fish and Game employees or others are entering his property. He's granting an easement for access to allow that thing to be installed. We want that, because that saves a lot of fish, but he has an obligation under the law to check in the spring and make sure the sticks aren't mucking up the works, and that it's working. But there's an implicit understanding that there will be access to the screen, but the owner doesn't have time to pull sticks and weeds out every day. There's still a lot of things that need to be sorted out, but you're right on with your comment."

This is a good conversation and we should pursue it, Member Ferrioli said. "I just wanted to point out that a lot of the voluntary activities are driven by the threat of a take violation. Some of the dynamic between the land owner and the agency is either you do this or we'll prosecute you under an unauthorized take under the Endangered Species Act. It changes the equation from a voluntary effort by a cooperative landowner to 'either you do this or we will put you in jail eventually, or lien your property, cancel water rights, or your permit with

withdraw. So, there's a lot more to the relationship than 'let's do this because it's the right thing to do.' I don't want to call it coercive, but there's an element and we should be aware of that. So, when we credit people or agencies for doing the right thing, or quantify the benefits, we should give credit where credit is due. But we should fully understand the relationship between the landowner and the agency. In some cases, it wasn't always cooperative. It needed to get done. And it is getting done, but we need to understand there's a more complex dynamic there."

Member Karier said he wants to clarify that BPA does spend millions of dollars developing these projects identified here. "If we looked at private landowner investments, it would be a lot more dots on the map," he said. "I'm only interested in Bonneville's expenditures and development of those screens, which Bonneville was not mandated to do but did it voluntarily as an offsite mitigation as part of the Power Act. It didn't directly mitigate for the dams, it didn't reduce fish mortality at the dams, but it did help save fish in the region significantly. That benefit gets lost. In some of the court cases it gets lost. Bonneville has done a lot here. Every irrigation diversion that takes 10% of the stream flow might save 10% of the smolts swimming downstream. It could be that significant. I'd like to see Bonneville get credit for that. If there's any way to measure it, we should do that, maybe have our scientists take a look at it. The other issue of landowners doing this under a mandate or on their own dime is another story and not part of what we would look at. Also, I think Bonneville has to be careful that they aren't funding something that is legally mandated for someone else to do. I think they're not allowed to fund those projects that are in lieu, so I think most of these projects wouldn't run up against that. But that would be a legal issue of in lieu that Bonneville has pointed out and we're all aware of, I think."

Grover said he wanted to validate Member Ferrioli's comment. They heard from the Fish and Wildlife Service and, last time he talked with the federal caucus that this is just a small percentage of screens in the Columbia Basin, and the challenge here is that there's often mixed funding in many of these. There's in-kind participation and cash dollars spent by farmers, ranchers and irrigation districts, in collaboration with a state or federal agency. "So as Member Booth said, it's going to take some time to sort out who owns what," Grover said.

Member Ferrioli said, "The benefit we don't want to overlook is this: I don't get credit for jaywalking. If I follow the law, I don't get credit for that. BPA is mandated by law to fund these projects as part of mitigation. But the BPA participation, the support by tribes, the interest of water resource management agencies and state agencies, the early adopters in the private land base, the landowners ... all have the effect of a multiplier. If you look at BPA as a mandate, and the leverage that happens, and all the people who are induced into participation, invited to participate, voluntarily participate, compelled to participate put so many more resources into this equation. That's the story that isn't getting told. We tend to think of agencies mandated as the main drivers. But if you look at the leveraging that has been done in the private sector, it's multitudes more improvements that have happened on that landscape. This is a great first start. We should have every checked dam mapped,

every wood weir, every state and federally funded impediment to fish passage mapped. That would give you a much better effect of the size of the problem and why our habitat efforts aren't more immediately beneficial. There's a lot going on with these landscapes. This is fabulous. It makes me nervous that Mark can look at my property. I don't want people to lose the fact that there's a much richer story to be told. Give credit where it's due and it's not just to a federal agency that's under obligation to the law."

Member Yost asked Leonard if they're doing wildlife lands. The lands portion of the site is in progress, she replied.

Member Ferrioli described an image of his property on the screen, calling it a 377-acre parcel on Rattlesnake Creek. Fish passage would have to be by helicopter. He said they removed the juniper on the property except where they needed shade for a stream. Removing juniper adds water to the watershed, he said.

Leonard discovered that the tool is effective in cataloguing the objectives in the Columbia River Basin. The first time they had 3,000 rows of objectives. They can download code and customize it. You can change it to view it in different ways. You can pick a species and what's going on in that sub-basin. You can select an objective and get more background.

The last tool, which is in development with the Public Affairs staff, is to tell the story of the program through infographics. It appeals to ratepayers and the general public.

What's coming:

Fritsch said that the Lands portion of the site will become live shortly, but they still need polygons for Washington wildlife projects. So those parcels will show up later in the year.

On Artificial Production, they hope to get an extension to the end of the year. They have the 14 hatcheries, but there are other projects they would still like to include. That also will be finalized this year.

On Fish Objectives, they plan to have five resident fish species, Pacific lamprey and eulachon. Depending on internal funding, they hope to finish this section this year.

Program Outreach – this also depends on internal funding. They're hoping to get more input from the committee and finish this one by the end of the year.

Member Yost asked them to come back when the lands section is done.

7. Briefing on Columbia River Basin salmon and steelhead returns for 2017 and run forecasts for 2018

Lynn Palensky introduced Dan Rawding, Washington Department of Fish and Wildlife; and Paul Kline, Idaho Department of Fish and Game, who sported his fish-forecasting tie. Brian Burke, NOAA Northwest Fisheries Science Center, joined by phone. This is our annual three-state and science center look back at 2017 adult returns and forecast of 2018 returns, Palensky said. Burke will provide a look at ocean conditions as well.

Washington presentation: Dan Rawding

Rawding said that as we talk about salmon and steelhead returns, we have to think of it in context of their lifecycle. It's dependent upon their fresh water habitat quality and quantity, migration through the hydrosystem, marine conditions and predation. He said he's presenting information put together by the U.S. v Oregon Technical Advisory Committee. They are managers of fisheries in the Columbia River. He outlined how the TAC works.

Upriver are fish above Bonneville Dam. Lower are below.

Upriver Spring Chinook

2017 Forecast: 160,000

2017 Return: 115,000

2018 Forecast: 166,700

Upper Columbia Spring Chinook

2017 Forecast: 19,300 total / 3,300 wild

2017 Return: 11,166 total / 2,514 wild

2018 Forecast: 20,100 total / 3,400 wild

They had tough returns in the mid 1990s but have bounced up after mitigation measures.

Upper Columbia Summer Chinook

2017 Forecast: 63,100

2017 Return: 68,204

2018 Forecast: 67,300

These forecasts are returns to the mouth of the Columbia River, before fisheries. Before 2000, they had less than 20,000 and they rarely had fisheries on these fish. After 2000, due to changes in ocean productivity, improvements in the hydrosystem and hatchery programs, we had increasing returns of summer Chinook and had fisheries on them. Chief Joseph hatchery has contributed a lot of fish.

Columbia River Sockeye

2017 Forecast: 198,500 total / 1,400 wild

2017 Return: 88,263 / 445 wild

2018 Forecast: 99,000

There are three sockeye stocks: Okanagan, Wenatchee and Snake River. They're in the process of rebuilding. The forecast was for 200,000, but they got less than half. This year, the forecast is for 99,000. In 2015, when we had 500,000 fish, we lost 90% due to warm water before they got to McNary Dam. While returns were good, there are few spawners. The result is fewer returns.

Upriver Summer Steelhead

2017 Forecast: 130,700

2017 Return: 116,841

2018 Forecast: 190,350

This is a forecast of all steelhead to Bonneville Dam between April and October. It's the lowest return on record. We've talked about effects of the blob, especially on steelhead in 2015. We're looking at a better return in 2018, but not quite where we were for a 20-year average.

Wild Winter Steelhead

2017 Forecast: 11,900

2017 Return: 9,448

2018 Forecast: 11,700

Wild winter steelhead never got below Celilo Falls and most are confined to an area below Bonneville Dam. This group of fish has bounced around 10,000. Of the groups of fish, they tend to be most stable.

Total Fall Chinook

2017 Forecast 582,600 / 460,500 upriver

2017 Return: 475,900 / 391,300 upriver

2018 Forecast: 365,600 / 286,600 upriver

This is total fish returning to the mouth of the Columbia River. The upriver fish include the Hanford Reach group, which is the largest naturally spawning population in the Columbia Basin. It includes upriver fall Chinook going to Idaho and those in the Middle Columbia, such as the Deschutes and Yakama. It looks like a slight decline in forecasted returns.

Columbia River Coho returns:

2017 Forecast: 225,805

2017 Return: 235,656

2018 Forecast: 228,758

Most of the Coho return to the lower river. Upper river Coho were declared extinct in the NOAA status reviews in the 1990s. Much of what has occurred have been a reintroduction

program for Coho. When we see runs at Bonneville between 50,000 and 200,000, it's part of that ongoing reintroduction.

Columbia River Chum

Before 2002, they just had peak counts of chum. Since, they have had abundance estimates. They had a record return in 2016 of over 40,000 chum. The forecast for 2018 is about 4,000. They are declining.

Rawding reviewed the total return of salmonids. Chinook is the dominant species in returns. Coho and sockeye varies widely. Steelhead has been more stable, except for the last couple of years. Last year, we had 1.2 million and the forecast is in same neighborhood as last year.

Upriver salmonids are returning to the Columbia River:

2017 Return: 856,000 fish

2018 Forecast: 904,000 fish

Rawding talked about 2017 Fisheries Conservation efforts to protect a run that was in trouble:

- Summer Steelhead return was the lowest in the last 25 years.
- Co-managers worked together to reduce recreational impact to steelhead. There were rolling closures where no steelhead fishing was allowed.
- There was heighten concerned for Snake River B-run that return primarily to the Clearwater and Salmon Drainages in Idaho.
- Columbia (Oregon and Washington) and Snake (Washington).
- Rolling closures in mainstem Columbia August – December to protect B runs.
- Hatchery limit reduced from 2+ in a normal year to 1.
- Washington and Oregon closed tributaries to steelhead angling or limited angling to C&R.
- Snake River C&R until mid-Oct. and 1 hatchery steelhead < 28”.
- No fishing in Upper Columbia.

Rawding talked about 2017 non-Indian sport fisheries. Spring chinook was a large fishery below Bonneville and smaller in other places. The summer fishery goes from June to August. The dominant fish are hatchery Chinook and steelhead. In the Upper Columbia, they have good returns of Chinook and sockeye. The fall season starts August 1.

Looking at 2017 non-Indian commercial fisheries, the fall season is the dominant season.

Idaho presentation: Paul Kline

Kline covered the counts and forecasts at Lower Granite Dam on the Snake River escapement.

Natural origin spring/summer Chinook

2017 forecast: 10,124

2017 actual: 4,108

2018 forecast: 12,655

10-year average: 16,727

We had disappointing returns, Kline said. This year, we're more optimistic.

Hatchery origin spring/summer Chinook

2017 forecast: 49,439

2017 actual: 30,179

2018 forecast: 53,218

10-year average: 60,513

The run didn't come in as expected last year, about half of the 10-year average. We expect to see more fish in 2018.

Looking at the combined hatchery and wild fish, you can see clear patterns. In 2001, 2010 and 2015 there were strong returns. The forecast is up for this coming year.

Natural origin fall Chinook

2017 forecast: 8,135

2017 actual: 6,966

2018 forecast: 6,113

10-year average: 10,489

Returns in 2017 were just under the 10-year average. The forecast is down. This is our fourth year of being down for fall chinook. Rawding showed that trend at the mouth and we're seeing it in the Snake River.

Hatchery fall Chinook

2017 forecast: 19,056

2017 actual: 17,814

2018 forecast: 12,013

10-year average: 28,693

Fall Chinook shows the same pattern: down for four years. It's just under 20,000 this year. We're not optimistic and are forecasting lower than last year's forecast.

Looking at the combined returns for fall Chinook since 1980, we've had some very strong years. Don't misinterpret what I'm saying this year as all gloom and doom. This is a very successful program in the Snake River, and credit goes to the Nez Perce for implementing this program in the mid-1990s. We're just experiencing a downturn and it will reverse itself.

Natural-origin summer steelhead

2017 forecast: 17,325
2017 actual: 10,540
2018 forecast: 24,780
10-year average: 30,452

This was one of the worst years on record for natural-origin summer steelhead. Scientists say we should see 24,000 at Lower Granite Dam. We hope that comes true.

Kline discussed the A run and B run for natural origin summer steelhead. The return is weighted to the A run, with a forecast of 22,400. The B run forecast is 2,380, not a great return but the overall, combined run forecast is up.

Hatchery origin summer steelhead

2017 forecast: 44,200
2017 actual: 59,028
2018 forecast: 71,300
10-year average: 127,682

An optimistic outlook compared to last year.

Looking at the combined totals, the patterns are similar to Chinook. In 2001 and 2011 and 2015, we see three general peaks for steelhead as we did with Chinook in the Snake River. We have optimistic return forecasts.

Natural-origin sockeye

2017 forecast: 86
2017 actual: 14
2018 forecast: 216
10-year average: 212

Hatchery sockeye

2017 forecast: 782
2017 actual: 188
2018 forecast: 162
10-year average: 919

Kline recalled his presentation in Coeur d'Alene where he discussed issues with post-release survival of sockeye from the new Springfield Hatchery, which was built by Bonneville. It's designed to provide a million smolts annually. We're working through these issues.

Looking at the combined totals, they have had a couple of good years, considering the 16 wild fish that returned during the decade of the 1990s, so it has been a successful program. Sockeye has lived on the fringe. It makes the longest trip of any sockeye population in the world, to the highest elevation to spawn and it is the most southerly population of sockeye in the world. We are going to see ups and downs for this population forever.

Impact of recent observations on salmon returns

Brian Burke on the phone.

Burke discussed field sampling to understand the ecosystem and make a forecast. There are three types of surveys:

1. Juvenile Salmon & Ocean Ecosystem Survey (JSOES) – The survey is done three times a year, in May, June and September.
2. Newport line – has occurred for 20 years. Performed biweekly.
3. Micronekton Survey – This is done about 30-meters deep. June 2011, 2013 and present.

Burke discussed sea-surface temperature anomalies. The Blob started in December 2013 and stayed around three or more years. It had a huge impact on biology of the North American coast. Then El Niño, which was warm temperatures along the equator. There are teleconnections allowing warm water at the equator to influence conditions north to Alaska. Both systems were record setting. We experienced La Niña twice, which cooler-than-average temperatures. We won't see impacts of that for another year.

In 2015, fish species in the tropics were able to expand their range further north. Impacts include a dramatic change in jellyfish and there was the largest documentation of algae bloom. In 2016, we saw similar impacts, anchovies were abundant in the Salish Sea. Red pelagic crabs were coming north to Oregon. There were crab and fishery closures. More dramatic was the explosion of the pyrosomes. There were caught in huge numbers and they're still around. Also, there was low Pacific cod abundance.

In our surveys in 2017, there was extremely low salmon abundance, the lowest catch in 20 years of sampling. Jack Chinook will be low and adult Chinook in two years. This is fairly concerning for us. We have a lot of different metrics we measure using a stoplight chart. It shows different indicators of ocean conditions.

Burke talked about using regression analysis to make forecasts. There's still unexplained variability in his forecasts.

Spring Chinook:

Outlook for 2018: 96,000

Outlook for 2019: 109,000

Fall Chinook:

Outlook for 2018: 292,000

Outlook for 2019: 327,000

Coho:

Outlook for 2018: 1.9%

A review of the stoplight chart shows spring and summer chinook life cycle modeling.

Member Booth said it's a striking look at ocean conditions, looking at 2013 ocean conditions and comparing it to the high returns in 2015. That's an extremely striking truth that tends to justify your hypothesis about ocean conditions and the importance on returns.

Burke provided some conclusions for 2018:

- The Blob and El Niño are gone, La Niña is diminishing.
- The ocean ecosystem (biology) changed significantly, and is still changing
- Expected returns in 2018 will be similar to 2017 (well below the 10-year mean for Chinook).

Member Anders said that given the crazy ups and downs on the graphs, you have to start calling this the "stock" market.

Member Norman asked Paul Kline, relative to the summer steelhead forecast, "I know the "B" natural return was the focus of the conservation effort in the basin last year. The forecast for this year is 2,300 or so. How does that compare to last year's B natural return?" "It's lower than what we're forecasting for this year," Kline said. "Even worse, it might in the hundreds. We're trending upward, but still not where we want to be."

Member Booth said it would be interesting to do a report card on how the forecasts have panned out of the years. He asked if they had the data to come back next year and show us how they did. Rawding replied they can do that. He said he'd email Member Booth information. In general, spring Chinook tends to be the most difficult to forecast, half of the time, we're at plus or minus 25%. For the other species, we're within 25% two-thirds of the time. When we miss, often we miss big, by 100%. We'll incorporate this into next year's presentation.

Kline said it's a great suggestion. I have to believe we have that and have done that. A great suggestion.

8. Council Business

Northwest Power and Conservation Council Motion to Approve the Minutes of the February 13-14, 2018, Council Meeting

Member Anders moved that the Council approve for the signature of the Vice-Chair the minutes of the February 13-14, 2018, Council Meeting held in Portland, Oregon.

Member Norman second.

The motion was approved without objection.

Northwest Power and Conservation Council Motion to Support Non-Routine Maintenance for Fish Screens and Hatcheries in Fiscal Year 2019 and Fiscal Year 2020

Approval of Fish and Wildlife Committee recommendations on the use of cost saving funds for FY 2019 and 2020. Fritsch said this a continuation of work in progress as they complete their Asset Management Strategic Plan to address non-routine needs for our screens and hatcheries. In January, based on priorities received from managers and sponsors, a new email was sent out to get ahead of curve, to allocate \$589,386 in FY 2019 and \$497,475 in FY 2020, utilizing their cost-savings efforts from existing projects.

Member Anders moved that the Council recommend that Bonneville implement a set of non-routine maintenance actions for fish screens and hatcheries in Fiscal Year 2019 in an amount not to exceed \$589,386, and in Fiscal Year 2020 in an amount not to exceed \$497,475, as presented by staff and recommended by the Fish and Wildlife Committee.

Member Booth second.

Member Karier said, "This is another \$1 million in fish and wildlife expenditures. Again, on this one, I'm going to abstain. I think these are good projects, good expenditures, and I think the whole process was done well. I feel even stronger about these particular projects that there needs to be performance metrics built into the hatchery and screening work that's done, so we know what success looks like. I plan to write a separate letter with those qualifications for it."

The motion was approved with Member Karier abstaining.

Update on implementation of 2014 Fish and Wildlife Program cost- savings language

Grover shared a report on deliberations by the Fish and Wildlife Committee. They have a cost-savings workgroup with the premise of funding new projects with cost savings. The decision to approve funding for hatcheries and screens, the lamprey work and white sturgeon reflect that work. Grover proposed turning this into a routine staff function as opposed to a standing workgroup. They still want a Council member to lead the process.

Northwest Power and Conservation Council Motion to Approve the Release of the Final Marginal Carbon Emissions Rate Study

Member Anders moved that the Council approve for release the final marginal carbon paper, as presented by staff and recommended by the Power Committee.

Member Baker second.

The motion was approved without objection.

Northwest Power and Conservation Council Motion to Release the White Paper on the Power-System Value of Conserved Irrigation Diversions for Public Comment

Member Anders moved that the Council release the white paper on the power-system value of conserved irrigation diversions for public comment for a period of 30 days, as presented by staff and recommended by the Power Committee.

Member Baker second.

The motion was approved without objection.

Northwest Power and Conservation Council Motion to Authorize the Staff to Execute an Amended Contract with Systematic Solutions, Inc., in an Amount Not-To-Exceed \$50,000

Member Anders moved that the Council authorize the staff to execute an amended contract with Systematic Solutions, Inc. in an amount not to exceed \$50,000, including the payments already made to Systematic Solutions, as presented by staff and recommended by the Power Committee.

Baker second.

The motion was approved without objection.

Northwest Power and Conservation Council Motion to Appoint a Regional Technical Forum Policy Advisory Committee Member to Serve as Co-Chair to the RTF Policy Advisory Committee

Member Anders moved that the Council appoint Cory Scott of PacifiCorp as co-chair of the RTF Policy Advisory Committee as recommended by the RTF PAC and as presented by staff.

Member Karier second.

Charlie Grist thanked Jim West from Snohomish PUD for chairing the RTF.

The motion was approved without objection.

Public Comment

Scott Levy, Bluefish.org, said he has been following the Council around for two years. He handed out papers to Council members. He mentioned ocean events and said that the Snake River Dams will have to be removed because of climate change. He referred to a scientist who he says supports removal of the Snake River Dams. Levy wrote a paper about breaching the dams, and said he has met with a three-star general at the Army Corp of Engineers several times about breaching the dams. He wanted the Council to know about a pending decision on breaching the dams before they start the amendment process. The orcas are starving.

Chair Yost adjourned the meeting at 11:52 a.m.

Approved April _____, 2018

Vice-Chair