

Northwest Power & Conservation Council
RAAC/SAAC
November 3, 2022

John Ollis, NWPCC, began the meeting at 9:30 by asking Chad Madron, NWPCC, to explain how to best interact with Go-to-Webinar.

Ollis then called attendance and reviewed the agenda, noting that there is a lot of information to cover.

Clint Kalich, Avista, appreciated the concerns around ramp rate [Slide 14]. He voiced surprise that upstream flows could be a good resource and wondered how variability might constrain a downstream project. Ollis answered that it depends on your perspective, explaining that flow may not change at the project but downstream at a gauging station or there could be a side flow or biological protections.

Kalich said it sound like Ollis is basing upstream reservoir operations by downstream rates. Ollis said it's not always a downstream requirement, but the model has the functionality to put in a ramp rate. He added that there can be a lag between up and downstream, or limits to upstream capability that force more conservative operations. Kalich agreed with the approach, asking how it affected model speed and performance. Ollis said the constraint added a 25% increase in run time, calling it "not the worst."

Scott Levy, Bluefish, asked about model fidelity around delay times. Ollis answered it measures in hours, adding that river delays are not static. Levy asked where the upstream release is measured. Ollis answered that the model tracks upstream release to the reservoir downstream. Levy asked if this works for each reservoir. Ollis said it is probably okay for large projects, but you should check with individual project owners.

High Leve Metrics
Dor Hirsh Bar Gai, NPWCC

John Fazio, NWPCC, clarified that the orange bars on [Slide 9] have a 10-point distribution while the blue bars have 7000. He explained that end-of-month numbers show storage and allows better comparison with the classic model. Hirsh Bar Gai confirmed.

Joel Nightingale, WA UTC, asked what KSFD on [Slide 10] means. Hirsh Bar Gai explained that it is a unit that of storage it stands for thousand square foot days.

Levy confirmed that the classic GENESYS had a constant sustained peaking number while the redeveloped model shows the sustained peaking [Slide 28]. Fazio said the classic model also produces hourly generation while the redeveloped GENESYS does it on a project-by-project level. He said this slide looks at aggregate hourly generation and Hirsh Bar Gai found the

simulated max over two-, four-, and 10-hour periods to make an apples-to-apples comparison. Levy thanked him for the clarification.

BREAK

Ollis addressed the question of where the redeveloped GENESYS's usable storage is coming from, listing US projects like Boundary, all the Mid-Cs and smaller ones like Diablo/Gorge, Deschutes, and a few more. Ollis said these small storage projects may free up other resources.

Fazio stopped at [Slide 14] to address spill, saying both models have the same bypass spill requirements, but the classic GENESYS has overgeneration spill when there is no market. He added that the new model may allow market. Fazio discussed economic spill when it might be more economic to bring in solar or wind. Ollis added that they may have been held as a DEC reserve.

Fazio stopped at [Slide 17] to remind the room that the classic GENESYS does not have thermal reserves or forecasting errors. He said the new GENESYS does model forecasting errors which require INC reserves. Ollis added that they had to increase the INC reserves as part of maintaining adequacy for the 2021 Plan.

Levy asked how the model determines that need, wondering if percentages are increased in parameter settings. Ollis said the model is given an INC, DEC, and contingency reserves. He said planning level data revealed shortfalls if thermal generation is not used. Ollis and others did not think this was a reasonable approach, so they upped regional reserve amounts to better mimic operations which in turn removed the small, forecast error shortfalls. Ollis stressed the only way to achieve this outcome is to use this strategy and up reserves.

Levy confirmed that there is a global reserve requirement set by Balancing Area. Ollis answered that it could be by BA or region adding that it is presently set up like the EIM.

Kalich praised the work calling it a major, impressive undertaking. He suggested that it might be impossible to get a feel for how realistic this data is unless you could obtain flow output. Kalich asked about how this approach holds up to benchmarking and if utilities will keep come back with questions.

Ollis stated that Council staff does not have access to utility operational data, and the goal of the effort is to pull out high-level themes. Ollis said this is designed to create a realistic picture and gathering operational information would be a very different pursuit. He added that staff try to get the market as realistic as possible, and utilities have been very helpful with this effort. Ollis concluded by saying it is part of Council staff's job to handle these questions.

Ollis agreed that reserves have been an issue for years and suggested that the Council could provide space and a forum for discussion. Kalich suggested ways to get at quasi-public data and wondered about the possibility of a back cast. Ollis said Council staff does not have the

bandwidth for a back cast project, but they will compare the 2021 hydro year in the afternoon session. Kalich understood the barriers to a full back cast and praised the investment in the remodel. However, he worried that the modeling effort might not pay off if there is no resource for validation.

Levy asked to get a copy of the graphic on [Slide 21] for the lower Snake River projects as the Corps of Engineers had a really high sustained generation number. Fazio answered that the classic model only has regional aggregate hourly information, but they can show sustained peaking information. Levy said that might work.

Fazio then addressed benchmarking, listing all the inputs required to make it work. He said this makes benchmarking a monumental task. Ollis agreed, comparing his last back cast effort to an IRP. Fazio said owner/operator input can reveal if model output looks like actual operations. Ollis said that is what they will be looking at in the afternoon.

LUNCH

GENESYS Simulation versus Actuals

John Ollis

Fred Heutte, NW Energy Coalition, recalled that 2021 was a low water year with a one in five or one in ten flow [Slide 2] calling it a good match. Fazio stated that the Oct-Sept is showing total year volume and all 10 Climate Change inputs are higher.

Heutte said the WRAP is assuming average hydro and BPA has filed for next summer. He asked if we can really know next year's flow and if this graph shows what is possible. Fazio said the metric will be a planning reserve margin which will work with average hydro. Heutte called that a fair point, saying this analysis will give a finer grained look.

Heutte voiced concern about the Columbia River treaty which will change in 2024. He asked how the Council plans to fold in those changes. Ollis called that a hard question, but stated that flood control may stay the same either by treaty or individual agreement. He said that if it changes the model will be updated.

Fazio asked Heutte if there will be changes as both sides must agree and give a 10-year lead time. Heutte said his reading of the Columbia River treaty finds it odd as it continues on and has a 60-year flood policy trigger. Heutte said something definitely will change in two years unless both parties agree they shouldn't and suggested some model tests.

Fazio predicted that flood control will move to an on-call system and the change will be a question of revenue, not operations. He added that if the treaty goes away there will be a big change. Heutte asked what happens if operation changes do occur. Ollis said they gave this a lot of thought when making the 2021 Plan, but it was too ambitious to do at the time. He added that they have been working on it with nothing to report yet.

Heutte said he was concerned about the lack of available information even though he reads press releases and attended meetings. Ollis said an adequacy assessment could test the risk, but worried about the scope of the project.

Kalich asked if high penalties might even mean the model under-estimates flexibility. Ollis said it is too soon to tell. Kalich then asked what share of the objective is penalties vs. "real" costs/values in the MIP. Ollis said it depends on the time of year as it is constrained in the spring and summer while fall brings less issues. He offered to connect offline for more detailed information.

Kathryn Walter, Avista, asked what gap the model solves to in MIP. Ollis said .005 calling it tighter than the AURORA number.

Kalich stated finding very compromised results with our tech when MIP is consumed by penalties [Slide 4]. Ollis agreed, wishing there was less constraint on the river system.

Heutte called Albany Falls interesting even though he is not too concerned about it [Slide 9]. He said Dworshak has about ten times as much storage. Ollis said there are a lot of restrictions on Albany Falls and it may have more storage than generation.

Heutte brought up the February cold snap [Slide 10] that could have caused issues. Ollis said the actuals, represented on the right of the slide, stayed higher. Heutte pointed to the drawdowns. Ollis thought they were okay but was concerned with dropping below 735 more often. Heutte said he's been thinking about early spring/late winter because the system has been exceptionally tight. Heutte said it would be good to gauge how dynamic the system is especially in the late winter. Ollis said it's hard to get operations right in the spring.

Levy addressed model results for Granite forebay showing a seven-foot drop in seven days, calling it a big violation that can physically damage the reservoir. He said it looks like the model is finding much more storage than what exists there. Ollis said there is a constrain of 70kcfs per hour that will not be violated thanks to a very high penalty. Ollis thought this might be an end of the month phenomenon but said he will continue working on it. Levy thought increasing penalties could work.

Kalich asked for more information on forecast error as he thought it was an error in load and maybe VER forecasting. Ollis said it was. Kalich asked if extends to inflow forecasting. Ollis said yes it will, but it is presently limited to variable energy resources and load forecast. Kalich also asked if Ollis will conceptually discuss how forecast error is used in the model. Ollis moved to [Slide 25] to explain.

Kalich asked if all 8760 hours of the year are modeled with a rolling week of hourly data. Ollis answered yes. Joaquim Dias Garcia, PSR, confirmed that the model plans for a week, hour, and

day ahead and the planning study runs from the current hour to the end of the day. Ollis said they actually model a 364-day year.

Kalich confirmed this information with an example of modeling Oct 1-7, asking how it is done. Ollis explained the process including the weekly seam which has been smoothed in a way to reduce spikes. Kalich asked about the first step in weekly forecast. Ollis explained. Kalich asked how reservoir targets are incorporated. Ollis said the reservoir solves using the future value of hydro, adding that the end state of the model should understand and hedge for all the potential risk of future climate conditions.

Kalich was still confused on how the model starts, wondering if there was an earlier step that covers a longer time window to get flood control and other reservoir targets. Ollis said that some of those targets are input as constraints. Ollis further clarified that he runs two years at a time for one water year.

Dias Garcia said there is a block before the weekly forecast and explained the process. Kalich said he understood.

Levy called [Slide 22] interesting as BPA is splitting the spill in a way that benefits the fish. Ollis noted that actuals show BPA choosing a different window on different days and this is more like the spirit of the fact. He said this is the operators doing better than the model.

General Discussion

Heutte addressed conducting a sub-analysis of the Lower Snake, saying he would like to see that along with analysis of the lower Columbia, and the upper Columbia to gauge flexibility in those three areas. He called this a big question considering the number of river constraints. He pointed to the many changes to the energy system and new large loads coming on. Heutte called this a side car to what the system can do, adding that resources that replace the Lower Snake may be more flexible than the river. He thought breaking out flexibility work by sub-region may be helpful.

Ollis said that would be good to know and thought about different ways to set up the complex study. He also said the number of constraints on a projects don't mean it doesn't provide value and down/upstream benefits. Ollis offered to think about approaches.

Heutte thought that some ideas around sustained peaking capacity, or the flexibility of the Lower Snake, are overdone. He acknowledged that the analysis shows the interdependency of the different river segments. Heutte also thought the NW has a high-value opportunity to offer flexibility to the WECC but wondered how much.

Kalich asked if there is a data book for GENESYS that summarizes the data and constraints in the model [Slide 2]. Ollis said there are EXCEL workbooks that are rough but offered to share them after a light clean up.

Fazio discussed the upcoming RAAC technical/steering webinar on Nov 8. Ollis asked that feedback be emailed to him before that meeting.

Levy noted that these meetings are designed so people can gain confidence in the models and asked if people are more confident [Slide 3]. Ollis said he wanted to know that as well, noting that some people share publicly during these meetings while others reach out privately. Ollis said he collects all this information and express it to the Council members.

Ollis ended the meeting at 3:00.

Additional comments from the Go-to-Webinar question pane:

Scot Levy, Bluefish

2021 ranks 66 of 75 water years at Lower Granite dam, 63 of 75 water years at The Dalles dam, and 58 of 75 at Grand Coulee dam. (source: google search "site:nwrhc.noaa.gov ranking")

Increase penalties on LSR reservoir fluctuation. that's my only feedback aside from saying you guys have done a fantastic amount of work.

Attendees in person and via Go-to-Webinar

John Ollis	NWPCC	Dor Hirsh Bar Gai	NWPCC
John Fazio	NWPCC	Massoud Jourabchi	NWPCC
Dan Hua	NWPCC	Ian Bledsoe	Clatskanie PUD
Guiherme Bodin	PSR Inc	Pat Byrne	BPA
Matt Chaney	Bluefish	Milli Chennell	BPA
Rachel Clark	Tacoma Power	Marcelo Cruz	PSR Inc
Michael Deen	PPC	Andre Dias	PSR
Joaquim Dias Garcia	PSR	Rob Diffely	BPA
Ryan Egerdahal	BPA	Ryan Fulleman	Tacoma
João Garcia	PSR	Doug Grob	NWPCC
Doug Hart	PSE	Bill Henry	Pacific Ocean Energy
Erich Hester	VT	Fred Heutte	NW Energy Coalition
Scott Levy	Bluefish	Weimin Li	US ACE
John Lyons	Avista	Ian Mcgetrick	Idaho Power
Heather Nicholson	Orcas Power & Light	Joel Nightingale	WA UTC
Elizabeth Osborne	NWPCC	Raphael Sampaio	PSR Inc
Aliza Seelig	PNUCC	Gwen Shearer	Cascade Access
Mitch Silvers	Crapo Office	Steven Simmons	NWPCC
Jaime Stamatson	Montana	Danielloe Szigeti	Tacoma
Saul Villarreal	Seattle City Light	Kathryn Walter	Avista Corp
Brian Dekiep	NWPCC	Clint Kalich	Avista

Barbara Miller	US ACE	Juan Bedoya	PNNL
Frank Brown	BPA	Yousu Chen	PNNL
Verene Martin	Seattle City Light	Blake Scherer	Benton PUD
Landon Snyder	Snohomish PUD	Rick Williams	PSU