



Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

FREEDOM OF INFORMATION ACT/PRIVACY PROGRAM

February 6, 2023

In reply refer to: FOIA #BPA-2022-01217-F

SENT VIA EMAIL ONLY TO: aschick@opb.org

Tony Schick
Oregon Public Broadcasting
7140 SW Macadam Avenue
Portland, OR 97219

Dear Mr. Schick,

This communication is the Bonneville Power Association's (BPA) final response to your request for agency records made under the Freedom of Information Act, 5 U.S.C. § 552 (FOIA). Your request was received on August 30, 2022 and formally acknowledged on September 29, 2022.

Request

"... emails and related attachments regarding the July 22, 2021 media release titled "Lower Snake River Dams Help Region Power Through Recent Heatwave";
... limit the search for documents to the time frame of July 1-July 22, 2021;
... limit the search to emails sent or received by Wanda Solano, Clarisse Messemer, Anthony Kelment, Pamela Van Calcar, Christopher Siewert or Robert Hawkins;
... limit the search to only those emails containing both the key phrases (not case-sensitive) "Snake River dams" and "heat wave" (or "heatwave")."

Response

BPA's Cyber Forensics team searched for and gathered 304 pages of records responsive to your request from BPA's email system. Those pages accompany this communication with 14 pages containing minor redactions made under exemption 5 U.S.C. § 552(b)(6). A more detailed explanation of the applied exemption follows.

Explanation of Exemptions

The FOIA generally requires the release of all agency records upon request. However, the FOIA permits or requires withholding certain limited information that falls under one or more of nine statutory exemptions (5 U.S.C. §§ 552(b)(1-9)). Further, section (b) of the FOIA, which contains

the FOIA's nine statutory exemptions, also directs agencies to publicly release any reasonably segregable, non-exempt information that is contained in those records.

Exemption 6

Exemption 6 serves to protect Personally Identifiable Information (PII) contained in agency records when no overriding public interest in the information exists. BPA does not find an overriding public interest in a release of the information redacted under Exemption 6—specifically, mobile phone numbers and three sentences regarding a staffing issue. This information sheds no light on the executive functions of the agency and BPA finds no overriding public interest in its release. BPA cannot waive these redactions, as the protections afforded by Exemption 6 belong to individuals and not to the agency.

Lastly, as required by 5 U.S.C. § 552(a)(8)(A), information has been withheld only in instances where (1) disclosure is prohibited by statute, or (2) BPA foresees that disclosure would harm an interest protected by the exemption cited for the record. When full disclosure of a record is not possible, the FOIA statute further requires that BPA take reasonable steps to segregate and release nonexempt information. The agency has determined that in certain instances partial disclosure is possible, and has accordingly segregated the records into exempt and non-exempt portions.

Fees

There are no fees associated with processing your FOIA request.

Certification

Pursuant to 10 C.F.R. § 1004.7(b)(2), I am the individual responsible for records search and information release described above. Your FOIA request BPA-2022-01217-F is now closed with the responsive agency information provided.

Appeal

Note that the records release certified above is final. Pursuant to 10 C.F.R. § 1004.8, you may appeal the adequacy of the records search and the completeness of this final records release within 90 calendar days from the date of this communication. Appeals should be addressed to:

Director, Office of Hearings and Appeals
HG-1, L'Enfant Plaza
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585-1615

The written appeal, including the envelope, must clearly indicate that a FOIA appeal is being made. You may also submit your appeal by e-mail to OHA.filings@hq.doe.gov, including the phrase "Freedom of Information Appeal" in the subject line. (The Office of Hearings and

Appeals prefers to receive appeals by email.) The appeal must contain all the elements required by 10 C.F.R. § 1004.8, including a copy of the determination letter. Thereafter, judicial review will be available to you in the Federal District Court either (1) in the district where you reside, (2) where you have your principal place of business, (3) where DOE's records are situated, or (4) in the District of Columbia.

Additionally, you may contact the Office of Government Information Services (OGIS) at the National Archives and Records Administration to inquire about the FOIA mediation services they offer. The contact information for OGIS is as follows:

Office of Government Information Services
National Archives and Records Administration
8601 Adelphi Road-OGIS
College Park, Maryland 20740-6001
E-mail: ogis@nara.gov
Phone: 202-741-5770
Toll-free: 1-877-684-6448
Fax: 202-741-5769

Questions about this communication may be directed to the James King, FOIA Public Liaison, at jjking@bpa.gov or 503-230-7621. Thank you for your interest in the Bonneville Power Administration.

Sincerely,

Candice D. Palen
Freedom of Information/Privacy Act Officer

[Responsive agency records accompany this communication.](#)

From: Solano,Wanda M (BPA) - PGST-5

Sent: Thu Jul 01 15:34:18 2021

To: Klement,Anthony J (BPA) - PGSD-5

Subject: Latest revs of reports

Importance: Normal

Attachments: June 2021 Heat Wave Report 06-25_06-30.docx; PI data for Heat Wave R2.xlsx; LSN_heatwave21.html

I have a meeting with Clarisse at 7:30, then there's the 8am. I have a meeting at 9 and 10 and a one hour available between 11 and 12. I have to leave promptly at 12.

Wanda

Critical Information – Controlled Distribution

Name/Org: Tony Klement/PGSD, Wanda Solano/PGST

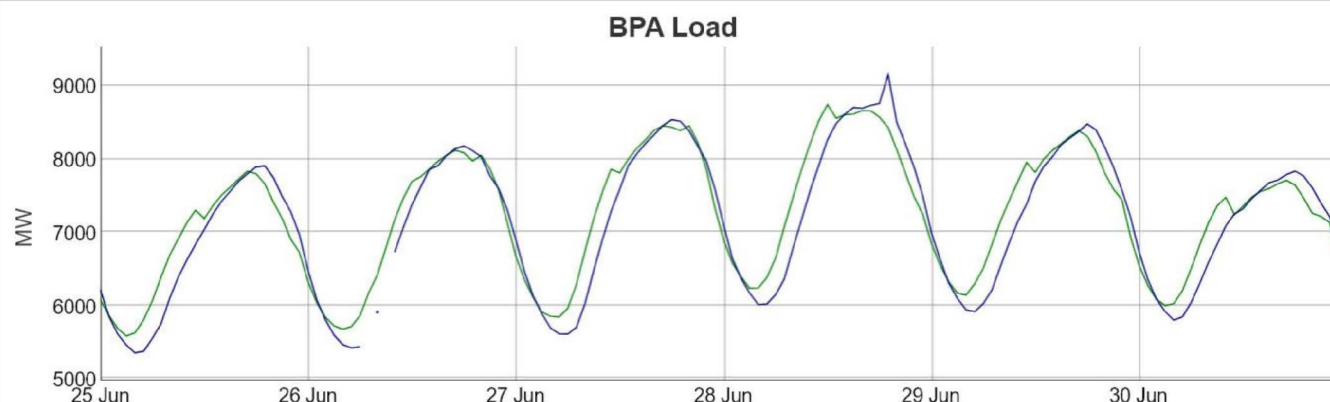
Date: 07/01/2021

This report covers the Pacific Northwest record heat days June 25th to June 30th. The most intense heat wave ever recorded in BPA Service Territory took place during this period. As a result of the ongoing heat wave, all-time record high temperatures were exceeded in many spots east of the Cascades. An all-time record high temperature for all of Canada was set in British Columbia, and the state of Washington appears to have also set new all-time record highs. Well-above-average temperatures for this time of year are still expected to continue through at least the beginning of next week. Little, if any, rainfall is expected except for isolated thunderstorms in OR/ID late in the week. Basinwide streamflow recessions continue although high snowmelt flows will progress in the upper Columbia.

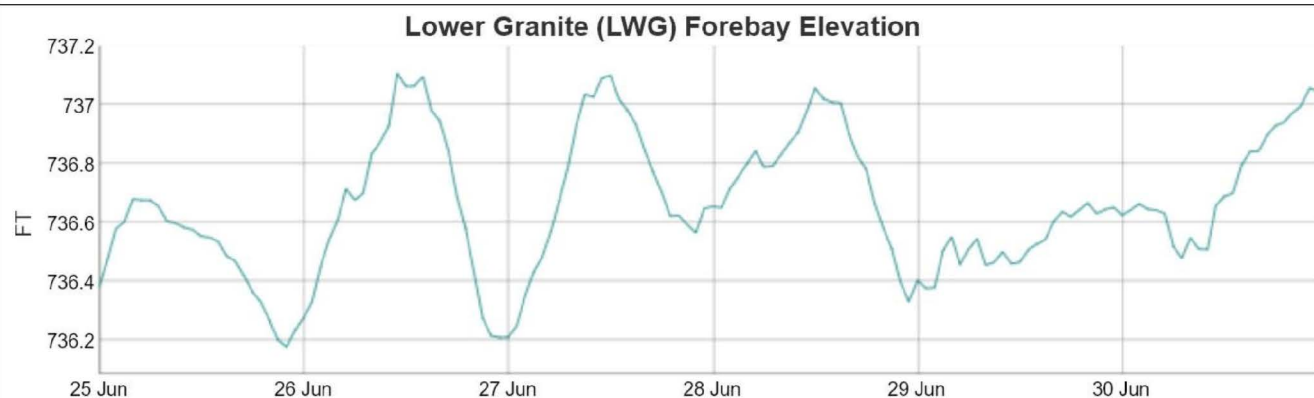
Fish Operations - Temperatures in the Lower Snake areas expected to continue with highs of 100-105 degrees for at least 10 days. A high water temperature emergency for Sockeye Salmon may require operational changes at Dworshak and the Lower Snake projects.

Spill Operations – Spill on the Lower Columbia and Lower Snake River dams have transitioned to the FOP summer spill levels. Snakes are passing inflow with the exception of some shaping to accommodate reserves held during daytime load peaks.

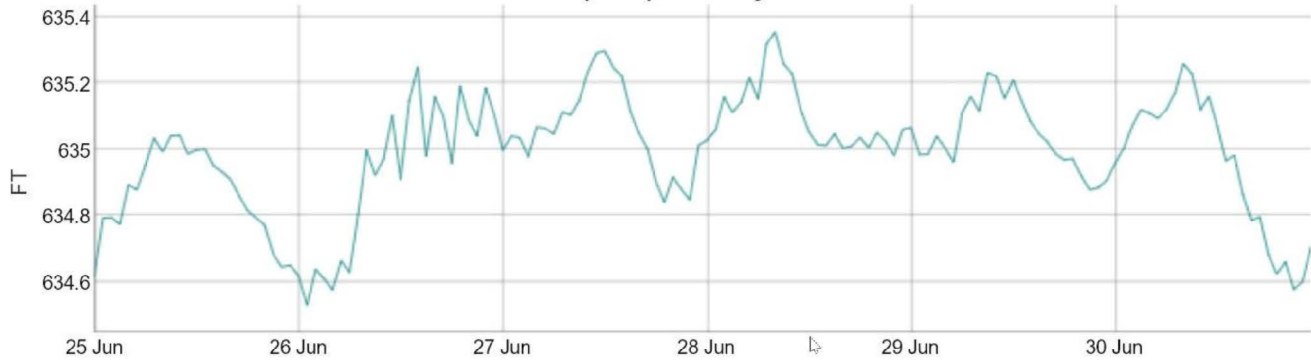
Loads were high in the afternoon evenings. This graph shows the load in blue and the energy delivery (BPA area load) in green.



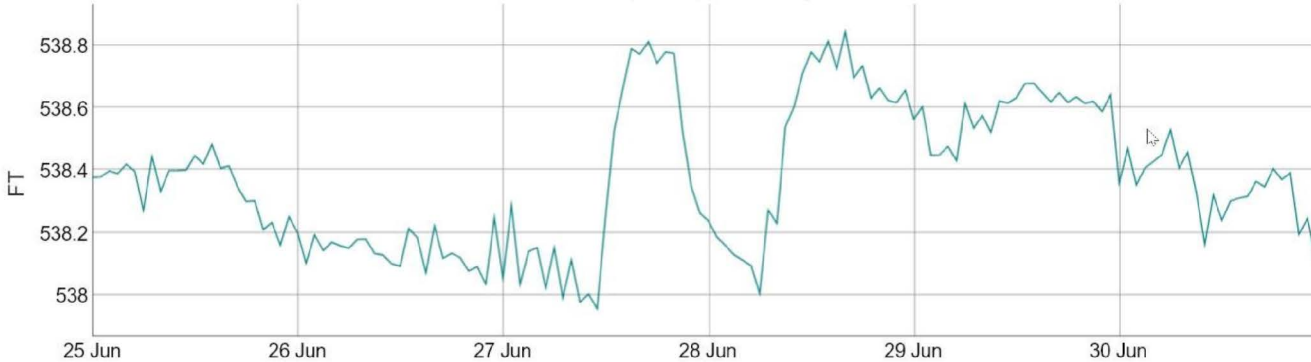
The lower snake projects were filled overnight and drafted in the morning to maximize peak loading. This was done within the limitations of a 1.5' forebay range during the fish passage season.



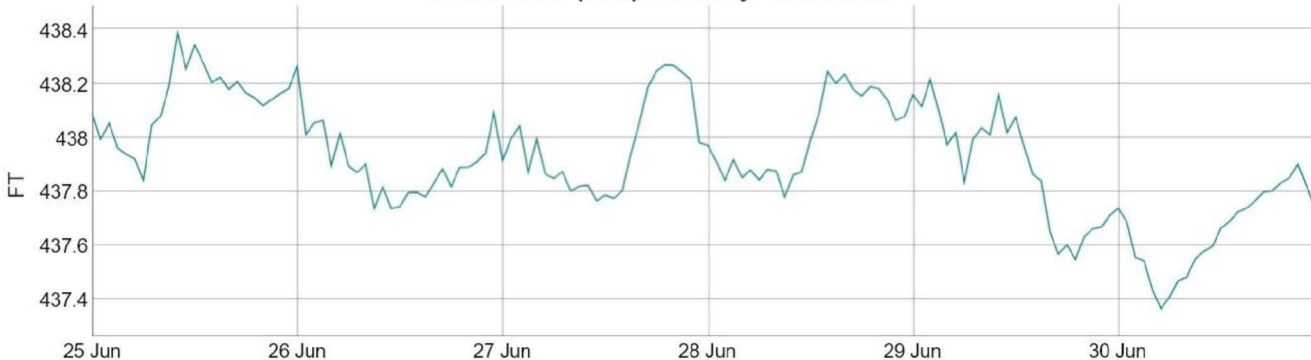
Little Goose (LGS) Forebay Elevation



Lower Monumental (LMN) Forebay Elevation

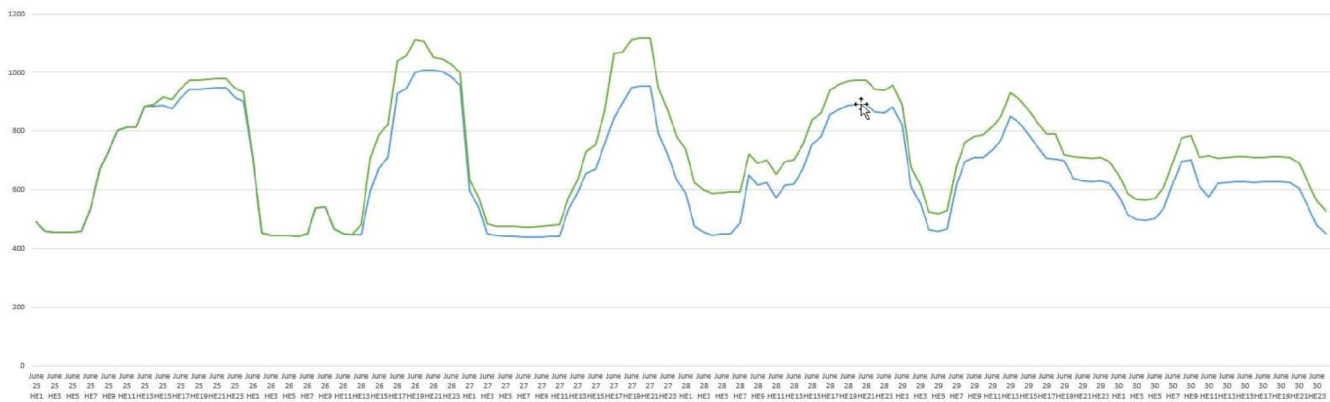


Ice Harbor (IHR) Forebay Elevation



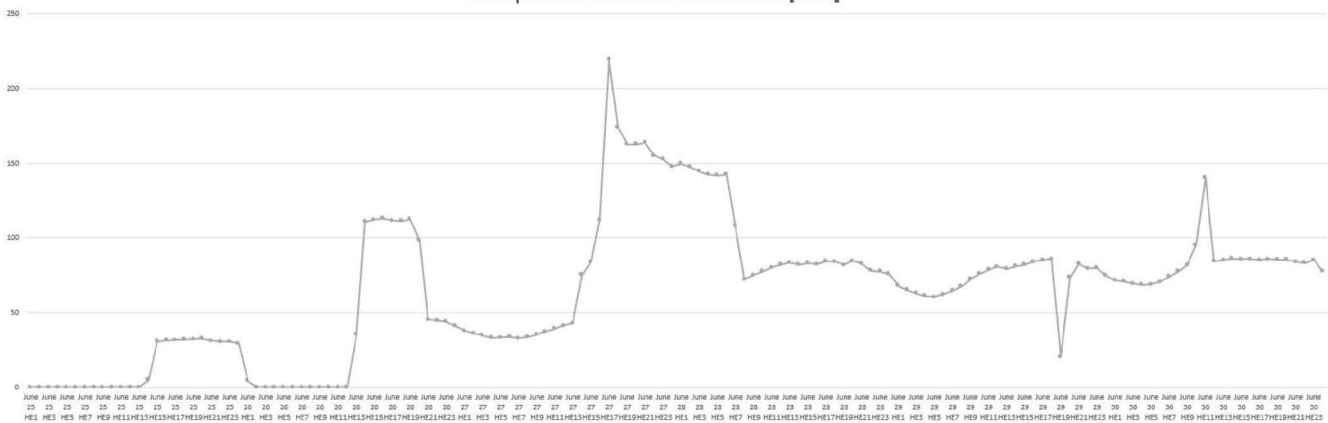
BPA must hold reserves in the event of a contingency, as well as to balance against forecast error and generation variation such as from wind generation projects, typically, during the spring and summer, due to limitations to support salmon migration. BPA hydro operators were able to apply some reserve responsibility to the lower snake projects thereby shifting available capacity at other FCRPS projects from holding capacity to delivering generation. BPA did not apply any DEC reserves on the LSN projects during the heat wave. The following graph shows the actual generation at the Lower Snake projects in blue, and the green line represents the amount of generation plus the amount of reserves that were carried at the project.

Lower Snake Projects Generation and Generation + Reserves Held [MW]



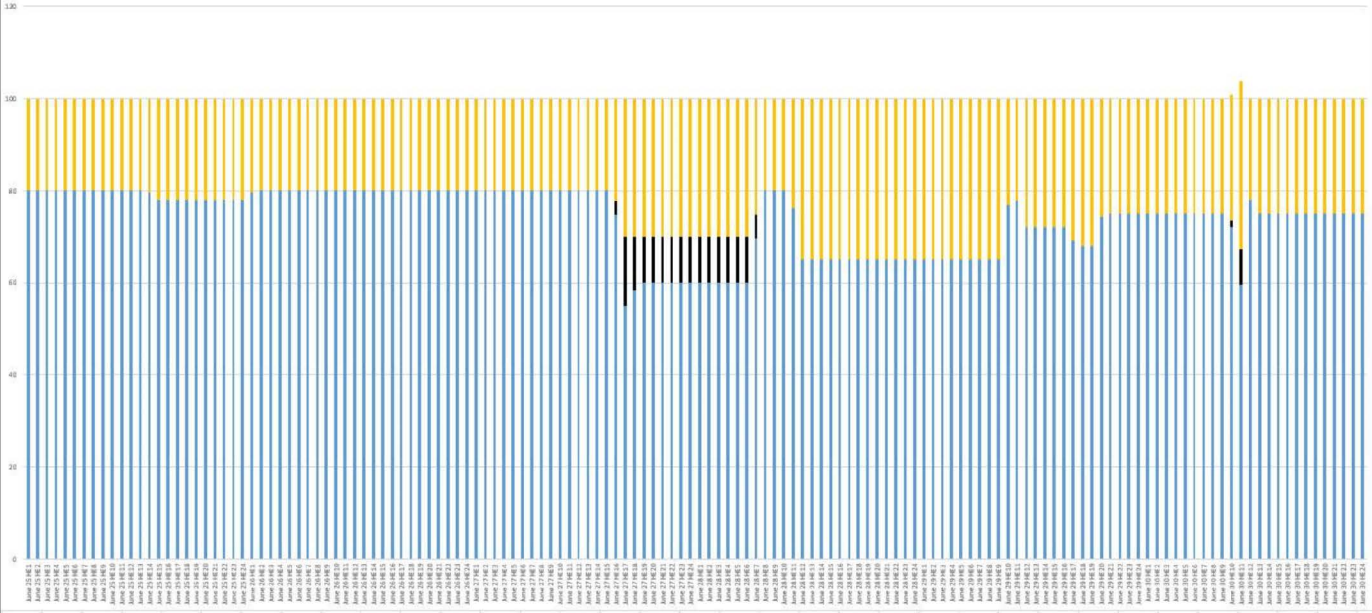
The next table shows a detail of the reserves held, as much as 220 MW.

Total positive Reserves Held on LSN [MW]

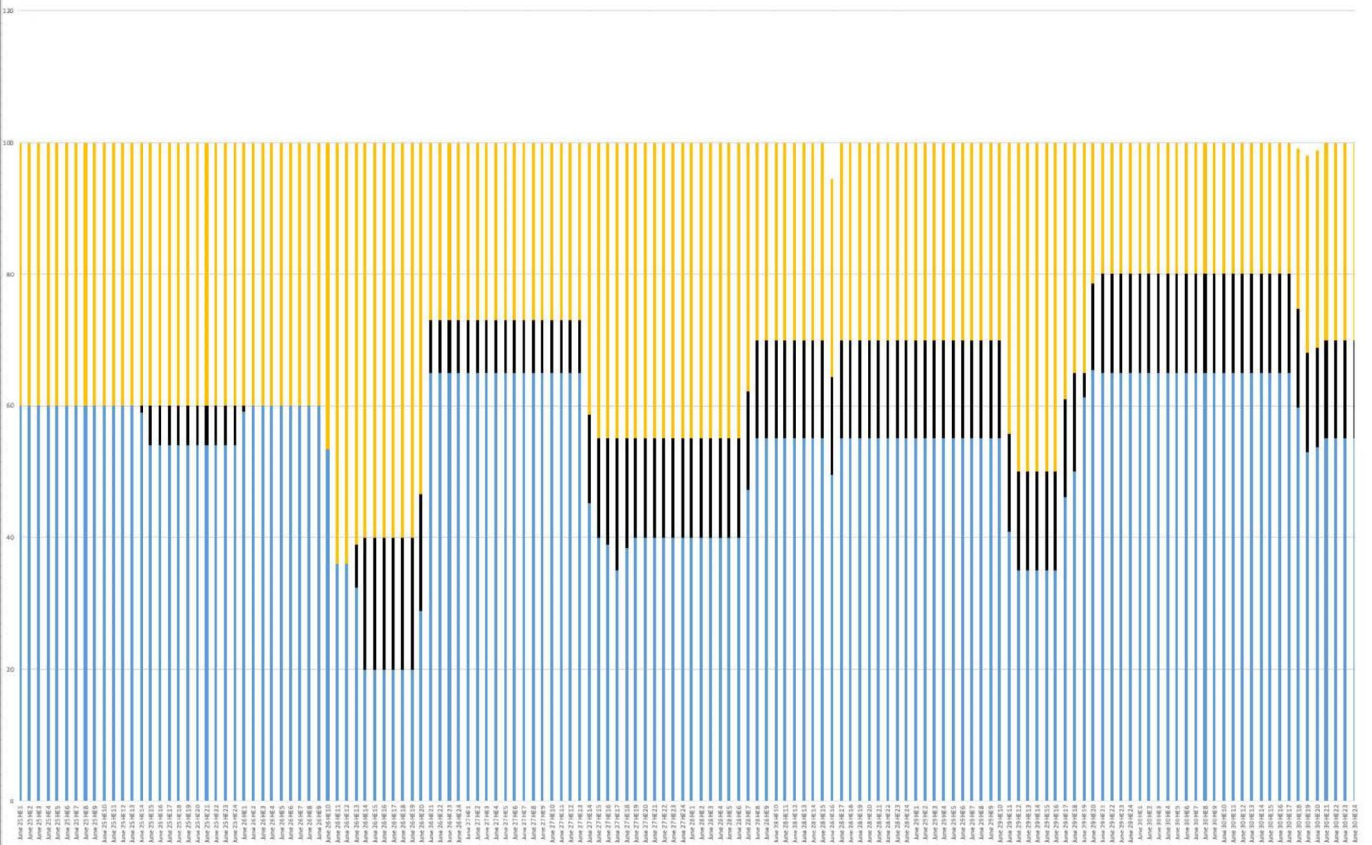


INC response distribution across the Lower Columbia (yellow), the Upper Columbia (blue) , and the Lower Snakes (black) illustrates the time between June 27 and June 28 that the Lower Snakes were used to support INC Response with about 10MW over 14 hours. Also shown is the CR response distribution where the Lower Snakes are shown to hold between 8 and 20 MW over about 80% of the report period.

INC Response Distribution



CR Response Distribution



A table showing the percentage of reserves held at each project is included at the end of this report.

Response Factors: Assumed to be percentages. Values are hour averages of responses that can be changed at any time.

	LWG			LGS			LMN			IHR			LSN Total		
Hour	DEC	INC	CR	DEC	INC	CR	DEC	INC	CR	DEC	INC	CR	DEC	INC	CR
June 25 HE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE14	0	0	0.316667	0	0	0	0	0	0	0	0	0	0	0	1
June 25 HE15	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE16	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE17	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE18	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE19	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE20	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE21	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE22	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE23	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE24	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 26 HE1	0	0	0.29	0	0	0	0	0	0	0	0	0	0	0	1
June 26 HE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE13	0	0	1.636111	0	0	2	0	0	2	0	0	2	0	0	7

June 26 HE14	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20
June 26 HE15	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20
June 26 HE16	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20
June 26 HE17	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20
June 26 HE18	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20
June 26 HE19	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20
June 26 HE20	0	0	4.408333	0	0	4	0	0	4	0	0	4	0	0	18
June 26 HE21	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 26 HE22	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 26 HE23	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 26 HE24	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE1	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE3	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE4	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE5	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE6	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE7	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE8	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE9	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE10	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE11	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE12	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE13	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE14	0	0	4.373333	0	0	4	0	0	4	0	0	0	0	0	14
June 27 HE15	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 27 HE16	0	1.047222222	5	0	1	5	0	1	5	0	0	1	0	3	16
June 27 HE17	0	5	5	0	5	5	0	5	5	0	0	5	0	15	20
June 27 HE18	0	5	5	0	1	5	0	5	5	0	0	2	0	11	17
June 27 HE19	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 27 HE20	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 27 HE21	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 27 HE22	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 27 HE23	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 27 HE24	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 28 HE1	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 28 HE2	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 28 HE3	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 28 HE4	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 28 HE5	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 28 HE6	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 28 HE7	0	2.583333333	5	0	0	5	0	3	5	0	0	0	0	5	15
June 28 HE8	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE9	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE10	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE11	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE12	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15

June 28 HE13	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE14	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE15	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE16	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE17	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE18	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE19	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE20	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE21	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE22	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE23	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE24	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE1	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE2	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE3	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE4	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE5	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE6	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE7	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE8	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE9	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE10	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE11	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE12	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE13	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE14	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE15	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE16	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE17	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE18	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE19	0	0	1.205556	0	0	1	0	0	1	0	0	0	0	0	4
June 29 HE20	0	0	4.4	0	0	4	0	0	4	0	0	0	0	0	13
June 29 HE21	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE22	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE23	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE24	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE1	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE2	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE3	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE4	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE5	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE6	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE7	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE8	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE9	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE10	0	0.73055556	5	0	0	5	0	1	5	0	0	0	0	1	15
June 30 HE11	0	3.83055556	5	0	0	5	0	4	5	0	0	0	0	8	15

June 30 HE12	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE13	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE14	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE15	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE16	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE17	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE18	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE19	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE20	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE21	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE22	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE23	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE24	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15

Response Factors: Assumed to be percentages. Values are hour averages of responses that can be changed at any time.																							
	LWG			LGS			LMN			IHR			LSN Total			System INC Bal	System Reg-Up	Total System INCs	System CR Obligation	INC Held on LSN	CR Held on LSN	Total positive Reserves Held on LSN	
Hour	DEC	INC	CR	DEC	INC	CR	DEC	INC	CR	DEC	INC	CR	DEC	INC	CR	[MW]	[MW]	[MW]	[MW]	[MW]	[MW]	[MW]	
June 25 HE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	468	0	0	0	
June 25 HE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	453	0	0	0	
June 25 HE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	435	0	0	0	
June 25 HE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	426	0	0	0	
June 25 HE5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	425	0	0	0	
June 25 HE6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	434	0	0	0	
June 25 HE7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	445	0	0	0	
June 25 HE8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	459	0	0	0	
June 25 HE9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	477	0	0	0	
June 25 HE10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	492	0	0	0	
June 25 HE11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	503	0	0	0	
June 25 HE12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	512	0	0	0	
June 25 HE13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	499	0	0	0	
June 25 HE14	0	0	0.3167	0	0	0	0	0	0	0	0	0	0	0	1	702	0	702	508	0	5	5	
June 25 HE15	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6	702	0	702	513	0	31	31	
June 25 HE16	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6	702	0	702	521	0	31	31	
June 25 HE17	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6	702	0	702	526	0	32	32	
June 25 HE18	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6	702	0	702	532	0	32	32	
June 25 HE19	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6	702	0	702	536	0	32	32	
June 25 HE20	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6	702	0	702	537	0	32	32	
June 25 HE21	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6	702	75	777	517	0	31	31	
June 25 HE22	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6	702	75	777	506	0	30	30	
June 25 HE23	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6	702	0	702	507	0	30	30	
June 25 HE24	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6	702	0	702	489	0	29	29	
June 26 HE1	0	0	0.29	0	0	0	0	0	0	0	0	0	0	0	1	702	0	702	462	0	4	4	
June 26 HE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	445	0	0	0	
June 26 HE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	436	0	0	0	
June 26 HE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	427	0	0	0	
June 26 HE5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	419	0	0	0	
June 26 HE6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	420	0	0	0	
June 26 HE7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	439	0	0	0	
June 26 HE8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	442	0	0	0	
June 26 HE9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	453	0	0	0	

June 26 HE10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	472	0	0	0
June 26 HE11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	503	0	0	0
June 26 HE12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702	0	702	520	0	0	0
June 26 HE13	0	0	1.6361	0	0	2	0	0	2	0	0	2	0	0	7	702	0	702	539	0	35	35
June 26 HE14	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20	702	0	702	553	0	111	111
June 26 HE15	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20	702	38	740	561	0	112	112
June 26 HE16	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20	702	75	777	565	0	113	113
June 26 HE17	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20	702	75	777	558	0	112	112
June 26 HE18	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20	702	0	702	557	0	111	111
June 26 HE19	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20	702	0	702	562	0	112	112
June 26 HE20	0	0	4.4083	0	0	4	0	0	4	0	0	4	0	0	18	702	75	777	557	0	98	98
June 26 HE21	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8	702	75	777	563	0	45	45
June 26 HE22	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8	702	75	777	557	0	45	45
June 26 HE23	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8	702	0	702	544	0	43	43
June 26 HE24	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8	702	0	702	511	0	41	41
June 27 HE1	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8	702	0	702	470	0	38	38
June 27 HE2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8	702	0	702	450	0	36	36
June 27 HE3	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8	702	0	702	434	0	35	35
June 27 HE4	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8	702	0	702	412	0	33	33
June 27 HE5	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8	702	0	702	417	0	33	33
June 27 HE6	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8	702	0	702	417	0	33	33
June 27 HE7	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8	702	0	702	408	0	33	33
June 27 HE8	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8	702	0	702	417	0	33	33
June 27 HE9	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8	702	0	702	440	0	35	35
June 27 HE10	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8	702	0	702	466	0	37	37
June 27 HE11	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8	702	0	702	491	0	39	39
June 27 HE12	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8	702	0	702	513	0	41	41
June 27 HE13	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8	702	0	702	536	0	43	43
June 27 HE14	0	0	4.3733	0	0	4	0	0	4	0	0	0	0	0	14	702	0	702	555	0	75	75
June 27 HE15	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	560	0	84	84
June 27 HE16	0	1.047222222	5	0	1	5	0	1	5	0	0	1	0	3	16	702	0	702	561	22	90	112
June 27 HE17	0	5	5	0	5	5	0	5	5	0	0	5	0	15	20	702	0	702	572	105	114	220
June 27 HE18	0	5	5	0	1	5	0	5	5	0	0	2	0	11	17	702	0	702	564	81	93	174
June 27 HE19	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15	702	75	777	567	78	85	163
June 27 HE20	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15	702	75	777	566	78	85	163
June 27 HE21	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15	702	75	777	573	78	86	164
June 27 HE22	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15	702	5	707	563	71	84	155
June 27 HE23	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15	702	0	702	548	70	82	152
June 27 HE24	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15	702	0	702	516	70	77	148
June 28 HE1	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15	702	75	777	480	78	72	150
June 28 HE2	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15	702	75	777	464	78	70	147
June 28 HE3	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15	702	75	777	446	78	67	145

June 28 HE4	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15	702	75	777	432	78	65	142
June 28 HE5	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15	702	75	777	427	78	64	142
June 28 HE6	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15	702	75	777	432	78	65	142
June 28 HE7	0	2.583333333	5	0	0	5	0	3	5	0	0	0	0	5	15	702	75	777	453	40	68	108
June 28 HE8	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	75	777	481	0	72	72
June 28 HE9	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	75	777	500	0	75	75
June 28 HE10	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	75	777	516	0	77	77
June 28 HE11	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	75	777	533	0	80	80
June 28 HE12	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	75	777	546	0	82	82
June 28 HE13	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	75	777	556	0	83	83
June 28 HE14	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	75	777	548	0	82	82
June 28 HE15	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	75	777	554	0	83	83
June 28 HE16	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	75	777	549	0	82	82
June 28 HE17	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	75	777	562	0	84	84
June 28 HE18	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	75	777	560	0	84	84
June 28 HE19	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	75	777	544	0	82	82
June 28 HE20	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	75	777	563	0	84	84
June 28 HE21	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	75	777	550	0	83	83
June 28 HE22	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	75	777	519	0	78	78
June 28 HE23	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	75	777	516	0	77	77
June 28 HE24	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	75	777	505	0	76	76
June 29 HE1	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	452	0	68	68
June 29 HE2	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	434	0	65	65
June 29 HE3	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	420	0	63	63
June 29 HE4	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	407	0	61	61
June 29 HE5	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	403	0	60	60
June 29 HE6	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	413	0	62	62
June 29 HE7	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	431	0	65	65
June 29 HE8	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	449	0	67	67
June 29 HE9	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	482	0	72	72
June 29 HE10	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	504	0	76	76
June 29 HE11	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	524	0	79	79
June 29 HE12	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	538	0	81	81
June 29 HE13	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	75	777	529	0	79	79
June 29 HE14	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	75	777	540	0	81	81
June 29 HE15	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	75	777	547	0	82	82
June 29 HE16	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	559	0	84	84
June 29 HE17	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	568	0	85	85
June 29 HE18	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	572	0	86	86
June 29 HE19	0	0	1.2056	0	0	1	0	0	1	0	0	0	0	0	4	702	0	702	562	0	20	20
June 29 HE20	0	0	4.4	0	0	4	0	0	4	0	0	0	0	0	13	702	75	777	558	0	74	74
June 29 HE21	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	75	777	550	0	82	82

June 29 HE22	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	75	777	530	0	80	80
June 29 HE23	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	34	736	532	0	80	80
June 29 HE24	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	499	0	75	75
June 30 HE1	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	477	0	72	72
June 30 HE2	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	472	0	71	71
June 30 HE3	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	462	0	69	69
June 30 HE4	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	457	0	69	69
June 30 HE5	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	459	0	69	69
June 30 HE6	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	469	0	70	70
June 30 HE7	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	494	0	74	74
June 30 HE8	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	516	0	77	77
June 30 HE9	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	545	0	82	82
June 30 HE10	0	0.730555556	5	0	0	5	0	1	5	0	0	0	0	1	15	702	0	702	567	10	85	95
June 30 HE11	0	3.830555556	5	0	0	5	0	4	5	0	0	0	0	8	15	702	0	702	577	54	87	140
June 30 HE12	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	561	0	84	84
June 30 HE13	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	567	0	85	85
June 30 HE14	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	573.9886	0	86	86
June 30 HE15	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	570.5311	0	86	86
June 30 HE16	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	570.9125	0	86	86
June 30 HE17	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	567.3556	0	85	85
June 30 HE18	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	570.2786	0	86	86
June 30 HE19	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	569.5279	0	85	85
June 30 HE20	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	568.4008	0	85	85
June 30 HE21	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	560.4671	0	84	84
June 30 HE22	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	554.23	0	83	83
June 30 HE23	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	567.1251	0	85	85
June 30 HE24	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15	702	0	702	516.9603	0	78	78

Reserves by ORA

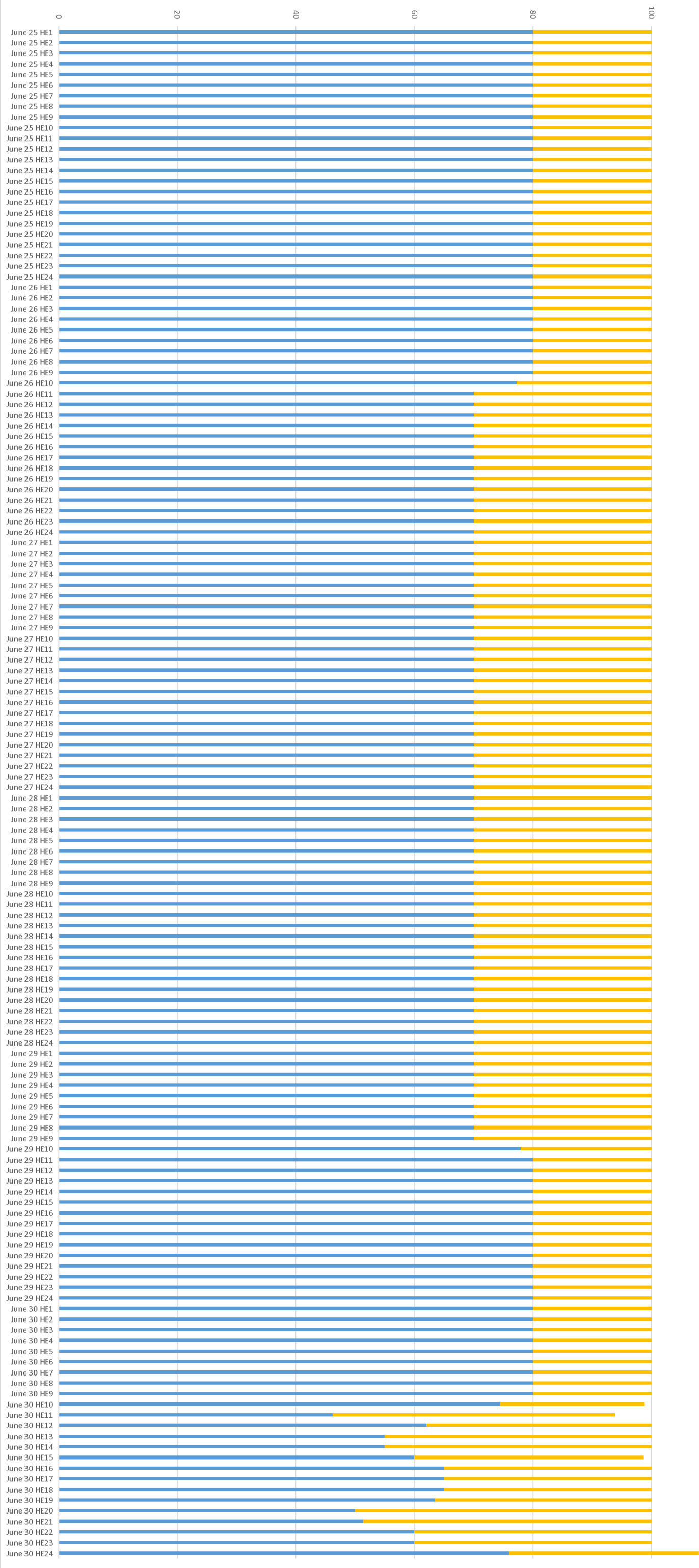
		Upper Columbia ORA									Lower Snake ORA											Lower Columbia ORA																			
		GCL DEC	CHJ DEC	UCOL DEC	GCL INC	CHJ INC	UCOL INC	GCL CR	CHJ CR	UCOL CR	LWG DEC	LGS DEC	LMN DEC	IHR DEC	LSN DEC	LWG INC	LGS INC	LMN INC	IHR INC	LSN INC	LWG CR	LGS CR	LMN CR	IHR CR	LSN CR	MCN DEC	JDA DEC	TDA DEC	BON DEC	LCOL DEC	MCN INC	JDA INC	TDA INC	BON INC	LCOL INC	MCN CR	JDA CR	TDA CR	BON CR	LCOL CR	
June 25 HE1	25-Jun-2101:00:00	52	28		80	52	28	80	40	20	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	7	0	20	5	8	7	0	20	10	15	15	0	40	
June 25 HE2	25-Jun-2102:00:00	52	28		80	52	28	80	40	20	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	7	0	20	5	8	7	0	20	10	15	15	0	40	
June 25 HE3	25-Jun-2103:00:00	52	28		80	52	28	80	40	20	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	7	0	20	5	8	7	0	20	10	15	15	0	40	
June 25 HE4	25-Jun-2104:00:00	52	28		80	52	28	80	40	20	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	7	0	20	5	8	7	0	20	10	15	15	0	40	
June 25 HE5	25-Jun-2105:00:00	52	28		80	52	28	80	40	20	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	7	0	20	5	8	7	0	20	10	15	15	0	40	
June 25 HE6	25-Jun-2106:00:00	52	28		80	52	28	80	40	20	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	7	0	20	5	8	7	0	20	10	15	15	0	40	
June 25 HE7	25-Jun-2107:00:00	52	28		80	52	28	80	40	20	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	7	0	20	5	8	7	0	20	10	15	15	0	40	
June 25 HE8	25-Jun-2108:00:00	52	28		80	52	28	80	40	20	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	7	0	20	5	8	7	0	20	10	15	15	0	40	
June 25 HE9	25-Jun-2109:00:00	52	28		80	52	28	80	40	20	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	7	0	20	5	8	7	0	20	10	15	15	0	40	
June 25 HE10	25-Jun-2110:00:00	52	28		80	52	28	80	40	20	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	7	0	20	5	8	7	0	20	10	15	15	0	40	
June 25 HE11	25-Jun-2111:00:00	52	28		80	52	28	80	40	20	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	7	0	20	5	8	7	0	20	10	15	15	0	40	
June 25 HE12	25-Jun-2112:00:00	52	28		80	52	28	80	40	20	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	7	0	20	5	8	7	0	20	10	15	15	0	40	
June 25 HE13	25-Jun-2113:00:00	52	28		80	52	28	80	40	20	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	7	0	20	5	8	7	0	20	10	15	15	0	40	
June 25 HE14	25-Jun-2114:00:00	52	28		80	51.6833	28	79.6833	38.4167	20.6333	59.05	0	0	0	0	0	0	0	0	0	0	0.31667	0.31667	0.31667	0	0.95	5	8	7	0	20	5	8.15833	7.15833	0	20.3167	10	15	15	0	40
June 25 HE15	25-Jun-2115:00:00	52	28		80	50	28	78	30	24	54	0	0	0	0	0	0	0	0	0	0	2	2	2	0	6	5	8	7	0	20	5	9	8	0	22	10	15	15	0	40
June 25 HE16	25-Jun-2116:00:00	52	28		80	50	28	78	30	24	54	0	0	0	0	0	0	0	0	0	0	2	2	2	0	6	5	8	7	0	20	5	9	8	0	22	10	15	15	0	40
June 25 HE17	25-Jun-2117:00:00	52	28		80	50	28	78	30	24	54	0	0	0	0	0	0	0	0	0	0	2	2	2	0	6	5	8	7	0	20	5	9	8	0	22	10	15	15	0	40
June 25 HE18	25-Jun-2118:00:00	52	28		80	50	28	78	30	24	54	0	0	0	0	0	0	0	0	0	0	2	2	2	0	6	5	8	7	0	20	5	9	8	0	22	10	15	15	0	40
June 25 HE19	25-Jun-2119:00:00	52	28		80	50	28	78	30	24	54	0	0	0	0	0	0	0	0	0	0	2	2	2	0	6	5	8	7	0	20	5	9	8	0	22	10	15	15	0	40
June 25 HE20	25-Jun-2120:00:00	52	28		80	50	28	78	30	24	54	0	0	0	0	0	0	0	0	0	0	2	2	2	0	6	5	8	7	0	20	5	9	8	0	22	10	15	15	0	40
June 25 HE21	25-Jun-2121:00:00	52	28		80	50	28	78	30	24	54	0	0	0	0	0	0	0	0	0	0	2	2	2	0	6	5	8	7	0	20	5	9	8	0	22	10	15	15	0	40
June 25 HE22	25-Jun-2122:00:00	52	28		80	50	28	78	30	24	54	0	0	0	0	0	0	0	0	0	0	2	2	2	0	6	5	8	7	0	20	5	9	8	0	22	10	15	15	0	40
June 25 HE23	25-Jun-2123:00:00	52	28		80	50	28	78	30	24	54	0	0	0	0	0	0	0	0	0	0	2	2	2	0	6	5	8	7	0	20	5	9	8	0	22	10	15	15	0	40
June 25 HE24	26-Jun-2100:00:00	52	28		80	50	28	78	30	24	54	0	0	0	0	0	0	0	0	0	0	2	2	2	0	6	5	8	7	0	20	5	9	8	0	22	10	15	15	0	40
June 26 HE1	26-Jun-2101:00:00	52	28		80	51.71	28	79.71	35.13	24	59.13	0	0	0	0	0	0	0	0	0	0	0.29	0.29	0.29	0	0.87	5	8	7	0	20	5	8.145	7.145	0	20.29	10	15	15	0	40
June 26 HE2	26-Jun-2102:00:00	52	28		80	52	28	80	36	24	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	7	0	20	5	8	7	0	20	10	15	15	0	40	
June 26 HE3	26-Jun-2103:00:00	52	28		80	52	28	80	36	24	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	7	0	20	5	8	7	0	20	10	15	15	0	40	
June 26 HE4	26-Jun-2104:00:00	52	28		80	52	28	80	36	24	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	7	0	20	5	8	7	0	20	10	15	15	0	40	
June 26 HE5	26-Jun-2105:00:00	52	28		80	52	28	80	36	24	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	7	0	20	5	8	7	0	20	10	15	15	0	40	
June 26 HE6	26-Jun-2106:00:00	52	28		80	52	28	80	36	24	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	8	7													

June 27 HE8	27-Jun-2108:00:00	46	24	70	50	30	80	40	25	65	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	8	5	15	10	0	30	5	8	7	0	20	5	10	10	2	27	
June 27 HE9	27-Jun-2109:00:00	46	24	70	50	30	80	40	25	65	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	8	5	15	10	0	30	5	8	7	0	20	5	10	10	2	27	
June 27 HE10	27-Jun-2110:00:00	46	24	70	50	30	80	40	25	65	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	8	5	15	10	0	30	5	8	7	0	20	5	10	10	2	27	
June 27 HE11	27-Jun-2111:00:00	46	24	70	50	30	80	40	25	65	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	8	5	15	10	0	30	5	8	7	0	20	5	10	10	2	27	
June 27 HE12	27-Jun-2112:00:00	46	24	70	50	30	80	40	25	65	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	8	5	15	10	0	30	5	8	7	0	20	5	10	10	2	27	
June 27 HE13	27-Jun-2113:00:00	46	24	70	50	30	80	40	25	65	0	0	0	0	0	0	0	0	0	0	0	2	2	2	2	8	5	15	10	0	30	5	8	7	0	20	5	10	10	2	27	
June 27 HE14	27-Jun-2114:00:00	46	24	70	50	30	80	20.2222	25	45.222222	0	0	0	0	0	0	0	0	0	0	0	4.37333	4.37333	4.37333	0.41778	13.5378	5	15	10	0	30	5	8	7	0	20	8.95556	13.9556	13.9556	4.37333	41.24	
June 27 HE15	27-Jun-2115:00:00	46	24	70	50	30	80	15	25	40	0	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	15	5	15	10	0	30	5	8	7	0	20	10	15	15	5	45
June 27 HE16	27-Jun-2116:00:00	46	24	70	44.7639	30	74.7639	12.9056	26.0472	38.952778	0	0	0	0	0	1.04722	1.04722	1.04722	0	3.14167	5	5	5	1.04722	16.0472	5	15	10	0	30	5	9.46611	7.62833	0	22.0944	10	15	16.0472	3.95278	45		
June 27 HE17	27-Jun-2117:00:00	46	24	70	25	30	55	5	30	35	0	0	0	0	0	5	5	5	5	0	15	5	5	5	5	20	5	15	10	0	30	5	15	10	0	30	10	15	20	0	45	
June 27 HE18	27-Jun-2118:00:00	46	24	70	35.3583	23.1722	58.5306	8.41389	30	38.413889	0	0	0	0	0	5	1.46944	5	0	11.4694	5	5	5	5	1.58611	16.5861	5	15	10	0	30	5	15	10	0	30	10	15	20	0	45	
June 27 HE19	27-Jun-2119:00:00	46	24	70	40	20	60	10	30	40	0	0	0	0	0	5	0	5	0	10	5	5	5	5	0	15	5	15	10	0	30	5	15	10	0	30	10	15	20	0	45	
June 27 HE20	27-Jun-2120:00:00	46	24	70	40	20	60	10	30	40	0	0	0	0	0	5	0	5	0	10	5	5	5	5	0	15	5	15	10	0	30	5	15	10	0	30	10	15	20	0	45	
June 27 HE21	27-Jun-2121:00:00	46	24	70	40	20	60	10	30	40	0	0	0	0	0	5	0	5	0	10	5	5	5	5	0	15	5	15	10	0	30	5	15	10	0	30	10	15	20	0	45	
June 27 HE22	27-Jun-2122:00:00	46	24	70	40	20	60	10	30	40	0	0	0	0	0	5	0	5	0	10	5	5	5	5	0	15	5	15	10	0	30	5	15	10	0	30	10	15	20	0	45	
June 27 HE23	27-Jun-2123:00:00	46	24	70	40	20	60	10	30	40	0	0	0	0	0	5	0	5	0	10	5	5	5	5	0	15	5	15	10	0	30	5	15	10	0	30	10	15	20	0	45	
June 27 HE24	28-Jun-2100:00:00	46	24	70	40	20	60	10	30	40	0	0	0	0	0	5	0	5	0	10	5	5	5	5	0	15	5	15	10	0	30	5	15	10	0	30	10	15	20	0	45	
June 28 HE1	28-Jun-2101:00:00	46	24	70	40	20	60	10	30	40	0	0	0	0	0	5	0	5	0	10	5	5	5	5	0	15	5	15	10	0	30	5	15	10	0	30	10	15	20	0	45	
June 28 HE2	28-Jun-2102:00:00	46	24	70	40	20	60	10	30	40	0	0	0	0	0	5	0	5	0	10	5	5	5	5	0	15	5	15	10	0	30	5	15	10	0	30	10	15	20	0	45	
June 28 HE3	28-Jun-2103:00:00	46	24	70	40	20	60	10	30	40	0	0	0	0	0	5	0	5	0	10	5	5	5	5	0	15	5	15	10	0	30	5	15	10	0	30	10	15	20	0	45	
June 28 HE4	28-Jun-2104:00:00	46	24	70	40	20	60	10	30	40	0	0	0	0	0	5	0	5	0	10	5	5	5	5	0	15	5	15	10	0	30	5	15	10	0	30	10	15	20	0	45	
June 28 HE5	28-Jun-2105:00:00	46	24	70	40	20	60	10	30	40	0	0	0	0	0	5	0	5	0	10	5	5	5	5	0	15	5	15	10	0	30	5	15	10	0	30	10	15	20	0	45	
June 28 HE6	28-Jun-2106:00:00	46	24	70	40	20	60	10	30	40	0	0	0	0	0	5	0	5	0	10	5	5	5	5	0	15	5	15	10	0	30	5	15	10	0	30	10	15	20	0	45	
June 28 HE7	28-Jun-2107:00:00	46	24	70	46.2833	23.3833	69.6667	22.0833	25.1667	47.25	0	0	0	0	0	2.58333	0	2.58333	0	5.16667	5	5	5	5	0	15	5	15	10	0	30	5	11.6167	8.55	0	25.1667	7.58333	15	15.1667	0	37.75	
June 28 HE8	28-Jun-2108:00:00	46	24	70	53	27	80	35	20	55	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	15	5	15	10	0	30	5	8	7	0	20	5	15	10	0	30	
June 28 HE9	28-Jun-2109:00:00	46	24	70	53	27	80	35	20	55	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	15	5	15	10	0	30	5	8	7	0	20	5	15	10	0	30	
June 28 HE10	28-Jun-2110:00:00	46	24	70	53	27	80	35	20	55	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	15	5	15	10	0	30	5	8	7	0	20	5	15	10	0	30	
June 28 HE11	28-Jun-2111:00:00	46	24	70	52.2533	24.0133	76.2667	35	20	55	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	15	5	15	10	0	30	6.24444	9.74222	7.74667	0	23.7333	5	15	10	0	30	
June 28 HE12	28-Jun-2112:00:00	46	24	70	50	15	65	35	20	55	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	15	5	15	10	0	30	10	15	10	0	35	5	15	10	0	30	
June 28 HE13	28-Jun-2113:00:00	46	24	70	50	15	65	35	20	55	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	15	5	15	10	0	30	10	15	10	0	35	5	15	10	0	30	
June 28 HE14	28-Jun-2114:00:00	46	24	70	50	15	65	35	20	55	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	15	5	15	10	0	30	10	15	10	0	35	5	15	10	0	30	
June 28 HE15	28-Jun-2115:00:00	46	24	70	50	15	65	35	20	55	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	15	5	15	10	0	30	10	15	10	0	35	5	15	10	0	30	
June 28 HE16	28-Jun-2116:00:00	55.191	14.809	70	48.3139	16.6861	65	35	14.4667	49.466667	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	15	5	15	10	0	30	10	15	10	0	35	5	15	10	0	30	
June 28 HE17	28-Jun-2117:00:00	50	20	70	40	25	65	35	20	55	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	15	5	15	10	0	30	10	15	10	0	35	5	15	10	0	30	
June 28 HE18	28-Jun-2118:00:00	50	20	70	40	25	65	35	20	55	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	15	5	15	10	0	30	10	15	10	0	35	5	15	10	0	30	
June 28 HE19	28-Jun-2119:00:00	50	20	70	40	25	65	35	20	55	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	15	5	15	10	0	30	10	15	10	0	35	5	15	10	0	30	
June 28 HE20	28-Jun-2120:00:00	50	20	70	40	25	65	35	20	55	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	15	5	15	10	0	30	10	15	10	0	35	5	15	10	0	30	
June 28 HE21	28-Jun-2121:00:00	50	20	70	40	25	65	35	20	55	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	15	5	15	10	0	30	10	15	10	0	35	5	15	10	0	30	
June 28 HE22	28-Jun-2122:00:00	50	20	70	40	25	65	35	20	55	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	15	5	15	10	0	30	10	15	10	0	35	5	15	10	0	30	
June 28 HE23	28-Jun-2123:00:00	50	20	70	40	25	65	35	20	55	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	15	5	15	10	0	30	10	15	10	0	35	5	15	10	0	30	
June 28 HE24	29-Jun-2100:00:00	50	20	70	40	25	65	35	20	55	0	0	0	0	0	0	0	0	0	0	5	5	5	5	0	15	5	15	10													

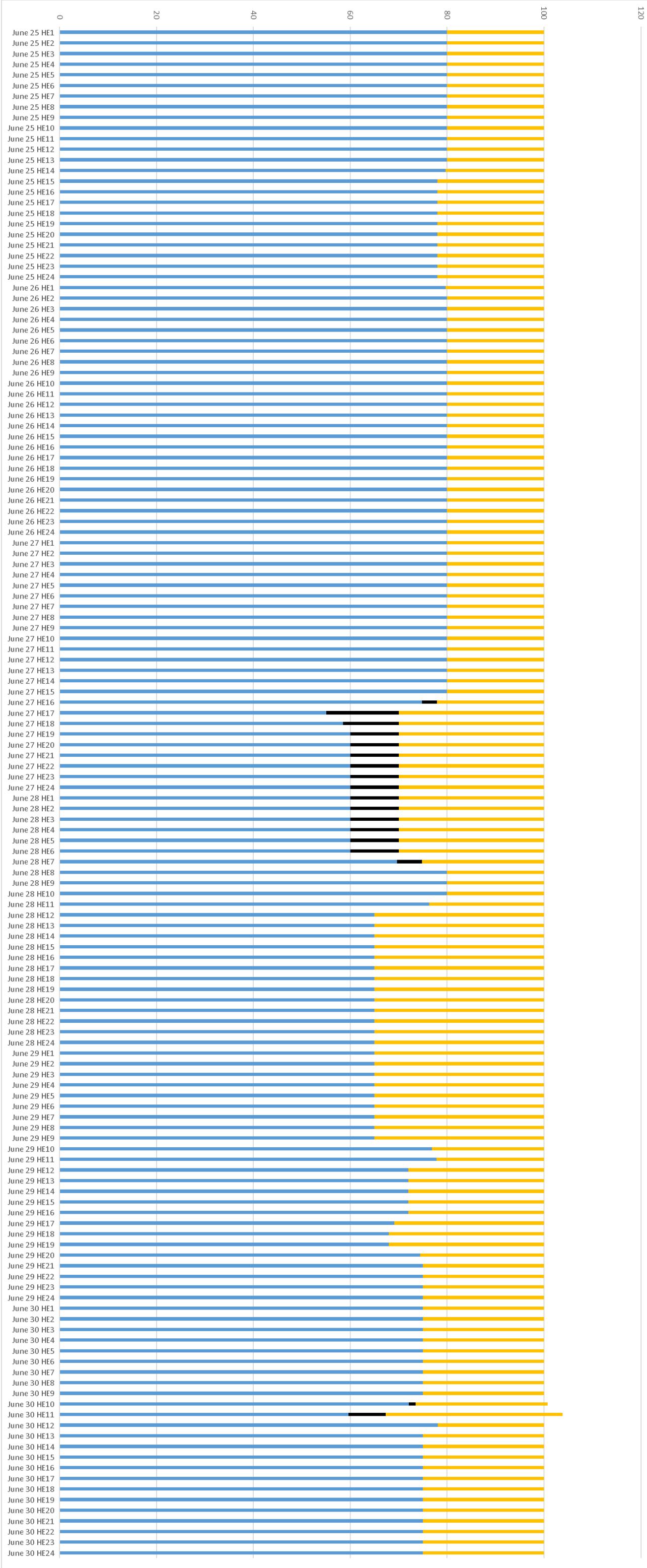
June 29 HE18	29-Jun-2118:00:00	52	28	80	45	23	68	30	20	50	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	5	8	7	0	20	10	7	15	0	32	10	10	15	0	35
June 29 HE19	29-Jun-2119:00:00	52	28	80	45	23	68	37.5889	23.7944	61.383333	0	0	0	0	0	0	0	0	0	0	1.20556	1.20556	1.20556	0	3.61667	5	8	7	0	20	10	7	15	0	32	10	10	15	0	35
June 29 HE20	29-Jun-2120:00:00	52	28	80	48.6867	25.765	74.4517	41.9683	23.4483	65.416667	0	0	0	0	0	0	0	0	0	0	4.4	4.4	4.4	0	13.2	5	8	7	0	20	10	0.54833	15	0	25.5483	5.6	0.78333	15	0	21.3833
June 29 HE21	29-Jun-2121:00:00	52	28	80	49	26	75	42	23	65	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	5	8	7	0	20	10	0	15	0	25	5	0	15	0	20
June 29 HE22	29-Jun-2122:00:00	52	28	80	49	26	75	42	23	65	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	5	8	7	0	20	10	0	15	0	25	5	0	15	0	20
June 29 HE23	29-Jun-2123:00:00	52	28	80	49	26	75	42	23	65	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	5	8	7	0	20	10	0	15	0	25	5	0	15	0	20
June 29 HE24	30-Jun-2100:00:00	52	28	80	49	26	75	42	23	65	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	5	8	7	0	20	10	0	15	0	25	5	0	15	0	20
June 30 HE1	30-Jun-2101:00:00	52	28	80	49	26	75	42	23	65	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	5	8	7	0	20	10	0	15	0	25	5	0	15	0	20
June 30 HE2	30-Jun-2102:00:00	52	28	80	49	26	75	42	23	65	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	5	8	7	0	20	10	0	15	0	25	5	0	15	0	20
June 30 HE3	30-Jun-2103:00:00	52	28	80	49	26	75	42	23	65	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	5	8	7	0	20	10	0	15	0	25	5	0	15	0	20
June 30 HE4	30-Jun-2104:00:00	52	28	80	49	26	75	42	23	65	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	5	8	7	0	20	10	0	15	0	25	5	0	15	0	20
June 30 HE5	30-Jun-2105:00:00	52	28	80	49	26	75	42	23	65	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	5	8	7	0	20	10	0	15	0	25	5	0	15	0	20
June 30 HE6	30-Jun-2106:00:00	52	28	80	49	26	75	42	23	65	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	5	8	7	0	20	10	0	15	0	25	5	0	15	0	20
June 30 HE7	30-Jun-2107:00:00	52	28	80	49	26	75	42	23	65	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	5	8	7	0	20	10	0	15	0	25	5	0	15	0	20
June 30 HE8	30-Jun-2108:00:00	52	28	80	49	26	75	42	23	65	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	5	8	7	0	20	10	0	15	0	25	5	0	15	0	20
June 30 HE9	30-Jun-2109:00:00	52	28	80	49	26	75	42	23	65	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	5	8	7	0	20	10	0	15	0	25	5	0	15	0	20
June 30 HE10	30-Jun-2110:00:00	50.539	23.909	74.447778	49.8767	22.2011	72.0778	42	23	65	0	0	0	0	0	0.73056	0	0.73056	0	1.46111	5	5	5	0	15	6.46111	9.02278	8.89944	0	24.3833	10.7306	1.46111	15	0	27.1917	5	0.73056	14.2694	0	20
June 30 HE11	30-Jun-2111:00:00	39.193	7.0167	46.21	56.1694	3.50833	59.6778	42	23	65	0	0	0	0	0	3.83056	0	3.83056	0	7.66111	5	5	5	0	15	13.8306	13.8306	20	0	47.6611	13.8306	10	12.6611	0	36.4917	5	3.83056	11.1694	0	20
June 30 HE12	30-Jun-2112:00:00	30.267	31.808	62.075	60	18.1	78.1	34.5667	30.4333	65	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	7.92778	11.0278	18.9694	0	37.925	6.9	10	5	0	21.9	5	0	15	0	20
June 30 HE13	30-Jun-2113:00:00	20	35	55	60	15	75	22	43	65	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	20	20	5	0	45	10	10	5	0	25	5	0	15	0	20
June 30 HE14	30-Jun-2114:00:00	20	35	55	60	15	75	22	43	65	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	20	20	5	0	45	10	10	5	0	25	5	0	15	0	20
June 30 HE15	30-Jun-2115:00:00	13	47	60	60	15	75	22	43	65	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	13.6722	20	5	0	38.6722	10	10	5	0	25	5	0	15	0	20
June 30 HE16	30-Jun-2116:00:00	10	55	65	60	15	75	22	43	65	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	10	20	5	0	35	10	10	5	0	25	5	0	15	0	20
June 30 HE17	30-Jun-2117:00:00	10	55	65	60	15	75	22	43	65	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	14.7389	15.2611	5	0	35	10	10	5	0	25	5	0	15	0	20
June 30 HE18	30-Jun-2118:00:00	10	55	65	60	15	75	16.78	43	59.78	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	20	10	5	0	35	10	10	5	0	25	5	4.35	15	0	24.35
June 30 HE19	30-Jun-2119:00:00	10	53.408	63.408333	60	15	75	10	43	53	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	20	10.6367	5.955	0	36.5917	10	10	5	0	25	5	10	15	0	30
June 30 HE20	30-Jun-2120:00:00	10	40	50	60	15	75	10	43.7633	53.763333	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	20	16	14	0	50	10	10	5	0	25	6.90833	10	11.1833	1.90833	30
June 30 HE21	30-Jun-2121:00:00	11.328	40	51.327778	60	15	75	10	45	55	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	18.6722	16	14	0	48.6722	10	10	5	0	25	10	10	5	5	30
June 30 HE22	30-Jun-2122:00:00	20	40	60	60	15	75	10	45	55	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	10	16	14	0	40	10	10	5	0	25	10	10	5	5	30
June 30 HE23	30-Jun-2123:00:00	20	40	60	60	15	75	10	45	55	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	10	16	14	0	40	10	10	5	0	25	10	10	5	5	30
June 30 HE24	01-Jul-2100:00:00	44.766	31.212	75.977778	50.4133	24.5867	75	10	45	55	0	0	0	0	0	0	0	0	0	0	5	5	5	0	15	6.00833	14.4022	11.605	0	32.0156	10	8.40222	6.59667	0	24.9989	10	10	5	5	30

DEC Response Distribution

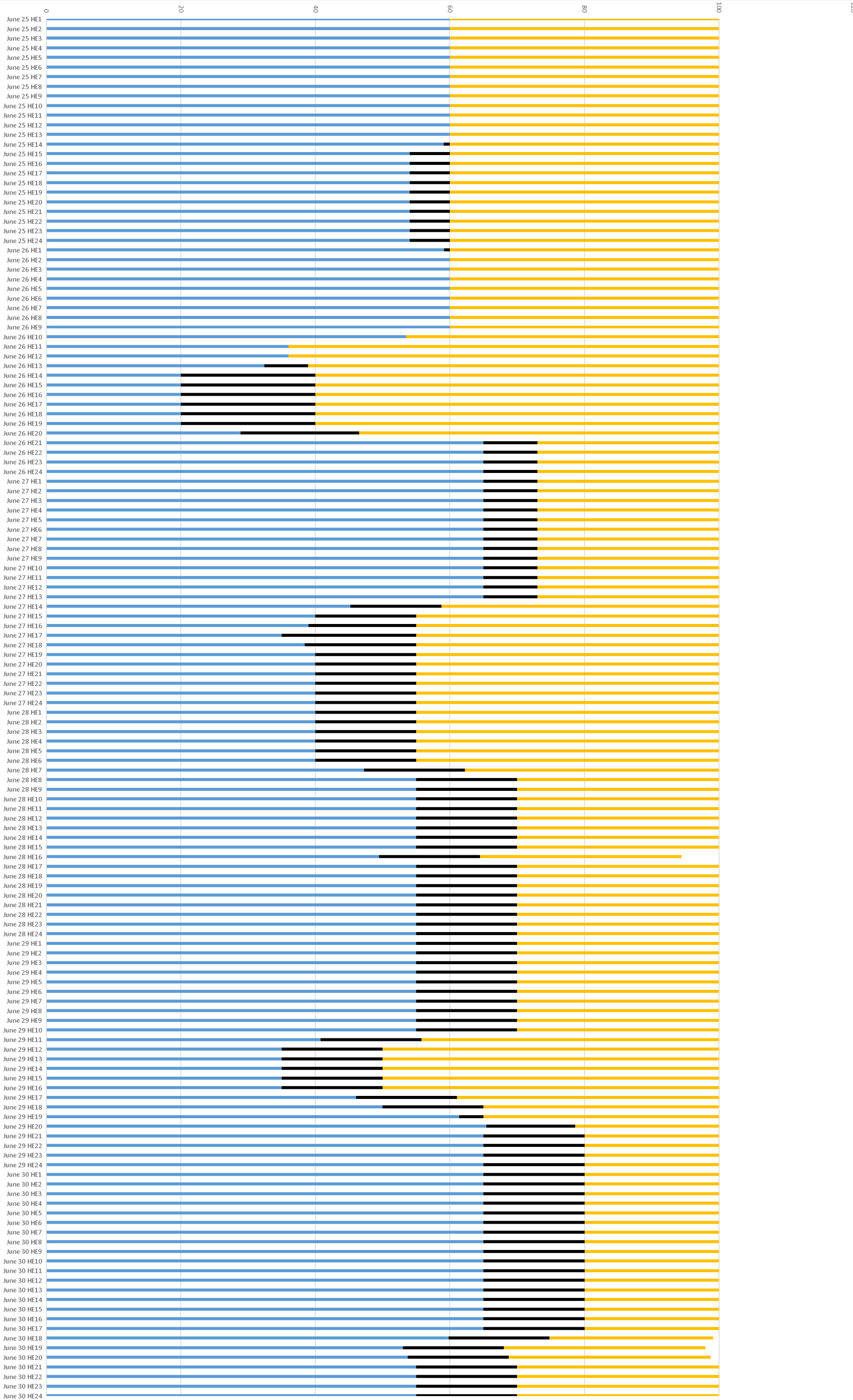
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INC Response Distribution



CR Response Distribution



Hour		LWG Gen	LGS Gen	LMN Gen	IHR Gen	LSN Gen Total	Maximum Obligation on Lower Snake Projects [Gen + Reserves]
June 25 HE1	25-Jun-21 01:00:00	99.55833435	117.1738892	89.03778076	184.283	490	490
June 25 HE2	25-Jun-21 02:00:00	99.29444122	116.4094467	84.97721863	158.092	459	459
June 25 HE3	25-Jun-21 03:00:00	99.33999634	115.6972198	85.30055237	156.523	457	457
June 25 HE4	25-Jun-21 04:00:00	98.50944519	116.0344467	84.7611084	156.905	456	456
June 25 HE5	25-Jun-21 05:00:00	99.43166351	115.8694458	85.09555817	156.361	457	457
June 25 HE6	25-Jun-21 06:00:00	102.5527802	114.8649979	85.54888916	156.502	459	459
June 25 HE7	25-Jun-21 07:00:00	176.4511108	118.3194427	89.31500244	156.341	540	540
June 25 HE8	25-Jun-21 08:00:00	176.8688965	170.5627747	167.9700012	156.773	672	672
June 25 HE9	25-Jun-21 09:00:00	205.8699951	195.4927826	172.4338837	157.227	731	731
June 25 HE10	25-Jun-21 10:00:00	208.2516632	205.3411102	212.3977814	175.866	802	802
June 25 HE11	25-Jun-21 11:00:00	207.1750031	213.9988861	214.8577728	176.669	813	813
June 25 HE12	25-Jun-21 12:00:00	208.1088867	211.5438843	214.9138947	179.159	814	814
June 25 HE13	25-Jun-21 13:00:00	200.9827728	215.9822235	215.3238831	254.406	887	887
June 25 HE14	25-Jun-21 14:00:00	199.3877716	216.4855499	215.3066711	253.759	885	890
June 25 HE15	25-Jun-21 15:00:00	199.9700012	216.7911072	215.6544495	254.587	887	918
June 25 HE16	25-Jun-21 16:00:00	194.1999969	214.9661102	214.2483368	254.114	878	909
June 25 HE17	25-Jun-21 17:00:00	194.410553	214.7583313	250.7427826	254.793	915	946
June 25 HE18	25-Jun-21 18:00:00	194.9905548	216.6699982	255.422226	275.797	943	975
June 25 HE19	25-Jun-21 19:00:00	195.0066681	216.1649933	255.2327728	276.345	943	975
June 25 HE20	25-Jun-21 20:00:00	196.1694489	216.6444397	255.9172211	275.39	944	976
June 25 HE21	25-Jun-21 21:00:00	194.8122253	220.4433289	254.4266663	278.516	948	979
June 25 HE22	25-Jun-21 22:00:00	193.7511139	224.7238922	253.3800049	277.89	950	980
June 25 HE23	25-Jun-21 23:00:00	176.5	225.3155518	254.3438873	258.284	914	945
June 25 HE24	26-Jun-21 00:00:00	173.6333313	222.839447	251.8805542	255.262	904	933
June 26 HE1	26-Jun-21 01:00:00	101.8988876	167.2355499	189.3816681	245.764	704	708
June 26 HE2	26-Jun-21 02:00:00	87.43444824	116.4616699	88.96444702	160.601	453	453
June 26 HE3	26-Jun-21 03:00:00	86.17055511	114.577774	84.30055237	159.295	444	444
June 26 HE4	26-Jun-21 04:00:00	85.22000122	116.4416656	85.56388855	156.304	444	444
June 26 HE5	26-Jun-21 05:00:00	85.08444214	116.2294464	86.02944183	157.103	444	444
June 26 HE6	26-Jun-21 06:00:00	84.90777588	115.7166672	85.22110748	154.923	441	441
June 26 HE7	26-Jun-21 07:00:00	92.62166595	115.3183365	86.44611359	155.593	450	450
June 26 HE8	26-Jun-21 08:00:00	182.9716644	114.3683319	85.86277771	154.799	538	538

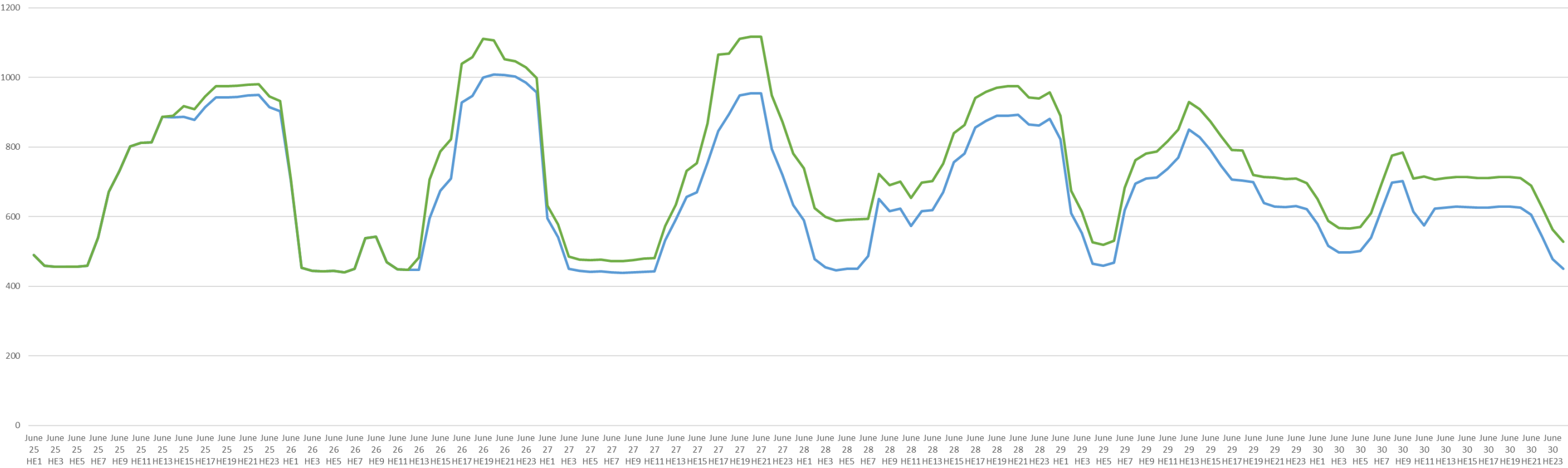
June 26 HE9	26-Jun-21 09:00:00	183.1738892	113.2644424	85.76777649	160.718	543	543
June 26 HE10	26-Jun-21 10:00:00	110.1222229	110.4916687	86.20999908	161.992	469	469
June 26 HE11	26-Jun-21 11:00:00	88.99333191	114.0116653	85.21111298	161.25	449	449
June 26 HE12	26-Jun-21 12:00:00	88.65333557	116.8727798	85.76166534	156.343	448	448
June 26 HE13	26-Jun-21 13:00:00	92.41110992	112.6144409	86.28500366	156.277	448	483
June 26 HE14	26-Jun-21 14:00:00	181.7938843	170.5188904	87.60832977	156.071	596	707
June 26 HE15	26-Jun-21 15:00:00	184.7866669	172.3966675	160.9638824	156.344	674	787
June 26 HE16	26-Jun-21 16:00:00	186.4088898	175.452774	169.8911133	178.066	710	823
June 26 HE17	26-Jun-21 17:00:00	185.5427704	230.8961182	252.6416626	259.251	928	1040
June 26 HE18	26-Jun-21 18:00:00	189.1466675	236.8961182	259.4866638	261.243	947	1058
June 26 HE19	26-Jun-21 19:00:00	246.0950012	235.6444397	257.4511108	260.181	999	1112
June 26 HE20	26-Jun-21 20:00:00	249.8955536	237.4577789	260.2711182	260.951	1009	1107
June 26 HE21	26-Jun-21 21:00:00	250.0166626	236.9427795	260.3833313	260.328	1008	1053
June 26 HE22	26-Jun-21 22:00:00	248.8027802	235.6244507	258.1177673	259.602	1002	1047
June 26 HE23	26-Jun-21 23:00:00	232.1394501	233.8122253	259.4849854	260.377	986	1029
June 26 HE24	27-Jun-21 00:00:00	216.2250061	232.1199951	251.2533264	258.423	958	999
June 27 HE1	27-Jun-21 01:00:00	123.6255569	171.1633301	123.1827774	177.095	595	633
June 27 HE2	27-Jun-21 02:00:00	87.25499725	160.7488861	117.8383331	175.397	541	577
June 27 HE3	27-Jun-21 03:00:00	85.20111084	114.1166687	89.00777435	161.796	450	485
June 27 HE4	27-Jun-21 04:00:00	84.22666931	113.9955521	85.27999878	160.611	444	477
June 27 HE5	27-Jun-21 05:00:00	84.28555298	116.339447	84.54555511	156.814	442	475
June 27 HE6	27-Jun-21 06:00:00	84.83889008	115.6449966	84.91000366	157.358	443	476
June 27 HE7	27-Jun-21 07:00:00	84.59166718	115.456665	84.47499847	155.202	440	472
June 27 HE8	27-Jun-21 08:00:00	84.62333679	114.1744461	84.67111206	155.467	439	472
June 27 HE9	27-Jun-21 09:00:00	84.58166504	115.7922211	84.49333191	155.003	440	475
June 27 HE10	27-Jun-21 10:00:00	86.05388641	114.3005524	85.64555359	155.676	442	479
June 27 HE11	27-Jun-21 11:00:00	92.23000336	108.207222	85.92222595	156.075	442	482
June 27 HE12	27-Jun-21 12:00:00	181.0555573	109.3027802	86.24888611	156.123	533	574
June 27 HE13	27-Jun-21 13:00:00	181.077774	170.577774	85.31944275	155.311	592	635
June 27 HE14	27-Jun-21 14:00:00	184.1555481	231.1049957	85.76333618	155.841	657	732
June 27 HE15	27-Jun-21 15:00:00	190.7388916	235.7738953	88.82555389	154.941	670	754
June 27 HE16	27-Jun-21 16:00:00	194.632782	236.0522156	170.2299957	154.398	755	867
June 27 HE17	27-Jun-21 17:00:00	203.960556	243.8972168	241.5288849	156.302	846	1065
June 27 HE18	27-Jun-21 18:00:00	200.2811127	243.761673	269.8888855	180.857	895	1069
June 27 HE19	27-Jun-21 19:00:00	195.0177765	234.5899963	262.5738831	255.967	948	1111
June 27 HE20	27-Jun-21 20:00:00	194.4044495	235.2372284	265.1700134	259.362	954	1117
June 27 HE21	27-Jun-21 21:00:00	193.8000031	234.8361053	261.1838989	264.262	954	1118

June 27 HE22	27-Jun-21 22:00:00	127.5566635	166.8300018	235.8361053	263.784	794	949
June 27 HE23	27-Jun-21 23:00:00	121.8427811	110.4538879	224.0522156	263.514	720	872
June 27 HE24	28-Jun-21 00:00:00	127.1938858	107.7244415	134.4450073	264.152	634	781
June 28 HE1	28-Jun-21 01:00:00	119.0372238	116.7883301	93.37388611	260.306	590	739
June 28 HE2	28-Jun-21 02:00:00	118.367775	108.0205536	90.23332977	160.867	477	625
June 28 HE3	28-Jun-21 03:00:00	94.71499634	110.2733307	94.3861084	155.738	455	600
June 28 HE4	28-Jun-21 04:00:00	87.16166687	110.1333313	92.30055237	155.945	446	588
June 28 HE5	28-Jun-21 05:00:00	87.11888885	114.8894424	91.99777985	155.745	450	592
June 28 HE6	28-Jun-21 06:00:00	87.64444733	115.0627747	91.9861145	155.821	451	593
June 28 HE7	28-Jun-21 07:00:00	120.2183304	116.9811096	93.52999878	155.66	486	594
June 28 HE8	28-Jun-21 08:00:00	192.1611176	166.2683258	135.4133301	156.744	651	723
June 28 HE9	28-Jun-21 09:00:00	196.414444	169.6627808	93.4422226	156.571	616	691
June 28 HE10	28-Jun-21 10:00:00	180.9511108	197.7434235	89.14444733	155.957	624	701
June 28 HE11	28-Jun-21 11:00:00	128.0261078	200.7544403	89.08499908	155.508	573	653
June 28 HE12	28-Jun-21 12:00:00	127.7827759	199.3483276	132.1661072	156.642	616	698
June 28 HE13	28-Jun-21 13:00:00	125.0055542	202.2727814	135.8777771	155.938	619	703
June 28 HE14	28-Jun-21 14:00:00	126.0361099	202.3327789	186.0500031	156.167	671	753
June 28 HE15	28-Jun-21 15:00:00	193.6655579	202.6450043	204.4661102	156.339	757	840
June 28 HE16	28-Jun-21 16:00:00	196.7005615	200.8777771	203.4155579	180.314	781	864
June 28 HE17	28-Jun-21 17:00:00	197.375	201.847229	204.7672272	252.786	857	941
June 28 HE18	28-Jun-21 18:00:00	197.4333344	201.7061157	223.011673	253.062	875	959
June 28 HE19	28-Jun-21 19:00:00	196.6994476	200.9255524	238.1950073	253.503	889	971
June 28 HE20	28-Jun-21 20:00:00	197.2333374	200.589447	239.1844482	253.639	891	975
June 28 HE21	28-Jun-21 21:00:00	198.2250061	202.0005493	238.3699951	253.692	892	975
June 28 HE22	28-Jun-21 22:00:00	198.0500031	201.6572266	212.1277771	253.461	865	943
June 28 HE23	28-Jun-21 23:00:00	196.678894	202.0833282	210.5888824	253.379	863	940
June 28 HE24	29-Jun-21 00:00:00	201.7822266	207.8755493	217.8555603	253.737	881	957
June 29 HE1	29-Jun-21 01:00:00	191.5994415	177.0183258	207.567215	245.854	822	890
June 29 HE2	29-Jun-21 02:00:00	90.4972229	171.4755554	172.0044403	176.242	610	675
June 29 HE3	29-Jun-21 03:00:00	85.77777863	122.8066635	167.3522186	176.263	552	615
June 29 HE4	29-Jun-21 04:00:00	85.23388672	118.5772247	84.85888672	176.098	465	526
June 29 HE5	29-Jun-21 05:00:00	84.24944305	117.042778	83.24277496	174.659	459	520
June 29 HE6	29-Jun-21 06:00:00	88.37555695	119.5611115	84.64111328	175.822	468	530
June 29 HE7	29-Jun-21 07:00:00	186.4244385	167.7749939	88.31222534	175.976	618	683
June 29 HE8	29-Jun-21 08:00:00	191.8488922	168.1238861	160.4988861	174.726	695	762
June 29 HE9	29-Jun-21 09:00:00	192.9411163	169.2583313	170.8422241	176.863	710	782

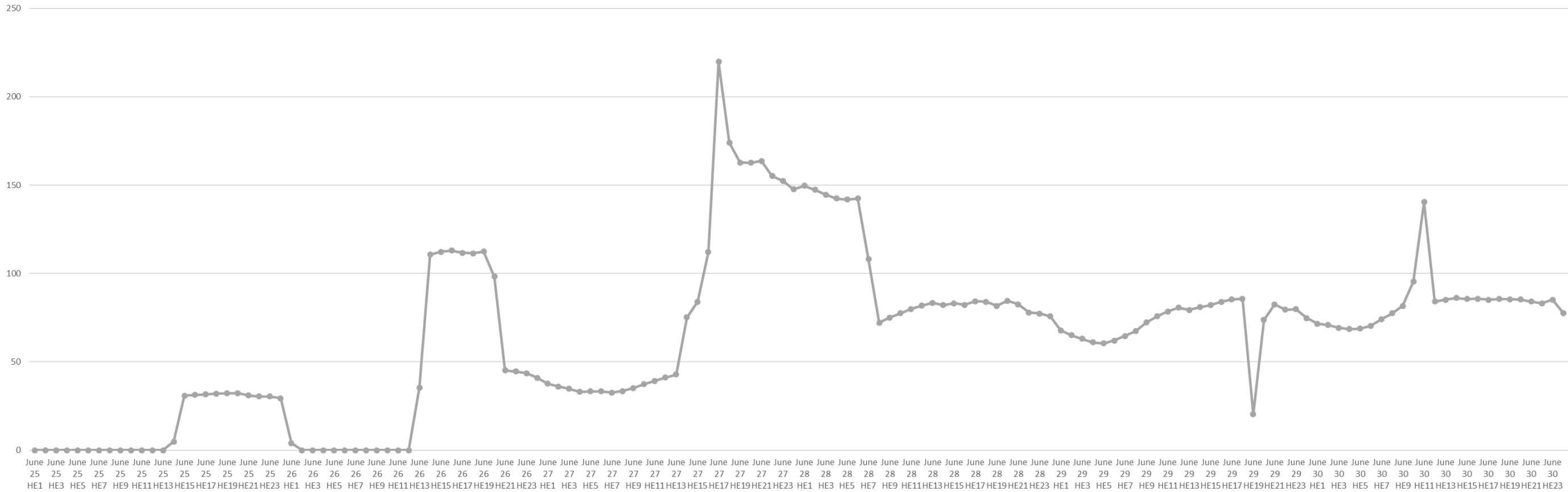
June 29 HE10	29-Jun-21 10:00:00	192.9233398	170.5666656	171.6255493	176.811	712	788
June 29 HE11	29-Jun-21 11:00:00	192.1848755	198.2899933	171.5427704	175.464	737	816
June 29 HE12	29-Jun-21 12:00:00	193.0011444	201.2188873	198.371109	177.251	770	851
June 29 HE13	29-Jun-21 13:00:00	191.7400055	200.7633362	199.8883362	258.307	851	930
June 29 HE14	29-Jun-21 14:00:00	169.4799957	201.5361176	198.2916718	259.001	828	909
June 29 HE15	29-Jun-21 15:00:00	133.9911041	200.132782	198.8288879	259.183	792	874
June 29 HE16	29-Jun-21 16:00:00	120.2388916	172.2116699	197.75	256.818	747	831
June 29 HE17	29-Jun-21 17:00:00	120.8655548	162.4516602	169.4661102	253.93	707	792
June 29 HE18	29-Jun-21 18:00:00	121.2850037	163.3533325	166.1844482	253.484	704	790
June 29 HE19	29-Jun-21 19:00:00	120.5761108	163.803894	167.9072266	247.182	699	720
June 29 HE20	29-Jun-21 20:00:00	120.7366638	167.218338	170.6555481	181.119	640	713
June 29 HE21	29-Jun-21 21:00:00	119.6255569	161.6033325	166.3000031	181.946	629	712
June 29 HE22	29-Jun-21 22:00:00	118.5561142	161.8883362	166.4149933	181.468	628	708
June 29 HE23	29-Jun-21 23:00:00	119.1244431	160.8694458	168.2705536	181.964	630	710
June 29 HE24	30-Jun-21 00:00:00	119.2177811	153.5927734	167.1955566	181.777	622	697
June 30 HE1	30-Jun-21 01:00:00	119.4405518	111.5772247	167.6316681	180.442	579	651
June 30 HE2	30-Jun-21 02:00:00	119.4755554	115.5088882	102.6172256	178.979	517	587
June 30 HE3	30-Jun-21 03:00:00	119.9811096	112.5327759	86.12944794	179.289	498	567
June 30 HE4	30-Jun-21 04:00:00	118.9355545	116.9255524	83.05666351	178.509	497	566
June 30 HE5	30-Jun-21 05:00:00	119.546669	118.043335	84.47666931	179.427	501	570
June 30 HE6	30-Jun-21 06:00:00	120.2377777	151.4122162	88.17778015	180.327	540	611
June 30 HE7	30-Jun-21 07:00:00	121.6072235	162.7677765	153.867218	179.648	618	692
June 30 HE8	30-Jun-21 08:00:00	189.0983276	160.6144409	167.7233276	180.438	698	775
June 30 HE9	30-Jun-21 09:00:00	194.4238892	160.9816742	166.5350037	180.222	702	784
June 30 HE10	30-Jun-21 10:00:00	109.9277802	156.5205536	168.2094421	179.738	614	710
June 30 HE11	30-Jun-21 11:00:00	101.9977798	123.7711105	169.0855556	180.244	575	715
June 30 HE12	30-Jun-21 12:00:00	101.9749985	172.3722229	168.3144379	180.425	623	707
June 30 HE13	30-Jun-21 13:00:00	102.0899963	178.8344421	164.9799957	179.917	626	711
June 30 HE14	30-Jun-21 14:00:00	102.1788864	179.5133362	167.0961151	179.722	629	715
June 30 HE15	30-Jun-21 15:00:00	102.660553	180.3794403	165.0622253	180.194	628	714
June 30 HE16	30-Jun-21 16:00:00	101.8566666	178.5872192	165.9049988	179.136	625	711
June 30 HE17	30-Jun-21 17:00:00	102.047226	179.0144501	165.2594452	180.244	627	712

June 30 HE18	30-Jun-21 18:00:00	102.6038895	180.5294495	164.817215	180.694	629	714
June 30 HE19	30-Jun-21 19:00:00	102.8155518	180.4533386	165.0033264	180.732	629	714
June 30 HE20	30-Jun-21 20:00:00	101.7433319	179.4888916	164.4550018	180.256	626	711
June 30 HE21	30-Jun-21 21:00:00	86.46277618	174.5994415	164.1177826	180.316	605	690
June 30 HE22	30-Jun-21 22:00:00	85.16833496	115.9438858	163.9077759	179.658	545	628
June 30 HE23	30-Jun-21 23:00:00	85.23332977	114.3122253	103.0022202	175.485	478	563
June 30 HE24	01-Jul-21 00:00:00	85.27388763	111.8977814	84.67500305	169.132	451	529

Lower Snake Projects Generation and Generation + Reserves Held [MW]



Total positive Reserves Held on LSN [MW]



From: Solano,Wanda M (BPA) - PGST-5

Sent: Thu Jul 01 07:15:48 2021

To: Klement,Anthony J (BPA) - PGSD-5

Subject: RE: hydro and heat

Importance: Normal

Even a Senator

From: Klement,Anthony J (BPA) - PGSD-5 <ajklement@bpa.gov>

Sent: Thursday, July 1, 2021 7:14 AM

To: Solano,Wanda M (BPA) - PGST-5 <wmsolano@bpa.gov>

Subject: RE: hydro and heat

It looks like we have more people to please. But I think we are on track for that.

T

From: Solano,Wanda M (BPA) - PGST-5 <wmsolano@bpa.gov>

Sent: Thursday, July 1, 2021 7:12 AM

To: Klement,Anthony J (BPA) - PGSD-5 <ajklement@bpa.gov>
Subject: FW: hydro and heat

Asking about reserves.. fyi

From: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>
Sent: Thursday, July 1, 2021 6:44 AM
To: Messemer,Clarisse M (BPA) - PGST-5 <cmmessemer@bpa.gov>
Cc: Solano,Wanda M (BPA) - PGST-5 <wmsolano@bpa.gov>
Subject: RE: hydro and heat

Great- I would love a copy of the report or link to where it is located. Does it have reserves information as well? Kieran wants to make sure we capture that part of the story in our response.

From: Messemer,Clarisse M (BPA) - PGST-5 <cmmessemer@bpa.gov>
Sent: Wednesday, June 30, 2021 2:25 PM
To: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>
Cc: Solano,Wanda M (BPA) - PGST-5 <wmsolano@bpa.gov>
Subject: RE: hydro and heat

Hi Eve. It's an evolving report but we are happy to send it your way. Let us know if you have any questions or feedback.

From: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>
Sent: Wednesday, June 30, 2021 1:11 PM
To: Messemer,Clarisse M (BPA) - PGST-5 <cmmessemer@bpa.gov>
Subject: FW: hydro and heat

Hi Clarisse- Rob mentioned your group produces a LSNK report? Could I get a link to the information? Peter offered to pull together some data but don't want to reinvent the wheel and make sure whatever we provide is consistent with what we are looking at internally.

From: Hawkins,Robert E (BPA) - PGSP-5 <rehawkins@bpa.gov>
Sent: Wednesday, June 30, 2021 1:05 PM
To: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>
Subject: RE: hydro and heat

Thanks for sharing this Eve. I believe PGST now produces LSNK reports that capture how the dams were operated. Given our narrow operating range this time of year I'm guessing it won't show anything too dramatic, but I did take a look through some of the data manually and saw some "peaking" usage even with the narrow operating range.

-Rob

From: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>
Sent: Wednesday, June 30, 2021 12:47 PM
To: Hawkins,Robert E (BPA) - PGSP-5 <rehawkins@bpa.gov>
Subject: FW: hydro and heat

Hi Rob- I forwarded this to Kieran and Birgit to get some feedback on what we want to provide given litigation sensitivities but wanted to give you a heads up these types of requests are starting to come in. Is your group capturing any LSN specific operations for this heat wave?

From: Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Sent: Wednesday, June 30, 2021 12:27 PM
To: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>; Baskerville,Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>
Cc: Cogswell,Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner,Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>
Subject: FW: hydro and heat

I responded to Jeff Allen, Idaho's Power Council Member, question below with: I will asked but it may not be available till after the heat wave period on how the 4 dams operated.

Jeff is trying to respond to Idaho US Senator Jim Risch question on how the 4 Lower Snake River Dams are operating during this heat wave in the region.

This is a heads-up that we are being asked by Sen. Risch (Via Idaho's power council) on our operation of the 4 projects. Please let me know the time table for when this information will become available.

Thanks

John J Williams

John J Williams

Idaho/Nevada Constituent Account Executive

Bonneville Power Administration ~ Constituent Service Office

950 W. Bannock Street, STE. 805

Boise, Idaho 83702

Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<http://www.bpa.gov/news/AboutUs/Logos/PublishingImages/BPA-Logo-color-220.jpg>

From: Jeff Allen <[jallen@NWCouncil.org](mailto:allen@NWCouncil.org)>
Sent: Wednesday, June 30, 2021 11:37 AM
To: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Subject: Re: hydro and heat

Thanks John. Is it possible to get specific information on the dams Senator Risch asked about?

Sent from my iPhone

On Jun 29, 2021, at 3:42 PM, Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov> wrote:

Hi all, Peter is out this week so I'm it. Our Weather and Streamflow Forecasting team is expecting daily, monthly and even all-time high temperatures, creating dangerous conditions. On the power supply side, excellent planning and the timing of Columbia Basin runoff has us in good shape to get through this heat wave. We're also benefiting from the output of the Columbia Generating Station nuclear plant, which recently returned to service after a refueling outage. That adds over 1,100 megawatts of generation in the Northwest. The following is on BPA's website:

As record-breaking heat bears down on the Pacific Northwest this weekend, the Bonneville Power Administration has taken several steps to position the federal power and transmission system to serve its customers during this weather event. BPA is ready to keep lights and air conditioners on even with the triple digit temperatures forecast across the region.

“We take our responsibility to provide reliable electricity to the consumer-owned utilities in the region very seriously,” said BPA Administrator John Hairston. “We are working hard to provide non-stop, reliable electricity this weekend to help residents and businesses stay cool and safe during the heatwave.”

On the Power Services side of BPA, these factors are helping:

- The Columbia Generating Station, a nuclear plant owned by Energy Northwest that produces power marketed by BPA, returned online this past weekend from a spring refueling outage. That adds over a 1,100 megawatts of generation in the Northwest and the West.
- Programmed fish spill on the lower Columbia and Snake rivers transitioned from spring to summer operations, increasing the federal hydropower generation from those facilities.
- The Bureau of Reclamation has the Grand Coulee reservoir well positioned to meet its refill target in early July, freeing up the remaining water flow to pass through the system for both power and non-power purposes.

“Even with streamflows below average levels, we are in a good position to serve our customers over this very hot weekend,” said Senior Vice President of Power Services Suzanne Cooper. “I want to thank our partners at the Bureau of Reclamation and the U.S. Army Corps of Engineers for the work and coordination they provide at the region’s 31 federal dams to ensure reliable operations.”

Despite the lower-than-average water year, there is plenty of water behind Grand Coulee Dam and some snowpack left in the Canadian Rockies. Unlike 2015 and 2001, years with a similar volume of water, the shape of this year’s runoff has been slower with snow gradually melting above Grand Coulee.

On the transmission side, BPA is taking measures to ensure the safe and reliable flow of electricity this weekend. BPA owns and operates more than 15,000 circuit miles of transmission lines across the Northwest and small amounts in Nevada, Utah and California.

“The reliable flow of electricity is vital to public safety,” said BPA Transmission Services Senior Vice President Richard Shaheen. “We’ve put all maintenance projects that we can on pause to ensure our transmission system can handle increased flows and meet our customers’ demands.”

On Thursday, BPA restricted planned maintenance on its transmission grid from 6 a.m. Monday, June 28 through Tuesday, June 29 at 10 p.m., so the federal agency can leverage the system to its greatest use when load is expected to increase with the start of the workweek.

“Having all of our lines available will help relieve congestion on the system,” said Vice President of Transmission Operations Michelle Cathcart. “With these unprecedented temperatures, we want to ensure electricity can move freely and reliably meet customer demands.”

While we have ample power to serve loads during heatwave, we are experiencing transmission related challenges in the Tri-Cities area. On Monday, June 28 as the Tri-Cities experienced record temperatures, we saw a record amount of electricity consumed in the area. We made it through the day, and expect to be able to make it through the rest of this heat wave if there are no unplanned equipment failures or outages, but out of an abundance of caution reviewed load shedding plans with the City of Richland, Franklin PUD, Benton PUD, Benton REA and Columbia REA in case that step becomes necessary to protect the system from broader unplanned power interruptions. While we made it through Monday, we expect electricity in the Tri-Cities loads to peak late afternoon/early evening on Tuesday, June 29. We continue to work with these customers on operational solutions

and voluntary customer conservation to avoid load shedding.

BPA continues to work with these utilities to make appeals to their retail customers to reduce energy use. As you might be aware, Idaho Power is asking its customers to reduce their power consumption. Please do not hesitate to contact me if I can be of any further assistance.

John J Williams

John J Williams

Idaho/Nevada Constituent Account Executive

Bonneville Power Administration ~ Constituent Service Office

950 W. Bannock Street, STE. 805

Boise, Idaho 83702

Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<image001.jpg>

From: Shirley Lindstrom <slindstrom@nwcouncil.org>
Sent: Tuesday, June 29, 2021 12:37 PM
To: Jeff Allen <jallen@NWCouncil.org>; Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>
Cc: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Subject: RE: hydro and heat

Jim has asked for an update on how this heat wave has affected the power system from staff tomorrow at the P4 meeting. I don't know if they will give specifics about how the hydro system was operated. BPA should have a better idea I would think so good that you included John and Peter on this e-mail.

From: Jeff Allen <jallen@NWCouncil.org>
Sent: Tuesday, June 29, 2021 11:35 AM
To: Peter Cogswell <ptcogswell@bpa.gov>
Cc: John Williams <jjwilliams@bpa.gov>; Shirley Lindstrom <slindstrom@nwcouncil.org>
Subject: Fwd: hydro and heat

Do you have something akin to what Sen Risch's staff is seeking? Thanks

Sent from my iPhone

Begin forwarded message:

From: "Neumeyer, Ayla (Risch)" <Ayla_Neumeyer@risch.senate.gov>
Date: June 29, 2021 at 9:26:47 AM MDT
To: Jeff Allen <jallen@nwcouncil.org>
Cc: "Wong, Bryson (Risch)" <Bryson_Wong@risch.senate.gov>
Subject: hydro and heat

Hey Jeff,

Are you tracking/could you help us track the dams re the recent heat waves? In our "when we need them, we really need them" we were thinking this would be the type of situation we point to.

Ayla

Ayla Neumeyer

Senior Legislative Assistant

Senator James E. Risch

202-224-2752

From: Van Calcar, Pamela M (BPA) - PGS-5

Sent: Thu Jul 15 14:33:34 2021

To: Messemer, Clarisse M (BPA) - PGST-5

Subject: FW: Past LSN reports

Importance: Normal

Attachments: Lower Snake Weekly Report_2021_07_02.html; Lower Snake Weekly Report_2021_06_28.html; Lower Snake Weekly Report Draft_2021_06_14.html; LSN Operations Weekly 07_09_2021.docx

FYI -

From: Solano, Wanda M (BPA) - PGST-5 <wmsolano@bpa.gov>

Sent: Thursday, July 15, 2021 1:51 PM

To: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>

Subject: RE: Past LSN reports

These are the last few I did. Moving forward I will work on the word version incorporating your comments and any others I get from Eve, Clarisse, Rob, Tony or anyone else as they come through. The end goal will be to do it in R if that makes sense but not sure that's really the way to go since they each take some hand research to add the narrative. I will do my best to get as many of the revision completed by tomorrow without any particular priority since Clarisse would like them all completed in no particular order. The 06/14 is a draft because I was unable to clean it up entirely.

Wanda

From: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>
Sent: Thursday, July 15, 2021 1:28 PM
To: Solano,Wanda M (BPA) - PGST-5 <wmsolano@bpa.gov>
Cc: Messemer,Clarisse M (BPA) - PGST-5 <cmmessemer@bpa.gov>
Subject: Past LSN reports

Hi Wanda –

Did I miss the publication of the LSN report in June? If you have them, please resend them. I getting follow up questions on the heat event and these may come in handy.

Thanks,

Pam

Pamela M. Van Calcar (She/Her/Hers)

Manager Generation Scheduling

Bonneville Power Administration

905 NE 11th Ave, PGS-5

Portland, OR 97232

503-230-3834

Lower Snake Weekly Report

2021-07-02 (yyyy - mm - dd)

This report covers the operation of the lower Snake river project during the time from July 2nd to July 8th , 2021. The four most downstream dams on the Snake river are referred to as the Lower Snake River projects. These include Lower Granite dam, Little Goose dam, Lower Monumental dam, and Ice Harbor dam.

Operational Context

Weather: A more typical summer weather pattern with warm high pressure in the upper atmosphere over much of the Columbia Basin and a weak upper-level low pressure trough just offshore. Onshore surface wind flow with episodes of marine air west of the Cascades kept temperatures in check, but impacted fire weather with deteriorated air quality. Smoke from two large northern California fires reached central and southern Idaho concurrent with mainly high altitude smoke from British Columbia's wildfires that curled southeastward across north-central and northeast Washington, northern Idaho and northwest Montana. A pattern of isolated thunderstorms continued through the weekend bringing gusty wind and lightning. A weak weather system brought some cooler air into British Columbia.

BPA Load

BPA Area Load data is collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

Lower Snake River Elevations

The Lower Granite (LWG) Forebay Elevation plot shows the data collected from Pi for the period of the report date and 7 days later and represents an average of the hour indicated by the time stamp. The 2021 Fish Operations Plan (FOP) normal (Aug 15 - April 2) elevation range is 733ft min and 738ft max. The MOP elevation range (April 3 - August 14) is 733ft min and 734.5ft max. Navigation Corp of Engineers CBT's direct MOP adjustments outside of seasonal ranges.

The Little Goose (LGS) Forebay Elevation plot shows the data collected from Pi for the period of the report date and 7 days later and represents an average of the hour indicated by the time stamp. The 2021 Fish Operations Plan (FOP) normal (Aug 15 - April 2) elevation range is 633ft min and 638ft max. The MOP elevation range (April 3 - August 14) is 633ft min and 634.5ft max. Navigation Corp of Engineers CBT's direct MOP adjustments outside of seasonal ranges.

The Lower Monumental (LMN) Forebay Elevation plot shows the data collected from Pi for the period of the report date and 7 days later and represents an average of the hour indicated by the time stamp. The 2021 Fish Operations Plan (FOP) normal (Aug 15 - April 2) elevation range is 537ft min and 540ft max. The MOP elevation range (April 3 - August 14) is 537ft min and 538.5ft max. Navigation Corp of Engineers CBT's direct MOP adjustments outside of seasonal ranges.

The Ice Harbor (IHR) Forebay Elevation plot shows the data collected from Pi for the period of the report date and 7 days later and represents an average of the hour indicated by the time stamp. The 2021 Fish Operations Plan (FOP) normal (Aug 15 - April 2) elevation range is 437ft min and 440ft max. The MOP elevation range (April 3 - August 14) is 437ft min and 438.5ft max. Navigation Corp of Engineers CBT's direct MOP adjustments outside of seasonal ranges.

Lower Snake River Inflow as shown at the Lower Granite Plant

The Lower Granite (LWG) InFlow plot shows the data collected from Pi for the period of the report date and 7 days later and represents an average of the hour indicated by the time stamp.

Lower Snake Weekly Report

2021-06-21 (yyyy - mm - dd)

The weekly Lower Snake Weekly Report is created from data collected as of the day of the report and the subsequent seven days. Plots can be scrolled over to view the label, value and timestamp for each point.

Operational Context

Weather: Most intense heat wave ever recorded in BPA Service Territory peaks today/Tuesday...

Last Week:

Temperatures: Climbed to all time record highs, especially in WA, OR and BC. Rainfall: Well below average. Isolated severe thunderstorms triggered PSPS event in central OR on 6/21, and a damaging wind/dust storm in Boise on 6/22. Streamflow: Significant rises above Arrow due to record heat on snowpack, which propped up unregulated flows at The Dalles above 350 kcfs. Recessions elsewhere.

This Week: Temperatures: All time record heat gradually easing after Tue, but heat wave conditions will continue into this coming weekend. Rainfall: Little, if any, except for isolated thunderstorms in OR/ID late in the week. Streamflow: Basinwide recessions, although high snowmelt flows will continue in the upper Columbia.

Week of July 3: Temperatures easing to slightly above average. Below average precipitation, but with isolated thunderstorms increasing in US Basins. Rapid recessions in the mainstem Columbia as BC snowpack depletes and temperatures cool.

Spill Operations – Spill on the Lower Columbia and Lower Snake River dams have transitioned to the FOP summer spill levels. Snakes are passing inflow.

BPA Area Load and the BPA Load Actual data is collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

The Balancing Reserves plot shows the Max Inc Reserves, Max Dec Reserves, Reserves Deployed and the Contingency Reserves Deployed for data collected from Pi that spans the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

Response Factor by Lower Snake River Plant

This is as of the start of the data set.

	BONCHJGCLIHJRJDALGSLMNLWGMCNTDA									
CR_RESPONSE	0	20	30	0	15	0	0	0	20	15
DEC_RESPONSE	0	30	50	0	5	0	0	0	8	7
INC_RESPONSE	0	31	59	0	5	0	0	0	2	3

Lower Snake River Plant Reserves

The Lower Granite (LWG) Reserves plot shows the LWG Dec Balancing Reserves Deployed, the LWG DEC Balancing Reserves Obligated/Held, the LWG INC Balancing Reserves Deployed, the LWG INC Balancing Reserves Obligated/Held, the LWG Minimum Obligation/Held, and the LWG Maximum Obligation/Held. The data is collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

The Lower Goose (LGS) Reserves plot shows the LGS Dec Balancing Reserves Deployed, the LGS DEC Balancing Reserves Obligated/Held, the LGS INC Balancing Reserves Deployed, the LGS INC Balancing Reserves Obligated/Held, the LGS Minimum Obligation/Held, and the LGS Maximum Obligation/Held. The data is collected

from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

The Lower Monumental (LMN) Reserves plot shows the LMN Dec Balancing Reserves Deployed, the LMN DEC Balancing Reserves Obligated/Held, the LMN INC Balancing Reserves Deployed, the LMN INC Balancing Reserves Obligated/Held, the LMN Minimum Obligation/Held, and the LMN Maximum Obligation/Held. The data is collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

The Ice Harbor (IHR) Reserves plot shows the IHR Dec Balancing Reserves Deployed, the IHR DEC Balancing Reserves Obligated/Held, the IHR INC Balancing Reserves Deployed, the IHR INC Balancing Reserves Obligated/Held, the IHR Minimum Obligation/Held, and the IHR Maximum Obligation/Held. The data is collected from Pi for the period of the report date and 7 days later. Each data point that represents an average of the hour indicated by the time stamp.

Lower Snake River Plant Generation Profiles

The Lower Granite (LWG) Generation Profile plot shows the LWG Generation and the LWG Basepoint data collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

The Lower Goose (LGS) Generation Profile plot shows the LGS Generation and the LGS Basepoint data collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

The Lower Monumental (LMN) Generation Profile plot shows the LMN Generation and the LMN Basepoint data collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

The Ice Harbor (IHR) Generation Profile plot shows the IHR Generation and the IHR Basepoint data collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

Lower Snake River Elevations

The Lower Granite (LWG) Forebay Elevation plot shows the data collected from Pi for the period of the report date and 7 days later and represents an average of the hour indicated by the time stamp. The 2021 Fish Operations Plan (FOP) normal (Aug 15 - April 2) elevation range is 733ft min and 738ft max. The MOP elevation range (April 3 - August 14) is 733ft min and 734.5ft max. Navigation Corp of Engineers CBT's direct MOP adjustments outside of seasonal ranges.

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The Lower Monumental (LMN) Forebay Elevation plot shows the data collected from Pi for the period of the report date and 7 days later and represents an average of the hour indicated by the time stamp. The 2021 Fish Operations Plan (FOP) normal (Aug 15 - April 2) elevation range is 537ft min and 540ft max. The MOP elevation range (April 3 - August 14) is 537ft min and 538.5ft max. Navigation Corp of Engineers CBT's direct MOP adjustments outside of seasonal ranges.

The Ice Harbor (IHR) Forebay Elevation plot shows the data collected from Pi for the period of the report date and 7 days later and represents an average of the hour indicated by the time stamp. The 2021 Fish Operations Plan (FOP) normal (Aug 15 - April 2) elevation range is 437ft min and 440ft max. The MOP elevation range (April 3 - August 14) is 437ft min and 438.5ft max. Navigation Corp of Engineers CBT's direct MOP adjustments outside of seasonal ranges.

Lower Snake River Inflow as shown at the Lower Granite Plant

The Lower Granite (LWG) InFlow plot shows the data collected from Pi for the period of the report date and 7 days later and represents an average of the hour indicated by the time stamp.

Lower Snake River Outflows

The Lower Granite (LWG) Outflow plot shows the LWG Total Discharge, the LWG Spill Discharge, and LWG Rate of Turbine Discharge data collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

The Lower Goose (LGS) Outflow plot shows the LGS Total Discharge, the LGS Spill Discharge, and LGS Rate of Turbine Discharge data collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

The Lower Monumental (LMN) Outflow plot shows the LMN Total Discharge, the LMN Spill Discharge, and LMN Rate of Turbine Discharge data collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

The Ice Harbor (IHR) Outflow plot shows the IHR Total Discharge, the IHR Spill Discharge, and IHR Rate of Turbine Discharge data collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

Lower Snake River Response Factors and Contingency Reserves Held

Lower Snake Weekly Report

2021-06-07 (yyyy - mm - dd)

The weekly Lower Snake Weekly Report is created from data collected as of the day of the report and the subsequent seven days. Plots can be scrolled over to view the label, value and timestamp for each point. The plot points are an average of the hour represented by the time stamp.

Temperatures over this reporting period were near record warmth Tue-Thu, then cooled sharply to below average. Precipitation was below average, but with scattered thunderstorms Wed-Fri and more showers this weekend concentrated in BC and western WA. Streamflow hit the peak of spring runoff at Grand Coulee and The Dalles this past weekend, driven mostly by mostly snowmelt in BC, western MT, northern ID. One last, minor snowmelt peak in the Snake basin (peaking near 90kcs), but below the mid-May peak.

BPA Area Load (green line) and the BPA Load Actual (purple line) data is collected from Pi for the period of the report date and 7 days later. The Pi data is pulled from the Pi entries (tags) associated with the Pi Real Time OPS display. Each data point that makes up the plots represents an average of the hour indicated by the time stamp.

Balancing Reserves consists of the System INC Balancing Reserve Obligation (green line), the System DEC Balancing Reserve Obligation (purple line), the System Balancing Reserves Deployed (turquoise line) and the System Contingency Reserves Deployed (color line). The data collected from Pi spans the period of the report date and 7 days later. The Pi data is pulled from the Pi entries (tags) associated with the Pi Reserves deployed display. Each data point that makes up the plots represents an average of the hour indicated by the time stamp.

Response Factor by Plant

This is as of the start of the data set.

	B	O	N	C	H	J	G	C	L	I	H	R	J	D	A	L	G	S	L	M	N	L	W	G	M	C	N	T	D	A
CR_RESPONSE	0	28	47	0	10	0	0	0	0	0	15																			
DEC_RESPONSE	0	40	45	0	5	0	0	0	0	0	10																			
INC_RESPONSE	0	30	45	0	10	0	0	0	0	0	15																			

LWG Reserves consists of the LWG Regulating Dec Res (tan line), the LWG Regulating Inc Res (purple line), the LWG Spinning Res (green line), the LWG Standby Capacity (pink line) data collected from Pi for the period of the report date and 7 days later. The Pi data is pulled from the Pi entries (tags) associated with the Pi Reserves deployed display. Each data point that makes up the plots represents an average of the hour indicated by the time stamp.

LGS Reserves consists of the LGS Regulating Dec Res (tan line), the LGS Regulating Inc Res (purple line), the LGS Spinning Res (green line), the LGS Standby Capacity (pink line) data collected from Pi for the period of the report date and 7 days later. The Pi data is pulled from the Pi entries (tags) associated with the Pi Reserves deployed display. Each data point that makes up the plots represents an average of the hour indicated by the time stamp.

LMN Reserves consists of the LMN Regulating Dec Res (tan line), the LMN Regulating Inc Res (purple line), the LMN Spinning Res (green line), the LMN Standby Capacity (pink line) data collected from Pi for the period of the report date and 7 days later. The Pi data is pulled from the Pi entries (tags) associated with the Pi Reserves deployed display. Each data point that makes up the plots represents an average of the hour indicated by the time stamp.

IHR Reserves consists of the IHR Regulating Dec Res (tan line), the IHR Regulating Inc Res (purple line), the IHR Spinning Res (green line), the IHR Standby Capacity (pink line) data collected from Pi for the period of the report date and 7 days later. The Pi data is pulled from the Pi entries (tags) associated with the Pi Reserves deployed display. Each data point that makes up the plots represents an average of the hour indicated by the time stamp.

LWG Generation Profile consists of the LWG_Gen (green line) and the LWG_Basepoint (purple line) data collected from Pi for the period of the report date and 7 days later. The Pi data is pulled from the Pi entries (tags) associated

with the Pi Real Time OPS display. Each data point that makes up the plots represents an average of the hour indicated by the time stamp.

LGS Generation Profile consists of the LGS_Gen (green line) and the LGS_Basepoint (purple line) data collected from Pi for the period of the report date and 7 days later. The Pi data is pulled from the Pi entries (tags) associated with the Pi Real Time OPS display. Each data point that makes up the plots represents an average of the hour indicated by the time stamp.

LMN Generation Profile consists of the LMN_Gen (green line) and the LMN_Basepoint (purple line) data collected from Pi for the period of the report date and 7 days later. The Pi data is pulled from the Pi entries (tags) associated with the Pi Real Time OPS display. Each data point that makes up the plots represents an average of the hour indicated by the time stamp.

IHR Generation Profile consists of the IHR_Gen (green line) and the IHR_Basepoint (purple line) data collected from Pi for the period of the report date and 7 days later. The Pi data is pulled from the Pi entries (tags) associated with the Pi Real Time OPS display. Each data point that makes up the plots represents an average of the hour indicated by the time stamp.

The Lower Granite (LWG) Forebay Elevation (turquoise line) data is collected from Pi for the period of the report date and 7 days later. The 2021 Fish Operations Plan (FOP) normal (Aug 15 - April 2) elevation range is 733ft min and 738ft max. The MOP elevation range (April 3 - August 14) is 733ft min and 734.5ft max. The Pi data is pulled from the Pi entries (tags) associated with the Pi Real Time OPS display. Each data point that makes up the plots represents an average of the hour indicated by the time stamp. Navigation Corp of Engineers CBT's direct MOP adjustments outside of seasonal ranges.

The Little Goose (LGS) Forebay Elevation (turquoise line) data is collected from Pi for the period of the report date and 7 days later. The 2021 Fish Operations Plan (FOP) normal (Aug 15 - April 2) elevation range is 633ft min and 638ft max. The MOP elevation range (April 3 - August 14) is 633ft min and 634.5ft max. The Pi data is pulled from the Pi entries (tags) associated with the Pi Real Time OPS display. Each data point that makes up the plots represents an average of the hour indicated by the time stamp. Navigation Corp of Engineers CBT's direct MOP adjustments outside of seasonal ranges.

The Lower Monumental (LMN) Forebay Elevation (turquoise line) data is collected from Pi for the period of the report date and 7 days later. The 2021 Fish Operations Plan (FOP) normal (Aug 15 - April 2) elevation range is 537ft min and 540ft max. The MOP elevation range (April 3 - August 14) is 537ft min and 538.5ft max. The Pi data is pulled from the Pi entries (tags) associated with the Pi Real Time OPS display. Each data point that makes up the plots represents an average of the hour indicated by the time stamp. Navigation Corp of Engineers CBT's direct MOP adjustments outside of seasonal ranges.

The Ice Harbor (IHR) Forebay Elevation (turquoise line) data is collected from Pi for the period of the report date and 7 days later. The 2021 Fish Operations Plan (FOP) normal (Aug 15 - April 2) elevation range is 437ft min and 440ft max. The MOP elevation range (April 3 - August 14) is 437ft min and 438.5ft max. The Pi data is pulled from the Pi entries (tags) associated with the Pi Real Time OPS display. Each data point that makes up the plots represents an average of the hour indicated by the time stamp. Navigation Corp of Engineers CBT's direct MOP adjustments outside of seasonal ranges.

LWG InFlow (green line) is shown for the period of the report date and 7 days later. The Pi data is pulled from the Pi entries (tags) associated with the Pi Real Time OPS display. Each data point that makes up the plots represents an average of the hour indicated by the time stamp.

LWG Outflows consist of the LWG Total Discharge (green line), the LWG Spill Discharge (purple line), and LWG Rate of Turbine Discharge (turquoise) data collected from Pi for the period of the report date and 7 days later. The Pi data is pulled from the Pi entries (tags) associated with the Pi Real Time OPS display. Each data point that makes up the plots represents an average of the hour indicated by the time stamp.

LGS Outflows consist of the LGS Total Discharge (green line), the LGS Spill Discharge (purple line), and LGS Rate of Turbine Discharge (turquoise) data collected from Pi for the period of the report date and 7 days later. The Pi data is pulled from the Pi entries (tags) associated with the Pi Real Time OPS display. Each data point that makes up the plots represents an average of the hour indicated by the time stamp.

LMN Outflows consist of the LMN Total Discharge (green line), the LMN Spill Discharge (purple line), and LMN Rate of Turbine Discharge (turquoise) data collected from Pi for the period of the report date and 7 days later. The Pi data

is pulled from the Pi entries (tags) associated with the Pi Real Time OPS display. Each data point that makes up the plots represents an average of the hour indicated by the time stamp.

IHR Outflows consist of the IHR Total Discharge (green line), the IHR Spill Discharge (purple line), and IHR Rate of Turbine Discharge (turquoise) data collected from Pi for the period of the report date and 7 days later. The Pi data is pulled from the Pi entries (tags) associated with the Pi Real Time OPS display. Each data point that makes up the plots represents an average of the hour indicated by the time stamp.

GCL Generation Profile consists of the GCL_Gen (green line), GCL_Basepoint (purple line), and Curr_Fed_Rqst_GCL (turquoise line) data collected from Pi for the period of the report date and 7 days later. The Pi data is pulled from the Pi entries (tags) associated with the Pi Real Time OPS display. Each data point that makes up the plots represents an average of the hour indicated by the time stamp.

CHJ Generation Profile consists of the CHJ_Gen (green line), CHJ_Basepoint (purple line), and Curr_Fed_Rqst_CHJ (turquoise line) data collected from Pi for the period of the report date and 7 days later. The Pi data is pulled from the Pi entries (tags) associated with the Pi Real Time OPS display. Each data point that makes up the plots represents an average of the hour indicated by the time stamp.

LOWER SNAKE RIVER PROJECT OPERATIONS WEEKLY REPORT, JULY 2 -8, 2021

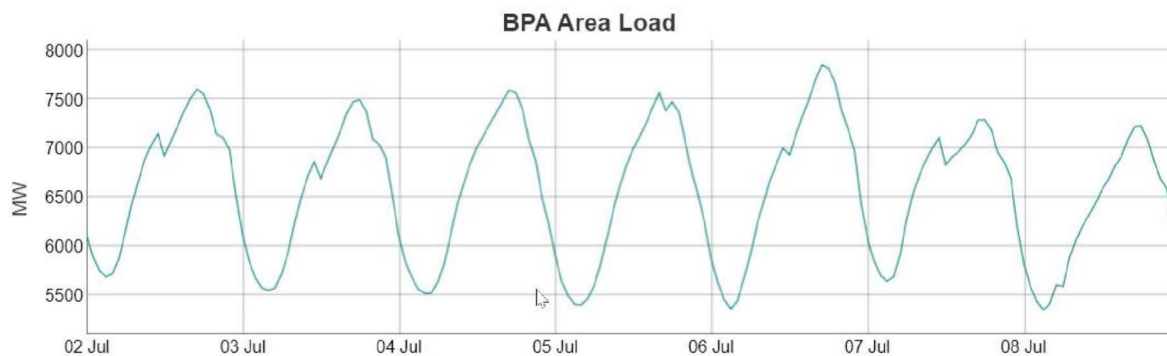
SUMMARY

This report covers the operation of the lower Snake river project during the time from July 2nd to July 8th, 2021. The four most downstream dams on the Snake River are referred to as the Lower Snake River projects. These include Lower Granite dam, Little Goose dam, Lower Monumental dam, and Ice Harbor dam.

Weather: A more typical summer weather pattern with warm high pressure in the upper atmosphere over much of the Columbia Basin and a weak upper-level low pressure trough just offshore. Onshore surface wind flow with episodes of marine air west of the Cascades kept temperatures in check, but impacted fire weather with deteriorated air quality. Smoke from two large northern California fires reached central and southern Idaho concurrent with mainly high altitude smoke from British Columbia's wildfires that curled southeastward across north-central and northeast Washington, northern Idaho and northwest Montana. A pattern of isolated thunderstorms continued through the weekend bringing gusty wind and lightning. A weak weather system brought some cooler air into British Columbia.

LOAD PROFILE

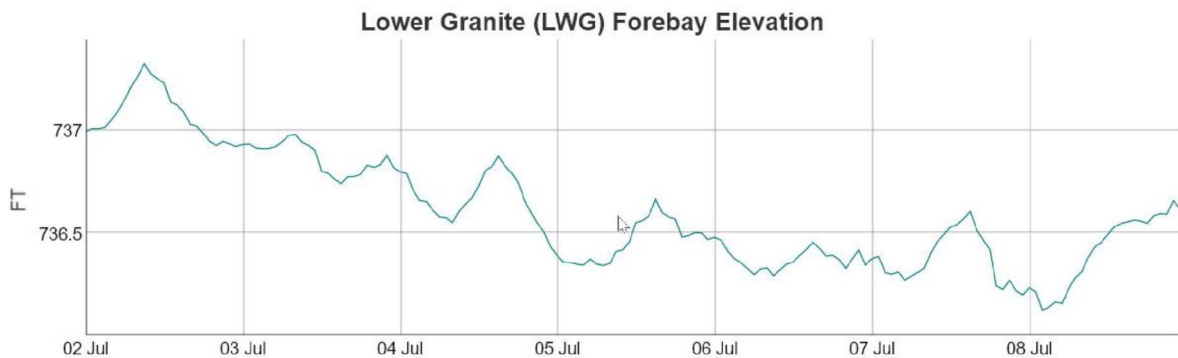
Loads are high in the afternoon and evenings, corresponding to the highest temperatures. This graph shows BPA's area load across the period.



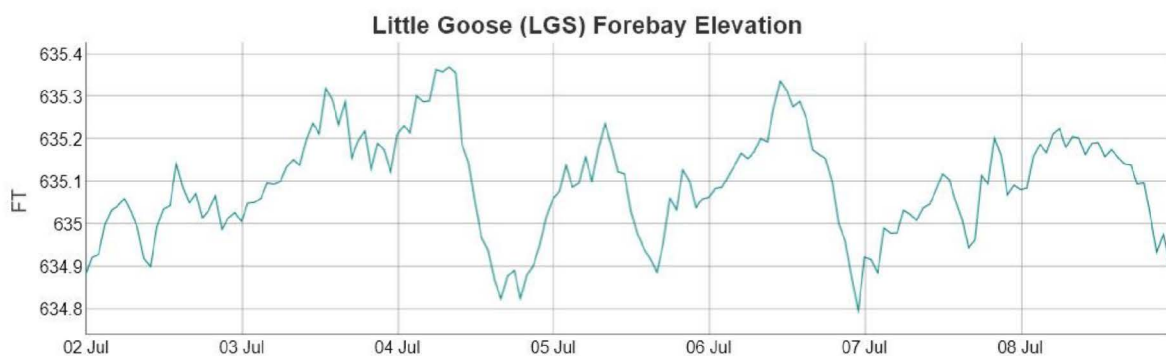
RESERVOIR STORAGE

The 2021 Fish Operations Plan (FOP) provides the elevation ranges for each project listed below. Navigation Corp of Engineers CBT's direct MOP adjustments outside of seasonal ranges. Spill requirements were modified by the Salmon managers to help maintain lower temperatures in this section of the Snake River.

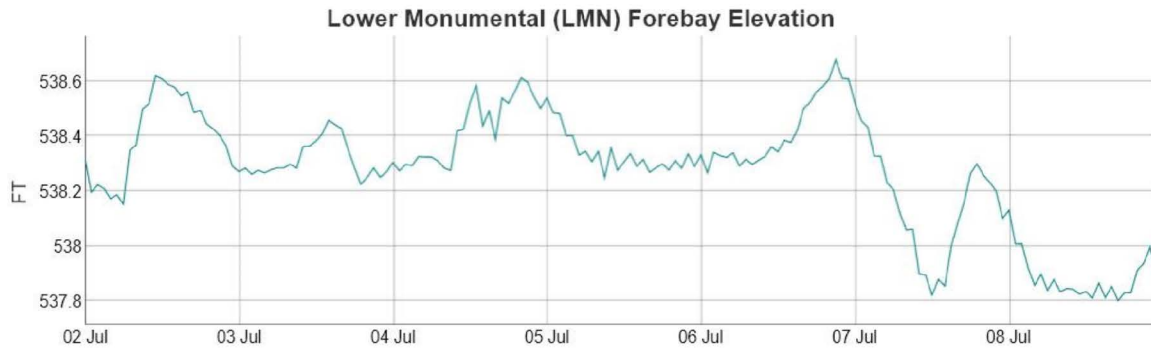
Lower Granite: Normal (Aug 15 - April 2) elevation range is 733ft min and 738ft max. The MOP elevation range (April 3 - August 14) is 733ft min and 734.5ft max. Current operational guidance is 736ft min and 737.5ft max.



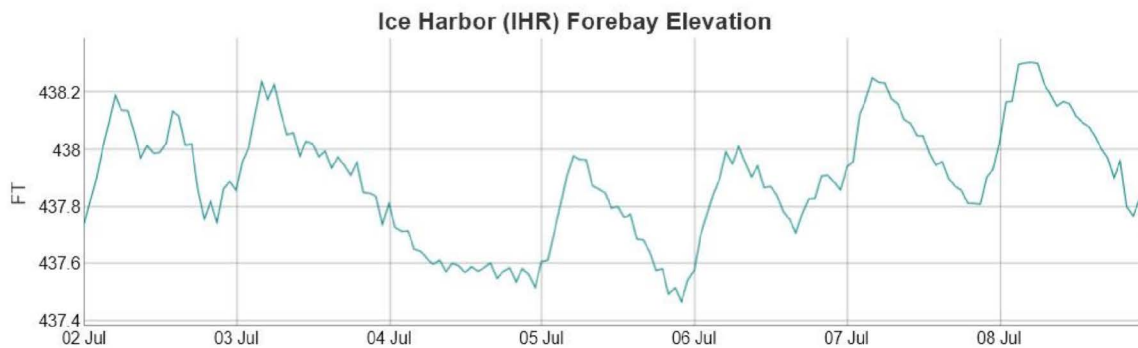
Little Goose: Normal (Aug 15 - April 2) elevation range is 633ft min and 638ft max. The MOP elevation range (April 3 - August 14) is 633ft min and 634.5ft max. Current operational guidance is 634ft min and 635.5ft max.



Lower Monumental: Normal (Aug 15 - April 2) elevation range is 537ft min and 540ft max. The MOP elevation range (April 3 - August 14) is 537ft min and 538.5ft max. Current operational guidance is 537.5ft min and 539 max.

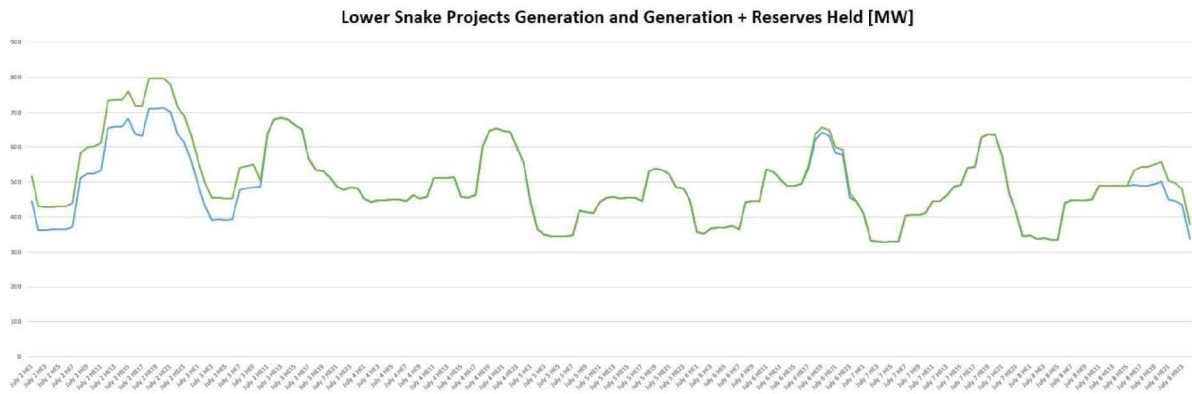


Ice Harbor: Normal (Aug 15 - April 2) elevation range is 437ft min and 440ft max. The MOP elevation range (April 3 - August 14) is 437ft min and 438.5ft max. Current operational guidance is 437ft min and 438.5ft max.

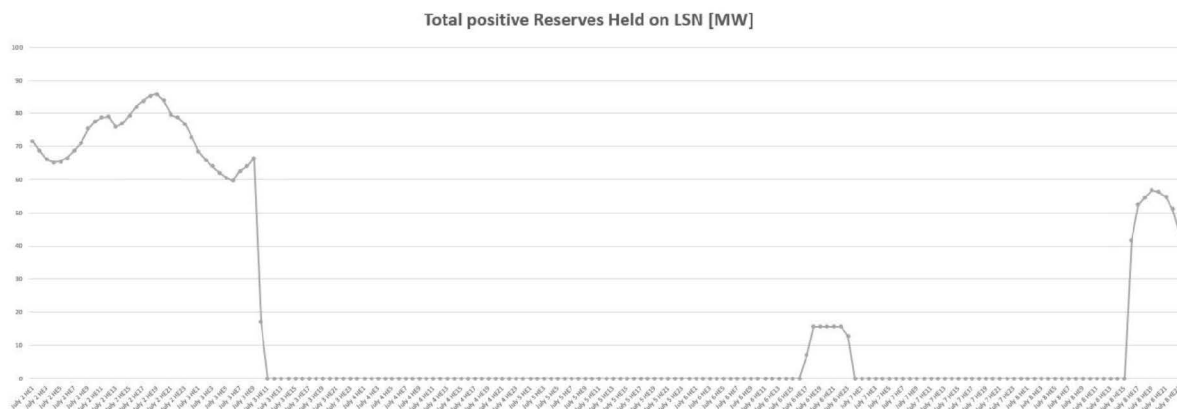


GENERATION AND RESERVES

BPA must hold reserves in the event of a contingency, as well as to balance against forecast error and generation variation such as from wind generation projects. During the spring and summer, due to operational limitations to support salmon migration, the holding of reserves complicates river operations and is often avoided on the lower Snake River.

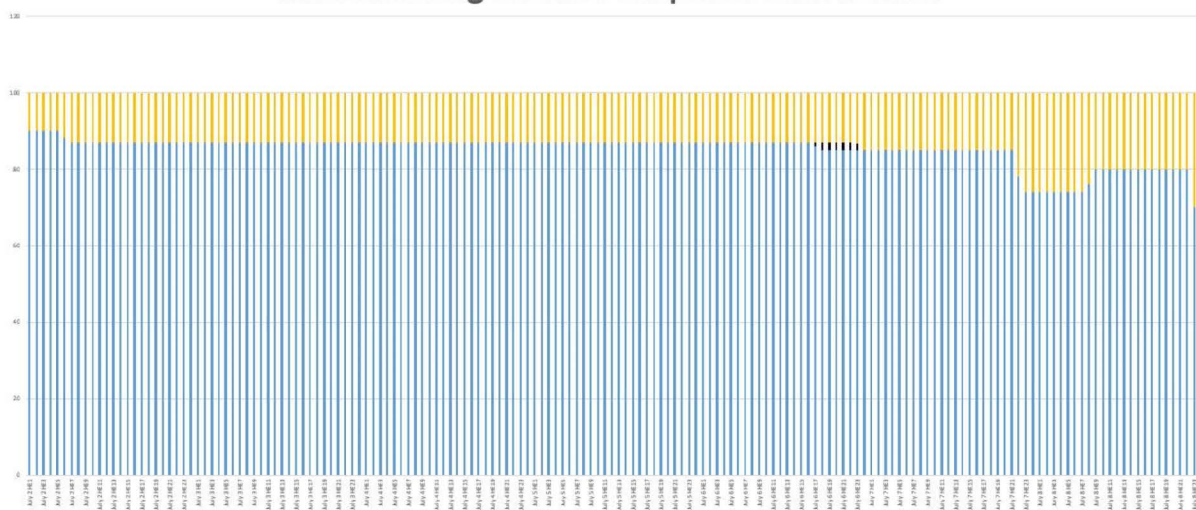


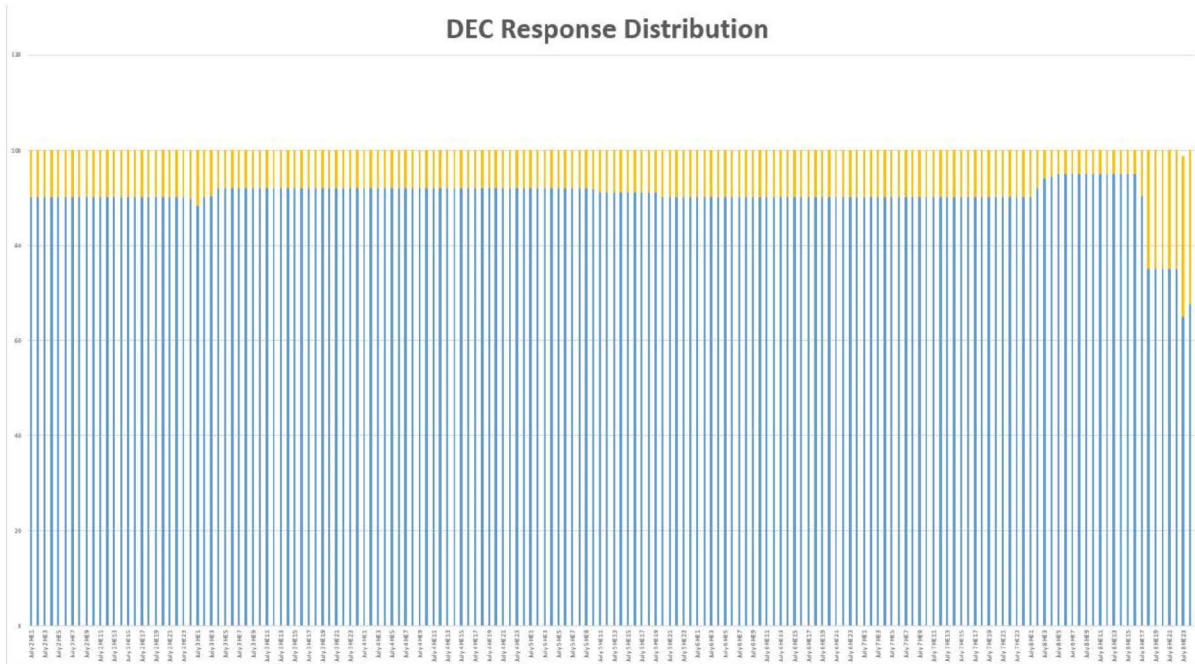
The next graph shows the magnitude of reserves held on the Lower Snake projects, as much as 86MW.



The following graphs illustrates the distribution of INC and DEC Balancing reserve allocations amongst the 3 river reaches. The distributions are based on ratios which typically reflect percentages. The Lower Columbia River reach is in yellow, the Upper Columbia in blue, and the Lower Snakes is shown in black. The deployment of balancing reserves complicates river operations during the fish passage season. Dynamic changes in generation to support balancing reserves must be matched by dynamic changes in spill amounts, as required at some Lower Snake River projects as a percentage of their total flow. Up to 2% of BPA's balancing reserve obligation was held on the Lower Snake River. There were no DEC reserves held over the period.

INC Balancing Reserve Response Distribution





Contingency reserves are generation capacity set aside as backup should there be an unexpected loss of generation in the region. The following table shows the distribution of the contingency reserve allocation across the three river systems. The allocation is a ratio that typically matches percentages. The Lower Columbia river reach is in yellow, the Upper Columbia in blue, and the Lower Snakes is shown in black. Up to 15% of BPA's balancing reserve obligation was held on the Lower Snake River.

120

This table shows the allocation of reserves, typically as a percentage, of the overall obligation required of BPA. DEC reserves require a project to decrease generation when another project generates more than they are scheduled to generate. This is a common occurrence for variable energy resources such as wind and solar generation. INC reserves are to cover for under generation which is typically from these same variable energy resource projects. Contingency reserves are to cover for the unexpected loss of generation and must be immediately available.

	LWG			LGS			LMN			IHR			LSN Total		
Hour	DEC	INC	CR	DEC	INC	CR	DEC	INC	CR	DEC	INC	CR	DEC	INC	CR
July2 HE1	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
July2 HE2	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
July2 HE3	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
July2 HE4	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
July2 HE5	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
July2 HE6	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
July2 HE7	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
July2 HE8	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
July2 HE9	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
July2 HE10	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
July2 HE11	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
July2 HE12	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
July2 HE13	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
July2 HE14	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
July2 HE15	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
July2	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15

HE16																
July2 HE17	0	0	5	0	0	5	0	0	5	0	0	0	0	0	0	15
July2 HE18	0	0	5	0	0	5	0	0	5	0	0	0	0	0	0	15
July2 HE19	0	0	5	0	0	5	0	0	5	0	0	0	0	0	0	15
July2 HE20	0	0	5	0	0	5	0	0	5	0	0	0	0	0	0	15
July2 HE21	0	0	5	0	0	5	0	0	5	0	0	0	0	0	0	15
July2 HE22	0	0	5	0	0	5	0	0	5	0	0	0	0	0	0	15
July2 HE23	0	0	5	0	0	5	0	0	5	0	0	0	0	0	0	15
July2 HE24	0	0	5	0	0	5	0	0	5	0	0	0	0	0	0	15
July 3 HE1	0	0	5	0	0	5	0	0	5	0	0	0	0	0	0	15
July 3 HE2	0	0	5	0	0	5	0	0	5	0	0	0	0	0	0	15
July 3 HE3	0	0	5	0	0	5	0	0	5	0	0	0	0	0	0	15
July 3 HE4	0	0	5	0	0	5	0	0	5	0	0	0	0	0	0	15
July 3 HE5	0	0	5	0	0	5	0	0	5	0	0	0	0	0	0	15
July 3 HE6	0	0	5	0	0	5	0	0	5	0	0	0	0	0	0	15
July 3 HE7	0	0	5	0	0	5	0	0	5	0	0	0	0	0	0	15
July 3 HE8	0	0	5	0	0	5	0	0	5	0	0	0	0	0	0	15
July 3 HE9	0	0	5	0	0	5	0	0	5	0	0	0	0	0	0	15
July 3 HE10	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	4
July 3 HE11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 3 HE12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 3 HE13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 3 HE14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HE15																
July 3 HE16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 3 HE17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 3 HE18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 3 HE19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 3 HE20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 3 HE21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 3 HE22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 3 HE23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 3 HE24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4 HE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4 HE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4 HE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4 HE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4 HE5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4 HE6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4 HE7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4 HE8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4 HE9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4 HE10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4 HE11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4 HE12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4 HE13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HE14																
July 4 HE15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4 HE16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4 HE17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4 HE18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4 HE19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4 HE20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4 HE21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4 HE22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4 HE23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 4 HE24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5 HE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5 HE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5 HE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5 HE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5 HE5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5 HE6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5 HE7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5 HE8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5 HE9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5 HE10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5 HE11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5 HE12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HE13																
July 5 HE14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5 HE15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5 HE16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5 HE17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5 HE18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5 HE19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5 HE20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5 HE21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5 HE22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5 HE23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 5 HE24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 6 HE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 6 HE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 6 HE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 6 HE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 6 HE5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 6 HE6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 6 HE7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 6 HE8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 6 HE9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 6 HE10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 6 HE11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HE12																
July 6 HE13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 6 HE14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 6 HE15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 6 HE16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 6 HE17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
July 6 HE18	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	0
July 6 HE19	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	0
July 6 HE20	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	0
July 6 HE21	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	0
July 6 HE22	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	0
July 6 HE23	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	0
July 6 HE24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7 HE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7 HE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7 HE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7 HE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7 HE5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7 HE6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7 HE7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7 HE8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7 HE9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7 HE10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HE11																
July 7 HE12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7 HE13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7 HE14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7 HE15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7 HE16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7 HE17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7 HE18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7 HE19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7 HE20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7 HE21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7 HE22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7 HE23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 7 HE24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 8 HE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 8 HE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 8 HE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 8 HE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 8 HE5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 8 HE6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 8 HE7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 8 HE8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 8 HE9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HE10																
July 8 HE11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 8 HE12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 8 HE13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 8 HE14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 8 HE15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July 8 HE16	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	8
July 8 HE17	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	10
July 8 HE18	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	10
July 8 HE19	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	10
July 8 HE20	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	10
July 8 HE21	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	10
July 8 HE22	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	10
July 8 HE23	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	10
July 8 HE24	0	0	0	0	0	5	0	0	5	0	0	0	0	0	0	10

From: Van Calcar, Pamela M (BPA) - PGS-5

Sent: Fri Jul 02 11:13:47 2021

To: Klement,Anthony J (BPA) - PGSD-5;Solano,Wanda M (BPA) - PGST-5

Cc: Messemer,Clarisse M (BPA) - PGST-5

Subject: RE: hydro and heat

Importance: Normal

I would send it to the following:

Please send this copy out. I would use the following distribution:

Myself

Clarisse Messemer

Rob Hawkins

Chris Siewert

Eve James

Erin Riley

Peter Williams

Rob Petty

Ryan Egerdahl

I think Eve is doing a consolidated report for Suzanne, Kieran, Birgit and John Williams.

Feel free to check with Eve regarding these final three names.

From: Klement,Anthony J (BPA) - PGSD-5 <ajklement@bpa.gov>

Sent: Friday, July 2, 2021 11:09 AM

To: Solano,Wanda M (BPA) - PGST-5 <wmsolano@bpa.gov>; Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>

Cc: Messemer,Clarisse M (BPA) - PGST-5 <cmmessemer@bpa.gov>

Subject: RE: hydro and heat

I think I saw Suzanne Cooper, Kieran Connolly, John Williams, Rob Hawkins, and Birgit Koehler.

Tony

From: Solano,Wanda M (BPA) - PGST-5 <wmsolano@bpa.gov>
Sent: Friday, July 2, 2021 11:03 AM
To: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>
Cc: Klement,Anthony J (BPA) - PGSD-5 <ajklement@bpa.gov>; Messemer,Clarisse M (BPA) - PGST-5 <cmmessemer@bpa.gov>
Subject: FW: hydro and heat

Pam,

Once you finish with your final review, please let me know who you'd like it sent out to if anyone in addition to Eve James, Peter Williams and Erin Riley (see below).

Wanda

From: James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>
Sent: Friday, July 2, 2021 11:01 AM
To: Solano,Wanda M (BPA) - PGST-5 <wmsolano@bpa.gov>
Cc: Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; Riley,Erin A (BPA) - PGPR-5 <eariley@bpa.gov>
Subject: RE: hydro and heat

Hi Wanda-

Could you include Peter Williams and Erin Riley on your report distribution? They will be helping pull information together if we need additional data to tell the heat wave story.

Thanks,

Eve

From: James,Eve A L (BPA) - PG-5
Sent: Friday, July 2, 2021 7:13 AM
To: Solano,Wanda M (BPA) - PGST-5 <wmsolano@bpa.gov>
Subject: RE: hydro and heat

Thanks Wanda!

Sent from Workspace ONE Boxer

On Jul 2, 2021 8:00 AM, "Solano,Wanda M (BPA) - PGST-5" <wmsolano@bpa.gov> wrote:

We are putting the finishing touches on it and will have it to you later today

From: James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>
Sent: Friday, July 2, 2021 6:49 AM
To: Solano,Wanda M (BPA) - PGST-5 <wmsolano@bpa.gov>
Subject: FW: hydro and heat

Hi Wanda-

Do you have a copy of this report or a link to where it is located?

Thanks,

Eve

From: James,Eve A L (BPA) - PG-5
Sent: Thursday, July 1, 2021 6:44 AM
To: Messemer,Clarisse M (BPA) - PGST-5 <cmmessemer@bpa.gov>
Cc: Solano,Wanda M (BPA) - PGST-5 <wmsolano@bpa.gov>
Subject: RE: hydro and heat

Great- I would love a copy of the report or link to where it is located. Does it have reserves information as well? Kieran wants to make sure we capture that part of the story in our response.

From: Messemer,Clarisse M (BPA) - PGST-5 <cmmessemer@bpa.gov>
Sent: Wednesday, June 30, 2021 2:25 PM
To: James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>
Cc: Solano,Wanda M (BPA) - PGST-5 <wmsolano@bpa.gov>
Subject: RE: hydro and heat

Hi Eve. It's an evolving report but we are happy to send it your way. Let us know if you have any questions or feedback.

From: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>
Sent: Wednesday, June 30, 2021 1:11 PM
To: Messemer,Clarisse M (BPA) - PGST-5 <cmmessemer@bpa.gov>
Subject: FW: hydro and heat

Hi Clarisse- Rob mentioned your group produces a LSNK report? Could I get a link to the information? Peter offered to pull together some data but don't want to reinvent the wheel and make sure whatever we provide is consistent with what we are looking at internally.

From: Hawkins,Robert E (BPA) - PGSP-5 <rehawkins@bpa.gov>
Sent: Wednesday, June 30, 2021 1:05 PM
To: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>
Subject: RE: hydro and heat

Thanks for sharing this Eve. I believe PGST now produces LSNK reports that capture how the dams were operated. Given our narrow operating range this time of year I'm guessing it won't show anything too dramatic, but I did take a look through some of the data manually and saw some "peaking" usage even with the narrow operating range.

-Rob

From: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>
Sent: Wednesday, June 30, 2021 12:47 PM
To: Hawkins,Robert E (BPA) - PGSP-5 <rehawkins@bpa.gov>
Subject: FW: hydro and heat

Hi Rob- I forwarded this to Kieran and Birgit to get some feedback on what we want to provide given litigation sensitivities but wanted to give you a heads up these types of requests are starting to come in. Is your group capturing any LSN specific operations for this heat wave?

From: Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Sent: Wednesday, June 30, 2021 12:27 PM
To: Egerdahl,Ryan J (BPA) - PGPR-5 <rjeagerdahl@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>; Baskerville,Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>
Cc: Cogswell,Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner,Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>
Subject: FW: hydro and heat

I responded to Jeff Allen, Idaho's Power Council Member, question below with: I will asked but it may not be available till after the heat wave period on how the 4 dams operated.

Jeff is trying to respond to Idaho US Senator Jim Risch question on how the 4 Lower Snake River Dams are operating during this heat wave in the region.

This is a heads-up that we are being asked by Sen. Risch (Via Idaho's power council) on our operation of the 4 projects. Please let me know the time table for when this information will become available.

Thanks

John J Williams

John J Williams

Idaho/Nevada Constituent Account Executive

Bonneville Power Administration ~ Constituent Service Office

950 W. Bannock Street, STE. 805

Boise, Idaho 83702

Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<http://www.bpa.gov/news/AboutUs/Logos/PublishingImages/BPA-Logo-color-220.jpg>

From: Jeff Allen <jallen@NWCouncil.org>
Sent: Wednesday, June 30, 2021 11:37 AM
To: Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Subject: Re: hydro and heat

Thanks John. Is it possible to get specific information on the dams Senator Risch asked about?

Sent from my iPhone

On Jun 29, 2021, at 3:42 PM, Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov> wrote:

Hi all, Peter is out this week so I'm it. Our Weather and Streamflow Forecasting team is expecting daily, monthly and even all-time high temperatures, creating dangerous conditions. On the power supply side, excellent planning and the timing of Columbia Basin runoff has us in good shape to get through this heat wave. We're also benefiting from the output of the Columbia Generating Station nuclear plant, which recently returned to service after a refueling outage. That adds over 1,100 megawatts of generation in the Northwest. The following is on BPA's website:

As record-breaking heat bears down on the Pacific Northwest this weekend, the Bonneville Power Administration has taken several steps to position the federal power and transmission system to serve its

customers during this weather event. BPA is ready to keep lights and air conditioners on even with the triple digit temperatures forecast across the region.

“We take our responsibility to provide reliable electricity to the consumer-owned utilities in the region very seriously,” said BPA Administrator John Hairston. “We are working hard to provide non-stop, reliable electricity this weekend to help residents and businesses stay cool and safe during the heatwave.”

On the Power Services side of BPA, these factors are helping:

- The Columbia Generating Station, a nuclear plant owned by Energy Northwest that produces power marketed by BPA, returned online this past weekend from a spring refueling outage. That adds over a 1,100 megawatts of generation in the Northwest and the West.
- Programmed fish spill on the lower Columbia and Snake rivers transitioned from spring to summer operations, increasing the federal hydropower generation from those facilities.
- The Bureau of Reclamation has the Grand Coulee reservoir well positioned to meet its refill target in early July, freeing up the remaining water flow to pass through the system for both power and non-power purposes.

“Even with streamflows below average levels, we are in a good position to serve our customers over this very hot weekend,” said Senior Vice President of Power Services Suzanne Cooper. “I want to thank our partners at the Bureau of Reclamation and the U.S. Army Corps of Engineers for the work and coordination they provide at the region’s 31 federal dams to ensure reliable operations.”

Despite the lower-than-average water year, there is plenty of water behind Grand Coulee Dam and some

snowpack left in the Canadian Rockies. Unlike 2015 and 2001, years with a similar volume of water, the shape of this year's runoff has been slower with snow gradually melting above Grand Coulee.

On the transmission side, BPA is taking measures to ensure the safe and reliable flow of electricity this weekend. BPA owns and operates more than 15,000 circuit miles of transmission lines across the Northwest and small amounts in Nevada, Utah and California.

"The reliable flow of electricity is vital to public safety," said BPA Transmission Services Senior Vice President Richard Shaheen. "We've put all maintenance projects that we can on pause to ensure our transmission system can handle increased flows and meet our customers' demands."

On Thursday, BPA restricted planned maintenance on its transmission grid from 6 a.m. Monday, June 28 through Tuesday, June 29 at 10 p.m., so the federal agency can leverage the system to its greatest use when load is expected to increase with the start of the workweek.

"Having all of our lines available will help relieve congestion on the system," said Vice President of Transmission Operations Michelle Cathcart. "With these unprecedented temperatures, we want to ensure electricity can move freely and reliably meet customer demands."

While we have ample power to serve loads during heatwave, we are experiencing transmission related challenges in the Tri-Cities area. On Monday, June 28 as the Tri-Cities experienced record temperatures, we saw a record amount of electricity consumed in the area. We made it through the day, and expect to be able to make it through the rest of this heat wave if there are no unplanned equipment failures or outages, but out of an abundance of

caution reviewed load shedding plans with the City of Richland, Franklin PUD, Benton PUD, Benton REA and Columbia REA in case that step becomes necessary to protect the system from broader unplanned power interruptions. While we made it through Monday, we expect electricity in the Tri-Cities loads to peak late afternoon/early evening on Tuesday, June 29. We continue to work with these customers on operational solutions and voluntary customer conservation to avoid load shedding.

BPA continues to work with these utilities to make appeals to their retail customers to reduce energy use. As you might be aware, Idaho Power is asking its customers to reduce their power consumption. Please do not hesitate to contact me if I can be of any further assistance.

John J Williams

John J Williams

Idaho/Nevada Constituent Account Executive

Bonneville Power Administration ~ Constituent Service Office

950 W. Bannock Street, STE. 805

Boise, Idaho 83702

Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<image001.jpg>

From: Shirley Lindstrom <slindstrom@nwcouncil.org>
Sent: Tuesday, June 29, 2021 12:37 PM
To: Jeff Allen <jallen@NWCouncil.org>; Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>
Cc: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Subject: RE: hydro and heat

Jim has asked for an update on how this heat wave has affected the power system from staff tomorrow at the P4 meeting. I don't know if they will give specifics about how the hydro system was operated. BPA should have a better idea I would think so good that you included John and Peter on this e-mail.

From: Jeff Allen <jallen@NWCouncil.org>
Sent: Tuesday, June 29, 2021 11:35 AM
To: Peter Cogswell <ptcogswell@bpa.gov>
Cc: John Williams <jjwilliams@bpa.gov>; Shirley Lindstrom <slindstrom@nwcouncil.org>

Subject: Fwd: hydro and heat

Do you have something akin to what Sen Risch's staff is seeking? Thanks

Sent from my iPhone

Begin forwarded message:

From: "Neumeyer, Ayla (Risch)" <Ayla_Neumeyer@risch.senate.gov>
Date: June 29, 2021 at 9:26:47 AM MDT
To: Jeff Allen <jallen@nwcouncil.org>
Cc: "Wong, Bryson (Risch)" <Bryson_Wong@risch.senate.gov>
Subject: hydro and heat

Hey Jeff,

Are you tracking/could you help us track the dams re the recent heat waves? In our "when we need them, we really need them" we were thinking this would be the type of situation we point to.

Ayla

Ayla Neumeyer

Senior Legislative Assistant

Senator James E. Risch

202-224-2752

From: Van Calcar, Pamela M (BPA) - PGS-5

Sent: Fri Jul 16 09:58:17 2021

To: Messemer, Clarisse M (BPA) - PGST-5

Subject: FW: hydro and heat - Update 7/2/2021

Importance: Normal

Attachments: LSN Operations for June 2021 Heat Wave-project specific.docx

FYI

From: Egerdahl, Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>

Sent: Friday, July 16, 2021 9:38 AM

To: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>; Koehler, Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>; Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner, Joshua P (BPA) - DIR-7 <jpwarner@bpa.gov>

Cc: Solano, Wanda M (BPA) - PGST-5 <wmsolano@bpa.gov>; Neuls, Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>

Subject: FW: hydro and heat - Update 7/2/2021

From: James, Eve A L (BPA) - PG-5 <eajames@bpa.gov>

Sent: Friday, July 9, 2021 4:33 PM

To: Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Neuls,Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>

Cc: Cogswell,Peter (BPA) - DI-7 <ptcogswell@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

Attached is the report with the LSN project generation separated out by project.

Have a good weekend!

Eve

From: Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>

Sent: Friday, July 9, 2021 9:36 AM

To: James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Neuls,Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>

Cc: Cogswell,Peter (BPA) - DI-7 <ptcogswell@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

Yes that would be helpful. Thanks

From: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>
Sent: Friday, July 9, 2021 10:24 AM
To: Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Neuls,Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>
Cc: Cogswell,Peter (BPA) - DI-7 <ptcogswell@bpa.gov>
Subject: RE: hydro and heat - Update 7/2/2021

The Generation and reserves section has a graphic of the generation for the LSN river project generation MW output- did you want them separated out? I'm not sure having them separated would change the story but can get them by project if needed.

From: Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Sent: Thursday, July 8, 2021 1:02 PM
To: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>; Neuls,Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>
Cc: Cogswell,Peter (BPA) - DI-7 <ptcogswell@bpa.gov>
Subject: FW: hydro and heat - Update 7/2/2021

This is great but do you have specific generation MW output for the Lower Snake river projects for this period? I'm sure that Senator Risch would like to use this information to articulate their value. Could you incorporate the information in the executive summary?

Thanks

John J Williams

John J Williams

Idaho/Nevada Constituent Account Executive

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Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<http://www.bpa.gov/news/AboutUs/Logos/PublishingImages/BPA-Logo-color-220.jpg>

From: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>

Sent: Friday, July 2, 2021 5:34 PM

To: Neuls,Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjeagerdahl@bpa.gov>; Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams,Peter T (BPA) -

PGPO-5 <ptwilliams@bpa.gov>; Baskerville, Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>
Cc: Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner, Joshua P (BPA) - DIR-7 <jpwarner@bpa.gov>;
Johnson, G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty, Robert J (BPA) - PGP-5 <ripetty@bpa.gov>;
Siewert, Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>
Subject: RE: hydro and heat - Update 7/2/2021

Attached is the report from the short-term planning group that covers the operation of the Lower Snake river project during the time from June 25th to June 30th, 2021.

Executive Summary:

This report covers the operation of the lower Snake river project during the time from June 25th to June 30th, 2021. The four most downstream dams on the Snake river are referred to as the Lower Snake river projects. These include Lower Granite dam, Little Goose dam, Lower Monumental dam, and Ice Harbor dam. The most intense heat-wave recorded in BPA Service Territory took place during this period. This heat wave produced temperatures which exceeded all previous records in many areas in the region. An all-time record high temperature for all of Canada was set in British Columbia, and the state of Washington appears to have also set new all-time record highs. The record high temperatures resulted in very high electrical demand for the region. BPA was able to increase generation across the highest load hours to meet that demand. The lower Snake river projects played a significant role in providing generation across the peak hours as well as holding significant reserves. The holding of reserves on the lower Snake river projects allowed other projects in BPA's system to shift from holding reserve obligations to actual power generation.

The report was compiled by Tony Klement (PGSD) and Wanda Solano (PGST)

The table at the end could be taken out for space if Doug wants to incorporate the Transmission information on the Tri-Cities load service.

Thanks,

Eve

From: Neuls, Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>

Sent: Friday, July 2, 2021 11:12 AM

To: Egerdahl, Ryan J (BPA) - PGPR-5 <rjeagerdahl@bpa.gov>; Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams, Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James, Eve A L (BPA) - PG-5 <eaajames@bpa.gov>; Baskerville, Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>

Cc: Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner, Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson, G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty, Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Siewert, Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>; Neuls, Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

Good morning all,

Just wanted to provide an update on LSN hydro gen.

[COE site](#) only have hourly Power Gen (MW) data up to 6/25 as of this morning. A screenshot from COE query site of all four LSN projects is below.

Since we (BPA) have hourly Generation data available from THOR, I started looking at the data... Noticed generation increased from LSN projects as early as 6/21...

I have the following charts ready for your review, please let me know if you're interested.

- Hourly Net Generation from our LSN projects
- Daily Net Generation from LSN projects
- Individual LSN project daily generation

My understanding is that our short term planning group may have a LSN report, which I am sure will have better information as well.

Please let me know if you have any questions

Thank you & wishing you all a wonderful weekend,
Esther

cid:image001.jpg@01D76F33.11703320

From: Neuls, Esther T (BPA) - PGPR-5

Sent: Wednesday, June 30, 2021 1:11 PM

To: Egerdahl, Ryan J (BPA) - PGPR-5 <rjeagerdahl@bpa.gov>; Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams, Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James, Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville, Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>

Cc: Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner, Joshua P (BPA) - DIR-7 <jpwarner@bpa.gov>; Johnson, G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty, Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Siewert, Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>

Subject: RE: hydro and heat

Hello!

Looks like if we use the COE website, we could get hourly flow data (kcfs) almost real time but hourly Power gen (mw) data looks like there is a good 6-day lag. Please see below for LWG as an example.

We can get real time hourly Net Gen data from THOR (not accessible by public), no problem.

Potentially I can try to put something together this Friday on LSN projects to see if we get a good picture on the month of June...

Please let me know if you have other suggestions

Thanks

Esther

cid:image002.jpg@01D76F33.11703320

From: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>

Sent: Wednesday, June 30, 2021 12:52 PM

To: Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville,Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>

Cc: Cogswell,Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner,Joshua P (BPA) - DIR-7 <jpwarner@bpa.gov>; Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Neuls,Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>; Siewert,Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>

Subject: RE: hydro and heat

At some point soon we can pull the actual generation data for the Snakes and pass it along to give to Jeff. It is public information; I'm just not sure how quickly the public website is updated based on historical generation. Peter or Eve or Esther probably know. Looks like it should "cool down" by tomorrow. J I will wait to see if Esther thinks we can pull the data tomorrow for the prior week of LSR generation.

Thanks all.

cid:image008.jpg@01D76F5C.B0B00900

From: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Sent: Wednesday, June 30, 2021 12:27 PM
To: Egerdahl, Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; Williams, Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James, Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville, Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>
Cc: Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner, Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson, G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>
Subject: FW: hydro and heat

I responded to Jeff Allen, Idaho's Power Council Member, question below with: I will asked but it may not be available till after the heat wave period on how the 4 dams operated.

Jeff is trying to respond to Idaho US Senator Jim Risch question on how the 4 Lower Snake River Dams are operating during this heat wave in the region.

This is a heads-up that we are being asked by Sen. Risch (Via Idaho's power council) on our operation of the 4 projects. Please let me know the time table for when this information will become available.

Thanks

John J Williams

John J Williams

Idaho/Nevada Constituent Account Executive

Bonneville Power Administration ~ Constituent Service Office

950 W. Bannock Street, STE. 805

Boise, Idaho 83702

Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<http://www.bpa.gov/news/AboutUs/Logos/PublishingImages/BPA-Logo-color-220.jpg>

From: Jeff Allen <[jallen@NWCouncil.org](mailto:allen@NWCouncil.org)>
Sent: Wednesday, June 30, 2021 11:37 AM
To: Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Subject: Re: hydro and heat

Thanks John. Is it possible to get specific information on the dams Senator Risch asked about?

Sent from my iPhone

On Jun 29, 2021, at 3:42 PM, Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov> wrote:

Hi all, Peter is out this week so I'm it. Our Weather and Streamflow Forecasting team is expecting daily, monthly and even all-time high temperatures, creating dangerous conditions. On the power supply side, excellent planning and the timing of Columbia Basin runoff has us in good shape to get through this heat wave. We're also benefiting from the output of the Columbia Generating Station nuclear plant, which recently returned to service after a refueling outage. That adds over 1,100 megawatts of generation in the Northwest. The following is on BPA's website:

As record-breaking heat bears down on the Pacific Northwest this weekend, the Bonneville Power Administration has taken several steps to position the federal power and transmission system to serve its customers during this weather event. BPA is ready to keep lights and air conditioners on even with the triple digit temperatures forecast across the region.

“We take our responsibility to provide reliable electricity to the consumer-owned utilities in the region very seriously,” said BPA Administrator John Hairston. “We are working hard to provide non-stop, reliable electricity this weekend to help residents and businesses stay cool and safe during the heatwave.”

On the Power Services side of BPA, these factors are helping:

- The Columbia Generating Station, a nuclear plant owned by Energy Northwest that produces power marketed by BPA, returned online this past weekend from a spring refueling outage. That adds over a 1,100 megawatts of generation in the Northwest and the West.
- Programmed fish spill on the lower Columbia and Snake rivers transitioned from spring to summer operations, increasing the federal hydropower generation from those facilities.
- The Bureau of Reclamation has the Grand Coulee reservoir well positioned to meet its refill target in early July, freeing up the remaining water flow to pass through the system for both power and non-power purposes.

“Even with streamflows below average levels, we are in a good position to serve our customers over this very hot weekend,” said Senior Vice President of Power Services Suzanne Cooper. “I want to thank our partners at the Bureau of Reclamation and the U.S. Army Corps of Engineers for the work and coordination they provide at the region’s 31 federal dams to ensure reliable operations.”

Despite the lower-than-average water year, there is plenty of water behind Grand Coulee Dam and some snowpack left in the Canadian Rockies. Unlike 2015 and 2001, years with a similar volume of water, the shape of this year’s runoff has been slower with snow gradually melting above Grand Coulee.

On the transmission side, BPA is taking measures to ensure the safe and reliable flow of electricity this weekend. BPA owns and operates more than 15,000 circuit miles of transmission lines across the Northwest and small amounts in Nevada, Utah and California.

“The reliable flow of electricity is vital to public safety,” said BPA Transmission Services Senior Vice President Richard Shaheen. “We’ve put all maintenance projects that we can on pause to ensure our transmission system can handle increased flows and meet our customers’ demands.”

On Thursday, BPA restricted planned maintenance on its transmission grid from 6 a.m. Monday, June 28 through Tuesday, June 29 at 10 p.m., so the federal agency can leverage the system to its greatest use when load is expected to increase with the start of the workweek.

“Having all of our lines available will help relieve congestion on the system,” said Vice President of Transmission Operations Michelle Cathcart. “With these unprecedented temperatures, we want to ensure electricity can move freely and reliably meet customer demands.”

While we have ample power to serve loads during heatwave, we are experiencing transmission related challenges in the Tri-Cities area. On Monday, June 28 as the Tri-Cities experienced record temperatures, we saw a record amount of electricity consumed in the area. We made it through the day, and expect to be able to make it through the rest of this heat wave if there are no unplanned equipment failures or outages, but out of an abundance of caution reviewed load shedding plans with the City of Richland, Franklin PUD, Benton PUD, Benton REA and Columbia REA in case that step becomes necessary to protect the system from broader unplanned power interruptions. While we made it through Monday, we expect electricity in the Tri-Cities loads to peak late

afternoon/early evening on Tuesday, June 29. We continue to work with these customers on operational solutions and voluntary customer conservation to avoid load shedding.

BPA continues to work with these utilities to make appeals to their retail customers to reduce energy use. As you might be aware, Idaho Power is asking its customers to reduce their power consumption. Please do not hesitate to contact me if I can be of any further assistance.

John J Williams

John J Williams

Idaho/Nevada Constituent Account Executive

Bonneville Power Administration ~ Constituent Service Office

950 W. Bannock Street, STE. 805

Boise, Idaho 83702

Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<image001.jpg>

From: Shirley Lindstrom <slindstrom@nwcouncil.org>
Sent: Tuesday, June 29, 2021 12:37 PM
To: Jeff Allen <jallen@NWCouncil.org>; Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>
Cc: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Subject: RE: hydro and heat

Jim has asked for an update on how this heat wave has affected the power system from staff tomorrow at the P4 meeting. I don't know if they will give specifics about how the hydro system was operated. BPA should have a better idea I would think so good that you included John and Peter on this e-mail.

From: Jeff Allen <jallen@NWCouncil.org>
Sent: Tuesday, June 29, 2021 11:35 AM
To: Peter Cogswell <ptcogswell@bpa.gov>
Cc: John Williams <jjwilliams@bpa.gov>; Shirley Lindstrom <slindstrom@nwcouncil.org>
Subject: Fwd: hydro and heat

Do you have something akin to what Sen Risch's staff is seeking? Thanks

Sent from my iPhone

Begin forwarded message:

From: "Neumeyer, Ayla (Risch)" <Ayla_Neumeyer@risch.senate.gov>
Date: June 29, 2021 at 9:26:47 AM MDT
To: Jeff Allen <jallen@nwcouncil.org>
Cc: "Wong, Bryson (Risch)" <Bryson_Wong@risch.senate.gov>
Subject: hydro and heat

Hey Jeff,

Are you tracking/could you help us track the dams re the recent heat waves? In our "when we need them, we really need them" we were thinking this would be the type of situation we point to.

Ayla

Ayla Neumeyer

Senior Legislative Assistant

Senator James E. Risch

202-224-2752

LOWER SNAKE RIVER PROJECT OPERATIONS

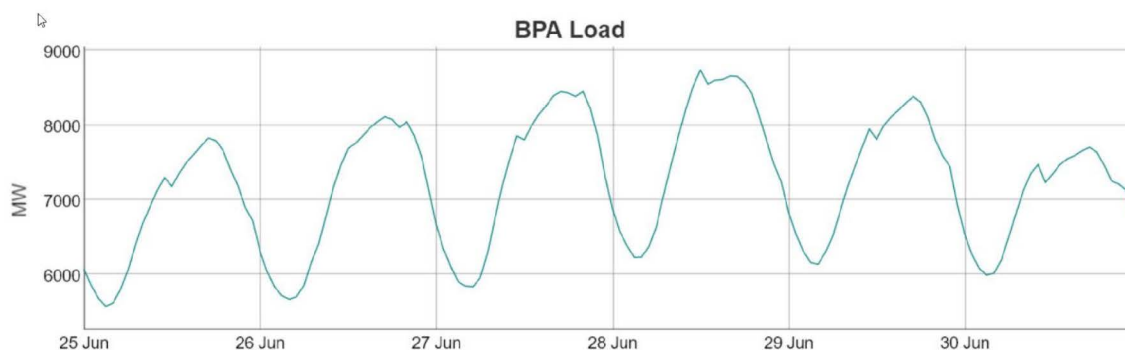
NORTHWEST – RECORD HEAT WAVE, JUNE 25 -30, 2021

SUMMARY

This report covers the operation of the lower Snake River projects during the time from June 25th to June 30th, 2021. The four most downstream dams on the Snake river are referred to as the lower Snake River projects. These include Lower Granite dam, Little Goose dam, Lower Monumental dam, and Ice Harbor dam. The most intense heat-wave recorded in BPA Service Territory took place during this period. This heat wave produced temperatures which exceeded all previous records in many areas in the region. An all-time record high temperature for all of Canada was set in British Columbia, and the state of Washington appears to have also set new all-time record highs. The record high temperatures resulted in very high electrical demand for the region. BPA was able to increase generation across the highest load hours to meet that demand. For the duration of the heatwave, the four dams on the lower Snake River generated between 439 and 1,009 megawatts. For perspective, the average consumption of the City of Seattle is approximately 1,000 megawatts. The lower Snake river projects played a significant role in providing generation across the peak hours as well as holding significant reserves. BPA must hold contingency reserves to ensure it can keep the lights on if emergencies take generators out of service. BPA must also hold balancing reserves to move up and down with generators that stray from their energy schedules which is important for integrating renewable generation such as wind and solar. The holding of reserves on the lower Snake river projects allowed other projects in BPA's system to shift from holding reserve obligations to actual power generation.

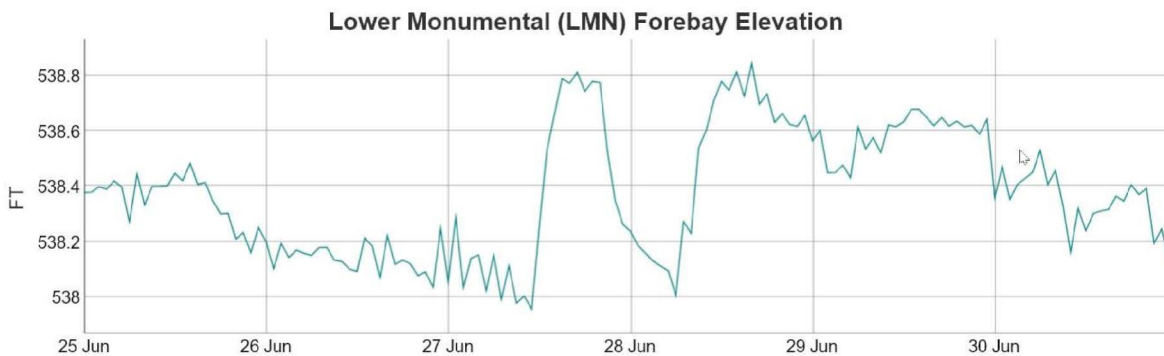
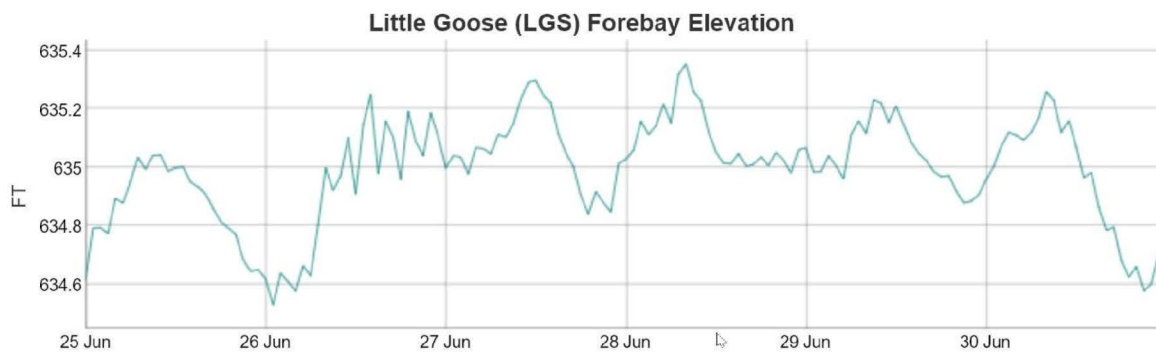
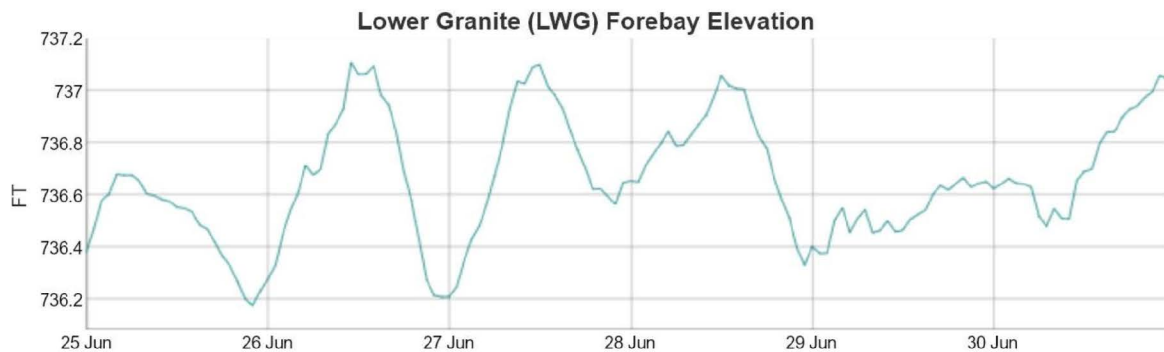
LOAD PROFILE

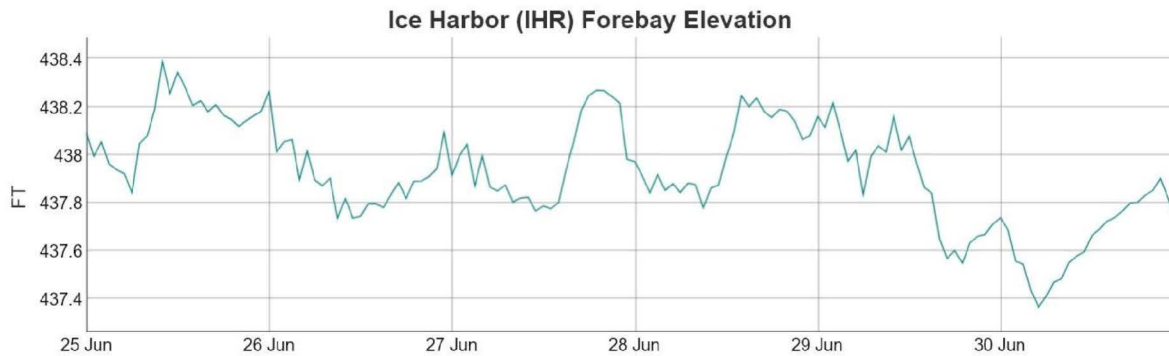
Loads were high in the afternoon and evenings, corresponding to the highest temperatures. This graph shows BPA's area load across the period. This graph does not include the Federal load obligations outside the balancing area.



RESERVOIR STORAGE

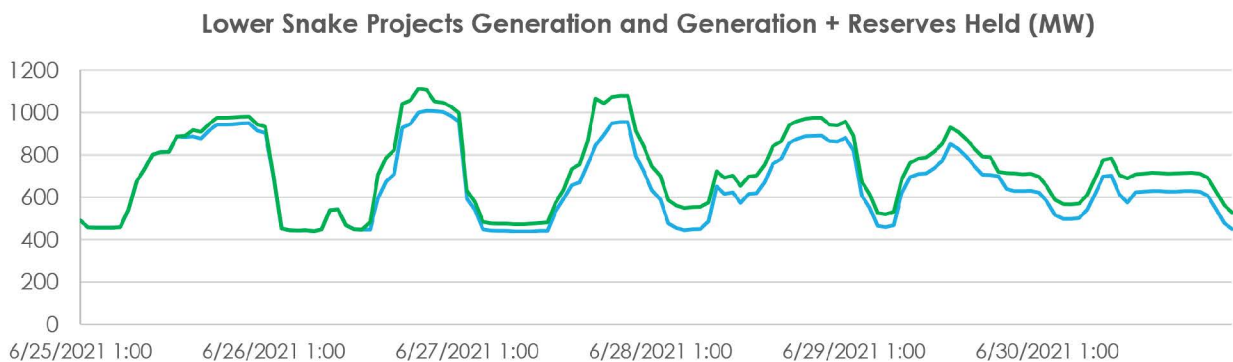
In general, the lower snake projects were filled overnight and drafted across the afternoons maximizing peak generation to coincide with peak loading. This was done within the limitations of a 1.5' forebay range during the fish passage season and while maintaining required fish spill in support of the downstream migration of juvenile salmon. The inflow to the lower Snake river varied on a day average basis from about 42 kcfs to about 36 kcfs, in a diminishing amount across the period. With these lower flows and with minimum flow requirements in support of juvenile salmon the ability to draft and refill projects is problematic. This is especially true at Lower Monumental dam and Ice Harbor dam.



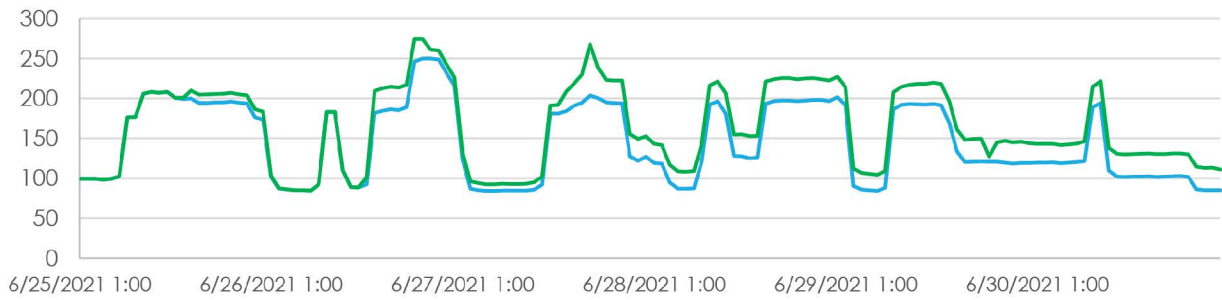


GENERATION AND RESERVES

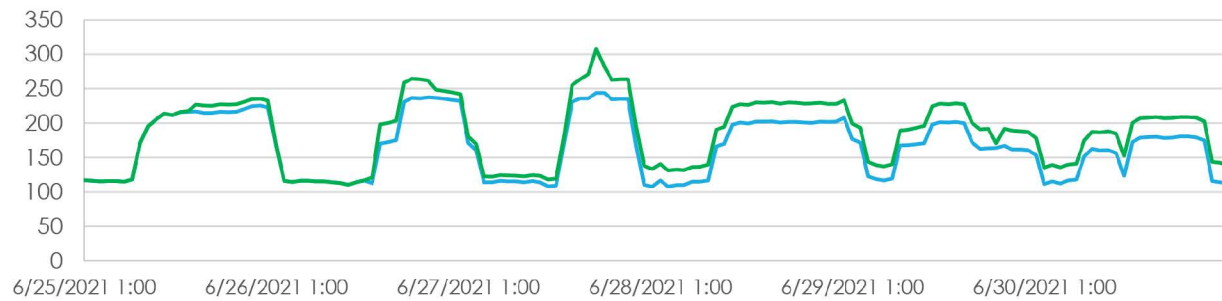
BPA must hold reserves in the event of a contingency, as well as to balance against forecast error and generation variation such as from wind generation projects. During the spring and summer, due to operational limitations to support salmon migration, the holding of reserves complicates river operations and is often avoided on the lower Snake river. During the heat-wave BPA hydro operators were able to apply some reserve responsibility to the lower snake projects thereby shifting available capacity at other Federal Columbia River Power System projects, from holding reserves to delivering generation. BPA did not apply any DEC reserves on the LSN projects during the heat wave. The following graph shows the actual generation at the Lower Snake projects in blue, and the green line represents the amount of generation plus the amount of reserves that were carried at the project. During the period, the lower snake generation ranged from 439 MW to 1,009 MW. If the projects had just passed inflow, the average generation would have been approximately 730 MW. The highest amount of Generation and reserves carried was 1,112 MW. The generation and reserves data is also showed for each individual project.



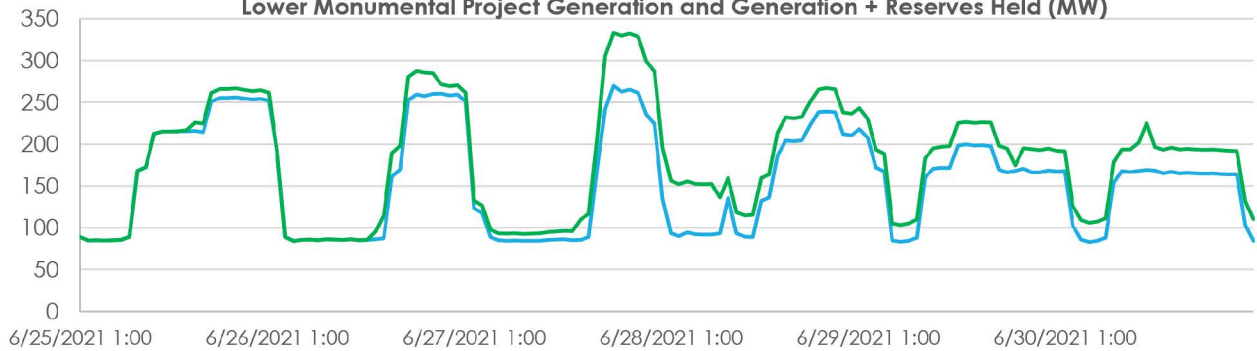
Lower Granite Project Generation and Generation + Reserves Held (MW)



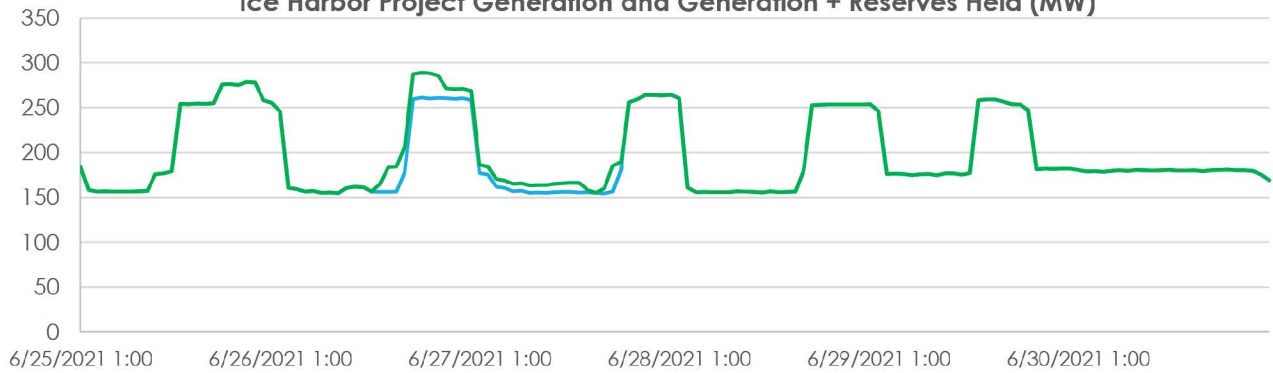
Little Goose Project Generation and Generation + Reserves Held (MW)



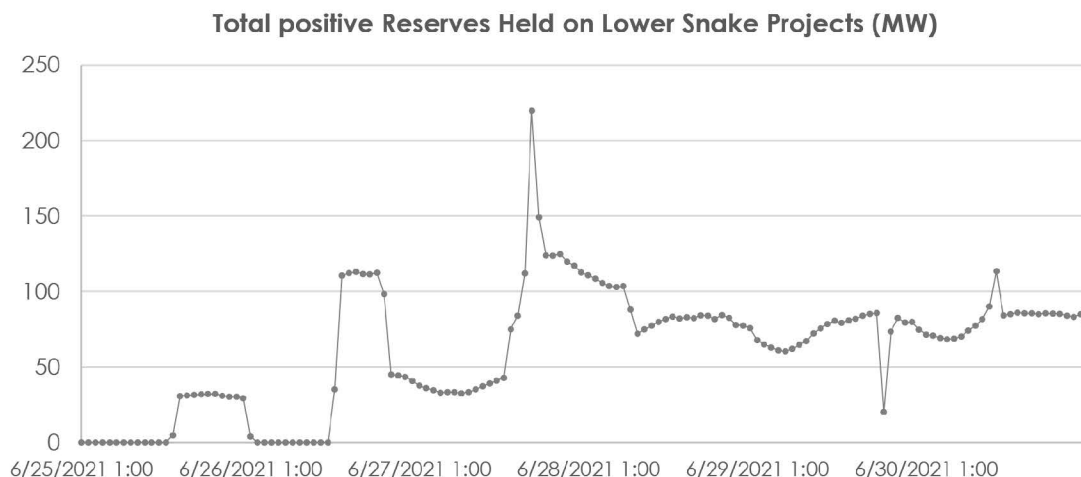
Lower Monumental Project Generation and Generation + Reserves Held (MW)



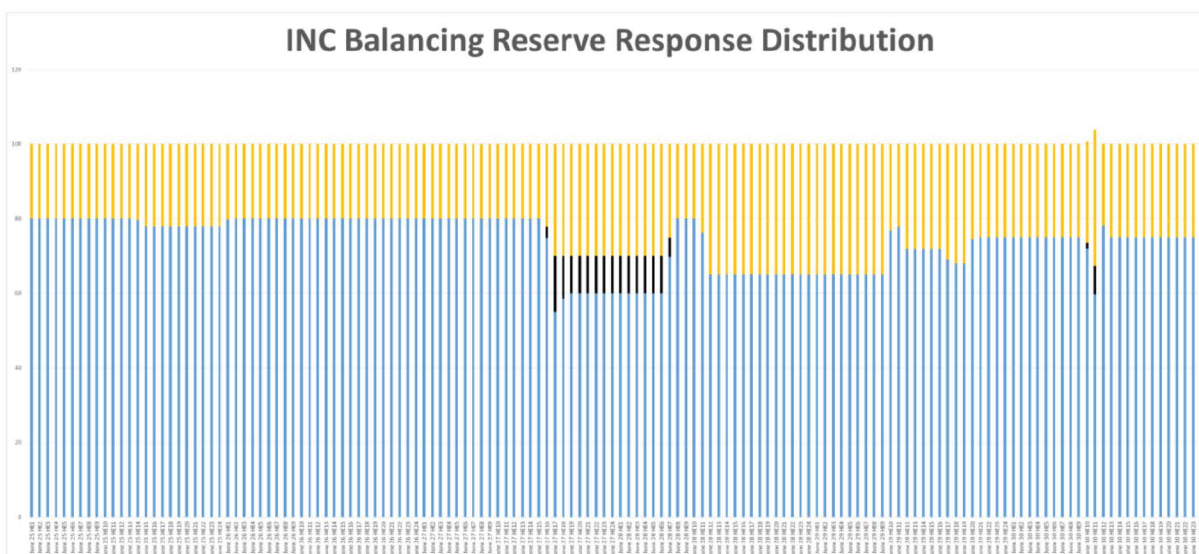
Ice Harbor Project Generation and Generation + Reserves Held (MW)



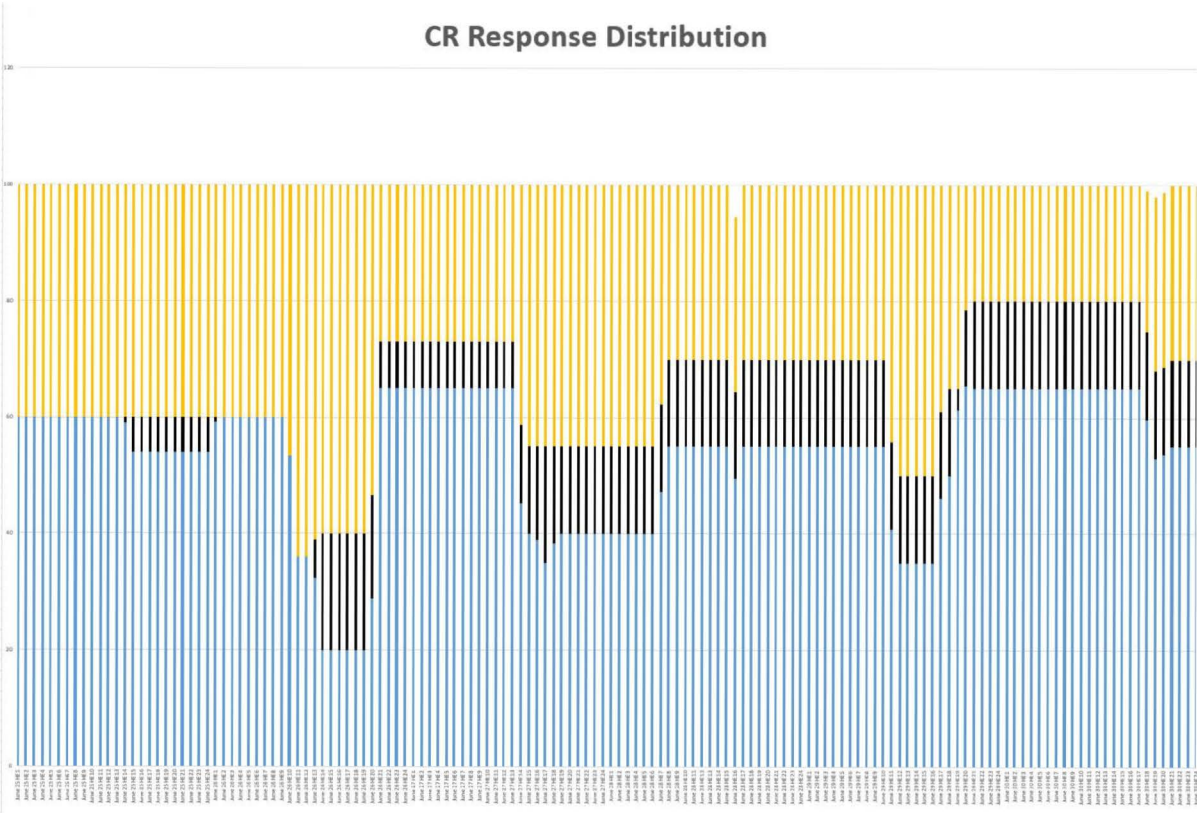
The next graph shows the magnitude of reserves held on the lower snake projects, as much as 220 MW.



The following graph illustrates the distribution of INC Balancing reserve allocations amongst the 3 river reaches. The distributions are based on ratios which typically reflect percentages. The Lower Columbia river reach is in yellow, the Upper Columbia in blue, and the Lower Snakes is shown in black. Up to 15% of BPA's balancing reserve obligation was held on the Lower Snake River. The deployment of balancing reserves complicates river operations during the fish passage season. Dynamic changes in generation to support balancing reserves must be matched by dynamic changes in spill amounts, as required at some Lower Snake river projects as a percentage of their total flow.



Contingency reserves are generation capacity set aside as backup should there be an unexpected loss of generation in the region. The following table shows the distribution of the contingency reserve allocation across the three river systems. The allocation is a ratio that typically matches percentages. The Lower Columbia river reach is in yellow, the Upper Columbia in blue, and the Lower Snakes is shown in black. The lower snake river projects were used extensively throughout the heat-wave to carry up to 20% of BPA's overall contingency reserve obligation. By shifting this obligation to the lower Snake river projects, other river reaches and especially the upper Columbia, were able to utilize more of their capacity to generate power for the grid.



This table shows the allocation of reserves, typically as a percentage, of the overall obligation required of BPA. DEC reserves require a project to decrease generation when another project generates more than they are scheduled to generate. This is a common occurrence for variable energy resources such as wind and solar generation. INC reserves are to cover for under generation which is typically from these same variable energy resource projects. Contingency reserves are to cover for the unexpected loss of generation and must be immediately available. On the afternoon of June 17, the lower Snake river projects carried 15% of the INC balancing reserve obligation and 20% of the contingency reserve obligation for the BPA system. The reserve allocations can change at any time. The values shown are hour averages rounded to whole numbers.

	LWG			LGS			LMN			IHR			LSN Total		
Hour	DEC	INC	CR	DEC	INC	CR	DEC	INC	CR	DEC	INC	CR	DEC	INC	CR
June 25 HE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
June 25 HE15	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE16	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE17	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE18	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE19	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE20	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE21	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE22	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6

June 25 HE23	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE24	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 26 HE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
June 26 HE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE13	0	0	2	0	0	2	0	0	2	0	0	2	0	0	7
June 26 HE14	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20
June 26 HE15	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20
June 26 HE16	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20
June 26 HE17	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20
June 26 HE18	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20
June 26 HE19	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20
June 26 HE20	0	0	4	0	0	4	0	0	4	0	0	4	0	0	18
June 26 HE21	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 26 HE22	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 26 HE23	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 26 HE24	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE1	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE3	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE4	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE5	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE6	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE7	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE8	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE9	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8

June 27 HE10	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE11	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE12	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE13	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE14	0	0	4	0	0	4	0	0	4	0	0	0	0	0	14
June 27 HE15	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 27 HE16	0	1	5	0	1	5	0	1	5	0	0	1	0	3	16
June 27 HE17	0	5	5	0	5	5	0	5	5	0	0	5	0	15	20
June 27 HE18	0	5	5	0	1	5	0	5	5	0	0	2	0	11	17
June 27 HE19	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 27 HE20	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 27 HE21	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 27 HE22	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 27 HE23	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 27 HE24	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 28 HE1	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 28 HE2	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 28 HE3	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 28 HE4	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 28 HE5	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 28 HE6	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 28 HE7	0	3	5	0	0	5	0	3	5	0	0	0	0	5	15
June 28 HE8	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE9	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE10	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE11	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE12	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE13	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE14	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE15	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE16	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE17	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE18	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE19	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE20	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15

June 28 HE21	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE22	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE23	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE24	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE1	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE2	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE3	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE4	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE5	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE6	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE7	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE8	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE9	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE10	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE11	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE12	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE13	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE14	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE15	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE16	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE17	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE18	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE19	0	0	1	0	0	1	0	0	1	0	0	0	0	0	4
June 29 HE20	0	0	4	0	0	4	0	0	4	0	0	0	0	0	13
June 29 HE21	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE22	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE23	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE24	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE1	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE2	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE3	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE4	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE5	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE6	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE7	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15

June 30 HE8	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE9	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE10	0	1	5	0	0	5	0	1	5	0	0	0	0	1	15
June 30 HE11	0	4	5	0	0	5	0	4	5	0	0	0	0	8	15
June 30 HE12	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE13	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE14	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE15	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE16	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE17	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE18	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE19	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE20	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE21	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE22	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE23	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE24	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15

From: Van Calcar, Pamela M (BPA) - PGS-5

Sent: Wed Jul 21 11:14:20 2021

To: Messemer, Clarisse M (BPA) - PGST-5

Subject: FW: hydro and heat - Update 7/2/2021

Importance: Normal

Oops!

From: Egerdahl, Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>

Sent: Wednesday, July 21, 2021 11:13 AM

To: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>; James, Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Petty, Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler, Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>; Connolly, Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

I like that approach Pam. Should we ask Wanda if she can roll up the info so we can post that summarized report?

Ryan Egerdahl

Manager, Long Term Power Planning

Bonneville Power Administration

rjegerdahl@bpa.gov

| P 503.230.4732 | C (b)(6)

From: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>

Sent: Wednesday, July 21, 2021 10:47 AM

To: James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>; Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>

Cc: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

I defer to others on the appropriateness of posting this report. If we do, I ask that we scrub this report and provide only rolled up LSN information, probably just the final table.

For awareness we are working to establish a weekly LSN report that will can be used for reference in these types of request. This should give us quick background information and provide a template for generating consistent event reports in the future.

From: James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>

Sent: Wednesday, July 21, 2021 10:34 AM

To: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>; Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>

Cc: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>

Subject: FW: hydro and heat - Update 7/2/2021

This PR story has a reference link to a Power Report on the LSN operations during the heat wave. The report he is referring to is the PGST report Wanda and Tony put together that I've attached. Do we want to post that on an external Power Services website for public information about the heat wave? This was the information that John Williams was asking about to share with Jeff Allen (Idaho's Power Council Member) who was asked questions from Idaho US Senator Jim Risch about the dam operations during the heat wave .

From: Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>

Sent: Wednesday, July 21, 2021 9:44 AM

To: James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

Eve and Ryan,

Please see the highlighted part of the attached release. We intend to send this out tomorrow. Are we going to post the study referenced in this email on the Power Services website? If not, I'll have to modify the reference to the work. Please advise. Thanks!

From: James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>

Sent: Friday, July 2, 2021 4:34 PM

To: Neuls,Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; Baskerville,Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>

Cc: Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner, Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson, G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty, Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Siewert, Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>
Subject: RE: hydro and heat - Update 7/2/2021

Attached is the report from the short-term planning group that covers the operation of the Lower Snake river project during the time from June 25th to June 30th, 2021.

Executive Summary:

This report covers the operation of the lower Snake river project during the time from June 25th to June 30th, 2021. The four most downstream dams on the Snake river are referred to as the Lower Snake river projects. These include Lower Granite dam, Little Goose dam, Lower Monumental dam, and Ice Harbor dam. The most intense heat-wave recorded in BPA Service Territory took place during this period. This heat wave produced temperatures which exceeded all previous records in many areas in the region. An all-time record high temperature for all of Canada was set in British Columbia, and the state of Washington appears to have also set new all-time record highs. The record high temperatures resulted in very high electrical demand for the region. BPA was able to increase generation across the highest load hours to meet that demand. The lower Snake river projects played a significant role in providing generation across the peak hours as well as holding significant reserves. The holding of reserves on the lower Snake river projects allowed other projects in BPA's system to shift from holding reserve obligations to actual power generation.

The report was compiled by Tony Klement (PGSD) and Wanda Solano (PGST)

The table at the end could be taken out for space if Doug wants to incorporate the Transmission information on the

Tri-Cities load service.

Thanks,

Eve

From: Neuls, Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>

Sent: Friday, July 2, 2021 11:12 AM

To: Egerdahl, Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams, Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James, Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville, Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>

Cc: Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner, Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson, G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty, Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Siewert, Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>; Neuls, Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

Good morning all,

Just wanted to provide an update on LSN hydro gen.

[COE site](#) only have hourly Power Gen (MW) data up to 6/25 as of this morning. A screenshot from COE query site of all four LSN projects is below.

Since we (BPA) have hourly Generation data available from THOR, I started looking at the data... Noticed generation increased from LSN projects as early as 6/21...

I have the following charts ready for your review, please let me know if you're interested.

- Hourly Net Generation from our LSN projects
- Daily Net Generation from LSN projects
- Individual LSN project daily generation

My understanding is that our short term planning group may have a LSN report, which I am sure will have better information as well.

Please let me know if you have any questions

Thank you & wishing you all a wonderful weekend,
Esther

cid:image001.jpg@01D76F33.11703320

From: Neuls, Esther T (BPA) - PGPR-5
Sent: Wednesday, June 30, 2021 1:11 PM
To: Egerdahl, Ryan J (BPA) - PGPR-5 <rjeegerdahl@bpa.gov>; Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams, Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James, Eve A L (BPA) - PG-5 <ejames@bpa.gov>; Baskerville, Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>
Cc: Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner, Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson, G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty, Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Siewert, Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>
Subject: RE: hydro and heat

Hello!

Looks like if we use the COE website, we could get hourly flow data (kcfs) almost real time but hourly Power gen (mw) data looks like there is a good 6-day lag. Please see below for LWG as an example.

We can get real time hourly Net Gen data from THOR (not accessible by public), no problem.

Potentially I can try to put something together this Friday on LSN projects to see if we get a good picture on the month of June...

Please let me know if you have other suggestions

Thanks

Esther

cid:image002.jpg@01D76F33.11703320

From: Egerdahl,Ryan J (BPA) - PGPR-5 <rjeegerdahl@bpa.gov>

Sent: Wednesday, June 30, 2021 12:52 PM

To: Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville,Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>

Cc: Cogswell,Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner,Joshua P (BPA) - DIR-7 <jpwarner@bpa.gov>; Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Neuls,Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>; Siewert,Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>

Subject: RE: hydro and heat

At some point soon we can pull the actual generation data for the Snakes and pass it along to give to Jeff. It is public information; I'm just not sure how quickly the public website is updated based on historical generation. Peter or Eve or Esther probably know. Looks like it should "cool down" by tomorrow. J I will wait to see if Esther thinks we can pull the data tomorrow for the prior week of LSR generation.

Thanks all.

cid:image008.jpg@01D76F5C.B0B00900

From: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Sent: Wednesday, June 30, 2021 12:27 PM
To: Egerdahl, Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; Williams, Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James, Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville, Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>
Cc: Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner, Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson, G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>
Subject: FW: hydro and heat

I responded to Jeff Allen, Idaho's Power Council Member, question below with: I will asked but it may not be available till after the heat wave period on how the 4 dams operated.

Jeff is trying to respond to Idaho US Senator Jim Risch question on how the 4 Lower Snake River Dams are operating during this heat wave in the region.

This is a heads-up that we are being asked by Sen. Risch (Via Idaho's power council) on our operation of the 4 projects. Please let me know the time table for when this information will become available.

Thanks

John J Williams

John J Williams

Idaho/Nevada Constituent Account Executive

Bonneville Power Administration ~ Constituent Service Office

950 W. Bannock Street, STE. 805

Boise, Idaho 83702

Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<http://www.bpa.gov/news/AboutUs/Logos/PublishingImages/BPA-Logo-color-220.jpg>

From: Jeff Allen <[jallen@NWCouncil.org](mailto:allen@NWCouncil.org)>
Sent: Wednesday, June 30, 2021 11:37 AM
To: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Subject: Re: hydro and heat

Thanks John. Is it possible to get specific information on the dams Senator Risch asked about?

Sent from my iPhone

On Jun 29, 2021, at 3:42 PM, Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov> wrote:

Hi all, Peter is out this week so I'm it. Our Weather and Streamflow Forecasting team is expecting daily, monthly and even all-time high temperatures, creating dangerous conditions. On the power supply side, excellent planning and the timing of Columbia Basin runoff has us in good shape to get through this heat wave. We're also benefiting from the output of the Columbia Generating Station nuclear plant, which recently returned to service after a refueling outage. That adds over 1,100 megawatts of generation in the Northwest. The following is on BPA's website:

As record-breaking heat bears down on the Pacific Northwest this weekend, the Bonneville Power Administration has taken several steps to position the federal power and transmission system to serve its customers during this weather event. BPA is ready to keep lights and air conditioners on even with the triple digit temperatures forecast across the region.

“We take our responsibility to provide reliable electricity to the consumer-owned utilities in the region very seriously,” said BPA Administrator John Hairston. “We are working hard to provide non-stop, reliable electricity this weekend to help residents and businesses stay cool and safe during the heatwave.”

On the Power Services side of BPA, these factors are helping:

- The Columbia Generating Station, a nuclear plant owned by Energy Northwest that produces power marketed by BPA, returned online this past weekend from a spring refueling outage. That adds over a 1,100 megawatts of generation in the Northwest and the West.
- Programmed fish spill on the lower Columbia and Snake rivers transitioned from spring to summer operations, increasing the federal hydropower generation from those facilities.
- The Bureau of Reclamation has the Grand Coulee reservoir well positioned to meet its refill target in early July, freeing up the remaining water flow to pass through the system for both power and non-power purposes.

“Even with streamflows below average levels, we are in a good position to serve our customers over this very hot weekend,” said Senior Vice President of Power Services Suzanne Cooper. “I want to thank our partners at the Bureau of Reclamation and the U.S. Army Corps of Engineers for the work and coordination they provide at the region’s 31 federal dams to ensure reliable operations.”

Despite the lower-than-average water year, there is plenty of water behind Grand Coulee Dam and some snowpack left in the Canadian Rockies. Unlike 2015 and 2001, years with a similar volume of water, the shape of this year’s runoff has been slower with snow gradually melting above Grand Coulee.

On the transmission side, BPA is taking measures to ensure the safe and reliable flow of electricity this weekend. BPA owns and operates more than 15,000 circuit miles of transmission lines across the Northwest and small amounts in Nevada, Utah and California.

“The reliable flow of electricity is vital to public safety,” said BPA Transmission Services Senior Vice President Richard Shaheen. “We’ve put all maintenance projects that we can on pause to ensure our transmission system can handle increased flows and meet our customers’ demands.”

On Thursday, BPA restricted planned maintenance on its transmission grid from 6 a.m. Monday, June 28 through Tuesday, June 29 at 10 p.m., so the federal agency can leverage the system to its greatest use when load is expected to increase with the start of the workweek.

“Having all of our lines available will help relieve congestion on the system,” said Vice President of Transmission Operations Michelle Cathcart. “With these unprecedented temperatures, we want to ensure electricity can move freely and reliably meet customer demands.”

While we have ample power to serve loads during heatwave, we are experiencing transmission related challenges in the Tri-Cities area. On Monday, June 28 as the Tri-Cities experienced record temperatures, we saw a record amount of electricity consumed in the area. We made it through the day, and expect to be able to make it through the rest of this heat wave if there are no unplanned equipment failures or outages, but out of an abundance of caution reviewed load shedding plans with the City of Richland, Franklin PUD, Benton PUD, Benton REA and Columbia REA in case that step becomes necessary to protect the system from broader unplanned power interruptions. While we made it through Monday, we expect electricity in the Tri-Cities loads to peak late afternoon/early evening on Tuesday, June 29. We continue to work with these customers on operational solutions

and voluntary customer conservation to avoid load shedding.

BPA continues to work with these utilities to make appeals to their retail customers to reduce energy use. As you might be aware, Idaho Power is asking its customers to reduce their power consumption. Please do not hesitate to contact me if I can be of any further assistance.

John J Williams

John J Williams

Idaho/Nevada Constituent Account Executive

Bonneville Power Administration ~ Constituent Service Office

950 W. Bannock Street, STE. 805

Boise, Idaho 83702

Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<image001.jpg>

From: Shirley Lindstrom <slindstrom@nwcouncil.org>
Sent: Tuesday, June 29, 2021 12:37 PM
To: Jeff Allen <jallen@NWCouncil.org>; Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>
Cc: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Subject: RE: hydro and heat

Jim has asked for an update on how this heat wave has affected the power system from staff tomorrow at the P4 meeting. I don't know if they will give specifics about how the hydro system was operated. BPA should have a better idea I would think so good that you included John and Peter on this e-mail.

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Sent: Tuesday, June 29, 2021 11:35 AM
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Cc: John Williams <jjwilliams@bpa.gov>; Shirley Lindstrom <slindstrom@nwcouncil.org>
Subject: Fwd: hydro and heat

Do you have something akin to what Sen Risch's staff is seeking? Thanks

Sent from my iPhone

Begin forwarded message:

From: "Neumeyer, Ayla (Risch)" <Ayla_Neumeyer@risch.senate.gov>
Date: June 29, 2021 at 9:26:47 AM MDT
To: Jeff Allen <jallen@nwcouncil.org>
Cc: "Wong, Bryson (Risch)" <Bryson_Wong@risch.senate.gov>
Subject: hydro and heat

Hey Jeff,

Are you tracking/could you help us track the dams re the recent heat waves? In our "when we need them, we really need them" we were thinking this would be the type of situation we point to.

Ayla

Ayla Neumeyer

Senior Legislative Assistant

Senator James E. Risch

202-224-2752

From: Messemer,Clarisse M (BPA) - PGST-5

Sent: Wed Jul 21 10:55:03 2021

To: Van Calcar, Pamela M (BPA) - PGS-5

Subject: RE: hydro and heat - Update 7/2/2021

Importance: Normal

(b)(6)

(b)(6)

(b)(6)

From: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>

Sent: Wednesday, July 21, 2021 10:48 AM

To: Messemer,Clarisse M (BPA) - PGST-5 <cmmessemer@bpa.gov>

Subject: FW: hydro and heat - Update 7/2/2021

From: Van Calcar, Pamela M (BPA) - PGS-5
Sent: Wednesday, July 21, 2021 10:47 AM
To: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>; Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>
Cc: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>
Subject: RE: hydro and heat - Update 7/2/2021

I defer to others on the appropriateness of posting this report. If we do, I ask that we scrub this report and provide only rolled up LSN information, probably just the final table.

For awareness we are working to establish a weekly LSN report that will can be used for reference in these types of request. This should give us quick background information and provide a template for generating consistent event reports in the future.

From: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>
Sent: Wednesday, July 21, 2021 10:34 AM
To: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>; Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>
Cc: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>
Subject: FW: hydro and heat - Update 7/2/2021

This PR story has a reference link to a Power Report on the LSN operations during the heat wave. The report he

is referring to is the PGST report Wanda and Tony put together that I've attached. Do we want to post that on an external Power Services website for public information about the heat wave? This was the information that John Williams was asking about to share with Jeff Allen (Idaho's Power Council Member) who was asked questions from Idaho US Senator Jim Risch about the dam operations during the heat wave .

From: Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>

Sent: Wednesday, July 21, 2021 9:44 AM

To: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjeherdahl@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

Eve and Ryan,

Please see the highlighted part of the attached release. We intend to send this out tomorrow. Are we going to post the study referenced in this email on the Power Services website? If not, I'll have to modify the reference to the work. Please advise. Thanks!

From: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>

Sent: Friday, July 2, 2021 4:34 PM

To: Neuls,Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjeherdahl@bpa.gov>; Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; Baskerville,Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>

Cc: Cogswell,Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner,Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Siewert,Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

Attached is the report from the short-term planning group that covers the operation of the Lower Snake river project during the time from June 25th to June 30th, 2021.

Executive Summary:

This report covers the operation of the lower Snake river project during the time from June 25th to June 30th, 2021. The four most downstream dams on the Snake river are referred to as the Lower Snake river projects. These include Lower Granite dam, Little Goose dam, Lower Monumental dam, and Ice Harbor dam. The most intense heat-wave recorded in BPA Service Territory took place during this period. This heat wave produced temperatures which exceeded all previous records in many areas in the region. An all-time record high temperature for all of Canada was set in British Columbia, and the state of Washington appears to have also set new all-time record highs. The record high temperatures resulted in very high electrical demand for the region. BPA was able to increase generation across the highest load hours to meet that demand. The lower Snake river projects played a significant role in providing generation across the peak hours as well as holding significant reserves. The holding of reserves on the lower Snake river projects allowed other projects in BPA's system to shift from holding reserve obligations to actual power generation.

The report was compiled by Tony Klement (PGSD) and Wanda Solano (PGST)

The table at the end could be taken out for space if Doug wants to incorporate the Transmission information on the Tri-Cities load service.

Thanks,

Eve

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Cc: Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner, Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson, G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty, Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Siewert, Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>; Neuls, Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>
Subject: RE: hydro and heat - Update 7/2/2021

Good morning all,

Just wanted to provide an update on LSN hydro gen.

[COE site](#) only have hourly Power Gen (MW) data up to 6/25 as of this morning. A screenshot from COE query site of all four LSN projects is below.

Since we (BPA) have hourly Generation data available from THOR, I started looking at the data... Noticed generation increased from LSN projects as early as 6/21...

I have the following charts ready for your review, please let me know if you're interested.

- Hourly Net Generation from our LSN projects
- Daily Net Generation from LSN projects
- Individual LSN project daily generation

My understanding is that our short term planning group may have a LSN report, which I am sure will have better information as well.

Please let me know if you have any questions

Thank you & wishing you all a wonderful weekend,
Esther

cid:image001.jpg@01D76F33.11703320

From: Neuls, Esther T (BPA) - PGPR-5

Sent: Wednesday, June 30, 2021 1:11 PM

To: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville,Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>

Cc: Cogswell,Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner,Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Siewert,Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>

Subject: RE: hydro and heat

Hello!

Looks like if we use the COE website, we could get hourly flow data (kcfs) almost real time but hourly Power gen (mw) data looks like there is a good 6-day lag. Please see below for LWG as an example.

We can get real time hourly Net Gen data from THOR (not accessible by public), no problem.

Potentially I can try to put something together this Friday on LSN projects to see if we get a good picture on the month of June...

Please let me know if you have other suggestions

Thanks

Esther

cid:image002.jpg@01D76F33.11703320

From: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>
Sent: Wednesday, June 30, 2021 12:52 PM
To: Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville,Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>
Cc: Cogswell,Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner,Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Neuls,Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>; Siewert,Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>
Subject: RE: hydro and heat

At some point soon we can pull the actual generation data for the Snakes and pass it along to give to Jeff. It is public information; I'm just not sure how quickly the public website is updated based on historical generation. Peter or Eve or Esther probably know. Looks like it should "cool down" by tomorrow. J I will wait to see if Esther thinks we can pull the data tomorrow for the prior week of LSR generation.

Thanks all.

cid:image008.jpg@01D76F5C.B0B00900

From: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Sent: Wednesday, June 30, 2021 12:27 PM
To: Egerdahl, Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; Williams, Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James, Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville, Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>
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Subject: FW: hydro and heat

I responded to Jeff Allen, Idaho's Power Council Member, question below with: I will asked but it may not be available till after the heat wave period on how the 4 dams operated.

Jeff is trying to respond to Idaho US Senator Jim Risch question on how the 4 Lower Snake River Dams are operating during this heat wave in the region.

This is a heads-up that we are being asked by Sen. Risch (Via Idaho's power council) on our operation of the 4 projects. Please let me know the time table for when this information will become available.

Thanks

John J Williams

John J Williams

Idaho/Nevada Constituent Account Executive

Bonneville Power Administration ~ Constituent Service Office

950 W. Bannock Street, STE. 805

Boise, Idaho 83702

Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<http://www.bpa.gov/news/AboutUs/Logos/PublishingImages/BPA-Logo-color-220.jpg>

From: Jeff Allen <jallen@NWCouncil.org>

Sent: Wednesday, June 30, 2021 11:37 AM

To: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>

Subject: Re: hydro and heat

Thanks John. Is it possible to get specific information on the dams Senator Risch asked about?

Sent from my iPhone

On Jun 29, 2021, at 3:42 PM, Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov> wrote:

Hi all, Peter is out this week so I'm it. Our Weather and Streamflow Forecasting team is expecting daily, monthly and even all-time high temperatures, creating dangerous conditions. On the power supply side, excellent planning and the timing of Columbia Basin runoff has us in good shape to get through this heat wave. We're also benefiting from the output of the Columbia Generating Station nuclear plant, which recently returned to service after a refueling outage. That adds over 1,100 megawatts of generation in the Northwest. The following is on BPA's website:

As record-breaking heat bears down on the Pacific Northwest this weekend, the Bonneville Power Administration has taken several steps to position the federal power and transmission system to serve its customers during this weather event. BPA is ready to keep lights and air conditioners on even with the triple digit temperatures forecast across the region.

"We take our responsibility to provide reliable electricity to the consumer-owned utilities in the region very seriously," said BPA Administrator John Hairston. "We are working hard to provide non-stop, reliable electricity this weekend to help residents and businesses stay cool and safe during the heatwave."

On the Power Services side of BPA, these factors are helping:

- The Columbia Generating Station, a nuclear plant owned by Energy Northwest that produces power marketed by BPA, returned online this past weekend from a spring refueling outage. That adds over a 1,100 megawatts of generation in the Northwest and the West.
- Programmed fish spill on the lower Columbia and Snake rivers transitioned from spring to summer operations, increasing the federal hydropower generation from those facilities.
- The Bureau of Reclamation has the Grand Coulee reservoir well positioned to meet its refill target in early July, freeing up the remaining water flow to pass through the system for both power and non-power purposes.

“Even with streamflows below average levels, we are in a good position to serve our customers over this very hot weekend,” said Senior Vice President of Power Services Suzanne Cooper. “I want to thank our partners at the Bureau of Reclamation and the U.S. Army Corps of Engineers for the work and coordination they provide at the region’s 31 federal dams to ensure reliable operations.”

Despite the lower-than-average water year, there is plenty of water behind Grand Coulee Dam and some snowpack left in the Canadian Rockies. Unlike 2015 and 2001, years with a similar volume of water, the shape of this year’s runoff has been slower with snow gradually melting above Grand Coulee.

On the transmission side, BPA is taking measures to ensure the safe and reliable flow of electricity this weekend. BPA owns and operates more than 15,000 circuit miles of transmission lines across the Northwest and small amounts in Nevada, Utah and California.

“The reliable flow of electricity is vital to public safety,” said BPA Transmission Services Senior Vice President Richard Shaheen. “We’ve put all maintenance projects that we can on pause to ensure our transmission system can handle increased flows and meet our customers’ demands.”

On Thursday, BPA restricted planned maintenance on its transmission grid from 6 a.m. Monday, June 28 through Tuesday, June 29 at 10 p.m., so the federal agency can leverage the system to its greatest use when load is expected to increase with the start of the workweek.

“Having all of our lines available will help relieve congestion on the system,” said Vice President of Transmission Operations Michelle Cathcart. “With these unprecedented temperatures, we want to ensure electricity can move freely and reliably meet customer demands.”

While we have ample power to serve loads during heatwave, we are experiencing transmission related challenges in the Tri-Cities area. On Monday, June 28 as the Tri-Cities experienced record temperatures, we saw a record amount of electricity consumed in the area. We made it through the day, and expect to be able to make it through the rest of this heat wave if there are no unplanned equipment failures or outages, but out of an abundance of caution reviewed load shedding plans with the City of Richland, Franklin PUD, Benton PUD, Benton REA and Columbia REA in case that step becomes necessary to protect the system from broader unplanned power interruptions. While we made it through Monday, we expect electricity in the Tri-Cities loads to peak late afternoon/early evening on Tuesday, June 29. We continue to work with these customers on operational solutions and voluntary customer conservation to avoid load shedding.

BPA continues to work with these utilities to make appeals to their retail customers to reduce energy use. As you might be aware, Idaho Power is asking its customers to reduce their power consumption. Please do not hesitate to contact me if I can be of any further assistance.

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Cell (208) 867-4978

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<image001.jpg>

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Cc: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Subject: RE: hydro and heat

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Subject: Fwd: hydro and heat

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Cc: "Wong, Bryson (Risch)" <Bryson_Wong@risch.senate.gov>
Subject: hydro and heat

Hey Jeff,

Are you tracking/could you help us track the dams re the recent heat waves? In our "when we need them, we really need them" we were thinking this would be the type of situation we point to.

Ayla

Ayla Neumeyer

Senior Legislative Assistant

Senator James E. Risch

202-224-2752

From: Johnson,G Douglas (BPA) - DK-7

Sent: Thu Jul 22 06:49:14 2021

To: Egerdahl,Ryan J (BPA) - PGPR-5

Cc: James,Eve A L (BPA) - PG-5;Van Calcar, Pamela M (BPA) - PGS-5;Bellcoff,Steve (BPA) - PGPR-5;Koehler,Birgit G (BPA) - PG-5

Subject: RE: hydro and heat - Update 7/2/2021

Importance: Normal

Sounds good. I'll need to modify the release a little. Let me do that and send it to you to make sure I characterize the operational info correctly. Thanks.

From: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>

Sent: Wednesday, July 21, 2021 4:14 PM

To: Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>

Cc: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>; Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>; Bellcoff,Steve (BPA) - PGPR-5 <srbellcoff@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

Hi Doug. I think PG is now preferring to not link to any LSN internal report in the heat wave article. We will work on a more standardized template of data for public releases. It may end up looking like what we used for the winter, but it will have input from more PG orgs so we will see where it lands.

How does that sound? thx

Ryan Egerdahl

Manager, Long Term Power Planning

Bonneville Power Administration

rjeagerdahl@bpa.gov

| P 503.230.4732 | C (b)(6)

From: Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>

Sent: Wednesday, July 21, 2021 12:25 PM

To: Egerdahl,Ryan J (BPA) - PGPR-5 <rjeagerdahl@bpa.gov>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

Sounds good. We could delay until maybe next Monday or Tuesday – but the rate case stuff goes out Wednesday. If we could get this up by 3 p.m., I could send out after that tomorrow. Just let me know. Thanks!

From: Egerdahl,Ryan J (BPA) - PGPR-5 <rjeagerdahl@bpa.gov>

Sent: Wednesday, July 21, 2021 12:19 PM

To: Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

Importance: High

Hi Doug. What time are you shooting for tomorrow for release? There has been some PG feedback to use the LSN report you saw, but to consolidate the 4 hydro projects data into one set. I am going to check with the internal author on when they could get to this. Thx

Ryan Egerdahl

Manager, Long Term Power Planning

Bonneville Power Administration

rjeherdahl@bpa.gov

| P 503.230.4732 | C (b)(6)

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The report was compiled by Tony Klement (PGSD) and Wanda Solano (PGST)

The table at the end could be taken out for space if Doug wants to incorporate the Transmission information on the Tri-Cities load service.

Thanks,

Eve

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To: Egerdahl, Ryan J (BPA) - PGPR-5 <riegerdahl@bpa.gov>; Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams, Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James, Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville, Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>
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Subject: RE: hydro and heat - Update 7/2/2021

Good morning all,

Just wanted to provide an update on LSN hydro gen.

[COE site](#) only have hourly Power Gen (MW) data up to 6/25 as of this morning. A screenshot from COE query site of all four LSN projects is below.

Since we (BPA) have hourly Generation data available from THOR, I started looking at the data... Noticed generation increased from LSN projects as early as 6/21...

I have the following charts ready for your review, please let me know if you're interested.

- Hourly Net Generation from our LSN projects
- Daily Net Generation from LSN projects
- Individual LSN project daily generation

My understanding is that our short term planning group may have a LSN report, which I am sure will have better information as well.

Please let me know if you have any questions

Thank you & wishing you all a wonderful weekend,

Esther

cid:image001.jpg@01D76F33.11703320

From: Neuls, Esther T (BPA) - PGPR-5
Sent: Wednesday, June 30, 2021 1:11 PM
To: Egerdahl, Ryan J (BPA) - PGPR-5 <rjeagerdahl@bpa.gov>; Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams, Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James, Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville, Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>
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Subject: RE: hydro and heat

Hello!

Looks like if we use the COE website, we could get hourly flow data (kcfs) almost real time but hourly Power gen (mw) data looks like there is a good 6-day lag. Please see below for LWG as an example.

We can get real time hourly Net Gen data from THOR (not accessible by public), no problem.

Potentially I can try to put something together this Friday on LSN projects to see if we get a good picture on the month of June...

Please let me know if you have other suggestions

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Sent: Wednesday, June 30, 2021 12:52 PM

To: Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville,Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>

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Subject: RE: hydro and heat

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see if Esther thinks we can pull the data tomorrow for the prior week of LSR generation.

Thanks all.

cid:image008.jpg@01D76F5C.B0B00900

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Jeff is trying to respond to Idaho US Senator Jim Risch question on how the 4 Lower Snake River Dams are operating during this heat wave in the region.

This is a heads-up that we are being asked by Sen. Risch (Via Idaho's power council) on our operation of the 4 projects. Please let me know the time table for when this information will become available.

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John J Williams

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Idaho/Nevada Constituent Account Executive

Bonneville Power Administration ~ Constituent Service Office

950 W. Bannock Street, STE. 805

Boise, Idaho 83702

Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<http://www.bpa.gov/news/AboutUs/Logos/PublishingImages/BPA-Logo-color-220.jpg>

From: Jeff Allen <allen@NWCouncil.org>
Sent: Wednesday, June 30, 2021 11:37 AM
To: Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Subject: Re: hydro and heat

Thanks John. Is it possible to get specific information on the dams Senator Risch asked about?

Sent from my iPhone

On Jun 29, 2021, at 3:42 PM, Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov> wrote:

Hi all, Peter is out this week so I'm it. Our Weather and Streamflow Forecasting team is expecting daily, monthly and even all-time high temperatures, creating dangerous conditions. On the power supply side, excellent planning and the timing of Columbia Basin runoff has us in good shape to get through this heat wave. We're also benefiting from the output of the Columbia Generating Station nuclear plant, which recently returned to service after a refueling outage. That adds over 1,100 megawatts of generation in the Northwest. The following is on BPA's website:

As record-breaking heat bears down on the Pacific Northwest this weekend, the Bonneville Power

Administration has taken several steps to position the federal power and transmission system to serve its customers during this weather event. BPA is ready to keep lights and air conditioners on even with the triple digit temperatures forecast across the region.

“We take our responsibility to provide reliable electricity to the consumer-owned utilities in the region very seriously,” said BPA Administrator John Hairston. “We are working hard to provide non-stop, reliable electricity this weekend to help residents and businesses stay cool and safe during the heatwave.”

On the Power Services side of BPA, these factors are helping:

- The Columbia Generating Station, a nuclear plant owned by Energy Northwest that produces power marketed by BPA, returned online this past weekend from a spring refueling outage. That adds over a 1,100 megawatts of generation in the Northwest and the West.
- Programmed fish spill on the lower Columbia and Snake rivers transitioned from spring to summer operations, increasing the federal hydropower generation from those facilities.
- The Bureau of Reclamation has the Grand Coulee reservoir well positioned to meet its refill target in early July, freeing up the remaining water flow to pass through the system for both power and non-power purposes.

“Even with streamflows below average levels, we are in a good position to serve our customers over this very hot weekend,” said Senior Vice President of Power Services Suzanne Cooper. “I want to thank our partners at the Bureau of Reclamation and the U.S. Army Corps of Engineers for the work and coordination they provide at the region’s 31 federal dams to ensure reliable operations.”

Despite the lower-than-average water year, there is plenty of water behind Grand Coulee Dam and some snowpack left in the Canadian Rockies. Unlike 2015 and 2001, years with a similar volume of water, the shape of this year's runoff has been slower with snow gradually melting above Grand Coulee.

On the transmission side, BPA is taking measures to ensure the safe and reliable flow of electricity this weekend. BPA owns and operates more than 15,000 circuit miles of transmission lines across the Northwest and small amounts in Nevada, Utah and California.

"The reliable flow of electricity is vital to public safety," said BPA Transmission Services Senior Vice President Richard Shaheen. "We've put all maintenance projects that we can on pause to ensure our transmission system can handle increased flows and meet our customers' demands."

On Thursday, BPA restricted planned maintenance on its transmission grid from 6 a.m. Monday, June 28 through Tuesday, June 29 at 10 p.m., so the federal agency can leverage the system to its greatest use when load is expected to increase with the start of the workweek.

"Having all of our lines available will help relieve congestion on the system," said Vice President of Transmission Operations Michelle Cathcart. "With these unprecedented temperatures, we want to ensure electricity can move freely and reliably meet customer demands."

While we have ample power to serve loads during heatwave, we are experiencing transmission related challenges in the Tri-Cities area. On Monday, June 28 as the Tri-Cities experienced record temperatures, we saw a record amount of electricity consumed in the area. We made it through the day, and expect to be able to make it through

the rest of this heat wave if there are no unplanned equipment failures or outages, but out of an abundance of caution reviewed load shedding plans with the City of Richland, Franklin PUD, Benton PUD, Benton REA and Columbia REA in case that step becomes necessary to protect the system from broader unplanned power interruptions. While we made it through Monday, we expect electricity in the Tri-Cities loads to peak late afternoon/early evening on Tuesday, June 29. We continue to work with these customers on operational solutions and voluntary customer conservation to avoid load shedding.

BPA continues to work with these utilities to make appeals to their retail customers to reduce energy use. As you might be aware, Idaho Power is asking its customers to reduce their power consumption. Please do not hesitate to contact me if I can be of any further assistance.

John J Williams

John J Williams

Idaho/Nevada Constituent Account Executive

Bonneville Power Administration ~ Constituent Service Office

950 W. Bannock Street, STE. 805

Boise, Idaho 83702

Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<image001.jpg>

From: Shirley Lindstrom <slindstrom@nwcouncil.org>

Sent: Tuesday, June 29, 2021 12:37 PM

To: Jeff Allen <jallen@NWCouncil.org>; Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>

Cc: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>

Subject: RE: hydro and heat

Jim has asked for an update on how this heat wave has affected the power system from staff tomorrow at the P4 meeting. I don't know if they will give specifics about how the hydro system was operated. BPA should have a better idea I would think so good that you included John and Peter on this e-mail.

From: Jeff Allen <jallen@NWCouncil.org>

Sent: Tuesday, June 29, 2021 11:35 AM

To: Peter Cogswell <ptcogswell@bpa.gov>

Cc: John Williams <jjwilliams@bpa.gov>; Shirley Lindstrom <slindstrom@nwcouncil.org>
Subject: Fwd: hydro and heat

Do you have something akin to what Sen Risch's staff is seeking? Thanks

Sent from my iPhone

Begin forwarded message:

From: "Neumeyer, Ayla (Risch)" <Ayla_Neumeyer@risch.senate.gov>
Date: June 29, 2021 at 9:26:47 AM MDT
To: Jeff Allen <jjallen@nwcouncil.org>
Cc: "Wong, Bryson (Risch)" <Bryson_Wong@risch.senate.gov>
Subject: hydro and heat

Hey Jeff,

Are you tracking/could you help us track the dams re the recent heat waves? In our "when we need them, we really need them" we were thinking this would be the type of situation we point to.

Ayla

Ayla Neumeyer

Senior Legislative Assistant

Senator James E. Risch

202-224-2752

From: Egerdahl,Ryan J (BPA) - PGPR-5

Sent: Wed Jul 21 12:20:15 2021

To: Van Calcar, Pamela M (BPA) - PGS-5

Subject: RE: hydro and heat - Update 7/2/2021

Importance: Normal

I'm checking with Doug on the targeted release time tomorrow.

Ryan Egerdahl

Manager, Long Term Power Planning

Bonneville Power Administration

rjegeardahl@bpa.gov

| P 503.230.4732 | C (b)(6)

From: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>

Sent: Wednesday, July 21, 2021 12:00 PM

To: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegeardahl@bpa.gov>; James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgoehler@bpa.gov>; Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

If we confirm any other items that need to be cleaned up and target date to have something ready for posting, then we can pass this on to Wanda/Clarisse.

From: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegeerdahl@bpa.gov>

Sent: Wednesday, July 21, 2021 11:13 AM

To: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>; James,Eve A L (BPA) - PG-5 <eaajames@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>; Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

I like that approach Pam. Should we ask Wanda if she can roll up the info so we can post that summarized report?

Ryan Egerdahl

Manager, Long Term Power Planning

Bonneville Power Administration

rjegeerdahl@bpa.gov

| P 503.230.4732 | C (b)(6)

From: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>

Sent: Wednesday, July 21, 2021 10:47 AM

To: James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>; Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>
Cc: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>
Subject: RE: hydro and heat - Update 7/2/2021

I defer to others on the appropriateness of posting this report. If we do, I ask that we scrub this report and provide only rolled up LSN information, probably just the final table.

For awareness we are working to establish a weekly LSN report that will can be used for reference in these types of request. This should give us quick background information and provide a template for generating consistent event reports in the future.

From: James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>
Sent: Wednesday, July 21, 2021 10:34 AM
To: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>; Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>
Cc: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>
Subject: FW: hydro and heat - Update 7/2/2021

This PR story has a reference link to a Power Report on the LSN operations during the heat wave. The report he is referring to is the PGST report Wanda and Tony put together that I've attached. Do we want to post that on an external Power Services website for public information about the heat wave? This was the information that John Williams was asking about to share with Jeff Allen (Idaho's Power Council Member) who was asked questions from Idaho US Senator Jim Risch about the dam operations during the heat wave .

From: Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>
Sent: Wednesday, July 21, 2021 9:44 AM
To: James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>
Subject: RE: hydro and heat - Update 7/2/2021

Eve and Ryan,

Please see the highlighted part of the attached release. We intend to send this out tomorrow. Are we going to post the study referenced in this email on the Power Services website? If not, I'll have to modify the reference to the work. Please advise. Thanks!

From: James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>
Sent: Friday, July 2, 2021 4:34 PM
To: Neuls,Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; Baskerville,Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>
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Attached is the report from the short-term planning group that covers the operation of the Lower Snake river

project during the time from June 25th to June 30th, 2021.

Executive Summary:

This report covers the operation of the lower Snake river project during the time from June 25th to June 30th, 2021. The four most downstream dams on the Snake river are referred to as the Lower Snake river projects. These include Lower Granite dam, Little Goose dam, Lower Monumental dam, and Ice Harbor dam. The most intense heat-wave recorded in BPA Service Territory took place during this period. This heat wave produced temperatures which exceeded all previous records in many areas in the region. An all-time record high temperature for all of Canada was set in British Columbia, and the state of Washington appears to have also set new all-time record highs. The record high temperatures resulted in very high electrical demand for the region. BPA was able to increase generation across the highest load hours to meet that demand. The lower Snake river projects played a significant role in providing generation across the peak hours as well as holding significant reserves. The holding of reserves on the lower Snake river projects allowed other projects in BPA's system to shift from holding reserve obligations to actual power generation.

The report was compiled by Tony Klement (PGSD) and Wanda Solano (PGST)

The table at the end could be taken out for space if Doug wants to incorporate the Transmission information on the Tri-Cities load service.

Thanks,

Eve

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Idaho/Nevada Constituent Account Executive

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Boise, Idaho 83702

Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<http://www.bpa.gov/news/AboutUs/Logos/PublishingImages/BPA-Logo-color-220.jpg>

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Subject: Re: hydro and heat

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- The Columbia Generating Station, a nuclear plant owned by Energy Northwest that produces power marketed by BPA, returned online this past weekend from a spring refueling outage. That adds over a 1,100 megawatts of generation in the Northwest and the West.
- Programmed fish spill on the lower Columbia and Snake rivers transitioned from spring to summer operations, increasing the federal hydropower generation from those facilities.
- The Bureau of Reclamation has the Grand Coulee reservoir well positioned to meet its refill target in early July, freeing up the remaining water flow to pass through the system for both power and non-power purposes.

“Even with streamflows below average levels, we are in a good position to serve our customers over this very hot weekend,” said Senior Vice President of Power Services Suzanne Cooper. “I want to thank our partners at the Bureau of Reclamation and the U.S. Army Corps of Engineers for the work and coordination they provide at the region’s 31 federal dams to ensure reliable operations.”

Despite the lower-than-average water year, there is plenty of water behind Grand Coulee Dam and some snowpack left in the Canadian Rockies. Unlike 2015 and 2001, years with a similar volume of water, the shape of this year’s runoff has been slower with snow gradually melting above Grand Coulee.

On the transmission side, BPA is taking measures to ensure the safe and reliable flow of electricity this weekend. BPA owns and operates more than 15,000 circuit miles of transmission lines across the Northwest and small amounts in Nevada, Utah and California.

“The reliable flow of electricity is vital to public safety,” said BPA Transmission Services Senior Vice President

Richard Shaheen. "We've put all maintenance projects that we can on pause to ensure our transmission system can handle increased flows and meet our customers' demands."

On Thursday, BPA restricted planned maintenance on its transmission grid from 6 a.m. Monday, June 28 through Tuesday, June 29 at 10 p.m., so the federal agency can leverage the system to its greatest use when load is expected to increase with the start of the workweek.

"Having all of our lines available will help relieve congestion on the system," said Vice President of Transmission Operations Michelle Cathcart. "With these unprecedented temperatures, we want to ensure electricity can move freely and reliably meet customer demands."

While we have ample power to serve loads during heatwave, we are experiencing transmission related challenges in the Tri-Cities area. On Monday, June 28 as the Tri-Cities experienced record temperatures, we saw a record amount of electricity consumed in the area. We made it through the day, and expect to be able to make it through the rest of this heat wave if there are no unplanned equipment failures or outages, but out of an abundance of caution reviewed load shedding plans with the City of Richland, Franklin PUD, Benton PUD, Benton REA and Columbia REA in case that step becomes necessary to protect the system from broader unplanned power interruptions. While we made it through Monday, we expect electricity in the Tri-Cities loads to peak late afternoon/early evening on Tuesday, June 29. We continue to work with these customers on operational solutions and voluntary customer conservation to avoid load shedding.

BPA continues to work with these utilities to make appeals to their retail customers to reduce energy use. As you might be aware, Idaho Power is asking its customers to reduce their power consumption. Please do not hesitate to contact me if I can be of any further assistance.

John J Williams

John J Williams

Idaho/Nevada Constituent Account Executive

Bonneville Power Administration ~ Constituent Service Office

950 W. Bannock Street, STE. 805

Boise, Idaho 83702

Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<image001.jpg>

From: Shirley Lindstrom <slindstrom@nwcouncil.org>
Sent: Tuesday, June 29, 2021 12:37 PM
To: Jeff Allen <jallen@NWCouncil.org>; Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>
Cc: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Subject: RE: hydro and heat

Jim has asked for an update on how this heat wave has affected the power system from staff tomorrow at the P4 meeting. I don't know if they will give specifics about how the hydro system was operated. BPA should have a better idea I would think so good that you included John and Peter on this e-mail.

From: Jeff Allen <jallen@NWCouncil.org>
Sent: Tuesday, June 29, 2021 11:35 AM
To: Peter Cogswell <ptcogswell@bpa.gov>
Cc: John Williams <jjwilliams@bpa.gov>; Shirley Lindstrom <slindstrom@nwcouncil.org>
Subject: Fwd: hydro and heat

Do you have something akin to what Sen Risch's staff is seeking? Thanks

Sent from my iPhone

Begin forwarded message:

From: "Neumeyer, Ayla (Risch)" <Ayla_Neumeyer@risch.senate.gov>

Date: June 29, 2021 at 9:26:47 AM MDT
To: Jeff Allen <jjallen@nwcouncil.org>
Cc: "Wong, Bryson (Risch)" <Bryson_Wong@risch.senate.gov>
Subject: hydro and heat

Hey Jeff,

Are you tracking/could you help us track the dams re the recent heat waves? In our “when we need them, we really need them” we were thinking this would be the type of situation we point to.

Ayla

Ayla Neumeyer

Senior Legislative Assistant

Senator James E. Risch

202-224-2752

From: Egerdahl,Ryan J (BPA) - PGPR-5

Sent: Tue Jul 20 14:41:35 2021

To: Van Calcar, Pamela M (BPA) - PGS-5

Subject: FW: One more quick look - LSRD heatwave release

Importance: Normal

Attachments: LSRDs help region power through heatwave v3 Power and T reviewed.docx

I thought it was posted until I saw some back and forth today with Kieran and Doug. :O

Ryan Egerdahl

Manager, Long Term Power Planning

Bonneville Power Administration

rjegeerdahl@bpa.gov

| P 503.230.4732 | C (b)(6)

From: Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>

Sent: Tuesday, July 20, 2021 11:11 AM

To: Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjegeerdahl@bpa.gov>

Cc: Scruggs,Joel L (BPA) - DK-7 <jlscruggs@bpa.gov>

Subject: One more quick look - LSRD heatwave release

You can just look at the track changes stuff. You've seen the rest.

Lower Snake River dams help region power through recent heatwave
Ice Harbor key to relieving transmission congestion in Tri-Cities

Portland, Oregon – The four dams on the lower Snake River provided much-needed energy, balancing and contingency reserves and Ice Harbor dam on the lower Snake River played a key role in keeping the lights on in the Tri-Cities area during the early July intense heat. Without these four dams, powering through the heatwave could have been much more expensive and operationally challenging.

“This is another example of the value these facilities provide the region from an electricity perspective,” said BPA administrator John Hairston. “As the region continues to discuss the future of these facilities, we believe it is important to provide data and information about their performance, as a solid foundation for discussions about the future of these four dynamic dams.”

Power and Reserves provision

As the entire Pacific Northwest experienced record or near-record temperatures between June 25 and 30, the challenge of keeping the lights on was top of mind at BPA and nationally. The record temperatures led to record electricity demand, and BPA was able to meet that demand due to careful planning and measures such as canceling planned transmission maintenance to ensure high electricity flows would not cause congestion, which can lead to cascading outages across the region and western interconnection.

The lower Snake River dams, which often take a backseat to larger facilities on the upper and lower Columbia River during the summer, provided key electricity and balancing and contingency reserves that helped the region power through the unprecedented heat.

Maximizing the performance of the lower Snake River dams during summer is no easy task. With minimum flow levels for juvenile fish migration in place, dam operators were still able to fill the projects overnight, so there was enough water for fish and power production during the peak electricity consumption hours of the day.

For the duration of the heatwave, the four dams on the lower Snake River generated between 439 and 1,009 megawatts. For perspective, the average consumption of the City of Seattle is approximately 1,000 megawatts. However, the four dams did much more. BPA must hold contingency reserves to ensure it can keep the lights on if emergencies take generators out of service and balancing reserves to move up and down with generators that stray from their energy schedules. As the region adds more renewable energy to mitigate climate change, these balancing reserves will become more important.

Over this five-day heatwave, BPA transferred some reserve requirements to the four lower Snake River Dams. At times, these four dams held 15% of BPA's total required reserves, peaking at 220 megawatts. At their highest, these dams provided 1,118 megawatts of combined energy production and reserve capacity.

You can view the full report at this link [\(please post this somewhere to the Power Services website once it is finalized\)](#)

Ice Harbor relieves Tri-Cities transmission capacity issue

Ice Harbor dam on the lower Snake River played a key role in keeping the lights on in the Tri-Cities area during last week's intense heat. Had Ice Harbor not been generating, it is likely BPA would have had to work with local customers to shift loads, which can take time and require some power outages or have rolling blackouts in selected areas in the Tri-Cities to protect the system from wider, cascading outages.

BPA relies on Ice Harbor to relieve stress on our transmission system in the Tri-Cities area," said BPA Vice President of Transmission Operations Michelle Cathcart. "During the recent heatwave, Ice Harbor provided voltage stabilization and helped increase the amount of energy our system could provide to parts of the Tri-Cities."

Post-heatwave analysis by BPA Transmission engineers indicates, if Ice Harbor had not been generating, an unplanned loss of one of the key transformer banks would have caused a System Operating Limit exceedance. Also, the loss of a different key transformer bank would have pushed a facility to 98% of its capacity. While BPA did not have to work with customers to shed load, that may not have been the case if Ice Harbor were offline.

"If not for Ice Harbor, we would have been scrambling with customers to move loads around to avoid putting customers in the dark," said Cathcart. "Given the amount of work done to avoid rotating blackouts with Ice Harbor in service last week, it is hard to imagine getting enough additional relief from moving loads around to keep the lights on everywhere with the plant offline."

Ice Harbor is one of four dams on the lower Snake River. These dams have long been discussed for breaching or removal to help several runs of salmon and steelhead recover. The Bonneville Power Administration markets the power from the lower Snake River dams and 27 other federal dams across the Northwest.

About BPA

The Bonneville Power Administration, headquartered in Portland, Oregon, is a nonprofit federal power marketer that sells wholesale, carbon-free hydropower from 31 federal dams in the Columbia River Basin. It also markets the output of the region's only nuclear plant. BPA delivers this power to more than 140 Northwest electric utilities, serving millions of consumers and businesses in Washington, Oregon, Idaho, western Montana and parts of California, Nevada, Utah and Wyoming. BPA also owns and operates more than 15,000 circuit miles of high-voltage power lines and 261 substations, and provides transmission service to

more than 300 customers. In all, BPA provides nearly a third of the power generated in the Northwest. To mitigate the impacts of the federal dams, BPA implements a fish and wildlife program that includes working with its partners to make the federal dams safer for fish passage. It also pursues cost-effective energy savings and operational solutions that help maintain safe, affordable, reliable electric power for the Northwest. www.bpa.gov

###

From: Egerdahl,Ryan J (BPA) - PGPR-5

Sent: Wed Jul 21 13:59:03 2021

To: Van Calcar, Pamela M (BPA) - PGS-5

Subject: RE: hydro and heat - Update 7/2/2021

Importance: Normal

I thought you might. J

Ryan Egerdahl

Manager, Long Term Power Planning

Bonneville Power Administration

rjegeerdahl@bpa.gov

| P 503.230.4732 | C (b)(6)

From: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>

Sent: Wednesday, July 21, 2021 1:58 PM

To: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegeerdahl@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

I agree with this plan

From: Egerdahl,Ryan J (BPA) - PGPR-5 <rjeagerdahl@bpa.gov>
Sent: Wednesday, July 21, 2021 1:57 PM
To: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>; Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>
Subject: RE: hydro and heat - Update 7/2/2021

For all of those valid reasons, how about we have Doug post the heat wave article tomorrow and remove any reference to a LSN report? I should have added voting buttons.

We can then work on the standard template and likely be ready before the next request/article.

Thanks

Ryan

From: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>
Sent: Wednesday, July 21, 2021 1:50 PM
To: Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjeagerdahl@bpa.gov>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>
Subject: RE: hydro and heat - Update 7/2/2021

I don't think the PGST report is appropriate to be a publically facing report at this time. The main focus is on how reserves are being placed on these projects which is a sensitive topic. I would prefer we spend some time planning what we want in a public facing report that can be fairly standard to implement when these events occur.

I don't want to be regularly posting reserve allocations for LSN plants or other operational decisions.

From: Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>

Sent: Wednesday, July 21, 2021 12:38 PM

To: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

I haven't gone back to the source material, but we certainly should review prior to posting. We are in an environment where our public declarations will be characterized in the most negative way possible.

Kieran P. Connolly

Vice President, Generation Asset Management

Bonneville Power Administration

bpa.gov | P 503-230-4680

C (b)(6)

[cid:image001.jpg@01D58E5A.E3E56480cid:image002.jpg@01D58E5A.E3E56480cid:image003.jpg@01D58E5A.E3E56480cid:image004.jpg@01D58E5A.E3E56480cid:image005.jpg@01D58E5A.E3E56480cid:image006.jpg@01D58E5A.E3E56480](#)

From: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>

Sent: Wednesday, July 21, 2021 12:00 PM

To: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>;

Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>;

Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

If we confirm any other items that need to be cleaned up and target date to have something ready for posting, then we can pass this on to Wanda/Clarisse.

From: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>

Sent: Wednesday, July 21, 2021 11:13 AM

To: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>; Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

I like that approach Pam. Should we ask Wanda if she can roll up the info so we can post that summarized report?

Ryan Egerdahl
Manager, Long Term Power Planning

Bonneville Power Administration
riegerdahl@bpa.gov
| P 503.230.4732 | C (b)(6)

From: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>
Sent: Wednesday, July 21, 2021 10:47 AM
To: James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>; Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>
Cc: Egerdahl,Ryan J (BPA) - PGPR-5 <riegerdahl@bpa.gov>
Subject: RE: hydro and heat - Update 7/2/2021

I defer to others on the appropriateness of posting this report. If we do, I ask that we scrub this report and provide only rolled up LSN information, probably just the final table.

For awareness we are working to establish a weekly LSN report that will can be used for reference in these types of request. This should give us quick background information and provide a template for generating consistent event reports in the future.

From: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>
Sent: Wednesday, July 21, 2021 10:34 AM
To: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>; Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>
Cc: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>
Subject: FW: hydro and heat - Update 7/2/2021

This PR story has a reference link to a Power Report on the LSN operations during the heat wave. The report he is referring to is the PGST report Wanda and Tony put together that I've attached. Do we want to post that on an external Power Services website for public information about the heat wave? This was the information that John Williams was asking about to share with Jeff Allen (Idaho's Power Council Member) who was asked questions from Idaho US Senator Jim Risch about the dam operations during the heat wave .

From: Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>
Sent: Wednesday, July 21, 2021 9:44 AM
To: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>
Subject: RE: hydro and heat - Update 7/2/2021

Eve and Ryan,

Please see the highlighted part of the attached release. We intend to send this out tomorrow. Are we going to post the study referenced in this email on the Power Services website? If not, I'll have to modify the reference to the

work. Please advise. Thanks!

From: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>

Sent: Friday, July 2, 2021 4:34 PM

To: Neuls,Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjeegerdahl@bpa.gov>; Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; Baskerville,Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>

Cc: Cogswell,Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner,Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Siewert,Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

Attached is the report from the short-term planning group that covers the operation of the Lower Snake river project during the time from June 25th to June 30th, 2021.

Executive Summary:

This report covers the operation of the lower Snake river project during the time from June 25th to June 30th, 2021. The four most downstream dams on the Snake river are referred to as the Lower Snake river projects. These include Lower Granite dam, Little Goose dam, Lower Monumental dam, and Ice Harbor dam. The most intense heat-wave recorded in BPA Service Territory took place during this period. This heat wave produced temperatures which exceeded all previous records in many areas in the region. An all-time record high temperature for all of Canada was set in British Columbia, and the state of Washington appears to have also set new all-time record highs. The record high temperatures resulted in very high electrical demand for the region. BPA was able to increase generation across the highest load hours to meet that demand. The lower Snake river projects played a significant role in providing generation across the peak hours as well as holding significant reserves. The holding of reserves on the lower Snake river projects allowed other projects in BPA's system to shift

from holding reserve obligations to actual power generation.

The report was compiled by Tony Klement (PGSD) and Wanda Solano (PGST)

The table at the end could be taken out for space if Doug wants to incorporate the Transmission information on the Tri-Cities load service.

Thanks,

Eve

From: Neuls, Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>

Sent: Friday, July 2, 2021 11:12 AM

To: Egerdahl, Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams, Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James, Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville, Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>

Cc: Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner, Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson, G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty, Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Siewert, Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>; Neuls, Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

Good morning all,

Just wanted to provide an update on LSN hydro gen.

[COE site](#) only have hourly Power Gen (MW) data up to 6/25 as of this morning. A screenshot from COE query site of all four LSN projects is below.

Since we (BPA) have hourly Generation data available from THOR, I started looking at the data... Noticed generation increased from LSN projects as early as 6/21...

I have the following charts ready for your review, please let me know if you're interested.

- Hourly Net Generation from our LSN projects
- Daily Net Generation from LSN projects
- Individual LSN project daily generation

My understanding is that our short term planning group may have a LSN report, which I am sure will have better information as well.

Please let me know if you have any questions

Thank you & wishing you all a wonderful weekend,
Esther

cid:image001.jpg@01D76F33.11703320

From: Neuls, Esther T (BPA) - PGPR-5
Sent: Wednesday, June 30, 2021 1:11 PM
To: Egerdahl, Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams, Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James, Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville, Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>
Cc: Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner, Joshua P (BPA) - DIR-7 <jpwarner@bpa.gov>; Johnson, G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty, Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Siewert, Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>
Subject: RE: hydro and heat

Hello!

Looks like if we use the COE website, we could get hourly flow data (kcfs) almost real time but hourly Power gen (mw) data looks like there is a good 6-day lag. Please see below for LWG as an example.

We can get real time hourly Net Gen data from THOR (not accessible by public), no problem.

Potentially I can try to put something together this Friday on LSN projects to see if we get a good picture on the month of June...

Please let me know if you have other suggestions

Thanks

Esther

cid:image002.jpg@01D76F33.11703320

From: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegeerdahl@bpa.gov>

Sent: Wednesday, June 30, 2021 12:52 PM

To: Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville,Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>

Cc: Cogswell,Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner,Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Neuls,Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>; Siewert,Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>

Subject: RE: hydro and heat

At some point soon we can pull the actual generation data for the Snakes and pass it along to give to Jeff. It is public information; I'm just not sure how quickly the public website is updated based on historical generation. Peter or Eve or Esther probably know. Looks like it should "cool down" by tomorrow. J I will wait to see if Esther thinks we can pull the data tomorrow for the prior week of LSR generation.

Thanks all.

cid:image008.jpg@01D76F5C.B0B00900

From: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Sent: Wednesday, June 30, 2021 12:27 PM
To: Egerdahl, Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; Williams, Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James, Eve A L (BPA) - PG-5 <ejames@bpa.gov>; Baskerville, Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>
Cc: Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner, Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson, G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>
Subject: FW: hydro and heat

I responded to Jeff Allen, Idaho's Power Council Member, question below with: I will asked but it may not be available till after the heat wave period on how the 4 dams operated.

Jeff is trying to respond to Idaho US Senator Jim Risch question on how the 4 Lower Snake River Dams are operating during this heat wave in the region.

This is a heads-up that we are being asked by Sen. Risch (Via Idaho's power council) on our operation of the 4 projects. Please let me know the time table for when this information will become available.

Thanks

John J Williams

John J Williams

Idaho/Nevada Constituent Account Executive

Bonneville Power Administration ~ Constituent Service Office

950 W. Bannock Street, STE. 805

Boise, Idaho 83702

Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<http://www.bpa.gov/news/AboutUs/Logos/PublishingImages/BPA-Logo-color-220.jpg>

From: Jeff Allen <jallen@NWCouncil.org>
Sent: Wednesday, June 30, 2021 11:37 AM
To: Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Subject: Re: hydro and heat

Thanks John. Is it possible to get specific information on the dams Senator Risch asked about?

Sent from my iPhone

On Jun 29, 2021, at 3:42 PM, Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov> wrote:

Hi all, Peter is out this week so I'm it. Our Weather and Streamflow Forecasting team is expecting daily, monthly and even all-time high temperatures, creating dangerous conditions. On the power supply side, excellent planning and the timing of Columbia Basin runoff has us in good shape to get through this heat wave. We're also benefiting from the output of the Columbia Generating Station nuclear plant, which recently returned

to service after a refueling outage. That adds over 1,100 megawatts of generation in the Northwest. The following is on BPA's website:

As record-breaking heat bears down on the Pacific Northwest this weekend, the Bonneville Power Administration has taken several steps to position the federal power and transmission system to serve its customers during this weather event. BPA is ready to keep lights and air conditioners on even with the triple digit temperatures forecast across the region.

"We take our responsibility to provide reliable electricity to the consumer-owned utilities in the region very seriously," said BPA Administrator John Hairston. "We are working hard to provide non-stop, reliable electricity this weekend to help residents and businesses stay cool and safe during the heatwave."

On the Power Services side of BPA, these factors are helping:

- The Columbia Generating Station, a nuclear plant owned by Energy Northwest that produces power marketed by BPA, returned online this past weekend from a spring refueling outage. That adds over a 1,100 megawatts of generation in the Northwest and the West.
- Programmed fish spill on the lower Columbia and Snake rivers transitioned from spring to summer operations, increasing the federal hydropower generation from those facilities.
- The Bureau of Reclamation has the Grand Coulee reservoir well positioned to meet its refill target in early July, freeing up the remaining water flow to pass through the system for both power and non-power purposes.

"Even with streamflows below average levels, we are in a good position to serve our customers over this very hot weekend," said Senior Vice President of Power Services Suzanne Cooper. "I want to thank our partners at the Bureau of Reclamation and the U.S. Army Corps of Engineers for the work and coordination they provide at the

region's 31 federal dams to ensure reliable operations.”

Despite the lower-than-average water year, there is plenty of water behind Grand Coulee Dam and some snowpack left in the Canadian Rockies. Unlike 2015 and 2001, years with a similar volume of water, the shape of this year's runoff has been slower with snow gradually melting above Grand Coulee.

On the transmission side, BPA is taking measures to ensure the safe and reliable flow of electricity this weekend. BPA owns and operates more than 15,000 circuit miles of transmission lines across the Northwest and small amounts in Nevada, Utah and California.

“The reliable flow of electricity is vital to public safety,” said BPA Transmission Services Senior Vice President Richard Shaheen. “We’ve put all maintenance projects that we can on pause to ensure our transmission system can handle increased flows and meet our customers’ demands.”

On Thursday, BPA restricted planned maintenance on its transmission grid from 6 a.m. Monday, June 28 through Tuesday, June 29 at 10 p.m., so the federal agency can leverage the system to its greatest use when load is expected to increase with the start of the workweek.

“Having all of our lines available will help relieve congestion on the system,” said Vice President of Transmission Operations Michelle Cathcart. “With these unprecedented temperatures, we want to ensure electricity can move freely and reliably meet customer demands.”

While we have ample power to serve loads during heatwave, we are experiencing transmission related challenges in the Tri-Cities area. On Monday, June 28 as the Tri-Cities experienced record temperatures, we saw a record amount of electricity consumed in the area. We made it through the day, and expect to be able to make it through the rest of this heat wave if there are no unplanned equipment failures or outages, but out of an abundance of caution reviewed load shedding plans with the City of Richland, Franklin PUD, Benton PUD, Benton REA and Columbia REA in case that step becomes necessary to protect the system from broader unplanned power interruptions. While we made it through Monday, we expect electricity in the Tri-Cities loads to peak late afternoon/early evening on Tuesday, June 29. We continue to work with these customers on operational solutions and voluntary customer conservation to avoid load shedding.

BPA continues to work with these utilities to make appeals to their retail customers to reduce energy use. As you might be aware, Idaho Power is asking its customers to reduce their power consumption. Please do not hesitate to contact me if I can be of any further assistance.

John J Williams

John J Williams

Idaho/Nevada Constituent Account Executive

Bonneville Power Administration ~ Constituent Service Office

950 W. Bannock Street, STE. 805

Boise, Idaho 83702

Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<image001.jpg>

From: Shirley Lindstrom <slindstrom@nwcouncil.org>

Sent: Tuesday, June 29, 2021 12:37 PM

To: Jeff Allen <jallen@NWCouncil.org>; Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>

Cc: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>

Subject: RE: hydro and heat

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Cc: John Williams <jjwilliams@bpa.gov>; Shirley Lindstrom <slindstrom@nwcouncil.org>
Subject: Fwd: hydro and heat

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Sent from my iPhone

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From: "Neumeyer, Ayla (Risch)" <Ayla_Neumeyer@risch.senate.gov>
Date: June 29, 2021 at 9:26:47 AM MDT
To: Jeff Allen <jallen@nwcouncil.org>
Cc: "Wong, Bryson (Risch)" <Bryson_Wong@risch.senate.gov>
Subject: hydro and heat

Hey Jeff,

Are you tracking/could you help us track the dams re the recent heat waves? In our "when we need them, we really need them" we were thinking this would be the type of situation we point to.

Ayla

Ayla Neumeyer

Senior Legislative Assistant

Senator James E. Risch

202-224-2752

From: James,Eve A L (BPA) - PG-5

Sent: Wed Jul 21 10:34:09 2021

To: Van Calcar, Pamela M (BPA) - PGS-5;Petty,Robert J (BPA) - PGP-5;Koehler,Birgit G (BPA) - PG-5;Connolly,Kieran P (BPA) - PG-5

Cc: Egerdahl,Ryan J (BPA) - PGPR-5

Subject: FW: hydro and heat - Update 7/2/2021

Importance: Normal

Attachments: LSRDs help region power through heatwave v6 FINAL DRAFT.docx; LSN Operations for June 2021 Heat Wave.docx

This PR story has a reference link to a Power Report on the LSN operations during the heat wave. The report he is referring to is the PGST report Wanda and Tony put together that I've attached. Do we want to post that on an external Power Services website for public information about the heat wave? This was the information that John Williams was asking about to share with Jeff Allen (Idaho's Power Council Member) who was asked questions from Idaho US Senator Jim Risch about the dam operations during the heat wave .

From: Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>

Sent: Wednesday, July 21, 2021 9:44 AM

To: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

Eve and Ryan,

Please see the highlighted part of the attached release. We intend to send this out tomorrow. Are we going to post the study referenced in this email on the Power Services website? If not, I'll have to modify the reference to the work. Please advise. Thanks!

From: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>
Sent: Friday, July 2, 2021 4:34 PM
To: Neuls,Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; Baskerville,Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>
Cc: Cogswell,Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner,Joshua P (BPA) - DIR-7 <jpwarner@bpa.gov>; Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Siewert,Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>
Subject: RE: hydro and heat - Update 7/2/2021

Attached is the report from the short-term planning group that covers the operation of the Lower Snake river project during the time from June 25th to June 30th, 2021.

Executive Summary:

This report covers the operation of the lower Snake river project during the time from June 25th to June 30th, 2021. The four most downstream dams on the Snake river are referred to as the Lower Snake river projects. These include Lower Granite dam, Little Goose dam, Lower Monumental dam, and Ice Harbor dam. The most intense heat-wave recorded in BPA Service Territory took place during this period. This heat wave produced temperatures which exceeded all previous records in many areas in the region. An all-time record high temperature for all of Canada was set in British Columbia, and the state of Washington appears to have also set new all-time record highs. The record high temperatures resulted in very high electrical demand for the region.

BPA was able to increase generation across the highest load hours to meet that demand. The lower Snake river projects played a significant role in providing generation across the peak hours as well as holding significant reserves. The holding of reserves on the lower Snake river projects allowed other projects in BPA's system to shift from holding reserve obligations to actual power generation.

The report was compiled by Tony Klement (PGSD) and Wanda Solano (PGST)

The table at the end could be taken out for space if Doug wants to incorporate the Transmission information on the Tri-Cities load service.

Thanks,

Eve

From: Neuls, Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>

Sent: Friday, July 2, 2021 11:12 AM

To: Egerdahl, Ryan J (BPA) - PGPR-5 <rjeagerdahl@bpa.gov>; Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams, Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James, Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville, Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>

Cc: Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner, Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson, G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty, Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>;

Siewert, Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>; Neuls, Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

Good morning all,

Just wanted to provide an update on LSN hydro gen.

[COE site](#) only have hourly Power Gen (MW) data up to 6/25 as of this morning. A screenshot from COE query site of all four LSN projects is below.

Since we (BPA) have hourly Generation data available from THOR, I started looking at the data... Noticed generation increased from LSN projects as early as 6/21...

I have the following charts ready for your review, please let me know if you're interested.

- Hourly Net Generation from our LSN projects
- Daily Net Generation from LSN projects
- Individual LSN project daily generation

My understanding is that our short term planning group may have a LSN report, which I am sure will have better

information as well.

Please let me know if you have any questions

Thank you & wishing you all a wonderful weekend,
Esther

cid:image001.jpg@01D76F33.11703320

From: Neuls, Esther T (BPA) - PGPR-5
Sent: Wednesday, June 30, 2021 1:11 PM
To: Egerdahl, Ryan J (BPA) - PGPR-5 <rjeagerdahl@bpa.gov>; Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams, Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James, Eve A L (BPA) - PG-5 <eaajames@bpa.gov>; Baskerville, Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>
Cc: Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner, Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson, G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty, Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Siewert, Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>
Subject: RE: hydro and heat

Hello!

Looks like if we use the COE website, we could get hourly flow data (kcfs) almost real time but hourly Power gen (mw) data looks like there is a good 6-day lag. Please see below for LWG as an example.

We can get real time hourly Net Gen data from THOR (not accessible by public), no problem.

Potentially I can try to put something together this Friday on LSN projects to see if we get a good picture on the month of June...

Please let me know if you have other suggestions

Thanks

Esther

cid:image002.jpg@01D76F33.11703320

From: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegeerdahl@bpa.gov>

Sent: Wednesday, June 30, 2021 12:52 PM

To: Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville,Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>

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Subject: RE: hydro and heat

At some point soon we can pull the actual generation data for the Snakes and pass it along to give to Jeff. It is public information; I'm just not sure how quickly the public website is updated based on historical generation. Peter or Eve or Esther probably know. Looks like it should "cool down" by tomorrow. J I will wait to see if Esther thinks we can pull the data tomorrow for the prior week of LSR generation.

Thanks all.

cid:image008.jpg@01D76F5C.B0B00900

From: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>

Sent: Wednesday, June 30, 2021 12:27 PM

To: Egerdahl, Ryan J (BPA) - PGPR-5 <riegerdahl@bpa.gov>; Williams, Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James, Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville, Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>

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Subject: FW: hydro and heat

I responded to Jeff Allen, Idaho's Power Council Member, question below with: I will asked but it may not be available till after the heat wave period on how the 4 dams operated.

Jeff is trying to respond to Idaho US Senator Jim Risch question on how the 4 Lower Snake River Dams are operating during this heat wave in the region.

This is a heads-up that we are being asked by Sen. Risch (Via Idaho's power council) on our operation of the 4 projects. Please let me know the time table for when this information will become available.

Thanks

John J Williams

John J Williams

Idaho/Nevada Constituent Account Executive

Bonneville Power Administration ~ Constituent Service Office

950 W. Bannock Street, STE. 805

Boise, Idaho 83702

Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<http://www.bpa.gov/news/AboutUs/Logos/PublishingImages/BPA-Logo-color-220.jpg>

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Sent: Wednesday, June 30, 2021 11:37 AM
To: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Subject: Re: hydro and heat

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Sent from my iPhone

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Ayla

Ayla Neumeyer

Senior Legislative Assistant

Senator James E. Risch

202-224-2752

Lower Snake River dams help region power through recent heatwave
Ice Harbor key to relieving transmission congestion in Tri-Cities

Portland, Oregon – The four dams on the lower Snake River provided much-needed energy, balancing and contingency reserves and Ice Harbor dam on the lower Snake River played a key role in keeping the lights on in the Tri-Cities area in eastern Washington during the early July intense heat. Without these four dams, powering through the heatwave could have been much more expensive and operationally challenging.

“This is another example of the value these facilities provide the region from a clean energy perspective,” said Administrator John Hairston. “As the region continues to discuss the future of these facilities, we believe it is important to provide data and information about their performance, as a solid foundation for discussions about the future of these four dynamic dams.”

Power and Reserves provision

As the entire Pacific Northwest experienced record or near-record temperatures between June 25 and 30, the challenge of keeping the lights on was top of mind at BPA and nationally. The record temperatures led to record electricity demand, and BPA was able to meet that demand due to careful planning and measures such as canceling planned transmission maintenance to ensure high electricity flows would not cause congestion, which can lead to cascading outages across the region and western interconnection.

The lower Snake River dams, which often take a backseat to larger facilities on the upper and lower Columbia River during the summer, provided key electricity and balancing and contingency reserves that helped the region power through the unprecedented heat. They are a valuable part of the region’s clean energy portfolio, providing carbon-free electricity, which is important in the region’s efforts to reduce carbon dioxide emissions and mitigate the impacts of climate change. Maximizing the performance of the lower Snake River dams during summer is no easy task. With minimum flow levels for juvenile fish migration in place, dam operators were still able to fill the projects overnight, so there was enough water for fish and power production during the peak electricity consumption hours of the day.

For the duration of the heatwave, the four dams on the lower Snake River generated between 439 and 1,009 megawatts. For perspective, the average consumption of the City of Seattle is approximately 1,000 MW. However, the four dams did much more. BPA must hold contingency reserves to ensure it can keep the lights on if emergencies take generators out of service and balancing reserves to move up and down with generators that stray from their energy schedules. As the region adds more intermittent renewable energy to mitigate climate change, these balancing reserves will become more important.

Over this five-day heatwave, BPA transferred some reserve requirements to the four lower Snake River Dams. At times, these four dams held 15% of BPA's total required reserves, peaking at 220 megawatts. At their highest, these dams provided 1,118 megawatts of combined energy production and reserve capacity.

You can view the full report at this link [\(please post this somewhere to the Power Services website once it is finalized\)](#)

Ice Harbor relieves Tri-Cities transmission capacity issue

Ice Harbor dam on the lower Snake River played a key role in keeping the lights on in the Tri-Cities area during last month's intense heat. Had Ice Harbor not been generating, it is likely BPA would have had to work with local customers to shift loads, which can take time and require some power outages or have rolling blackouts in selected areas in the Tri-Cities to protect the system from wider, cascading outages.

"BPA relies on Ice Harbor to relieve stress on our transmission system in the Tri-Cities area," said Vice President of Transmission Operations Michelle Cathcart. "During the recent heatwave, Ice Harbor provided voltage stabilization and helped increase the amount of energy our system could provide to parts of the Tri-Cities."

Post-heatwave analysis by BPA Transmission engineers indicates, if Ice Harbor had not been generating, an unplanned loss of one of the key transformer banks would have caused a System Operating Limit exceedance. Also, the loss of a different key transformer bank would have pushed a facility to 98% of its capacity. While BPA did not have to work with customers to shed load, that may not have been the case if Ice Harbor were offline.

"If not for Ice Harbor, we would have been scrambling with customers to move loads around to avoid putting customers in the dark," said Cathcart. "Given the amount of work done to avoid rotating blackouts with Ice Harbor in service last week, it is hard to imagine getting enough additional relief from moving loads around to keep the lights on everywhere with the plant offline."

Ice Harbor is one of four federal dams on the lower Snake River. These dams have long been discussed for breaching or removal to help several runs of salmon and steelhead recover. In addition to delivering affordable and reliable carbon-free renewable, and providing critical support for the region's high-voltage transmission system, these dams feature state-of-the-art fish passage technology, and contribute to the region's economy by supporting irrigation, navigation and recreation.

BPA markets the power from the lower Snake River dams and 27 other federal dams across the Northwest. The Tri-Cities of Kennewick, Pasco, and Richland are at the confluence of the Yakima, Snake, and Columbia rivers.

About BPA

The Bonneville Power Administration, headquartered in Portland, Oregon, is a nonprofit federal power marketer that sells wholesale, carbon-free hydropower from 31 federal dams in

the Columbia River Basin. It also markets the output of the region's only nuclear plant. BPA delivers this power to more than 140 Northwest electric utilities, serving millions of consumers and businesses in Washington, Oregon, Idaho, western Montana and parts of California, Nevada, Utah and Wyoming. BPA also owns and operates more than 15,000 circuit miles of high-voltage power lines and 261 substations, and provides transmission service to more than 300 customers. In all, BPA provides nearly a third of the power generated in the Northwest. To mitigate the impacts of the federal dams, BPA implements a fish and wildlife program that includes working with its partners to make the federal dams safer for fish passage. It also pursues cost-effective energy savings and operational solutions that help maintain safe, affordable, reliable electric power for the Northwest. www.bpa.gov

###

LOWER SNAKE RIVER PROJECT OPERATIONS

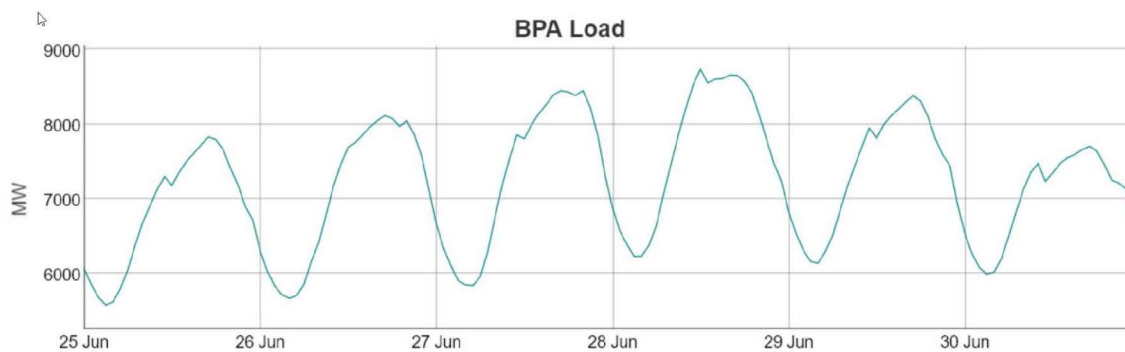
NORTHWEST – RECORD HEAT WAVE, JUNE 25 -30, 2021

SUMMARY

This report covers the operation of the lower Snake river project during the time from June 25th to June 30th, 2021. The four most downstream dams on the Snake river are referred to as the lower Snake river projects. These include Lower Granite dam, Little Goose dam, Lower Monumental dam, and Ice Harbor dam. The most intense heat-wave recorded in BPA Service Territory took place during this period. This heat wave produced temperatures which exceeded all previous records in many areas in the region. An all-time record high temperature for all of Canada was set in British Columbia, and the state of Washington appears to have also set new all-time record highs. The record high temperatures resulted in very high electrical demand for the region. BPA was able to increase generation across the highest load hours to meet that demand. The lower Snake river projects played a significant role in providing generation across the peak hours as well as holding significant reserves. The holding of reserves on the lower Snake river projects allowed other projects in BPA's system to shift from holding reserve obligations to actual power generation.

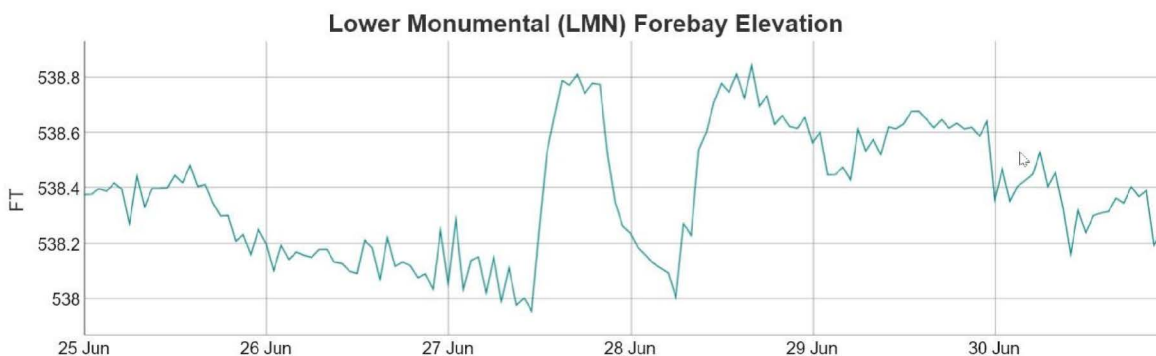
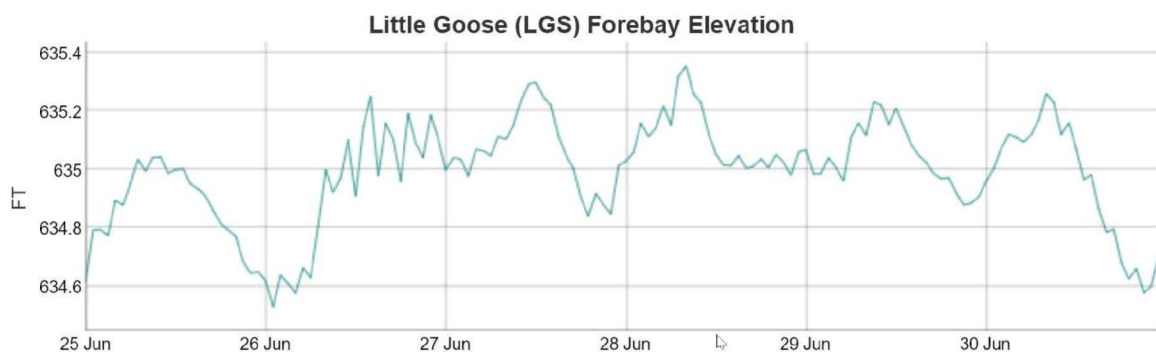
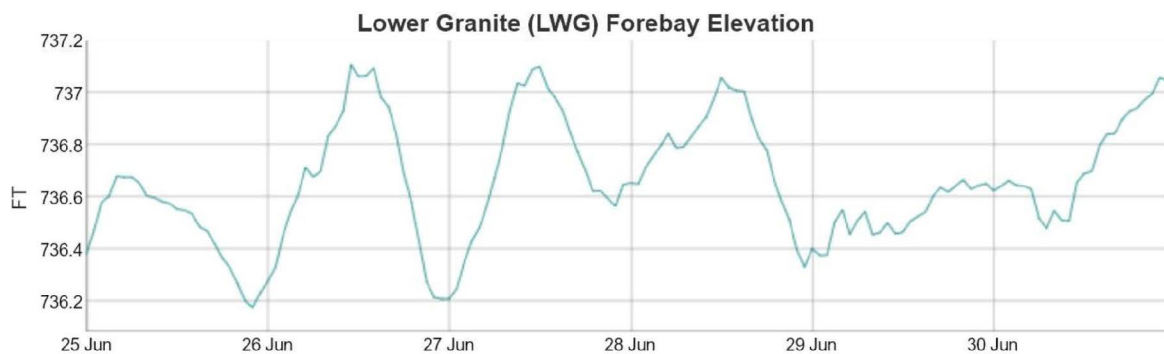
LOAD PROFILE

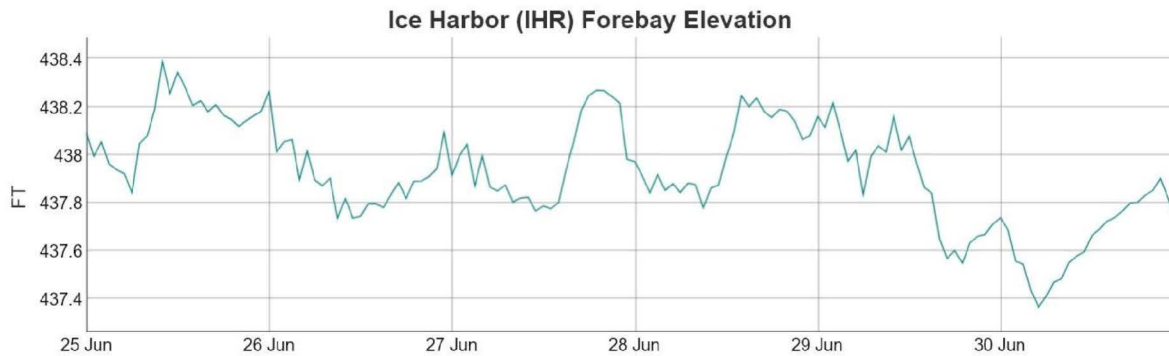
Loads were high in the afternoon and evenings, corresponding to the highest temperatures. This graph shows BPA's area load across the period. This graph does not include the Federal load obligations outside the balancing area.



RESERVOIR STORAGE

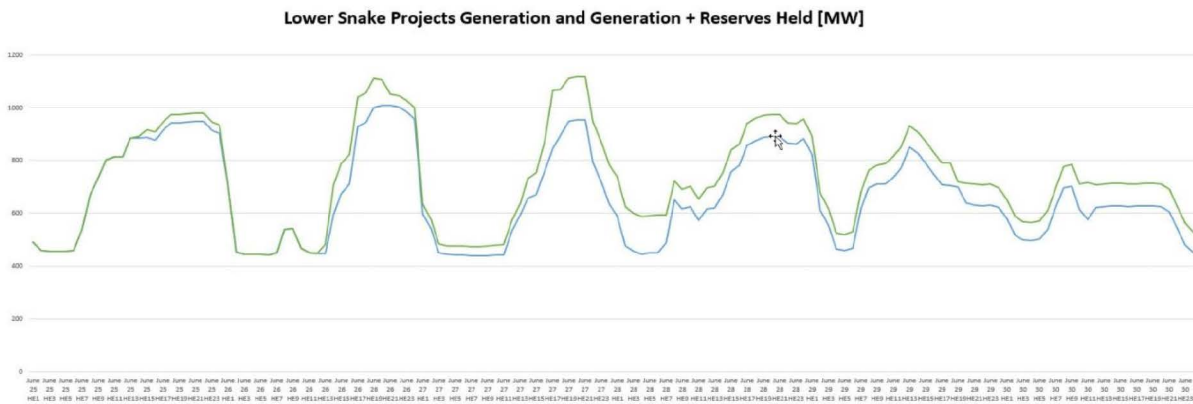
In general, the lower snake projects were filled overnight and drafted across the afternoons maximizing peak generation to coincide with peak loading. This was done within the limitations of a 1.5' forebay range during the fish passage season and while maintaining required fish spill in support of the downstream migration of juvenile salmon. The inflow to the lower Snake river varied on a day average basis from about 42 kcfs to about 36 kcfs, in a diminishing amount across the period. With these lower flows and with minimum flow requirements in support of juvenile salmon the ability to draft and refill projects is problematic. This is especially true at Lower Monumental dam and Ice Harbor dam.





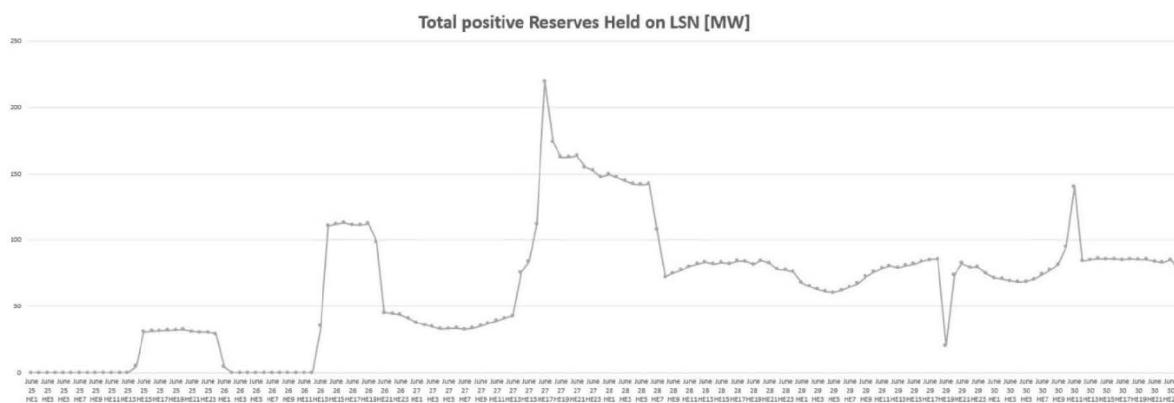
GENERATION AND RESERVES

BPA must hold reserves in the event of a contingency, as well as to balance against forecast error and generation variation such as from wind generation projects. During the spring and summer, due to operational limitations to support salmon migration, the holding of reserves complicates river operations and is often avoided on the lower Snake river. During the heat-wave BPA hydro operators were able to apply some reserve responsibility to the lower snake projects thereby shifting available capacity at other Federal Columbia River Power System projects, from holding reserves to delivering generation. BPA did not apply any DEC reserves on the LSN projects during the heat wave. The following graph shows the actual generation at the Lower Snake projects in blue, and the green line represents the amount of generation plus the amount of reserves that were carried at the project. During the period, the lower snake generation ranged from 439 MW to 1,009 MW. If the projects had just passed inflow, the average generation would have been approximately 730 MW. The highest amount of

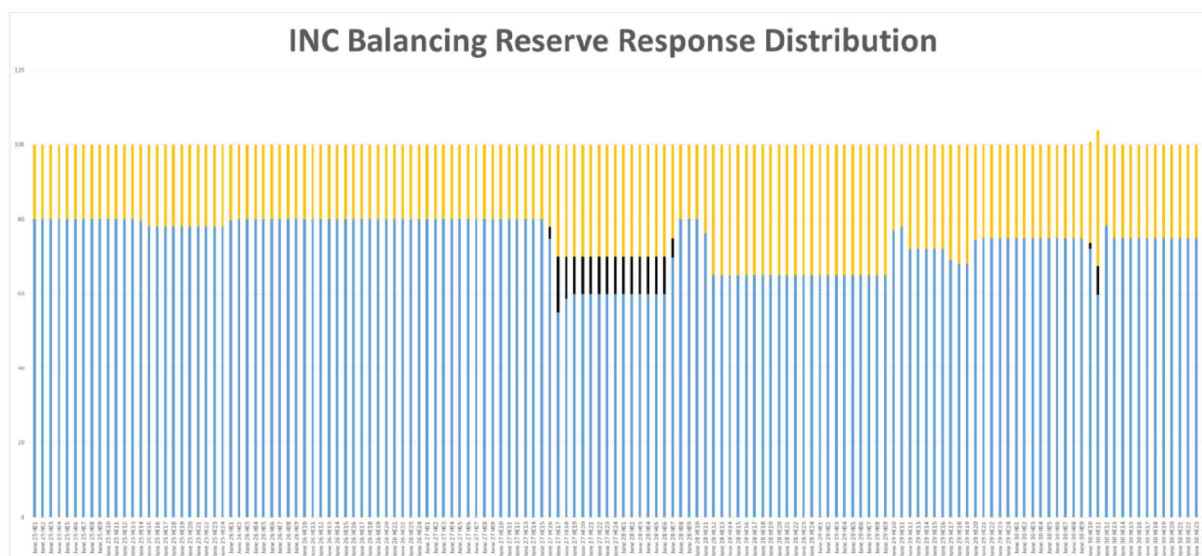


Generation and reserves carried was 1,118 MW.

The next graph shows the magnitude of reserves held on the lower snake projects, as much as 220 MW.



The following graph illustrates the distribution of INC Balancing reserve allocations amongst the 3 river reaches. The distributions are based on ratios which typically reflect percentages. The Lower Columbia river reach is in yellow, the Upper Columbia in blue, and the Lower Snakes is shown in black. Up to 15% of BPA's balancing reserve obligation was held on the Lower Snake River. The deployment of balancing reserves complicates river operations during the fish passage season. Dynamic changes in generation to support balancing reserves must be matched by dynamic changes in spill amounts, as required at some Lower Snake river projects as a percentage of their total flow.



CR Response Distribution

The chart displays the distribution of 'Yes' and 'No' responses for 100 CRs. The 'Yes' responses are represented by blue bars, and 'No' responses by yellow bars. The data shows a wide range of agreement levels across the different CRs, with some having high 'Yes' percentages (e.g., CR01 at ~80%) and others having lower percentages (e.g., CR02 at ~20%).

CR	Yes (%)	No (%)
CR01	80	20
CR02	20	80
CR03	50	50
CR04	50	50
CR05	50	50
CR06	50	50
CR07	50	50
CR08	50	50
CR09	50	50
CR10	50	50
CR11	50	50
CR12	50	50
CR13	50	50
CR14	50	50
CR15	50	50
CR16	50	50
CR17	50	50
CR18	50	50
CR19	50	50
CR20	50	50
CR21	50	50
CR22	50	50
CR23	50	50
CR24	50	50
CR25	50	50
CR26	50	50
CR27	50	50
CR28	50	50
CR29	50	50
CR30	50	50
CR31	50	50
CR32	50	50
CR33	50	50
CR34	50	50
CR35	50	50
CR36	50	50
CR37	50	50
CR38	50	50
CR39	50	50
CR40	50	50
CR41	50	50
CR42	50	50
CR43	50	50
CR44	50	50
CR45	50	50
CR46	50	50
CR47	50	50
CR48	50	50
CR49	50	50
CR50	50	50
CR51	50	50
CR52	50	50
CR53	50	50
CR54	50	50
CR55	50	50
CR56	50	50
CR57	50	50
CR58	50	50
CR59	50	50
CR60	50	50
CR61	50	50
CR62	50	50
CR63	50	50
CR64	50	50
CR65	50	50
CR66	50	50
CR67	50	50
CR68	50	50
CR69	50	50
CR70	50	50
CR71	50	50
CR72	50	50
CR73	50	50
CR74	50	50
CR75	50	50
CR76	50	50
CR77	50	50
CR78	50	50
CR79	50	50
CR80	50	50
CR81	50	50
CR82	50	50
CR83	50	50
CR84	50	50
CR85	50	50
CR86	50	50
CR87	50	50
CR88	50	50
CR89	50	50
CR90	50	50
CR91	50	50
CR92	50	50
CR93	50	50
CR94	50	50
CR95	50	50
CR96	50	50
CR97	50	50
CR98	50	50
CR99	50	50
CR100	50	50

This table shows the allocation of reserves, typically as a percentage, of the overall obligation required of BPA. DEC reserves require a project to decrease generation when another project generates more than they are scheduled to generate. This is a common occurrence for variable energy resources such as wind and solar generation. INC reserves are to cover for under generation which is typically from these same variable energy resource projects. Contingency reserves are to cover for the unexpected loss of generation and must be immediately available. On the afternoon of June 17, the lower Snake river projects carried 15% of the INC balancing reserve obligation and 20% of the contingency reserve obligation for the BPA system. The reserve allocations can change at any time. The values shown are hour averages rounded to whole numbers.

	LWG			LGS			LMN			IHR			LSN Total		
Hour	DEC	INC	CR	DEC	INC	CR	DEC	INC	CR	DEC	INC	CR	DEC	INC	CR
June 25 HE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 25 HE14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
June 25 HE15	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE16	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE17	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE18	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE19	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE20	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE21	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE22	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6

June 25 HE23	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 25 HE24	0	0	2	0	0	2	0	0	2	0	0	0	0	0	6
June 26 HE1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
June 26 HE2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
June 26 HE13	0	0	2	0	0	2	0	0	2	0	0	2	0	0	7
June 26 HE14	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20
June 26 HE15	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20
June 26 HE16	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20
June 26 HE17	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20
June 26 HE18	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20
June 26 HE19	0	0	5	0	0	5	0	0	5	0	0	5	0	0	20
June 26 HE20	0	0	4	0	0	4	0	0	4	0	0	4	0	0	18
June 26 HE21	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 26 HE22	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 26 HE23	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 26 HE24	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE1	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE2	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE3	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE4	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE5	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE6	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE7	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE8	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE9	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8

June 27 HE10	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE11	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE12	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE13	0	0	2	0	0	2	0	0	2	0	0	2	0	0	8
June 27 HE14	0	0	4	0	0	4	0	0	4	0	0	0	0	0	14
June 27 HE15	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 27 HE16	0	1	5	0	1	5	0	1	5	0	0	1	0	3	16
June 27 HE17	0	5	5	0	5	5	0	5	5	0	0	5	0	15	20
June 27 HE18	0	5	5	0	1	5	0	5	5	0	0	2	0	11	17
June 27 HE19	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 27 HE20	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 27 HE21	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 27 HE22	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 27 HE23	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 27 HE24	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 28 HE1	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 28 HE2	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 28 HE3	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 28 HE4	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 28 HE5	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 28 HE6	0	5	5	0	0	5	0	5	5	0	0	0	0	10	15
June 28 HE7	0	3	5	0	0	5	0	3	5	0	0	0	0	5	15
June 28 HE8	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE9	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE10	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE11	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE12	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE13	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE14	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE15	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE16	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE17	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE18	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE19	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE20	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15

June 28 HE21	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE22	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE23	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 28 HE24	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE1	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE2	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE3	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE4	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE5	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE6	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE7	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE8	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE9	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE10	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE11	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE12	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE13	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE14	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE15	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE16	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE17	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE18	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE19	0	0	1	0	0	1	0	0	1	0	0	0	0	0	4
June 29 HE20	0	0	4	0	0	4	0	0	4	0	0	0	0	0	13
June 29 HE21	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE22	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE23	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 29 HE24	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE1	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE2	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE3	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE4	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE5	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE6	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE7	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15

June 30 HE8	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE9	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE10	0	1	5	0	0	5	0	1	5	0	0	0	0	1	15
June 30 HE11	0	4	5	0	0	5	0	4	5	0	0	0	0	8	15
June 30 HE12	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE13	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE14	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE15	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE16	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE17	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE18	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE19	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE20	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE21	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE22	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE23	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15
June 30 HE24	0	0	5	0	0	5	0	0	5	0	0	0	0	0	15

From: Van Calcar, Pamela M (BPA) - PGS-5

Sent: Fri Jul 02 10:07:27 2021

To: Solano,Wanda M (BPA) - PGST-5

Subject: RE: hydro and heat

Importance: Normal

Great. I have time to review if you have it ready for me. I'm fine with you sending the report to Eve after I've reviewed it.

From: Solano,Wanda M (BPA) - PGST-5 <wmsolano@bpa.gov>

Sent: Friday, July 2, 2021 10:04 AM

To: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>

Subject: RE: hydro and heat

Pam,

You're welcome. Eve James emailed me earlier to receive a copy, but I didn't want to forward it until you had a chance to review it. I will be leaving at 12 and am happy to incorporate your comments and forward it to her if you are ok with that. Otherwise I can send a revision back to you and you could forward it. I'm fine handling it however you feel is best.

Wanda

From: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>
Sent: Friday, July 2, 2021 10:01 AM
To: Solano,Wanda M (BPA) - PGST-5 <wmsolano@bpa.gov>; Messemer,Clarisse M (BPA) - PGST-5 <cmmessemer@bpa.gov>
Cc: Klement,Anthony J (BPA) - PGSD-5 <ajklement@bpa.gov>
Subject: RE: hydro and heat

Thanks Wanda. Sorry I didn't catch this email earlier.

From: Solano,Wanda M (BPA) - PGST-5 <wmsolano@bpa.gov>
Sent: Wednesday, June 30, 2021 3:43 PM
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Cc: Klement,Anthony J (BPA) - PGSD-5 <ajklement@bpa.gov>
Subject: RE: hydro and heat

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Idaho/Nevada Constituent Account Executive

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Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<http://www.bpa.gov/news/AboutUs/Logos/PublishingImages/BPA-Logo-color-220.jpg>

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As record-breaking heat bears down on the Pacific Northwest this weekend, the Bonneville Power Administration has taken several steps to position the federal power and transmission system to serve its customers during this weather event. BPA is ready to keep lights and air conditioners on even with the triple

digit temperatures forecast across the region.

“We take our responsibility to provide reliable electricity to the consumer-owned utilities in the region very seriously,” said BPA Administrator John Hairston. “We are working hard to provide non-stop, reliable electricity this weekend to help residents and businesses stay cool and safe during the heatwave.”

On the Power Services side of BPA, these factors are helping:

- The Columbia Generating Station, a nuclear plant owned by Energy Northwest that produces power marketed by BPA, returned online this past weekend from a spring refueling outage. That adds over a 1,100 megawatts of generation in the Northwest and the West.
- Programmed fish spill on the lower Columbia and Snake rivers transitioned from spring to summer operations, increasing the federal hydropower generation from those facilities.
- The Bureau of Reclamation has the Grand Coulee reservoir well positioned to meet its refill target in early July, freeing up the remaining water flow to pass through the system for both power and non-power purposes.

“Even with streamflows below average levels, we are in a good position to serve our customers over this very hot weekend,” said Senior Vice President of Power Services Suzanne Cooper. “I want to thank our partners at the Bureau of Reclamation and the U.S. Army Corps of Engineers for the work and coordination they provide at the region’s 31 federal dams to ensure reliable operations.”

Despite the lower-than-average water year, there is plenty of water behind Grand Coulee Dam and some snowpack left in the Canadian Rockies. Unlike 2015 and 2001, years with a similar volume of water, the shape of

this year's runoff has been slower with snow gradually melting above Grand Coulee.

On the transmission side, BPA is taking measures to ensure the safe and reliable flow of electricity this weekend. BPA owns and operates more than 15,000 circuit miles of transmission lines across the Northwest and small amounts in Nevada, Utah and California.

"The reliable flow of electricity is vital to public safety," said BPA Transmission Services Senior Vice President Richard Shaheen. "We've put all maintenance projects that we can on pause to ensure our transmission system can handle increased flows and meet our customers' demands."

On Thursday, BPA restricted planned maintenance on its transmission grid from 6 a.m. Monday, June 28 through Tuesday, June 29 at 10 p.m., so the federal agency can leverage the system to its greatest use when load is expected to increase with the start of the workweek.

"Having all of our lines available will help relieve congestion on the system," said Vice President of Transmission Operations Michelle Cathcart. "With these unprecedented temperatures, we want to ensure electricity can move freely and reliably meet customer demands."

While we have ample power to serve loads during heatwave, we are experiencing transmission related challenges in the Tri-Cities area. On Monday, June 28 as the Tri-Cities experienced record temperatures, we saw a record amount of electricity consumed in the area. We made it through the day, and expect to be able to make it through the rest of this heat wave if there are no unplanned equipment failures or outages, but out of an abundance of caution reviewed load shedding plans with the City of Richland, Franklin PUD, Benton PUD, Benton REA and

Columbia REA in case that step becomes necessary to protect the system from broader unplanned power interruptions. While we made it through Monday, we expect electricity in the Tri-Cities loads to peak late afternoon/early evening on Tuesday, June 29. We continue to work with these customers on operational solutions and voluntary customer conservation to avoid load shedding.

BPA continues to work with these utilities to make appeals to their retail customers to reduce energy use. As you might be aware, Idaho Power is asking its customers to reduce their power consumption. Please do not hesitate to contact me if I can be of any further assistance.

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<image001.jpg>

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Jim has asked for an update on how this heat wave has affected the power system from staff tomorrow at the P4 meeting. I don't know if they will give specifics about how the hydro system was operated. BPA should have a better idea I would think so good that you included John and Peter on this e-mail.

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Sent: Tuesday, June 29, 2021 11:35 AM
To: Peter Cogswell <ptcogswell@bpa.gov>
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Cc: "Wong, Bryson (Risch)" <Bryson_Wong@risch.senate.gov>
Subject: hydro and heat

Hey Jeff,

Are you tracking/could you help us track the dams re the recent heat waves? In our "when we need them, we really need them" we were thinking this would be the type of situation we point to.

Ayla

Ayla Neumeyer

Senior Legislative Assistant

Senator James E. Risch

202-224-2752

From: Van Calcar, Pamela M (BPA) - PGS-5

Sent: Fri Jul 02 11:18:06 2021

To: James,Eve A L (BPA) - PG-5

Subject: RE: hydro and heat

Importance: Normal

Thanks. It looks like they are just about finished.

From: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>

Sent: Friday, July 2, 2021 10:51 AM

To: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>

Subject: RE: hydro and heat

I would like to get something out early next week if possible. I think Wanda was going to send me something today which I can then combine with other information if needed to tell the story.

From: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>

Sent: Friday, July 2, 2021 10:02 AM

To: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>

Subject: FW: hydro and heat

Hi Eve –

What is your timeline for this?

Thanks,

Pam

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Ayla Neumeyer

Senior Legislative Assistant

Senator James E. Risch

202-224-2752

From: Messemer,Clarisse M (BPA) - PGST-5

Sent: Wed Jul 21 16:51:45 2021

To: Van Calcar, Pamela M (BPA) - PGS-5

Subject: RE: hydro and heat - Update 7/2/2021

Importance: Normal

Thank you

From: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>

Sent: Wednesday, July 21, 2021 1:58 PM

To: Messemer,Clarisse M (BPA) - PGST-5 <cmmessemer@bpa.gov>

Subject: FW: hydro and heat - Update 7/2/2021

FYI

From: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegeardahl@bpa.gov>

Sent: Wednesday, July 21, 2021 1:57 PM

To: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>; Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

For all of those valid reasons, how about we have Doug post the heat wave article tomorrow and remove any reference to a LSN report? I should have added voting buttons.

We can then work on the standard template and likely be ready before the next request/article.

Thanks

Ryan

From: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>
Sent: Wednesday, July 21, 2021 1:50 PM
To: Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjegeerdahl@bpa.gov>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>
Subject: RE: hydro and heat - Update 7/2/2021

I don't think the PGST report is appropriate to be a publically facing report at this time. The main focus is on how reserves are being placed on these projects which is a sensitive topic. I would prefer we spend some time planning what we want in a public facing report that can be fairly standard to implement when these events occur.

I don't want to be regularly posting reserve allocations for LSN plants or other operational decisions.

From: Connolly, Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>

Sent: Wednesday, July 21, 2021 12:38 PM

To: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>; Egerdahl, Ryan J (BPA) - PGPR-5 <rjegeerdahl@bpa.gov>; James, Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Petty, Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler, Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

I haven't gone back to the source material, but we certainly should review prior to posting. We are in an environment where our public declarations will be characterized in the most negative way possible.

Kieran P. Connolly

Vice President, Generation Asset Management

Bonneville Power Administration

bpa.gov | P 503-230-4680

C(b)(6)

[cid:image001.jpg@01D58E5A.E3E56480cid:image002.jpg@01D58E5A.E3E56480cid:image003.jpg@01D58E5A.E3E56480cid:image004.jpg@01D58E5A.E3E56480cid:image005.jpg@01D58E5A.E3E56480cid:image006.jpg@01D58E5A.E3E56480](#)

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To: Egerdahl,Ryan J (BPA) - PGPR-5 <riegerdahl@bpa.gov>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>; Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>
Subject: RE: hydro and heat - Update 7/2/2021

If we confirm any other items that need to be cleaned up and target date to have something ready for posting, then we can pass this on to Wanda/Clarisse.

From: Egerdahl,Ryan J (BPA) - PGPR-5 <riegerdahl@bpa.gov>
Sent: Wednesday, July 21, 2021 11:13 AM
To: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>; Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>
Subject: RE: hydro and heat - Update 7/2/2021

I like that approach Pam. Should we ask Wanda if she can roll up the info so we can post that summarized report?

Ryan Egerdahl
Manager, Long Term Power Planning

Bonneville Power Administration

rjegerdahl@bpa.gov

| P 503.230.4732 | C (b)(6)

From: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>

Sent: Wednesday, July 21, 2021 10:47 AM

To: James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>; Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>

Cc: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

I defer to others on the appropriateness of posting this report. If we do, I ask that we scrub this report and provide only rolled up LSN information, probably just the final table.

For awareness we are working to establish a weekly LSN report that will can be used for reference in these types of request. This should give us quick background information and provide a template for generating consistent event reports in the future.

From: James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>

Sent: Wednesday, July 21, 2021 10:34 AM

To: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>; Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>

Cc: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>

Subject: FW: hydro and heat - Update 7/2/2021

This PR story has a reference link to a Power Report on the LSN operations during the heat wave. The report he is referring to is the PGST report Wanda and Tony put together that I've attached. Do we want to post that on an external Power Services website for public information about the heat wave? This was the information that John Williams was asking about to share with Jeff Allen (Idaho's Power Council Member) who was asked questions from Idaho US Senator Jim Risch about the dam operations during the heat wave .

From: Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>

Sent: Wednesday, July 21, 2021 9:44 AM

To: James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

Eve and Ryan,

Please see the highlighted part of the attached release. We intend to send this out tomorrow. Are we going to post the study referenced in this email on the Power Services website? If not, I'll have to modify the reference to the work. Please advise. Thanks!

From: James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>

Sent: Friday, July 2, 2021 4:34 PM

To: Neuls,Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; Baskerville,Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>

Cc: Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner, Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson, G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty, Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Siewert, Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>
Subject: RE: hydro and heat - Update 7/2/2021

Attached is the report from the short-term planning group that covers the operation of the Lower Snake river project during the time from June 25th to June 30th, 2021.

Executive Summary:

This report covers the operation of the lower Snake river project during the time from June 25th to June 30th, 2021. The four most downstream dams on the Snake river are referred to as the Lower Snake river projects. These include Lower Granite dam, Little Goose dam, Lower Monumental dam, and Ice Harbor dam. The most intense heat-wave recorded in BPA Service Territory took place during this period. This heat wave produced temperatures which exceeded all previous records in many areas in the region. An all-time record high temperature for all of Canada was set in British Columbia, and the state of Washington appears to have also set new all-time record highs. The record high temperatures resulted in very high electrical demand for the region. BPA was able to increase generation across the highest load hours to meet that demand. The lower Snake river projects played a significant role in providing generation across the peak hours as well as holding significant reserves. The holding of reserves on the lower Snake river projects allowed other projects in BPA's system to shift from holding reserve obligations to actual power generation.

The report was compiled by Tony Klement (PGSD) and Wanda Solano (PGST)

The table at the end could be taken out for space if Doug wants to incorporate the Transmission information on the

Tri-Cities load service.

Thanks,

Eve

From: Neuls, Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>

Sent: Friday, July 2, 2021 11:12 AM

To: Egerdahl, Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams, Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James, Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville, Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>

Cc: Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner, Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson, G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty, Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Siewert, Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>; Neuls, Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

Good morning all,

Just wanted to provide an update on LSN hydro gen.

[COE site](#) only have hourly Power Gen (MW) data up to 6/25 as of this morning. A screenshot from COE query site of all four LSN projects is below.

Since we (BPA) have hourly Generation data available from THOR, I started looking at the data... Noticed generation increased from LSN projects as early as 6/21...

I have the following charts ready for your review, please let me know if you're interested.

- Hourly Net Generation from our LSN projects
- Daily Net Generation from LSN projects
- Individual LSN project daily generation

My understanding is that our short term planning group may have a LSN report, which I am sure will have better information as well.

Please let me know if you have any questions

Thank you & wishing you all a wonderful weekend,
Esther

cid:image001.jpg@01D76F33.11703320

From: Neuls, Esther T (BPA) - PGPR-5
Sent: Wednesday, June 30, 2021 1:11 PM
To: Egerdahl, Ryan J (BPA) - PGPR-5 <rjeagerdahl@bpa.gov>; Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams, Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James, Eve A L (BPA) - PG-5 <ejames@bpa.gov>; Baskerville, Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>
Cc: Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner, Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson, G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty, Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Siewert, Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>
Subject: RE: hydro and heat

Hello!

Looks like if we use the COE website, we could get hourly flow data (kcfs) almost real time but hourly Power gen (mw) data looks like there is a good 6-day lag. Please see below for LWG as an example.

We can get real time hourly Net Gen data from THOR (not accessible by public), no problem.

Potentially I can try to put something together this Friday on LSN projects to see if we get a good picture on the month of June...

Please let me know if you have other suggestions

Thanks

Esther

cid:image002.jpg@01D76F33.11703320

From: Egerdahl,Ryan J (BPA) - PGPR-5 <rjeegerdahl@bpa.gov>

Sent: Wednesday, June 30, 2021 12:52 PM

To: Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville,Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>

Cc: Cogswell,Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner,Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Neuls,Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>; Siewert,Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>

Subject: RE: hydro and heat

At some point soon we can pull the actual generation data for the Snakes and pass it along to give to Jeff. It is public information; I'm just not sure how quickly the public website is updated based on historical generation. Peter or Eve or Esther probably know. Looks like it should "cool down" by tomorrow. J I will wait to see if Esther thinks we can pull the data tomorrow for the prior week of LSR generation.

Thanks all.

cid:image008.jpg@01D76F5C.B0B00900

From: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Sent: Wednesday, June 30, 2021 12:27 PM
To: Egerdahl, Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; Williams, Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James, Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville, Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>
Cc: Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner, Joshua P (BPA) - DIR-7 <jpwarner@bpa.gov>; Johnson, G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>
Subject: FW: hydro and heat

I responded to Jeff Allen, Idaho's Power Council Member, question below with: I will asked but it may not be available till after the heat wave period on how the 4 dams operated.

Jeff is trying to respond to Idaho US Senator Jim Risch question on how the 4 Lower Snake River Dams are operating during this heat wave in the region.

This is a heads-up that we are being asked by Sen. Risch (Via Idaho's power council) on our operation of the 4 projects. Please let me know the time table for when this information will become available.

Thanks

John J Williams

John J Williams

Idaho/Nevada Constituent Account Executive

Bonneville Power Administration ~ Constituent Service Office

950 W. Bannock Street, STE. 805

Boise, Idaho 83702

Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<http://www.bpa.gov/news/AboutUs/Logos/PublishingImages/BPA-Logo-color-220.jpg>

From: Jeff Allen <[jallen@NWCouncil.org](mailto:allen@NWCouncil.org)>
Sent: Wednesday, June 30, 2021 11:37 AM
To: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Subject: Re: hydro and heat

Thanks John. Is it possible to get specific information on the dams Senator Risch asked about?

Sent from my iPhone

On Jun 29, 2021, at 3:42 PM, Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov> wrote:

Hi all, Peter is out this week so I'm it. Our Weather and Streamflow Forecasting team is expecting daily, monthly and even all-time high temperatures, creating dangerous conditions. On the power supply side, excellent planning and the timing of Columbia Basin runoff has us in good shape to get through this heat wave. We're also benefiting from the output of the Columbia Generating Station nuclear plant, which recently returned to service after a refueling outage. That adds over 1,100 megawatts of generation in the Northwest. The following is on BPA's website:

As record-breaking heat bears down on the Pacific Northwest this weekend, the Bonneville Power Administration has taken several steps to position the federal power and transmission system to serve its customers during this weather event. BPA is ready to keep lights and air conditioners on even with the triple digit temperatures forecast across the region.

“We take our responsibility to provide reliable electricity to the consumer-owned utilities in the region very seriously,” said BPA Administrator John Hairston. “We are working hard to provide non-stop, reliable electricity this weekend to help residents and businesses stay cool and safe during the heatwave.”

On the Power Services side of BPA, these factors are helping:

- The Columbia Generating Station, a nuclear plant owned by Energy Northwest that produces power marketed by BPA, returned online this past weekend from a spring refueling outage. That adds over a 1,100 megawatts of generation in the Northwest and the West.
- Programmed fish spill on the lower Columbia and Snake rivers transitioned from spring to summer operations, increasing the federal hydropower generation from those facilities.
- The Bureau of Reclamation has the Grand Coulee reservoir well positioned to meet its refill target in early July, freeing up the remaining water flow to pass through the system for both power and non-power purposes.

“Even with streamflows below average levels, we are in a good position to serve our customers over this very hot weekend,” said Senior Vice President of Power Services Suzanne Cooper. “I want to thank our partners at the Bureau of Reclamation and the U.S. Army Corps of Engineers for the work and coordination they provide at the region’s 31 federal dams to ensure reliable operations.”

Despite the lower-than-average water year, there is plenty of water behind Grand Coulee Dam and some snowpack left in the Canadian Rockies. Unlike 2015 and 2001, years with a similar volume of water, the shape of this year’s runoff has been slower with snow gradually melting above Grand Coulee.

On the transmission side, BPA is taking measures to ensure the safe and reliable flow of electricity this weekend. BPA owns and operates more than 15,000 circuit miles of transmission lines across the Northwest and small amounts in Nevada, Utah and California.

“The reliable flow of electricity is vital to public safety,” said BPA Transmission Services Senior Vice President Richard Shaheen. “We’ve put all maintenance projects that we can on pause to ensure our transmission system can handle increased flows and meet our customers’ demands.”

On Thursday, BPA restricted planned maintenance on its transmission grid from 6 a.m. Monday, June 28 through Tuesday, June 29 at 10 p.m., so the federal agency can leverage the system to its greatest use when load is expected to increase with the start of the workweek.

“Having all of our lines available will help relieve congestion on the system,” said Vice President of Transmission Operations Michelle Cathcart. “With these unprecedented temperatures, we want to ensure electricity can move freely and reliably meet customer demands.”

While we have ample power to serve loads during heatwave, we are experiencing transmission related challenges in the Tri-Cities area. On Monday, June 28 as the Tri-Cities experienced record temperatures, we saw a record amount of electricity consumed in the area. We made it through the day, and expect to be able to make it through the rest of this heat wave if there are no unplanned equipment failures or outages, but out of an abundance of caution reviewed load shedding plans with the City of Richland, Franklin PUD, Benton PUD, Benton REA and Columbia REA in case that step becomes necessary to protect the system from broader unplanned power interruptions. While we made it through Monday, we expect electricity in the Tri-Cities loads to peak late afternoon/early evening on Tuesday, June 29. We continue to work with these customers on operational solutions

and voluntary customer conservation to avoid load shedding.

BPA continues to work with these utilities to make appeals to their retail customers to reduce energy use. As you might be aware, Idaho Power is asking its customers to reduce their power consumption. Please do not hesitate to contact me if I can be of any further assistance.

John J Williams

John J Williams

Idaho/Nevada Constituent Account Executive

Bonneville Power Administration ~ Constituent Service Office

950 W. Bannock Street, STE. 805

Boise, Idaho 83702

Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<image001.jpg>

From: Shirley Lindstrom <slindstrom@nwcouncil.org>
Sent: Tuesday, June 29, 2021 12:37 PM
To: Jeff Allen <jallen@NWCouncil.org>; Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>
Cc: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Subject: RE: hydro and heat

Jim has asked for an update on how this heat wave has affected the power system from staff tomorrow at the P4 meeting. I don't know if they will give specifics about how the hydro system was operated. BPA should have a better idea I would think so good that you included John and Peter on this e-mail.

From: Jeff Allen <jallen@NWCouncil.org>
Sent: Tuesday, June 29, 2021 11:35 AM
To: Peter Cogswell <ptcogswell@bpa.gov>
Cc: John Williams <jjwilliams@bpa.gov>; Shirley Lindstrom <slindstrom@nwcouncil.org>
Subject: Fwd: hydro and heat

Do you have something akin to what Sen Risch's staff is seeking? Thanks

Sent from my iPhone

Begin forwarded message:

From: "Neumeyer, Ayla (Risch)" <Ayla_Neumeyer@risch.senate.gov>
Date: June 29, 2021 at 9:26:47 AM MDT
To: Jeff Allen <jallen@nwcouncil.org>
Cc: "Wong, Bryson (Risch)" <Bryson_Wong@risch.senate.gov>
Subject: hydro and heat

Hey Jeff,

Are you tracking/could you help us track the dams re the recent heat waves? In our "when we need them, we really need them" we were thinking this would be the type of situation we point to.

Ayla

Ayla Neumeyer

Senior Legislative Assistant

Senator James E. Risch

202-224-2752

From: Connolly,Kieran P (BPA) - PG-5

Sent: Thu Jul 22 09:56:39 2021

To: Johnson,G Douglas (BPA) - DK-7;Van Calcar, Pamela M (BPA) - PGS-5;Egerdahl,Ryan J (BPA) - PGPR-5;Hawkins,Robert E (BPA) - PGSP-5;Koehler,Birgit G (BPA) - PG-5

Cc: Petty,Robert J (BPA) - PGP-5

Subject: RE: REVIEW REQUESTED: Final Draft LSRD heatwave contributions

Importance: Normal

Attachments: LSRDs help region power through heatwave v7 FINAL DRAFT.docx

Thanks Doug, I liked those too. One additional comment from me in the attached.

Kieran P. Connolly

Vice President, Generation Asset Management

Bonneville Power Administration

bpa.gov | P 503-230-4680

C (b)(6)

[cid:image001.jpg@01D58E5A.E3E56480cid:image002.jpg@01D58E5A.E3E56480cid:image003.jpg@01D58E5A.E3E56480cid:image004.jpg@01D58E5A.E3E56480cid:image005.jpg@01D58E5A.E3E56480cid:image006.jpg@01D58E5A.E3E56480](#)

From: Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>
Sent: Thursday, July 22, 2021 9:50 AM
To: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; Hawkins,Robert E (BPA) - PGSP-5 <rehawkins@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>
Cc: Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>
Subject: RE: REVIEW REQUESTED: Final Draft LSRD heatwave contributions

I like what you suggested Pam. I'll use the edit for the final version. Thanks!

From: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>
Sent: Thursday, July 22, 2021 9:27 AM
To: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; Hawkins,Robert E (BPA) - PGSP-5 <rehawkins@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>
Cc: Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>
Subject: RE: REVIEW REQUESTED: Final Draft LSRD heatwave contributions

Here is my suggested edits to better capture BPA's part of operating the river.

From: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegeerdahl@bpa.gov>
Sent: Thursday, July 22, 2021 8:30 AM
To: Van Calcar, Pamela M (BPA) - PGS-5 <pmvancalcar@bpa.gov>; Hawkins,Robert E (BPA) - PGSP-5 <rehawkins@bpa.gov>; Koehler,Birgit G (BPA) - PG-5 <bgkoehler@bpa.gov>
Cc: Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>
Subject: FW: REVIEW REQUESTED: Final Draft LSRD heatwave contributions

Hi. I think you will agree with the red font language, but pls take a look this morning to help the boss out. J thx See below from Doug.

Ryan Egerdahl
Manager, Long Term Power Planning

Bonneville Power Administration
rjegeerdahl@bpa.gov
| P 503.230.4732 | C (b)(6)

From: Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>
Sent: Thursday, July 22, 2021 8:22 AM
To: Hairston,John L (BPA) - A-7 <jlhairston@bpa.gov>; Connolly,Kieran P (BPA) - PG-5 <kpconnolly@bpa.gov>; Scruggs,Joel L (BPA) - DK-7 <jlsruggs@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjegeerdahl@bpa.gov>
Subject: REVIEW REQUESTED: Final Draft LSRD heatwave contributions

We got some edits from OGC right after the last review yesterday. Please just review the info in red print. I'd like to get this out by 3 p.m. today, so if I could get approval or edits by 2 p.m., I'd appreciate it. Sorry for the rush and the late request.

John, I just added the carbon-free attributes and importance to efforts to mitigate climate change to the end of your quote. If you are comfortable with that, you can skip review.

Lower Snake River dams help region power through recent heatwave
Ice Harbor key to relieving transmission congestion in Tri-Cities

Portland, Oregon – The four dams on the lower Snake River provided much-needed energy, balancing and contingency reserves and Ice Harbor dam on the lower Snake River played a key role in keeping the lights on in the Tri-Cities area in eastern Washington during the early July intense heat. Without these four dams, powering through the heatwave could have been much more expensive and operationally challenging.

“This is another example of the value these facilities provide the region from a clean energy perspective,” said Administrator John Hairston. “As the region continues to discuss the future of these facilities, we believe it is important to provide data and information about their performance, as a solid foundation for discussions about the future of these four dynamic **dams that provide carbon-free electricity and are important in efforts to mitigate the impact of climate change.**”

Power and Reserves provision

As the entire Pacific Northwest experienced record or near-record temperatures and record energy demand in parts of the region between June 25 and 30, BPA was able to meet high summer demand through careful power and transmission planning.

BPA also canceled planned transmission maintenance to ensure high electricity flows would not cause congestion, which can lead to cascading outages across the region and the west

At the four lower Snake River dams, dam operators balanced water flow levels for juvenile fish migration with the ability to fill the projects overnight, so there was enough water for fish and power production during the peak electricity consumption hours of the day. These four dams also provided key electricity reserves during the heatwave.

Maximizing the performance of the lower Snake River dams during summer is no easy task. With minimum flow levels for juvenile fish migration in place, dam operators were still able to fill the projects overnight, so there was enough water for fish and power production during the peak electricity consumption hours of the day.

For the duration of the heatwave, the four dams on the lower Snake River generated between 439 and 1,009 megawatts. For perspective, the average consumption of the City of Seattle is approximately 1,000 MW. However, the four dams did much more. **To be prepared for an emergency, BPA must have the ability to call on power reserves to ensure it can keep the lights on. For example, in the event that generators on the grid go out of service unexpectedly, other generators must be called upon to increase their power generation instantaneously to ensure grid stability. The dams also provided balancing reserves to move up and down with generators that can**

stray from their energy schedules. As the region adds more intermittent renewable energy to mitigate climate change, these balancing reserves will become more important.

Over this five-day heatwave, BPA transferred some reserve requirements to the four lower Snake River Dams. At times, these four dams held 15% of BPA's total required reserves, peaking at 220 megawatts. At their highest, these dams provided 1,118 megawatts of combined energy production and reserve capacity.

Ice Harbor relieves Tri-Cities transmission capacity issue

Ice Harbor dam on the lower Snake River played a key role in keeping the lights on in the Tri-Cities area during last month's intense heat. Had Ice Harbor not been generating, it is likely BPA would have had to work with local customers to shift loads, which can take time and require some power outages or have rolling blackouts in selected areas in the Tri-Cities to protect the system from wider, cascading outages.

"BPA relies on Ice Harbor to relieve stress on our transmission system in the Tri-Cities area," said Vice President of Transmission Operations Michelle Cathcart. "During the recent heatwave, Ice Harbor provided voltage stabilization and helped increase the amount of energy our system could provide to parts of the Tri-Cities."

Post-heatwave analysis by BPA Transmission engineers indicates, if Ice Harbor had not been generating, an unplanned loss of one of the key transformer banks would have caused a System Operating Limit exceedance. Also, the loss of a different key transformer bank would have pushed a facility to 98% of its capacity. While BPA did not have to work with customers to implement rolling blackouts, that may not have been the case if Ice Harbor were offline.

"If not for Ice Harbor, we would have been scrambling with customers to move loads around to avoid putting customers in the dark," said Cathcart. "Given the amount of work done to avoid rotating blackouts with Ice Harbor in service last week, it is hard to imagine getting enough additional relief from moving loads around to keep the lights on everywhere with the plant offline."

Ice Harbor is one of four federal dams on the lower Snake River. These dams have long been discussed for breaching or removal to help several runs of salmon and steelhead recover. In addition to delivering affordable and reliable carbon-free renewable, and providing critical support for the region's high-voltage transmission system, these dams feature state-of-the-art fish passage technology, and contribute to the region's economy by supporting irrigation, navigation and recreation.

BPA markets the power from the lower Snake River dams and 27 other federal dams across the Northwest. The Tri-Cities of Kennewick, Pasco, and Richland are at the confluence of the Yakima, Snake, and Columbia rivers.

About BPA

The Bonneville Power Administration, headquartered in Portland, Oregon, is a nonprofit federal power marketer that sells wholesale, carbon-free hydropower from 31 federal dams in

the Columbia River Basin. It also markets the output of the region's only nuclear plant. BPA delivers this power to more than 140 Northwest electric utilities, serving millions of consumers and businesses in Washington, Oregon, Idaho, western Montana and parts of California, Nevada, Utah and Wyoming. BPA also owns and operates more than 15,000 circuit miles of high-voltage power lines and 261 substations, and provides transmission service to more than 300 customers. In all, BPA provides nearly a third of the power generated in the Northwest. To mitigate the impacts of the federal dams, BPA implements a fish and wildlife program that includes working with its partners to make the federal dams safer for fish passage. It also pursues cost-effective energy savings and operational solutions that help maintain safe, affordable, reliable electric power for the Northwest. www.bpa.gov

###

From: Klement,Anthony J (BPA) - PGSD-5

Sent: Mon Jul 12 06:31:52 2021

To: James,Eve A L (BPA) - PG-5;Solano,Wanda M (BPA) - PGST-5

Subject: RE: hydro and heat - Update 7/2/2021

Importance: Normal

Sorry about that Eve,

I found the error. The values for LWG, were actually listing the values for LGS, so LGS was counted twice and LWG not at all.

I have it corrected if you need it.

Tony

From: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>

Sent: Friday, July 9, 2021 4:29 PM

To: Klement,Anthony J (BPA) - PGSD-5 <ajklement@bpa.gov>; Solano,Wanda M (BPA) - PGST-5 <wmsolano@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

Thanks for sharing that- I was able to pull out the individual project information. Just an FYI- as I was digging around I noticed an error in the calculation that started showing up 6/27 1800 to 6/28 7:00 and then 6/30 HE 10 and 11. It wasn't big- just slightly off on the gen+reserves values but wanted to let you know for future reports.

From: Klement,Anthony J (BPA) - PGSD-5 <ajklement@bpa.gov>

Sent: Friday, July 9, 2021 10:40 AM

To: James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Solano,Wanda M (BPA) - PGST-5 <wmsolano@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

Eve,

Here is our raw data spreadsheet which has individual project generations for each hour in folder "Gen 2."

I added data in columns AB – AI on the tab "Response Factors" to show the reserve amount held on each project by reserve type. I did not include DEC reserves because none were held on the lower snake projects across the period.

You need to open with PI data link to see the data.

Tony

From: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>
Sent: Friday, July 9, 2021 10:04 AM
To: Solano,Wanda M (BPA) - PGST-5 <wmsolano@bpa.gov>; Klement,Anthony J (BPA) - PGSD-5 <ajklement@bpa.gov>
Subject: FW: hydro and heat - Update 7/2/2021

Could you provide the LSN generation and reserves information by LSN project split out?

Thanks,

Eve

From: Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Sent: Friday, July 9, 2021 9:36 AM
To: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>; Neuls,Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjegerdahl@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>
Cc: Cogswell,Peter (BPA) - DI-7 <ptcogswell@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

Yes that would be helpful. Thanks

From: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>
Sent: Friday, July 9, 2021 10:24 AM
To: Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Neuls,Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <riegerdahl@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>
Cc: Cogswell,Peter (BPA) - DI-7 <ptcogswell@bpa.gov>
Subject: RE: hydro and heat - Update 7/2/2021

The Generation and reserves section has a graphic of the generation for the LSN river project generation MW output- did you want them separated out? I'm not sure having them separated would change the story but can get them by project if needed.

From: Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Sent: Thursday, July 8, 2021 1:02 PM
To: James,Eve A L (BPA) - PG-5 <ejames@bpa.gov>; Neuls,Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <riegerdahl@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>
Cc: Cogswell,Peter (BPA) - DI-7 <ptcogswell@bpa.gov>
Subject: FW: hydro and heat - Update 7/2/2021

This is great but do you have specific generation MW output for the Lower Snake river projects for this period? I'm sure that Senator Risch would like to use this information to articulate their value. Could you incorporate the information in the executive summary?

Thanks

John J Williams

John J Williams

Idaho/Nevada Constituent Account Executive

Bonneville Power Administration ~ Constituent Service Office

950 W. Bannock Street, STE. 805

Boise, Idaho 83702

Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<http://www.bpa.gov/news/AboutUs/Logos/PublishingImages/BPA-Logo-color-220.jpg>

From: James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>
Sent: Friday, July 2, 2021 5:34 PM
To: Neuls,Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>; Egerdahl,Ryan J (BPA) - PGPR-5 <rjeagerdahl@bpa.gov>; Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; Baskerville,Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>
Cc: Cogswell,Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner,Joshua P (BPA) - DIR-7 <jpwarner@bpa.gov>; Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <ripetty@bpa.gov>; Siewert,Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>
Subject: RE: hydro and heat - Update 7/2/2021

Attached is the report from the short-term planning group that covers the operation of the Lower Snake river project during the time from June 25th to June 30th, 2021.

Executive Summary:

This report covers the operation of the lower Snake river project during the time from June 25th to June 30th, 2021. The four most downstream dams on the Snake river are referred to as the Lower Snake river projects. These include Lower Granite dam, Little Goose dam, Lower Monumental dam, and Ice Harbor dam. The most intense heat-wave recorded in BPA Service Territory took place during this period. This heat wave produced temperatures which exceeded all previous records in many areas in the region. An all-time record high temperature for all of Canada was set in British Columbia, and the state of Washington appears to have also set new all-time record highs. The record high temperatures resulted in very high electrical demand for the region. BPA was able to increase generation across the highest load hours to meet that demand. The lower Snake river projects played a significant role in providing generation across the peak hours as well as holding significant reserves. The holding of reserves on the lower Snake river projects allowed other projects in BPA's system to shift from holding reserve obligations to actual power generation.

The report was compiled by Tony Klement (PGSD) and Wanda Solano (PGST)

The table at the end could be taken out for space if Doug wants to incorporate the Transmission information on the Tri-Cities load service.

Thanks,

Eve

From: Neuls, Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>

Sent: Friday, July 2, 2021 11:12 AM

To: Egerdahl, Ryan J (BPA) - PGPR-5 <rjeagerdahl@bpa.gov>; Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams, Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James, Eve A L (BPA) - PG-5 <eaajames@bpa.gov>; Baskerville, Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>

Cc: Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner, Joshua P (BPA) - DIR-7 <jpwarnar@bpa.gov>; Johnson, G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty, Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Siewert, Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>; Neuls, Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>

Subject: RE: hydro and heat - Update 7/2/2021

Good morning all,

Just wanted to provide an update on LSN hydro gen.

[COE site](#) only have hourly Power Gen (MW) data up to 6/25 as of this morning. A screenshot from COE query site of all four LSN projects is below.

Since we (BPA) have hourly Generation data available from THOR, I started looking at the data... Noticed generation increased from LSN projects as early as 6/21...

I have the following charts ready for your review, please let me know if you're interested.

- Hourly Net Generation from our LSN projects
- Daily Net Generation from LSN projects
- Individual LSN project daily generation

My understanding is that our short term planning group may have a LSN report, which I am sure will have better information as well.

Please let me know if you have any questions

Thank you & wishing you all a wonderful weekend,
Esther

cid:image001.jpg@01D76F33.11703320

From: Neuls, Esther T (BPA) - PGPR-5
Sent: Wednesday, June 30, 2021 1:11 PM
To: Egerdahl, Ryan J (BPA) - PGPR-5 <rjeagerdahl@bpa.gov>; Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams, Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James, Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville, Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>
Cc: Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner, Joshua P (BPA) - DIR-7 <jpwarner@bpa.gov>; Johnson, G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty, Robert J (BPA) - PGP-5 <ripetty@bpa.gov>; Siewert, Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>
Subject: RE: hydro and heat

Hello!

Looks like if we use the COE website, we could get hourly flow data (kcfs) almost real time but hourly Power gen (mw) data looks like there is a good 6-day lag. Please see below for LWG as an example.

We can get real time hourly Net Gen data from THOR (not accessible by public), no problem.

Potentially I can try to put something together this Friday on LSN projects to see if we get a good picture on the month of June...

Please let me know if you have other suggestions

Thanks

Esther

cid:image002.jpg@01D76F33.11703320

From: Egerdahl,Ryan J (BPA) - PGPR-5 <rjegeerdahl@bpa.gov>

Sent: Wednesday, June 30, 2021 12:52 PM

To: Williams,John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>; Williams,Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville,Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>

Cc: Cogswell,Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner,Joshua P (BPA) - DIR-7 <jpwarner@bpa.gov>; Johnson,G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>; Petty,Robert J (BPA) - PGP-5 <rjpetty@bpa.gov>; Neuls,Esther T (BPA) - PGPR-5 <etneuls@bpa.gov>; Siewert,Christopher W (BPA) - PGSD-5 <cwsiewert@bpa.gov>

Subject: RE: hydro and heat

At some point soon we can pull the actual generation data for the Snakes and pass it along to give to Jeff. It is

public information; I'm just not sure how quickly the public website is updated based on historical generation. Peter or Eve or Esther probably know. Looks like it should "cool down" by tomorrow. J I will wait to see if Esther thinks we can pull the data tomorrow for the prior week of LSR generation.

Thanks all.

cid:image008.jpg@01D76F5C.B0B00900

From: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Sent: Wednesday, June 30, 2021 12:27 PM
To: Egerdahl, Ryan J (BPA) - PGPR-5 <rjeagerdahl@bpa.gov>; Williams, Peter T (BPA) - PGPO-5 <ptwilliams@bpa.gov>; James, Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Baskerville, Sonya L (BPA) - DIN-WASH <slbaskerville@bpa.gov>
Cc: Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>; Warner, Joshua P (BPA) - DIR-7 <jpwarner@bpa.gov>; Johnson, G Douglas (BPA) - DK-7 <gdjohnson@bpa.gov>
Subject: FW: hydro and heat

I responded to Jeff Allen, Idaho's Power Council Member, question below with: I will asked but it may not be available till after the heat wave period on how the 4 dams operated.

Jeff is trying to respond to Idaho US Senator Jim Risch question on how the 4 Lower Snake River Dams are operating during this heat wave in the region.

This is a heads-up that we are being asked by Sen. Risch (Via Idaho's power council) on our operation of the 4 projects. Please let me know the time table for when this information will become available.

Thanks

John J Williams

John J Williams

Idaho/Nevada Constituent Account Executive

Bonneville Power Administration ~ Constituent Service Office

950 W. Bannock Street, STE. 805

Boise, Idaho 83702

Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<http://www.bpa.gov/news/AboutUs/Logos/PublishingImages/BPA-Logo-color-220.jpg>

From: Jeff Allen <allen@NWCouncil.org>
Sent: Wednesday, June 30, 2021 11:37 AM
To: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>
Subject: Re: hydro and heat

Thanks John. Is it possible to get specific information on the dams Senator Risch asked about?

Sent from my iPhone

On Jun 29, 2021, at 3:42 PM, Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov> wrote:

Hi all, Peter is out this week so I'm it. Our Weather and Streamflow Forecasting team is expecting daily, monthly and even all-time high temperatures, creating dangerous conditions. On the power supply side, excellent planning and the timing of Columbia Basin runoff has us in good shape to get through this heat wave. We're also benefiting from the output of the Columbia Generating Station nuclear plant, which recently returned to service after a refueling outage. That adds over 1,100 megawatts of generation in the Northwest. The following is on BPA's website:

As record-breaking heat bears down on the Pacific Northwest this weekend, the Bonneville Power Administration has taken several steps to position the federal power and transmission system to serve its customers during this weather event. BPA is ready to keep lights and air conditioners on even with the triple digit temperatures forecast across the region.

“We take our responsibility to provide reliable electricity to the consumer-owned utilities in the region very seriously,” said BPA Administrator John Hairston. “We are working hard to provide non-stop, reliable electricity this weekend to help residents and businesses stay cool and safe during the heatwave.”

On the Power Services side of BPA, these factors are helping:

- The Columbia Generating Station, a nuclear plant owned by Energy Northwest that produces power marketed by BPA, returned online this past weekend from a spring refueling outage. That adds over a 1,100 megawatts of generation in the Northwest and the West.
- Programmed fish spill on the lower Columbia and Snake rivers transitioned from spring to summer operations, increasing the federal hydropower generation from those facilities.
- The Bureau of Reclamation has the Grand Coulee reservoir well positioned to meet its refill target in early July, freeing up the remaining water flow to pass through the system for both power and non-power purposes.

“Even with streamflows below average levels, we are in a good position to serve our customers over this very hot weekend,” said Senior Vice President of Power Services Suzanne Cooper. “I want to thank our partners at the Bureau of Reclamation and the U.S. Army Corps of Engineers for the work and coordination they provide at the region’s 31 federal dams to ensure reliable operations.”

Despite the lower-than-average water year, there is plenty of water behind Grand Coulee Dam and some snowpack left in the Canadian Rockies. Unlike 2015 and 2001, years with a similar volume of water, the shape of this year's runoff has been slower with snow gradually melting above Grand Coulee.

On the transmission side, BPA is taking measures to ensure the safe and reliable flow of electricity this weekend. BPA owns and operates more than 15,000 circuit miles of transmission lines across the Northwest and small amounts in Nevada, Utah and California.

"The reliable flow of electricity is vital to public safety," said BPA Transmission Services Senior Vice President Richard Shaheen. "We've put all maintenance projects that we can on pause to ensure our transmission system can handle increased flows and meet our customers' demands."

On Thursday, BPA restricted planned maintenance on its transmission grid from 6 a.m. Monday, June 28 through Tuesday, June 29 at 10 p.m., so the federal agency can leverage the system to its greatest use when load is expected to increase with the start of the workweek.

"Having all of our lines available will help relieve congestion on the system," said Vice President of Transmission Operations Michelle Cathcart. "With these unprecedented temperatures, we want to ensure electricity can move freely and reliably meet customer demands."

While we have ample power to serve loads during heatwave, we are experiencing transmission related challenges

in the Tri-Cities area. On Monday, June 28 as the Tri-Cities experienced record temperatures, we saw a record amount of electricity consumed in the area. We made it through the day, and expect to be able to make it through the rest of this heat wave if there are no unplanned equipment failures or outages, but out of an abundance of caution reviewed load shedding plans with the City of Richland, Franklin PUD, Benton PUD, Benton REA and Columbia REA in case that step becomes necessary to protect the system from broader unplanned power interruptions. While we made it through Monday, we expect electricity in the Tri-Cities loads to peak late afternoon/early evening on Tuesday, June 29. We continue to work with these customers on operational solutions and voluntary customer conservation to avoid load shedding.

BPA continues to work with these utilities to make appeals to their retail customers to reduce energy use. As you might be aware, Idaho Power is asking its customers to reduce their power consumption. Please do not hesitate to contact me if I can be of any further assistance.

John J Williams

John J Williams

Idaho/Nevada Constituent Account Executive

Bonneville Power Administration ~ Constituent Service Office

950 W. Bannock Street, STE. 805

Boise, Idaho 83702

Cell (208) 867-4978

Email: jjwilliams@bpa.gov

<image001.jpg>

From: Shirley Lindstrom <slindstrom@nwcouncil.org>

Sent: Tuesday, June 29, 2021 12:37 PM

To: Jeff Allen <jallen@NWCouncil.org>; Cogswell, Peter (BPA) - DI-7 <ptcogswell@bpa.gov>

Cc: Williams, John J (BPA) - DIR-BOISE <jjwilliams@bpa.gov>

Subject: RE: hydro and heat

Jim has asked for an update on how this heat wave has affected the power system from staff tomorrow at the P4 meeting. I don't know if they will give specifics about how the hydro system was operated. BPA should have a better idea I would think so good that you included John and Peter on this e-mail.

From: Jeff Allen <jallen@NWCouncil.org>

Sent: Tuesday, June 29, 2021 11:35 AM
To: Peter Cogswell <ptcogswell@bpa.gov>
Cc: John Williams <jjwilliams@bpa.gov>; Shirley Lindstrom <slindstrom@nwcouncil.org>
Subject: Fwd: hydro and heat

Do you have something akin to what Sen Risch's staff is seeking? Thanks

Sent from my iPhone

Begin forwarded message:

From: "Neumeyer, Ayla (Risch)" <Ayla_Neumeyer@risch.senate.gov>
Date: June 29, 2021 at 9:26:47 AM MDT
To: Jeff Allen <jallen@nwcouncil.org>
Cc: "Wong, Bryson (Risch)" <Bryson_Wong@risch.senate.gov>
Subject: hydro and heat

Hey Jeff,

Are you tracking/could you help us track the dams re the recent heat waves? In our "when we need them, we really need them" we were thinking this would be the type of situation we point to.

Ayla

Ayla Neumeyer

Senior Legislative Assistant

Senator James E. Risch

202-224-2752

From: Solano,Wanda M (BPA) - PGST-5

Sent: Thu Jul 01 09:05:04 2021

To: Klement,Anthony J (BPA) - PGSD-5

Subject: Lower Snake special Heat wave report

Importance: Normal

Attachments: LSN_heatwave21_0625_0630.html

This is what I got for the weekly report version for the 25th-30th. I wasn't sure what to say for streamflow and spill operations. PG wants to be copied on the weekly report starting now. I'll start the cut and paste to a word file.

Wanda

Lower Snake Weekly Report

2021-06-25 (yyyy - mm - dd)

This report covers the Pacific Northwest record heat days June 25th to June 30th. Plots can be scrolled over to view the label, value and timestamp for each point.

Operational Context

Weather: Most intense heat wave ever recorded in BPA Service Territory.

Temperatures: As a result of the ongoing heat wave, all-time record high temperatures were again broken on Tuesday in many spots east of the Cascades. Additionally, an all-time record high temperature for all of Canada was set yesterday in British Columbia, and the state of Washington appears to have also set a new all-time record high. Well-above-average temperatures for this time of year are still expected to continue through at least the beginning of next week.

Rainfall: Little, if any, except for isolated thunderstorms in OR/ID late in the week.

Streamflow: Basinwide recessions, although high snowmelt flows will continue in the upper Columbia.

Fish Operations - Temperatures in the Lower Snake areas expected to continue with highs of 100-105 degrees for at least 10 days. A high water temperature emergency for Sockeye Salmon may require operational changes at Dworshak and the Lower Snake projects.

Spill Operations – Spill on the Lower Columbia and Lower Snake River dams have transitioned to the FOP summer spill levels. Snakes are passing inflow with the exception of some shaping to accomodate reserves held during daytime load peaks.

BPA Area Load and the BPA Load Actual data is collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

The Balancing Reserves plot shows the Max Inc Reserves, Max Dec Reserves, Reserves Deployed and the Contingency Reserves Deployed for data collected from Pi that spans the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

Response Factor by Lower Snake River Plant

This is as of the start of the data set.

	BONCHJGCLIHJRJDALGSLMNLWGMCNTDA									
CR_RESPONSE	0	20	40	0	15	0	0	0	10	15
DEC_RESPONSE	0	28	52	0	8	0	0	0	5	7
INC_RESPONSE	0	28	52	0	8	0	0	0	5	7

Lower Snake River Plant Reserves

The Lower Granite (LWG) Reserves plot shows the LWG Dec Balancing Reserves Deployed, the LWG DEC Balancing Reserves Obligated/Held, the LWG INC Balancing Reserves Deployed, the LWG INC Balancing Reserves Obligated/Held, the LWG Minimum Obligation/Held, and the LWG Maximum Obligation/Held. The data is collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

The Little Goose (LGS) Reserves plot shows the LGS Dec Balancing Reserves Deployed, the LGS DEC Balancing Reserves Obligated/Held, the LGS INC Balancing Reserves Deployed, the LGS INC Balancing Reserves Obligated/Held, the LGS Minimum Obligation/Held, and the LGS Maximum Obligation/Held. The data is collected

from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

The Lower Monumental (LMN) Reserves plot shows the LMN Dec Balancing Reserves Deployed, the LMN DEC Balancing Reserves Obligated/Held, the LMN INC Balancing Reserves Deployed, the LMN INC Balancing Reserves Obligated/Held, the LMN Minimum Obligation/Held, and the LMN Maximum Obligation/Held. The data is collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

The Ice Harbor (IHR) Reserves plot shows the IHR Dec Balancing Reserves Deployed, the IHR DEC Balancing Reserves Obligated/Held, the IHR INC Balancing Reserves Deployed, the IHR INC Balancing Reserves Obligated/Held, the IHR Minimum Obligation/Held, and the IHR Maximum Obligation/Held. The data is collected from Pi for the period of the report date and 7 days later. Each data point that represents an average of the hour indicated by the time stamp.

Lower Snake River Plant Generation Profiles

The Lower Granite (LWG) Generation Profile plot shows the LWG Generation and the LWG Basepoint data collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

The Little Goose (LGS) Generation Profile plot shows the LGS Generation and the LGS Basepoint data collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

The Lower Monumental (LMN) Generation Profile plot shows the LMN Generation and the LMN Basepoint data collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

The Ice Harbor (IHR) Generation Profile plot shows the IHR Generation and the IHR Basepoint data collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

Lower Snake River Elevations

The Lower Granite (LWG) Forebay Elevation plot shows the data collected from Pi for the period of the report date and 7 days later and represents an average of the hour indicated by the time stamp. The 2021 Fish Operations Plan (FOP) normal (Aug 15 - April 2) elevation range is 733ft min and 738ft max. The MOP elevation range (April 3 - August 14) is 733ft min and 734.5ft max. Navigation Corp of Engineers CBT's direct MOP adjustments outside of seasonal ranges.

The Little Goose (LGS) Forebay Elevation plot shows the data collected from Pi for the period of the report date and 7 days later and represents an average of the hour indicated by the time stamp. The 2021 Fish Operations Plan (FOP) normal (Aug 15 - April 2) elevation range is 633ft min and 638ft max. The MOP elevation range (April 3 - August 14) is 633ft min and 634.5ft max. Navigation Corp of Engineers CBT's direct MOP adjustments outside of seasonal ranges.

The Lower Monumental (LMN) Forebay Elevation plot shows the data collected from Pi for the period of the report date and 7 days later and represents an average of the hour indicated by the time stamp. The 2021 Fish Operations Plan (FOP) normal (Aug 15 - April 2) elevation range is 537ft min and 540ft max. The MOP elevation range (April 3 - August 14) is 537ft min and 538.5ft max. Navigation Corp of Engineers CBT's direct MOP adjustments outside of seasonal ranges.

The Ice Harbor (IHR) Forebay Elevation plot shows the data collected from Pi for the period of the report date and 7 days later and represents an average of the hour indicated by the time stamp. The 2021 Fish Operations Plan (FOP) normal (Aug 15 - April 2) elevation range is 437ft min and 440ft max. The MOP elevation range (April 3 - August 14) is 437ft min and 438.5ft max. Navigation Corp of Engineers CBT's direct MOP adjustments outside of seasonal ranges.

Lower Snake River Inflow as shown at the Lower Granite Plant

The Lower Granite (LWG) InFlow plot shows the data collected from Pi for the period of the report date and 7 days later and represents an average of the hour indicated by the time stamp.

Lower Snake River Outflows

The Lower Granite (LWG) Outflow plot shows the LWG Total Discharge, the LWG Spill Discharge, and LWG Rate of Turbine Discharge data collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

The Little Goose (LGS) Outflow plot shows the LGS Total Discharge, the LGS Spill Discharge, and LGS Rate of Turbine Discharge data collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

The Lower Monumental (LMN) Outflow plot shows the LMN Total Discharge, the LMN Spill Discharge, and LMN Rate of Turbine Discharge data collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

The Ice Harbor (IHR) Outflow plot shows the IHR Total Discharge, the IHR Spill Discharge, and IHR Rate of Turbine Discharge data collected from Pi for the period of the report date and 7 days later. Each data point represents an average of the hour indicated by the time stamp.

Lower Snake River Response Factors and Contingency Reserves Held