Lower Snake Temperature Management

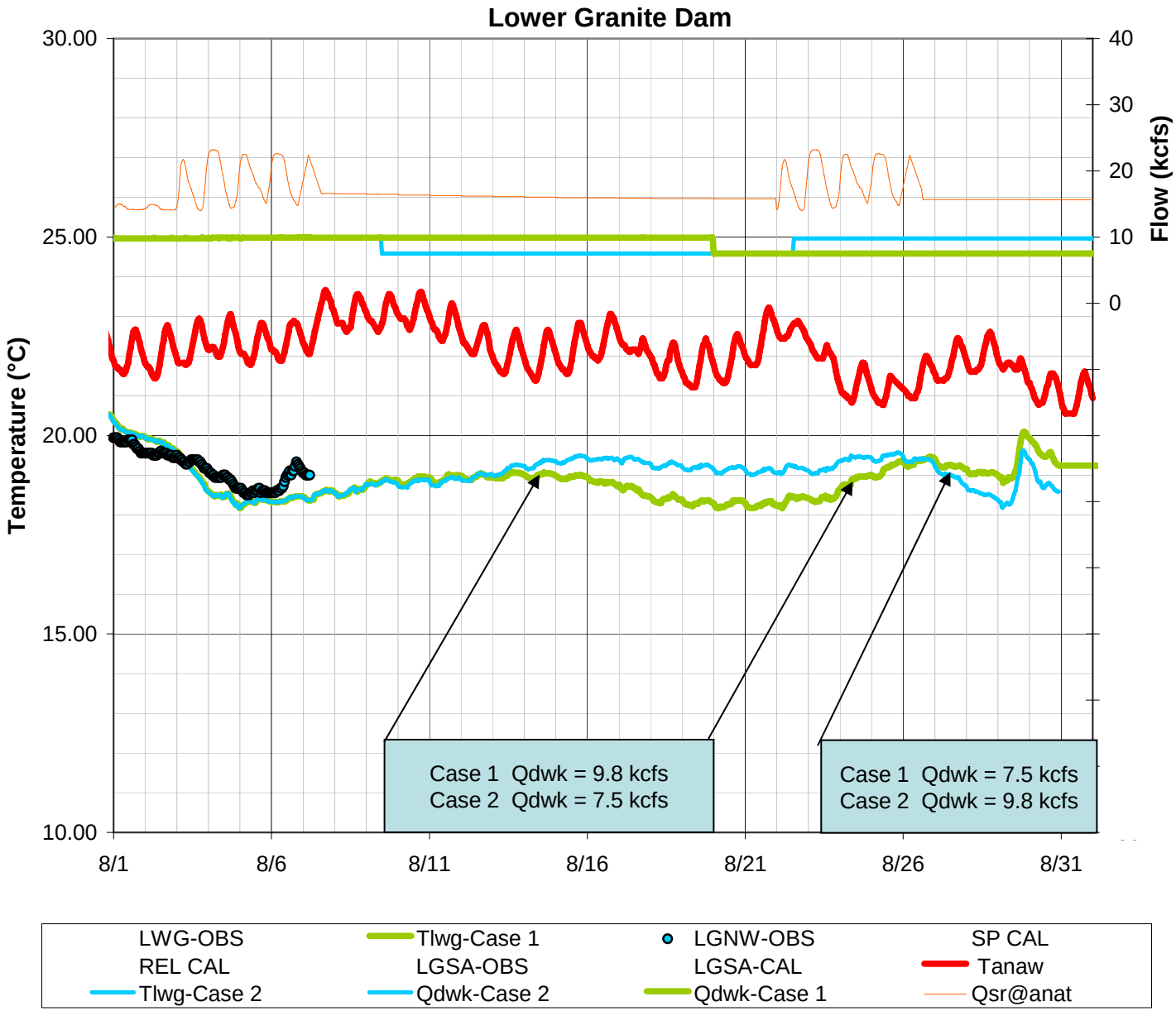
- Flows and Temperatures were simulated in the Snake River and Clearwater River Basins for the Month of August 2006.
  - Snake RM 107-167
  - Clearwater RM 0-42
- Meteorologic Conditions
  - NOAA 7 Day Forecast Aug 8-14
  - Weather data 2005 Aug 15-31 at Silcott Island/Dent Acres
- Boundary Conditions
  - Flows (STP) with Aug 22-26 high flows from HC
  - Temperatures (2005 observed)
- Dworshak Operations
  - Case 1 Aug 8-19 @ 9.8 kcsf, Aug 20-31 @ 7.5 kcfs
  - Case 2 Aug 8 @ 9.8 kcfs, Aug 9-22 @ 7.5 kcfs, Aug 22-31 @ 9.8 kcfs

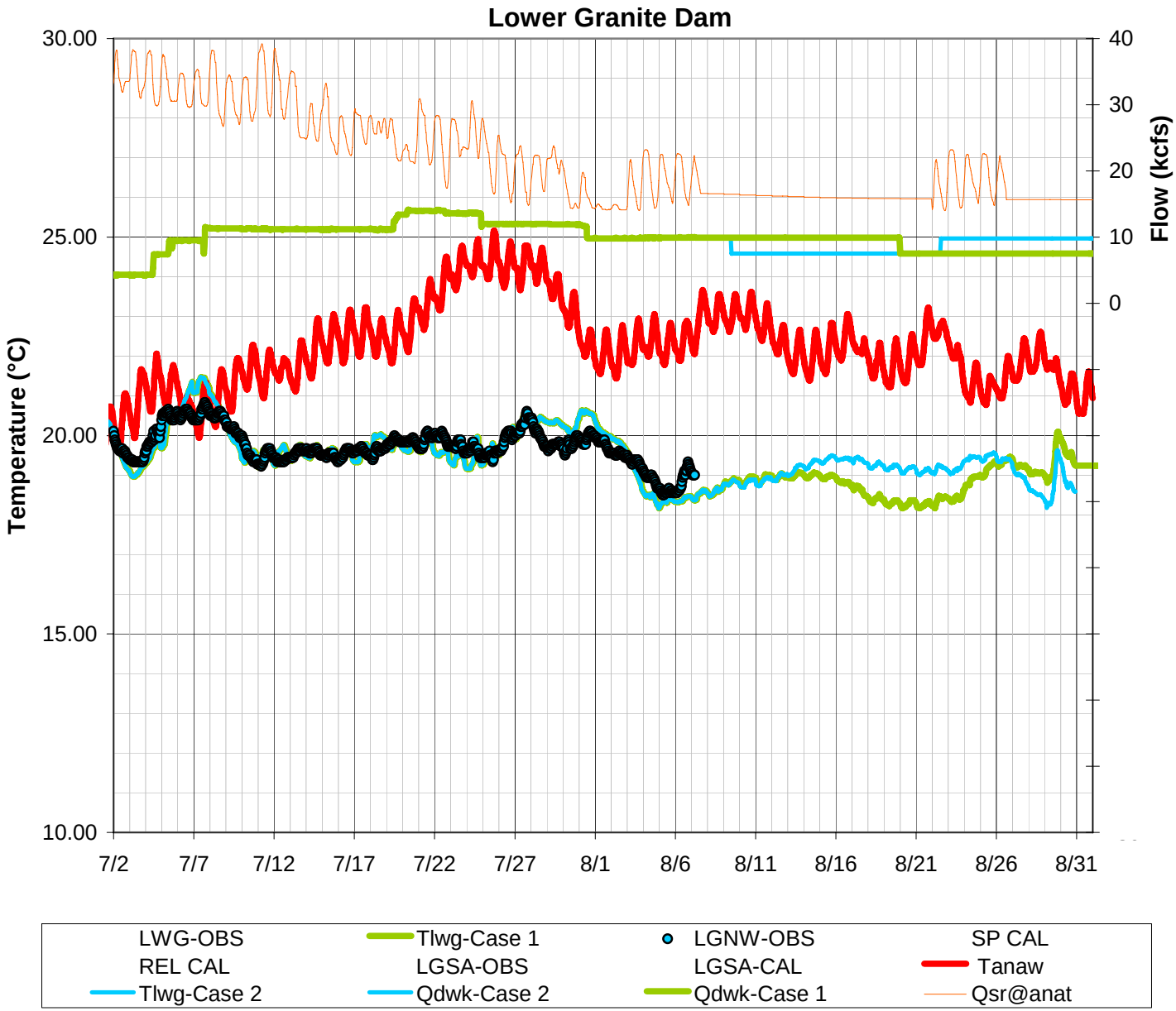
Lower Snake Temperature Management

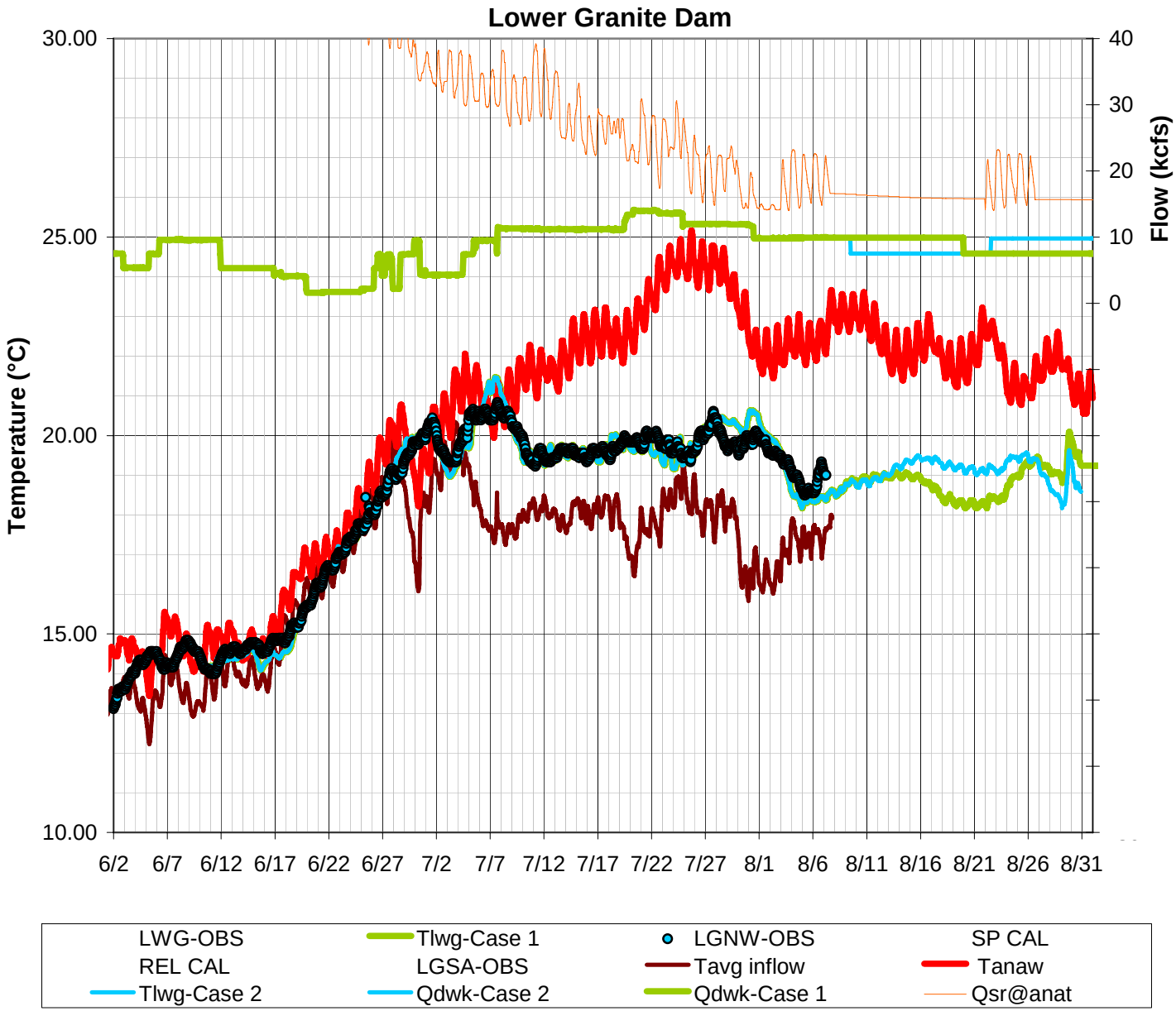
- Results
  - Shaping the releases (+/- 2.3 kcfs) from Dworshak can result in a ~1 C impact (increase or decrease) in releases from Lower Granite Dam
    - Case 1 – continued capacity releases from Dworshak will result in 19 C release temperatures from Lower Granite Dam this week
    - Case 1 - If releases from HC Dam are reduced to 10-11 kcfs daily average the release temperatures from Lower Granite Dam will fall below 19 C next week
    - Case 1 – operating schedule forces 2 turbine operation at 7.5 kcfs during the end of August to attain 1535 ft in Dworshak pool on Aug 31. This policy is less able to moderate a pulse of warm water from the SR during this time frame (second half of August).
    - Case 2 – Two turbine releases at 7.5 kcfs from Dworshak Dam are initiated on Aug 9 to conserve water for the second half of August with release temperatures at high as 19.5 C at Lower Granite Dam over the next week.
      - If HC Dam discharge remain higher than projected, temperature could approach 20 C.
    - Case 2 – The conservation of water in Dworshak pool afforded by this policy allows the moderation of water temperatures at the end of August during a pulse of warm water

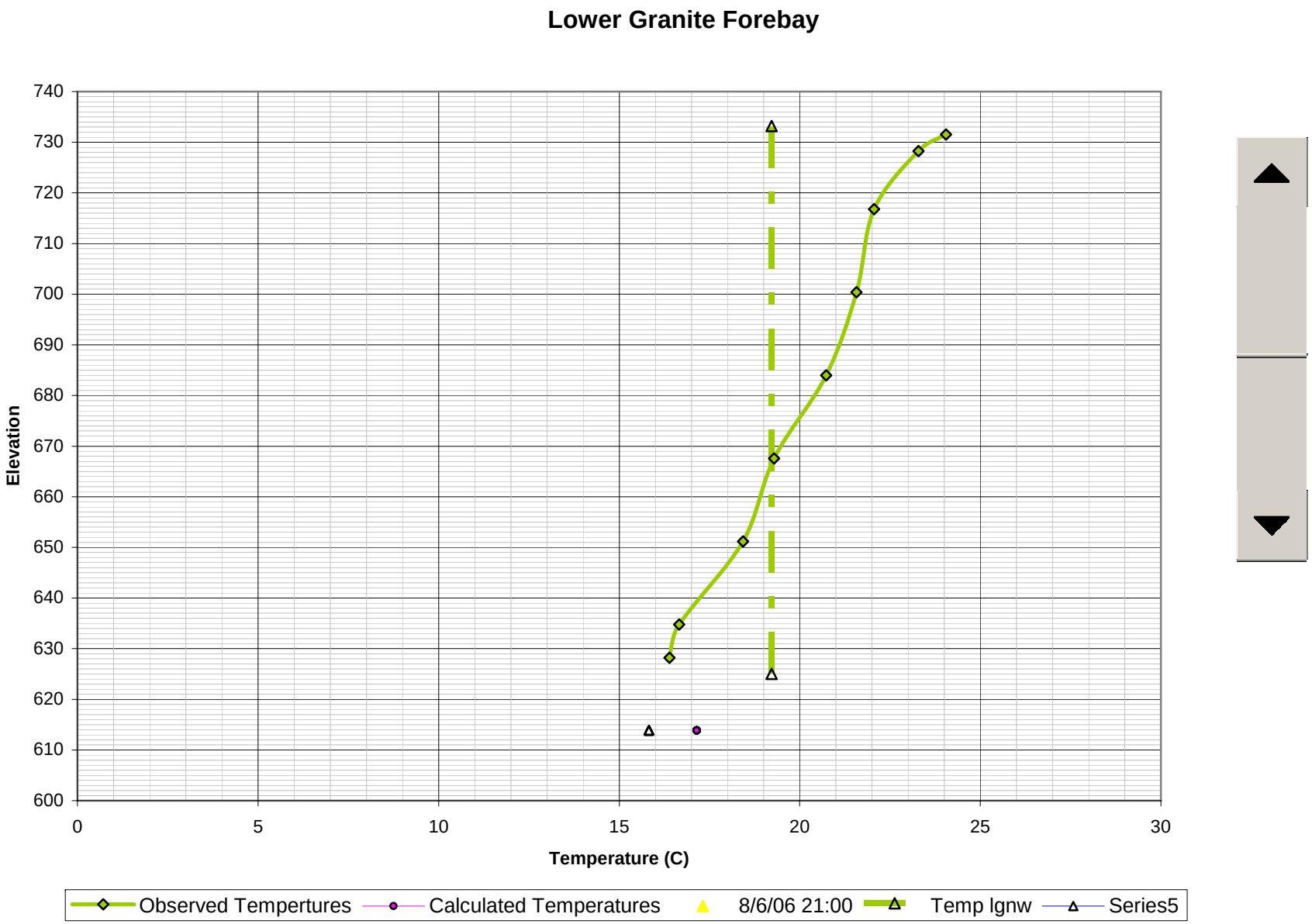
Lower Snake Temperature Management

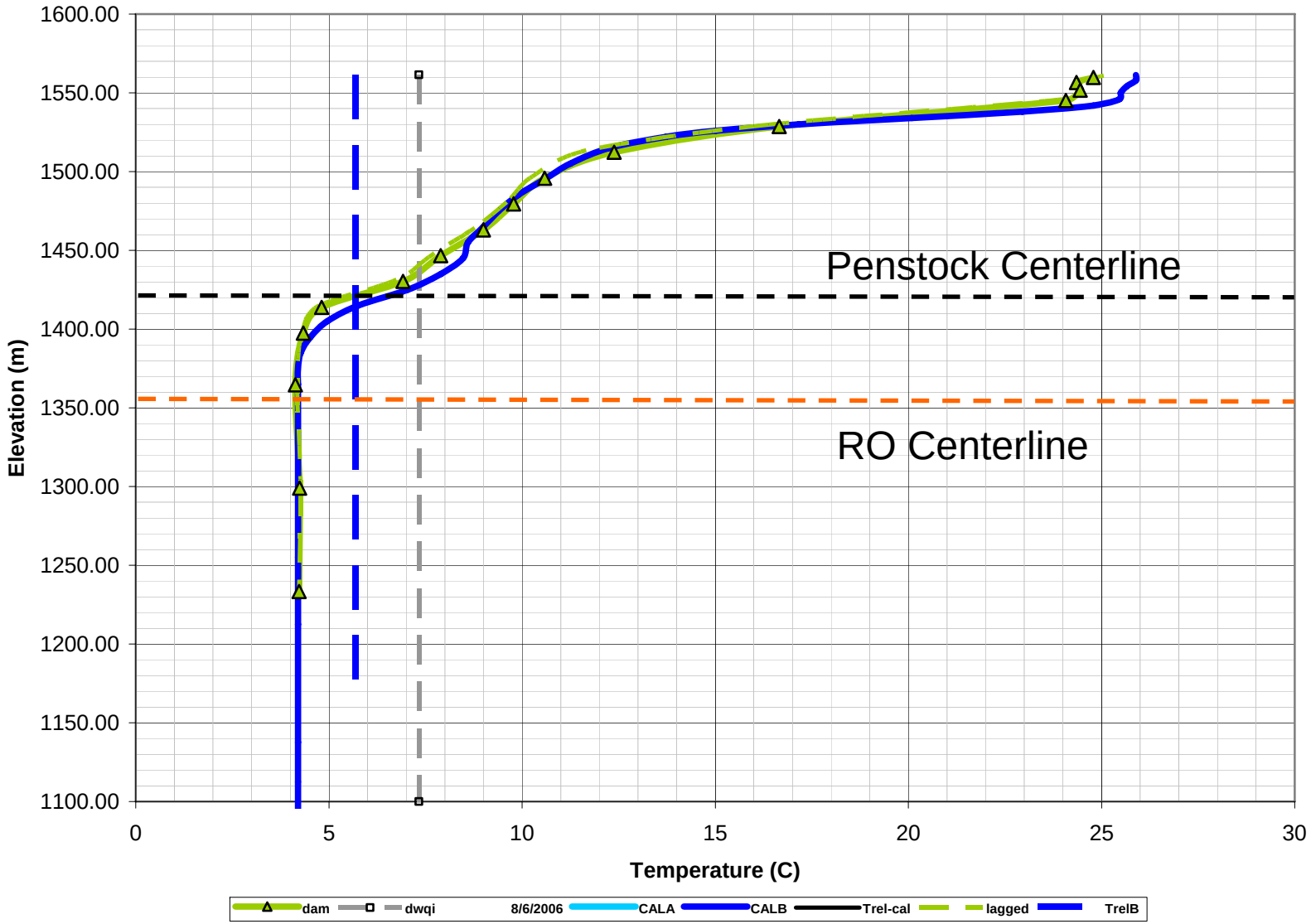
- Results
  - Recommended temperature management policy is to time capacity releases from Dworshak Dam with high thermal loading on the Snake River above the confluence with the Clearwater River
    - Metric of operational decision making should involve the average temperature of Clearwater River at Lewistion and Snake River at Anatone
    - When the average temperature from these sources is above 19 C it will generally result in 20+C at Lower Granite Dam
    - This location will allow for operational changes at DWK to be paired with thermal loading changes on the Snake River.
  - Lagged response between Dworshak operational change and thermal response at Lower Granite Dam
    - About a 5-6 day lag forecasted August conditions
  - Cooling influence of Dworshak releases go further in the second half of August due to lower forecasted flows on the Snake River.
  - Variability of forecasted water temperature are a function of model inputs (flows, temperatures, weather conditions)
    - Hells Canyon Dam Releases (Q & Temp)?
    - Reaccurance of “hellishly” warm weather conditions or rain


Lower Granite Dam
30.00
25.00
20.00
15.00
10.00
Temperature (°C)
40
30
20
10
0
Flow (kcfs)
8/1
8/6
8/11
8/16
8/21
8/26
8/31
Case 1 Qdwk = 9.8 kcfs
Case 2 Qdwk = 7.5 kcfs
Case 1 Qdwk = 7.5 kcfs
Case 2 Qdwk = 9.8 kcfs
LWG-OBS
Tlwg-Case 1
LGNW-OBS
SP CAL
REL CAL
LGSA-OBS
LGSA-CAL
Tanaw
Tlwg-Case 2
Qdwk-Case 2
Qdwk-Case 1
Qsr@anat


Lower Granite Dam
Temperature (°C)
Flow (kcfs)
30.00
25.00
20.00
15.00
10.00
40
30
20
10
0
7/2
7/7
7/12
7/17
7/22
7/27
8/1
8/6
8/11
8/16
8/21
8/26
8/31
LWG-OBS
Tlwg-Case 1
LGNW-OBS
SP CAL
REL CAL
LGSA-OBS
LGSA-CAL
Tanaw
Tlwg-Case 2
Qdwk-Case 2
Qdwk-Case 1
Qsr@anat


Lower Granite Dam
Temperature (°C)
Flow (kcfs)
30.00
25.00
20.00
15.00
10.00
40
30
20
10
0
6/2
6/7
6/12
6/17
6/22
6/27
7/2
7/7
7/12
7/17
7/22
7/27
8/1
8/6
8/11
8/16
8/21
8/26
8/31
LWG-OBS
Tlwg-Case 1
LGNW-OBS
SP CAL
REL CAL
LGSA-OBS
Tavg inflow
Tanaw
Tlwg-Case 2
Qdwk-Case 2
Qdwk-Case 1
Qsr@anat


Lower Granite Forebay
Elevation
740
730
720
710
700
690
680
670
660
650
640
630
620
610
600
0
5
10
15
20
25
30
Temperature (C)
Observed Tempertures
Calculated Temperatures
8/6/06 21:00
Temp lgnw
Series5


1600.00
1550.00
1500.00
1450.00
1400.00
1350.00
1300.00
1250.00
1200.00
1150.00
1100.00
Elevation (m)
0
5
10
15
20
25
30
Temperature (C)
Penstock Centerline
RO Centerline
dam
dwqi
8/6/2006
CALA
CALB
Trel-cal
lagged
TrelB