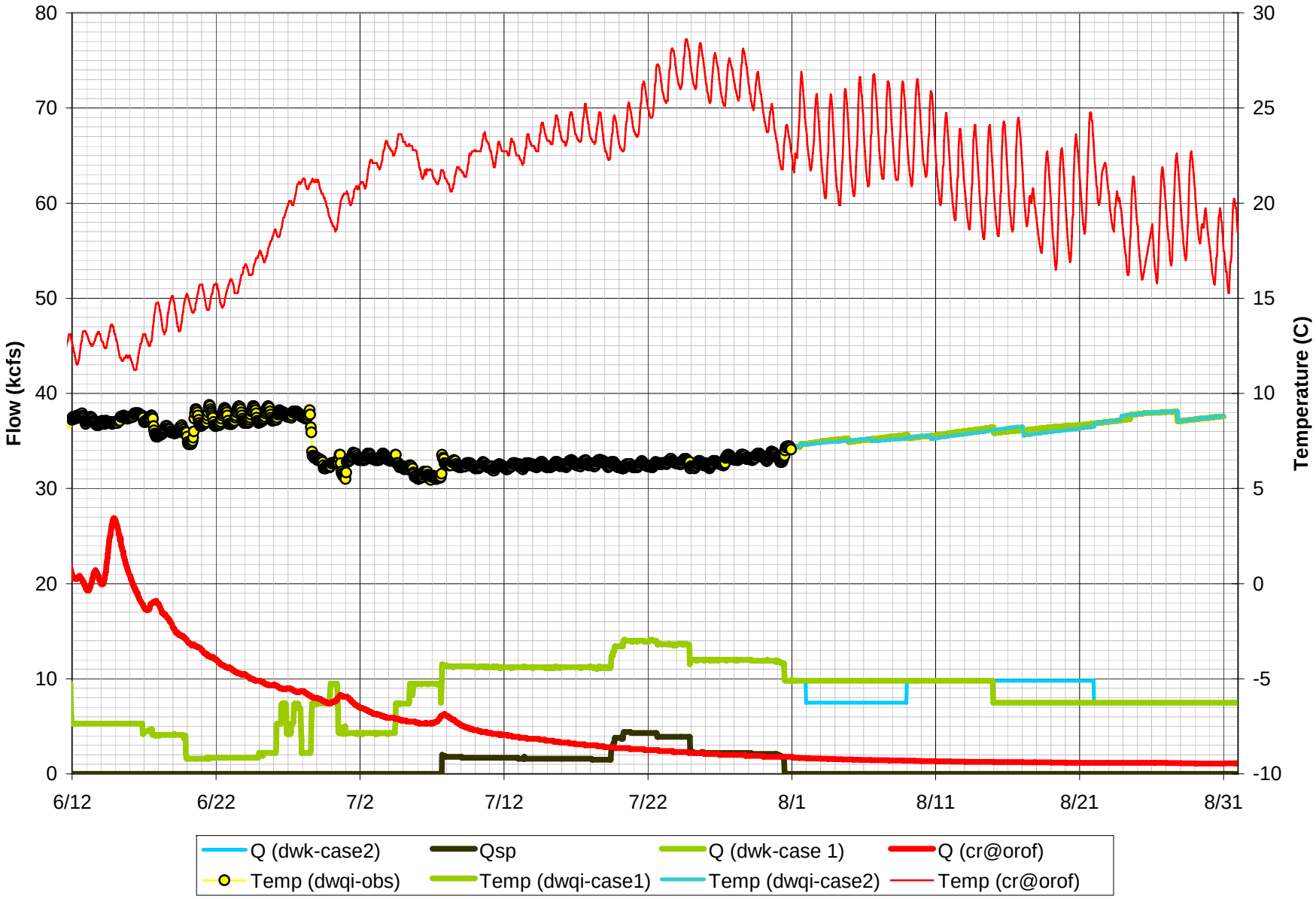
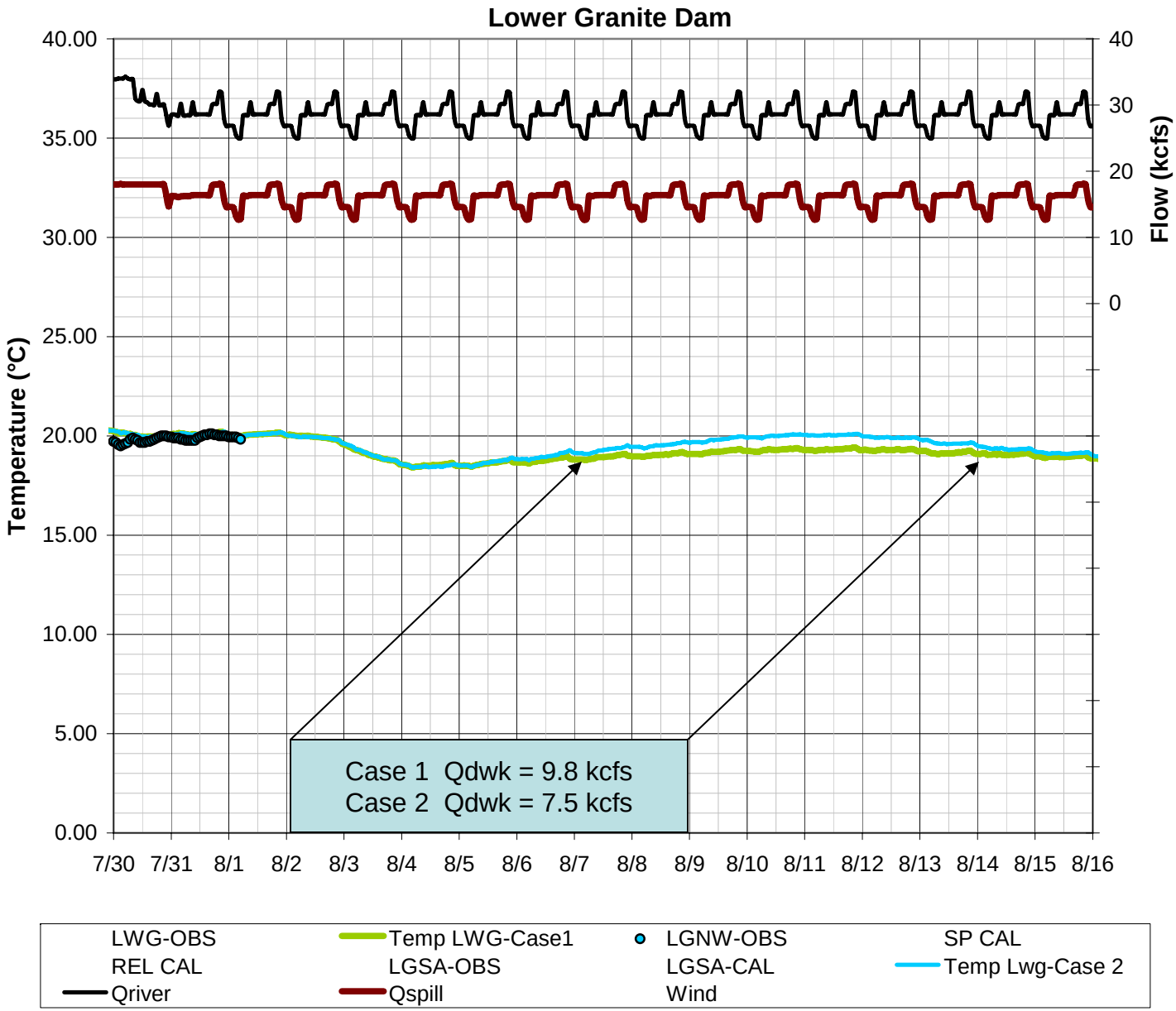
Lower Snake Temperature Management

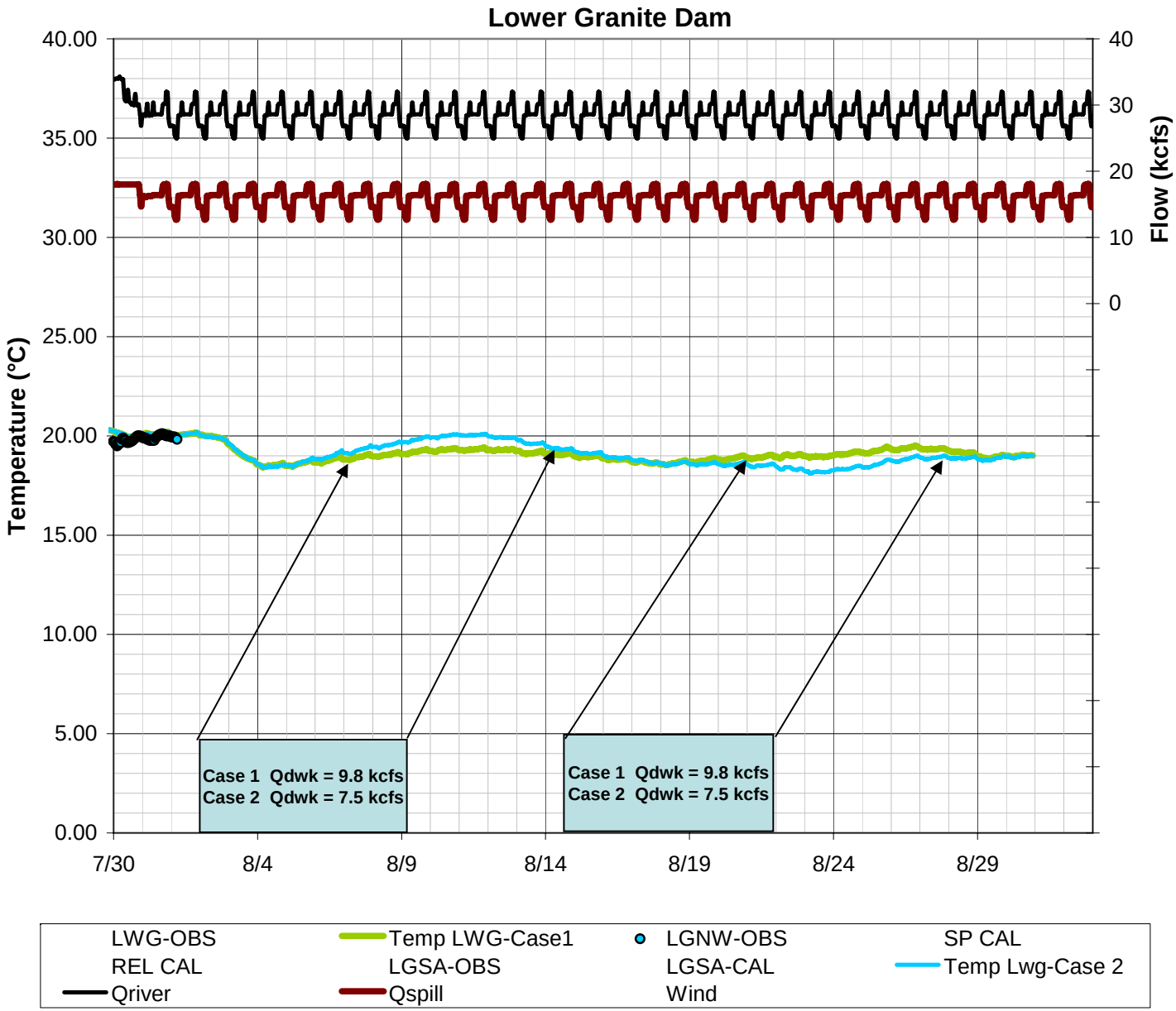
- Flows and Temperatures were simulated in the Snake River and Clearwater River Basins for the Month of August 2006.
  - Snake RM 107-167
  - Clearwater RM 0-42
- Meteorologic Conditions
  - NOAA 7 Day Forecast Aug 1-7
  - Weather station data 2005 Aug 8-31
- Boundary Conditions
  - Flows (STP)
  - Temperatures (2005 observed)
- Dworshak Operations
  - Case 1 Aug 1-14 @ 9.8 kcsf, Aug 15-31 @ 7.5 kcfs
  - Case 2 Aug 1 @ 9.8 kcfs, Aug 2-8 @ 7.5 kcfs, Aug 9-21 @ 9.8 kcfs
    Aug 22-31 @ 7.5 kcfs

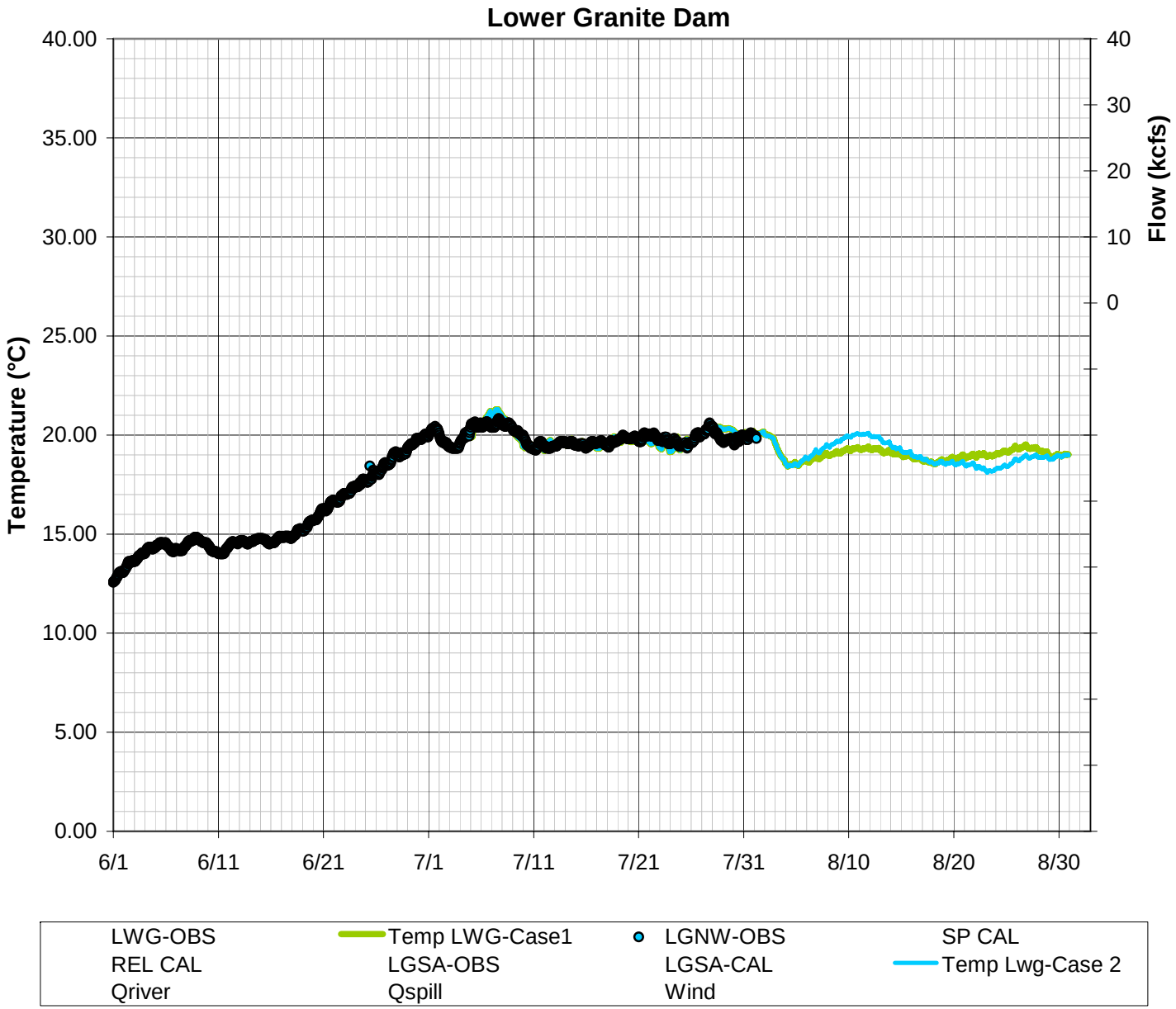
Lower Snake Temperature Management

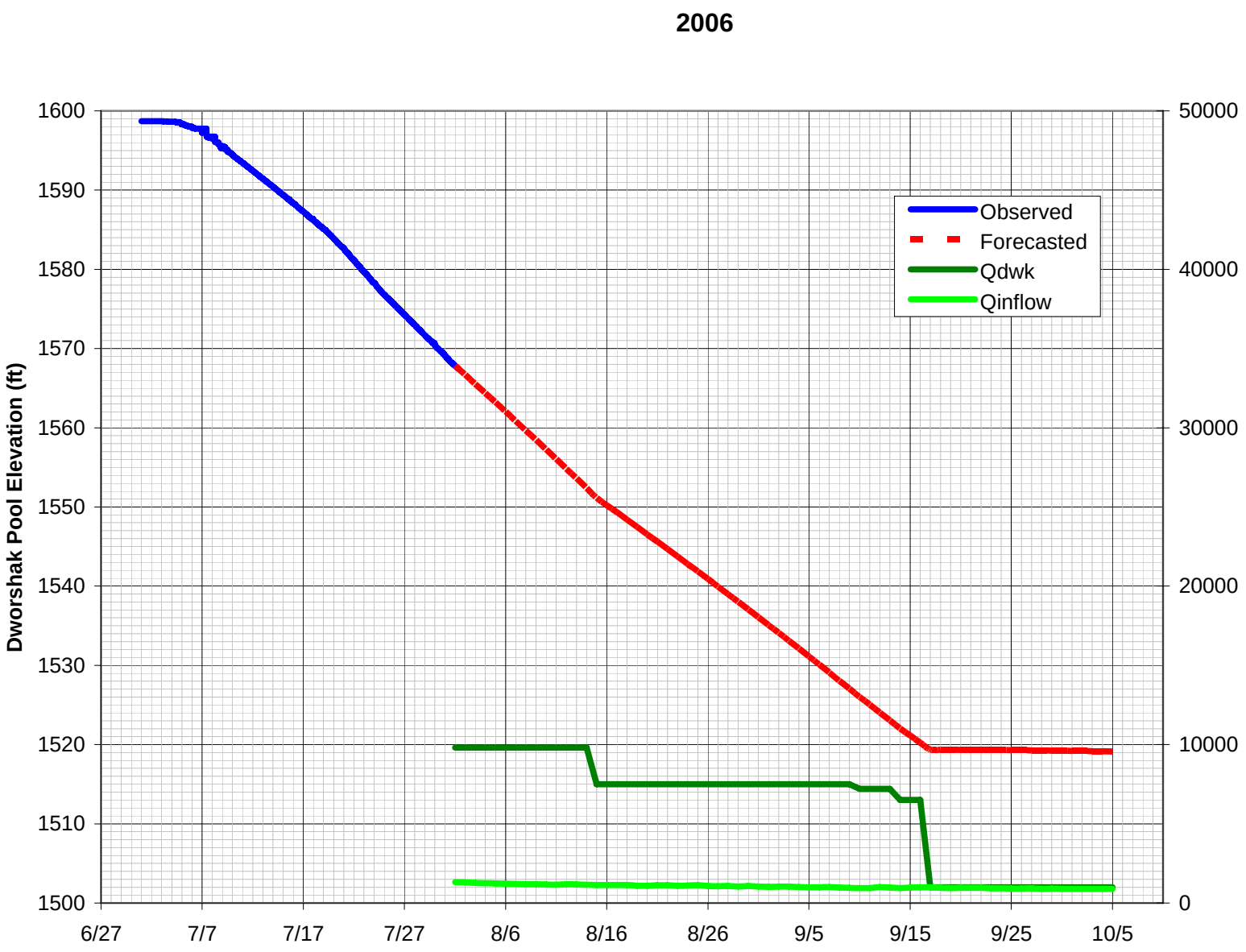
- Results
  - Shaping the releases (+/- 2.3 kcfs) from Dworshak can result in a ~1 C impact (increase or decrease) in releases from Lower Granite Dam
  - Recommended temperature management policy is to time capacity releases from Dworshak Dam with high thermal loading on the Snake River above the confluence with the Clearwater River
    - Flows impact time of travel
  - 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

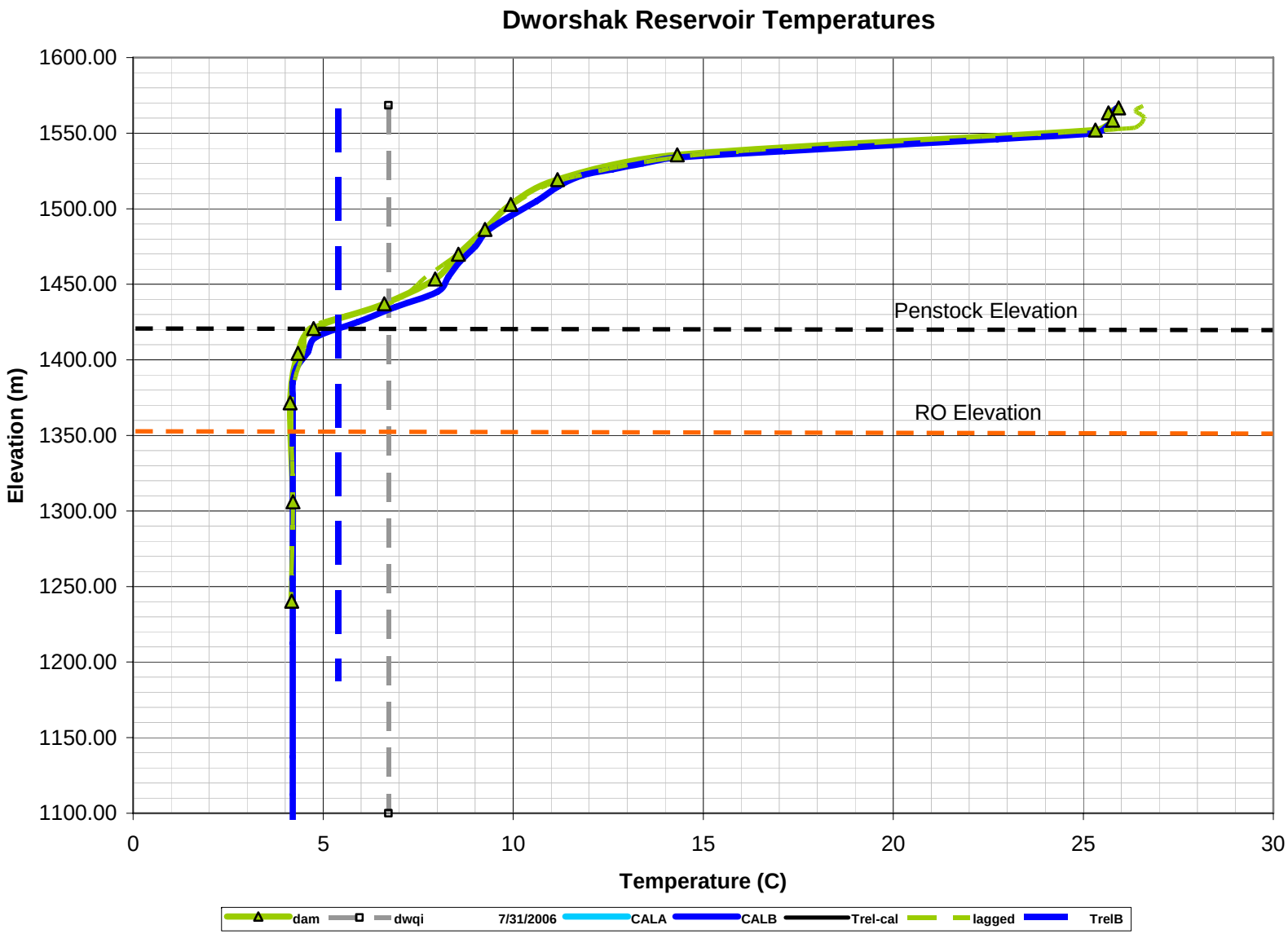

Flow (kcfs)
Temperature (C)
80
70
60
50
40
30
20
10
0
30
25
20
15
10
5
0
-5
-10
6/12
6/22
7/2
7/12
7/22
8/1
8/11
8/21
8/31
Q (dwk-case2)
Qsp
Q (dwk-case 1)
Q (cr@orof)
Temp (dwqi-obs)
Temp (dwqi-case1)
Temp (dwqi-case2)
Temp (cr@orof)

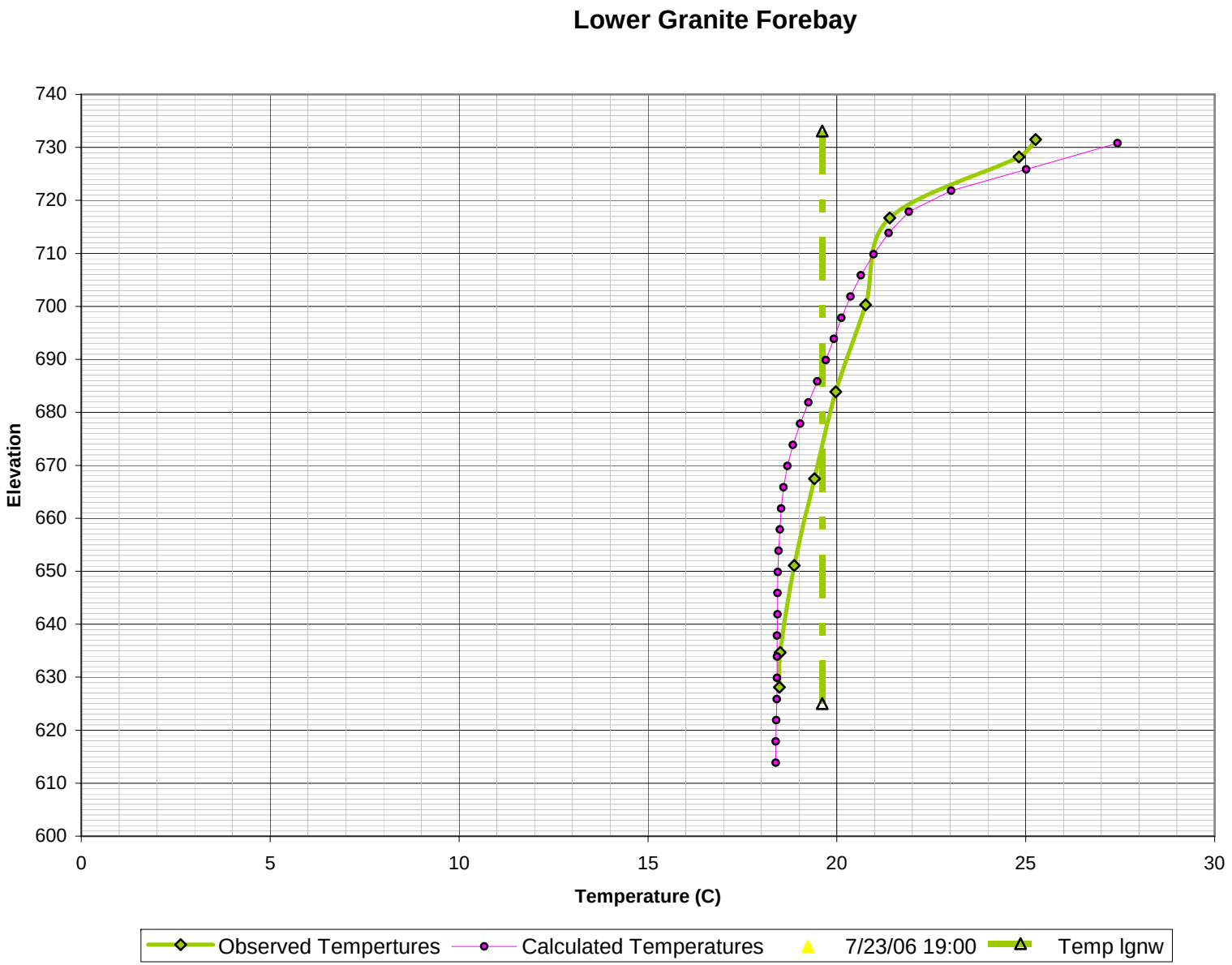

Lower Granite Dam
Temperature (°C)
Flow (kcfs)
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
40
30
20
10
0
7/30
7/31
8/1
8/2
8/3
8/4
8/5
8/6
8/7
8/8
8/9
8/10
8/11
8/12
8/13
8/14
8/15
8/16
Case 1 Qdwk = 9.8 kcfs
Case 2 Qdwk = 7.5 kcfs
LWG-OBS
Temp LWG-Case1
LGNW-OBS
SP CAL
REL CAL
LGSA-OBS
LGSA-CAL
Temp Lwg-Case 2
Qriver
Qspill
Wind

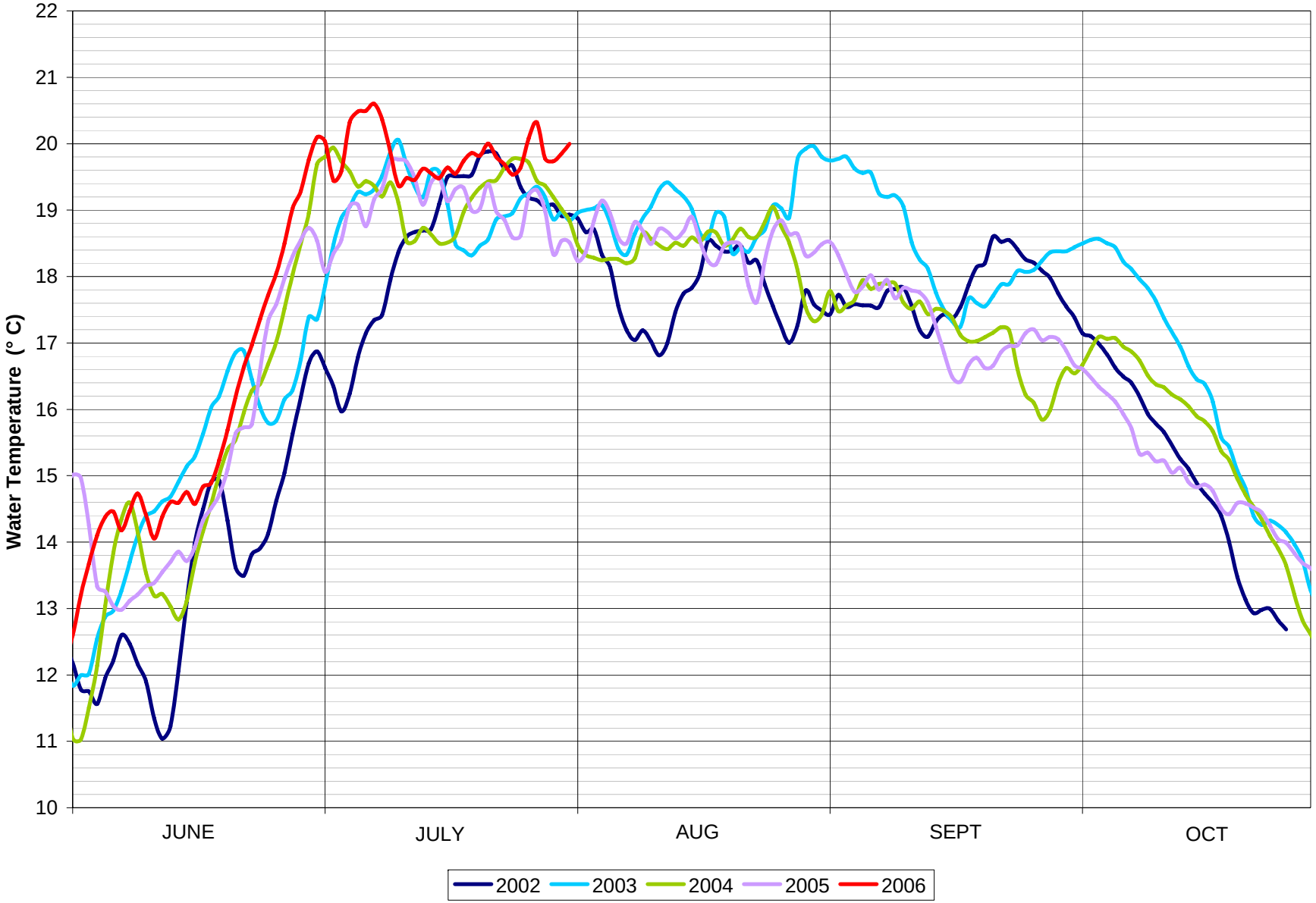

Lower Granite Dam
Temperature (°C)
Flow (kcfs)
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
40
30
20
10
0
7/30
8/4
8/9
8/14
8/19
8/24
8/29
Case 1 Qdwk = 9.8 kcfs
Case 2 Qdwk = 7.5 kcfs
Case 1 Qdwk = 9.8 kcfs
Case 2 Qdwk = 7.5 kcfs
LWG-OBS
Temp LWG-Case1
LGNW-OBS
SP CAL
REL CAL
LGSA-OBS
LGSA-CAL
Temp Lwg-Case 2
Qriver
Qspill
Wind


Lower Granite Dam
Temperature (°C)
Flow (kcfs)
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
40
30
20
10
0
6/1
6/11
6/21
7/1
7/11
7/21
7/31
8/10
8/20
8/30
LWG-OBS
Temp LWG-Case1
LGNW-OBS
SP CAL
REL CAL
LGSA-OBS
LGSA-CAL
Temp Lwg-Case 2
Qriver
Qspill
Wind

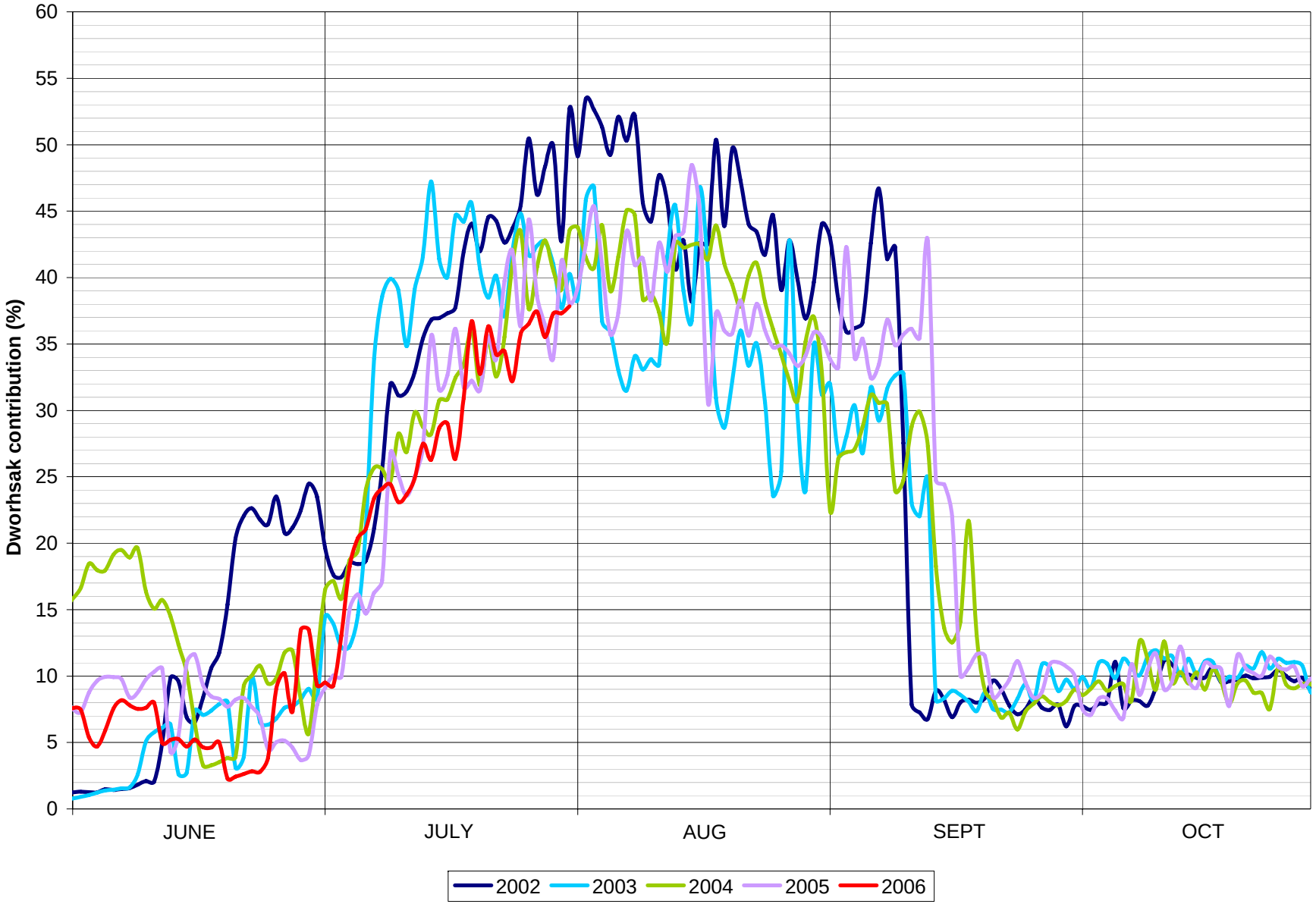

2006
Dworshak Pool Elevation (ft)
1600
1590
1580
1570
1560
1550
1540
1530
1520
1510
1500
50000
40000
30000
20000
10000
0
6/27
7/7
7/17
7/27
8/6
8/16
8/26
9/5
9/15
9/25
10/5
Observed
Forecasted
Qdwk
Qinflow


Dworshak Reservoir Temperatures
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 Elevation
RO Elevation
dam
dwqi
7/31/2006
CALA
CALB
Trel-cal
lagged
TrelB


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
7/23/06 19:00
Temp lgnw



Lower Granite Dam release temperatures, June through October, 2002-2006.



The percent contribution of Dworshak releases as seen at Lower Granite Dam, June through October, 2002-2006.