

# Lower Snake Temperature Management

July 12, 2007

- General Observations

- Lower Granite Pool

- Temperature in Snake River at Lower Granite 19.5 °C (70 F)
    - Temperature of flow weighted inflow  $T_{crit} = 18.4$  °C
    - Heat gain in LWG pool 0.9-1.5 C
    - Travel time in LWG pool 5.0 days

- Density stratified flow / underflow reducing time of travel

- Snake River at Anatone  $Q_{5d} = 20.6$  kcf,  $T_{5d} = 22.4$  °C (72.2 F)

- Clearwater River

- Dworshak  $Q_{5d} = 11.9$  kcf,  $T_{5d} = 6.5$  °C (43.7 F)
    - Orofino  $Q_{5d} = 3.0$  kcf,  $T_{5d} = 24.6$  °C (76.1 F)
    - Lewiston  $T_{5d} = 12.3$  C (54.3 F)
    - Flow ratio  $Q_{cr} / Q_{sr@lwg} = 42\%$

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- Forecasts

- Weather (NOAA)

- Very Hot Temperatures predicted for later this week at Lewiston ID

- July 13 14 15 16 17 18 19
      - Fri Sat Sun Mon Tue Wed Thu
      - Highs 109 105 99 98 96 93 92
      - Lows 70 70 69 65 64 63 62

- Hourly weather data from 2006 for July 20-31

- Flows

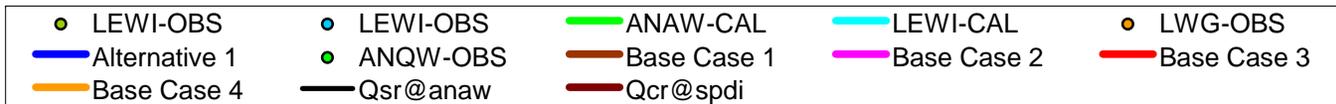
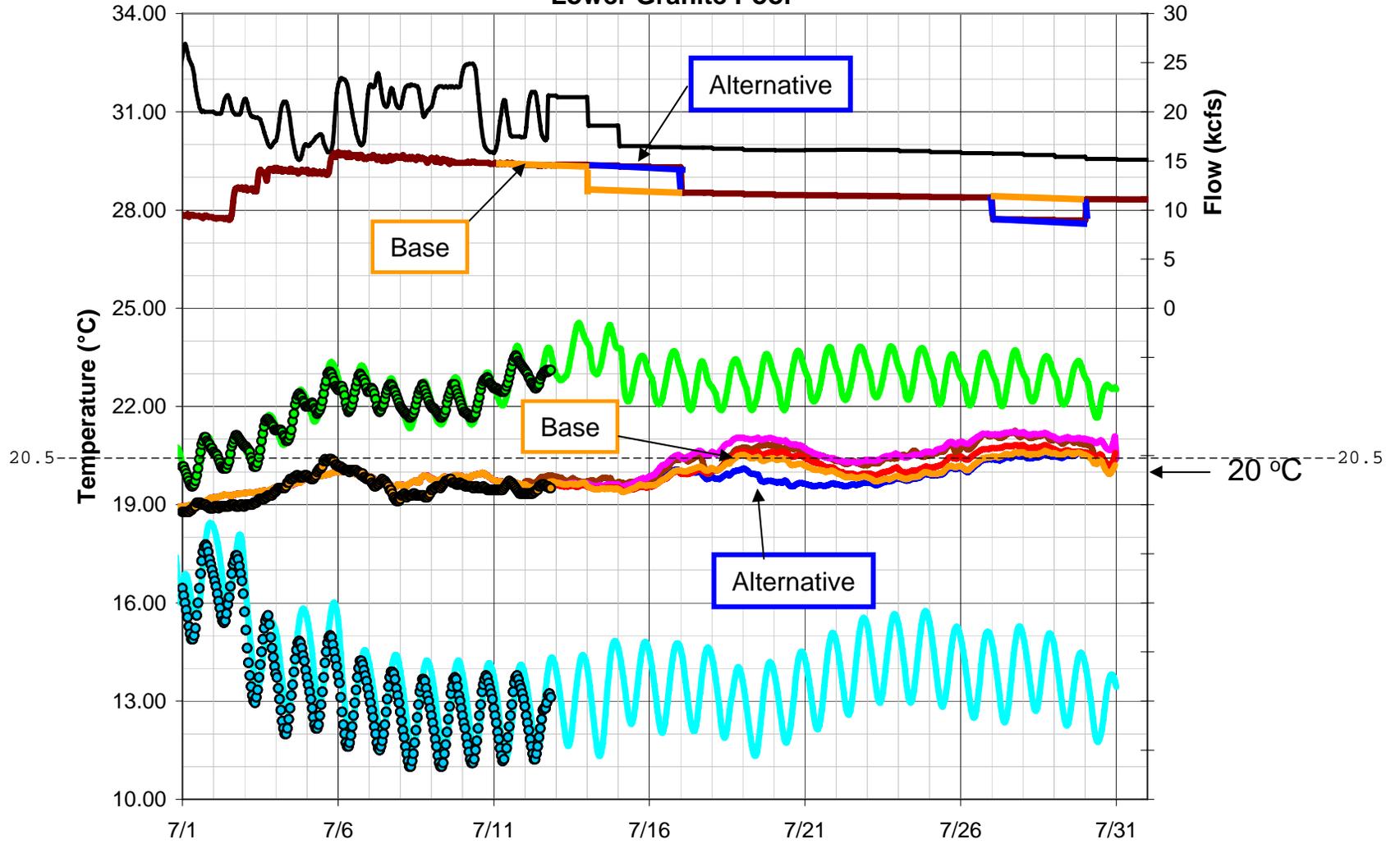
- Clearwater River at Orofino (STP) falling from 2.7 to 2.0 kcfs by July 19
    - Snake River at Anatone (STP) falling from 21.6 to 16.1 by July 19
    - Dworshak Operations (STP inflow 1.3 kcfs Sept. 1)
      - 50 days before Sept 1 – 0 days @ 12 kcfs and 50 days @ 9.5 kcfs = 1535 ft
      - Base Plan 12 kcfs through July 13, 9.5 July 14-31
        - » Case 1 HCD continued volume discharge from week of July 6-12 (14.6 kcfs)
        - » Case 2 HCD 15% increase in volume discharge from week of July 6-12 (16.8 kcfs)
        - » Case 3 HCD 15% decrease in volume discharge from week of July 6-12 (12.6 kcfs)
        - » Case 4 HCD STD flows (11.4 kcfs)
      - Alternative 1 12 kcfs through July 16, 9.5 July 17-26, 7.3 kcfs July 27-29
        - » Case 1 HCD STD flow (11.4 kcfs)

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- Results of CEQUAL-W2 simulation (June 1-July 31 simulation)
  - Base Condition (variable HCD flows)
    - SR Temps remain below 20 C through July 16
    - Mild warming trend on July 17 in response to July 13 heat wave
      - SR Temps edge above 20 C
    - Higher HCD flows result in higher excursions above 20 C
    - Second Heat Wave on July 21 (hypothetical)
  - Alternative 1 (STP HCD flows)
    - Slightly cooler temperatures July 18-21
      - Up to 0.5 C cooler than base condition
      - Temperatures at or below 20 C
    - Warmer conditions associated with DWK 7.3 kcfs release in August
- Based on review of 2006 conditions should have multiple opportunities to drop below PH capacity and still meet temperature targets
  - Alternative 1 can still reach 1535 ft on Sept. 1 by selectively backing off PH flows

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