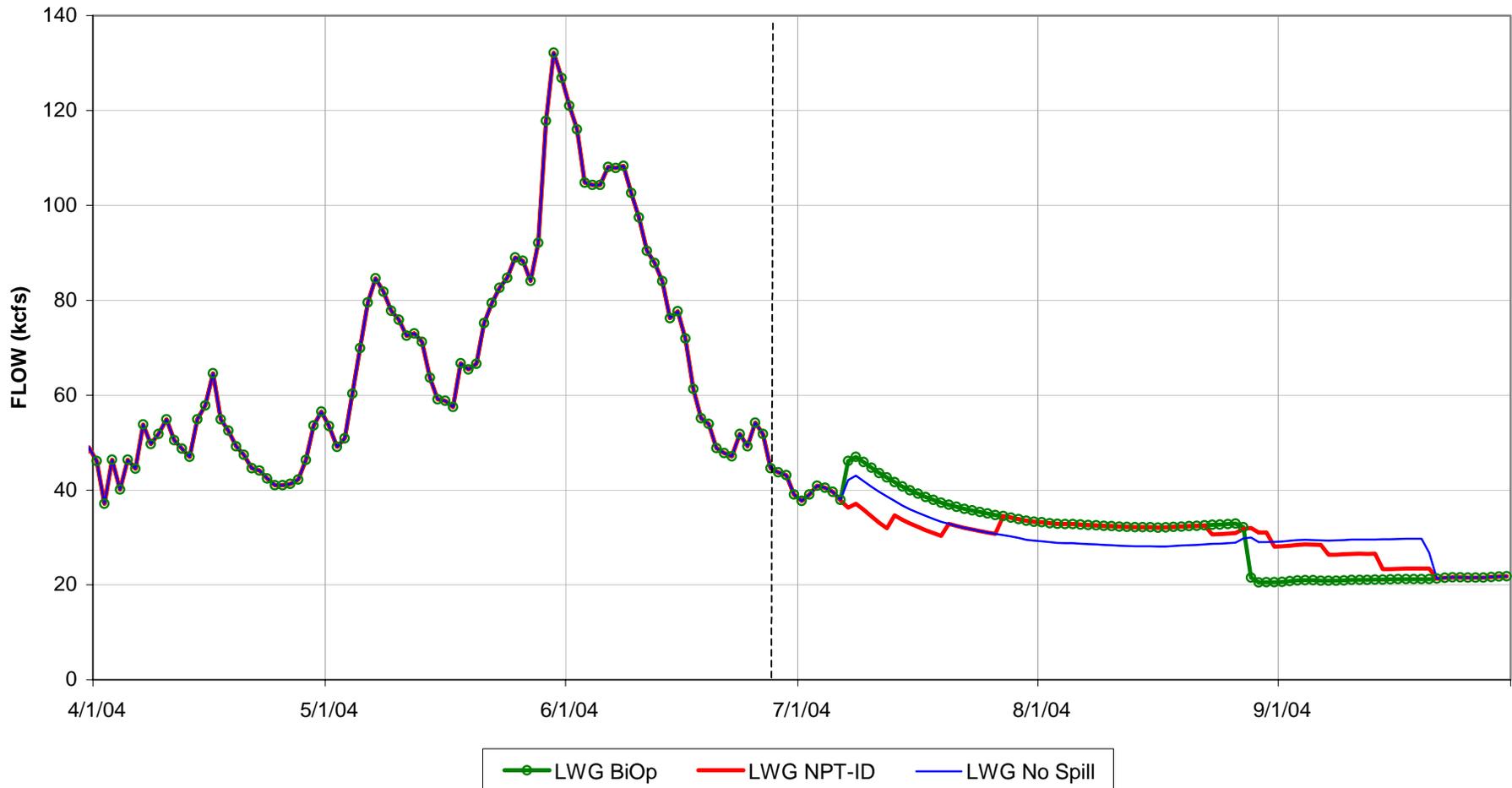


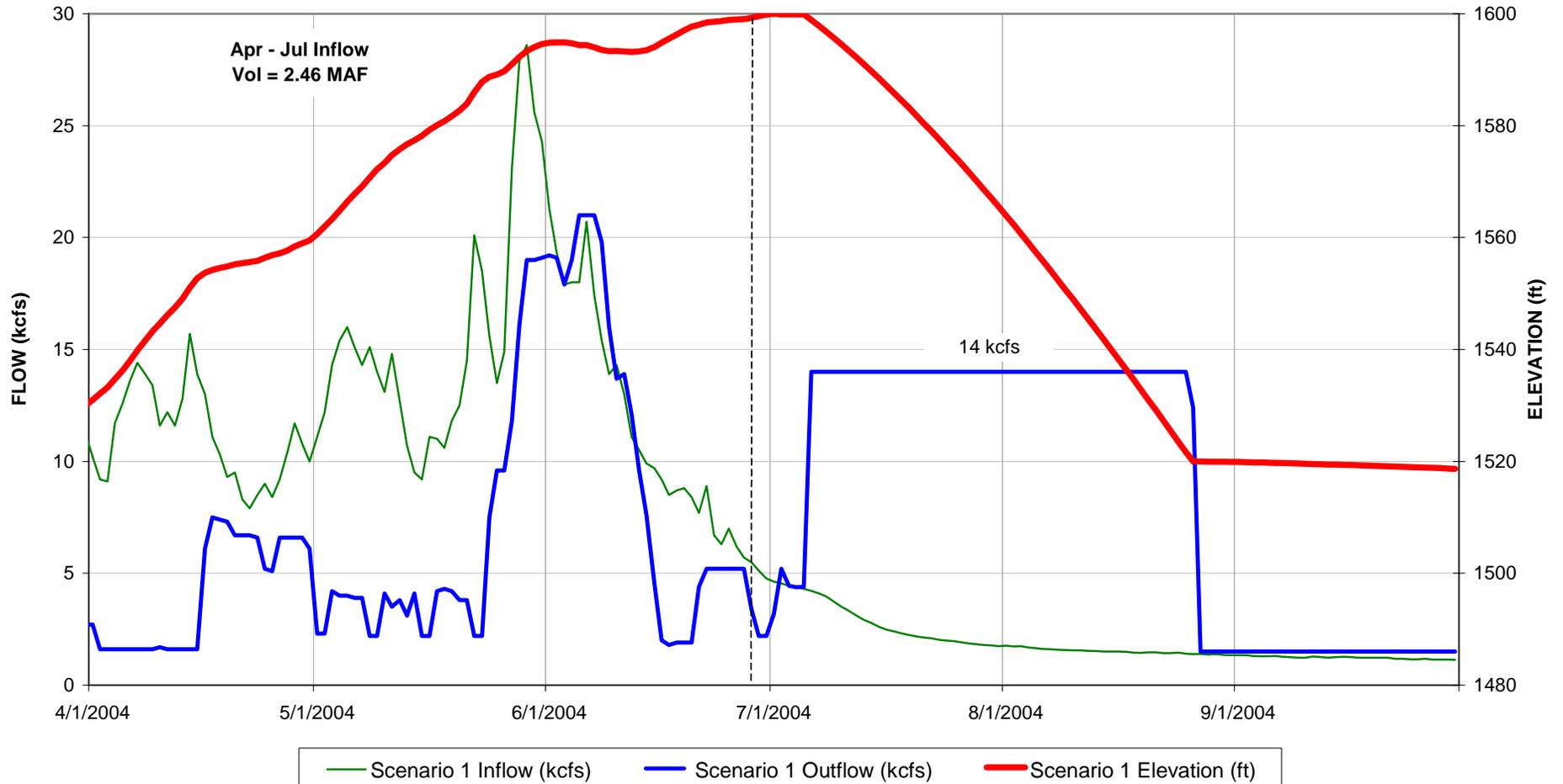
Temperature Modeling

- Water temperatures in DWR reservoir peak the first week of September – see the DWR temperature profile.
- DWR reservoir cools down in the mid to late September, so the available water temperature drops, making it more difficult to control water release temperatures.
- From July through September, there is a surplus of cool water but a shortage of the right distribution of warm water needed to maintain a set release temperature.
- The “warm” water thermo clines used to control DWR water temperatures are between 1474 and 1564 ft elevation (July 2) and between 1457 and 1499 ft by September 5.
- The flows determine how many different thermal clines can be used at the same time. Low flows (7 kcfs and less) allow only one or two units to operate while high flows allow all three units to operate with the ROs and spillway.

RESULTANT LOWER GRANITE FLOWS (Based on Dworshak Modeling)



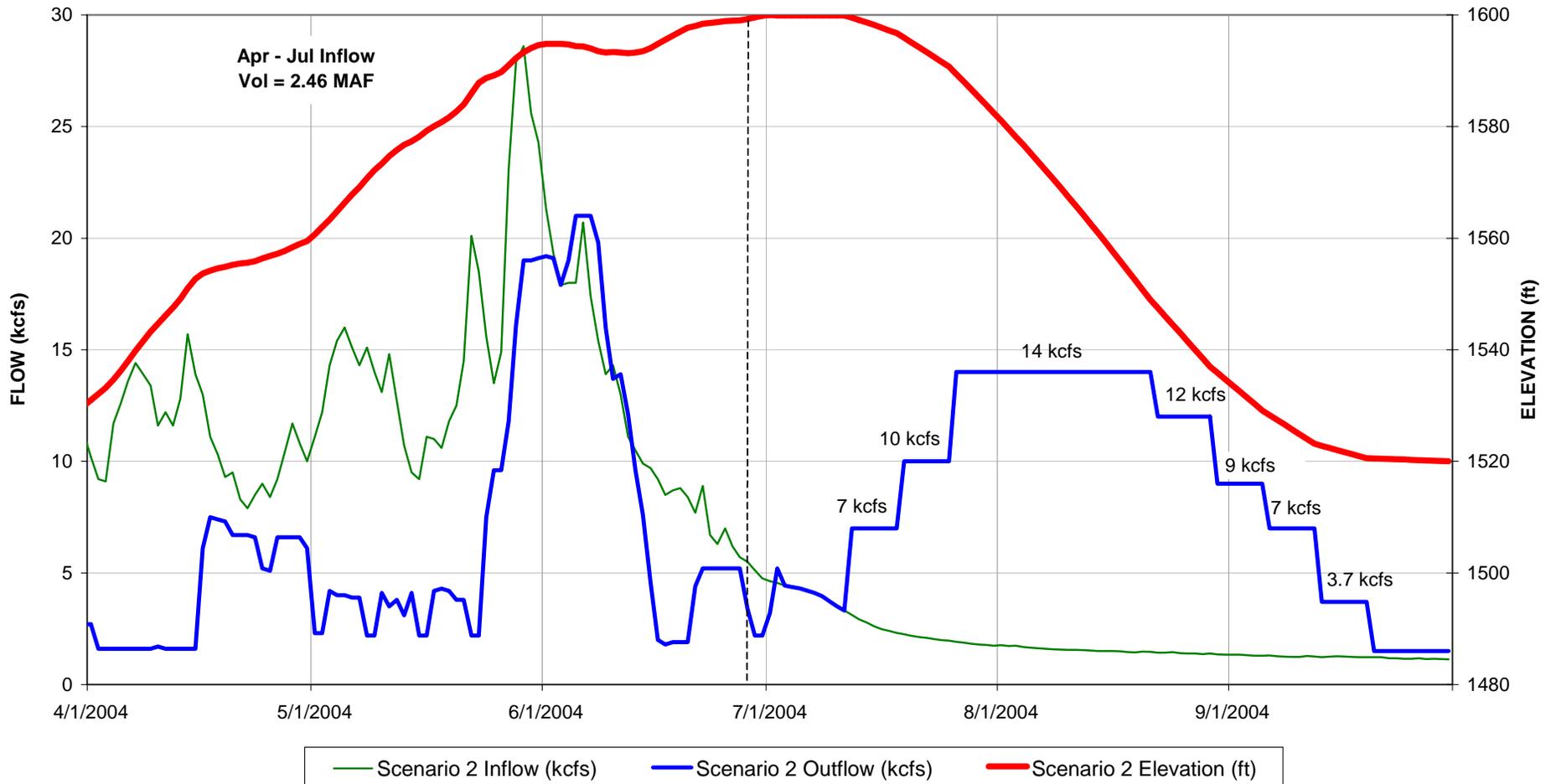
DWORSHAK OPERATION (Scenario 1: BiOp Operation)



BiOp Flow Modeling

- Water temperature of 48°F can be maintained from July 5 until 1520 ft elevation is reached in late August.
- After the reservoir reaches 1520 ft, the needed thermal cline zones are not available. DWR water release temperatures either go above 50 °F or below 42 °F.

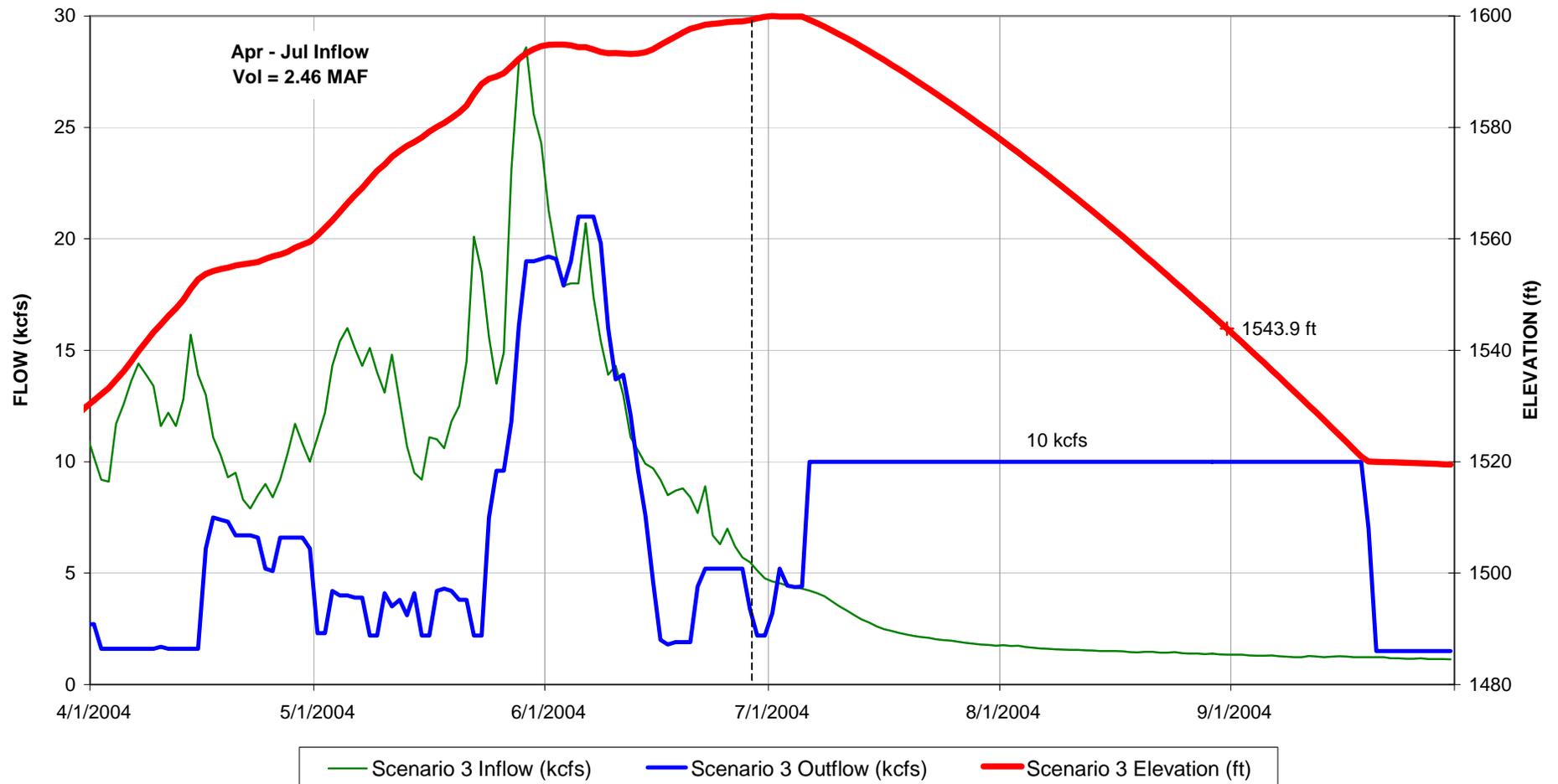
DWORSHAK OPERATION (Scenario 2: Nez Perce Tribe - Idaho Recommendation)



NPT-ID Flow Modeling

- Reserving more water to be released in late August and early September gives the “warm” water in the reservoir more time to get even warmer, providing more “warm” water in the specific thermo clines needed to control DWR release water temperatures.
- Water temperature of 48°F can be maintained until Aug 31.
- At the end of August, the needed thermal cline zones are available to maintain 46 °F for two more weeks into September before the water release temperatures either go above 50 °F or below 42 °F.

DWORSHAK OPERATION (Scenario 3: Draft to elev 1520 ft using full powerhouse capacity - no spill)



No Spill Modeling

- Being able to use the ROs and spillway give more flexibility to control water temperatures for a longer period of time. (5 different water temperature levels vs. three).
- This flow regime was not modeled, but the same comments on the Nez Perce flow modeling applies here: Reserving more water to be released in late August early September gives the “warm” water in the reservoir more time to get even hotter, making more “warm” water available for controlling release water temperatures.