

# Spokane River Water Temperatures Summer 2017

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## Background

This study documents the difference between locations in summertime water temperatures in the Spokane River and compares them to state water quality standards. It provides a record of water temperatures to compare to past and future studies and document the effect of global climate change.

Water temperature plays an important role in the survival of our native Redband Trout and other species in our river. Little, if any, continuous summer water temperature monitoring occurs in the Spokane River, despite the threats posed by global climate change.

The Spokane River flows 111 miles from Lake Coeur d'Alene to the Columbia River. The losing reach, upstream from Sullivan Road, usually has higher summertime water temperatures than downstream, where the Spokane River gains cold water from the aquifer (gaining reach). Water temperature throughout the gaining reach may vary due to amounts and temperatures of surface water inputs, proportion of aquifer inputs to the river, local geography, and possibly dams.

Previous studies show water temperatures above 80 F (26 C) in the losing reach of the Spokane River, while the gaining reach remains under 68 F (20 C) during summer. Water temperatures in the gaining reach vary by as much as 8 F (4 C) between locations.

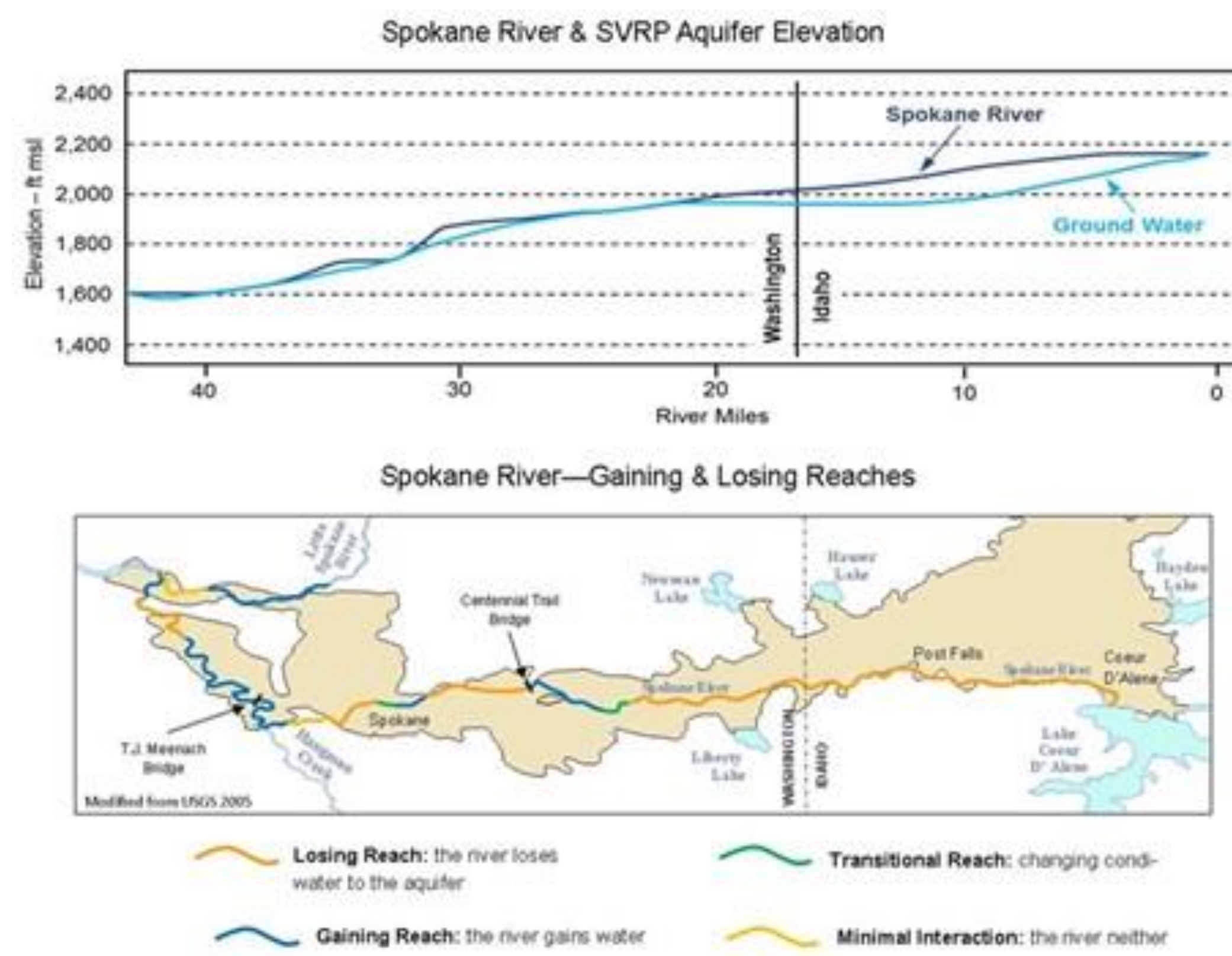
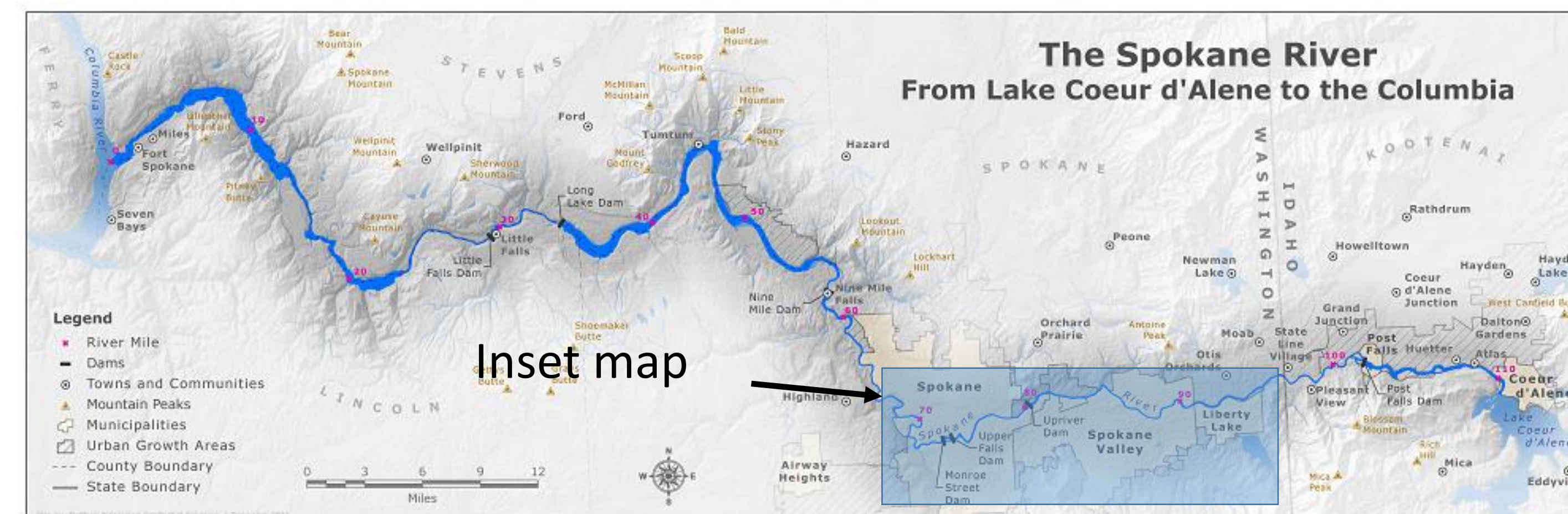


Figure 1. Gaining and losing reaches of the Spokane River. Image courtesy of deq.idaho.gov.

## Study Area

We placed temperature loggers throughout the Spokane River from the Idaho-Washington State Line to TJ Meenach Bridge in Spokane. This area includes the gaining and losing reaches of the Spokane River (see graphic above), expecting much warmer temperatures in the losing reach. We placed loggers throughout the gaining reach to determine the variability of water temperatures in this section of the river.



## Materials and Methods

Onset Hobo Pendant temperature loggers were calibrated by Washington Department of Ecology Staff and set to record every 30 minutes. Loggers were rejected if over 0.3 C discrepancy from actual temperature. Loggers were placed in a PVC shade and zip tied to a rock or brick to anchor and elevate them above the river bed. At the field location the logger was tied to a piece of twine and placed in the river in over a three foot depth of river. The other end of twine was tied to a tree or large boulder.



Figure 3. Hobo Pendant temperature loggers in a PVC shade were placed in the Spokane River to monitor water temperature.

Temperature logger locations in the Spokane River.

- |                      |                      |
|----------------------|----------------------|
| 1. State Line*       | 5. Upriver Dam       |
| 2. Harvard Road      | 6. Division Street   |
| 3. Barker Road*      | 7. Peaceful Valley   |
| 4. Islands Trailhead | 8. TJ Meenach Bridge |

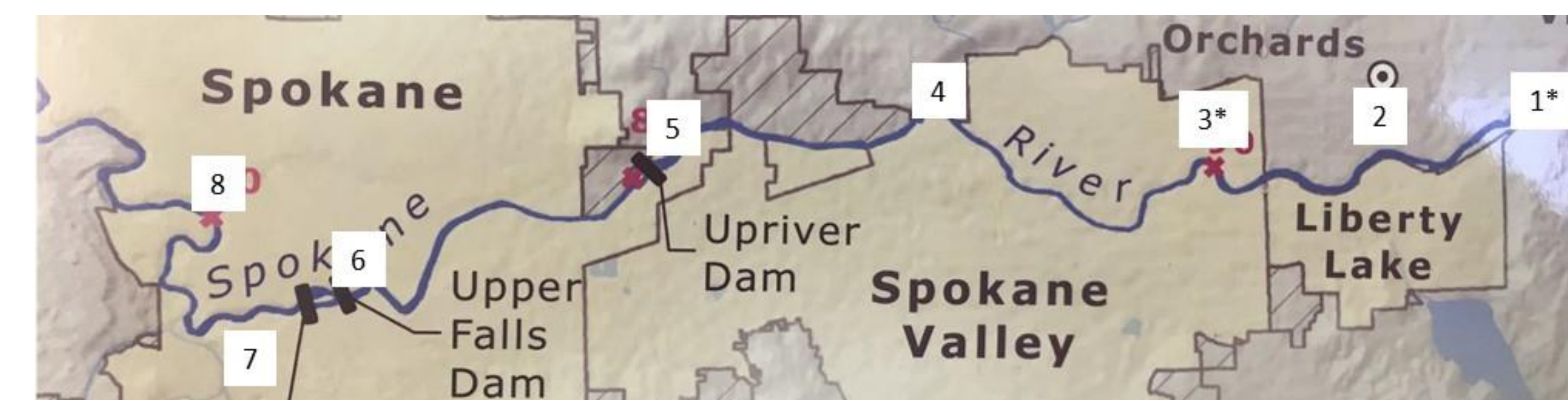
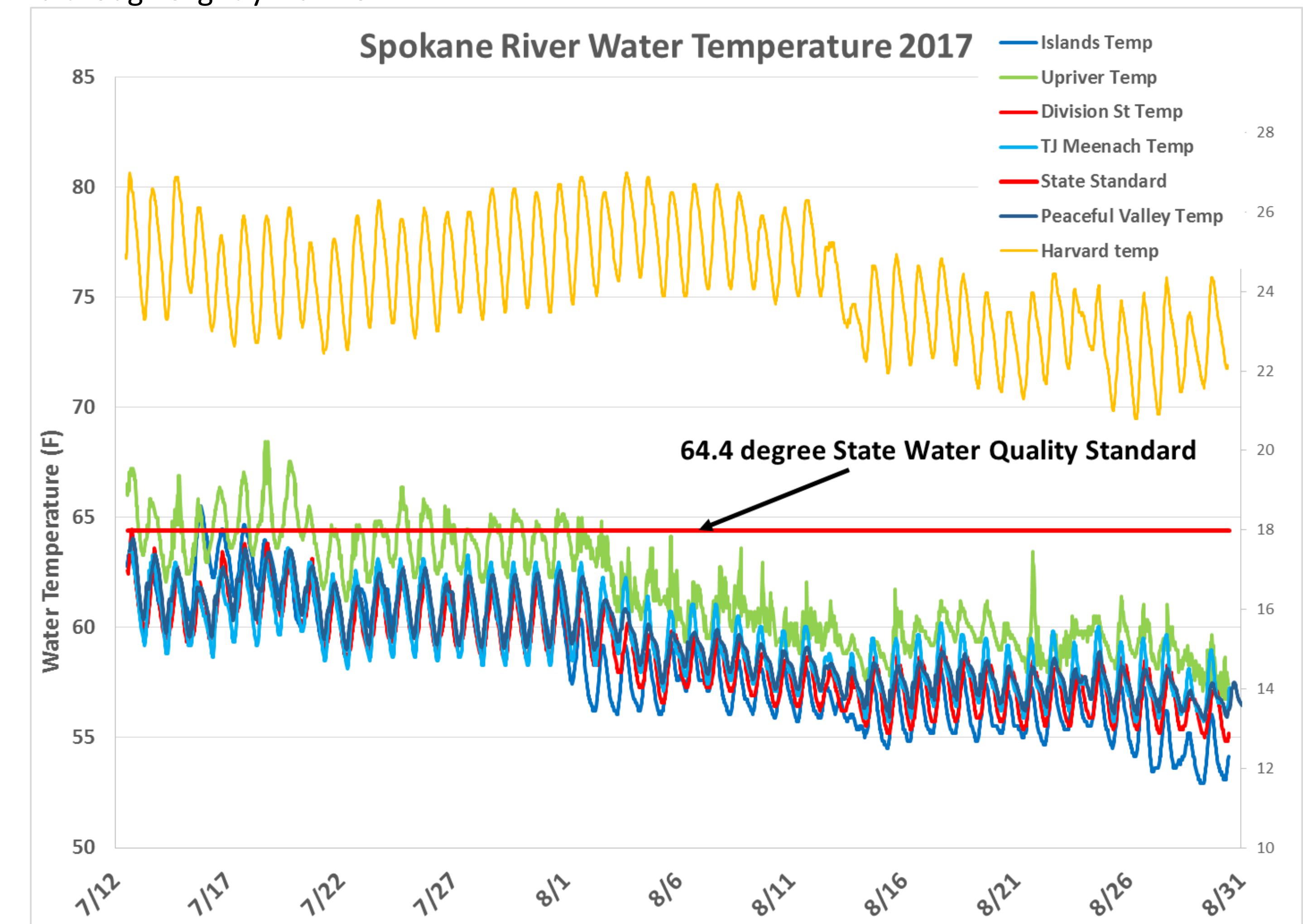


Figure 4. Locations of temperature loggers in the Spokane River. "\*" denotes missing (stolen?) logger/data

## Results Continued

Spokane River water temperatures exceeded state standard of 64.4 F (18 C) at Harvard Road during the entire monitoring period, while in the gaining reach exceeded it only at the site above Upriver Dam. Water temperatures at Harvard Road averaged 75.6 F (24.2 C), exceeded 80 F (26.6 C) on multiple days during the summer, and had a "Seven Day Average Daily Maximum (7DADMax) of 80.1 F (26.7 C) Water temperatures were coldest at Islands Trailhead (near Sullivan Road), averaging 60 F (~15.5 C) during the monitoring period with the coldest instantaneous temperature of 52.9 taken there on 8/29/17. Water temperatures at Division St., Peaceful Valley, TJ Meenach all showed similar patterns to Islands Trailhead, although slightly warmer.



## Discussion

The Spokane Valley Rathdrum Prairie Aquifer has the biggest impact on water temperatures in the Spokane River during the summer months. Portions of the river in the gaining reach and downstream have much colder temperatures than upstream, in the losing reach. Water temperatures in the gaining reach and below remain near or below suitable temperatures to sustain native Redband Trout.

Water temperatures at Harvard Road, in the losing reach, average around 75 F (24 C). This is greater than the state water quality standard of 64 F (18 C) and much too warm for native Redband Trout survival.

High water temperatures in the losing reach may be a result of global warming, which impacts the timing of snowmelt in our watershed and air temperatures, leading to less, warmer water entering the Spokane River from Lake Coeur d'Alene during the mid to late summer months.

## Future Studies

Continuous summer water temperature monitoring is needed to determine the effect of global warming on our rivers, especially the Spokane River. More locations in the losing reach of the river should be monitored to verify these data. These data suggest an effect of Upriver Dam, which could be assessed.

As temperatures warm, the impact on native trout, which need cool, clean water to survive, should be assessed. Snorkel surveys of trout populations in the losing reach could be conducted throughout the summer to determine the correlation between water temperature and trout populations.

## Results

