Temperature Modelling of Fifteenmile Creek

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We developed a water temperature forecasting tool with the intent to diminish loss of ESA listed "threatened" steelhead during periods of high water temperatures in Fifteenmile Creek, near The Dalles, Oregon. In the summer of 2009, a temperature induced fish-kill was noted on irrigated portions of Fifteenmile Creek, prompting an investigation by NOAA fisheries. In response, the Fifteenmile Watershed Council ratified the development of the FAST program (Fifteenmile Action to Stabilize Temperatures). The program used funds to compensate irrigators so instream flow was maximized during periods of high water temperatures. We used a Bayesian mixed-model to forecast water temperatures at five sites throughout the watershed using historic water temperature and climate data. Then, using the local 7-day forecast, we projected the daily water temperature at each site. If water temperature was forecast to exceed temperatures lethal to steelhead (22^{o} C), an alert was issued so irrigators could curtail water-use for the benefit of fish. In 2013 a voluntary program was initiated, and from 2014 to 2017 a fully-developed compensation-based approach was implemented. We will present results and learned from this implementation.