

Process-Based Stream Modeling of Lower Indian Creek for a Temperature TMDL

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The Idaho DEQ is currently developing several TMDLs for Indian Creek, one of which is for temperature. This TMDL affects several major wastewater treatment facilities, namely, the cities of Nampa and Kuna, and XL Four Star Beef. As the TMDL was progressing, it was recognized by DEQ and other stakeholders such as Nampa that a process-based (deterministic) model would be a very useful tool for further development of the temperature TMDL. The model selected was the EPA-developed and supported “QUAL2K.” The QUAL2K model has the capability to simulate the key processes and inputs needed for temperature, including stream geometry, hydraulics, meteorological inputs such as solar radiation and air temperature, and mechanisms for stream shading. One the key reasons for modeling Indian Creek is that DEQ temperature regulations state that when natural background temperatures exceed numeric biological temperature criteria, then the natural background temperatures become the applicable TMDL target. Based on information from other more natural areas in the Boise watershed, it was thought likely that natural temperatures would have exceeded numeric biological criteria in lower Indian Creek. Thus, a model was needed to simulate natural background conditions. We worked collaboratively through a series of technical meetings, with intervening research into historical conditions, to identify appropriate inputs to the model for natural flows and riparian shade characteristics specific to lower Indian Creek (i.e., from the Callopy Gates on the New York Canal to the mouth at the Boise River). This presentation will describe the model development process and mutually agreeable inputs to the model, as well as model predictions for natural temperatures.