Alison Wood
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Research Project Progress Report
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Introduction

To better understand the permitting structure surrounding the TCEQ's environmental flows (e-flows) standards, I have begun research on the background of the standards and the process by which those standards are developed. I have also begun research on the RAPID model created by Cédric David for use in modifying the pulse flow standards currently in place and tailoring those standards yet to be created to better fit the true flow conditions in the streams in question. Finally, I have been considering the use of web interfaces as a means of simultaneously accessing multiple information systems to facilitate the integration of multiple data sets in analysis without requiring the merger of the underlying data sets.

E-Flow Standards

The TCEQ has instituted a process whereby teams of scientific experts and stakeholders create e-flow recommendations that are incorporated into the e-flow standards TCEQ establishes. This process is taking place on a basin-by-basin basis across the state over a number of years. The process begins with a Basin and Bay Expert Science Team (BBEST) undertaking a year of research and producing a report on the environmental needs of the streams and bays in questions, based on the best available science. In the second step of the process, a Basin and Bay Area Stakeholder Committee (BBASC) considers the report of the BBEST along with the needs of human users in the basin, and generates a second report with recommendations that incorporate the stream flow needs of both the environment and the people. Both of these reports are then considered by TCEQ in the creation of e-flow standards for the basins and streams in questions.

To date, e-flow standards have been put in place in the Sabine-Neches basin and in the San Jacinto-Trinity-Galveston Bay basin; they include high flow pulse requirements. These pulse requirements are specified in terms of a trigger flow (in cubic feet per second), a volume (in acre-feet), and a duration (in days), and are given for specific locations on the streams in

question. When a flow equal to or greater than the trigger flow is measured at the specified gage, diversion of water must stop until the designated time period or flow volume has passed. The decision of who must stop diverting, when, and for how long, in order to truly meet the goals of these pulse flow requirements will be more clearly answered by this research.

RAPID

The locations of high flows predicted by the RAPID model based on flow-affecting events in various locations in and near the basin will be compared with the locations of the gages used to implement the high flow pulse requirements. In this way the choice of which gage should be used to determine a high flow pulse event on each stream reach – especially those of tributaries – can be modified so that diversions must only stop when there is a high flow pulse in the local reach rather than stoppages being based on gages that might not accurately reflect local flow conditions. CRWR has, thanks to Cédric David's research efforts, the output of the Noah-MP land surface model, which gives surface runoff based on factors such as precipitation, infiltration, and evaporation, for the entirety of Region 12, which corresponds roughly with the state of Texas, for the period from January 1, 2004 to December 31, 2007. This data can be fed into the RAPID model to give, as output, stream flows for this purpose.

Web Interfaces

Based in part on another current CRWR project (allowing simultaneous access to the TXWAS and WAM systems without merging the underlying databases), another aspect of this research will be to consider the utility and feasibility of using web interfaces for the synthesis of data from multiple sources. It seems likely that such interfaces will prove to be the simplest, most efficient means of considering multiple factors and datasets for any single geographic region. For example, this outcome of this e-flows research could be viewed in a map interface along with permitting data and water accounting data for the Guadalupe basin, allowing for analyses that require information on who is allowed to divert water, how much water is left in each account for the year, and whether each diverter should currently be observing high flow pulse restrictions.

Questions and Data Needs

Does a diverter currently respond to high pulse flows measured only at the gage directly upstream of the diversion point? How are the requirements currently applied to diverters on tributaries with no gages?

Is the RAPID model currently installed on any computer at CRWR? If so, which, and with whom should I speak about access? If not, with whom should I speak about installing it on one of the computers – or should I simply install it locally?

Use cases are needed from Kathy Alexander at TCEQ for comparison with the output from RAPID.