

TEMP

Record of Discussion regarding Methods to Validate the IOSRTM and Triton Water Temperature Models

June 12/07

Attendees:

Byron Nutten
John Heinonen
John Morrison
Rod Bell-Irving
Clyde Mitchell
Steve Macdonald

Introduction:

This meeting was originally called to discuss the technical aspects of modelling Finmoore water temperatures to resolve an apparent water volume discrepancy that occurred when comparing the water requirements recommended by the N-DAModel, to those recommended by the IOSRTModel. Initially, a discrepancy in two sources of data describing upper Nechako conditions was thought to be responsible. But having investigated these data it was felt that the problem was more likely associated with model input variables and assumptions. Discussions at the meeting were divided to address the database discrepancy and model validation.

Database Discrepancy:

Between 1953 and 1980, upper Nechako temperatures (near Irvines) are described by only one database that was collected by a chart recorder thermograph serviced by Alcan. There is no reason to suspect these data but their accuracy cannot be confirmed with backup measurements. From 1981 to the present the Alcan strip recorder was replaced with an electronic logger that was serviced by Water Survey of Canada (WSC). A variety of additional electronic water recorders were also located in the vicinity of Irvines by Fisheries and Oceans in the early 80's, some of which remain in place today.

Both the Department and Triton believe they have been using WSC data from Irvines since 1981. However, comparison of their databases revealed discrepancies in the data which were particularly large in 1981, 1982, 1983 and 1998 but existed during most years. WSC began archiving the Irvine data in 2001 and are not able to confirm the validity of any previous Irvine data, nor is it clear to what degree the pre-2001 data had been QA/QC'ed. Runs of the IOSRTModel using both the Departmental and Triton databases from Irvines, suggest that Finmoore temperatures can be best estimated using the Departmental data in 1981, 83 and 98, but the Triton data provides the best estimate in 1982.

We concluded that model runs during these years should be suspect as we have no means to validate these data. However, Byron has agreed to approach WSC in Prince George to request additional investigation into Irvines data availability and source (**ACTION**).

Model Validation:

John Morrison circulated an Excel file that provided annual validation runs of the IOSRTM model from 1981 to 1999. Comparison of Finmoore observed temperatures to model estimates were provided including annual estimates of error. During most years, the model estimates were within two thirds of a degree of observed. A similar validation exercise with was performed with the Triton model in the 1980's and a report was written. Clyde has agreed to locate this report and the model runs, and send them (report and input data) to John Morrison for further validation modelling using the IOSRTM model (**ACTION**). It will take a few weeks to locate the necessary material but we expect to have these results by mid July.

We considered the possibility that the models were run based on different input variables or assumptions that led to the water volume discrepancies that have been noted. John suggested that the models were sensitive to daily air temperature input and performed better with diurnal rather than mean measurements. Clyde believed that the Triton model also used diurnal measures but will provide confirmation. Clyde suggested that the water requirements for the N-DAModel being operational in nature were based on input of meteorological condition predictions as provided by AES. John has based the IOSRTM validations on actual observations. While this may be a source of discrepancy in the outputs from the models, it was acknowledged that water volume prescriptions based on meteorological predictions provided temperatures that were centred on the temperature target at Finmoore. Consequently, the output should be self correcting and comparable to output modelled on actual meteorological observations.

Ultimately, if the two models do not provide similar output using the model runs and input variables for the 1980's provided by Clyde, a mechanism will need to be found to access the algorithms associated with each model and analyse the assumptions on which they are based. Clyde and Rod will consider the copyright complications associated with providing a copy of the Triton model for this purpose (**ACTION**).