



CHATFIELD WATERSHED AUTHORITY

TRC Meeting Summary February 14, 2008

Member
ATTENDEES:

Martha Hahn	John Hendrick
Fred Bromberger	Ronda Sandquist
Larry Moore	Kristi Livedalen
Craig Wolf	Rick McCloud
Amy Conklin	
Penny Wilkinson	
Erik Nelson	
Dan Dertz	

OTHER ATTENDEES: Tamara Allen
Jim Saunders
Steve Lund
Chris Sturm
Joni Nuttle
Larry Mugler
Steve Lundt
Chris Sturm
Sandy Rayl

Call to Order:

An Executive Session meeting was called to order by Martha Hahn at 12:00 p.m. All other members arrived at 1:00 when the regular meeting was called to order.

Authority Technical Executive Session:

The Authority met to discuss preparing a response to the Draft EIS, Water Quality Chapter, of the Chatfield Reallocation EIS. The document is confidential and the Authority was receiving advice from their consultant, GEI. A formal set of comments will be prepared and sent to the full board for approval.

TRC Meeting

Approval of 10 January 2008 Meeting Summary– Larry Moore moved to approve the meeting summary, Martha Hahn seconded. The vote was unanimous.

WQCD Presentation on Phosphorus Translator – Jim Saunders presented information regarding the status of his work on a phosphorus translator for Chatfield Reservoir. The purpose of the phosphorus translator is to establish a quantitative linkage between the loading from Plum Creek and the South Platte River and a phosphorous concentration in the

reservoir, then to describe the relationship between the concentration in the reservoir and the chlorophyll a. In effect, the translator is intended to establish the TMAL consistent with a chlorophyll a or total phosphorous standard.

Selection of the appropriate load translator cannot be done until data sets are developed. The current data needs are: (1) phosphorous concentrations in-lake; (2) phosphorous loads; (3) hydraulic data (volume, area, computed inflow, outflow); and (4) phosphorous export (this is a product of flow and concentration).

It is expected that the large volume of water in the reservoir would buffer outflow phosphorous concentration. Phosphorous concentrations in the outflow are measured in the channel below the dam. Concentrations have been somewhat higher the last couple of years. There are MDL issues and 2002 was particularly troublesome. We need to see if there are patterns in concentration. Dr. Saunders thinks it makes sense to aggregate concentration data to increase the sample size. The sampling program provided only 13 samples a year. Attempts to aggregate into 5 year blocks, however, proved to be unsuccessful. The data can be examined for seasonal patterns, but if there is a seasonal pattern it is not strong.

In natural streams there tends to be a close relationship between the phosphorus concentration of inflows and the phosphorus concentration in the lake. In Chatfield, the relationship is not as strong because of reservoirs upstream on the South Platte River. A significant amount of sediment (and phosphorus) is 'decanted' out of the SPR as the flows are detained in Strontia Springs and Cheesman Reservoirs. So the sediment that remains in the water flowing to Chatfield appears different than in a natural system. It is probably finer and tends to remain suspended longer, and therefore more likely to be flushed out of the reservoir. Complicating factors are that DWD occasionally has 'black water' releases from the bottom of the upstream reservoirs to flush them out and there may be an underflow that occasionally develops in the upstream reservoirs where sediment is sucked through the system during high flows.

Another component to the translator is the internal loading, the amount of phosphorus that is re-suspended from the sediments on the bottom. In Chatfield, this doesn't appear to be a significant contribution. Phosphorus is released more quickly when dissolved oxygen concentrations are low, called an anoxic condition. Anoxia appears to be a rare phenomenon in Chatfield, further validating the small part internal loading plays in determining the phosphorus concentration.

Dr. Saunders talked about how the Clean Lakes Study modified an existing mass-balance model (the Vollenweider model). The Clean Lakes Study applied the Canfield-Bachmann equation with a component modified so the prediction would match the one year of data from 1982. There is now ample data for review. His goal is to better refine the model that relates load to in-lake concentration using the twenty-plus years of data that have been collected so far. He showed different statistical techniques he has used to refine the models. He concluded that the Dillon-Rigler model provides a better fit than the Vollenweider model.

One of the key, and difficult to quantify, values in the translator is the sedimentation coefficient. The sedimentation coefficient describes how much of the phosphorus coming

into the reservoir stays there. Dr. Saunder's calculations show that somewhere between 60 to 70% of the phosphorus coming into Chatfield (60 to 70% of the load) is retained annually.

Attempts to refine the sediment coefficient have not been wholly successful. Dr. Saunders has tried different values but hasn't found one that explains the variability or uncertainty of the predictions. It may be that the sedimentation coefficient doesn't vary with hydrology. What Dr. Saunders is proposing so far is to use the Dillon-Rigler model with a constant value for the sedimentation coefficient, but he will continue exploring options and will continue communicating with the Authority. The materials provided by Dr. Saunders noted the a load translator based on the Dillon-Rigler model shows performance that is better than the Vollenweider model, but "still is not very satisfying" and further notes "greater accuracy would be preferable."

Concentrations in Plum Creek may be as much as 5 times higher than in the SPR. Dr. Saunders wants to consider the two main tributaries from a hydrologic perspective. The flows are largely uncorrelated (they do not deliver phosphorous at the same time of year); the SPR is always the dominant flow; and the loads are closer to being equal due to the higher concentration in Plum Creek.

Most years, flows from Plum Creek are below 20,000AF. The years where flows from Plum Creek exceeded 20,000 AF, the data points do not fit predictions. When flows and loads from Plum Creek are higher than normal, the data do not fit the models. Predictions of phosphorus concentrations in the reservoir are higher than observed during Plum Creek high flow years.

As to whether the load translator is ready to use, Dr. Saunders would prefer it to be stronger. The plan is to continue exploring options. He is especially interested in the five-odd years where high flows in Plum Creek occurred. It may be that the particles coming from Plum Creek settle faster than the particles in the SPR that are decanted through upstream reservoirs. He hopes to reflect that characteristic in future refinements to the model

If he looks at 20 years of data and uncertainty remains, that must be considered in how the TMAL is established. It is necessary to be honest about what is known and unknown.

In response to questions from the group, Dr. Saunders commented that he expects residence times in the reservoir to increase with completion of the reallocation project. The group also discussed the impacts from changing water rights in the basin. Some water providers have increased ground water pumping and that water is eventually discharged to Plum Creek, artificially increasing flows. The issue of loading from tributaries and precipitation were discussed with the conclusion being that contributions from these sources would mimic Plum Creek and would not be significant.

The next steps are to: (1) define the load translator; (2) Look at flows and TMAL (what scenario for inflow, and does the worst case scenario for in-lake concentration represent the highest load scenario). Regarding the technical component of the load translator, it is necessary to link chlorophyll a and phosphorous, and phosphorous concentration and

phosphorous load, then define the allowable phosphorous load. He will develop a proposal for the Commission with recommendations regarding the phosphorous load consistent with the Chatfield standards. Dr. Saunders noted that at the next TRC meeting, he would be discussing the hydrologic considerations for calculating the TMAL and that 260,000 AF with 59,000 lbs. may not be a worst case scenario.

QAPP and PIP for Massey Draw – Tammy Allen and Joni Nuttle presented a letter stating the WQCD preferences for the QAPP and Massey Draw PIP. The QAPP (SAP and SOP) need to be separated into 3 documents and updated to reflect what data is being collected. Amy will work with WQCD to update this information but in the mean time, the Authority will extend the existing monitoring contract through 2008, updating as appropriate.

Data coming from monitoring the Massey Draw is worrisome in that it shows an increase in loading after implementation of remediation. Amy will continue working with WQCD staff to revise the PIP in such a way that funding is not put in jeopardy. The original proposal will be forwarded to the full board along with the financial commitment for discussion on February 27th 2008. The TRC will discuss the issue again at their 13 March meeting.

Discussion of Draft Annual Report Outline – The group discussed the report outline and the schedule for submission and presentation to the WQCC. The outline was satisfactory with a descriptive narrative for the section on MS4 stormwater permits being sufficient for this year's report. Data and information on BMP's will be added as available and appropriate. Inclusion of the Resolution on Septic Systems and Animal Feedlots will be part of the final product.

A Draft of the full report will be submitted to the TRC for their 13 March meeting with their comments being included in the draft submitted to the full board on 19 March. It may be possible to submit a final to the WQCD in time for presentation to the WQCC in May (but no promises). If the May deadline is missed, the WQCC won't have an opening until August.

Law Enforcement Facility- No report was available from Tri County Health so the status of the Law Enforcement septic systems will return for the March TRC meeting. Amy will contact Tri-County.

Adjournment – The meeting was adjourned at 4:00