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Department of Water Resources

January 10, 2002
Donna Cosgrove
University of Idaho
1776 Science Court Drive
Idaho Falls, ID 83402

Subject: Comments and Suggestions on ESRP Model Enhancement Project

Dear Donna:

I am taking this opportunity, at your suggestion but belatedly, to comment in writing on the project, in particular those items covered in the October 31-November 1 Design Review meeting.

1. Are we on schedule? It was indicated at the meeting that budget constraints or changes might alter or delay completion of some of the tasks outlined. I believe it is imperative that the schedule as originally outlined be maintained to provide a credible tool for IDWR to commence use in conjunctive management procedures and transfer application evaluation. What is the ending date for the model to be complete and usable? I understood it was to be December 31, 2003; is this correct.

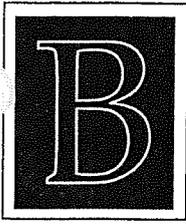
Have you documented any contingency plan if complete funding is not available from the legislature or other funding sources? What tasks might be cut? What are the priorities for elimination, if necessary?

2. A definitive purpose of the model enhancement project was never articulated to my knowledge. It would be well to identify the purpose in writing so that the public and the legislature are aware.

3. The selection of a 24 month stress periods for the majority of the calibration run seems somewhat arbitrary and not justified by the data requirements. Most of the input data is monthly and the ultimate use of the model would justify one-month stress periods. The current model is already being used to help define short-term impacts from well pumping and in transfer analyses. I suggest utilization of 1 month stress periods and bi-monthly stress periods except for the last 24 months so that utilization of scattered water level data can be better utilized. I believe that the data management routines are robust enough so that we need not fear being inundated by output or input data constraints.

Why not start at the beginning of April 1980 instead of April 15. This would not vary significantly from beginning irrigation periods and would certainly obviate the need for splitting every monthly data entry for the entire period.

The concern expressed by Gregg that a one year calibration period using short stress period may not be as "robust" as the long term calibration could be alleviated by selecting two or three abnormally dry or wet periods with a reasonable amount of water level data to run with short stress periods. This



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would confirm whether or not the calibration was adequate for simulation of periods different from the single year calibration period.

The factor which dictates the model calibration procedure, stress periods, and degree of refinements of input, is the ultimate use of the model. This use has to be defined succinctly by the primary users, IDWR, before a definitive plan for calibration can be formulated. For instance, if a primary use of the model is to quantify impacts from aquifer depletions on reach-gains in short, defined reaches of the Snake River, then considerable effort should be placed on quantifying those reach-gains and on weighting those outputs heavily in the objective function for calibration.

4. A better nomenclature for "dummy data" might be "pseudo data".
5. Early use of some form of sensitivity analysis on specific parameters using the existing model could prevent too much time spent on fine-tuning of the new model. For example, the concern about in-county vs. out-county irrigated areas may not be significant enough to warrant a large expenditure of effort to refine.
6. The "stress factor" or "water use adjustment factor" is a can of worms. Attempting to assign specific adjustment factors to ET based on application method will lead to allegations of discrimination by certain types of users; mainly out of fear that these adjustment factors will find their way into transfer expansion evaluations and penalize certain types of users. For instance, if the adjustment factor for sprinkler application is greater than for surface irrigation, there may ultimately be an acceptable ET for sprinkled corn vs. furrow irrigated corn adopted for determination of impacts and depletions from irrigation. This is not justified.

If the intent is to assign different adjustment factors based on source/application method to the various combinations such as ground water/sprinkler, ground water/surface, surface water/sprinkler, and surface water/surface, then we should have adequate justification to show that these differences exist and can be quantified. At this point, I don't believe we have to data or research to quantify any of these relationships.

I suggest that, if these factors were to be used that, rather than calling this water use ET that a better term would be "depletion".

7. I believe the variation in canal seepage on irrigation system is significant enough to warrant a functional relationship between discharge and seepage rate throughout the season. The current model uses a linear relationship with discharge with a beginning threshold level of seepage. This could be incorporated for each major canal system or sub-reach of the canal and, if the data to identify the relation ship is not available now, an average seepage rate could be utilized until the data is available. This would allow better definition of spatial differences in seepage caused by soil type or lining to be incorporated.

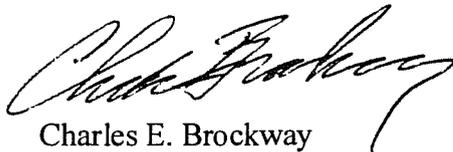
8. The treatment of non-irrigated land and recharge therefrom is a major concern, mainly because we cannot quantify the amount of precipitation and snowfall that ultimately reaches the aquifer. This parameter is a good candidate for sensitivity analysis to see just how important it is and how much time should be spent on quantifying and refining the input.

9. The suggestion that perhaps this model enhancement project should develop several model versions depending on a variety of uses for the model is not politically or technically palatable. First of all, to try to explain to legislators or funding entities that we are going to have several different model versions and only one aquifer is a difficult task. Secondly, development of multiple calibrations using PEST may be easier to do than by hand, but, because of the ease of calibration, may result in a proliferation of calibrations, none of which works as an operational model for an agency.

10. In the preparation of input including canal diversions, ET on canal service areas, and return flow, there should be some arithmetic check to assure that the sum of the outflows (ET + return flow + recharge) does not exceed the total diversion.

There are some non-technical items relative to the modeling committee functions, which probably should be addressed. One is the involvement or depth of involvement of consultants and attorneys for the various affected groups in committee deliberations. I believe that some consultant input is necessary and valuable on technical matters, but a considerable amount of time has been spent in committee meetings discussing uses of the model, which are tempered by consultants and/or attorney posturing for client's interests. I enjoy personally being involved in the process since I have been part of the Idaho modeling community for so many years. I also know that I probably do a lot of talking at the meetings, which may or may not be entirely germane to the topic at hand. Perhaps there is a way to limit the input from consultants or attorneys or at least admonish us so that the technical committee can do their job more efficiently.

Sincerely,



Charles E. Brockway

Cc: Paul Castelin
Chuck Brendke
Gregg Sullivan