



State of Idaho

DEPARTMENT OF WATER RESOURCES

1301 North Orchard Street, Boise, ID 83706 - P.O. Box 83720, Boise, ID 83720-0098
Phone: (208) 327-7900 Fax: (208) 327-7866 Web Site: www.idwr.state.id.us

DIRK KEMPTHORNE
Governor

KARL J. DREHER
Director

August 14, 2001

Mr. Chuck Brendecke
Hydrosphere Resource Consultants
1002 Walnut, Suite 200
Boulder, CO 80302

Dear Chuck:

We appreciate very much your thoughtful comments and feedback on the direction of the ESPA modeling effort discussed at the workshop on June 12-13, 2001 in Twin Falls. Below, we've attempted to address each topic that you presented in order:

Although we share your concern that the model could be misused in the future, we feel that the potential for misuse exists with all models and should not be a driving factor in model design. We feel that model cell sizes in the 1-km to 2-km range are appropriate. A model cell size smaller than that used in the current model helps to reduce numerical error by lessening the gradient between model cells. Similarly, we feel that there are sound technical reasons to include one model year of shorter stress periods (half-month or full month) at the end of the model period. This enables us to make use of measured seasonal fluctuations in aquifer water levels and reach gains.

Once the model calibration has been done, it is virtually certain that the model will be re-configured using different stress period lengths for specific applications, but maintaining the model physical properties (hydraulic conductivities, storage coefficients, boundaries, etc.). For example, the model will likely be run for a longer time period for generation of response functions. The stress periods selected for the calibration are intended to make the best use of available data, in order to calibrate the model as well as possible. We agree that initial conditions should match actual real-time values, to the extent possible.

We do not understand the concern regarding the segregation of pumping effects from those of surface irrigation. We feel that the ground-water model will be able to predict the isolated effects of ground-water pumping on surface water resources. The scale of this prediction capability will be regional, not local.

We do not intend to use a Monte Carlo approach for characterizing model uncertainty. We propose to use John Doherty's approach of pilot points and parameterization to help characterize

he model uncertainty. We have initiated a study of the current model grid and boundary conditions to assess the model sensitivity to various parameters. This study involves automated re-calibration of the existing model. It is hoped that the results of this initial study will help determine which parameters of the modeled system exert the greatest hydrologic control and present the greatest uncertainty.

Specific Issues

We agree that irrigated acreage is an important driver of water use. We are attempting to evaluate whether changes in irrigated acreage occur as large, discrete increments, or whether these changes occur slowly over time. The current irrigation year appears to show a sizeable change in irrigated acreage from last year; however, this may be anomalous. If the changes appear to generally occur slowly over time, we concur with the suggestion that the acreage should be evolved using interpolation and judgement. This topic will be addressed in the October meetings.

The topics of discerning the source of irrigation water and irrigation efficiency are both being looked at. We are currently planning to use the Adjudication database to help determine the source of irrigation water. This topic will be further complicated with the use of supplemental wells. We will address this topic further in October, but expect that there will still be some open questions at that time. We are also looking at the topic of irrigation efficiency. Some attempt will be made in this initial sensitivity analysis to determine how sensitive model parameters are to varying assumptions of irrigation efficiency. The canal company survey was designed to address some of these questions, but it is not yet known whether that information will be sufficient. This topic will also be addressed in October.

The PRISM data, which will be available this year, is monthly data. There was perhaps, a misconception at the June meeting that the data would be annual. A residual problem with precipitation data is that PRISM data will not be available for the last model year in time to be reflected in the model recharge. We are working with the developers of PRISM to expedite that data or to devise a work-around.

The balancing of half-year water budgets will likely be done as you have suggested, by distributing the error based on the magnitude of each term and whatever information is available regarding uncertainty of the individual water budget components. Bryce Contor is discussing this methodology with a professor who specializes in statistics. We would like to stress that the balancing of the water budget will be based largely on professional judgement and will not be an automated process.

We agree that the method for estimating reach gains and losses and for estimating return flow lag factors needs to be documented. Bob Sutter is preparing a white paper that documents how these have been estimated in the past. This paper will be distributed once it is available. Where possible, we will use measured return flow data (historical or current) to establish new lag

Mr. Chuck Brendecke

August 14, 2001
Page 2 of 3

factors. We anticipate that uncertainty will always exist in the accounting of return flows. Bryce Contor has been assigned the task of overseeing the preparation of water budget elements. By having one person responsible for bringing all of the elements together, we hope to avoid errors such as double-accounting or missing significant components of the water budget.

We do not view the uncertainty in the elevation of the measuring points of wells a point of great concern, due to the approximately 2,000 ft gradient across the study area. We do, however, agree that aquifer elevations near springs are of concern. We are looking into whether more accurate measuring point elevations can be obtained for wells close to the river. We also agree that the calibration effort should emphasize river/aquifer interactions, since prediction of reach gains is one of the principal goals of the model.

We appreciate the time and thought which you put into generating these comments. We hope that the above responses are helpful. Please feel free to contact us if new questions arise. We look forward to seeing you at the October review meeting.

Sincerely,



Paul M. Castelin, P.G., Chief
Technical Services Bureau

Cc: Karl Dreher
Hal Anderson
Donna Cosgrove