

NAS Report 1 Abbreviated Implementation Plan: Hydrologic Modeling

	Recommended for Implementation	Program Component	Recommendation	Description	Fiscally Feasible	Implementation Strategy	Additional Comments
1	Done	Hydrologic Model	Don't use the term "verification" when describing model runs with changing parameters (35:27).	EAA uses the term verification in several reports and presentations when describing model runs that started with existing parameters but allowed for changing parameters to update the model. These efforts should be described as "additional calibration runs".	Yes - no immediate fiscal impact; however, this leads to the conclusion that additional verification testing is needed, which if conducted would create additional expenses	Use the correct terminology in future discussions and reports (Immediate Implementation) .	EAA should draft a multi-year modeling plan that outlines future modeling efforts that will effect/be utilized by the EAHCP. This plan should be comprehensive to all models.
2	Yes- continual effort will improve model over time	Hydrologic Model	Consider MODFLOW as a work in progress and not a final product (43:20).	Due to the size and complexity of the aquifer and the data limitations, conceptual model issues will continue to arise.	Yes - no immediate fiscal impact; however, future model updates will create expense	Continue to update the MODFLOW model as additional data/information is realized.	*EAA has been committed to an iterative modeling process since the creation of the MODFLOW model; continuously improving and updating the model. The next iteration could be Modflow USG. *EAA should draft a multi-year modeling plan that outlines future modeling efforts that will effect/be utilized by the EAHCP. This plan should be comprehensive to all models.

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3	Yes- in progress	Hydrologic Model	Continue development and testing of the Hydrological Simulation Program (HSPF) for estimating recharge (47:45).	There are large differences in the recharge estimates between HSPF and the Puente method	Yes - no immediate fiscal impact; however, future model updates will create expense	Continue to update the HSPF model as additional data/information is realized.	<p>*EAA has been committed to an iterative modeling process since the creation of the HSPF models; continuously improving and updating the models.</p> <p>*Refinement of Recharge Estimates are a goal of the EAA strategic plan.</p> <p>*EAA should draft a multi-year modeling plan that outlines future modeling efforts that will effect/be utilized by the EAHCP. This plan should be comprehensive to all models.</p> <p>*Recharge is a major source of uncertainty.</p>
4	Yes - in progress (EAA developing SOW)	Hydrologic Model	Quantitatively assess model uncertainty (57:27).	Model uncertainty needs to be quantitatively assessed and presented in formal EAA documents. Assessed uncertainty increase[s] a model's defensibility and can provide a reasonable estimate of model error, which is important information when using a model for management decisions.	Yes - EAA is paying for this analysis out of its operational funds.	Have EAA staff or technical consultants conduct uncertainty analysis. This should occur sooner rather than later (Immediate Implementation).	This is already included in Model development by EAA staff. However there is merit to having a 3rd party perform this analysis. The Work Group unanimously recommended the EAA to perform this analysis (6/26).

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5	Yes - continual	Hydrologic Model	Do not compare results from MODFLOW and FEFLOW (45:19).	The two models, developed using two separate codes, will each have their own inherent uncertainty, which cannot be understood by a comparison of the two.	Yes - no immediate fiscal impact; however, future model development and utilization will require either additional EAA staff time or contractor expense.	*EAA will not perform a head to head comparison of model results, but will rather utilize each model for specific purposes. *There has been much discussion by the IC and Stakeholders as to the purpose of having two models. Many have publically supported the use of both since they are now close to ready for utilization.	*Calibration of the models is not sufficient for a head to head comparison . *EAA should draft a multi-year modeling plan that outlines future modeling efforts that will effect/be utilized by the EAHCP. This plan should be comprehensive to all models.
6	Yes - continual	Hydrologic Model	Move toward a single model (57:19).	Gain efficiency by moving toward a single model that incorporates the best concepts from existing modeling efforts.	Yes - if FE Flow is abandoned and MODFLOW utilized. However, if MODFLOW USG is pursued, there will be costs associated with developing MODFLOW USG.	Move to single modeling platform: MODFLOW USG	*There seems to be support for this from both the technical perspective and political perspective. *Participants in the workshop noted that a Cost/Benefit analysis of one model vs two should be conducted.
7	Yes	Hydrologic Model	Display error bars on MODFLOW data (49:12).	Error bars or some other indication of uncertainty should be used in predictions.	Yes - EAA is paying for this analysis out of its operational funds.	These error bars will be established by the Uncertainty Analysis.	*The error bars will be most useful on the acct of forbearance. *EAA has a multi-year modeling plan that outlines future modeling efforts that will effect/be utilized by the EAHCP. This plan should be comprehensive to all models.

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8	Future goal - as modeling capabilities allow.	Hydrologic Model	Include conduits in the development of the Hydrologic Model (58:1).	Moving forward, more attention should be paid to the modeling of conduits.	No - currently there is no budget for this large undertaking. Will pursue as resources allow.	Would require additional hydrologic research and data collection.	<p>*Workshop participants generally supported modeling of conduits; however, many cautioned about the limited modeling capabilities to achieve this and the lack of data needed.</p> <p>*EAA has a multi-year modeling plan that outlines future modeling efforts that will effect/be utilized by the EAHCP. This plan should be comprehensive to all models.</p>
9	Future goal - as modeling capabilities allow.	Hydrologic Model	Move toward making predictions on a daily time scale (58:9).	The hydrologic modeling effort should move toward making predictions on a daily time scale, e.g., by developing telescoping models of smaller regions.	No - currently there is no budget for this large undertaking. Will pursue as resources allow.	Would require additional hydrologic research and data collection.	<p>*This would require outside consultation and expertise if established.</p> <p>*EAA has a multi-year modeling plan that outlines future modeling efforts that will effect/be utilized by the EAHCP. This plan should be comprehensive to all models.</p>

Clarifying Statements

- All aspects of this table are Science components except #6 and #9 have policy implications
- None of the recommendations are required for compliance
- All recommendations are operational feasible except #7, #8, and #9
- All recommendations are politically feasible
- None of the recommendations are fatal flaws of the program
- All but #1 support biological goals and objectives