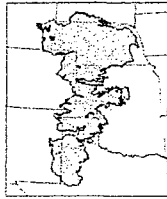


# High Plains Hydrology LLC

7956 S. Shawnee St.  
Aurora, CO 80016-7206  
Phone (303) 693-0299 Cell (303) 916-5973



# INVOICE

INVOICE #144  
DATE: APRIL 1, 2008

**TO:**  
Nebraska Department of Natural Resources  
301 Centennial Mall South  
P.O. Box 94676  
Lincoln, NE 68509-4676

**FOR:**  
Services of Senior Groundwater Modeler

LABOR DESCRIPTION	HOURS	RATE	AMOUNT
March, 2008, Task 1-1 (see attached spreadsheet)	0.25	\$ 75.00	\$ 18.75
March, 2008, Task 1-2 (see attached spreadsheet)	53.75	75.00	4,031.25
EXPENSES DESCRIPTION	QUANTITY	UNIT PRICE	LINE TOTAL
<b>TOTAL this Period</b>			\$ 4,050.00
<b>Previous balance</b>			\$ 1,650.00
<b>Payments received</b>			\$ 1,650.00
<b>TOTAL</b>			\$ 4,050.00

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DEPARTMENT OF  
NATURAL RESOURCES

OK to PAY  
56

Make all checks payable to **High Plains Hydrology LLC**  
Total due in 30 days. Overdue accounts subject to a service charge of 1% per month.

**Thank you for your business!**

**Groundwater Modeling Support for the Nebraska Department of Natural Resources**

**Status Report, March 31, 2008**

**Objectives:** 1. Provide modeling support as requested; and

2. Compare COHYST and RRCA models in area of overlap, with emphasis on the groundwater mound area.

**Status:**

Dick spent considerable time in March working on the comparison of the COHYST and Republican models. He worked on comparison of water-level changes in the groundwater mound area. He prepared figures of the RRCA change, the COHYST change, and the differences between the changes. He revised the report outline on how he would discuss these changes. He completed the text discussing the changes in the mound area.

Dick selected ten streams to compare simulated baseflows between the RRCA and COHYST models. He tried to run the RRCA model to get simulated streamflows into the MODFLOW output file, but ran into problems with convergence. He discussed the problem with Paul Koester and Paul provided a new MODFLOW executable file that solved the problem. Dick extracted the streamflows for the ten streams and put them into a spreadsheet.

Dick ran the central and eastern COHYST models, extracted the simulated streamflows for the ten streams, and put them into a spreadsheet.

Dick added text to the report about the differences in streamflows for the ten streams. However, Red Willow Creek and Medicine Creek need further work as the streamflows may not be compared correctly due to on-stream reservoirs.

Dick updated the shaded relief map in the Introduction of the report. He also updated several other figures that were inconsistent with the rest of the report.

**Plans for next month:**

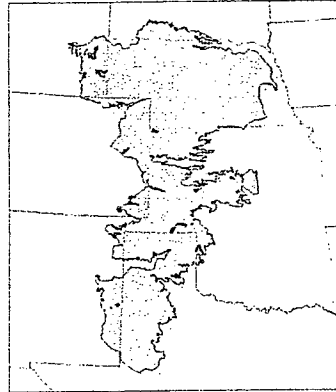
Dick will continue to work on comparisons of COHYST and Republican models in April. He will work on simulated streamflows out of the mound area. However, in the overall comparison, he looked at several streams draining the mound area, so there may not be much left to be done here. He is still trying to figure out if something more can be done.

Dick will then work on a section on the effects that the differences between the models might have. This section will be fairly general because the effects cannot be accurately known without changing the models. Dick hopes to have this done and a first draft sent to DNR for review by the end of the month.

Dick will do other tasks as requested by DNR.

Date	Start	Stop	Start	Stop	Start	Stop	Hours	COHYST 1	COHYST 4	DNR 1-1	DNR 1-2	Notes
03/03/2008	9:15 AM	12:15 PM	1:00 PM	5:00 PM			7.00	1.00	5.75	0.25		Monthly reports. Compare and my model.
03/04/2008	8:45 AM	12:45 PM	1:15 PM	2:30 PM			5.25	0.75	4.50			Western Model Unit (WMI) differences. Wrote note to
03/05/2008	8:45 AM	11:45 AM	3:30 PM	5:30 PM			5.00				5.00	Reviewing status of RRCA for size of RRCA mound.
03/06/2008	8:00 AM	12:30 PM	3:15 PM	5:00 PM			6.25	1.00			5.25	RRCA mound water-level (just started).
03/07/2008	8:30 AM	12:30 PM	2:00 PM	5:00 PM			7.00	0.25			6.75	Helped Clint with sensitivity report with problems. Red
03/10/2008	8:30 AM	12:30 PM	1:30 PM	6:00 PM			8.50	1.25			7.25	RRCA streamflow comparison to get it to run. Call from L
03/11/2008	8:30 AM	12:30 PM					4.00		1.00		3.00	to Loring. Mapping stream for RRCA streamflow from CI accepted). Distributed ND for RRCA report.
03/12/2008	9:15 AM	12:30 PM	1:00 PM	3:15 PM	4:45 PM	5:30 PM	6.25				6.25	Searching for RRCA stream without success.
03/13/2008	9:15 AM	12:30 PM	1:00 PM	5:00 PM			7.25					Going back to original RRCA from Appendix A DVD. Re
03/14/2008	9:00 AM	10:30 AM					1.50				1.50	Checking RRCA streamflow
03/17/2008	8:00 AM	12:30 PM	1:30 PM	4:45 PM			7.75				7.75	Mapping Medicine Creek
03/18/2008	8:15 AM	9:30 AM	2:45 PM	5:15 PM			3.75				3.75	Checking streamflow comparison
03/19/2008	8:45 AM	11:00 AM	1:30 PM	4:30 PM			5.25	5.25				Checking stream linkages Loring Watkins to talk about
03/20/2008	8:30 AM	1:30 PM	2:00 PM	4:45 PM			7.75	7.75				Checking stream linkages him we had CMU problem
03/21/2008	8:30 AM	12:30 PM	1:15 PM	3:45 PM			6.50	6.50				stream problems. Call to S
03/24/2008	9:30 AM	12:15 PM	12:45 PM	3:00 PM	5:45 PM	6:45 PM	6.00	6.00				Working on CMU streams suggestion. If this cleans up
03/25/2008	8:15 AM	12:00 PM	12:30 PM	5:00 PM			8.25	8.25				Collecting stuff for Technical supplemental pumpage. R
03/26/2008	8:00 AM	12:00 PM	1:00 PM	5:00 PM			8.00	8.00				Travel to Lincoln for Technical
03/27/2008	8:00 AM	12:00 PM	12:30 PM	4:00 PM			7.50	7.50				streams (most of time). All
03/28/2008	1:00 PM	4:30 PM					3.50	3.50				Technical Committee meeting
												COHYST modelers work
												Checking CMU stream notes
03/31/2008	9:45 AM	1:00 PM	3:45 PM	5:15 PM			4.75	4.75				Reviewing WMU 1950-98 segments defined. Call for
							127.00	61.75	11.25	0.25	53.75	March total and total by 1

High Plains Hydrology LLC  
7956 S. Shawnee St.  
Aurora, CO 80016-7206  
(303) 693-0299



April 1, 2008

Steve Gaul  
Supervisor, Planning and Assistance Division  
Nebraska Department of Natural Resources  
P.O. Box 94676  
Lincoln, NE 68509-4676

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APR 03 2008

DEPARTMENT OF  
NATURAL RESOURCES

Dear Steve:

Enclosed please find my monthly report for March, an invoice for the time and expenses for work with the Department of Natural Resource, and a spreadsheet supporting the time. If you have any questions, please give me a call. Thank you.

Sincerely,

A handwritten signature in cursive script that reads "Dick".

Richard R. Luckey  
Senior Hydrologist