The Nebraska Environmental Trust

preserving NATURAL NEBRASKA™ for future generations

PERIODIC REPORT COVER SHEET AND INSTRUCTIONS

Please use this form to file periodic project reports as required in your Trust grant contract. These reports should consist of the following four parts:

1. **The Cover Sheet**. Please complete the information below as requested.
2. **Request for Reimbursement**. You must submit **original** invoices to document each expense for which you request reimbursement, unless otherwise provided in your grant contract. Each invoice must contain the name, address and social security or federal tax identification number of the vendor, and an **itemized list** of services or goods with costs and the dates of service or delivery. If invoices contain non-grant items, clearly note the exceptions. On the reverse of this page you will find a table entitled "Summary of Invoices Submitted for Reimbursement." List each invoice on the table, providing the information as requested. Be sure the expenditure description contains sufficient information to determine that the item or activity is a legitimate project expense. The column "Budget Category" references the categories you created in your contract budget outline: each invoice must identify which category name it falls under. Copy the table if you need additional reporting space. Clip the invoices in the order listed on the Summary sheet.
3. **Project Narrative.** On a separate page(s), describe project activities, partners and results of the project for this period. If modifications were made to the project, describe the changes and explain why they were necessary. Quantify any results you can, for example, acres restored, pounds recycled, etc.
4. **Report on Matching and In-Kind Expenditures.** Use this form to report all resources expended on the project other than those funded by the Trust. Examples of these costs could include materials, labor, donations, other matching funds or volunteer labor time.

Project Sponsor: Nebraska Department of Natural Resources

Fiscal Agent: Steve Gaul, Designated Project Representative; Rex Gittins, Fiscal Agent

Fiscal Agent Address: 301 Centennial Mall South, PO Box 94676, Lincoln, NE 68509-4676
(street address, city, state, zip code)

Project Title: Riparian Vegetation Impacts on Stream Quantity, Quality, and Stream Ecology

Project No.: 08-141

Reporting Period: July 1, 2008 to September 30, 2008

Tax I.D. # 47-0491233

TOTAL AMOUNT REQUESTED FOR THIS PERIOD: $46,793.36 ☐ **ACH** or ☐ **CHECK**

I certify that this report is correct and just; that all expenses were necessary expenses of the project and were incurred in accordance with the approved grant agreement, including any amendments thereto; and that progress of the work and services under grant contract is satisfactory and consistent with the amount billed. As the Sponsor named above, or agent thereof, I hereby claim reimbursement from the STATE OF NEBRASKA for the attached and itemized expenses, for which payment has not previously been made by the STATE OF NEBRASKA.

FOR THE SPONSOR: _____ DATE: 10/30/2008
Signature

Steve Gaul — TITLE: Designated Project Representative
Typed or Printed Name

_____ DATE: _____
Nebraska Environmental Trust Signature

The Nebraska Environmental Trust

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SUMMARY OF INVOICES SUBMITTED FOR REIMBURSEMENT

Invoice # or Date	Vendor	Description of Services	Budget Category	Invoice Amount
90060886 10/17/08	University of Nebraska	Personnel and equipment for contracting agency to conduct project	#3, 4, 5 and 6 Personnel, equipment, travel, other project costs	$46,793.36
			TOTAL:	**$ 46,793.36**

Project #: _____ **Project Sponsor:** _____

The Nebraska Environmental Trust

preserving NATURAL NEBRASKA™ for future generations

REPORT ON MATCHING AND IN-KIND EXPENDITURES

Please summarize all resources expended on the project other than those funded by the Trust. Examples of these costs could include materials, labor, donations, other grants, matching funds or volunteer labor time.

ITEM	SOURCE	$ VALUE
Match amount for indirect costs	University of Nebraska - see attached documentation	$25,712.63
		$0.00
		$0.00
		$0.00
		$0.00
		$0.00
		$0.00
		$0.00
		$0.00
		$0.00
		$0.00
		$0.00
		$0.00
		$0.00
		$0.00
		$0.00
		$0.00
		$0.00
	TOTAL:	$25,712.63

Report for period from 07/01/08 to 09/30/08

University of Nebraska Lincoln

TO:
Nebraska Department of Natural Resources
301 Centennial Mall South
PO Box 94676
Lincoln, NE 68509-4676

RECEIVED
OCT 28 2008
DEPARTMENT OF NATURAL RESOURCES

OFFICE OF SPONSORED PROGRAMS
Post-Award Administration
303 Canfield Administration Building
Lincoln, NE 68588-0431
FED ID # 47-0049123

AGREEMENT TITLE/CONTRACT NUMBER:
Riparian Vegetation Impacts on Water Quantity, Quality and Stream Ecology

Directed by Durelle Scott and John Lenters

INVOICE/REPORT: 2662380391-02

INVOICE PERIOD: 7/1/08 to 9/30/08

REFERENCE NUMBER: 26-6238-0391-001

ANALYSIS OF CLAIMED CURRENT AND CUMULATIVE COSTS

MAJOR COST ELEMENTS	MATCH AMOUNT FOR CURRENT PERIOD	AMOUNT FOR CURRENT PERIOD	CUM. AMOUNT FROM INCEPTION TO DATE
Personnel and Benefits	$0.00	$34,085.61	$46,131.00
Equipment	$0.00	$5,597.13	$32,850.11
Travel-Domestic	$0.00	$2,991.81	$2,991.81
Other Direct Costs	$0.00	$4,118.81	$8,143.63
Indirect Costs	$25,712.63	$0.00	$0.00
Total Amount	$25,712.63	$46,793.36	$90,116.55

Payment Requested **$46,793.36**

NOTE: **Payment due in 30 days -** **November 15, 2008**

PLEASE REMIT A COPY OF THE INVOICE ALONG WITH THE PAYMENT.

"I certify that all expenditures reported (or payment requested) are for appropriate purposes and in accordance with the agreements noted above."

Belinda Gillam

Date: October 16, 2008

Belinda Gillam - Project Specialist
(402) 472-7061
bgillam1@unl.edu

UNFORM2 07-04

Riparian Vegetation Impacts on Water Quantity, Quality and Stream Ecology
Detail
26-6238-0391-001

effective_date	document_description	item_description	account	amount	
20080630	Unemployment FY08 4th Qtr	4th Qtr Unemployment Assessment	Personnel and Benefits	3.74	
20080630	Workers Comp FY08 Q4c	4th Qtr Work Comp Assessment	Personnel and Benefits	84.70	
20080630	ERKAN ISTANBULLUOGLU	PIPE, WASHERS, CATCH BOLTS	Other Direct Cost	129.95	
20080630	KIPP & ZONEN USA	2ND SHIPMT OF CNR2 NET RADIOMETER-REPUB RVR PROJ	Equipment	2,935.00	
20080703	DURELLE SCOTT	VIRGINIA BEA Lodging	Travel	158.08	
20080703	DURELLE SCOTT	VIRGINIA BEA Meals	Travel	27.51	
20080703	DURELLE SCOTT	VIRGINIA BEA Commercial Fares	Travel	10.00	
20080703	DURELLE SCOTT	VIRGINIA BEA Miscellaneous Travel Expense	Travel	18.00	
20080715		CUSTOM MAC PRO/320GB/2GB/WBK/WMM	Equipment	2,649.00	
20080717	YSI INC	Part # 006092	Equipment	506.62	
20080721	SCHEELS-LINCOLN	1-2-PERSON CARAVELLE RAFT-FIELDWK IN CENTRAL NEBR	Other Direct Cost	29.99	
20080722	JOHN D LENTERS	LODGING, INSTALL A WEATHER STATION	Travel	134.64	
20080728	KIPP & ZONEN USA	SEE SAP #27121585 CR BY VENDOR FOR DOUBLE BILLING	Equipment	-2,935.00	
20080728	MPC - PRO - MANUAL	SEE SAP #27121585 CR BY VENDOR FOR DOUBLE BILLING	Equipment	-2,338.00	
20080731		University Salary Payroll 07/31/08	Personnel and Benefits	11,088.00	
20080731		University Salary Payroll 07/31/08	Personnel and Benefits	2,700.00	
20080731		University Salary Payroll 07/31/08	Personnel and Benefits	772.17	
20080731		University Salary Payroll 07/31/08	Personnel and Benefits	829.99	
20080731		University Salary Payroll 07/31/08	Personnel and Benefits	825.18	
20080731		University Salary Payroll 07/31/08	Personnel and Benefits	2.16	
20080801	MPC - PRO - MANUAL	SEE SAP #27122330 VEN CR RETD NOTEBK COMPUTER BERG	Equipment	-2,338.00	
20080801	XIAOMAO LIN	LAB SUPPLIES, TUBE, CABLES, BOLTS RESEARCH	Other Direct Cost	394.34	
20080801	MPC - PRO - MANUAL	SEE SAP #27121585 CR BY VENDOR FOR DOUBLE BILLING	Equipment	2,338.00	
20080804	MPC	SEE REPOST#27009172 RET'D NOTEBK COMPUTER-BERG	Equipment	2,338.00	
20080815	R.M. YOUNG COMPANY	INV #96067 TEMP/RH SENSOR W/TEMP BATH CALIBRATION-	Equipment	1,003.51	
20080819	MEHMET SOYLU	LAB SUPPLIES, PVC TUBES-PIPES-PC BOARD	Other Direct Cost	78.09	
20080821	S AND W SUPPLY RUS	2 INTIMIDATOR-MARINE	Other Direct Cost	351.44	
~~20080826~~	~~———————~~	~~LASERJET P1505 PRINTER WANG/ISTAN~~	~~Other Direct Cost~~	~~195.00~~	**
~~20080828~~	~~VEHICLE REPAIRS~~	~~Repair damage Vehicle #789~~	~~Other Direct Cost~~	~~300.00~~	**
20080828	STEVEN WALTERS	HOUSEHOLD SUPPLIES, TOWELS	Other Direct Cost	12.01	
20080828	MEHMET SOYLU	RESEARCH EQUIP, PVC PIPES, DRILL BITS	Other Direct Cost	98.22	
20080828	BATON ROUGH	DURELLE SCOTT	Travel	237.59	
20080828	BATON ROUGH	DURELLE SCOTT	Travel	238.27	
20080828	BATON ROUGH	TRAVEL & TRANSPORT DURELLE SCOTT	Travel	502.50	
20080828	BATON ROUGH	TRAVEL & TRANSPORT DURELLE SCOTT	Travel	10.00	
20080828	STEVEN WALTERS	MILEAGE, FIELD WORK	Travel	112.91	
20080829		University Salary Payroll 08/29/08	Personnel and Benefits	7,736.74	
20080829		University Salary Payroll 08/29/08	Personnel and Benefits	3,133.33	
20080829		University Salary Payroll 08/29/08	Personnel and Benefits	833.42	
20080829		University Salary Payroll 08/29/08	Personnel and Benefits	559.01	

20080829		University Salary Payroll 08/29/08	Personnel and Benefits	573.94
20080829		University Salary Payroll 08/29/08	Personnel and Benefits	890.13
20080829		University Salary Payroll 08/29/08	Personnel and Benefits	2.79
20080831	UNL INFOSERVICES 08-2008	4024726275 WANG, TEIJUN	Other Direct Cost	89.89
20080904	FISHER SCIENTIFIC	INV# 0577604 09/03/08	Other Direct Cost	51.33
20080905	RADIOSHACK COR00125070	BATTERY HOLDERS AND SNAP PLUGS	Other Direct Cost	9.24
20080905	MENARDS 3112 LINCOLN NORT	STORAGE BAGS AND BATTERIES	Other Direct Cost	27.86
20080910	SYX*TIGERDIRECT.COM	USB CABLE	Other Direct Cost	21.98
20080910	MENARDS 3179 LINCOLN SOUT	WIDE MOUTH JARS FOR RESEACH EXPERIMENTS	Other Direct Cost	16.78
20080911	KYLE HERRMAN	LAB SUPPLIES, TOOLS-RESEARCH	Other Direct Cost	6.41
20080911	KYLE HERRMAN	TAXABLE MEAL, RESEARCH	Travel	9.69
20080912	FISHER SCIENTIFIC	INV# 0786765 09/11/08	Other Direct Cost	271.02
20080912	DAILY RENTAL CHARGES	HERRMAN, K-366 - Cambridge 09/04-09/04 421miles	Travel	190.77
20080917	MATHWORKS INC	MATLAB - ACADEMIC LICENSE 5	Other Direct Cost	370.00
20080917	MATHWORKS INC	STATISTICS TOOLBOX FOR LICENSE 5	Other Direct Cost	150.00
20080917	MATHWORKS INC	SHIPPING	Other Direct Cost	18.00
20080917	MATHWORKS INC	STATISTICS TOOLBOX FOR LICENSE 3	Other Direct Cost	150.00
20080917	MATHWORKS INC	MATLAB - ACADEMIC LICENSE 4	Other Direct Cost	370.00
20080917	MATHWORKS INC	STATISTICS TOOLBOX FOR LICENSE 4	Other Direct Cost	150.00
20080917	MATHWORKS INC	MATLAB - ACADEMIC LICENSE 2	Other Direct Cost	370.00
20080917	MATHWORKS INC	STATISTICS TOOLBOX FOR LICENSE 2	Other Direct Cost	150.00
20080917	MATHWORKS INC	MATLAB - ACADEMIC LICENSE 3	Other Direct Cost	370.00
20080917	MATHWORKS INC	MATLAB - ACADEMIC LICENSE 1	Other Direct Cost	370.00
20080917	MATHWORKS INC	STATISTICS TOOLBOX FOR LICENSE 1	Other Direct Cost	150.00
20080922	MENARDS 3179 LINCOLN SOUT	Reflective tape, PVC Elbow, Vest, and plmb goop	Other Direct Cost	71.44
20080922	FISHER SCIENTIFIC	INV# 0984944 09/19/08	Other Direct Cost	37.26
20080922	ONSET COMPUTER CORPORATIO	BASE STATION, LOGGER, AND RADIATION SHIELD	Equipment	1,438.00
20080922	Transportation Services	08/01-29/2008 909 miles	Travel	827.22
20080923	DAILY RENTAL CHARGES	HERRMAN, K-455 - Kearney, 09/16-09/18 719miles	Travel	502.26
20080926	VWR SCIENTIFIC	INV# 35935285 09/25/08	Other Direct Cost	267.41
20080926	KYLE HERRMAN	TAXABLE MEAL, RESEARCH	Travel	12.37
20080929	MATHWORKS, INC	MATHLAB & STATISTICS TOOLBOX LICENSES A. IRMAK	Other Direct Cost	-523.00
20080929	VWR SCIENTIFIC	INV# 35950006 09/26/08	Other Direct Cost	26.31
20080930		University Salary Payroll 09/30/08	Personnel and Benefits	3,133.33
20080930		University Salary Payroll 09/30/08	Personnel and Benefits	833.42
20080930		University Salary Payroll 09/30/08	Personnel and Benefits	82.88
20080930		University Salary Payroll 09/30/08	Personnel and Benefits	0.68
20080930	UNL INFOSERVICES 09-2008	4024726275 WANG, TEIJUN	Other Direct Cost	32.84
				47,288.36
		INELIGIBLE EXPENSES		495.00
		BALANCE DUE		**46,793.36**

'* These items were incorrectly charged to this account. Expenses are not included in total.

Riparian Vegetation Impacts on Water Quantity, Quality and Stream Ecology
Detail
26-6238-0391-001

cost_object	account	item_description	amount	effective_date	document_description
2662380391001	511100	University Salary Payroll 07/31/08	11,088.00	20080731	
2662380391001	511100	University Salary Payroll 08/29/08	7,736.74	20080829	
2662380391001	515210	University Salary Payroll 07/31/08	2,700.00	20080731	
2662380391001	515210	University Salary Payroll 08/29/08	3,133.33	20080829	
2662380391001	515210	University Salary Payroll 09/30/08	3,133.33	20080930	
2662380391001	515220	University Salary Payroll 08/29/08	833.42	20080829	
2662380391001	515220	University Salary Payroll 09/30/08	833.42	20080930	
2662380391001	519100	University Salary Payroll 07/31/08	772.17	20080731	
2662380391001	519100	University Salary Payroll 08/29/08	559.01	20080829	
2662380391001	519200	University Salary Payroll 07/31/08	829.99	20080731	
2662380391001	519200	University Salary Payroll 08/29/08	573.94	20080829	
2662380391001	519300	University Salary Payroll 07/31/08	825.18	20080731	
2662380391001	519300	University Salary Payroll 08/29/08	890.13	20080829	
2662380391001	519300	University Salary Payroll 09/30/08	82.88	20080930	
2662380391001	519400	University Salary Payroll 07/31/08	2.16	20080731	
2662380391001	519400	University Salary Payroll 08/29/08	2.79	20080829	
2662380391001	519400	University Salary Payroll 09/30/08	0.68	20080930	
2662380391001	519700	4th Qtr Unemployment Assessment	3.74	20080630	Unemployment FY08 4th Qtr
2662380391001	519800	4th Qtr Work Comp Assessment	84.70	20080630	Workers Comp FY08 Q4c
2662380391001	521200	4024726275 WANG, TEIJUN	89.89	20080831	UNL INFOSERVICES 08-2008
2662380391001	521200	4024726275 WANG, TEIJUN	32.84	20080930	UNL INFOSERVICES 09-2008
~~2662380391001~~	~~525300~~	~~Repair damage Vehicle #789~~	~~300.00~~	~~20080828~~	~~VEHICLE REPAIRS~~
2662380391001	531200	HOUSEHOLD SUPPLIES, TOWELS	12.01	20080828	STEVEN WALTERS
2662380391001	531900	USB CABLE	21.98	20080910	SYX*TIGERDIRECT.COM
~~2662380391001~~	~~531951~~	~~LASERJET P1505 PRINTER WANG/ISTAN~~	~~195.00~~	~~20080826~~	~~_____~~
2662380391001	531952	MATLAB - ACADEMIC LICENSE 5	370.00	20080917	MATHWORKS INC
2662380391001	531952	STATISTICS TOOLBOX FOR LICENSE 5	150.00	20080917	MATHWORKS INC
2662380391001	531952	SHIPPING	18.00	20080917	MATHWORKS INC
2662380391001	531952	STATISTICS TOOLBOX FOR LICENSE 3	150.00	20080917	MATHWORKS INC
2662380391001	531952	MATLAB - ACADEMIC LICENSE 4	370.00	20080917	MATHWORKS INC
2662380391001	531952	STATISTICS TOOLBOX FOR LICENSE 4	150.00	20080917	MATHWORKS INC
2662380391001	531952	MATLAB - ACADEMIC LICENSE 2	370.00	20080917	MATHWORKS INC
2662380391001	531952	STATISTICS TOOLBOX FOR LICENSE 2	150.00	20080917	MATHWORKS INC
2662380391001	531952	MATLAB - ACADEMIC LICENSE 3	370.00	20080917	MATHWORKS INC
2662380391001	531952	MATLAB - ACADEMIC LICENSE 1	370.00	20080917	MATHWORKS INC
2662380391001	531952	STATISTICS TOOLBOX FOR LICENSE 1	150.00	20080917	MATHWORKS INC
2662380391001	531952	MATHLAB & STATISTICS TOOLBOX LICENSES A. IRMAK	-523.00	20080929	MATHWORKS, INC
2662380391001	531955	CUSTOM MAC PRO/320GB/2GB/WBK/WMM	2,649.00	20080715	
2662380391001	531955	SEE SAP #27122330 VEN CR RETD NOTEBK COMPUTER BERG	-2,338.00	20080801	MPC - PRO - MANUAL
2662380391001	531955	SEE REPOST#27009172 RET'D NOTEBK COMPUTER-BERG	2,338.00	20080804	MPC
2662380391001	533100	PIPE, WASHERS, CATCH BOLTS	129.95	20080630	ERKAN ISTANBULLUOGLU
2662380391001	533100	INV# 0577604 09/03/08	51.33	20080904	FISHER SCIENTIFIC
2662380391001	533100	BATTERY HOLDERS AND SNAP PLUGS	9.24	20080905	RADIOSHACK COR00125070
2662380391001	533100	STORAGE BAGS AND BATTERIES	27.86	20080905	MENARDS 3112 LINCOLN NORT
2662380391001	533100	WIDE MOUTH JARS FOR RESEACH EXPERIMENTS	16.78	20080910	MENARDS 3179 LINCOLN SOUT
2662380391001	533100	LAB SUPPLIES, TOOLS-RESEARCH	6.41	20080911	KYLE HERRMAN
2662380391001	533100	INV# 0786765 09/11/08	271.02	20080912	FISHER SCIENTIFIC
2662380391001	533100	Reflective tape, PVC Elbow, Vest, and plmb goop	71.44	20080922	MENARDS 3179 LINCOLN SOUT
2662380391001	533100	INV# 0984944 09/19/08	37.26	20080922	FISHER SCIENTIFIC
2662380391001	533100	BASE STATION, LOGGER, AND RADIATION SHIELD	1,438.00	20080922	ONSET COMPUTER CORPORATIO
2662380391001	533100	INV# 35935285 09/25/08	267.41	20080926	VWR SCIENTIFIC
2662380391001	533100	INV# 35950006 09/26/08	26.31	20080929	VWR SCIENTIFIC
2662380391001	533103	1-2-PERSON CARAVELLE RAFT-FIELDWK IN CENTRAL NEBR	29.99	20080721	SCHEELS-LINCOLN
2662380391001	533103	LAB SUPPLIES, TUBE, CABLES, BOLTS RESEARCH	394.34	20080801	XIAOMAO LIN
2662380391001	533103	LAB SUPPLIES, PVC TUBES-PIPES-PC BOARD	78.09	20080819	MEHMET SOYLU
2662380391001	533103	2 INTIMIDATOR-MARINE	351.44	20080821	S AND W SUPPLY RUS
2662380391001	533103	RESEARCH EQUIP, PVC PIPES, DRILL BITS	98.22	20080828	MEHMET SOYLU
2662380391001	533910	2ND SHIPMT OF CNR2 NET RADIOMETER-REPUB RVR PROJ	2,935.00	20080630	KIPP & ZONEN USA
2662380391001	533910	Part # 006092	506.62	20080717	YSI INC
2662380391001	533910	SEE SAP #27121585 CR BY VENDOR FOR DOUBLE BILLING	-2,935.00	20080728	KIPP & ZONEN USA
2662380391001	533910	SEE SAP #27121585 CR BY VENDOR FOR DOUBLE BILLING	-2,338.00	20080728	MPC - PRO - MANUAL
2662380391001	533910	SEE SAP #27121585 CR BY VENDOR FOR DOUBLE BILLING	2,338.00	20080801	MPC - PRO - MANUAL
2662380391001	533910	INV #96067 TEMP/RH SENSOR W/TEMP BATH CALIBRATION-	1,003.51	20080815	R.M. YOUNG COMPANY
2662380391001	541110	VIRGINIA BEA Lodging	158.08	20080703	DURELLE SCOTT
2662380391001	541110	LODGING, INSTALL A WEATHER STATION	134.64	20080722	JOHN D LENTERS
2662380391001	541110	DURELLE SCOTT	237.59	20080828	BATON ROUGH
2662380391001	541120	VIRGINIA BEA Meals	27.51	20080703	DURELLE SCOTT
2662380391001	541120	DURELLE SCOTT	238.27	20080828	BATON ROUGH

Match for Riparian Vegetation Impacts on Water Quantity, Quality and Stream Ecology
John Lenters, P.I.
UNL Reference Number: 26-6238-0391-001

Item	Source	Value
John Lenters-salary and benefits (May 1, 2008 to September 30, 2008)	UNL	5502.75
Indirect on above	UNL	2470.73
Waived indirect costs (April 4, 2008 to June 30, 2008)	UNL	15940.54
Waived indirect costs (July 1 to September 30, 2008)	UNL	21232.47
		45146.49

PROJECT NARRATIVE/PERIODIC REPORT
July 1, 2008 to September 30, 2008
Project 08-141 Riparian Vegetation Impacts on Water Quantity, Quality and Stream Ecology

Please see the attached progress report submitted by our contractor.

Quarterly Report

Reporting period: June 1 – September 30, 2008

Project: Riparian Vegetation Impacts on Water Quantity, Quality, and Stream Ecology

Principal Investigators: Durelle Scott, Erkan Istanbulluoglu, John Lenters

Summary

Since the last quarterly update, we have continued to collect data at the research site, furthered our progress with the IBIS model, and begun two separate research experiments. Through cooperation with county weed managers and project coordinators in the Twin Valley Management District, we expect to collect data through the summer of 2009 and conduct invasive species removal at our site in the fall of 2009. Data collection will continue through the growing season of 2010 to understand how the system is altered following the removal.

Data Collection

Due to high temperatures and irrigation withdrawals in surrounding agricultural fields, our study site had little surface water over the summer months (Fig. 1). For several weeks, no water was present in the wetland, and water quality instrumentation had to be removed (Fig. 2). Baseline data for the meteorological instruments has been collected all summer. Data will be downloaded and specific instruments not equipped for winter deployment will be collected from the site in mid-November. We expect to continue to collect baseline data in the spring and summer of 2009. Initial discussions with weed managers from Furnas County (Todd Waverka) and the Twin Valley Management District (Merle Illian) have indicated that *Phragmites australis* removal will occur in the fall of 2009.

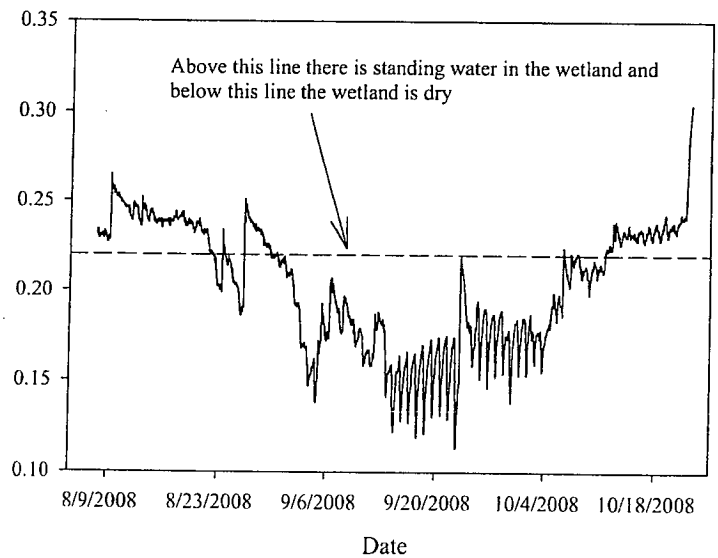

Figure 1. Water level data (in meters) for Site 1 of the water quality monitoring stations. The reference level (indicating the presence or absence of surface water) is 0.22 m; above this level the wetland has standing water and below this level the wetland is dry.

Figure 2. Picture taken on 09-04-08 showing the wetland without water and an exposed YSI sensor that had to be removed.

IBIS Modeling

The Integrated Biosphere Simulator (IBIS) is being used in our project to simulate the regional water balance in the Republican River basin and the entire state of Nebraska. Dr. Chris Kucharik from the University of Wisconsin-Madison recently visited UNL to provide consultation on installing and running the IBIS code on our workstations. Dr. Kucharik worked with Dr. Lenters, Dr. Istanbulluoglu, Dr. Tiejun Wang (postdoc), and Evren Soylu (graduate student) to begin regional simulations for the state of Nebraska. A brief summary of the model and some preliminary results are discussed here.

The IBIS model includes a wide range of processes, including land surface physics, canopy physiology, plant phenology, vegetation dynamics and competition, and carbon and nutrient cycling. We performed a simulation from 1911 to 2000 using 0.5° x 0.5° gridded, daily climate data as input, as well as a contemporary geographic distribution of soil and vegetation types. The simulation results are plotted in Figures 3 to 7.

It is well known that a precipitation gradient exists across Nebraska and neighboring states as well. Figure 3 shows the annual mean precipitation from the input climate dataset, which accurately captures the spatial precipitation gradient for this region. In Nebraska, the long-term, annual mean precipitation (for the period 1911 to 2000) increases from about 350 mm/year in the west to about 750 mm/year in the east.

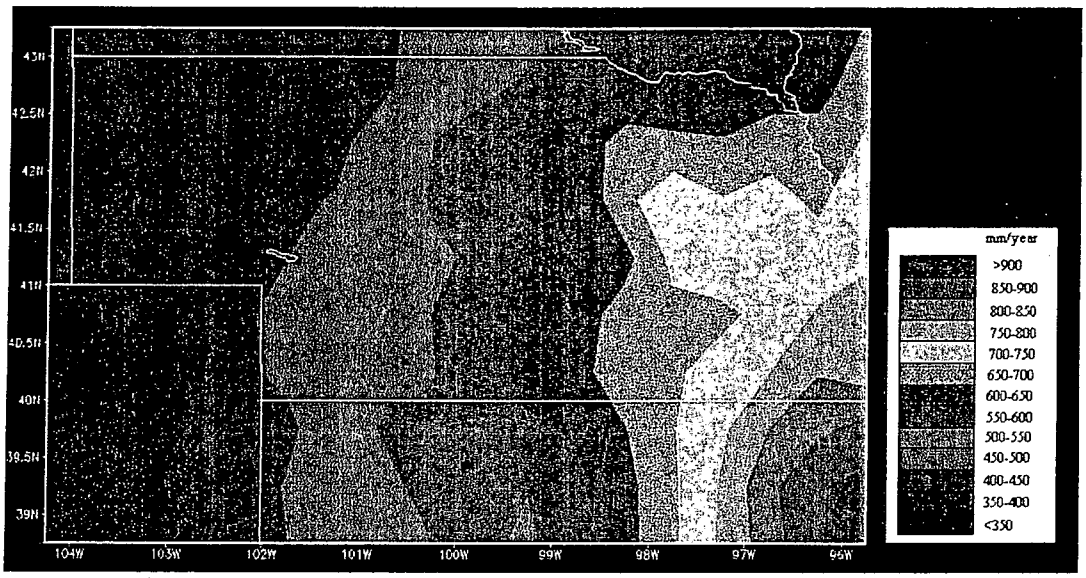

Figure 3. Annual mean precipitation (mm/year) for the period 1911-2000.

As a direct result of the regional precipitation pattern, the long-term, annual mean evapotranspiration (ET) also exhibits a similar spatial gradient. Figure 4 shows the simulated annual mean ET increasing from about 350 mm/year in the west to over 600 mm/year in the east. Annual mean runoff, on the other hand, exhibits a rather different pattern. Figure 5 shows the simulated sub-surface drainage (i.e., groundwater recharge), which can approximately represent natural surface runoff, since significant portions of the streamflow in this area are fed by groundwater. Although the drainage also shows an east-west gradient (i.e. increasing from less than 20 mm/year in the west to over 100 mm/year in the east), the highest drainage rate is found to be located in the northeastern part of Nebraska.

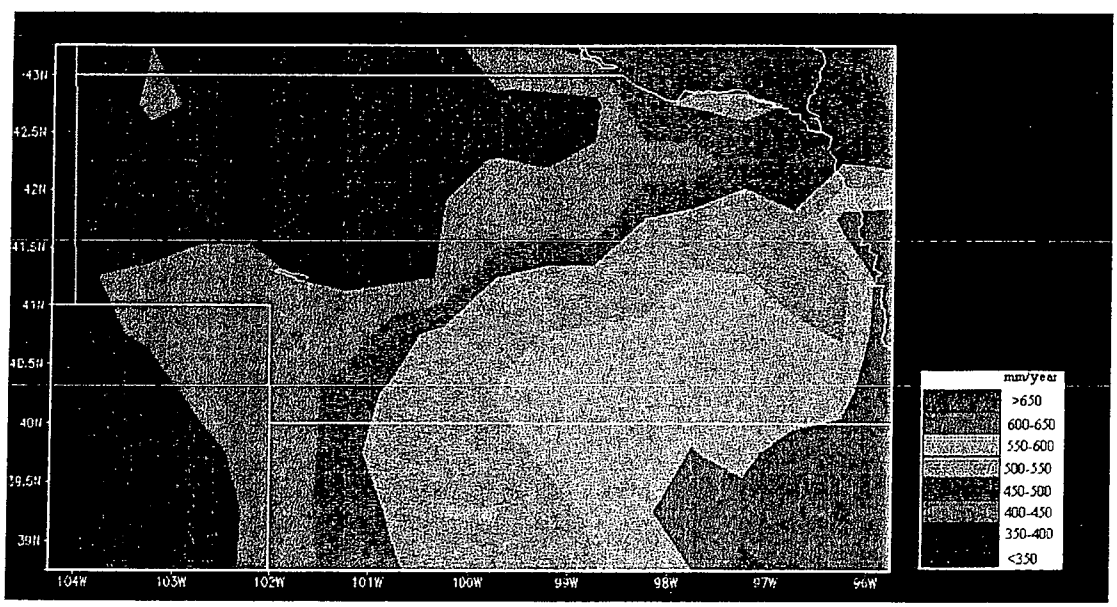

Figure 4. Long-term, annual mean evapotranspiration (mm/year), as simulated by IBIS for 1911-2000.

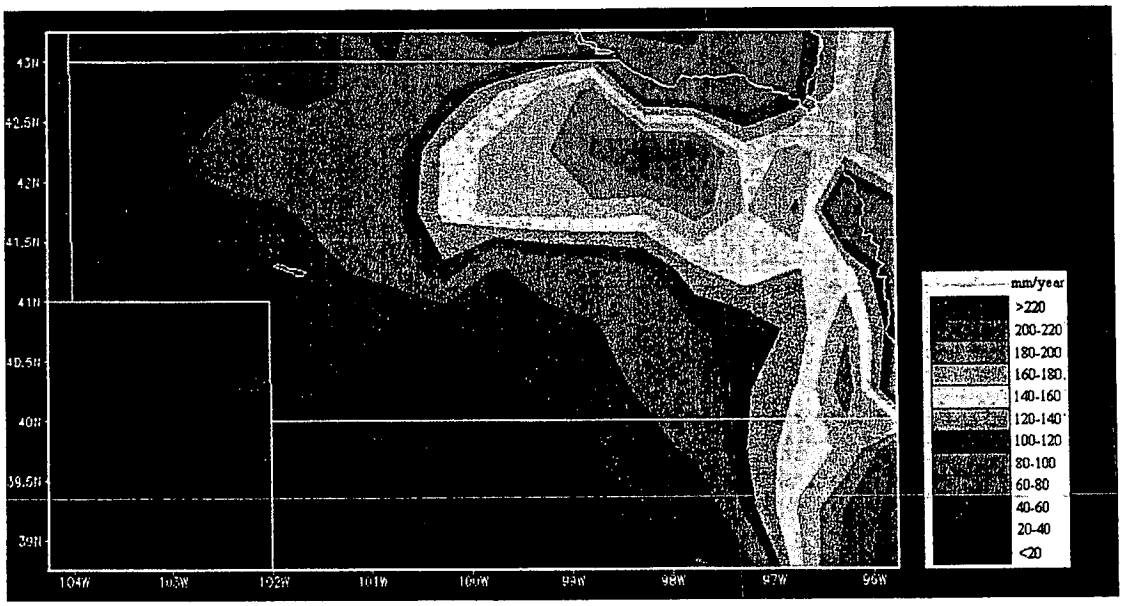

Figure 5. Long-term, annual mean drainage (mm/year), as simulated by IBIS for 1911-2000.

One way to assess the aridity and water availability of a region is to examine the ET-to-precipitation ratio and runoff-to-precipitation ratio. These quantities are plotted in Figures 6 and 7, respectively. In contrast to the distribution of the annual mean ET, Figure 6 reveals that the *lowest* value of the ET-to-precipitation ratio is found in the northeastern part of Nebraska. Correspondingly, the *highest* ratios of runoff-to-precipitation are also found in this part of the state (Fig. 7). This indicates that northeastern Nebraska is particularly "efficient" at producing runoff, given the region's annual precipitation and evaporative demand.

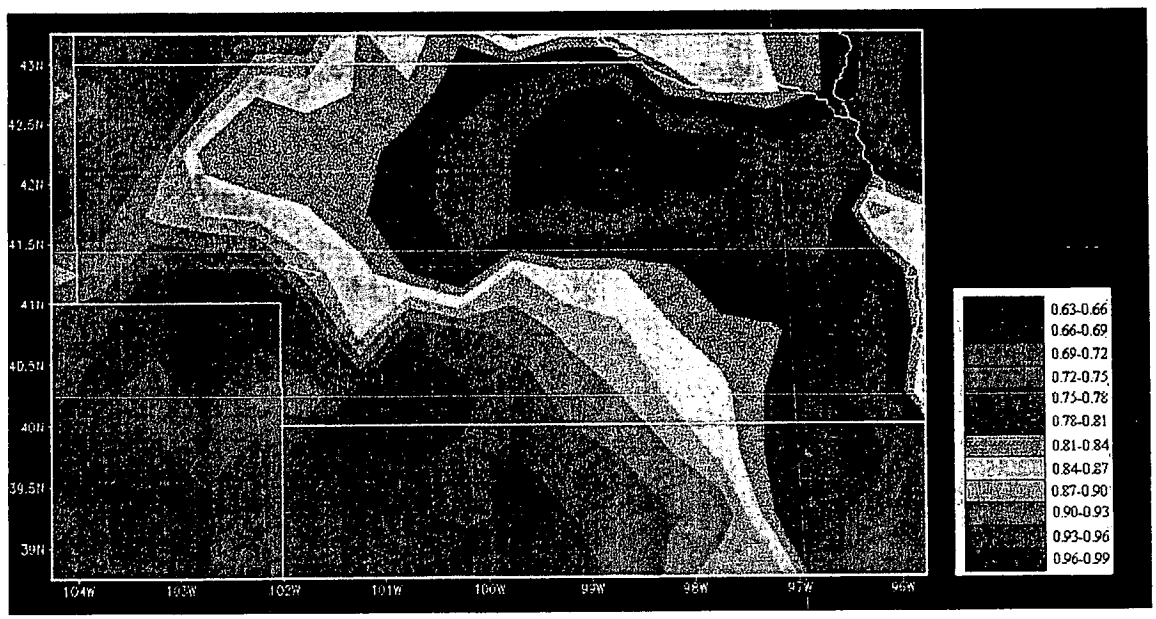

Figure 6. Ratio of annual mean ET to annual mean precipitation (1911-2000).

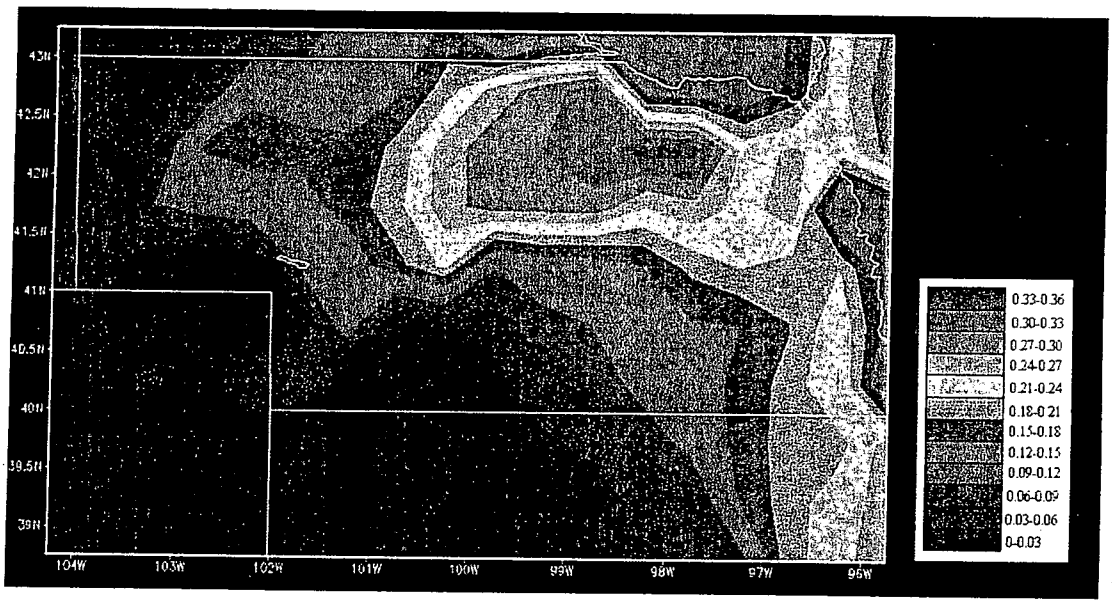

Figure 7. Ratio of annual mean runoff to annual mean precipitation (1911-2000).

In general, the ET-to-precipitation ratio is higher and the runoff-to-precipitation ratio is lower in southwestern Nebraska as compared to northeastern parts of the state. In comparison with observations, discharge data from the USGS for the Republican River basin (gauging stations 06823000, 06835500, 06838000, and 06843000) show that the ratio of long-term annual mean runoff-to-precipitation in the upstream basins of the Republican River is less than 3%, which is consistent with the simulation results in Figure 7. Overall, both the simulation results and the observational data indicate that the IBIS model can be successfully used to simulate the regional water balance of the Republican River basin and other parts of the state.

Impacts of *Phragmites australis* on Carbon and Nitrogen Cycling

In addition to the larger project occurring at the wetland site, two other studies are being conducted to examine the impacts of invasive species on the ecology of riparian systems. Data collection for both of these studies is expected to be completed by the fall of 2009. A brief summary of the projects and progress to date is reported as follows:

Project #1: *The impacts of Phragmites australis on microbially mediated carbon and nitrogen cycling in riverine wetlands*

The objective of this study is to understand how microbial communities in riverine wetlands respond to invasion by *Phragmites australis*. Specifically, we will examine how carbon and nitrogen biogeochemistry is altered by the presence of the exotic species *P. australis* compared to the native species, *Juncus effusus* and *Carex sp.* We will take sediment samples beneath areas dominated by *P. australis*, *J. effusus*, or *Carex sp.*, and open water in three riverine wetlands. The sites are located along the Republican River (east of Cambridge, Nebraska), along the Platte River (west of Kearney, Nebraska), and along the Platte River (east of Grand Island, Nebraska). Soil samples and surface water samples will be taken during fall of 2008 and the spring and summer of 2009. Laboratory assays will

be conducted on the sediments to assess microbially mediated nitrogen and carbon cycling and microbial biomass. Statistical analyses will then be conducted to determine if any differences are observed in the areas dominated by *P. australis*.

To date, sites for this project have been identified. Equipment for laboratory assays has been purchased or permission to borrow or use equipment has been granted. On 18 September 2008, sediment samples were collected from all three sites for the fall of 2008 sampling period (Fig. 8). Samples are currently being processed for laboratory assays and preliminary data should be ready in December 2008.

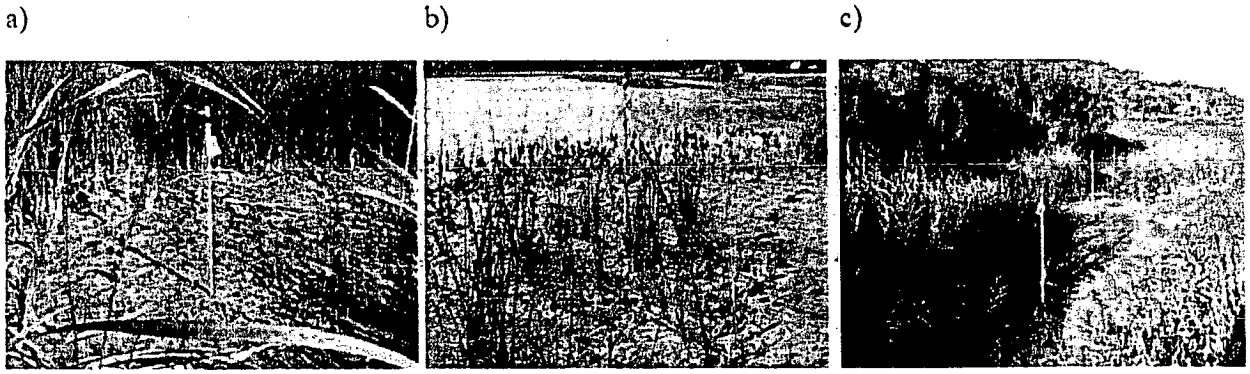

Figure 8. Pictures taken from the study sites on 09-18-08. a) The open water area in the wetland along the Republican River. b) The *Juncus effusus* area in the wetland along the Platte River east of Kearney, Nebraska. c) The open water area in the wetland along the Platte River west of Grand Island, Nebraska.

Project #2: *Net ecosystem exchange from wetland sediments: impacts of Phragmites australis on carbon dioxide flux from riverine systems*

One ecological advantage invasive species have over native species is prolific growth. This is particularly true for *Phragmites australis*, which expends massive amounts of energy into aboveground biomass. If the biomass is not decomposed, then ecosystems dominated by *P. australis* could become a sink for atmospheric carbon dioxide (CO_2) and accumulate significant amounts of soil organic carbon. If, however, respiration rates are significant beneath invasive species, then CO_2 sequestration could be negligible in systems dominated by invasive species. The objective of this study is to measure *in situ* rates of net ecosystem exchange (NEE) and respiration from areas dominated by the invasive species *P. australis*, the native species *Juncus effusus*, and open water areas. Measurements will be made throughout the growing season and comparisons will also be made between daytime and nighttime. Permanent collars will be installed in the Republican River wetland to ensure that repeated measures will be conducted in the identical location each time.

Because NEE is the difference between gross primary production (GPP) and respiration (i.e., NEE = GPP – Respiration), it is important to not inhibit photosynthesis when measuring *in situ* NEE. Thus, a sophisticated chamber had to be created to measure the rates directly in the wetland. The chamber was constructed of clear plexiglass to allow sunlight to penetrate and a combination of motorized fans and cooler packs were installed inside the chamber to keep temperatures similar to ambient conditions. With the chamber completely sealed, a Licor LI840 CO_2 analyzer was attached to measure CO_2 concentrations *in situ*. Uncovered and exposed to sunlight, the change in CO_2 concentration inside the

chamber is due to the difference between GPP and respiration. When the chamber is covered (i.e., no sunlight and no photosynthesis) the change in CO_2 is entirely due to respiration.

This setup was built during the summer of 2008 and was recently tested in a wetland in Lincoln, Nebraska (Fig. 9). Data were collected during the preliminary test, and changes in CO_2 concentration were recorded (Fig. 10). Values of NEE and respiration were found to be comparable to that in the literature. Collars are going to be constructed and installed later this fall. We expect to begin data collection in the wetland site along the Republican River early in the spring of 2009.

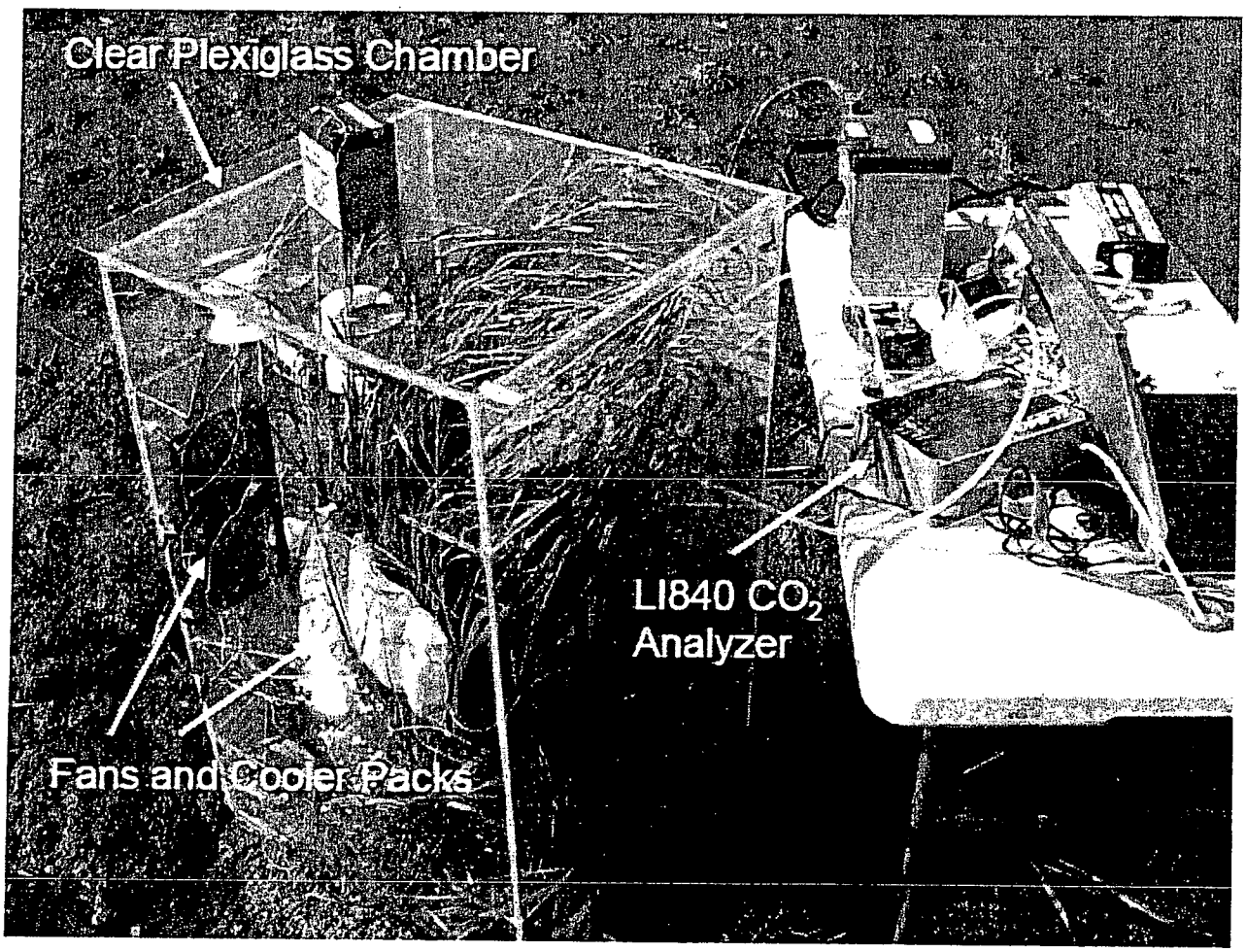

Figure 9. Plexiglass chamber used during a preliminary test conducted on 09-17-08. The chamber is equipped with a Licor LI840 CO_2 analyzer and measures the change in CO_2 concentration due to gross primary production and respiration.

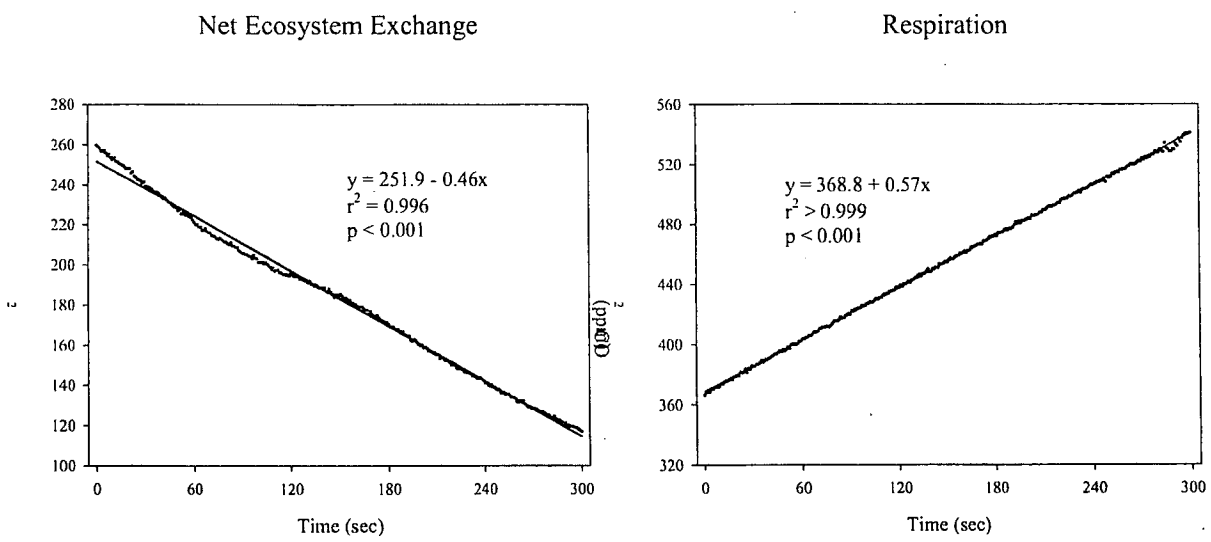

Figure 10. Data collected from the preliminary CO_2 run conducted on 09-17-08. The graph on the left is from data collected inside the chamber exposed to sunlight and shows a decrease in CO_2 due to gross primary production removing CO_2 at a faster rate than respiration can produce CO_2. The graph on the right is from data collected inside the chamber covered from sunlight and shows an increase in CO_2 due to no gross primary production occurring and respiration producing CO_2.

REQUEST FOR REIMBURSEMENT
July 1, 2008 to September 30, 2008
Project 08-141 Riparian Vegetation Impacts on Water Quantity, Quality and Stream Ecology

We request reimbursement of $46,793.36 for the period of July 1, 2008 to June 30, 2008. For a breakdown of costs by budget category, please see the accompanying bill submitted to the Department of Natural Resources by the University of Nebraska.