These metadata were largely pulled from the quality assurance project plan for the Nebraska Cooperative Pesticide Immunoassay Analysis Project, hereafter called the Natural Resource District (NRD) ELISA Project, sponsored by the Nebraska Department of Agriculture (NDA), Nebraska Department of Environmental Quality (NDEQ), Nebraska Association of Resources Districts (NARD), and participating NRDs. Groundwater quality data for pesticides analyzed using immunoassay methods and obtained from other sources will be compared to these minimum data quality requirements for inclusion with this dataset. Note that data obtained using immunoassay analysis are eligible for inclusion into the Quality Assessed Agrichemical Contaminant Database for Nebraska Groundwater[1], if they meet more stringent criteria (see column 1 in Table 2. Quality Assessment Levels for Pesticide Data at 1.usa.gov/NVfqTM).

PROJECT OBJECTIVES

The objectives of the NRD ELISA Project (the project) will be:

- To increase the collection of ground water quality samples for selected pesticide active ingredients (i.e. acetochlor, alachlor, atrazine, and metolachlor) and their degradate compounds over what is currently being collected, and subsequently expand the pesticides in water dataset for Nebraska;

- To coordinate and enhance the collection of pesticide water quality data between Nebraska's local, state, and federal monitoring agencies;

- To use the data collected for determining vulnerable areas, targeting additional monitoring, and defining areas potentially requiring further management/regulation of pesticides to protect the quality of the water; and

- To potentially use the data for supporting the adoption of regulations within NDA's Pesticide Act for protecting the State's water quality.

Ground water sample results using enzyme-linked immunosorbent assay (ELISA) methods will be compared to the appropriate Maximum Contaminant Level (MCL) or Health Advisory (HA) level for drinking water to determine whether additional samples and laboratory analysis are needed. Because of financial limitations and the potential margin in specificity of the ELISA method, sites having samples which meet or exceed ¾ of the MCL or HA should be resampled and confirmed through traditional laboratory analysis. The trigger concentration for confirmation samples will be evaluated by the project coordinators and adjusted, if necessary.

DATA QUALITY OBJECTIVE AND DATA QUALITY INDICATOR

The data quality objective (DQO) for the project is to provide valid data of known and documented quality for use in supporting pesticide management plans for ground water.

Precision, accuracy, comparability, representativeness, and completeness will be described and addressed in this document and agency SOPs. For the purpose of these documents, these terms are defined as follows.

Precision: A measure of agreement among repeated measurements of the same property under identical, or substantially similar conditions; a measure of reproducibility. Precision will be indicated by taking duplicate samples, to be analyzed in the spectrophotometer.

Accuracy: A measure of how close the analytical result is to "true" value. For the ELISA equipment, a correlation factor is determined when a calibration curve is generated during the course of running an immunoassay analysis, including control samples. The correlation factor should be greater than or equal to 0.9900, and the control samples should be within ± 0.6 ppb of its actual concentration (or within the limits specified by the owner's manual). The analysis method uses 4 standards of known concentration to generate the calibration curve and correlation factor. The concentration of the standards varies by analyte, but all include a zero standard. Two replicates of each standard are used in the calibration process, and the percent coefficient of variation between the absorbance obtained should be less than or equal to 10% for each standard. Another metric for assessing accuracy is comparing the absorbance of Standard 1 and Standard 3 with the absorbance of the Zero Standard. The absorbance of Standard 1 should be between 75 and 90% of the absorbance of the Zero Standard; and the absorbance of Standard 3 should be less than 50% of the absorbance of the Zero Standard.

An attempt will always be made to meet these criteria; however, should these criteria not be met, the analytical data will not simply be discarded because the immunoassay analysis serves as a screening technique for which the most accurate results are not completely necessary.

Accuracy is also indicated by taking split (second lab) samples. For the purposes of this dataset, split samples are encouraged, but not required.

A reference sample with known concentration will be utilized at a minimum of once per batch (i.e. in addition to the control sample used in the calibration steps). This project will utilize the University of Nebraska's Water Sciences Laboratory, Abraxis LLC, or other qualified laboratory, for producing reference samples. The concentrations produced from the ELISA method will be compared to the concentration of the reference sample. Concentrations plus or minus 10% or greater will trigger further investigation by the project coordinators.

Comparability: A measure of the confidence with which one data set or method can be compared to another.

Reducing the variability potentially introduced during the sampling phase allows some confidence in comparing data collected and analyzed from different regions in the state,

and comparing data through time. This will be accomplished by having standardized training sessions for NRD and NDEQ personnel collecting samples to be analyzed with the ELISA equipment. This will include a review of NDEQ's established SOPs (see below) or NRD equivalent.

Reference samples will also be utilized if samples from a specific immunoassay lab, or from a specific sample collector, are suspected of being contaminated prior to being analyzed.

Representativeness: The measure of the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. For this project, a representativeness goal will be to get as much data as feasible to expand the knowledge-base on pesticides in water. However, for ground water, another general goal is to sample approximately 10% of registered wells (these will mostly consist of irrigation, domestic, and stock wells) in a study area or NRD. A good reference that discusses the number and percent of wells for a study of ground water quality is Luzzadder-Beach (1995)[2].

Field blanks will be used for the ELISA equipment to determine if any of the measured compounds are being introduced during the sampling phase. In addition, variability will be reduced by following established sampling SOPs.

Completeness: A measure of the amount of valid data obtained from a measurement system compared to the amount of data expected to be obtained under correct, normal conditions. The possibility of data becoming unavailable, due to laboratory accidents or inaccuracies, insufficiency in sample volume collected, samples being broken in shipping, and DQOs not being met must be accepted and minimized. Also, emergency situations may arise, or field conditions may not allow for 100% data completeness. It will be a goal of this project to have 90% useable data.

In order to address the above concerns, QC samples will be taken according to the following schedule:

Type of QC Sample	Approximate Number
Split	10% of total (encouraged)
Field Blank	10% of total or >= 1 per run/batch
Duplicate	10% of total or >= 1 per run/batch
Reference	>= 1 per ELISA run/batch

NDA will reference NDEQ's Standard Operating Procedures (SOPs) in evaluating the DQOs for this project[3]. They are as follows:

- GWS-030 Ground Water Sampling Equipment and Supplies;
- GWS-060 Ground Water Sampling – Nitrates, Pesticides, and Inorganics;
- GWS-061 QA/QC Ground Water Samples;
- GWS-140 Chain-of-Custody Procedures for Ground Water Samples
- GWS-150 Data Management;
- Operating Procedures provided by the ELISA equipment and reagent manufacturers.

Requirements and Qualifications for Sampling Personnel

If samples will be collected by opening a groundwater well, project personnel will be certified by the Nebraska Health and Human Services - Department of Regulation and Licensure as either a Water Well Monitoring Technician or a Natural Resources Ground Water Technician. This certification requires an initial competency evaluation, and periodic training in the form of continuing education units (CEUs), according to Chapters 10 and 11 of Title 178[4, 5]. All sampling teams/units will have at least one member possessing this certification present at all times during ground water sampling operations. All sampling personnel will train with experienced samplers before performing sample or data collection.

Monitoring procedures for NRDs may be governed by a quality assurance document other than the SOPs mentioned above, if it is determined to be satisfactory by the Project Coordinators.

Training for the operation and maintenance of the spectrophotometers and associated supplies will be conducted for the NRD personnel using these units. NDA, NDEQ, or NARD personnel will go through the analysis procedure and explain some of the obstacles to obtaining quality data. In addition, NRDs will be encouraged to use the Abraxis and/or NDEQ videos for refresher training as needed, along with the manufacturer's references.

DATA GENERATION AND ACQUISITION

Sampling Methods and Handling Custody

Refer to the appropriate SOPs listed in Data Quality Objectives section. If outliers in data are attributed to procedures in this section, the project coordinators will meet with the appropriate NRD to review the SOPs for reducing the variation in expected results.

Analytical Methods

Various NRDs will conduct herbicide analysis on water samples. The ELISA method is used to determine concentrations of herbicides (acetochlor, alachlor, atrazine, and metolachlor) in water samples. This technique applies the principals of ELISA for the determination of a particular herbicide (see [6] for explanation of the method for the

triazines). Refer to the manufacturer's "kit" instructions for additional details on performing the individual procedures and their associated data generation.

Quality Control

Representativeness, Completeness and Comparability. During the data review process the level of quality for these elements is checked for the data collected, and is compared to the required level as stated in the DQOs. For some elements this comparison is indirect, while for others, it is a direct comparison. Specifically, precision, accuracy and to some extent representativeness can be directly measured using duplicates, reference samples, and field blanks. Duplicate samples will provide a measure of precision. One duplicate sample will be analyzed at an approximate rate of one for every 10 regular samples (10%), or with each ELISA batch. A duplicate sample is an additional sample collected side by side at the same time as the original sample at a given site, and processed and analyzed similarly and for the same parameters. The lab is unaware of which site was duplicated. The difference in values provides a measure of the repeatability for that parameter and incorporates differences due to sampling and lab analysis variability. A concentration within ± 10% is deemed acceptable.

Known reference samples will be used to provide a measure of accuracy and should be performed at least once per ELISA batch. This also provides a measure of accuracy of the field and ELISA lab processes.

Field blanks provide a measure of representativeness. One field blank will be provided at an approximate rate of one for every ten regular samples (10%) or one for each sample trip. A field blank consists of de-ionized water collected in similar containers and from the same batch as those used for the regular samples. A field blank is analyzed for the same parameters as the regular sample. The blank is prepared in the field and is handled in a similar manner as the regular sample. Values above method detection limits suggest non-representativeness or contamination from field or lab handling processes, chemical preservations, containers, or possibly contaminated de-ionized water.

Instrument/Equipment Testing, Inspection, and Maintenance

All equipment is routinely inspected upon receipt and tested for accuracy against known standards. Additionally, all equipment is routinely inspected and maintained according to the recommended schedule listed in the operational manual.

Instrument Calibration and Frequency

Calibration of the ELISA equipment will be conducted by NRD personnel following the frequency and procedure steps outlined in the manufacturer's recommendations. In general, calibration of the spectrophotometers is done every sample batch (of up to 60

samples) by using standards and controls. These are used to generate an absorbance curve by which the sample absorbance is compared.

Inspection/Acceptance Requirements for Supplies and Consumables

See Appendix D for a listing of the required equipment, supplies, and consumable material for this project.

All equipment, supplies, and consumable material will be visually inspected upon receipt, and compared to the quantity ordered. Any discrepancies in this regard, as well as any physical damage or contamination which would affect product performance or data quality will be reported to the NDA project coordinator.

Data Acquisition Requirements for Non-direct Measurements

Non-direct measurements for this project may include such data as well-drilling log information and well location (GPS) data obtained from the Nebraska Department of Natural Resources Registered Groundwater Well database.[7] Accuracy of the location data for this database is described in the metadata, under the 'Identification Information' section. In addition, well location information may be collected by the sampling entity using GPS equipment.

Data Management

Data management will be complex given the number of sample collectors and offices having photometers, and will require some attentive coordination directed by the project managers. However, data management will generally follow the procedures outlined in GWS-150 - Data Management and SWS-1520.1A – Data and Document Control. Following the analysis and an initial quality review by NRD personnel, the results will be entered into an NRD database, including the location and descriptive information for the site, and most of the data supplied on the field data sheet (see Appendix C, example 2). This site and descriptive data may already exist in databases maintained by the local NRD. Whenever possible, immunoassay results will be exported directly from the photometer and linked to the site and descriptive information. Copies of the results sheet (see Appendix C, example 4), the photometer output sheet, as well as the data sheets and electronic data, will be sent to the NDA project coordinator, after a cursory review for data-entry errors by the NRD. This will be done after every batch, or, more likely, toward the end of the sampling season when data entry is complete. A secondary check for data entry errors will be conducted by NDA or NDEQ, along with the data validation procedures explained in the Data Validation section below. The primary repository for all data will be with NDA and NDEQ, however each NRD collecting samples will retain the results for their own use.

ASSESSMENT AND OVERSIGHT

Assessments and Response Actions

Assessments of the project and any corresponding actions will be conducted by the NDA and NARD project coordinators. Assessments of data quality, outlined in the Data Validation section below, will be conducted at least once annually.

An overall project evaluation will be done annually to document any problems identified by NRD, NDA, or NARD personnel during the previous sampling season.

DATA VALIDATION AND USABILITY

Data Review, Verification, and Validation

The purpose of data quality review is to provide documentation of the quality of the data and to assure they are of a sufficient quality to meet the project objectives. The level of quality required is defined by the DQOs in terms of the QA elements of completeness, comparability, accuracy, representativeness, and precision. During this review process, each of these elements is compared to the data collected to assure these criteria were met. The data review process for this project will generally follow the steps described in SWS-9200.2A - Data Quality Review and GWS-150 - Data Management. As such, there will be several opportunities for review. Each NRD office performing the ELISA analysis will review the field data for errors and completeness, as well as the analysis output to see if it complies with the standards for the equipment. The project coordinators will also review the data submitted by the NRD offices.

When a criterion is not met, corrective action may be taken. This action will sometimes be directed towards identifying and correcting the cause of the problem to assure that additional out-of-control data is not produced. For example, a more in-depth review of the sample collection, handling and transportation, field office analysis, and laboratory procedures may be needed, depending on which quality criterion is not met. This process will be used to document questionable data for consideration during the assessment stages of the project. This may result in not using the data at all. For this project, criteria for rejecting data will be somewhat subjective and occur only after the issues of the questionable data are discussed between the data quality reviewer, the project coordinators, and possibly the sampler and/or lab personnel. Values outside the limits sited in the data quality objectives will not automatically result in data being thrown out.

After this review, data meeting the DQOs and Indicators will be forwarded to the University of Nebraska Conservation and Survey Division (UNL CSD), which will format the data for inclusion in the web database.

Any determination by the project coordinators on the limitations of use for data will be described and sent to the appropriate NDEQ personnel, the NRD generating the data,

and the Pesticide Program manager. Any qualification of these limitations will be considered when reporting on the results of this project.

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[1] University of Nebraska-Lincoln. 2000. Quality-assessed Agrichemical Contaminant Database for Nebraska Ground Water. A cooperative project of the Nebraska Departments of Agriculture, Environmental Quality, and Natural Resources and the University of Nebraska - Lincoln. On-line at 1.usa.gov/NVfqTM, updated September 28, 2013.

[2] Luzzadder-Beach, S. (1995). Evaluating the Effects of Spatial Monitoring Policy on Groundwater Quality Portrayal. Environmental Management, v. 19, #3, p. 383-392.

[3] Nebraska Department of Environmental Quality. 2003. Ground Water Standard Operating Procedures. (http://bit.ly/DEQgwSOP)

[4] Nebraska Health and Human Services System. 2011. Title 178, Chapter 10 - Regulations Governing Licensure of Water Well and Pump Installation Contractors and Certification of Water Well Drilling, Pump Installation, and Water Well Monitoring Supervisors. (http://bit.ly/A9E1B3)

[5] Nebraska Health and Human Services System. 2011. Title 178, Chapter 11 - Regulations Governing Examinations, Continuing Education and Fees (http://bit.ly/A9E1B3)

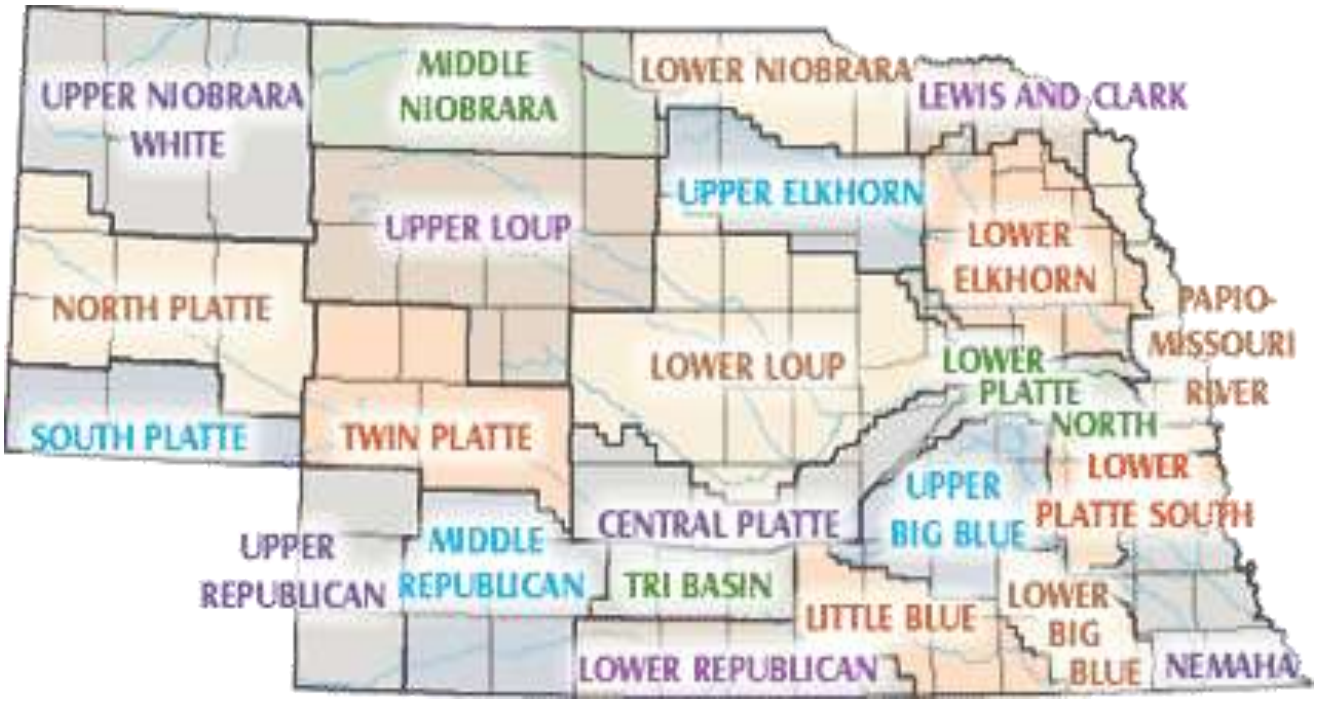
[6] U.S. Environmental Protection Agency. 1998. Method 4670 – Triazine Herbicides as Atrazine in Water by Quantitative Immunoassay. (http://1.usa.gov/x78HVk)

[7] Nebraska Department of Natural Resources Registered Groundwater Well Database (dnr.ne.gov/nebraska-interactive-maps)

[8] Modern Water, Inc. (formerly Strategic Diagnostics, Inc.) (http://www.modernwater.com/)

[9] Abraxis, LLC (http://www.abraxiskits.com/)

Appendix A. Nebraska's Natural Resources Districts



A hyperlinked map to each NRD's web page can be found at http://bit.ly/unU0Du.

Appendix B. Specificity tables provided by the two major manufacturers of ELISA reagent kits.[8,9]

Atrazine

Strategic Diagnostics Inc.

Specificity

The cross-reactivity of the Atrazine RaPID Assay for various triazine analogues can be expressed as the least detectable dose (LDD) which is estimated at 90% B/Bo, or as the dose required for 50% absorbance inhibition (50% B/Bo).

Compound	LDD (ppb)	50% B/Bo (ppb)
Atrazine	0.046	0.72
Propazine	0.033	0.74
Ametryn	0.053	0.39
Prometryn	0.054	0.64
Prometon	0.056	2.22
Desethyl Atrazine	0.062	3.21
Terbutryn	0.090	5.50
Terbutylazine	0.310	15.5
Simazine	0.340	4.90
Desisopropyl Atrazine	0.800	217
Cyanazine	1.0	>10,000
2-Hydroxy Atrazine	1.1	148

The following compounds demonstrated no reactivity in the Atrazine RaPID Assay at concentrations up to 1000 ppb: aldicarb, aldicarb sulfoxide, aldicarb sulfone, alachlor, benomyl, butachlor, butylate, captan, carbaryl, carbendazim, carbofuran, 2,4-D, 1,3-dichloropropene, dinoseb, MCPA, metolachlor, metribuzin, pentachlorophenol, picloram, propachlor, terbufos, thiabendazole, and thiophanate-methyl.

Alachlor

Specificity

The cross-reactivity of the Alachlor RaPID Assay for various chloroacetanilide analogues can be expressed as the least detectable dose (LDD) which is estimated at 90% B/Bo, or as the dose required to displace 50% (50% B/Bo).

Compound	LDD (ppb)	50% B/Bo (ppb)
Alachlor	0.05	0.98
Alachlor ESA	0.03	2.98
Butachlor	5.6	130
Metolachlor	6.0	78.3
Propachlor	6000	>10,000

The following compounds demonstrated no reactivity in the Alachlor RaPID Assay at concentrations up to 10 ppm: aldicarb, aldicarb sulfoxide, aldicarb sulfone, atrazine, benomyl, butylate, captan, carbaryl, carbendazim, carbofuran, cyanazine, 2,4-D, 1,3-dichloropropene, dinoseb, MCPA, metribuzin, pentachlorophenol, picloram, simazine, terbufos, thiabendazole, and thiophanate-methyl.

Abraxis LLC

Specificity

The cross-reactivity of the Abraxis Atrazine Assay for various triazine analogues can be expressed as the least detectable dose (LDD) which is estimated at 90% B/Bo, or as the dose required for 50% absorbance inhibition (50% B/Bo).

Compound	LDD (ppb)	50% B/Bo (ppb)
Atrazine	0.050	0.70
Propazine	0.084	1.18
Ametryn	0.022	0.44
Prometryn	0.052	0.80
Prometon	0.140	2.20
Desethyl Atrazine	0.250	4.75
Terbutryn	0.340	210
Simazine	0.760	3.40
Desisopropyl Atrazine	29	970
Cyanazine	0.800	47
2-Hydroxy Atrazine	0.960	20

The following compounds demonstrated no reactivity in the Abraxis Atrazine Assay at concentrations up to 1000 ppb: aldicarb, aldicarb sulfoxide, aldicarb sulfone, alachlor, benomyl, butachlor, butylate, captan, carbaryl, carbendazim, carbofuran, 2,4-D, 1,3-dichloropropene, dinoseb, MCPA, metolachlor, metribuzin, pentachlorophenol, picloram, propachlor, terbufos, thiabendazole, and thiophanate-methyl.

Specificity

The cross-reactivity of the Abraxis Alachlor Assay for various acetanilides analogues can be expressed as the least detectable dose (LDD) which is estimated at 90% B/Bo, or as the dose required for 50% absorbance inhibition (50% B/Bo).

Compound	LDD (ppb)	50% B/Bo (ppb)
Alachlor	0.042	0.72
Acetochlor	0.15	10
Metolachlor	0.19	25
Butachlor	0.14	20
Alachlor Sulfonic Acid	16	>10,000
Alachlor Oxalinic Acid	>10,000	>10,000
Metalaxyl	12	1700
Propachlor	1500	>10,000

The following compounds demonstrated no reactivity in the Abraxis Alachlor Assay at concentrations up to 1000 ppb: aldicarb, aldicarb sulfoxide, aldicarb sulfone, Atrazine ametryn, benomyl, butylate, captan, carbaryl, carbendazim, carbofuran, cyanazine, 2,4-D, 1,3-dichloropropene, dinoseb, MCPA, metribuzin, pentachlorophenol, picloram, propazine, simazine, terbufos, thiabendazole, and thiophanate-methyl.

Metolachlor

Strategic Diagnostics Inc.

Specificity
The cross-reactivity of the Metolachlor RaPID Assay for various chloroacetanilide analogues can be expressed as the least detectable dose (LDD) which is estimated at 90% B/Bo, or as the dose required to displace 50% (50% B/Bo).

Compound	LDD (ppb)	50% B/Bo (ppb)
Metolachlor	0.05	0.85
Acetochlor	0.06	6.55
Metalaxyl	0.06	5.60
Butachlor	0.26	52.0
Propachlor	1.0	2500
Alachlor	1.3	84.0

The following compounds demonstrated no reactivity in the Metolachlor RaPID Assay at concentrations up to 10 ppm: aldicarb, aldicarb sulfoxide, aldicarb sulfone, atrazine, benomyl, butylate, captan, carbaryl, carbendazim, carbofuran, cyanazine, 2,4-D, 1,3-dichloropropene, dinoseb, MCPA, metribuzin, pentachlorophenol, picloram, simazine, terbufos, thiabendazole, and thiophanate-methyl.

Acetochlor

Not Available

Abraxis LLC

Specificity
The cross-reactivity of the Abraxis Metolachlor Assay for various acetanilides analogues can be expressed as the least detectable dose (LDD) which is estimated at 90% B/Bo, or as the dose required for 50% absorbance inhibition (50% B/Bo).

Compound	LDD (ppb)	50% B/Bo (ppb)
Metolachlor	0.074	1.90
Acetochlor	0.35	26
Butachlor	2.2	56
Alachlor	3.0	110
Metalaxyl	9	260
Propachlor	140	4,200

The following compounds demonstrated no reactivity in the Abraxis Metolachlor Assay at concentrations up to 1000 ppb: aldicarb, aldicarb sulfoxide, aldicarb sulfone, atrazine, ametryn, benomyl, butylate, captan, carbaryl, carbendazim, carbofuran, cyanazine, 2,4-D, 1,3-dichloropropene, dinoseb, MCPA, metribuzin, pentachlorophenol, picloram, propazine, simazine, terbufos, thiabendazole, and thiophanate-methyl.

Specificity
The cross-reactivity of the Abraxis Acetochlor Assay for various acetanilides analogues can be expressed as the least detectable dose (LDD) which is estimated at 90% B/Bo, or as the dose required for 50% absorbance inhibition (50% B/Bo).

Compound	LDD (ppb)	50% B/Bo (ppb)
Acetochlor	0.042	0.60
Alachlor	0.045	0.70
Metolachlor	0.110	1.60
Butachlor	0.920	20
Alachlor Sulfonic Acid	9.2	224
Acetochlor Sulfonic Acid	15	78
Alachlor Oxalinic Acid	16.8	496
Metalaxyl	68	1600
Acetochlor Oxalinic Acid	130	680
Propachlor	8,000	>10,000

The following compounds demonstrated no reactivity in the Abraxis Acetochlor Assay at concentrations up to 1000 ppb: aldicarb, aldicarb sulfoxide, aldicarb sulfone, atrazine, ametryn, benomyl, butylate, captan, carbaryl, carbendazim, carbofuran, cyanazine, 2,4-D, 1,3-dichloropropene, dinoseb, MCPA, metribuzin, pentachlorophenol, picloram, propazine, simazine, terbufos, thiabendazole, and thiophanate-methyl.

Appendix C. Examples of Field and NRD ELISA Laboratory Forms.

1. Example Field Sample Labels

Ambient Stream WQ Network (SE Run)

Trip #: DEQ ___ ___ ___ ___ ___ ___ ___ ___ ___ A

Station #: SNE3LNEMA143
Little Nemaha River at Auburn

Ambient Stream WQ Network (SE Run)

Trip #: DEQ ___ ___ ___ ___ ___ ___ ___ ___ ___ A

Station #: SNE2BIGNEM60
B. Nemaha-Falls City

Ambient Stream WQ Network (SE Run)

Trip #: DEQ ___ ___ ___ ___ ___ ___ ___ ___ ___ A

Station #: SNE2NFBNR152
N F Big Nemaha- River at Humboldt

Ambient Stream WQ Network (SE Run)

Trip #: DEQ ___ ___ ___ ___ ___ ___ ___ ___ ___ A

Station #: SBB1BBLUE110
Big Blue R. - Barneston

Ambient Stream WQ Network (SE Run)

Trip #: DEQ ___ ___ ___ ___ ___ ___ ___ ___ ___ A

Station #: ___ ___ ___ ___ QCDUP1

Ambient Stream WQ Network (SE Run)

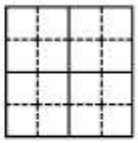
Trip #: DEQ ___ ___ ___ ___ ___ ___ ___ ___ ___ A

Station #: ___ ___ ___ ___ QCFBLK1

2. Example field sample inventory sheet.

XYZ Study **SAMPLE # XYZ-_____**
Date_____
Time_____
Blank/Dup/Pest/Split **Sampled By**_____

• **LOCATION** **Legal** T_____N, R_____W, Sec_____, _____ = ____¼____¼____¼
Long _____ **Lat** _____ (Dig/GPS/Map Est)
County: _____ |ST=31| NRD=_____
Hydrologic Unit (CATUNIT)_____ Topo Map_____



• **GPS INFORMATION** Filename _____ Offset from well _____ (distance, direction)
Start Time _____ End Time _____

• **WELL** Domestic/Municipal Pivot/Other Sprinkler Gate/Ditch
Other_____
Location: Pit Lowlying NearDitch/Drainage High Flat Sidehill Low End Field CenterField
Well Condition:_____
DWR Reg #_____ **Date Drilled** _____ (Reg/Approx/Known) **Yield** _____

• **POINT SOURCES**
Barnyard _____ft,_____ of well Active/Idle Cattle/Swine/Poultry/Horse/Other
Septic/Sewer _____ ft. _____ of well Up/Down Hill
Chemigation: On/Off Fert/Pest
Other PS_____

• **NONPOINT SOURCES**
Crops at/near well: Corn Soybean Sorghum Alfalfa Bean Small Grain Potato Other
(type, distance, direction) _____
Pesticides/Fertilizer used: (field, type, amount, appl.method, time) _____
_____

• **OTHER WELL INFORMATION** (STORET)
Type (84056): Irrig Dmstc Pubsp Stksp Ind Unusd Other
Topography (84060) Vally Slope Hiltp Draw Flat Lcdep Trrc Undlg Flpln Other
Well Owner (84059) Priv Inst Comm **Casing Material** (84114) Steel PVC Cncrt Other
Drill Method (84063) Dug Bore Cable Drivn Rvrt Other **Avail. Log** (84055) D E G on back
Well Depth (72008)_____ft **Source Well Depth Info** (84126) Ownop Drllg Ragnc Other
SWL (72019)_____ft BGS **Source SWL** (84128) Ownop Drllg Ragnc Other
PWL (73674)_____ft BGS **PumpPer** (72004)_____minutes before sampling
Screen Length (82509)_____ft **Elevation** (72000)_____ft. above MSL
Sample Type Freq (84053) WQA **Sample Purpose** (84122) GWQAL
Reg Ag (84121) State
Date of Lab Analysis (73672)_____(yr mo day)

• **FIELD DATA** **Temperature** _____°C **Conductivity** _____ umho/cm **pH** _____
Hach NO_3-N _____ mg/l **Triazine** Positive Negative Not Applicable

• **LAB DATA** NHHS Lab/Other Lab NRD WQ Sample **NO_3-N** _____ mg/l **Year** _____

	mg/l	Dup/Split		mg/l	Dup/Split	Pesticides
Nitrate-N	_____	_____	Sodium	_____	_____	Type_____
Chloride	_____	_____	Magnesium	_____	_____	Conc_____
Sulfate	_____	_____	Calcium	_____	_____	Type_____
Bicarbonate	_____	_____	Potassium	_____	_____	Conc_____
			Ionic Balance	_____%	_____%	Type_____
						Conc_____

• **WELL OWNER/OPERATOR**
Name
Address
Prior/OnsitePermission
Send results? Y N

3. Example field sampling and custody record sheet

STATE OF NEBRASKA
Department of Environmental Quality
Water Quality Division/Ground Water Section
Field Sampling and Custody Record

Sample Site/Project:_____ Resource Tracking:_____

Sampler(s):_____

Results to:_____ Revised 6/98

	Sample ID	Lab Number	Owner/ Location	Sample Date	Sample Time	# of Containers	Analysis	Comments
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								
11.								
12.								
13.								
14.								
15.								
16.								
17.								
18.								
19.								
20.								

	Samples Delivered By	Samples Received By	Date	Time	Lab Number
1.					
2.					
3.					
4.					
5.					

4. Example Lab Analysis Sheet

ATRAZINE
Blank Form

Analyzer:	Corr (r):	Control Known Concentration: 3.0 ± 0.6ppb
Date of Analysis:	% CV 0.0:	Observed Concentration:
Time of Analysis (starting - ending):	% CV 0.1:	Range of Detection: 0.05ppb - 5.00ppb
Kit Lot Number:	% CV 1.0:	Dilution Factor:
Kit Expiration Date:	% CV 5.0:	Batch Number:

51 Conc.:	52 Conc.:	53 Conc.:	54 Conc.:	55 Conc.:	56 Conc.:	57 Conc.:	58 Conc.:	59 Conc.:	60 Conc.:
41 Conc.:	42 Conc.:	43 Conc.:	44 Conc.:	45 Conc.:	46 Conc.:	47 Conc.:	48 Conc.:	49 Conc.:	50 Conc.:
31 Conc.:	32 Conc.:	33 Conc.:	34 Conc.:	35 Conc.:	36 Conc.:	37 Conc.:	38 Conc.:	39 Conc.:	40 Conc.:
21 Conc.:	22 Conc.:	23 Conc.:	24 Conc.:	25 Conc.:	26 Conc.:	27 Conc.:	28 Conc.:	29 Conc.:	30 Conc.:
11 Conc.:	12 Conc.:	13 Conc.:	14 Conc.:	15 Conc.:	16 Conc.:	17 Conc.:	18 Conc.:	19 Conc.:	20 Conc.:
1 0.0 STD	2 0.0 STD	3 0.1 STD	4 0.1 STD	5 1.0 STD	6 1.0 STD	7 5.0 STD	8 5.0 STD	9 Control	10 Conc.:

Remark Codes
U - Material analyzed but not detected. Value given is Minimum Detection Limit (MDL). **Q** - Beyond 7 day holding time.
F - Sample was filtered through 0.2-micron filter prior to being analyzed. **D** - Sample was diluted prior to being analyzed.

Appendix D. Required equipment, supplies, and consumable material for this project.

One-time Purchases	Annual Purchases
RPA-1 photometer	Pesticide Reagent Kits (atrazine, acetochlor, alachlor, and metolachlor) Includes standards and controls; color, stopping, and washing solutions; and test tubes.
200 µl pipette	Disposable pipette tips
1 ml Repeater pipette	60 ml or 120 ml sample bottles (QC samples) and bottles (for the ELISA analysis)
Magnetic test tube rack	
Vortex Genie	
Digital Alarm/Timer	