

1962 - 2012

50
Years

ARDC



A commemorative booklet celebrating the 50th anniversary of

UNIVERSITY OF NEBRASKA-LINCOLN

AGRICULTURAL RESEARCH

AND DEVELOPMENT CENTER

Near Mead, Nebraska - 2012



Feeding the Future



UNIVERSITY OF
Nebraska
Lincoln

UNIVERSITY OF NEBRASKA-LINCOLN * INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES



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ARDC

Half a century ago, University of Nebraska–Lincoln embarked on a journey to enhance ag research and education capabilities and the Agricultural Research and Development Center was founded.

Many changes have taken place since that time, from the type of research conducted to the facilities and landscape. We recognize the advances and accomplishments of the first five decades, as we look ahead towards the future.

On April 12, 1962, the United States Department of Health, Education, and Welfare transferred land and former Nebraska Ordnance Plant buildings to the University of Nebraska for the purpose of education and research.

The September 23, 2012 open house celebrates these endeavors and also recognizes another momentous milestone - the Morrill Act's 150th anniversary.

In 2012, the University of Nebraska–Lincoln, along with other land-grant universities and the states they serve, celebrates the 150th anniversary of the Morrill Act. The Morrill Act brought into being land-grant universities, making education more affordable to all people, educating them in agriculture, home economics, mechanical arts and other professions practical at the time. Before the Morrill Act, higher education was primarily a privilege of the rich.

Thanks to the land-grant legislation, each state has tremendous success stories to tell, graduating successful leaders and citizens, extending knowledge to those who put it to immediate use in their lives, and conducting agricultural research that helps feed the world.

We hope you enjoy this keepsake publication intended to archive our past history as well as to provide insight about our research and education mission to serve the citizens of Nebraska.

*ARDC 50th Anniversary Celebration Committee
Deloris Pittman (Chair), Mark Schroeder, Dan Duncan, Ruby Urban,
Galen Erickson, Karna Dam, Lannie Wit, Rich Anderson, and Doug Gustafson*

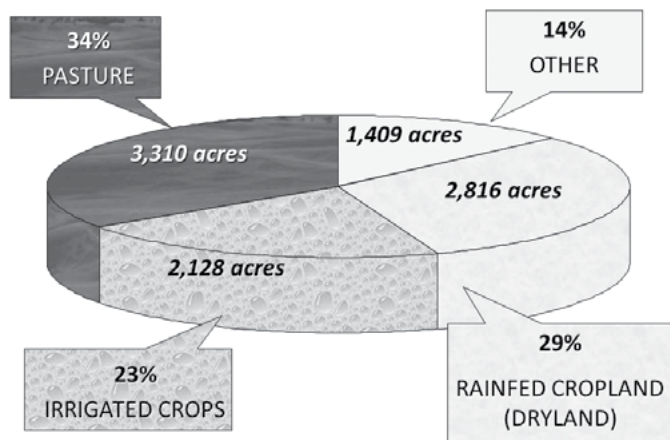


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About the ARDC

The University of Nebraska-Lincoln Agricultural Research and Development Center (ARDC) is a major research and education facility of the Agricultural Research Division of the University of Nebraska Institute of Agriculture and Natural Resources (IANR). The ARDC encompasses approximately 9,663 acres and serves as the primary site for field-based research involving 90 faculty and 150 graduate students within IANR.



ARDC Land Use

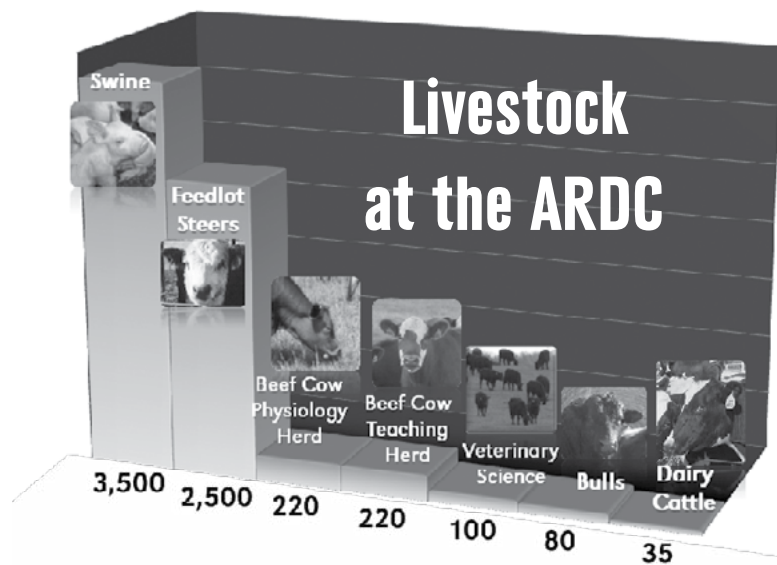
UNL Institute of Agriculture and Natural Resources (IANR)

representation at the ARDC:

- Agronomy and Horticulture
- Animal Science
- Biological Systems Engineering
- Center for Advanced Land Management Information Technologies (CALMIT)
- Entomology
- Husker Genetics
- Nebraska Forest Service
- Plant Pathology
- School of Natural Resource Sciences
- Southeast Research and Extension Center
- UNL Extension in Saunders County
- Veterinary and Biomedical Sciences

Other University of Nebraska representation:

- Electrical Engineering
- Nebraska Educational Television
- Physics and Astronomy
- University of Nebraska Medical Center
- University of Nebraska - Omaha



The size of the ARDC allows for interdisciplinary research work that cannot be performed at other Universities.

Some recent examples include:

- Carbon Sequestration Program
- Nutrient management research (cycle)
- Feedlot research involving numerous hybrids produced on the ARDC
- E-Coli management in feedlots

Farm Operations

While ARDC Farm Operations does not conduct research, it provides land, equipment, labor, expertise, and services to departments when the resource is not available within the academic department or is cost prohibitive for the department to do so on its own. This allows the university to efficiently manage ARDC lands and provide large scale agricultural services to assist the research on a least-cost basis. The farm provides a working laboratory using modern production practices and equipment sized to today's production agriculture.

Production services relieve the researcher of the burden of managing a crop and instead allowing them to concentrate on research implementation and data collection. Farm Operations manages the crop from planting through harvest and the researcher needs only to concern themselves with specialized applications and other research protocols within the field. Farm Operations works closely with the researcher to plan out every facet of the crop including research treatment layout (using the farm's 20 ft wide equipment), seed requirements (often changing within field by hybrid and rates), tillage, pest control management (weed, insect, disease), application timing and rates, irrigation, and harvest method (dry grain, high moisture 28-30%, silage, identity preserved segregation).

The farm staff must be meticulous at implementing and documenting their work in the field. The utmost care is taken to ensure that the work is completed on an accurate and consistent basis which reduces unknown variables in the research. Record keeping and reporting also consume a considerable amount of staff time. The data collected and reported is analyzed, error checked and summarized for use by the researcher.

Revenue from cropland not intensely used for research is used to fund employee wages and benefits and to purchase all farm-related equipment, services, and supplies. Tax dollars are not used to fund farm operations. Much of

ARDC Farm Operations play an integral part in the successful outcomes of research, teaching, and extension programs of many University departments. The ultimate mission of Farm Operations is to help facilitate research and education programs the most effective way by sharing resources and expertise.

Farm Operations QUICK FACTS

- Tillable Acres (However, all are no-till) 3,000
- Number of Fields 111
- Acres Irrigated 1,325
- Yield Difference Between Irrigated and Dryland Corn 71 bu/ac
- Yield Difference Between Irrigated and Dryland Soybean 13 bu/ac
- Days of Harvest 31
- Tandem Truck Loads of Grain Harvested Fall 758
- Most Grain Harvested In One Day 31,084 bushel
- Bin Storage Capacity 275,000 bushel
- Miles Traveled by Combines Harvesting Crop 1,328 miles
- Number of GPS Yield Points Recorded 573,600
- Pages Filled by GPS Yield Points if Printed 15,095
- Number of Large Round Bales Made 1,216
- Roadside Mowing Tractor Hours 415 Hrs.
- Hour Meter Runtime for all Farm Equipment 3,741 Hrs.
- Gallons of Fuel Metered from Fuel Station (Farm and other ARDC vehicles) 46,281 Gallons
- Miles of Road for Snow Plowing 26 miles

the farm equipment is available for occasional use by all departments at ARDC, which helps keep cost of ownership down. Services such as trucking, haying, fertilizer and pesticide application, and other custom field operations are provided to research units as requested.

The farm maintains a road grader for grading of the gravel roads on the ARDC, provides snow removal on the roads, and does roadside mowing. The farm works with the animal science units to plan and manage livestock manure applications based on crop nutrient need and soil status. Hay, grain, and grazing land needs are coordinated to ensure the right feedstuff is delivered at the right time to the animal research units.



Business Operations

The ARDC's business support is provided by staff located in the ARDC August N. Christenson Research and Education Building who are members of the IANR Greater Nebraska Business Center (GNBC). The GNBC is a formal partnership of staff from the Northeast (Norfolk/Concord), West Central (North Platte) and Panhandle (Scottsbluff) Research and Extension Centers, the Southeast Research and Extension Center, and the ARDC. By leveraging expertise to develop best business practices, review internal controls, and solve problems jointly, the business center concept improves business processes in a cost effective manner. Eight ARDC-based staff duties include business center management, human resources, payroll, accounting, grant/contract administration, and other business services. In addition to the ARDC, they also provide business support to Southeast and Northeast Research and Extension Centers, Husker Genetics, and South Central Ag Lab near Clay Center.



Business support for the Agricultural Research and Development Center is provided by the Greater Nebraska Business Center. By joining forces with other IANR centers, business functions are streamlined more efficiently.

Headquartered at the ARDC:

The ARDC August N. Christenson Research and Education Building serves as headquarters to the following:

- **ARDC Administration**
- **Greater Nebraska Business Center - ARDC Based**
- **Husker Genetics**
- **Southeast Research and Extension Center**
- **UNL Extension in Saunders County**

Facilities Operations

Facilities Operations at the ARDC provides services for all of the units at the research center. This involves maintaining, modifying and improving facilities used by departments, such as the roads and central water system.

Most of these facilities were installed when the Nebraska Ordnance Plant was constructed in the 1940's. There are approximately 26 miles of public roads and over 25 miles of water mains and 2 water towers serving the water system. Units or departments at the ARDC also have their own roads and water systems and Facilities Operations helps them maintain, expand and improve their systems.

The main facilities that other departments own are buildings. There are over 167 buildings at the ARDC. The Facilities Operations staff works with all departments to help them maintain or modify their buildings.

The ARDC Facilities Operations staff includes a facilities manager, trades supervisor, two carpenters, two electricians, a landscape assistant, a plumber and a heavy equipment operator.



ARDC Facilities Operations helps support the infrastructure of the ARDC. They maintain over 25 miles of water mains and 32 wells. In the above photo, the Facilities Operations crew are replacing a section of the original 70-year old 12" water supply mainline. They are assisted by Nebraska Forestry Fire Shop using a Military 800 series 5-ton wrecker from NFS Fire Shop. Facilities has developed a Geographic Information System (GIS) where all utilities on the ARDC are GPS mapped, including marking such line repairs.

Who's Visiting Us

Annually, 5,000 to 7,500 people attend programs, events, training, and tours at the ARDC. The following pages provide a brief synopsis of some of those visits from July 1, 2011 through June 30, 2012.

PROGRAMS FOR ADULTS

- Ag Builders of Nebraska Summer Tour
- Ag Development Team Training
- Beef Profitability Workshop
- Beekeeping Workshops
- Beginning Beekeeping Field Day
- Behlen Observatory Public Viewing Nights
- Beef Quality Assurance Training
- CenUSA Biofuels Switchgrass Establishment Workshop
- Crop Management Diagnostic Clinics
- Cover Crop Field Day
- EPA Public Meeting
- Excellence in Ag Science Inservice
- Extension Board of Directors
- Field Scout Training
- Friends of 4-H and Extension Foundation
- Grain Marketing Meeting
- Husker Beef Nutrition Conference
- Mid-Plains Beef Short Course
- Multiple Sclerosis Society Bike Rest Stop
- NAE4HA Tour -Animal Science
- Nebraska Agricultural Water Management Network
- NDEQ Livestock Tour
- Nebraska Corn Growers Association Directors
- Nebraska No-Till Conference
- Nitrogen Management Training
- On-farm Research Consultations and Research Review
- Onsite Wastewater Training
- Organic Farming Meeting
- Platte Valley Equipment Planter Program
- Pollinator Conservation Short Course
- PQA Plus Certification via Webinar
- Private Applicator Pesticide Certification Training
- Research Center Administrators Society Tour
- Saunders County Extension Board
- Saunders County Soybean Grower's Directors
- Saunders County Corn and Soybean Growers Call-a-Thon and Directors Meetings
- Saunders County Grain Marketing
- Saunders County Soybean Growers Twilight Tour
- SoyWater - Bit Mobile Demonstrations
- Turfgrass Field Day
- UNMC Ag Occupational Health Training
- USDA-ARS Focus Group Update
- Veterans into Farming Program

INTERNATIONAL

- Argentina Producers (3 visits)
- Brazilian Feedlot Tour
- Jain India Irrigation Team
- Krasnodar Russian Visitors
- National Maize RD Center, MOA China Tour
- NE State Dept. of Ag Vietnamese Visitors
- Open World Visitors
- SNF Vietnam Delegation Visit
- University of Bonn Germany Visitors
- UNESCO-IHE Institute for Water Education - Delft, Netherlands
- Valmont Singapore Tour
- Vietnamese Ministry of Agriculture and Rural Development (MARD) National Agricultural Extension Center

Students with the UNESCO Institute of Hydraulic and Environmental Engineering of Netherlands visited the ARDC to get hands-on experience with irrigation. The 18 students are originally from Costa Rica, Ethiopia, Indonesia, and Uruguay.





**UNL Extension
brings
expertise and
educational
programs to the
ARDC**



YOUTH AND 4-H

- 4-H ATV Training
- 4-H Workshops - Babysitting Basics, Clover Kids Daycamp, Flower Arranging Workshop, Foods Workshop, Home Environment Workshop, Natural Resources Workshop, Painting Workshop, and Shadowbox Workshop
- 4-H Council Meetings
- 4-H Leaders Banquet
- 4-H Mobile Beef Lab
- 4-H Science Festival
- 4-H Shooting Sports Training
- 4-H Tagging & Tattooing
- Ag Awareness Festival
- FFA State Land Judging Contest
- Millard English Language Learners Visit
- Omaha Westside AP Human Geography Students
- Omaha Westside Chinese Exchange Students
- Wahoo High School ASSET and PSAT testing
- Wahoo Public Science Club



With continued urban growth, many communities are losing touch with Nebraska's greatest resource - agriculture. The Agricultural Awareness Festival provides an opportunity for youth to take a close-up look at agriculture. Each fall, 750-900 fourth-graders attend the festival at the ARDC.

COLLEGE LEARNERS

- Mississippi State Collegiate Cattlemen's Student Tour
- UNL AGRO/MSYM/AGEN 431 Site-Specific Crop Management Class
- UNL AniSci150 Class, AniSci 100 Study Tour, and UNL Livestock Evaluation Class
- UNMC Farm Safety Tour and UNMC Agro-Medicine Students

The ARDC works with the University of Nebraska Medical Center to provide general agricultural information and ag safety tours. The tours are attended by students and professionals in the medical field that work or will be working in rural communities.



UNL Extension's Crop Management educational programs are tailored for agricultural businesses, representatives, producers, educators, and others wishing to expand their knowledge base or needing Continuing Education Credits. Held at a site at the ARDC developed exclusively for the clinics, the expertise of University and industry agricultural specialists and professionals is drawn upon to provide the latest, most up-to-date information. Presentations include hands-on activities or field demonstrations in small groups to encourage interaction between presenter and participants.

The First 50 Years

There is a lot that can happen in 50 years...so much that it is impossible to capture *every* detail of *every* project that has taken place at the ARDC or *every* visitor that has been to the center within the context of this publications. This section highlights some of the milestones, significant events and visits, and various projects that have occurred over the years.

The history of the Agricultural Research and Development Center is ongoing. So let us know if there is additional information that we can include in our records.

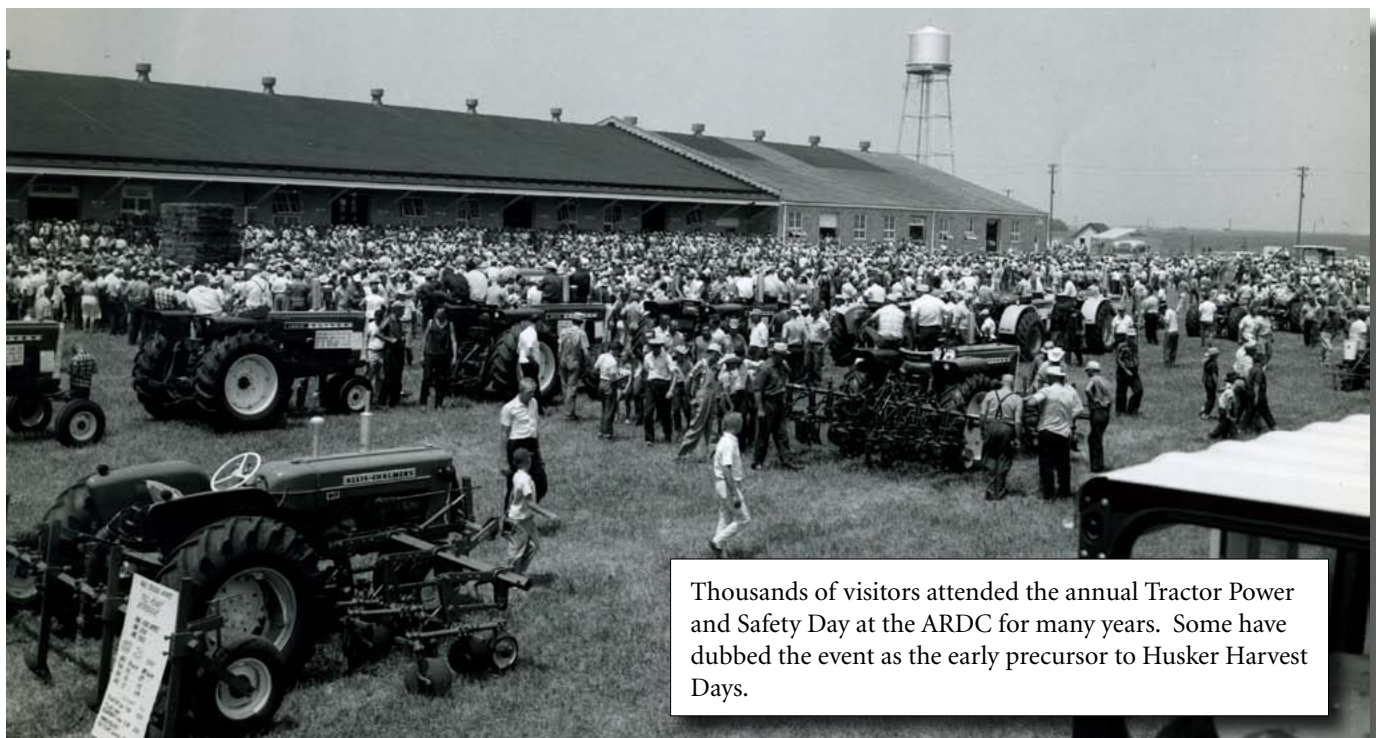
Year	Noteworthy Events
1962	<ul style="list-style-type: none"> • On April 12, 1962, the United States Department of Health, Education, and Welfare transfers land and former Nebraska Ordnance Plant (NOP) buildings to the University of Nebraska for the purpose of education and research. UNL embarks on a journey to enhance ag research and education capabilities. • Forestry establishes six 40-acre windbreaks systems and four 4-acre control plots on 600 acres. A new McIntire Stennis project “Windbreak Shelter Effects” is initiated. • Veterinary Science starts operations at the University of Nebraska Field Laboratory in the early 1960s. • More than 14 semi truckloads of prehistoric fossil bones in their field casts (approximately 56 tons) are placed in temporary storage at the ARDC, thus earning the building they are stored in the nickname of the “Bones” Building. • Warren Sahs is named Superintendent of the new field laboratory
1963	<ul style="list-style-type: none"> • The Entomology facility and Agronomy operations are established. • UNL’s Ag Engineering Department holds the first Tractor Power and Safety Day in 1963. This event drew in huge crowds and continued until 1983. • A frame building is moved east of the Load Line 2 for Horticulture headquarters. • NU Mum Day attracts 6,268 people.
1964	<ul style="list-style-type: none"> • From 1964-1966, 3,000 acres of improved pastures are planted. • Irrigation well #1 is drilled. • Feedlot pens are developed from 1964-1974. Nebraska Ordnance Plant (NOP) inert storage buildings are relocated and renovated for headquarters offices and a shop. • The Hydraulics Laboratory is initiated by the Army Corps of Engineers at the ARDC. The scale model of the Missouri River’s Pomeroy Bend is utilized to determine soil erosion and water navigation issues by utilizing crushed walnut shells.

<p>1965</p>	<ul style="list-style-type: none"> • Research on the biology, ecology, and management of corn rootworms begins at the ARDC Insect Field Laboratory in the mid-1960s. • From 1965-1975 livestock fencing is constructed. • The Dairy Unit facilities are constructed from 1965-1966 and UNL's dairy herd is moved from UNL's East Campus to the ARDC. • A crowd of 17,600 attends the Tractor Power and Safety Day .
<p>1966</p>	<ul style="list-style-type: none"> • The Dairy residence, the Climatology lab and the Forestry facility are constructed. • \$380,000 worth of hard surface road repair and improvements are made from 1966-1980. The source of funding for this project is from sale of surplus equipment, primarily rail and ties. • A test involving 498 clones of Eastern Cottonwood begins and leads to release of 3 selective varieties: Mighty Moe, Platte and Noreastern.
<p>1967</p>	<ul style="list-style-type: none"> • Construction of the individual feeding facilities for Animal Science beef projects is completed. • A section of land is assigned to the Agronomy Department. Roads, drainage systems and two irrigation wells are completed in the Agronomy area. • The Nebraska Agricultural Experiment Station hosts the Third National Grassland Conference and Field Days at the Field Laboratory, July 12-14 with 20,000 in attendance. Numerous agricultural-oriented groups and foreign visitors attend. Tillage, conservation, irrigation, and materials handling are demonstrated on a realistic field scale. • The ETV transmitter is constructed. • Alfalfa variety testing begins at the ARDC. Every year through 2003, alfalfa varieties and germplasms from state and federal breeding programs, as well as from commercial companies, are planted side-by-side, harvested, and compared. But alfalfa variety testing does more than just compare varieties. In the late 1960s and early 1970s, some of the earliest work with multiple pest resistance is conducted at the ARDC. In the mid-1980s, the ARDC provided the first university-based alfalfa variety test plots for forage quality. • A 24 pen swine nutrition building and a 30 sow farrowing unit are completed. • Five upright silos are added to the Dairy Unit.



In 1963, NU Mum Day drew in 6,268 people who came to see 82 varieties of chrysanthemums. 7,000 mums were on display. The event continued to be a popular attraction for many years.

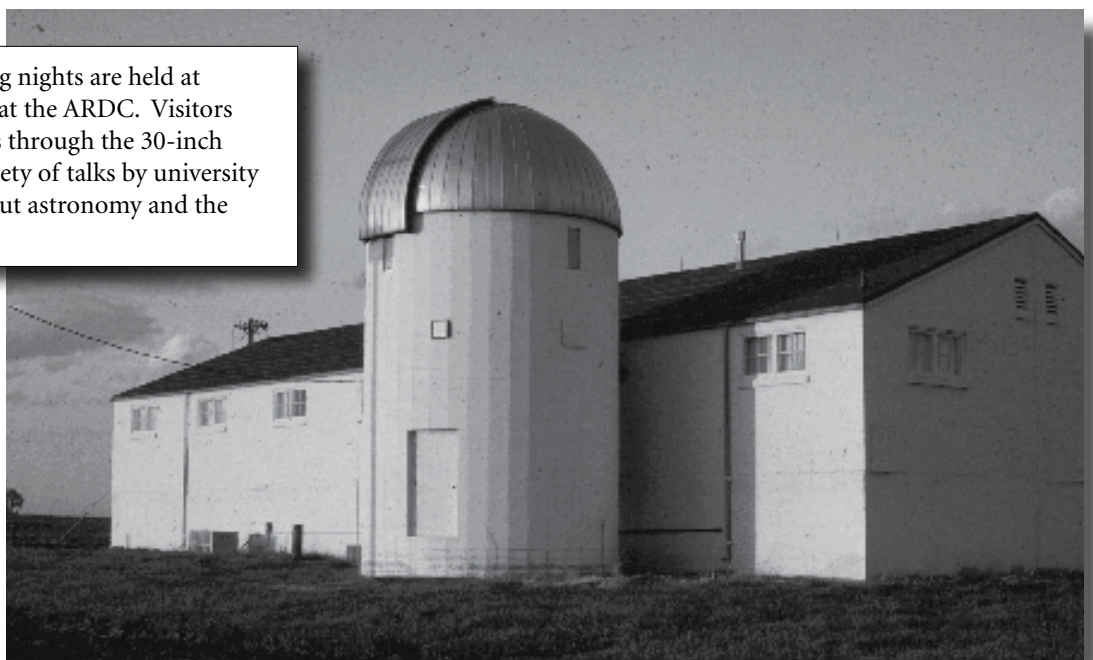
<p>1968</p>	<ul style="list-style-type: none"> • A waste management project is initiated and structures are installed below the Beef Research Center at the Field Laboratory. • Irrigation water re-use systems are installed, activated, and demonstrated. Nitrogen practicality is demonstrated in a gated pipe irrigation system. An additional sixty acres of land is re-shaped for gated pipe irrigation. • The UNL Department of Animal Science Hereford herd is relocated to the ARDC. The Hereford herd is maintained as a purebred herd until 1985 when the decision is made to convert the Hereford herd to a composite herd using the Hereford cows as the base. • The annual Tractor Power and Safety Day attracts 12,000 visitors. • The Eppley Cancer Institute (College of Medicine) breeding farm is located at the ARDC and is composed of sixteen environmentally controlled buildings. Several thousand hamsters, rats, and mice are reared each month for research use at the College of Medicine. • A shower in/shower out headquarters building with truck storage is constructed at the Swine Unit. • Sheep research is relocated to the ARDC from UNL's East Campus. Eleven 30' x 60' excess NOP buildings are moved and consolidated at one location, creating 16,500 square feet of covered floor space for the Sheep Unit.
<p>1969</p>	<ul style="list-style-type: none"> • A solid set sprinkler system is installed and operated during the growing season to test the infiltration rates of deep silty clay soils. • A second irrigation water re-use system is installed and activated; an additional forty acres of row crop land is shaped for irrigation. An area is re-shaped for a manure loading experiment in conjunction with the utilization of beef animal waste on agricultural land. • A 32 pen swine nutrition building is erected. The building is an insulated and mechanically ventilated. • The annual Tractor Power and Safety Day attracts 10,000 visitors. • An August 2 storm causes \$100,000 worth of damage to property. Damage appears to be from tornadic activity.



Thousands of visitors attended the annual Tractor Power and Safety Day at the ARDC for many years. Some have dubbed the event as the early precursor to Husker Harvest Days.

<p>1970</p>	<ul style="list-style-type: none"> • A Scotch pine seed orchard is established by the Nebraska Forest Service. • The annual Tractor Power and Safety Day attracts 10,000 visitors. • A 3,500 ft. sodded airstrip is completed. • Fifty acres of land are re-shaped in the Agronomy section for ultimate research plot use. An irrigation well and power source are supplied to Agronomy sub-surface irrigation projects. • A long-term cropping systems study begins at the Agronomy research area in the early 1970's. Yield results over the years have shown a slight benefit from rotation for corn and soy-bean, but grain sorghum has yielded just as well in monoculture as in rotation when sufficient N fertilizer is applied.
<p>1971</p>	<ul style="list-style-type: none"> • Volatile fatty acids (acetic-propionic) are applied to 20,000 bushels of wet shell corn to study preservative capabilities. • The first segment of the Feedmill is completed for beef nutrition rations. • A modern small grain seed cleaning and processing center is finished for the Foundation Seed Division. • The North Change House at Load Line 3, is modified for a canine project for the UNMC relating to cancer research. • Outside lots are constructed for swine research.
<p>1972</p>	<ul style="list-style-type: none"> • The Behlen Observatory at the ARDC is established in 1972 through a \$200,000 donation by Walter Behlen, the founder and president of Behlen Manufacturing Company in Columbus, Nebraska. Mr. Behlen was an avid amateur astronomer who would invite friends and neighbors to look through his 10-inch telescope on the front porch of his home in Columbus. This telescope is currently on display at Behlen Observatory. • The south feed mixing mill is constructed through private donations by beef producers.
<p>1973</p>	<ul style="list-style-type: none"> • The Veterinary Science complex is added. • An additional 40 acres are assigned to the Entomology Unit.

Scheduled public viewing nights are held at the Behlen Observatory at the ARDC. Visitors can view celestial objects through the 30-inch telescope and hear a variety of talks by university faculty and students about astronomy and the observatory.



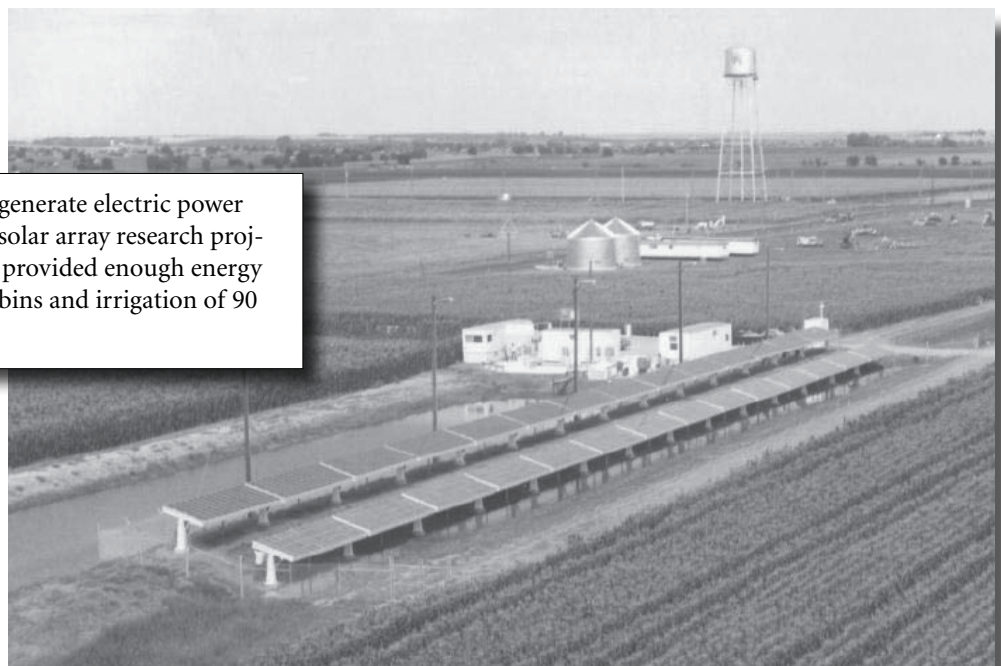
<p>1974</p>	<ul style="list-style-type: none"> • The Nebraska Till Plant system is used on 500 acres of dryland corn. • Number of hunters during hunting season totals 3,511. They bagged the following: Pheasants 711; quail 42; rabbits 198; and squirrel 11. • A trailer house is moved in for the Swine Unit Manager's residence. • Agronomy complex renovation of irrigation and drainage systems occurs from 1974-1985. • Control structures are installed to handle all surface water runoff from the Beef Nutrition Center. • Construction of a water flush confined beef barn with holding reservoir begins.
<p>1975</p>	<ul style="list-style-type: none"> • "Organic Residues and By-Products in Crop Production" project is initiated. The project involves 13 treatments, 4 replications, and the use of manure, rotations, and crop residues as an organic approach to eastern Nebraska dryland farming practices. Corn, oats, clover, and soybeans are utilized to ascertain favorable economic returns without the use of herbicides, insecticides, or chemical fertilizers. • A revolutionary Individual Beef Feeding Confinement Barn (120 head) using a sloped floor, water flush manure system, with a grate over the "dairy barn" type gutter is completed. Advantages of group feeding and individual intake and feeding habits are monitored and confirmed with the use of electronic gates. • A Feedmill for all departments is completed, expending \$600,000 of Havelock land sale funds.
<p>1976</p>	<ul style="list-style-type: none"> • A long-term experiment that evaluates and compares a crop rotation under organic and conventional management systems and a corn monoculture system is initiated in 1976. The experiment is managed consistently from 1976 through 1992. • Agronomic research projects includes comparisons between semi-composted paunch manure vs. feedlot manure vs. commercial N. • The semi-composted beef feedlot manure land loading project is underway. Irrigated corn is the primary indicator of treatment effect. Grain yields varied from 80 to 160 bu/acre, which is an excellent indicator of plant response to land treatment of the organic residues. Fourteen inches of irrigation water are applied. • Field Lab electrical distribution responsibility is transferred to the Omaha Public Power District, Omaha, Nebraska. • A one day workshop, "Organic Residues and By-Products in Crop and Animal Production" is developed.

The feedmill at the ARDC is operated by UNL's Department of Animal Science. Feed made in the mill is mixed in one of two one-ton mixers. The feedmill also mixes and delivers feed to livestock located on UNL's East Campus in Lincoln. This includes feed for beef cattle, sheep, horses, pigs and poultry. Some experimental diets are made for cattle at the Dalbey-Halleck Research Farm near Virginia, Nebraska and at the Gudmundsen Sandhills Laboratory near Whitman.



<p>1977</p>	<ul style="list-style-type: none"> • The Forestry greenhouse is erected and installed utilities. • A 26' x 58' inert storage building is moved and set up as an Entomology project shop building. • Various types of organic residue are composted resulting in 1,000 tons of the finished product. • A 5 kilowatt photovoltaic solar array is installed 1977-1978 powering two natural air drying bins and irrigation of 90 acres. • The Nebraska Railroad Association is funded a project on grasses to maintain right of way and decrease fires.
<p>1978</p>	<ul style="list-style-type: none"> • A new project includes composted Fremont, Nebraska sewer sludge vs. beef feedlot manure vs. chemical N treatments with irrigated corn. • The new swine research facilities (Phase II and Phase III) are completed. • The "Chicago sludge" project is initiated in cooperation with W-124 regional project. • Precipitation Chemistry Studies begins at the ARDC in 1978 and still is ongoing in 2012. The lab constitutes a field facility where precipitation chemistry is monitored year-round as part of the National Atmospheric Program/National Trends Network (NADP/NTN). The purpose of this network is to provide information on the chemistry (e.g., sulphate, nitrate, ammonium) to help monitor temporal and geographical trends. This ARDC site is one of the inaugural sites starts in 1978. Now, the network consists of over 250 sites nationally. Following a strict quality control, data from the ARDC and other sites are made available via the NADP website.
<p>1979</p>	<ul style="list-style-type: none"> • All Field Laboratory buildings are inventoried, being classified as research intensive, research oriented, storage, or excess. • A complete set of confinement lots for beef cow management research are completed. • The Agricultural Meteorology Lab begins taking part in an acid rain study. The site is one of over 200 sites across the country involved in the National Atmospheric Deposition Program/National Trends Network.

Photovoltaics provides a way to generate electric power from the sun or solar energy. A solar array research project that was installed 1977-1978 provided enough energy to power two natural air drying bins and irrigation of 90 acres.



<p>1980</p>	<ul style="list-style-type: none"> • Over 188,000 square footage of roof renovation is made possible to LB 309 funding. • A pesticide disposal pit and storage building is constructed at the Agronomy complex. • Over 1,000 trees and shrubs are planted and maintained to provide future cover for wildlife in a designated wildlife habitat area. • A new livestock handling facility is constructed in the Beef Nutrition area and the first stage remodeling of the Dairy Nutrition barn is completed. • An electric drive Olson center pivot is installed in the Agricultural Engineering area. Two 16,000 grain drying and storage bins are installed in the Load Line 1 area. • Two harvestore silos are installed in the Feedmill area. • The Energy Integrated Farm is established. • Expansion of Climatology Laboratory occurs from 1980-1981.
<p>1981</p>	<ul style="list-style-type: none"> • Beef Nutrition cattle pens are re-worked including grading, fencing, and installation of new-free flow waterers, piping and drain lines. Concrete platforms are constructed at each waterer. • The automated weather station is established on the grassy areas just east of the Agrometeorology Laboratory. • Bids for the earthwork contract on the Energy Demonstration Farm are taken for the development of a 10-acre site. Construction will include an animal waste lagoon, swine buildings, general roads and site development. Over 2,000 trees for a shelterbelt are planted. . • Hunting season opens with 410 hunters taking 152 pheasants the first two days. • A 6 tower center pivot, 1185' length, covering 101 acres plus end gun is purchased. • The University hosted the Nebraska Hereford Tour in September and includes a small group of calves on display that were sired by L1 Domino 5109 that drawing a lot of attention. Subsequently, one of those calves, NU Domino 107, is entered in the Showcase sale and sells for the record price of \$20,000.



Research was conducted at the Integrated Energy Farm on energy producing and energy conserving practices and technologies. After the energy farm was decommissioned, the house was moved to the swine research unit to provide an on-site residence for the manager. Later, the swine building at the energy farm was utilized for a prawn (shrimp) production project and the ethanol production building is utilized for value-added research projects by UNL's Industrial Agricultural Products Center.

<p>1982</p>	<ul style="list-style-type: none"> • The Hydraulics Laboratory, a project of the Omaha Corps of Engineers and the UNL Civil Engineering department, ceases operations at the Field Laboratory after 15 years of studying erosion and sedimentation problem areas of the Missouri River. • Operations of the Eppley Institute, College of Medicine, small animal breeding farm, are reduced to a holding action wherein the best genetic strains of test animals are being maintained. Species involved are hamsters, rats, mice and rabbits. • Integrated Energy Farm Progress -Twelve hundred gallons of sweet forage sorghum "juice" are harvested and successfully fermented to ethanol. The final distilled product is 185 proof alcohol. • The deed for 8,400 acres of the University of Nebraska Field Laboratory is delivered from the U.S. Government to the Board of Regents. This results from 20 years of equity acquisition through approved and reported public service usage. The remaining 640 acres will be transferred in 1986. • The Field Laboratory contracts with the Nebraska Penal Complex for eight trustees to work on demolition, painting and general clean-up projects.
<p>1983</p>	<ul style="list-style-type: none"> • An open house at the Sheep Unit is held on June 28, and includes conclusions of the 1983 Nebraska Ram Test. The Ag Engineering 32nd Annual Tractor Power and Safety Day is held the same day. • The 8th University of Nebraska Turf Field Day and Equipment Show is held in August 9. • A contest is conducted August through September in 1983 to name the new IANR-wide annual event focusing on animal agriculture which will be held at the University Field Laboratory in 1984. The winning name..."AG EXPO".
<p>1984</p>	<ul style="list-style-type: none"> • The first annual IANR AG EXPO is held at the University Field Laboratory on July 26. The event includes an equipment parade, exhibits, livestock unit tours, swine research video, disease prevention video, and an open house at the Energy Farm. • Personnel from New York and Hollywood representing Walt Disney Films visits, to take early morning photographs of several in-line center pivot irrigation systems in action. The film is to depict agriculture from the cavemen through the American Indian era, to modern agriculture of today. • 1984 is the last year for the Tractor Power and Safety Day program - the which was funded by the UNL Ag Engineering Department. • A rhizotron underground root viewing lab is installed at the Horticulture/Turf Unit from 1984-1985.



The Mead Hydraulic Lab at the ARDC was operated by the U.S. Army Corps of Engineers. The model was utilized to study the navigation channel at the junction of the Kansas and Missouri Rivers near Kansas City, Missouri. An interesting component of the project was that finely ground walnut shells were utilized to simulate Missouri River sand.

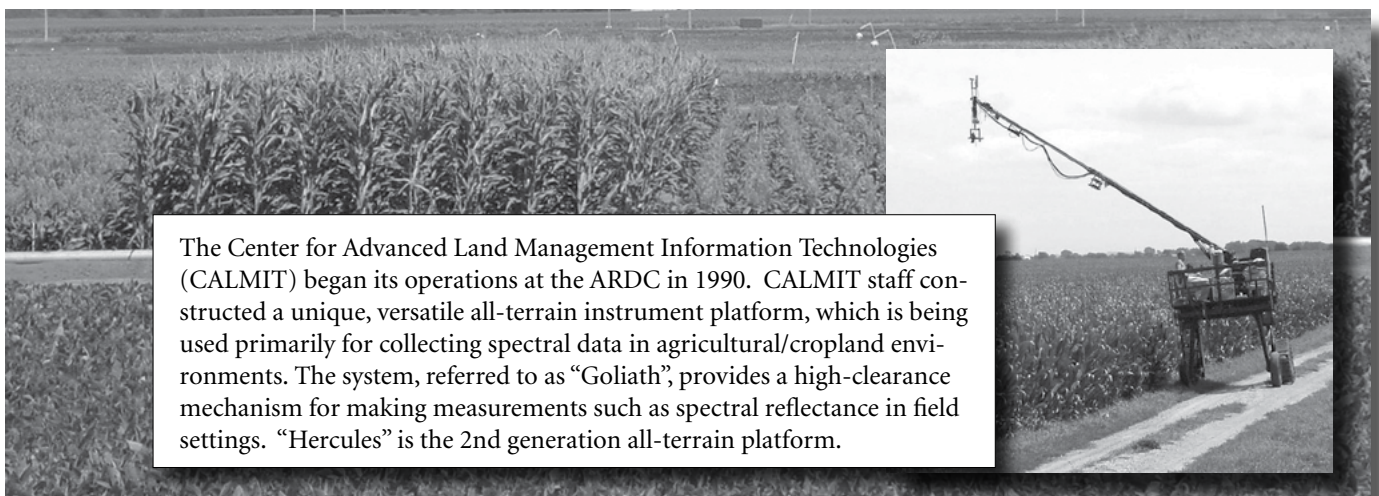
Picture from the U.S. Army Corps of Engineers Missouri River Design Study, MRD Hydraulic Laboratory Series Report No. 1, Operation and Function of the Mead Hydraulic Laboratory.

<p>1985</p>	<ul style="list-style-type: none"> • The University of Nebraska Field Laboratory is renamed University of Nebraska Agricultural Research and Development Center. • The second IANR AG EXPO features “Crop Production,” with the following departments sponsoring the event, i.e., Agronomy, Agricultural Economics, Agricultural Biochemistry, Forestry, Fisheries and Wildlife, Entomology, and Plant Pathology. This is a joint effort with the Cooperative Extension Service. • The Individual Beef Feeding barn is reconstructed after it is destroyed by an April 19th windstorm. • The south Line 2 change house is demolished and a 70 x 50 foot building is constructed for horticulture research.
<p>1986</p>	<ul style="list-style-type: none"> • Several projects are initiated to investigate different cropping systems and practices for Nebraska. Experiments includes: strip cropping of corn-soybeans and sorghum-soybeans, both dryland and irrigation; relay cropping of soybeans into winter wheat, dryland and irrigated; and windbreak effect of corn on soybeans compared to soybeans grown in a monoculture. • Behlen Observatory is renovated.
<p>1987</p>	<ul style="list-style-type: none"> • The ARDC celebrates its silver anniversary on April 9. • Several different cropping systems experiments include: strip cropping of corn-soybeans and sorghum-soybeans, dryland and irrigated; relay cropping of soybeans and grain sorghum into winter wheat, dryland and irrigated; windbreak effect of corn on soybeans compared to soybeans grown in a monoculture, and various weed control methods for corn and soybean production. • Concrete slabs are poured and a complex electrical system is installed on two new 7,500 bushel grain storage bins at the Animal Science Feedmill.
<p>1988</p>	<ul style="list-style-type: none"> • The ARDC is toured by World Bank-USAID representatives, Nebraska Agricultural Council, Ag Builders Inc., American Society of Civil Engineers, and Nebraska Irrigation tour. Approximately 550 people visited the center as special tour groups. • During hunting season, 1,136 hunters bagged 197 pheasants. Bow and arrow deer hunters bagged four deer. • Major physical improvements include: demolition and removal of Conservation and Survey building 2-26 and expansion of the Turf research area. The Dairy sewage lagoon and inlet is constructed. • The physical facilities of the Solar Array project, Energy Farm, are dismantled and recycled.



The 120 head individualized beef feeding barn involves training cattle to eat from one specific bunk. Each animal wears a sensor “key” around its neck. The key opens a one spring-loaded, self-locking door. The system provides for 1 door, 1 key, 1 ration for 1 animal. Just like a house key, you have to have the right key to open a specific door. The system provides a way to obtain exactly what every animal eats and monitor the growth rate on various diets.

<p>1989</p>	<ul style="list-style-type: none"> • A group of six veterinary assistants from Uganda visit the Dairy Unit as part of a 11-week tour. They are studying commercial dairy production in the U.S. • Ponderosa Pine are planted in 1988 and 1989. The planting is designed as a potential seed orchard for the production of high quality seed for use in the Central Great Plains. Early results are very positive with total economic benefits exceeding systems of trees alone or livestock alone. These trees represent genetic work initiated in the early 1960s. The ponderosa pine planting, a progeny test of selected seed sources identified in an original study of ponderosa pine from the Great Plains, is completely destroyed by a severe wind and hail storm in September 2010. In addition, the planting is in a long-term silvopastoral study designed to quantify the total economic return from integrating trees and livestock. It is just beginning to produce significant seed yields. • The UNL Department of Animal Science Angus herd is moved to the ARDC. Artificial insemination is used more extensively in both the Angus and newly forming composite herd. • An additional irrigated experiment is added to the relay intercropping research project to study growing two crops in one year.
<p>1990</p>	<ul style="list-style-type: none"> • The Center for Advanced Land Management Information Technologies (CALMIT) begins its operations on a small plot of land for remote-sensing research. A parcel of land is located east of Load Line #4. CALMIT field personnel and ARDC facilities excavate soil and place several 2,500-gallon tanks to use for a series of water quality / remote sensing experiments. • Research on developing switchgrass as a biomass energy crop begins and is still underway. • The IANR Expo featuring Soybean Production Utilization and Marketing is held at the ARDC. The event is sponsored by the Nebraska Soybean Checkoff Board, Saunders County Soybean Growers Association, and UNL IANR. Attendees participate in field demonstrations, five walking and riding tours, and view over 50 educational exhibits. • Studies are initiated to determine the impact of trees on the distribution and abundance of invertebrate natural enemies of crop pests. These studies are initially conducted in windbreak systems at the ARDC and are expanded to private farms in 1993. Ground and foliage-inhabiting arthropods in the shelterbelts and crops are sampled periodically throughout the year with pitfall traps, foliage sweeps, and branch samples. Distribution of these generalist arthropod predators in the woody edge and other components of the ecosystem are compared, in search of the most common and effective predators.



The Center for Advanced Land Management Information Technologies (CALMIT) began its operations at the ARDC in 1990. CALMIT staff constructed a unique, versatile all-terrain instrument platform, which is being used primarily for collecting spectral data in agricultural/cropland environments. The system, referred to as “Goliath”, provides a high-clearance mechanism for making measurements such as spectral reflectance in field settings. “Hercules” is the 2nd generation all-terrain platform.

<p>1991</p>	<ul style="list-style-type: none"> • Warren Sah retires as director. Daniel Duncan is hired as director and begins this role on November 11, 1991. • Several different cropping system experiments includes: four soybean varieties with trypsin inhibitors are increased for swine feeding trails; four grain sorghum varieties are increased for feeding trails; large plot (up acres) summer annual grazing trials are initiated; corn stalk grazing trials are continued. • 600 people visited the ARDC in 1991.
<p>1992</p>	<ul style="list-style-type: none"> • The Integrated Farm crop/livestock project begins to study innovative cropping and grazing systems. An interdisciplinary team of research, teaching, and extension faculty is involved in establishing long-term priorities and reviewing specific projects that will be includes in the program. The goal of the team is to develop systems of management that continue to increase the profitability of Nebraska agricultural producers while protecting the environment. The Integrated Farm includes: a 120-head feedlot, 120-head beef cow herd, a 140-head dairy herd, a 300-ewe flock, and about 4,000 acres of dryland and irrigated cropland, and warm and cool season grass pastures. • The UV-B Radiation Monitoring Program is initiated to provide information on geographical distribution and temporal trends of UV-B radiation in the U.S. • Declining federal funds for energy research results in closing in the Energy Farm. • The Army Corps of Engineers investigates issues related to Department of Defense operations at the former Nebraska Ordnance Plant, most of which is now occupied by the ARDC. The investigations are divided into three operable units under an Inter-Agency Agreement between the Army, EPA, and DEQ. <ul style="list-style-type: none"> - Operable Unit #1 studies possible soil contamination in the Load Line areas from explosive compounds, heavy metals' and PCB. The Corps proposes that approximately 6,100 cubic yards of soil will be excavated and treated. The excavations will mostly take place around vacant buildings in the Load Line areas and the old burning and proving grounds. Remediation is scheduled to begin in late 1994. - Operable Unit #2 studies possible ground water contamination from explosive compounds and TCE. Four drilling rigs placed over 100 observation wells on the former Nebraska Ordnance Plant, many of which are on the ARDC. - Operable Unit #3 studies building contamination and other possible areas of contamination not identified in Operable Units #1 and #2. PCB and antimony contaminates are found.

UNL Agricultural Research and Development Center Administrators



Warren Sah
ARDC Director, 1962-1991



Dan Duncan
ARDC Director, 1991-2008



Mark Schroeder
ARDC Director, 2008-Present

<p>1993</p>	<ul style="list-style-type: none"> • The Nebraska Legislature approves funding for construction of the ARDC Research and Outreach Facility. Design plans are presented for approval at the Board of Regents' December meeting. The facility is designed to be efficient in its use of space and energy. Building materials that are "environmentally friendly" will be used throughout the facility. Designed under the IANR Strategic Plan, the building is intended to demonstrate wise resource management. • Saunders County approves nominal lease agreement moving Saunders County Extension offices to the Research and Education Building once it is constructed. • The Festival of Color begins as a venue for the university to share research findings on water conservation and water quality in home and commercial landscapes. It evolves into a popular annual event attracting adults and children to the John Seaton Anderson Turfgrass and Ornamental Research Area. The festival grows from 850 visitors in 1993 to an average of more than 9,000 people annually until the last event held in 2001. • Integrated Farm establishes a strip intercropping rotation of corn-grain sorghum-soybean, with varying maturities and planting dates of each crop evaluated for their effect on crop yield. Crop residue is grazed. Enclosures are placed in strips of each crop to measure the effect of grazing on soil bulk density and subsequent crop yields. Conducted in cooperation with Biological Systems Engineering and the Cow/Calf Unit, two center pivot-irrigated fields are planted to corn and irrigated corn yields are measured in both grazed and ungrazed areas of the field. Manure composting from the different livestock enterprises and land application begins in the spring of 1993.
<p>1994</p>	<ul style="list-style-type: none"> • 240 people attend the "Initiation of Construction Ceremonies" on May 13 kicking off construction of the research and education building. The \$2.66 million construction contract is awarded to R.L. Fauss Builders Inc. of Fremont, designed by architectural firm Leo A. Daly of Omaha. • The ARDC Visions newsletter debuts in July. • The Dairy Research Unit builds a 40x160' hay storage shed, a silage bunker, and a 50x120 foot concrete pad for supporting silage ag bags. • The UNL Animal Science Merchandising Class conducts its first bull sale at the Bull Development area. Due to unfavorable April weather the first two years, animals are moved to campus and the sale event continues to be held in Lincoln. • 3,000 people attended the 2nd annual Festival of Color.



The former NOP gatehouse for Load Line #2 served as the ARDC headquarters until March 1995. The August N. Christenson Research and Education Building now serves as the headquarters and conference center for the ARDC.

<p>1995</p>	<ul style="list-style-type: none"> • The ARDC Research and Education Building is completed and administrative staff moves into their new offices in April. Saunders County Extension follows with relocation from Wahoo. Funding for the 23,000 square foot building is provided by the Nebraska Legislature and private donations. The \$2.89 million Research and Education Building is dedicated on October 10, 1995. • “Agriculture and People ... Building a Shared Environment” symposium is held in conjunction with the building dedication ceremony. The symposium focuses on managing animal waste resources for minimal impact on the environment, integrated production systems management, and the interface of agriculture, natural resources and the environment. • An uncommon crop at the ARDC, snap beans are planted in the summers of 1994 and 1995 in Forestry shelterbelts to examine their growth and yield as affected by wind protection and microclimate changes. • Compost, strip cropping, organic sweet corn, and student microfarms are featured at the 14th Sustainable Ag Tour attracting 70 participants.
<p>1996</p>	<ul style="list-style-type: none"> • The first Ag Awareness Festival is held at the ARDC. The one-day event for 200 Omaha Public School sixth-graders has since grown to four days each year with 950 fourth-grade students, primarily from Douglas, Sarpy and Saunders Counties. Over 10,979 students attend the fall festival from 1996-2011. • First Crop Management Diagnostic Clinic is held at the ARDC and is located at the solid-set irrigation research site developed years earlier by Agricultural Engineering. Over 130 people attend the 2 day training. • An expanded Extended Visions newsletter which includes Saunders County Extension news debuts in May. • First use of harvest yield monitors using GPS at the ARDC. • Roundup Ready soybeans are introduced. • The Biological Systems Engineering farm merges with the ARDC farm creating ARDC Farm Operations. Ag Meteorology and Entomology farms are also included.
<p>1997</p>	<ul style="list-style-type: none"> • Led by the efforts of U.S. Senator Bob Kerrey, \$13.5 million is appropriated to the Corps for the removal of asbestos and demolition of dilapidated structures at the former ordnance plant. The site is placed on the Superfund National Priority List (NPL) in 1990. • The Army Corps of Engineers begins incineration of 11,000 tons of soil contaminated with explosive RDX as part of the Superfund NOP cleanup project. Plans begin to start extraction and treatment of RDX and TCE contaminated ground water. • 22nd Annual Nebraska Turfgrass Field Day attracts 352 people involved in golf course management, grounds maintenance, commercial supply, athletic turf management, lawncare, and research. • A School to Work Fair provides the opportunity for 800 students to explore careers. • 20,012 people attend programs at the ARDC including 9,000 who attended the Festival of Color.



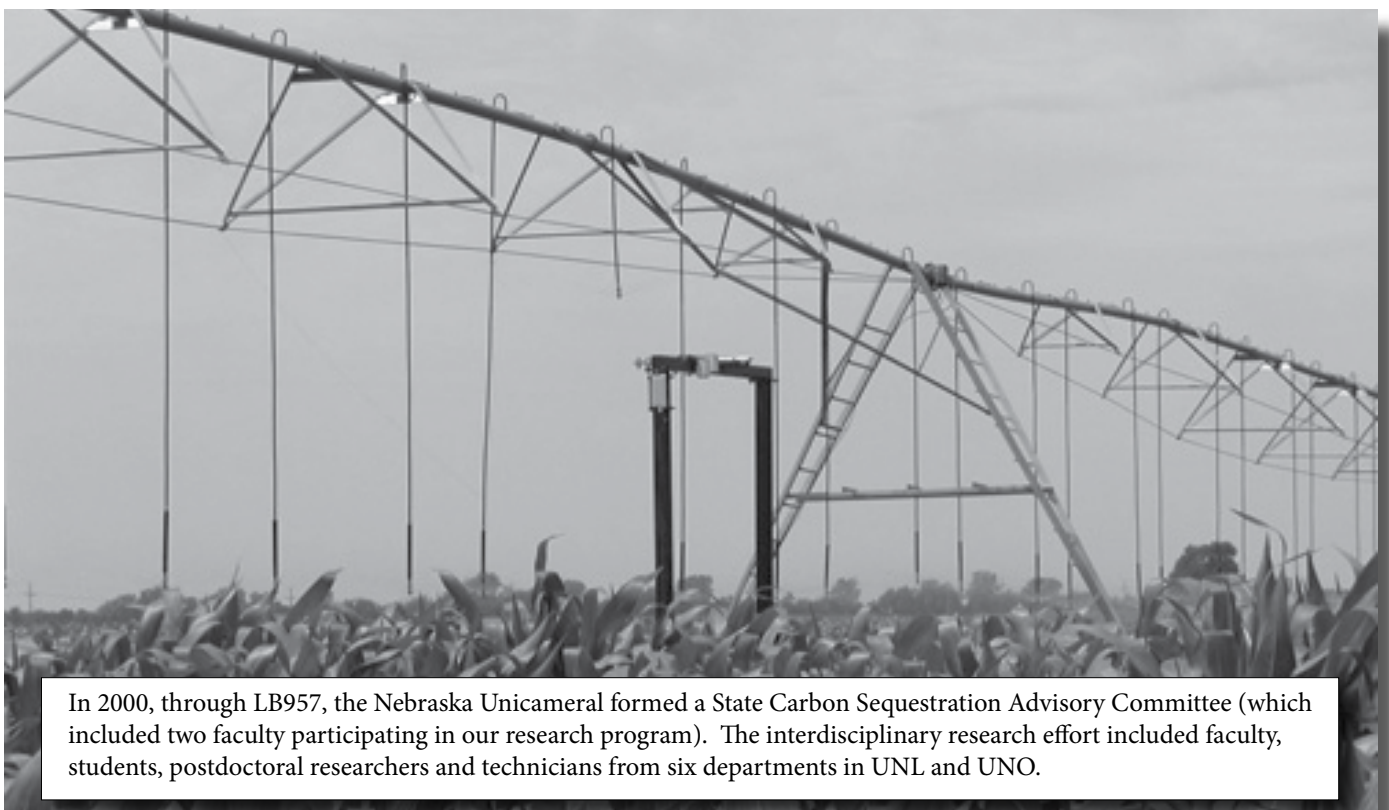
The John Seaton Anderson (JSA) Turfgrass and Ornamental Research Facility at the ARDC is utilized by UNL's interdisciplinary Turfgrass Science Team. The JSA area is the largest irrigated turfgrass research facility in the U.S. with over 50 acres dedicated to turfgrass studies.

<p>1998</p>	<ul style="list-style-type: none"> • Nebraska Ordnance Plant (NOP) Load Line structures are demolished including 102 ordnance “igloo” bunkers. • NU Regents hold their September monthly meeting at the ARDC and learn about current affairs at the ARDC. • 10,500 people attend the Festival of Color • 20,940 people tour or attend programs at the ARDC
<p>1999</p>	<ul style="list-style-type: none"> • Nebraska Forest Service Fire Equipment Shop relocates to ARDC from Lincoln’s Air Park West where they had been for 30 years. The shop utilizes the building site left behind from the USACE soil incineration remediation project to remove explosive compounds (RDX) from NOP soil contamination. • Funding is provided through a Nebraska Network for the 21st Century (NN21) grant to develop and implement agricultural sciences into the Mead Public Schools. The ARDC played an important role in this project. The Mead Magnet School results. • ARDC is the focal point of CALMIT’s large NASA-funded education grant known as “America’s Farm.” Educational materials based upon remote-sensing of agricultural lands are developed for web delivery. A web cam is positioned on the water tower northeast of Load Line 4 to provide internet users the opportunity to view agricultural operations and landscape. • Alley-cropping research and demonstration site is founded at Forestry, composed of shrubs that produce commercially viable specialty wood crops. The woody florals and fruit plants are planted in widely spaced rows between traditional corn, beans and wheat crops. Small producers and acreage owners learn to increase profits with information on production, processing and marketing using models that use low capital, and are family and environmentally friendly. • Notable visits -The UNL Chancellor’s Committee of Visitors tour the ARDC. State Senators and the Governor are amongst those in attendance at the “Solutions in Agriculture” forum exploring issues facing agriculture. The National Association of County Agriculture Agents (NACAA) holds their 84th Annual National Meeting in Omaha and visit the ARDC as part of their conference. • Historical items found from the Nebraska Ordnance Plant (several old lights, signs and an alert siren) are donated to the Saunders County Historical Society. • 8,500 people attend the Festival of Color.



The Festival of Color annual lawn and garden open house grew from 850 visitors in 1993 to an average of more than 9,000 people annually until it ended in 2001 due to funding issues.

<p>2000</p>	<ul style="list-style-type: none"> • Foundation Seed Division is transferred from the Department of Agronomy to Agricultural Research Division (ARD) on Jan. 1. FSD is administered by Agronomy since its founding in 1946. ARD assigns responsibility for FSD administration to the director of ARDC. The FSD business office and warehouse property located near 70th and Adams Streets in Lincoln is offered for sale along with the Genoa seed farm. • The Carbon Sequestration Program is initiated on one dryland and two irrigated quarters to study soil, plant, and atmosphere carbon and greenhouse gas dynamics. The CSP continues into 2013. Drs. Ken Cassmann and Shashi Verma are principal investigators leading a team of 18 faculty and dozens of graduate students. • 120 people attend a Manure Management Field Day.
<p>2001</p>	<ul style="list-style-type: none"> • Husker Genetics is introduced. Husker Genetics licenses UNL seed technology and serves as an interface between the University and industry. Husker Genetics is created to manage transgenic licensing and production for UNL. • Renovations of the Foundation Seed Plant are made including a new cold storage room and modification of the seed plants to allow separation between GMO and non-GMO varieties. • State-of-the-art wide area Wireless High-speed communication system is installed to provide fast internet access for research equipment and PCs, replacing excruciating slow and unreliable phone modems on the Center. • Waterlines are installed to the Agronomy and Sheep areas to provide potable drinking water, due to NOP contaminated ground water at those areas.. • Nearly 17,000 people enrolled in educational programs and tours at the ARDC. These “learners” includes government officials, researchers, farmers, agri-business professionals, educators, garden enthusiasts and students. Several foreign visitors are among the persons attending these programs.



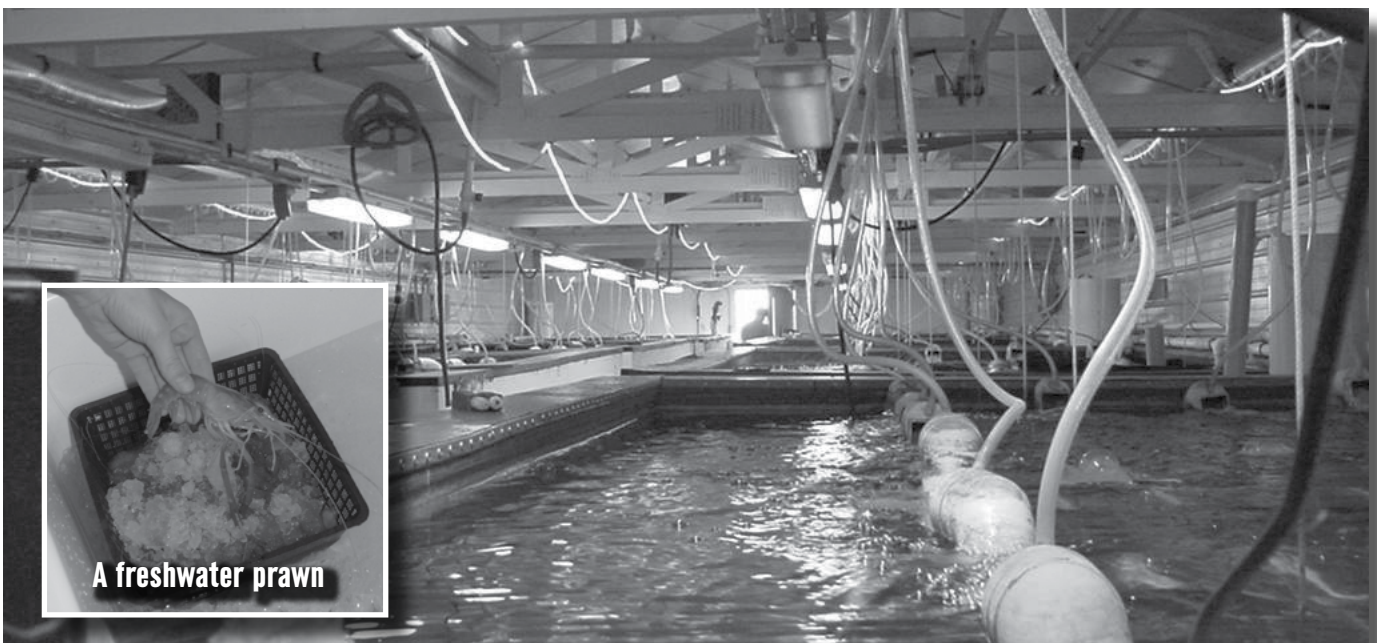
In 2000, through LB957, the Nebraska Unicameral formed a State Carbon Sequestration Advisory Committee (which included two faculty participating in our research program). The interdisciplinary research effort included faculty, students, postdoctoral researchers and technicians from six departments in UNL and UNO.

2002

- Aquatic indoor facility is developed for growing indoor **fresh water prawn** using the abandoned hog confinement at the Energy Farm. The Nebraska Soybean Board assists with funding with the significant use of soybean meal in the diet of the shrimp.
- Research begins on controlling the **Varroa mite in honeybee colonies** with focus on exploring strategies using inert dusts to remove mites from adult bees.
- HDW is hired to conduct engineering studies for municipal water systems upgrades and JEO for a LL2/Turf waste water system lagoon.
- The **Crop Management Diagnostic Clinics moves** to a new location – south of the ARDC Research and Education Building - to take advantage of the modern teaching facilities offered by the auditorium and exhibition hall.
- **NU President L. Dennis Smith** holds the annual **University of Nebraska Press Picnic** at the ARDC. The event is designed to inform the media about current happenings at the four University of Nebraska campuses.
- Hot and dry weather had a significant impact on crop yields for the second straight year. **Beneficial effects of crop rotation and no-till are noted.** Continuous corn yields on tilled ground are about 35% of normal while rotated no-till is about 70% of normal.
- The ARDC initiates a new **award** – the **ARDC Employee of the Year**. The award is sponsored by the ARDC social/benefits committee. Candidates are nominated by their peers. Doug Gustafson, Farm Operations, is selected as the first recipient.

2003

- A new 10,000 square foot area dedicated to investigating sand-based root-zone turf for athletic fields is constructed at the **John Seaton Anderson Turfgrass Research Facility**. The plots are constructed to better respond to the need for sand-based root-zone research, both in Nebraska and nationally.
- Departmental business support operations within IANR are reorganized into 8 business centers. The ARDC-based business personnel join the ASSIST Business Center team.
- 2003 *ARDC Employee of the Year* - Caryl Carstenson



In 2002, research was conducted on raising indoor fresh water prawn. The Nebraska Soybean Board assisted in funding for the project due to the soybean meal in the diet of the shrimp. The prawn raising facility was located in an abandoned hog confinement shed that was formerly part of the Energy Farm at the ARDC.

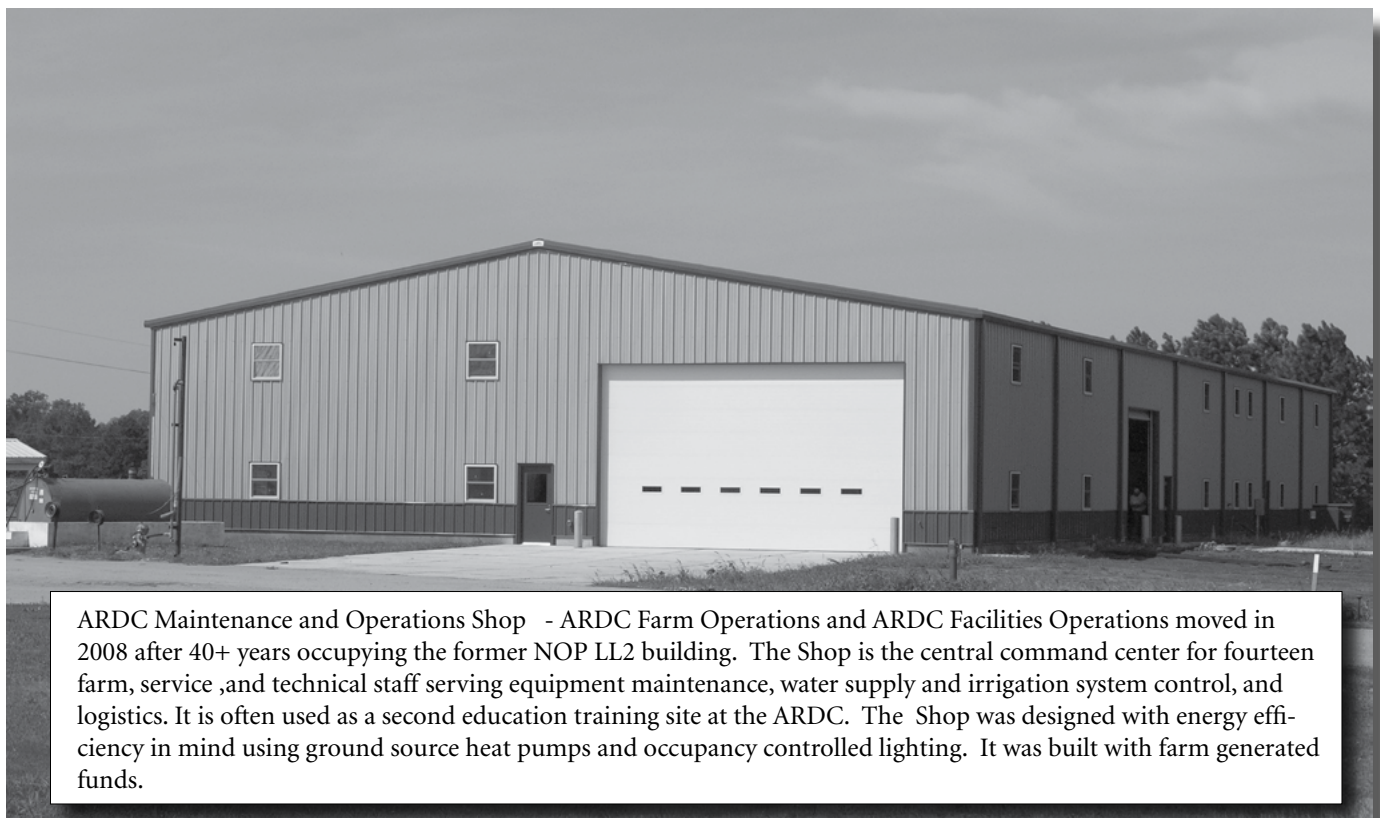
<p>2004</p>	<ul style="list-style-type: none"> • A RTK GPS base station is installed enabling sub-centimeter GPS accuracy across the entire facility. The base station is used to survey infrastructure, lay out plots, and enable machine guidance systems. Straight rows become the norm. • On October 25, 2004, the exhibition hall at the Research and Education Building is named the "Warren Sahs Exhibition Hall". • Irrigated and rain-fed corn yields on ARDC attain historic highs with yields of 230 and 170 respectfully. • 2004 <i>ARDC Employee of the Year</i> - Ken Rezac
<p>2005</p>	<ul style="list-style-type: none"> • The Research and Education building is renamed the August N. Christenson Research and Education Building at a celebration June 3. A significant endowment is created by Mr. Christenson for the perpetual support of the ARDC and UNL College of Business Administration. • Animal Science completes a new feedlot north of the individualized feed barn and former sheep research barn increasing research animal capability 50%. A 90-acre pivot is installed to distribute livestock pen runoff water. • In late 2005 a team of seven researchers at UNL representing Agronomy and Horticulture, Entomology, and the School of Natural Resources receives a grant from USDA to establish four certified organic research sites across the State. One of those sites is located on 44 acres within the SNR FFW shelterbelt system at ARDC. • A digital lighted welcome sign is installed at the Hwy 66 entrance to the Christenson building. • The Ag Builders of Nebraska (ABN) group meets and tour the ARDC. ABN serves as an advisory group and advocate for UNL's Institute of Agriculture and Natural Resources. Membership includes Nebraskans from across the state who provide valuable input to IANR administrators and who also serve as a cohesive voice on issues affecting IANR. • At the invitation of Chancellor Harvey Perlman, the ARDC is featured at the Chancellor's pre-game luncheon before the Huskers vs. Texas Tech football game. Huskers lose 34-31 with last second Raiders TD. • 2005 <i>ARDC Employee of the Year</i> - Ruby Urban



A digital lighted welcome sign was installed in 2005. It was unveiled at the building renaming celebration and welcomes visitors to the center and alerts those passing by on Hwy. 66 of programs.

The Research and Education Building is named in honor of August N. Christenson for his outstanding loyalty and commitment to the students, faculty and programs of the University of Nebraska-Lincoln. Pictured are: UNL Vice President and IANR Vice Chancellor John C. Owens, UNL Chancellor Harvey Perlman, August "Augie" Christenson, and Howard Hawks, District 2 University of Nebraska Regent at the June 3, 2005 building renaming celebration. The event also marked the 10th anniversary of the Christenson Building.

<p>2006</p>	<ul style="list-style-type: none"> • Over 16 miles of fiber optic line are installed connecting 18 locations at the ARDC to high speed data access. • The Biotechnology Isolation Field Facility is developed in Sec 32, providing dedicated area for protected releases of genetically enhanced crops. A tornado in March upsets the newly installed linear irrigation system before first use, but is replaced in time for the summer season. • Construction of a new \$1 million Shop and Office building for ARDC Farm and Facilities Operations is completed. Renovation of the former sheep barn into a cattle working and load-out facility at the new feedlot area and an addition to the Dairy Manager's house are also completed. • Crop Management and Diagnostic Clinics are expanded due to increased interest from private industry. • The Nebraska Legislature's Natural Resources Committee hold public hearings at the ARDC. • Fall plantings of wheat are increased by about 100 acres due to higher demand for foundation seed. • <i>2006 ARDC Employee of the Year - Marnie Cihal</i>
<p>2007</p>	<ul style="list-style-type: none"> • The ARDC PBX phone system transitions from copper wire to VoIP (Voice over Internet Protocol). VoIP technologies enable analog telephone communications to be digitally transferred and routed over data networks and is possible due to the fiber line installation in 2006. • CALMIT deploys spectroradiometers and other scientific instruments using all-terrain motorized platforms based on high clearance self-propelled ag sprayer. CALMIT begins using 2nd generation "Hercules" for data collection during 2007 replacing "Goliath" which did the work prior to 2006. • <i>2007 ARDC Employee of the Year - Dave Werner</i>



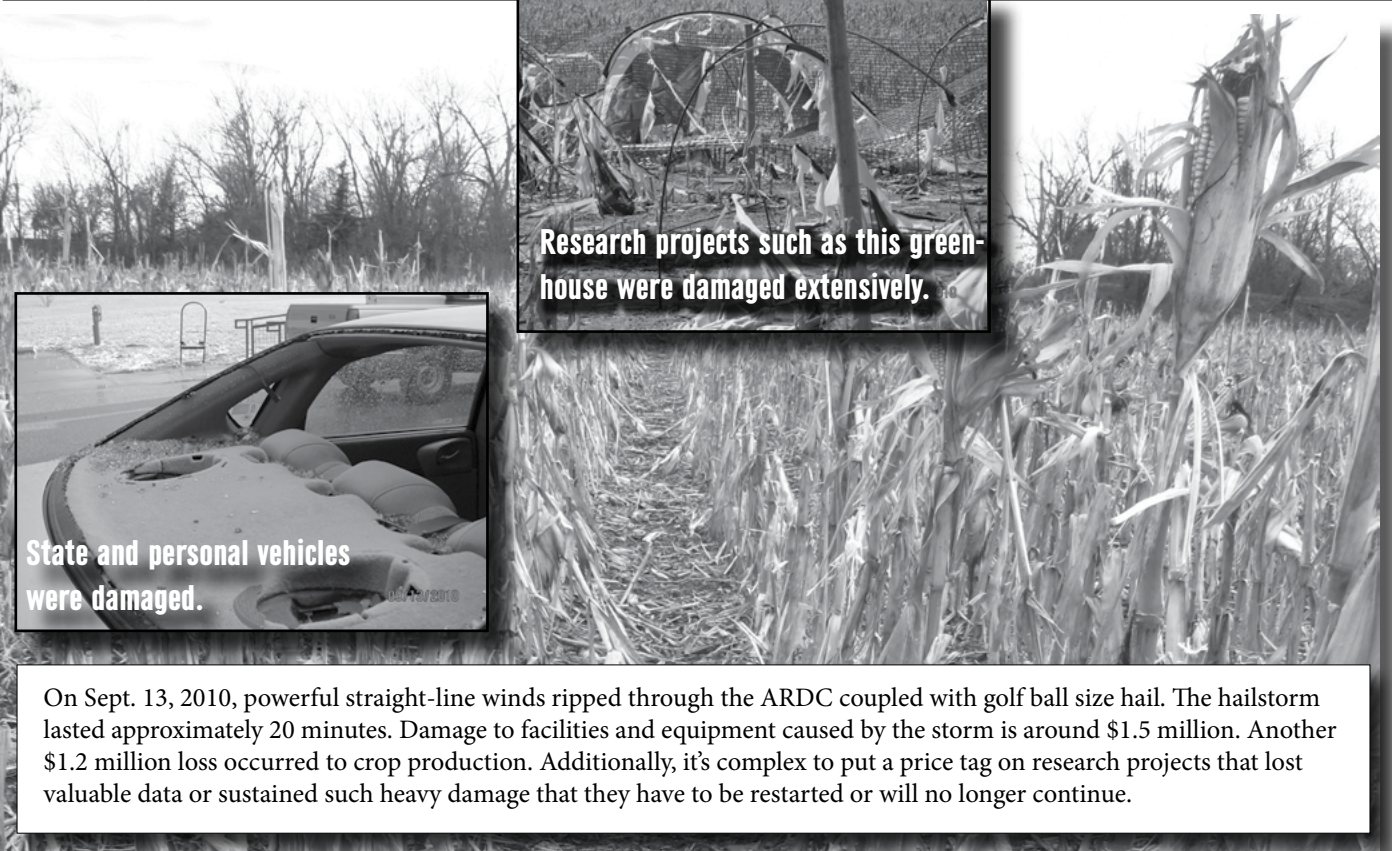
ARDC Maintenance and Operations Shop - ARDC Farm Operations and ARDC Facilities Operations moved in 2008 after 40+ years occupying the former NOP LL2 building. The Shop is the central command center for fourteen farm, service, and technical staff serving equipment maintenance, water supply and irrigation system control, and logistics. It is often used as a second education training site at the ARDC. The Shop was designed with energy efficiency in mind using ground source heat pumps and occupancy controlled lighting. It was built with farm generated funds.

<p style="text-align: center;">2008</p>	<ul style="list-style-type: none"> • The Agrometeorology Laboratory at the ARDC is home for the longest continuously operated automated weather station (AWS) in the U.S.A. In 1981 the automated weather station is established in the grassy area just east of the Agrometeorology Laboratory. This site served as a test bed for the Automated Weather Data Network (AWDN), where new sensors and operating procedures are tested. Once the testing is complete, the remaining stations in the AWDN are updated with the sensors and procedures that prove to give the best performance. In 2008, there are over 60 AWS's in Nebraska and another 110 in the surrounding states providing comprehensive data for use in agricultural decision making for our region. • Governor Heineman and Neil Parish, chairman of the European Parliament, visit the ARDC. • Governor Heineman hosted the state's first reverse trade mission tour. More than 125 guests from eight nations visit Nebraska. The event is devised to encourage international companies to explore opportunities for investment in Nebraska. Nearly 40 people from the group, accompanied by representatives from the State Department of Agriculture, made a stop at the ARDC. • The Foundation Seed Division is merged into Husker Genetics on July 1, 2008. • Results from a five year USDA ARS study showed that switchgrass produces five times more energy than needed to grow, harvest and process it into cellulosic ethanol. • Ground is broken for the Soybean Cyst Nematode (SCN) demonstration area. • ARDC Director Dan Duncan moves into the Assistant Dean and Director position at UNL's Ag Research Division. Mark Schroeder assumes role of ARDC Acting Director and General Farm Manager. Ruby Urban serves as ARDC Acting Assistant Director and ASSIST Business Center Manager. • August N. Christenson passed away on November 28, 2008. The Research and Education Building is named in honor of August N. Christenson for his outstanding loyalty and commitment to the students, faculty and programs of the University of Nebraska-Lincoln. • <i>2008 ARDC Employee of the Year - Sharron Ankersen</i>
<p style="text-align: center;">2009</p>	<ul style="list-style-type: none"> • In June, 82 tractors passed through and took a break at the ARDC as part of the Great Nebraska Tractor Ride. • The Southeast Research and Extension Center (SREC) administrative offices relocated to the ARDC in December 2009. Half of the west conference room is remodeled as office space for the SREC staff. • Over 1.34 million data points between planting and harvesting operations are collected and stored. • A wheat virus screen is established at the ARDC in order to screen developing and advanced wheat lines for their resistance to wheat viruses. Previously, this screen had been conducted in western Nebraska and is instrumental in characterizing the effectiveness of new sources of resistance for a newly released wheat variety, 'Mace'. • <i>2009 ARDC Employee of the Year - Lisa Moravec</i>



Research on developing switchgrass as a biomass energy crop began in 1990. Switchgrass produces 5 times more energy than needed to grow, harvest and process it into cellulosic ethanol.

<p>2010</p>	<ul style="list-style-type: none"> • A rare fall hailstorm hit the ARDC at 4:59 p.m. Monday, September 13, 2010. Damage to facilities and equipment is widespread across the eastern half of ARDC. Several fields and research projects are a total loss. Damages \$1.5 million facilities, plus \$1.2 million to crops. • July 1, IANR ASSIST Business Center reorganizes and the ARDC-based business staff join the Greater Nebraska Business Center team. • 2010 <i>ARDC Employee of the Year</i> - Ed Booth
<p>2011</p>	<ul style="list-style-type: none"> • Milking operations cease at UNL's Department of Animal Science dairy research unit. Research is refocused from large scale feed and lactation studies to individual animal research that will be conducted on East Campus with a smaller herd. The adult dairy herd at the ARDC is liquidated at auction in December 2011. • The original ARDC headquarters building is demolished. • UNL Extension's No-Till Conferences continue to draw in large numbers of participants. In 2011, 211 producers participated at the conference at the ARDC. • Over 6,600 agriculture business representatives, ag producers, crop consultants and educators have attended the University of Nebraska-Lincoln Extension's Crop Management and Diagnostic Clinics (CMDIC) at the ARDC since 1996. • The ARDC host visitors from Russia as part of the "Open World" and "Friendship Force" programs. The programs facilitate open discussion and learning internationally. • Well #32 is drilled for irrigation expansion in section 19. • Teams from Jain India, Indonesia, Singapore, Germany, China, and Hong Kong visit the ARDC. Government delegations from the Vietnamese Ministry of Agriculture and Rural Development (MARD), National Agricultural Extension Center and the National Maize RD Center, Ministry of Agriculture, China come to the ARDC to learn about current research and Nebraska agriculture. • 2011 <i>ARDC Employee of the Year</i> - Mike Zoubek



2012

- A new **Beef Nutrition Commodity Storage** building with 11 storage bays including liquid feed storage is put into service at a cost of \$362,000.
- Record warmth and drought conditions prevail in Nebraska and across the Corn Belt.
- On Sunday, September 23, 2012, the University of Nebraska–Lincoln Agricultural Research and Development Center (ARDC) celebrates its 50th anniversary with an open house.



In the summer of 2012, temperatures in the 100s are the norm and there was little to no rain. Crops are severely affected by the conditions statewide. The above photo of dryland corn was taken in early August. Stalks and leaves are brown and dry. Corn ears are dropping and are not filled out. Harvest is early in 2012 and yields are expected to be decreased significantly.



Research is being conducted on using corn and residues for feeding beef cattle. A June 2012 conference focused on new research on distillers grains, utilization of corn residue and implications of removing corn residue, and impact of feeding greater amounts of forage. New research on alkaline treatment of corn stover with calcium oxide and use in feedlot cattle was also presented.



The Beef Nutrition Commodity Shed, located adjacent to the Feedmill, provides holding storage of various distillers grains, meals, ground forages, and processed bulk feeds. It is key to holding identity preserved feedstuffs from receiving and processing to research feed ration preparation. It includes an insulated liquid feeds bay which features a modern control and distribution system which replaces the messy and cold-weather troublesome outdoor storage site.

The Early Years

The historical information contained in this section was published in the 1980's and is reprinted in this commemorative booklet from Elvin Folik and Ralston Graham's *College of Agriculture of the University of Nebraska-Lincoln, The First Century*.

While the book captures information on the earliest beginnings of UNL's Institute of Agriculture and Natural Resources (IANR), we include the chapter that focuses specifically on the Agricultural Research and Development Center here with permission by the Board of Regents of the University of Nebraska.

Chapter 1. University of Nebraska Field Laboratory at Mead/UN Agricultural Research and Development Center (UNARDC)¹

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¹The authors gratefully acknowledge the assistance of Warren W. Sahs in providing material for this Chapter from the time the Laboratory was activated to the present.

Names

University of Nebraska Field Laboratory 1962-1985
 University of Nebraska Research and
 Development Center 1985-present

Administrators²

Chief Administrator

Name	Title	Period Served
Warren W. Sahs	Superintendent, and Assistant Director Operations, ARD	1962-present

Other Administrators

Name	Title	Period Served
F. C. Hastert	Facilities Manager	1962-1974
Richard Ehlers	Facilities Manager	1974-1979
Richard McManaman	Facilities Manager	1979-present
Elmer Knapp	Farm Manager	1963-1982
Douglas Gustafson	Farm Manager	1982-present

Lands and Improvements

1. Conveyed by the U.S. Government to the Board of Regents of the University of Nebraska, without cost (24):
 a. **Quitclaim Deed N. SA-VI-31** dated April 12, 1962 - 8,420 acres of land via HEW/GSA, plus the load lines directly from GSA.

An inventory of the land and facilities constructed by the Government for the Ordnance Plant in the portion transferred to the University in 1962 was (15):

Land (including the four load lines)	8,833 acres	\$1,137,002
Natural gas line	18,028 feet	55,608
Railroad line.....	122,031 feet	433,210
Fence.....	125,654 feet	25,459
Bridge.....	1 each	1,983
Gravel road.....	251,729 feet	577,733
Concrete road	7,738 feet	35,953
Concrete walks	133 each	13,929
Entrance gates.....	64 each	2,500
Concrete aprons	52 each	54,926
Railroad equipment.....	45 items	4,958
Buildings	464 each	5,416,537
Dam.....	1 each	4,350
Concrete docks.....	133 each	60,859
Tanks, septic and recirculating	26 each	20,018
Sewer line.....	25,339 feet	50,678
Water line	73,668 feet	144,407
Steam distribution line	30,280 feet	81,756
Electrical distribution system.....	400,510 feet	140,908
Parking areas, gravel	10 each	15,942
Approaches, concrete.....	30,000 feet	185,222
Barricades, dirt.....	140 each	33,148
Fuel tanks, underground.....	19 each	48,363
Installed property in buildings		310,010
Equipment in load lines	1,413 items	271,428
TOTAL		\$9,126,887

- b. **Agreement of Retransfer No. SA-VI-15** dated September 13, 1966 - 640 acres of land, (S 1/2 Sec. 21 and N 1/2 of Sec. 28-14-9, Saunders County) and 6 buildings, signed by James W. Doarn, HEW, October 3, 1966 and Carl A. Donaldson, UN, September 13, 1966 (28).
 c. **Quitclaim Deed No. SA-VII-14** dated June 28, 1971 - 112 acres of land and 27 buildings³

²There have been no academic staff members stationed at the UNARDC. Warren W. Sahs has been headquartered at Lincoln throughout the time of his position as Superintendent.

³Warren W. Sahs has reported transfers of 32.45 acres to Saunders County for Avenue A, and 96.93 acres to the Nebraska Department of Roads for State Highway No. 63. Subtracting these transfers from the grants made to the University by the U.S. Government, leaves a net of 9,456 acres. However, Sahs also reported that a recent check at the Saunders County Courthouse showed that the University owns 9,497.06 acres. We are unable to reconcile the difference.

Major Buildings and Other Improvements Added Since 1962

Date	Item	Source of Funding	Cost
1963	Entomology facility	Product sales ¹	\$ (N.A.)
1964-66	Planting 3,000 acres improved pastures	Field Laboratory	93,000
1964	Irrigation well #1	Sale of South Genoa Foundation Seed Farm	8,000
1965-75	Livestock fencing	Principally product sales	15,000
1965	Hydraulics Laboratory	U.S. Army Corp of Engineers	(N.A.)
1965-66	Dairy unit facilities	State appropriated funds	100,000
1966	Dairy residence	Appropriated funds	28,000
1966	Forestry facility	McIntyre-Stennis federal funds	—
1966-80	Hard surface road repair and improvements	Sale of surplus equipment principally rail and ties	380,000
1966	Climatology laboratory	Nebr Water Resource Research Institute	15,000
1967	ETV transmitter	State appropriated funds	800,000
1967	Swine farrowing facility	State appropriated funds	10,000
1968	College of Medicine Eppley Cancer Institute facility	One-third State appropriated funds, two-thirds federal grant funds	200,000
1968-69	Swine complex	Sale of portions of Havelock farms	1,300,000
1969	Sheep complex	Sale of portions of Havelock farms	50,000
1970	Agronomy underground distribution irrigation system	Sale of portions of Havelock farms	60,000
1970-75	Land shaping	Product sales	80,000
1970-83	Twenty-one irrigation wells	Field laboratory	200,000
1971	Foundation Seed complex	Foundation seed sales	200,000
1972	Walter Behlen Observatory	Behlen grant	350,000
1972	South feed mixing mill	Private donations by beef producers	60,000
1973	Veterinary Science Complex	Grant funds	20,000
1974	Individual beef feeding barn	Dept. of Animal Science	35,000
1974	Swine manager's trailer house	Dept. of Animal Science	15,000
1974-85	Agronomy complex renovation of irrigation and drainage systems	Sales of portion of Havelock farms	218,000
1975	Main feed mill	Sales of portion of Havelock farms	600,000
1977-78	Solar array	U.S. Dept. of Energy	200,000
1980	Energy Integrated Farm	U.S. Dept. of Energy	800,000
1980-81	Expansion of Climatology Laboratory	Grant funds	15,000

¹Product sales include funds generated from surplus property such as rails and ties; and from sales of crops and livestock produced at the Laboratory.

History of Acquisition

Beginning and Disposal of the Nebraska Ordnance Plant

The UNARDC owes its existence to WW II as shown by these chains of events:

On October 14, 1941, in advance of Pearl Harbor but when U.S. involvement in the War appeared likely, the War Department announced that a \$25,000,000 Ordnance Plant was to be built south of Mead. Senator George W. Norris had worked hard to get the plant located in Nebraska. The Nebraska Ordnance Plant (NOP), as it came to be known, was constructed under the direction of the U.S. Army Corps of Engineers. A total of 17,348 acres of farming land, consisting of 177 tracts, was procured (1), which meant displacing 96 families (5). Construction began on January 1, 1942. Loading ammunition began on September 9, 1942 with the operation being conducted by the Nebraska Defense Corporation, a subsidiary of the Firestone Tire and Rubber Company. Over 3,000 employees worked at the plant during the peak of its operations.

Following WW II loading ammunition was terminated with the War Department assuming custody of the Plant on December 1, 1945. From July 1946 through December 1949, the Plant produced ammonium nitrate under the Emergency Export Corporation, a subsidiary of the Spencer Chemical Company. With the onset of the Korean War, the Plant was reactivated to again load ammunition, this time by the National Gypsum Company. The number of employees again exceeded 3,000. On June 30, 1956 the Plant was placed on a standby basis where it remained until 1959 when the U.S. Air Force began construction of an Atlas Missile Site. When the missile installation and the Ordnance Plant later became obsolete, the U.S. Government, on August 5, 1960, declared the land and buildings excess and published a notice for disposal (1).

Additional Needs for Land

The College of Agriculture needed more land, especially good quality, irrigated land for research on annual crops, and on grasses and legumes for grazing and forage production. In 1960, the College of Agriculture owned and operated⁵ 1,391 acres of land on the east edge of Lincoln (known as the Havelock farms), plus 2,408 acres in six other tracts scattered over the southeast quadrant of the State. The College was also renting a total of 1,186 additional acres at various locations in the above quadrant, including 480 acres from the Burlington Railroad, located near Pioneers Park southwest of Lincoln, and 530 acres on the Nebraska Ordnance Plant (2). Little of the land

⁵That the College of Agriculture owns and rents land is so stated for convenience — actually legal documents involving all segments of the UN can be entered into only by the legal entity which is the "Board of Regents of the University of Nebraska."

in the Lincoln vicinity was good enough quality or had sufficient underground water to carry out appropriate irrigation experiments. A good share of the land being irrigated was subject to flooding from Stevens Creek.

There was a second factor which made the acquisition of additional land away from the city urgent. This was population pressure. As the number of houses increased close to the then College of Agriculture campus and the Havelock farms, both of which had initially been "out in the country", there was an outcry from some of the nearby neighbors complaining about the bawling and occasional break out of cattle, and the presence of manure smells. This situation was not unique to the University — it was almost a universal experience among colleges of agriculture across the country. The complaints of nearby residents, the increased value of land, either for other University needs or purchase by developers, and the growing need for more (sometimes also better quality land), resulted in most colleges acquiring and shifting their field operations to enlarged land units some distance away from the enveloping cities where they were located.

Thus, it was only natural that when staff positions were refilled and normal operations restored following the end of WW II, additional land outside of the environs of Lincoln was increasingly needed by the College of Agriculture. The lack of availability of suitable land and shortage of state appropriated funds for the necessary purchase were virtually insurmountable roadblocks to obtaining the additional land from privately held sources.

That a solution to the problem might lie in getting land which might be declared surplus to military needs following the close of the Korean War on July 27, 1953, was recognized early on by Lambert, Baker and Frolik, as Station Administrators, and by Carl A. Donaldson, Business Manager of the University. Lambert made the suggestion at a College of Agriculture staff meeting and arranged for a group of staff members to explore the Hastings Naval Ammunition Depot with respect to suitability of the land and buildings for the College. Inspections were also made of the Nebraska Ordnance Plant at Mead. A tentative decision was made to attempt to obtain land at the plant first declared surplus to the needs of the U.S. Government. It was recognized, also, that Hastings had the best land but that Mead was fairly satisfactory; also that the distance of 25 miles from Lincoln to Mead with approximately 100 miles to Hastings made the former much more desirable from the standpoint of required travel. However, resistance to moving the principal field operations to either location was expected, both externally and internally.

As time progressed, the thinking evolved from adding a unit of land to existing facilities, to developing a completely new field laboratory which would involve the disposal of a major portion of the then existing holdings, both owned and leased. The concept in-

cluded a large scale expansion of land holdings sufficient to take care of needs for experimental work for the existing staff and for a markedly larger staff in the future. At the same time it was recognized that there was need to retain some lands near or in Lincoln for intensive types of studies, such as those requiring day-to-day attention by staff members.

Another factor in retention of the then existing lands was that some experimental units such as the Dalbey section at Virginia, the 320 acre Rogers Memorial Farm eight miles east of Lincoln, and the 240 acre Horning Forestry Farm at Plattsmouth, must, under the terms of the respective conveyances, be retained by the University in perpetuity.

Probably the first information that Mead would be declared surplus was obtained by Donaldson when he called on the surplus property division of the U.S. Department of Health, Education and Welfare (DHEW) in 1959, and was told that Mead would likely be so listed sometime in 1960 (3). The mechanism for conveyance consisted of such facilities being made available through the Department of Health, Education and Welfare for educational purposes⁶.

Donaldson's visit to and subsequent reports from Washington activated the campaign on the part of the University to obtain land at Mead. Chancellor Hardin was fully supportive from the start. Carl Donaldson and George S. Round were also active in the efforts to obtain the facility. Lambert and Frolik were "in the middle" of the campaign, with Frolik continuing the efforts after Lambert left the University in June 1960.

Gaining Public Support for Application for Land at Mead

Various groups had to be supportive in order for the campaign to succeed. The Nebraska Congressional delegation consisting of Senators Carl Curtis and Roman Hruska, and Congressman Larry Brock, provided excellent support as soon as the University plan for Mead had been made known. State Senator Harold Stryker, 17th District, which encompassed the Ordnance Plant, was initially opposed to the University plan. He had been quoted on March 3, 1960 (21) as saying, "I will go on record as opposing the Agricultural College obtaining 8,000 to 10,000 acres . . . It would seem an experimental farm of 80 to 160 acres would be sufficient . . ." Later Donaldson, Frolik and Round visited him at his home near Rising City. They spread blueprints on the Stryker living room floor and explained the proposal in detail. Later at a meeting with a group of business men in Wahoo, reported in the *Wahoo Newspaper* on April 21, 1960, the Senator voiced no continued opposition (22). In fact, as time went on, he became an ardent supporter.

On April 21, 1960, a dozen Wahoo business men

⁶Educational purposes was used in the broad sense, including resident instruction, research and extension.

met with Senator Stryker to discuss the disposition of the Nebraska Ordnance Plant, including the pending application of the University. Among those present were Tom Ludi, publisher, and Derrel Ludi, editor, respectively, of the *Wahoo Newspaper*. It was reported in the *Wahoo Newspaper* "At the conclusion of the meeting almost everyone present held the view that the land in question should be placed back on the tax rolls of Saunders County and sold to individuals in tracts of 80 acres". However, there was one person present (not identified) who took the opposite view, and spoke in favor of the University proposal (22).

A visit to Derrel Ludi by Frolik and Round did not appear to materially change his position. Attracting industry; restoring the open lands to family-sized farms, preferably giving priority to former owners; and getting the land back on the tax rolls were uppermost in his mind. He felt that 160 acres should be adequate for the University.

On May 9, 1960, Donaldson, Frolik, Round and Robert M. Koch, presented the University case for Mead to members of the Wahoo Lions Club and guests. Senator Stryker was also present (23). No opposition was expressed and, in fact, the group appeared to be fairly supportive.

A definitely favorable response was received when Donaldson and Frolik explained the proposal to members of the Fremont Kiwanis Club on June 23, 1960 (4). On the other hand, persons attending an open meeting at Mead, which was called for the purpose of explaining the University's proposal, were generally noncommittal or rather cool to the entire idea.

Leadership in support of the University plan, by William Vavak, farmer whose property adjoined the Ordnance Plant on the west, and the late Ralph Trep-tow of Ithaca, farmer and certified seed producer, was most effective in neutralizing opposition from people in the local area and in actually gaining the support of many. These two men deserve a special role of honor in the advancement of agricultural research and education in Nebraska.

Gaining Internal Support

Frolik's concept had no upper limits on how much land should be applied for, but he was advised that the Board of Regents would not stand still for applying for more than one-half of the total NOP area. In view of his subsequent support, it is likely that Richard Adkins of Osmond helped convince his fellow Regents that the acreage applied for should be as high as it was. It must also be admitted, in retrospect, that asking for even 8,000 acres was a rather daring move.

Following the directive on the upper limit of land that could be applied for, Frolik called a meeting of the College departmental chairmen to assess their respective interests in land needs. There was some reluctance to shifting most of the field research to Mead. Robert Koch, Chairman of the Department

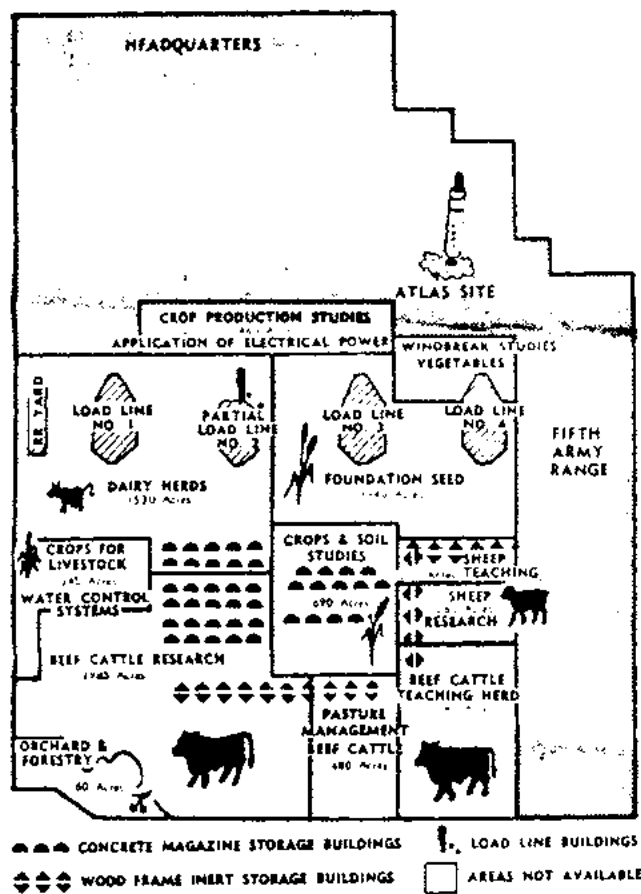


Figure 1. This drawing shows proposed use of the Nebraska Ordnance Plant land at the time the application for transfer was prepared (July 15, 1960).

of Animal Husbandry, made a major contribution when he stated, "We (Animal Husbandry) will take the whole chunk." And he meant what he said. The effect on the other chairmen was immediate and salutary. Those having major departmental field operations soon visualized needs for considerable land at Mead. Subsequently, a bus trip was made to Mead by staff members with field operations, some of whom had also expressed reluctance to the move, principally because of the distance involved. However, there was never any out-and-out opposition on the part of the staff, and as time went on most did all in their power to make the Field Laboratory a success.

Preparing the Application to the U.S Department of Health, Education and Welfare

The next and crucial step in acquisition was to get an application prepared for the Board of Regents to submit to the DHEW. A committee was appointed to assess needs and prepare an official application. Ralston J. Graham was appointed Secretary but lost that position at the first meeting of the Committee when he was elected Chairman. Graham worked full time to develop a plan and prepare the official application.

He soon recognized that he needed the assistance of an engineer in preparation of maps and other technical aspects of the application. Accordingly, Frolik assigned George M. Petersen, Professor of Agricultural Engineering, to devote full time to working with Graham. These two staff members did an excellent job of carrying out their assignment. Petersen got into the spirit of the assignment at hand and worked hand in hand with Graham in preparing the application. They searched far and wide to find every possible appropriate need for the facility, and then spent months in preparing and revising the official application. Although it cannot be documented, later University authorities were told numerous times by representatives of the DHEW that the University application was so good that they suggested it as a model for applications by other universities desiring surplus military lands.

Roadblocks and Gaining U.S. Government Approval

A few roadblocks surfaced as the program to obtain the Ordnance land proceeded. An early version of the application, dated May 1960, envisioned a rectangular area roughly encompassing all of the land south of the load lines (see Figure 1), of approximately 8,000 acres. But shortly before the application was to be submitted to DHEW, the Department of the Army turned over to the 5th Army Headquarters in Chicago, 968 acres of land in the southeast corner of the Plant, a tract which had been included in the University application. The land had been requested by Nebraska Adjutant General Lyle Welch for a rifle range for the Nebraska National Guard. The National Guard Bureau in Washington approved the application, making the range available to Reserve Armed Forces units as well (6).

The revised and final application, dated July 15, 1960 (2), was approved by the Board of Regents. To make up for the "loss" of the land to the 5th Army, the area being applied for was extended to the north, going beyond but not including the four load lines (see Figure 1). The application was delivered by Carl Donaldson to Dwayne Gardner, surplus property officer of the Nebraska State Department of Education, a necessary first step in attempting to get transfer of the land (7). Gardner approved and transmitted the application to the Kansas City office of DHEW. That office approved the application and transmitted it to the Washington DHEW office. After some minor changes in the application were agreed upon, DHEW/Washington recommended approval to the U.S. General Services Administration (GSA) which made the final decision.

The GSA proved to be a tough barrier in the negotiations⁷. Word came to the University, that GSA

⁷It speaks well for the former Department of DHEW and the GSA that the officials were cautious in disposing of U.S. property. They were protective of the taxpayers' interests.

would attempt to reduce the area to be transferred and would shift granting some of the remainder of the open lands to those occupied by concrete igloos, inert storage areas and load lines. Also, the revised area was to be reduced to 7,500 acres (8).

A meeting was held at GSA offices in Washington on January 12, 1961, for the purpose of attempting to resolve the differences. An "advance guard", consisting of Donaldson and Frolik, met with Lloyd Taylor of DHEW in Washington to assess the status of the application and to help determine the position the University should take. Taylor insisted that they stand their ground, repeatedly referring to the excellent program which had been presented and which, he insisted, should not be lessened in effectiveness by any shift in amount or quality of land being applied for. There had been some feeling in Lincoln that a compromise should be attempted with GSA in order to finalize the transfer without further delay. When Chancellor Hardin and Round arrived in Washington, Donaldson and Frolik strongly urged holding fast. Following discussion, Hardin concurred. The thought of agreeing to a possible compromise was thereby dropped.

In attendance at the final meeting with GSA to resolve differences were Senators Carl Curtis and Ro-

man L. Hruska; representatives of DHEW; and Hardin, Donaldson, Frolik and Round of the University. Senator Hruska, who had been fully briefed on the University proposal, made a masterful presentation in support of the application. He informed GSA in no uncertain terms of the intention of Congress in supporting transfer of federal lands to universities via DHEW for educational purposes, and specifically spoke in behalf of the Mead application. After the Senators withdrew, the presiding GSA official said, "Now, let's get down to the serious business of deciding what will be transferred." He found not the slightest give on the part of DHEW or the UN on his desire to reduce the area being applied for (38). But on one point he did get a concession. The University had not applied for the four load lines, consisting of approximately 116 acres each, because of contamination problems and the large number of buildings, most of which were not useful for the field laboratory. Maintenance of the load line buildings had been considered almost prohibitive and the danger of liability, resulting from explosions of the contaminant TNT, was, at first, considered more than the University could be responsible for. Somewhat grudgingly, the UN agreed to accept the load lines in addition to the original land applied for.



University officials in Washington, D. C., in 1960 in the interest of getting the Nebraska Ordnance Plant land transferred to the University for use as a field laboratory. Here they discuss the newly completed application (copy on table) with the Nebraska Congressional delegation. Back row, from left: Regent Richard Adkins, Carl Donaldson, Congressman Don McGinley, Congressman Lawrence Brock, George Round and Elvin F. Frolik. Seated: Senator Carl Curtis, Chancellor Clifford M. Hardin, and Senator Roman L. Hruska.

On January 23, 1961, GSA officials announced that the application had been approved, subject to the University taking responsibility for the "contaminated" areas of the former Ordnance Plant (9) and temporarily withholding some "islands" of land and facilities in the area being transferred⁸. This meant, in effect, that the University would take title to and be responsible for the load lines.

A "victory" luncheon was held at the Nebraska Center for Continuing Education on Saturday, April 19, 1962 (10). In attendance were representatives of GSA/Kansas City, DHEW/Washington and Kansas City; the Ordnance Ammunition Command and the Nebraska Ordnance Plant; the Corps of Engineers, U.S. Army, Omaha; the State Department of Education, Lincoln; and University officials. The transfer of the load line areas (which was not included in the grant which came via DHEW) was made official upon Carl Donaldson paying a silver dollar (polished up for the occasion) to the GSA officials. The mechanics for making the transfer were worked out at this meeting.

Official Conveyances

A joint conveyance of the land covered by the DHEW grant and the load lines by GSA was made to the University through Quit Claim Deed SA-VI-31, dated April 12, 1962.

A line drawing of the Ordnance Plant, along with the area transferred to the University in 1962, is shown in Figure 1 (14). Land areas on which the concrete magazine storage buildings (igloos) are located can be used only for grazing purposes, since use of modern farm machinery on such areas would be impractical. With present technology, the cost of removing the igloos would be prohibitive.

In accordance with established procedures, the University received full title to the land covered by the 1962 federal grant at the rate of 5 percent per year. In 1982, upon completion of the 20 years required to complete the transfer, the University became the unconditional owner.

In 1966, the University applied for two additional tracts of land, with buildings, at the Nebraska Ordnance Plant. The first of these consisted of 640 acres located along the east side of the original grant, described as the S^{1/2} of Section 21, T 14N, R9E and the N^{1/2} of Section 28, T 14N, R9E, Saunders County, Nebraska. This tract had been granted to the State of Nebraska in 1963 for the purpose of establishing a vegetable training center. However, the program proved to be a failure due primarily to disciplinary problems with the inmates (13). The program was terminated and the land was returned to the U.S. Government. On October 3, 1966, DHEW approved

⁸Title to a portion of load line 2, a railroad yard, and some other limited land and facility areas, totaling in all 112 acres, was retained by the U.S. Government to accommodate activities still underway. These areas were transferred to the University in 1971.

the University's application for the section of land. A second tract was transferred on June 28, 1971 consisting of 112 acres. The latter constituted a completion of turning over to the University odd tracts which had been retained temporarily when the initial transfer had been made in 1962 (16, 24).

Activation

Acquisition was only the first step — the huge job of activation (with very limited funds) now faced the College of Agriculture. Much credit belongs to two men who were retained, initially, by the University for getting the program underway (15).

One of these was Warren W. Sah⁹ who, up to 1961, had been in charge of the University Foundation Seed Division and who was recalled from a temporary assignment with the Rockefeller Foundation in India to initiate the Field Laboratory program. He reported for duty at Lincoln as superintendent on September 1, 1962.

The other man was F. C. (Chick) Hastert, a chemical engineer, who had been Head Inspector at the Ordnance Plant throughout most of the period of its existence. He was hired by the University as facilities manager. His long experience and detailed knowledge of the Plant, along with his loyalty and initiative, made him extremely valuable in preserving and utilizing the physical plant and in disposing of surplus property in an orderly manner, with maximum returns to the University.

Disposal of the Remainder of the NOP

What happened to the rest of the Ordnance land and facilities? On December 13, 1961, the GSA sold at public auction 5,131 acres of the farm land and two industrial units (17). For the purpose of the sale, the farm land had been divided into 20 tracts ranging in size from 159 to 477 acres each. The land was purchased by 12 individual buyers at an average price of \$250 per acre. Of the total area, 14 percent was purchased by local farmers, 29 percent by outside investors, and 57 percent by three dehydrator corporations (18). Hastert reported that only one person purchased his previously owned farm (19). Late in 1968 the Administration area at the north end of the original Plant was sold to private interests for small industry (1).

Sale of University Lands to Help Finance the UN-ARDC

There was considerable concern at the time the University was applying for the land at Mead that the amount of land made available to the College of Ag-

⁹The University has been fortunate to have Sah⁹ in this position. He is equally at home at his office desk or in the field, including being able to adjust and operate any piece of farm equipment. He has the ability to get along with his fellow workers at all levels, and has excellent management capabilities.

riculture would be excessive. To allay the concern on the part of the DHEW, the University proposed, in the application, to drop the leasing of 656 acres of land in the southeast quadrant of the State and to dispose by sale (subject to approval by the Legislature), the 80-acre Univ. Fruit Farm and the 8.8-acre tract at Two Rivers. The Regents also entered into a "gentleman's" agreement with the Legislature to sell as much of the Havelock farms as could be spared from research and educational activities and to use the funds, so generated, for relocating research activities to the Mead Lab. Disposal of such lands to date is shown on the next page (20, 40).

Development and Utilization of the UN Field Laboratory at Mead

Getting Started

When Sahs took charge of the development and operation of the newly acquired land and facilities at Mead, he was faced with a Herculean task, to say the least. Here was a large tract of land which had been developed as an ordnance plant. Some idea of the extent of the structures can be gained by referring to the list of land and facilities shown earlier in this chapter, along with Figure 1. The load lines (that look like ironing boards on the map) which the University did

not want but was forced into by GSA, posed a serious problem with respect to upkeep and dangers resulting from contamination with TNT powder. The concrete magazine storage buildings (igloos) were of such heavy concrete construction that removal was prohibitive from a cost standpoint. Many new buildings were needed to accommodate research and educational programs, permanent pastures had to be established, irrigation had to be developed, and the existing physical plant had to be maintained in at least a reasonably respectable condition. Extensive equipment had to be obtained to do the farming and to conduct research field operations¹⁰.

A second and even more serious problem was that financially the operations were started on not much more than a "shoe string". The Legislature generally took the position that development and operating costs should come largely from sale of lands owned by the University which became surplus with the obtaining of the Mead Field Laboratory, and from income generated from the sale of personal property and agricultural products produced at Mead. The original philosophy was one of the State providing only start-up money. Accordingly, the 1961 Legislature appro-

¹⁰The open land had been leased by the Federal Government to private operators but as the leases expired the University took over operation of the land.



Although initially considered useless, most of the concrete bomb storage magazines (igloos) are now being used for other storage purposes and livestock shelters. None of them has been removed.

Sale of Lands to Help Finance the UNARDC

Year	No. of Acres	Designation of Tract	Buyer/ Recipient	Gross Proceeds
1961	80	Univ Fruit Farm (26)	B & R Corp.	\$ 24,320
1962 (29)	13.69	Portion of South Genoa farm	Sack Lumber Co.	250/acre
1965	8.8	Two Rivers	Returned to Federal Govern- ment	None
1966 (27)	20 240.2	Portions of So. Genoa Farm	Kent & Burke Co. Francis J and Helen Brown	6,520 60,290
1970	223.9	Portion of UN Havelock farms	City of Lincoln (Mahoney Park)	321,744
1970	16.52	Portion of UN Havelock farms	City of Lincoln ¹¹	None
1973	12	Tract along "O" St. origi- nally part of Veterans Hos- pital land ¹²	Dave Burhoop Realty (27)	128,010
1973	55.97	Portion of UN Havelock farms	Golf Park, Ltd. (John L. Hoppe)	229,650
1973	35.51	Portion of UN Havelock farms	Golf Park, Ltd.	151,800
1973	13.52	Portion of UN Havelock farms	Hub Hall	81,255
1973	5	Portion of UN Havelock farms	Sweeney-Burke-Hancock (Havelock Bank)	151,000
1975	5.44	Portion of UN Havelock farms	City of Lincoln (Mahoney Park)	11,970
1976	262	Portion of UN Havelock farms	Leavitt Bros.	400,400
1976	6 lots 1 lot 1 lot 1 lot 1 lot	Portion of Havelock farms (Castleton Addition)	Lincoln Real Estate Michaelis Spielman Thomas Brood	41,675 6,812 6,880 6,211 7,592
1977	8 lots	Portion of Havelock farms (Castleton Addition)	Lincoln Real Estate	66,800
1977	202	Portion of Havelock farms	John Breslow	361,924
1979	Outlot A	Portion of Havelock farms	Horizons (Rosement)	35,010

The proceeds less expenses from sale of the above lands were used by the University for improvements at the UNARDC.

¹¹Deeded to the City of Lincoln for the Northeast Diagonal right-of-way.

¹²12 acres had been conveyed to the UN by the GSA in 1951 on the customary 20 year arrangement (25). It was used by the Agronomy Dept. for crops research until sold by the University.

priated \$75,000 for the 1961-63 biennium for operations at Mead. The 1963 Legislature continued the \$75,000 appropriation for the ensuing biennium and appropriated an additional \$183,000 for development "... provided that this sum be returned later to the general fund out of proceeds obtained from sale of experimental lands now situated on the outskirts of Lincoln" (30).

Overall Development

Funding for development and operation of the Field Laboratory at Mead has never been adequate. Funds generated from the sale of other surplus real property by the University, state appropriations, receipts from sale of steel rails which were on the property¹³ and product sales have been utilized. Through the years still other funds such as contracts and grants which became available have also helped. Even so, in total Mead has always been operated on an austere budget.

The lists of principal physical facilities available and modified or added are shown in the following sections. In addition, 43 inert powder frame storage buildings were moved and renovated for use as animal shelters and other research operations. None of these buildings is now located on the original sites.

The approximately 100 igloos had been constructed by the Army with concrete floors, concrete walls up to two feet thick reinforced on three sides with mounds of dirt, and wooden frame roofs, so constructed that in case of an accidental explosion the force of the blast would go up through the roof.

The land in the igloo areas is used for grazing. Where sheep were used they would walk up on the roofs, eat the tar paper and sometimes make holes with their feet in the wooden roofing that remained; hence the dirt reinforcements on the sides had to be removed in order to deny the sheep access to the top of the igloos.

Although initially considered useless, most of the igloos are presently being utilized for storage purposes and for livestock shelters. None of them has been removed.

The power lines, 14 miles of hard surfaced roads, and 15 miles of graveled roads have been maintained by the Field Laboratory. Saunders County was invited to take over maintenance of the roadways but refused on the basis that the Laboratory was state/federal property for which the County was not responsible. Drainage ditches have been cleaned from time to time and weeds, which were a big problem to begin with, have been kept down to manageable conditions.

The entire water system installed by the NOP has been kept in working condition, along with the system being extended to provide water to 30 livestock pas-

¹³There were initially about 15 miles of railroad on the property, all of which have now been removed. The ties were utilized on the Laboratory lands for lot building and other purposes and the ballast was used for road surfacing.

tures. An excellent irrigation system has been developed with the water being pumped into a 12 inch main which runs across the north end of the entire area and southward about one mile. It then empties through fire plug type outlets onto the field where needed. The integrated system can supply about 4,000 gallons of water per minute. Water is applied to growing crops by gravity along with seven center pivots, with a solid set installation, and with one lateral move irrigator system.

Security has been somewhat of a problem on the Laboratory. This is understandable in view of such a large area of land and the many buildings, with only two residences located on the property. The University employs two guards to police the area nights, weekends and holidays. The Saunders County Sheriff and his deputies, and the Nebraska State Patrol also cooperate in providing security as the occasion demands.

Principal College of Agriculture Users of the Mead Lab

The principal College of Agriculture users (Departments) of the Laboratory are shown by land and building assignments in Figures 1 and 2. The research, extension and resident instruction programs and accomplishments are included principally in the Chapters devoted to the Departments. However, to identify the use of the Field Laboratory, a brief summary of the Departmental activities is shown:

Agricultural Engineering. The Department of Agricultural Engineering utilizes the land and facilities at the Laboratory for projects ranging from traction and conservation tillage through till planting, herbicide and fertilizer application through center pivots, irrigation scheduling, insecticide application through pivots, automated gated pipe irrigation, automated solid set irrigation, drying and storage of grain, swine facility design, and animal waste management.

From 1963 to 1983 the Agricultural Engineering Department sponsored Tractor Power and Safety Day which was a most effective way to provide research results to farmers.

Agronomy. Operations at the Mead Lab were started by the Department of Agronomy in the south one-half of Section 30 (see Figure 2) in the spring of 1963. The Department, including the Foundation Seed Division, still utilizes this parcel of land.

The south half of Section 21 and the north half of Section 28 (all in a contiguous tract) were also assigned to Agronomy upon transfer of this tract to the University by the Health, Education and Welfare Department in the fall of 1966. This land has come to be known as the "Agronomy Section" and constitutes the center of operations at the Laboratory for the Department. The main structure on this area was at one time the Air Force Global Communications building and later the dormitory for the "trusty" inmates

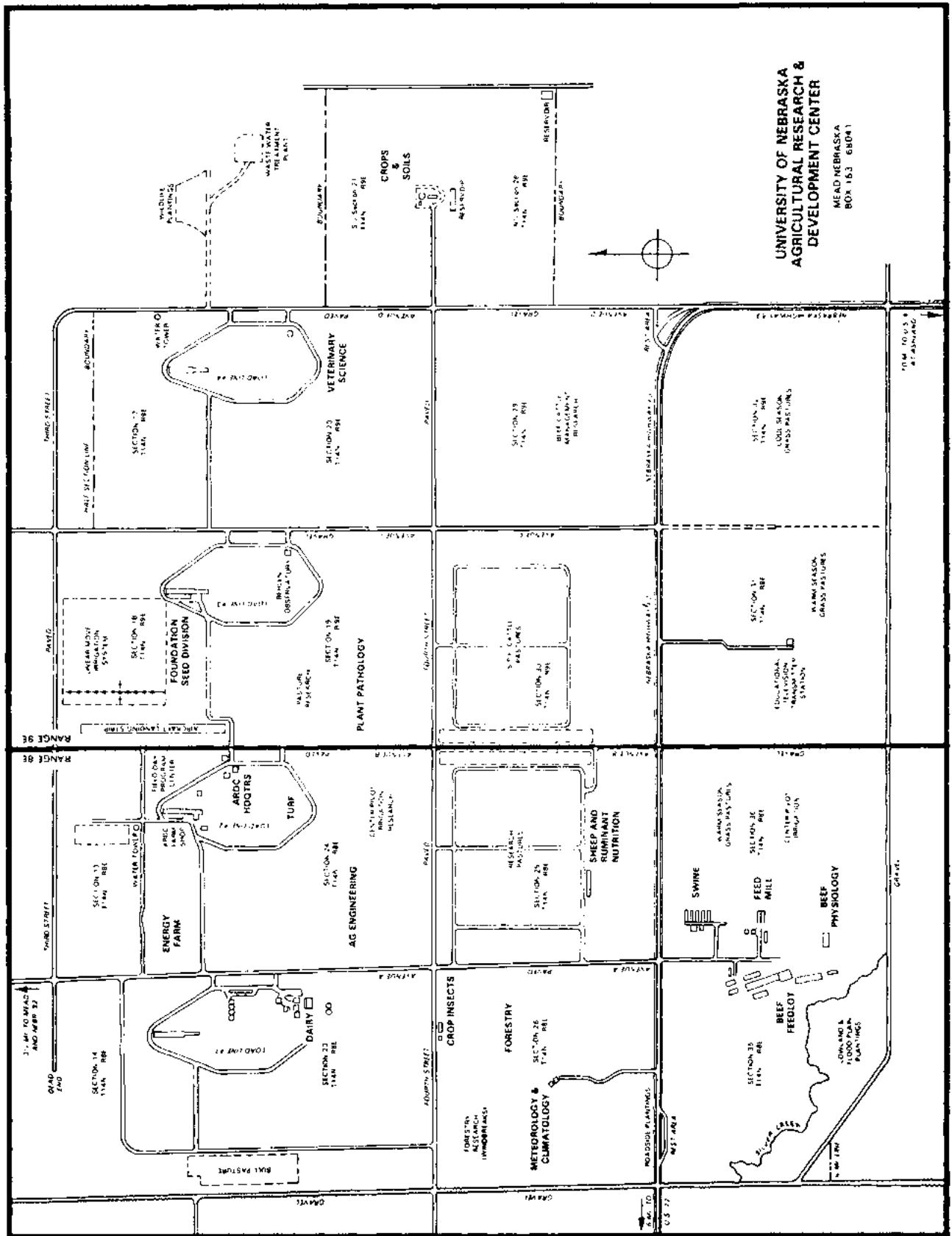


Figure 2. This map shows 1987 uses of the ARDC land. Legal descriptions are shown by sections.

of the State Correctional Services Department.

In early years of agronomy operations roads were constructed and an irrigation system was developed.

There were five buildings on the Agronomy Section at time of transfer. In addition, five inert powder storage buildings were moved to the Section for various Departmental usages.

Excess water is carried in a southeasterly direction across the Section to a holding pond, located south of the headquarters compound, and on to a reservoir covering five acres located in the extreme southeast corner of the Section. The stored water is used for irrigation.

Programs operating in the Agronomy Section as outlined in the 1974 Report to HEW were: 1) plant breeding and crop improvement work on alfalfa, corn, perennial grasses, small grains, sorghum, and sudan-grass; 2) crop production and management; 3) herbicide residual investigations; 4) soil fertility and management; 5) sorghum physiology and testing; 6) soil testing; 7) field crop variety evaluation; 8) Nebraska Crop Improvement Association varietal purity and seed quality trials; 9) irrigation water use; 10) use of ponds for water runoff control and; 11) chemical weed control.

In 1948 Warren W. Sahs, who was then manager of the Foundation Seed Division, arranged for the plantings of seed increases of corn and improved grasses on the Nebraska Ordnance Plant. When Secretary of Agriculture Ezra Benson terminated the Soil Conservation Service nurseries in 1952, the Foundation Seed Division assumed the responsibility of maintaining, harvesting, cleaning and distributing sizeable acreages of Nebr. 28 switchgrass, Nebr. 27 sandlove grass, and partridge pea, which the Soil Conservation Service Nurseries Division had established in the southwest corner of the Ordnance Plant.

In 1969 seed conditioning activities were moved from 3115 N. 70th Street, Lincoln, to loadline¹⁴ no. 3 at the Laboratory.

Animal Science. Feedlot pens for beef cattle nutrition studies were developed from 1964 through 1974. In 1964-65 inert storage buildings were moved and renovated for headquarters offices and a shop; a feed mill, constructed in 1972; bunker silos were built in 1970 and 1972; and the 120 head individual feeding barn was constructed in 1974.

Cow-calf herds are maintained to study factors relating to reproduction in beef cattle. Investigations are also carried out on the nutritional and hormonal factors relating to the reproduction in beef cattle.

A teaching herd is maintained to demonstrate economical systems of production and the effects of nutrition on hormonal secretion and reproduction.

Swine research includes breeding, nutrition, and reproductive physiology. Approximately 30 acres of land are devoted to this program. The development

of facilities for swine research took place chronologically as follows: farrowing facility - 1967; headquarters complex including an office, showers, shop, machine and truck storage - 1968-69; outside lots - 1971; and the swine manager's trailer house - 1974.

Sheep were moved from the East Campus to Section 13 at Mead in the fall of 1968. Since there were no suitable buildings available, the sheep and necessary equipment were housed temporarily in four of the concrete igloos. Meanwhile construction was started on the present building on Section 25 (where the sheep were later moved). The main portion of the building utilizing 11 existing inert storage shells, is 200' X 60', with a 56" by 30' section in addition used for housing a feed mixer, storage space for storing supplies, and for an office. Necessary fencing of pastures, constructing of a feedlot, and installing of a water system were also completed.

Between 1968 and 1974 the sheep numbers at the Laboratory were increased from 50 to 150 Corriedale ewes, and from 40 to 250 Hampshire ewes.

The dairy operations are located on Section 23. The dairy unit headquarters, including the offices, laboratories, and a milking parlor was built during 1965-1966. Free stall barns for the milking herd and other barns for the young stock, dry cows, and maternity pens, were constructed by moving and renovating inert storage (wooden frame) buildings, to the headquarters location. In 1966 a unit manager's residence was constructed adjacent to the dairy unit. Five upright silos were added in 1967.

The only dairy cattle herd owned by the College of Agriculture is now located at Mead. Earlier there had been herds at four Stations and the School at Curtis. The young dairy animals were moved from the East Campus to Mead in the summer of 1965, and the cows in February 1966. The dairy herd at the North Platte Station was dispersed and the better animals moved to Mead in 1968. Similar action was taken with respect to the dairy cattle herd at the Panhandle Station in 1969. Herds located at the School of Agriculture at Curtis and at the Valentine Substation had been disposed of much earlier.

The aim at Mead is to maintain a herd of 100 holstein cows in milk the year around.

Entomology. In 1963 the Department of Entomology was assigned a former fire station located in Section 26, along with adjacent 20 acres of irrigated land. The building was remodeled into an excellent laboratory facility for corn insect research. An equipment storage structure was also developed from an inert storage building. In 1973 an additional 40 acres of land were assigned to entomology.

This entomology complex exemplifies an excellent model of the Field Laboratory concept, i.e., laboratories, offices, a greenhouse, and irrigated land are all located in one compact area.

Horticulture. In 1963 a frame building was moved to the southeast corner of load line 2, Section 24 as a

¹⁴The load lines are numbered 1 through 4 from west to east.

headquarters for the Department of Horticulture.

Principal projects carried on at Mead have been: 1) plantings of a large collection of woody landscape cultivars which might have use in highway landscaping; 2) evaluation of chrysanthemum cultivars; 3) studies on cultural practices in growing hybrid tea and grandiflora roses; 4) evaluation of species and cultural practices to be used in planting mixtures of wild flowers; and 5) evaluation of turf grass cultivars and lawn management practices.

Forestry (under the Department of Horticulture until 1974, and presently a part of the Department of Forestry, Fisheries and Wildlife). Early in the development of the Field Laboratory, the major portion of Section 26 was set aside for forestry studies. Inert powder storage buildings were moved to the area and renovated to accommodate the facility needs for conducting the forestry research projects.

Shelterbelt plantings were made in 1966 to determine the effect of the wind protection provided thereby on yields of wheat, soybeans, and grain sorghums. Provenance tree plantings were made in 1966 and 1967.

Agricultural Meteorology and Climatology (part of the Department of Horticulture until 1975, then the Department of Agricultural Engineering until 1979 at which time it became a Center). Work in this area started at Mead on Section 26 in 1966. The initial laboratory structure was renovated and enlarged in 1980-81. Initial work consisted of studying the effect of artificial windbreaks constructed from snow fencing. Various orientations of the windbreaks were used in making these studies.

The major objective of the present agrometeorological research is to improve the efficiency of crop water usage, along with studying the effects of climate modification on crop and animal production.

Veterinary Science. The Department of Veterinary Science started operations at the Mead Field Lab in the early 60's at the south end of load line 4, in Section 20. The purpose of the program is to provide Specific Pathogen Free (SPF) swine and cattle for research projects, and for use by farmers. The advantage of maintaining these basic herds at the Laboratory is that isolation from other animals, and from people who might carry the disease on their clothing, is more easily provided than it would be at most other locations.

The integrated energy farm of 157 acres is one of the newer developments at the Laboratory. The program involves a crop rotation of corn, soybeans, and sweet sorghum; a swine facility; a 200-gallon alcohol fermentation/distillation unit; a methane gas production unit; crop drying and processing facilities; and a solar unit of 100,000 silicon solar cells, with a 25 kilowatt peak output. The objectives of energy farm include: 1) demonstrate energy-saving irrigation practices; 2) use ethanol produced from sweet sorghum to power farm engines; 3) reduce tillage

operations and fertilizer usage; 4) conserve soil and water; 5) demonstrate use of solar energy and methane gas to generate electricity for space heating in the swine facility; and 6) recover waste heat and carbon dioxide from alcohol fermentation. The hope is to demonstrate how usage of fossil fuels on farms can be minimized, and ultimately eliminated (39).

Users Outside of the College of Agriculture/IANR

At the time the application for the land at Mead was being prepared, an effort was made to include University units outside of the College of Agriculture. It was thought that including such additional programs would strengthen the application and make acceptance by the HEW/GSA more likely. The effort to interest such other units was unsuccessful. The only usages suggested were for the College of Agriculture. However, since the Laboratory became established, five units outside of the College of Agriculture have developed facilities and programs on the site¹³:

KUON-TV/NE ETV Transmitter Station, for KUON-TV/Nebraska Educational Television, is located in the center of Section 31.

UNL Museum. The University of Nebraska Museum is storing Ice Age and Tertiary fossils in one of the load lines. The first transfer of these valuable research materials consisted of 14 semi-truckloads of prehistoric fossil bones in their field casts, weighing a total of approximately 56 tons. C. Bertrand Schultz, former Director of the Museum, said in 1962: "We are going to have one of the finest research, collecting and storing facilities for Ice Age and Tertiary fossils in the country. . ." (31).

Behlen Observatory. The College of Arts and Sciences Department of Physics and Astronomy Behlen Observatory is located in a specially built silo. The Observatory located in the southeast corner of load line 3, Section 19, contains a 30" telescope.

UN Medical Center. Early in the development of the Laboratory, space was assigned to the UN Medical Center at Omaha in load line 4, Section 20, for research purposes. A herd of miniature swine which are fast maturing and economical to raise, was started in 1964 for studies on atherosclerosis. Initial funds for

¹³There was a sixth suggested usage which fortunately did not materialize. In the late 60's when the U.S. Atomic Energy Commission was casting about for locating a multimillion dollar giant particle accelerator, some Nebraska citizens strongly encouraged constructing the facility at the Mead Lab. This would have required a large amount of land and if installed would have ruined the Mead Lab for agricultural research and educational purposes. The AEC selected Illinois as the location for the accelerator. As this book goes to press, plans are underway to build a still larger particle accelerator which has been named the Superconducting Super Collider. It will have a diameter of 14 miles with an oval track of 52 miles. Estimated cost is \$4.5 billion dollars. This time the Mead Center does not appear in danger of being taken over because the needed land area is much larger than the total of the Center. Also, the *Lincoln Journal* has stated that "Nebraska is not planning to submit a proposal . . ." (40).

this project were provided by the Nebraska Heart Association. Also large numbers of small animals including mice, rats, hamsters and rabbits are produced for research conducted by the Eppley Institute for Research in Cancer and Allied Diseases. F. C. Hastert reported in 1974 that dogs were also being kept for studies by the Medical Center (33).

Corps of Engineers, U.S. Army/UN Department of Civil Engineering. In 1965 the University entered into a 10-year lease¹⁶ with the Corps of Engineers, U.S. Army, to construct a model of the Missouri River in a 50 X 100' water tank in the north end of load line 4, Section 17. The structure is used to study erosion and sedimentation problems. The course of the river is built in the tank with movable two-foot sections which can be varied to duplicate the different bends in the river. Water is pumped through the "river" and walnut shells, ground to various sizes are used to duplicate sand, silt or gravel. Through these model studies the Corps can better design stabilization structures for the Missouri River.

The UNL Department of Civil Engineering is cooperating in the project, principally with respect to graduate student research and field trips for undergraduate students (34).

Special Programs

Tractor power and safety day. This event, which was moved from the East Campus to Mead in 1964, not uncommonly attracted 10,000 or more people. Over the years there were demonstrations of tractor safety practices, sound tests for tractor noise levels, new tractor models, hay and grain handling equipment, automatic irrigation and center-pivot irrigation systems, and management of livestock wastes. Tours of the demonstration areas and experimental plots were given with notables commonly giving speeches.

In 1984 the format of the program and the title were changed, with the new event being titled "IANR AG EXPO."

Other events and visitors. Other events include hunting dog trials and state and national model airplane shows. Organized tours are provided for vocational agricultural classes, 4-H clubs, the Nebraska School of Technical Agriculture classes and other groups. Many unscheduled visitors come to the Laboratory to view the research underway.

Wildlife and hunting. The UNL Wildlife Club, sponsored by the Department of Forestry, Fisheries and Wildlife, helped develop a wildlife refuge on what had been the "burning ground" located east of the north end of load line 4 (not on a part of the University owned area).

Cooperation is carried on with the Nebraska Game and Parks Commission in encouraging wildlife on the grounds. The Laboratory includes a favorable envi-

ronment for wildlife. For example, a large portion of Section 35, bisected by Silver Creek, is used lightly for research and education purposes because of the flood plain involved. There are a large number of volunteer deciduous trees along the Creek, along with weed patches and grazing areas. In addition, about 10 percent of the Laboratory consists of land formerly used for railroad drainage ditches and basin areas, groves of trees, plum thickets and osage orange hedges. The latter two date back to the 96 farms and farmsteads present prior to establishment of the NOP.

Pheasants, quail, deer, squirrels, rabbits, and some coyotes propagate on the grounds. The basin lagoons caused by the high water table provide a resting place for migrating ducks and geese in the fall and spring of each year.

Since 1967, hunting has been permitted, for a few weeks each year on a portion of the grounds. The Laboratory makes available 5,000 acres for hunting and the Nebraska National Guard provides an additional 1,000 acres located contiguous to the north side of Section 17. Hunters may use only shotguns and must check in and out at the hunting "shack" located near the headquarters. An average of 3,000 hunters come to the Laboratory each fall. They harvest 350 to 400 pheasants and a lesser number of quail, rabbits, and coyotes.

Airstrip. The Laboratory maintains a sod air strip, 100 X 3200' in size, which is used by student pilots, commercial spray operators, and the Flying Farmers who come in for the various field days.

Utilizing inmates of the Nebraska Penal Complex. Inmates of the Nebraska Penal Complex helped a great deal in the early development of the Mead Laboratory. They were transported each morning from Lincoln and back that evening. Under supervision, they performed arduous tasks which others did not particularly want to do. These included cutting and hauling brush, removing trees from fences, cutting musk thistles, and disassembling frame buildings for the usable lumber.

In 1964 there was a good deal of enthusiasm in both the Nebraska Department of Institutions and in the University Department of Horticulture and Forestry when the S¹/₂ of Sec. 21 and the N¹/₂ of Sec. 28 were assigned to the former for the establishment of a vegetable farm training center. George Morris, institutions director, viewed the program as "... a self-supporting one to rehabilitate inmates from any state institution and provide an employment pool for a predicted vegetable-growing agricultural industry in Nebraska's future." J. O. Young, chairman of the Department of Horticulture and Forestry, who had actively supported Morris in his efforts to obtain the land and buildings, expressed pleasure over the assignment and stated: "Their large scale production (of vegetables) will help us in accomplishing demonstration and pilot operations". The vegetables were to be canned for use at all state institutions (12, 36).

¹⁶The original lease has been extended and is still in force (35).

Included in the original assignment was a 60-person capacity dormitory in which Director Morris housed prison inmates to carry out the labor needed in conducting the vegetable project. Unfortunately the program ran into a discipline problem. In early October 1965 a State Safety Patrol report quoted " 'Mead inmates' tales of drinking parties, repeated thefts, unauthorized trips, and sex play." When the difficulties surfaced, Governor Frank Morrison ordered a shut-down of the entire operation which was completed by the end of 1965 (37). Subsequently, after the State had turned the land and buildings back to the federal Government, Morris was actively supportive in getting the tract assigned by the HEW/GSA to the University. The transfer was made in the fall of 1966.

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Before it was the ARDC

In recognition of the many families who gave to the World War II effort with their sacrifice of land ownership, homes, and farming livelihood and on behalf of our nation and Nebraskans, we express our thankfulness.

With the war in Europe raging, the Federal Government stated a need for land located in Saunders County for the construction of an ordnance plant. All total, 17,348 acres were quickly acquired from 176 different parcels and the Nebraska Ordnance Plant (NOP) came into production.

Nebraska Defense Corporation, a subsidiary of the Firestone Rubber and Tire Company, was hired as a consultant for the design and construction phases and later as the facility operator. Contracts for construction of the Ordnance plant facilities were awarded in December of 1941 even though land acquisitions were not final until January of 1942.

The use of 10,000 workers during the \$25,000,000 construction phase enabled Load Line #1 to become operational in October of 1942. Load Lines #2, #3, and #4 were brought on line by January of

1943. In addition to the Load Lines, the facility contained a bomb booster assembly plant, ammonium-nitrate production plant, hospital, post office, fire department, railroad yards and maintenance facilities, and water, sewer, and power plants necessary to operate the NOP.

The NOP at full production employed 3,000 employees. Each bomb loading line had the capability of loading and assembling up to 42,000 pounds of bombs. Records indicate that 3,000,000 pounds of bombs ranging from 90 to 22,000 pounds were produced during World War II. Over 14,000,000 bomb boosters were produced in the same period. Bombs were loaded with Amatol, TNT, Tritonal, and Composition B. The bomb booster assemblies added Tetryl boosters to the bombs. The NOP continued operations into the Korean War.

In 1956 the NOP was declared excess to the Army's needs and turned over to the General Services Administration. In 1962, the University of Nebraska acquired 8,872 acres of the NOP. With subsequent acquisitions of other portions of the NOP in 1966 and 1971, the ARDC now encompasses 9,663 acres. The land is used for the benefit of all Nebraskans through research and educational programs.

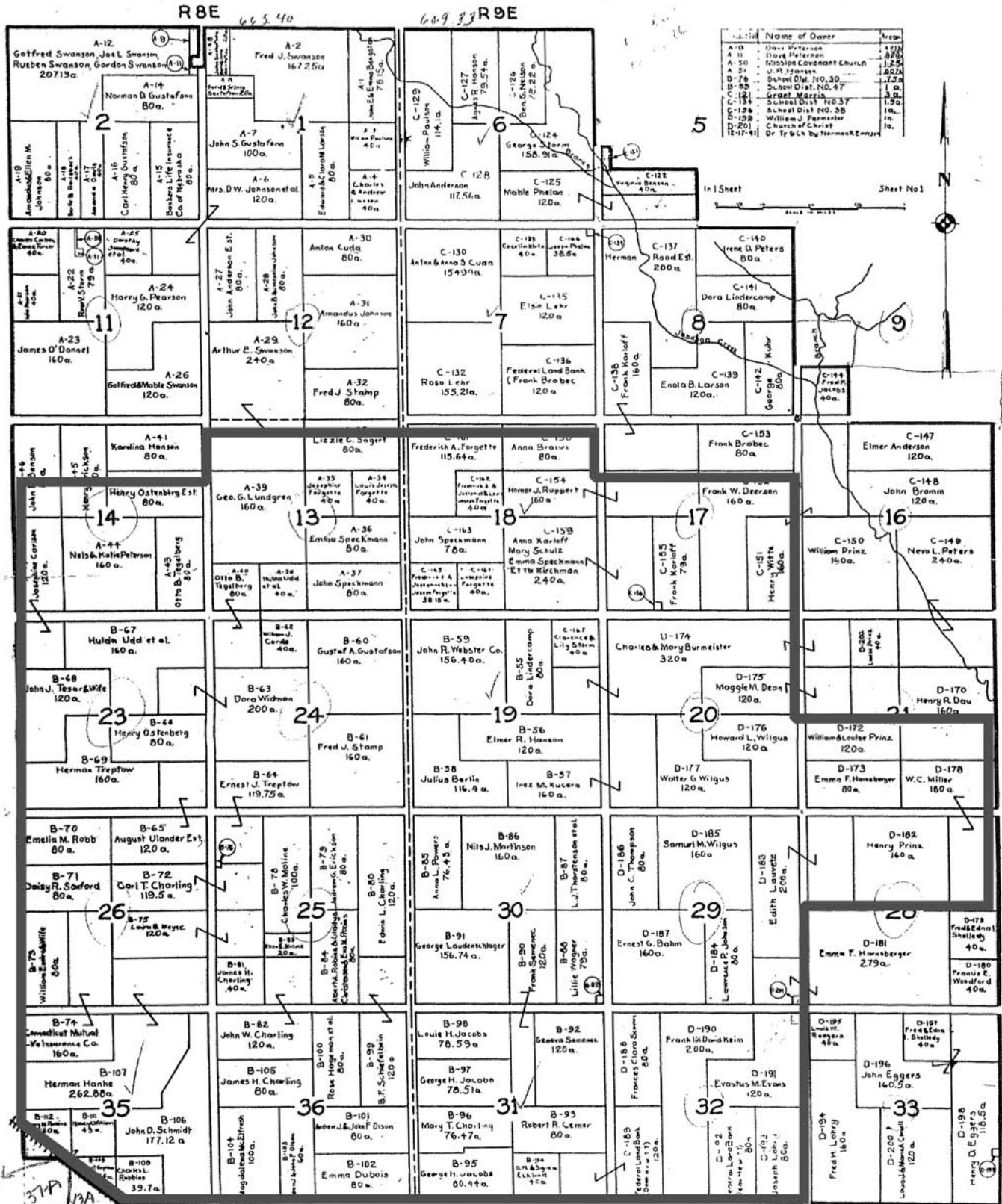
The Agricultural Research and Development Center is located on part of the former Nebraska Ordnance Plant (NOP) site. The NOP at full production employed 3,000 employees, mostly women. In 1956 the NOP was declared excess to the Army's needs and turned over to the General Services Administration. In 1962, the University of Nebraska acquired about 9,000 acres of the NOP. With subsequent acquisitions of other portions of the NOP in 1966 and 1971, the ARDC now comprises over 9,500 acres.



NEBRASKA ORDNANCE PLANT

WAHOO, NEBRASKA

OWNERSHIP MAP



In October of 1941, the Federal Government stated a need to use land located in Saunders County for the construction of the Nebraska Ordnance Plant (NOP). In all 17,348 acres were acquired in 176 different parcels. The map above shows the names of the families that were affected by the acquisition of land by the United States government for the NOP. Family names are also listed on the next page. The ARDC perimeter is also outlined on this map.

Section 13

O.B. Egelberg
 Louis Forgette
 Jose Forgette
 Geo G. Lundren
 Lizzie C. Sagert
 John Speckmann
 Emma Speckmann
 A.E. Swanson
 Hulda Udd

Section 14

J.E. Benson
 Josphine Carlson
 O.B. Egelberg
 Henry Erickson
 Karoline Hanson
 Emily Johnson
 H. Ostenberg
 Nels Peterson

Section 17

Frank Karloff
 Frank W. Deerson
 Henry Witte
 Homer J. Ruppert
 Anna Karloff
 Mary Schulz
 Emma Speckmann
 Etta Kirchman

Section 18

Frederich A. Forgette
 Anna Brabec
 Federick and Josphe Forgette
 Homer Ruppert
 Anna Karloff
 Mary Schulz
 Emma Speckmann
 Etta Kirchman
 John Spechmann
 Josephine Forgette

Section 19

John R. Webster Co.
 Dora Lindercamp
 Clarence and Lily Storm
 Charles and Mary Burmeister
 Elmer R. Hanson
 Julius Berlin
 Inez M. Kucera

Section 20

Charles and Mary Burmeister
 Maggie M. Dean
 Howard L. Wilgus
 Walter G. Wilgus
 Inez M. Kucera

Section 21

Henry R. Dou
 Wiliam and Louise Prinz
 Emma F. Harnsberger
 W.C. Miller

Section 23

Josephine Carlson
 Peter H. Olson
 H. Ostenberg
 Herman Treptow
 Hulda Udd
 Anna Ulander
 Dora Widman

Section 24

Wm. J. Cords
 O.B. Egelberg
 Gustaf Gustafson
 Fred J. Stamp
 Ernest Treptow
 Dora Widman

Section 25

C.T. Charline
 Vas Charling
 John Charling
 Edwin L. Charling
 Gus T. Erickson
 Laura B. Meyers
 C.W. Moline
 E. Moline
 Mable Robbins
 B.F. Scheieelbein
 Ernest Treptow

Section 26

C.T. Charling
 William Enders
 Herman Hanke
 Laura B. Meyers
 Millie Robb
 Daisy Sanford
 Anna Ulander
 Conn. Mut. Life

Section 28

Edith Lauvetz
 Henry Prinz
 Emma F. Hornberger

Section 29

John C. Thompson
 Ernest G. Bahm
 Samuel M. Wilgus
 Lawrence P. Johnson
 Edith Lauvetz
 Emma F. Hornberger

Section 30

Anna L. Powers
 George Laudenschlager
 Frank Semenec
 Lillie Wagner
 L.J. Thorstenson
 Nils J. Marlinson

Section 31

Louis H. Jacobs
 George H. Jacobs
 Mary T. Charling
 Geneva Semenec
 Robert R. Cemer
 Echland
 Federal Land Bank

Section 32

Francis Clara Semenec
 Federal Land Bank
 Franklin David Keim
 Evastus M. Evans
 Josphe Loh

Section 35

E. Hageman
 Herman Hanke
 H.N. Robbins
 C.L. Robbins
 John D. Schmidt
 N.L. Williams
 Conn. Mut. Life

Section 36

John W. Charling
 James H. Charling
 Rose Hogeman
 Jos. U. Mastera
 Magdalena McElfresh
 Andrew J and John F. Olson
 B.F. Scheifelbein
 B.F. Schmidt
 Emma Dubois

Nebraska Ordnance Plant (NOP)



Bombs, boosters and shells were produced and assembled from 1942-1945 and 1950-1956 at the Nebraska Ordnance Plant (NOP) near Mead, Nebraska where the ARDC is now located. The plant was also used for munitions storage and ammonium nitrate production. The NOP included 4 Load Line buildings that were 3/4 mile long, a bomb booster assembly plant, an ammonium nitrate plant, 2 explosive burning areas, a proving range, analytical labs, igloo storage buildings, and administration facilities.



The Research

The scope and diversity of ongoing research projects at UNL's Agricultural Research and Development Center (ARDC) combines to make the site one of the most unique research facilities in the United States.

The ARDC is a major research and education facility of the Agricultural Research Division of the University of Nebraska's Institute of Agriculture and Natural Resources (IANR). The size and diversity of the Center offers many research and educational opportunities. This report provides a glimpse of the range of projects and programs currently taking place at the ARDC.

The following is a sampling of current research projects and programs taking place at UNL's ARDC near Mead, Nebraska.

- ***THE BEEF NUTRITION FEEDLOT*** purchases approximately 2,500 steer calves each fall for research trials throughout the year. The steers are either fed in the winter/spring as calf-feds, or grown into yearlings on different forage-based systems, and then used in feedlot experiments for finishing studies in the summer or fall. Carcass performance is also measured on all cattle. The main research includes:

Byproduct utilization: Research focuses on methods to use wet distillers grains plus solubles, dry distillers grains plus solubles, modified wet distillers grains plus solubles, distillers solubles, wet corn gluten feed, or combinations of these. Impacts of removing oil from distillers grains are also of interest. The goal of this research is to optimize the amount of ethanol byproducts, determine the impact of drying on energy values, optimize diet ingredients such as corn processing, roughage amounts, and feed additives when byproducts are fed, and determine methods to feed very large amounts in the diet.

Crop residue utilization: Nebraska 21 million acres of cropland on which corn is the major crop. Crop residues have been effectively used by cows and growing calves, but a larger proportion of the available residue must be utilized if the beef industry is going to be maintained or grow. Additionally, opportunities exist to utilize harvested crop residues in growing and finishing diets. Research is focused on quantifying the quality of available forage, developing supplementation and grazing strategies to efficiently utilize the residues, and working with agronomists and soil scientists to evaluate the effects of grazing on subsequent crop production. Use of chemical treatments such as calcium oxide to improve the feeding value of harvested residues is an additional research focus.

Production systems: Research focuses on optimizing production systems and comparing yearlings to finishing cattle as calf-feds. Interests include determining the

BEEF NUTRITION FEEDLOT cont. on next page



To learn more
about research at
the ARDC - visit
our website at:

ardc.unl.edu



Beef feedlot research includes byproduct utilization, production systems, environment-nutrition interaction, starch utilization, and feed efficiency enhancement.

BEEF NUTRITION FEEDLOT cont. from previous page

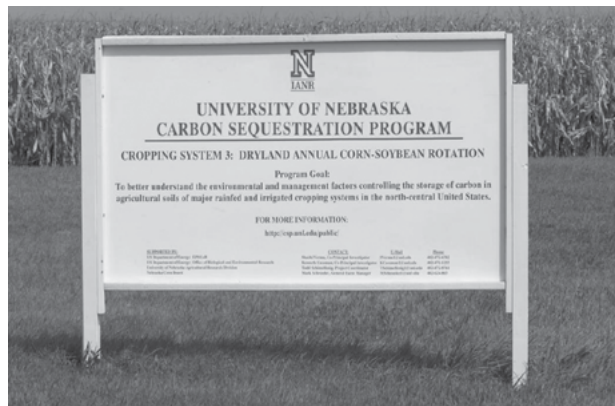
optimum rate of gain during the backgrounding and stocker phases to maximize profitability of the system. The research also includes supplementation studies for cattle on pasture or backgrounded through the winter in different forage-based systems. Use of byproducts for growing cattle is an important aspect to this research area. Research has concluded that yearling production systems can be very profitable when grain prices are high, but winter feed supplementation costs are critical to how profitable this system may be.

Environment-nutrition interaction: Numerous research projects (2 per year for the past 12 years) have focused on methods to decrease Nitrogen (N) lost into the air and increase the amount of manure N, as well as methods to improve the use of phosphorus and make manure management more economical. Dietary and management strategies have been tested that may decrease N losses by 25 to 50%, but more progress is needed.

Starch utilization: Research is being conducted on corn hybrids to improve cattle performance when fed different hybrids with different kernel characteristics, as well as evaluating genetically-enhanced hybrids such as herbicide and insect-tolerant hybrids. Research includes adapting cattle to high-grain rations with either forages or byproducts.

Growth and feed efficiency enhancement: Research focuses on methods to improve growth rates of finishing cattle such as use of feed additives like Optaflexx and Zilmax, or use of implants to increase growth rates. Current byproduct research studies include methods to feed greater than 70% wet distillers grains plus solubles, the impact of sulfur (which is elevated in diets containing distillers diets) on feedlot cattle performance, use of Optaflexx and Zilmax at the end of the feeding period, and the impact of drying distillers grains on the energy value and greenhouse gas emissions. The impact of feeding distillers grains on N losses from feedlots, as well as the impact of increasing the frequency of cleaning pens on N losses, is being evaluated.

Principal Investigators include: Drs. Galen Erickson, Terry Klopfenstein, and Jim MacDonald
For more information, beef research is published annually in the Nebraska Beef Report at <http://beef.unl.edu>. Research support is provided by numerous sources, including industry grants, Nebraska Corn Board funding, the Nebraska Center for Energy Sciences Research, and other sources.



• **CARBON SEQUESTRATION:** A state-of-the-art field research facility has been established at the ARDC to quantify carbon sequestration (storage) in agricultural systems. Agricultural crops have the potential to offset a significant amount of carbon dioxide emissions by sequestering carbon in the soil. CSP is an interdisciplinary research effort which includes faculty, students, post-doctoral researchers, and technicians from six UNL departments, focused on improving our understanding of processes controlling carbon sequestration (storage). The overall goal is to investigate the carbon sequestration potential of major rainfed and irrigated agroecosystems in the north-central USA and to understand the biophysical controls on carbon sequestration. 450 acres of corn/soybean production are dedicated to the project.
Principal Investigators: Drs. Shashi B. Verma, Ken G. Cassman and Andy Suyker



• **NEBRASKA FOREST SERVICE FIRE EQUIPMENT SHOP:** A unique shop is located at the ARDC. The Nebraska Forest Service Fire Equipment Shop refurbishes excess government equipment into usable fire fighting equipment for rural fire departments. The shop services and repairs fire equipment, for volunteer fire departments, as well as equipment utilized by the Nebraska Forest Service.

This is a cooperative program with the U.S. Forest Service in which vehicles that have become excess to the needs of the federal government are acquired, reconditioned and assigned for firefighting. The programs are called the Federal Excess Personal Property (FEPP) and Fire Fighter Property programs.

Fire districts across Nebraska have obtained essential fire-fighting equipment at an affordable price. 480 refurbished units have been distributed. Conservatively, the total replacement value of these trucks would be \$28 million dollars if these fire departments had to purchase new units.
Nebraska State Forester: Dr. Scott Josiah
Nebraska Fire Program Leader: Don Westover
Fire Equipment Manager: Lew Sieber
www.nfs.unl.edu/program-wildlandfireprotection.asp

- **AGROFORESTRY RESEARCH:** The network of windbreaks at the ARDC is the only replicated shelterbelt research site in the United States.

Established in 1966 by Professor Walt Bagley, the network consists of six, 40 to 45-acre windbreak systems and is home to the longest running study on crop response to wind protection. Long-term yield averages indicate that wind protection provides an increase in yield of 15% for winter wheat, 12% for corn, and 16% for soybeans.

While yields in individual years may vary considerably due to growing conditions, primarily rainfall, economic analysis indicates that an investment in windbreaks pays for itself in 7 to 10 years and results in long-term returns in the range of 4 to 6%. These long-term averages include the yield losses associated with the land planted to the windbreak and yield losses due to competition immediately adjacent to the windbreak. Long-term yield trials continue and indicate very positive impacts of well-designed field windbreaks.

Principal Investigator: Dr. Jim Brandle with technical support from Bruce Bolander, Mike Cieslik, and Doug Watson

- **LONG-TERM WINDBREAK STUDIES:** Long-term studies on the ecological role of windbreaks and other woody components of the agroecosystem in maintaining biological biodiversity, their impact on predatory species (both birds and insects) and their role in biological control of crop pests have indicated the value of the ecosystem services provided to all as a result of well managed agricultural ecosystems. In order to capture these values we have been developing a Healthy Farm Index. The Healthy Farm Index is a tool that integrates ecological, economic, and social parameters to assess how land-use and land-cover patterns influence biodiversity, production, and other ecosystem services.

Principal Investigators: Drs. Jim Brandle and John Quinn

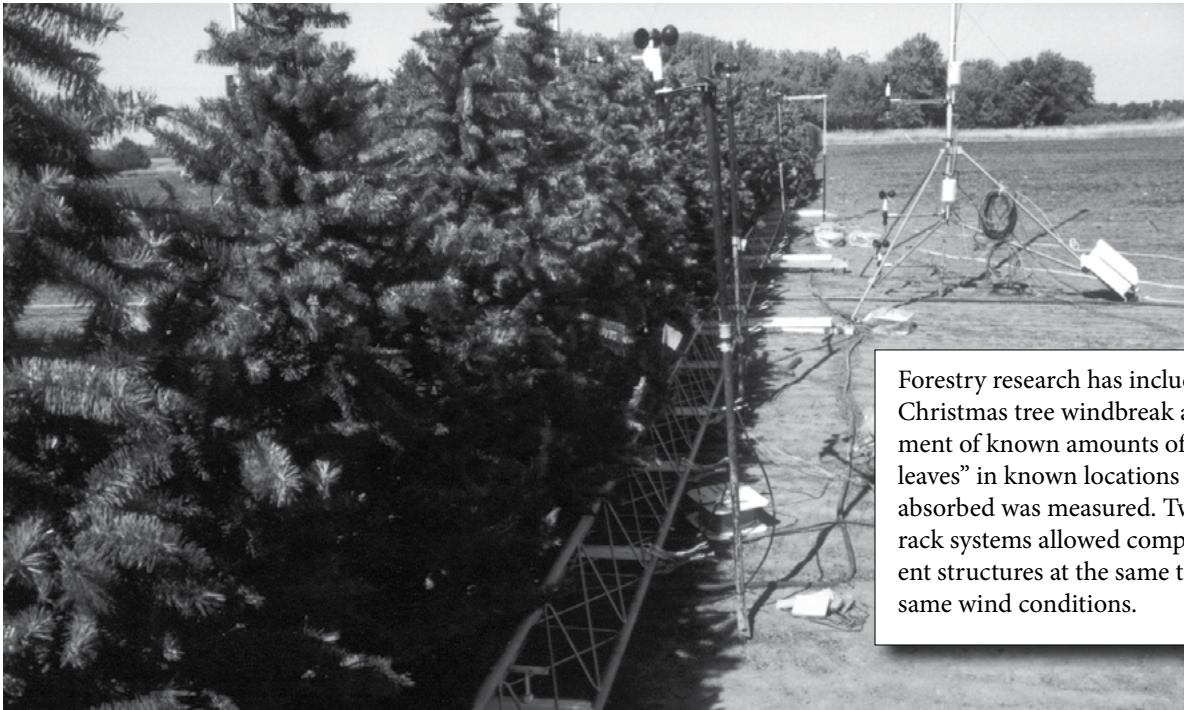
- **ORGANIC FARM SYSTEMS RESEARCH:** Building on 30 years of windbreak research, 45 acres of protected land were certified organic in 2008 in the shelterbelt area. The ARDC organic farm is part of a new network of University organic research sites across Nebraska and is supported by a USDA grant. Other organic sites are located at: the Haskell Ag Lab (HAL) near Concord, the South Central Ag Lab (SCAL) near Clay Center and the High Plains Ag Lab (HPAL) at Sidney. These four sites represent a statewide effort in interdisciplinary research.

The land at each organic research site is intended to support further organic research and outreach. The project provides opportunities for ongoing research in cover crop management for providing organic sources of nitrogen and weed control and development of wheat varieties for organic producers.

At the ARDC site, the primary rotation is wheat, followed by manure or cover crop, followed by corn and then soybean with wheat planted immediately following soybean harvest. Wheat breeding, biodiversity monitoring, and cover crop projects currently use part of the organic land at the ARDC. Current cover crops include: berseem clover, field peas, cow peas, hairy vetch, and soybeans. Indicators for the Healthy Farm Index, a new farm assessment tool, are being developed at the ARDC in collaboration with the sites and participating farmers. Biological monitoring has identified 63 bird species at the ARDC. Local organic farmer groups have been an integral part of our research efforts and are frequent visitors to the site.

Principal Investigators: Dr. Charles Shapiro, Agronomy - HAL; Dr. Jim Brandle, Natural Resources - ARDC; Dr. Steven Knezevic, Weed Science - HAL; Dr. Bob Wright, Entomology - SCAL; Dr. Chuck Francis, Agronomy; Dr. Steve Baenziger, Agronomy; Dr. Drew Lyon, Agronomy - HPAL; Liz Sarno, Extension Educator; and Dr. John Quinn

Website: <http://organic.unl.edu>



Forestry research has included an artificial Christmas tree windbreak allowed for placement of known amounts of “branches and leaves” in known locations while momentum absorbed was measured. Two side by side rack systems allowed comparison of different structures at the same time under the same wind conditions.



Apiculture research at the ARDC focuses on solving applied apicultural problems. UNL is currently a collaborator in a USDA Conservation Activity Plan (CAP) project to investigate unexplained losses of honey bee colonies that have been given the name “Colony Collapse Disorder.”

• **HONEYBEE RESEARCH CRITICAL TO FOOD SUPPLY:**

The Apiculture Laboratory at the ARDC provides a unique setting for beekeeping educational programs and applied apiculture research. Educational programs have the advantage of a fully equipped auditorium for classroom presentations and nearby apiaries for hands-on activities. Programs offered at the ARDC include beginning and master beekeeping workshops, and value-added products workshops and field days.

The laboratory also provides a site for UNL students to gain experience working with honey bees and hive products. Apiculture research at the ARDC focuses on solving applied apicultural problems. During the last 3 years,

UNL scientists are collaborators in a USDA Conservation Activity Plan (CAP) grant to investigate unexplained losses of honey bee colonies that have been given the name “Colony Collapse Disorder.” The goal of the research is to provide sustainable solutions to introduced bee diseases and pests

Principal Investigator: Dr. Marion Ellis

• **STABLE FLIES:** The USDA-Agricultural Research Service (ARS) Agroecosystem Management Research Unit, in collaboration with the Department of Entomology, has been conducting research on stable flies at the ARDC for nearly 30 years. This facility offers unique opportunities to study stable fly development, migration and feeding in a diverse agricultural environment. Current research focuses on characterizing stable fly larval developmental sites, population dynamics, and semiochemicals in order to develop cultural, physical and chemical technologies to manage stable flies and other flies impacting livestock production in Nebraska and nationwide.

Principal Investigators: Drs. David Taylor, Kristina Friesen and Jerry Zhu

• **CORN ROOTWORM:** Research on the biology, ecology, and management of corn rootworms has been conducted at the ARDC Insect Field Laboratory since the mid-1960’s. The main goals of ongoing research are 1) to increase understanding of the biology and behavior of rootworm species, and 2) develop and evaluate alternative corn rootworm management techniques and strategies. Many recent experiments have been conducted to evaluate new rootworm management technologies (e.g., seed treatment, and Bt corn hybrids) that are being developed by industry.

UNL Department of Entomology faculty are also actively working with grower, industry, and regulatory organizations to develop effective but practical resistance management strategies that are required by the U.S. Environmental Protection Agency (EPA) when new transgenic corn hybrids are registered. The long-term goal is to work with industry and the EPA to provide growers with a suite of viable rootworm management tactics (growers can then adopt the tactics that best fit their needs) and to facilitate their use within an Integrated Pest Management (IPM) framework in combinations that are sustainable over time.

Principal Investigator: Dr. Lance J. Meinke

• **INSECTS AND SWITCHGRASS:** On-going entomological research efforts at the ARDC are working to identify the insects and mites associated with switchgrass, investigate their biology, seasonal abundance, and injury potential, and develop management alternatives for potential pests. Special attention is being directed at identifying natural enemies, which may play an important role in regulating pest populations, and on locating insect-resistant germplasm.

Principal Investigator: Dr. Fred Baxendale



• **DAIRY RESEARCH:** Most recently dairy research at the ARDC has primarily focused on understanding the relationship between forage quality and ruminal fermentation in lactating dairy cattle. Studies include manipulations on forage particle size and evaluation of these effects on feed efficiency, milk production, composition and rumen fermentation.

Milking operations ceased at UNL’s Department of Animal Science dairy research unit in 2012. Research is being refocused from large scale feed and lactation studies to individual animal research that will be conducted on East Campus with a smaller herd. The adult dairy herd at the ARDC is liquidated at auction in December 2011.

Principal Investigator: Paul Kononoff

- **SWINE RESEARCH:** The primary focus of UNL swine research encompasses: progeny and genetics, breeding programs, nutrition and diet evaluation, meat production, and management systems.

Research focuses on deciphering the interactions between nutrients, gut microbes, and health in swine. This includes: 1) evaluating the effects of dam parity on progeny growth and health; 2) evaluating the effects of pre- and probiotics on nutrient transport and immune markers in vitro in a porcine intestinal epithelial cell line (IPEC-J2); and 3) evaluating the effects of dietary components (e.g., DDGS and lactose) on swine growth and health.

Current research is showing that an apparent increase in unsaturated (soft) fat may be alleviated by withdrawing DDGS prior to slaughter or by increasing the intake of saturated fat. In addition, increasing the amount of modified DDGS is now used in swine diets.

Phytase is an enzyme that helps animals utilize grains as a source of phosphorus in their diet. In another UNL DDGS study, the findings suggest that supplementing the diet of growing-finish pigs with phytase instead of calcium-phosphates could help decrease costs without altering animal performance and growth parameters.

Research is showing that with the improved phosphorous availability in DDGS in conjunction with adding phytase (and decreasing dicalcium phosphate) may provide an economic advantage to the producer.

Studies also look into the role DDGS plays in the growth performance on nursery pigs and during the development on growth and puberty of gilts. UNL research has shown that DDGS can effectively be incorporated into nursery diets, and it can help limit energy intake during gilt development.

UNL swine geneticist Rodger Johnson spent 38 years researching swine genetic improvement of reproductive efficiency, sow longevity and resistance to disease. Reproductive research continues focused on ovulation rate, litter size and uterine capacity observed during 27 generations of selection in the Nebraska Index Line. The index line is a maternal line of females selected for litter size using ovulation rate and uterine capacity as important biological components defining litter size.

Principal Investigators: Drs. Thomas Burkey, Daniel Ciobanu, Phillip Miller, and Brett White

The primary focus of the UNL Department of Animal Science swine research encompasses: progeny and genetics, breeding programs, nutrition and diet evaluation, meat production, and management system.

- **AUTOMATED WEATHER DATA NETWORK (AWDN):** The Agrometeorology Laboratory at the ARDC is home for the longest continuously operated automated weather stations in the U.S.A. There are over 65 AWDN stations in Nebraska and a total of 219 in the High Plains region providing comprehensive information, on air and soil temperature, humidity, wind speed and direction, solar radiation, and precipitation for use in agricultural decision making throughout the region. The Nebraska stations monitor soil water at depths of 10, 25, 50, and 100 cm. This is a unique non-federal network formed by cooperation between climatologists in the High Plains and nearby states.
Principal Investigator: Dr. Ken G. Hubbard

- **UV-B MONITORING AND RESEARCH PROGRAM:** One of the 36 USDA UV-B Monitoring and Research Program (UVMRP) climatological UV-B (Ultraviolet-B) stations is located at the Agrometeorology Laboratory at the ARDC. Data have been collected and reported to a central site since 1996. Data from the monitoring program provides information important for assessing the local impact of UV-B sunlight radiation on human health, plants, the environment and materials. Data from the UV-B Monitoring and Research Program are made available via the UVMRP web site (<http://uvb.nrel.colostate.edu/UVB/index.jsf>).
Principal Investigators: Drs. Elizabeth A. Walter-Shea and Ken G. Hubbard

- **NATIONAL ATMOSPHERIC DEPOSITION PROGRAM/ NATIONAL TRENDS NETWORK:** The lab constitutes a field facility where precipitation chemistry is monitored year-round as part of the National Atmospheric Program/National Trends Network (NADP/NTN). The purpose of this network is to provide information on the chemistry (e.g., sulphate, nitrate, ammonium) to help monitor temporal and geographical trends. This ARDC site is one of the inaugural sites started in 1978. Now, the network consists of over 250 sites nationally. Following strict quality control, data from the ARDC and other sites are made available via the NADP website (<http://nadp.sws.uiuc.edu/>).
Principal Investigator: Dr. Shashi B. Verma and Andy Suyker



The **COW/CALF RESEARCH HERD** is used to conduct basic and applied research in beef cattle reproductive physiology and includes 220 cows mostly of MARC III (red angus, pinzgauer, red poll and hereford) and red angus composition.

• **OVARIAN RESERVE AND REPRODUCTIVE LONGEVITY:** Scientists are working to determine if cows with larger ovarian reserve (born with more follicles on their ovaries) also have better oocytes (eggs) and stay reproductive for a longer period of time. Researchers are hopeful that using predictors such as number of antral follicles (counted by using ultrasound technology) may aid producers in determining which heifers should remain in the herd and may have greater longevity.
Principal Investigators: Drs. Andrea Cupp, Jennifer Wood and Robert Cushman, USMARC

• **EGG QUALITY AND SPERM PRODUCTION:** The gene Vascular endothelial growth factor (VEGF) can be alternatively processed to produce proteins that stimulate spermatogenesis (sperm production) and follicle development (the follicle contains the egg and allows for maturation of the egg) or produce inhibitory proteins that arrest both spermatogenesis and follicle development. Thus, scientists are trying to manipulate this gene to enhance fertility in cows and bulls.
Principal Investigator: Dr. Andrea Cupp

• **DEVELOPING MARKERS FOR EGG QUALITY AND EMBRYO QUALITY:** Scientists are determining genes that are involved in oocyte (egg) quality which may also be predictive of embryo quality and successful pregnancy outcomes. The scientists are treating cows with different levels of progesterone to develop abnormal follicles (persistent follicles) that will have an altered gene profile. Their intent is to compare this altered profile with follicles developed under “normal conditions” to obtain genes which may be good markers for competent and non-competent eggs.
Principal Investigators: Drs. Andrea Cupp, Jennifer Wood and Robert Cushman, USMARC

• **EFFECTS OF FEEDING CORN CO-PRODUCTS ON REPRODUCTIVE PERFORMANCE:** Research is also being conducted to determine the effects of feeding dried distillers grains to replacement heifers and to mature cows (prior to breeding) to determine how this may affect reproductive performance. Results from this research have demonstrated increased artificial insemination (AI) conception rates (10%) in heifers developed with dried distillers grain. Furthermore, cows supplemented with DDG 45 days prior to breeding have increased AI conception rates (10-15%) and wean a heavier calf (calf that is being nursed by the cow at breeding time). Thus, scientists are now working to determine the mechanisms for this increased conception rate and calf weaning weight after feeding DDG.
Principal Investigators: Drs. Andrea Cupp and Rick Funston

• **COW/CALF TEACHING HERD:** The teaching herd consists of 220 heifers and mature cows, approximately 100 are purebred Angus. The remaining cows are Husker Red and Husker Black composites. The Husker composites blend Red or Black Angus genetics with Simmental or Gelbvieh to produce seedstock that meet the needs of commercial producers.

Cattle from the teaching herd are transported to East Campus for use in a number of classes, including Animal Production Skills, Livestock Evaluation, and Reproductive Physiology courses. Students in these classes gain experience at the ARDC and on campus in animal handling, artificial insemination, live animal evaluation and evaluation of performance records, semen collection, and gain hands-on experience managing a cow-calf operation. Cattle from this herd are also utilized in various Extension programs and youth judging contests throughout the year.

Bulls produced from this herd are sold in the annual “Bulls Worth Waiting For” sale conducted by the Beef Merchandising class every April in the Animal Science arena. Animals from this herd are also utilized in various research projects spanning genetics, reproduction, and management techniques.
Principal Investigators: Dr. Matthew Spangler



The UNL Department of Animal Science maintains two herds at the ARDC - a cow/calf teaching herd and a research herd.

- **TURFGRASS RESEARCH:** The John Seaton Anderson (JSA) Turfgrass area at the ARDC is a location for the National Turfgrass Evaluation Trials. Species included in the trials are: Perennial Ryegrass, Tall Fescue, Fine Fescue, Kentucky Bluegrass, Creeping Bentgrass, and Buffalograss.

Each species has over 100 different cultivars in each study and there are over 2,500 plots in all. The data collected can be used by turfgrass professionals when trying to determine which cultivar would be best suited to grow. This may be a golf superintendent renovating a golf course, or a landscape professional selecting grasses for a landscape project.

The JSA research area is used by numerous faculty in multiple departments at the University of Nebraska-Lincoln, including: Agronomy and Horticulture, Plant Pathology, and Entomology. The area is primarily utilized for screening turfgrass pesticides, including herbicides, insecticide, and fungicides.

Several research projects funded by the United States Golf Association have been done or are currently underway. One project was a comparison of root zone media in the construction of golf greens. Another ongoing project is buffalograss cultivar development and management research.

Several improved selections of buffalograss have been developed at the ARDC and released into production.

Selections that have been developed at UNL and that are available as sod or plugs include: Legacy and Prestige. And two seeded types are also available: Cody and Bowie. Sundancer may be available fall of 2013.

Principal Investigators: Drs. Keenan Amundsen, Fred Baxendale, Roch Gaussoin, Loren Giesler, and Zac Reicher



The UNL Department of Agronomy and Horticulture relays turfgrass research results and updates during the annual Nebraska Turfgrass Research Field Day.

- **SOYBEAN DROUGHT TOLERANCE:** UNL scientists are developing a new approach that delays soybean irrigation until early pod formation in July, relying on stored soil moisture and early-season rainfalls while still producing high yields. The project builds on years of research into soybean's drought resistance and the best methods of irrigation. Typically, producers plant soybeans in early May and begin irrigating in June. In years with average or above-average early-season rainfall, irrigation can result in too much water being applied to plants. Too much moisture can result in taller and leafier soybean plants that can lodge and are more susceptible to disease. Research shows that avoiding early irrigation encourages soybean plants to develop stronger, healthier root systems that grow deeper in search of moisture. Delaying the irrigation to soybeans has produced yields equal to or higher than those achieved by starting irrigation sooner in the season.

Principal Investigator: Drs. Ken G. Cassman and James E. Specht

- **REMOTE ESTIMATION OF CROP BIOPHYSICAL CHARACTERISTICS:** The overall goal of this research is to develop non-destructive proximal- and remote-sensing techniques for estimating of crop biophysical characteristics including vegetation cover, fraction of absorbed photosynthetically active radiation, leaf area index, biomass, chlorophyll content and gross primary production. The methods for estimating leaf pigment content (chlorophylls, carotenoids, anthocyanins) were developed and validated for different plant species, thus allowing accurate estimation of these essential biophysical parameters. Techniques were developed to estimate crop health and vigor by means of sensors positioned on airborne and space platforms.

Principal Investigators: Drs. Anatoly A. Gitelson and Donald C. Rundquist

- **IMPROVED FORAGE AND BIOENERGY PLANTS AND TECHNOLOGIES FOR THE CENTRAL USA**

The long-term objectives of this project are the development of improved perennial grasses and management practices and technologies for use in biomass energy production systems and grazing land in the mid-continental USA. The focus of the research will be on switchgrass for bioenergy and other warm- and cool-season grasses for grazing lands. Over the next five years, the following specific objectives will be addressed: (1) provide appropriate plant materials for use in pasture-based livestock systems; (2) improve the economic viability of forage-livestock systems for the Great Plains and North Central States with improved plant materials and management; (3) provide improved plant materials for harvested biomass used for bioenergy, bioproducts, and forage; and (4) develop sustainable production systems for harvested biomass and forage.

Principal Investigators: Drs. Ken Vogel, Rob Mitchell, and Gautam Sarath, USDA ARS

Website: www.ars.usda.gov/research/projects/projects.htm?accn_no=412518



• **ENHANCEMENT OF SORGHUM FOR BIOENERGY, FEED, AND FOOD VALUE:** Long-term objectives are the development of sorghum (*Sorghum bicolor*) germplasm lines with improved bioenergy, feed, and food value, and the elucidation of genetic, biochemical, and biological factors impacting these characters. Over the next five years, the following specific objectives will be addressed: (1) identify and evaluate genes to improve sorghum for bioenergy, food, and feed traits; (2) develop a better understanding of genes and fundamental mechanisms controlling cell wall formation and energy availability; and (3) develop molecular and other technologies for monitoring sorghum fungal pathogens and determine the effects of sorghum genetic modification for bioenergy on pathogen populations.
Principal Investigators: Drs. Jeff Pedersen, Scott Sattler, and Deanna Funnell-Harris, USDA ARS.
Website: http://www.ars.usda.gov/research/projects/projects.htm?accn_no=412870

• **GENETIC IMPROVEMENT AND EVALUATION OF HARD WINTER AND SPRING WHEATS:** Objectives of this study are (1) to develop winter wheats adapted to the Great Plains with novel starches for use in biofuel production and food product manufacturing, as well as improved gluten strength and extractability of such wheats to produce a more economically viable package for producers and end-users. (2) A second objective is to develop hard white winter wheat germplasm with tolerance to pre-harvest sprouting and with nil levels of grain polyphenol oxidase (PPO). (3) The third objective is to coordinate the Hard Winter Wheat Regional Nursery Program to facilitate the evaluation, distribution, and exchange of high-yielding, high-quality, disease- and pest-resistant hard winter wheats for Great Plains environments.
Principal Investigator: Dr. Bob Graybosch
Website: http://www.ars.usda.gov/research/projects/projects.htm?accn_no=413036

• **SOYBEAN CYST NEMATODE ISOLATION STUDY:** In 2008, ground was broken for the Soybean Cyst Nematode (SCN) demonstration area. The containment site is being developed for educational programs offering hands-on training for SCN detection for areas where it has not been detected yet. Since anything that moves soil can move SCN, precautions have been taken that will minimize the risk of movement of infected soil into nearby plot areas. Plans are to place demonstration and research plots as new genetics or chemistries become available to manage this disease in Nebraska. Funding for development of the site was provided by the Nebraska Soybean Board.
Principal Investigator: Dr. Loren J. Giesler



The UNL Department of Plant Pathology conducts soybean cyst nematode research at the ARDC. A special containment site, much like a shallow, concrete walled swimming pool is utilized to contain the nematodes.

• **HUSKER GENETICS:** Crop breeding and genetics research are ongoing at UNL. Faculty develop and improve germplasm that holds potential for private and public plant breeding programs. **Husker Genetics** increases and maintains cultivars developed by UNL researchers and plant breeders. UNL's research team has done an outstanding job of developing superior genetics and there is a steady increase in the demand for this germplasm. **Husker Genetics** is the marketing brand of the University of Nebraska-Lincoln. Foundation Seed Division merged into the **Husker Genetics** brand identity effective July 1, 2008. **Husker Genetics** is the commercialization and production entity for seed distribution.
Director: Jeff Noel
Website: <http://huskergenetics.unl.edu>



University of Nebraska-Lincoln

**Here are a few QUICK FACTS
about some of the research projects at the ARDC**



USDA-ARS conducts research at the ARDC in conjunction with the UNL Departments of Entomology and Animal Science on stable flies. The research has shown catnip essential oil can be utilized as a repellent for stable fly management in beef feedlots.



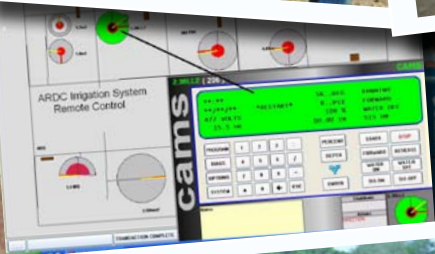
Aerial crop scouting is done by a small robotic helicopter that allows researchers to predict areas prone to turf stress at the Turf research area at the ARDC.



The impact of crop residue removal for biofuel production on the soil is studied at the ARDC. Research is focused on the amount of crop residues (e.g., corn stover, cover crop) that must remain on the land to maintain soil organic carbon (SOC) and sustain production.



Cattle from the Cow/Calf teaching herd are transported to UNL's East Campus for use in a number of classes, including Animal Management, Animal Production Skills, Livestock Evaluation, Cow-Calf Management, Beef Cattle Merchandising, and Reproductive Physiology courses.





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