

KANSAS FIELD CONFERENCE

FIELD GUIDE

2005 FIELD CONFERENCE

CENTRAL GREAT PLAINS

WATER, RECREATION, AND ECONOMIC DEVELOPMENT

JUNE 8–10, 2005

EDITED BY

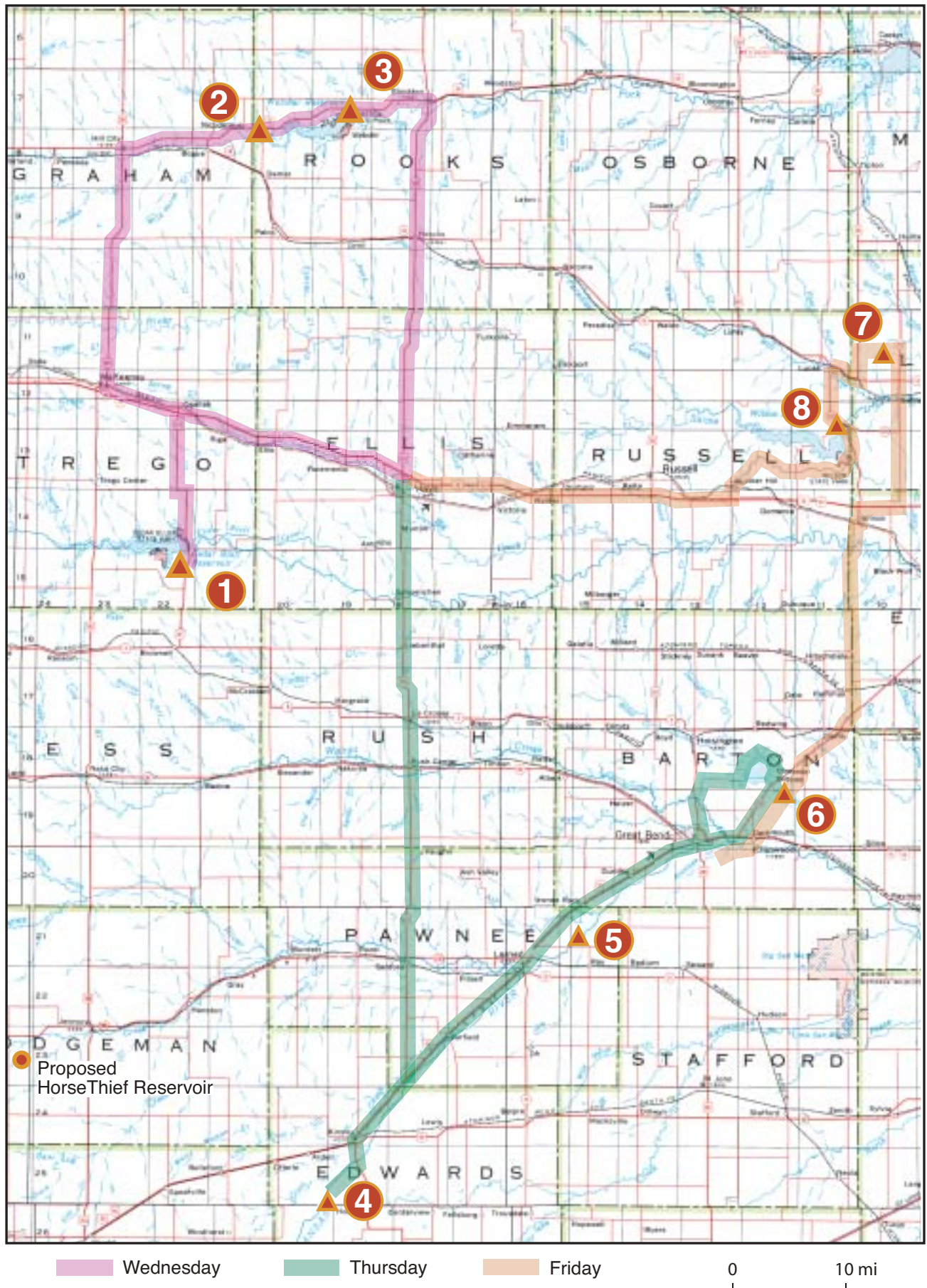
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REPORT 2005–17

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CENTRAL GREAT PLAINS
WATER, RECREATION, AND ECONOMIC DEVELOPMENT
2005 FIELD CONFERENCE



KANSAS FIELD CONFERENCE

**Central Great Plains
Water, Recreation, and Economic Development
2005 FIELD CONFERENCE**

June 8-10, 2005

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POCKET

Geologic Highway Map of Kansas

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KANSAS FIELD CONFERENCE

Central Great Plains
Water, Recreation, and Economic Development
2005 FIELD CONFERENCE

June 8-10, 2005

PARTICIPANTS LIST

Name	Title	Affiliation	Business Address
Steve Adams	Natural Resource Coordinator	Kansas Department of Wildlife & Parks	1020 S. Kansas Ave. Topeka, KS 66612 785/296-2281
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Dave Heinemann	Chairman	Geological Survey Advisory Council	3826 SW Cambridge Ct. Topeka, KS 66610 785/267-5033
Carl Holmes	Representative 125 th District / Chair	Kansas House of Representatives / Utilities Committee	P.O. Box 2288 Liberal, KS 67905 620/624-7361
Mitch Holmes	Representative 114 th District	Kansas House of Representatives / Wildlife, Parks & Tourism Committee	211 SE 20th Ave. St. John, KS 67576 620/234-5834
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Steve Irsik	Chairman	Kansas Water Authority	5405 Six Rd. Ingalls, KS 67853 620/335-5363
Dan Johnson	Representative 110 th District / Chair	Kansas House of Representatives / Agriculture Committee	P.O. Box 247 Hays, KS 67601-0247 785/625-6476
Annie Kuether	Representative 55 th District	Kansas House of Representatives / Utilities Committee	1346 SW Wayne Ave. Topeka, KS 66604 785/232-0717
Harold Lane	Representative 58 th District	Kansas House of Representatives / Agriculture Committee	1308 Kansas Topeka, KS 66612 785/232-3610
Wayne Lebsack	President / Trustee	Lebsack Oil Production, Inc. / The Nature Conservancy, Kansas Chapter	603 S. Douglas Lyons, KS 67554 620/938-2396
Janis Lee	Senator 36 th District	Kansas Senate / Utilities Committee	2032 90th Rd. Kensington, KS 66951 785/476-2294
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Margaret Long	Representative 36 th District	Kansas House of Representatives / Utilities Committee	1801 N. 126 th St. Kansas City, KS 66109 913/721-2322
Brad Loveless	Manager, Biology & Conservation Programs	Westar Energy / KACEE (KS Assoc. for Conservation and Environmental Education)	122 SW 2 nd St. Topeka, KS 66603 785/575-8115

Ed Martinko	Director	Kansas Biological Survey	2101 Constant Ave. Lawrence, KS 66047 785/864-1505
Peggy Mast	Representative 76 th District	Kansas House of Representatives / Utilities Committee	765 Road 110 Emporia, KS 66801 620/343-2465
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Carolyn McGinn	Senator 31 st District / Chair	Kansas State Senate / Natural Resources Committee	11047 N. 87 W. Sedgwick, KS 67135 316/772-0147
Ralph Ostmeyer	Senator 40 th District	Kansas State Senate Natural Resources Committee	Box 97 Grinnell, KS 67738 785/824-3773
Don Paxson	Vice Chair	Kansas Water Authority	P.O. Box 487 Penokee, KS 67659 785/421-2480
Adrian Polansky	Secretary	Kansas Department of Agriculture	109 SW 9 th St., 4 th Floor Topeka, KS 66612 785/296-3902
David Pope	Chief Engineer	Kansas Department of Agriculture, Division of Water Resources	109 SW 9 th St., 2 nd Floor Topeka, KS 66612 785/296-3710
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Sharon Schwartz	Representative 106 th District	Kansas House of Representatives / Environment Committee	2051 20th Rd. Washington, KS 66968 785/325-2419
Don Steeples	Vice Provost	University of Kansas	Strong Hall, Rm. 250 Lawrence, KS 66045 785/864-4904
Susan Stover	Manager / Environmental Scientist	Kansas Water Office	901 S. Kansas Ave. Topeka, KS 66612 785/296-0876
Tracy Streeter	Director	Kansas Water Office	901 S. Kansas Ave. Topeka, KS 66612 785/296-3185
John Strickler	Past Chairman, Trustee/Treasurer	The Nature Conservancy, Kansas Chapter / KACEE	1523 University Drive Manhattan, KS 66502-3447 785/565-9731

Josh Svaty	Representative 108 th District	Kansas House of Representatives / Environment Committee	1355 Highway 156 Ellsworth, KS 67439 785/472-7794
Ruth Teichman	Senator 33 rd District	Kansas Senate / Natural Resources Committee	434 E. Old Highway 50 Stafford, KS 67578 620/234-5159
Mary Torrence	Senior Assistant Revisor	Revisor of Statutes Office	300 SW 10 th , Suite 322-S Topeka, KS 66612 785/296-5239
Jim Triplett	Chairman	Biology Department Pittsburg State University	1701 S. Broadway Pittsburg, KS 66762 620/235-4730

BIOGRAPHICAL INFORMATION

Steve Adams

Title

Natural Resource Coordinator

Affiliation

Kansas Department of Wildlife & Parks

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Topeka, KS 66612

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stevea@wp.state.ks.us

Current Responsibilities

Natural Resource Coordinator, Wildlife & Parks

Experience

Fisheries biologist, Florida Game & Fish; Aquatic ecologist, Environmental Services, Kansas Department of Wildlife & Parks

Education

Northeastern State University – BS, 1980

Oklahoma State University – MS, 1983

Virginia Beamer

Title

Representative, 118th District

Affiliation

Kansas House of Representatives

Address and Telephone

P.O. Box 85

Oakley, KS 67748

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Current Responsibilities

Member, Utilities, Transportation, Wildlife, Tourism and Parks and Governmental Organization and Elections Committees

Experience

County Commissioner (Logan), Clerk of the District Court

Paul Carttar

Title

Executive Vice Chancellor

Affiliation

External Affairs, University of Kansas

Address and Telephone

Strong Hall, Rm. 231

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University of Kansas

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pcarttar@ku.edu

Current Responsibilities

Government relations, integrated marketing, media relations

Education

University of Kansas – BA, 1976

Stanford University – MBA, 1983

Sharon Falk

Title

Manager

Affiliation

Big Bend GMD #5

Address and Telephone

P.O. Box 7

125 S. Main

Stafford, KS 67578

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Current Responsibilities

Manager, Big Bend GMD #5

Experience

26 years with GMD #5

Education

Friends University – BS, 1989

Vaughn Flora

Title

Representative, 57th District

Affiliation

Kansas House of Representatives

Address and Telephone

431 SE Woodland Ave.

Topeka, KS 66607

785/232-5147

vflora@cox.net

Current Responsibilities

Ranking Democrat, Environment Committee; Member, Financial Institutions, Taxation, Pensions, and Investments & Benefits (Joint) Committees; Member, Select Committee on Pensions; asset manager

Experience

Asset manager, housing developer, real estate broker

Education

Kansas State University – BS, 1968

Joann Flower

Title

Representative, 47th District

Affiliation

Kansas House of Representatives

Address and Telephone

P.O. Box 97
Oskaloosa, KS 66066-0097
785/863-2918

Current Responsibilities

Member, Appropriations, Public Safety Budget,
Kansas Security (Joint), and Pensions Committees

Education

Johns Hopkins – B.S. 1958

Greg Foley

Title

Executive Director

Affiliation

State Conservation Commission

Address and Telephone

109 SW 9th, Suite 500
Topeka, KS 66612-1215
785/296-3600
gfoley@scc.state.ks.us

Current Responsibilities

Executive Director, State Conservation Commission

Experience

Asst. Secretary of Agriculture, 2000-04; Acting
Secretary of Agriculture, 2002-03

Education

Kansas State University – BS, 1989

Marci Francisco

Title

Senator, 2nd District

Affiliation

Kansas State Senate
and University of Kansas

Address and Telephone

1101 Ohio
Lawrence, KS 66044
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maf@sunflower.com

Current Responsibilities

Member, Agriculture, Natural Resources, Arts and
Cultural Resources (Joint), Elections and Local
Government, Legislative Educational Planning
(Joint), and Utilities Committees

Experience

Space Analyst for University of Kansas; Mayor of
Lawrence

Education

University of Kansas – B-Arch., 1977

Mary Galligan

Title

Assistant Director for Information Management

Affiliation

Kansas Legislative Research Department

Address and Telephone

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300 SW 10th
Topeka, KS 66612
785/296-3181
maryg@klrd.state.ks.us

Current Responsibilities

Staff House Utilities, Higher Education and Health
Committees and perform administrative duties

Experience

Legislative staff since 1982

Education

Southwest Missouri State – BS, 1974
University of Arkansas – MA, 1976
University of Kansas – MPA, 1985

Raney Gilliland

Title

Assistant Director for Research

Affiliation

Kansas Legislative Research Department

Address and Telephone

Rm 545-N, State Capitol
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Topeka, KS 66612
785/296-3181
raneyg@klrd.state.ks.us

Current Responsibilities

Staff House and Senate Agriculture Committees,
House Environment Committee, Senate Natural
Resources, Utilities, and Administrative Rules
and Regulations Committees

Experience

Legislative Research, 27 years

Education

Kansas State University – BS, 1975
Kansas State University – MS, 1979

Bob Grant

Title

Representative, 2nd District

Affiliation

Kansas House of Representatives

Address and Telephone

407 W. Magnolia
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620/457-8496
grantbnl@ckt.net

Current Responsibilities

Member, Commerce & Labor, Education Budget,
Financial Institutions, Insurance, State Buildings
Construction (Joint), Special Claims Against the State
(Joint) Committees

Experience

Self-employed bar and grill owner; Mayor of
Cherokee for 16 years

Education

Labette Community College – AA, 1971
Pittsburg State University

Mike Hayden**Title**

Secretary

Affiliation

Kansas Department of Wildlife & Parks

Address and Telephone

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Topeka, KS 66612
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Current Responsibilities

Secretary of Kansas Department of Wildlife & Parks

Experience

Speaker of the House; Governor

Education

Kansas State University – BS, 1966
Ft. Hays State University – MS, 1974

David Heinemann**Title**

Chairman

Affiliation

Geological Survey Advisory Council

Address and Telephone

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Current Responsibilities

Chairman of Geological Survey Advisory Council

Experience

State Representative, 27 years; General Counsel, KCC, 2 years; Executive Director, KCC, 2 years; Department of Revenue, Special Assistant to the Secretary, 5 years

Education

Augustana College – BA, 1967
University of Kansas – 1967–1968
Washburn Law School – JD, 1973

Carl Holmes**Title**

Representative, 125th District

Affiliation

Kansas House of Representatives

Address and Telephone

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Liberal, KS 67905
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Current Responsibilities

Chair, Utilities Committee; Chair, Joint Committee on Administrative Rules and Regulations; Member, Agriculture & Natural Resources Budget Committee

Experience

Chair, House Energy & Natural Resources Committee; President, Kansas League of Municipalities

Education

University of Kansas, 1958-1960
Colorado State University – BS, 1962

Mitch Holmes**Title**

Representative, 114th District

Affiliation

Kansas House of Representatives

Address and Telephone

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Current Responsibilities

Member, House Wildlife, Parks & Tourism, Education, Public Safety Budget, Economic Development Committees

Experience

Computer programmer, military, ethanol production

Education

Hutchinson Community College – AA, 1984
Friends University – BS, 1988
Depaul University – Cert., 1995

Becky Hutchins**Title**

Representative, 50th District

Affiliation

Kansas House of Representatives

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Current Responsibilities

Chair, House Education Budget Committee; Vice Chair, State Tribal Relations Committee; Member, Appropriations and Judiciary Committees

Experience

Precinct committee woman; Jackson County Republican Chair

Education

Washburn University – BA, 1986

Steve IrsikTitle

Chairman

Affiliation

Kansas Water Authority

Address and Telephone

5405 Six Rd.

Ingalls, KS 67853

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Current Responsibilities

Manage a diversified farm/ranch

Experience

Farmer, rancher, dairyman and businessman

Education

Kansas State University – 1969

Dan JohnsonTitle

Representative, 110th District

Affiliation

Kansas House of Representatives

Address and Telephone

P.O. Box 247

Hays, KS 67601-0247

785/625-6476

djohnson2@ruraltel.net

Current Responsibilities

Chair, House Agriculture Committee; Member,
Commerce and Labor and Environment Committees;
Owner Johnson Ranch

Experience

Instructor, Fort Hays State University, 1961–1969

Automotive test equipment sales; Over 20 years in

Kansas Army National Guard (Retired Lt. Col.)

Education

Fort Hays State University – BS, 1958

Fort Hays State University – MS, 1968

Annie KuetherTitle

Representative, 55th District

Affiliation

Kansas House of Representatives

Address and Telephone

1346 SW Wayne Ave.

Topeka, KS 66604

785/232-0717

kuet@aol.com

Current Responsibilities

Member, Utilities, General Government & Com-
merce Budget, Higher Education, and Economic
Development Committees

Experience

Administrative Assistant to Kathleen Sebelius; retail
sales; special education paraprofessional

Education

Bowling Green State University – 1 year

Harold LaneTitle

Representative, 58th District

Affiliation

Kansas House of Representatives

Address and Telephone

1308 Kansas

Topeka, KS 66612

785/232-3610

LaneBBQ@netzero.net

Current Responsibilities

Agriculture and Appropriations Committees, local
government

Experience

Topeka City Council; Owner Lane's BBQ

Education

Kaw Area Vo-Tech – HAVC, 1977

Kemper Military Juco – 1971

Wayne LebsackTitle

President / Trustee

Affiliation

Lebsack Oil Production Inc. /

The Nature Conservancy, Kansas Chapter

Address and Telephone

603 S. Douglas

Lyons, KS 67554

620/938-2396

Current Responsibilities

Chair, Stewardship Committee, The Nature Conser-
vancy; Petroleum exploration and development

Experience

Oil and gas exploration; Ground-water exploration
and pollution research

Education

Colorado School of Mines – Geol. Eng., 1949

Colorado School of Mines – MS, 1951

Janis LeeTitle

Senator, 36th District

Affiliation

Kansas State Senate

Address and Telephone

2032 90th Rd.

Kensington, KS 66951

785/476-2294

Current Responsibilities

Asst. Minority Leader; Ranking Minority Member,
Utilities, Assessment and Taxation, and Education
Committees; Member, Natural Resources and
Agricultural Committees

Experience

17 years in Kansas Senate

Education

Kansas State University – BS, 1970

Judith Loganbill

Title

Representative, 86th District

Affiliation

Kansas House of Representatives

Address and Telephone

215 S. Erie

Wichita, KS 67211

316/683-7382

JudithLoganbill@msn.com

Current Responsibilities

Member, Economic Development, Education, Federal & State Affairs, Economic Development, and Kansas Security (Joint) Committees; elementary teacher in Wichita

Experience

Elementary teacher

Education

Bethel College – BS, 1975

Northern Arizona University – MA, 1981

Margaret Long

Title

Representative, 36th District

Affiliation

Kansas House of Representatives

Address and Telephone

1801 N. 126th St.

Kansas City, KS 66109

913/721-2322

Current Responsibilities

Member, Utilities, Transportation, and Wildlife and Parks Committees

Experience

Accountant, TWA (40 years)

Education

Ward High School

Kansas City Kansas Community College

Brad Loveless

Title

Manager, Biology & Conservation Programs

Affiliation

Westar Energy / Kansas Association of Conservation and Environmental Education (KACEE)

Address and Telephone

122 SW 2nd St.

Topeka, KS 66603

785/575-8115

brad_loveless@wr.com

Current Responsibilities

Stewardship programs with Westar Energy's Green Team; Avian Protection Programs; Threatened & endangered species protection and aquatic regulatory compliance

Experience

Over Wolf Creek's Environmental, Safety, and Fire Protection programs

Education

The Ohio State University – BS, 1981

University of Kansas – MS, 1985

Ed Martinko

Title

Director

Affiliation

Kansas Biological Survey

Address and Telephone

2101 Constant Ave.

Higuchi Hall

University of Kansas

Lawrence, KS 66047

785/864-1505

martinko@ku.edu

Current Responsibilities

Director of Kansas Biological Survey & State Biologist; Professor of Ecology; Ex officio Water Authority member

Education

College of Emporia - BS, 1967

University of Colorado - MA, 1970

University of Kansas - PhD, 1976

Peggy Mast

Title

Representative, 76th District

Affiliation

Kansas House of Representatives

Address and Telephone

765 Road 110

Emporia, KS 66801

620/343-2465

pmast@ink.org

Current Responsibilities

Vice-chair, Health and Human Services Committee; Member, Utilities Committee

Experience

Twenty-six years working in oil-field servicing business

Melody McCray-Miller

Title

Representative, 89th District

Affiliation

Kansas House of Representatives

Address and Telephone

2121 E. 53rd N.
Wichita, KS 67219
316/744-7516
melody@southwind.net

Current Responsibilities

Member, Utilities, Federal and State Affairs, and
Governmental Organization and Elections Commit-
tees; Business owner

Experience

Business owner; Teacher; County Commission

Education

Wichita State University
University of Houston – BA, 1982
Wichita State – teaching certification, 1989

Carolyn McGinn

Title

Senator, 31st District

Affiliation

Kansas State Senate

Address and Telephone

11047 N. 87 W.
Sedgwick, KS 67135
mcginn1@att.net

Current Responsibilities

Chair, Natural Resources Committee; Member,
Education and Ways and Means Committees

Experience

County Commissioner

Education

Wichita State University – BBA, 1983
Friends University – MSES, 1998

Ralph Ostmeyer

Title

Senator, 40th District

Affiliation

Kansas State Senate

Address and Telephone

Box 97
Grinnell, KS 67738
785/824-3773
rkostmeyer@st-tel.net

Current Responsibilities

Vice Chair, Natural Resources Committee;
Member, Agriculture, Education, Federal and State
Affairs Committees

Experience

Two terms as 118th District Representative, School
Board; County Commissioner; FLBA board member

Education

High School – 1961

Don Paxson

Title

Vice Chairman

Affiliation

Kansas Water Authority

Address and Telephone

PO Box 487
Penokey, KS 67659
785/421-2480
dpaxson@ruraltel.net

Current Responsibilities

Vice Chair, Kansas Water Authority

Experience

Owner Paxson Elec. & Irr. for 35 years

Education

High School – 1961

Adrian Polansky

Title

Secretary

Affiliation

Kansas Department of Agriculture

Address and Telephone

109 SW 9th St., 4th Floor
Topeka, KS 66612
785/296-3902
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Current Responsibilities

Administrator for Kansas agriculture regulation and
policies; Advocate for agriculture; Works with
legislature for agriculture

Experience

Owner, Polansky Seed; Director, USDA Farm Service
Agency; President, Kansas Crop Improvement
Association; Chairman, U.S. Wheat Associates

Education

Kansas State University – BS, 1972

David Pope

Title

Chief Engineer

Affiliation

Kansas Department of Agriculture, Division of Water
Resources

Address and Telephone

109 SW 9th St., 2nd Floor
Topeka KS 66612
785/296-3710
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Current Responsibilities

Administration of a series of laws related to the
conservation management, use, and control of water
and water courses in Kansas

Experience

Manager of GMD #3 in Garden City; Extension
Irrigation Engineer for KSU in Manhattan and
Garden City

Education

Oklahoma State University – BS, 1970
Oklahoma State University – MS, 1971

Larry Powell

Title

Representative, 117th District

Affiliation

Kansas House of Representatives

Address and Telephone

2209 Grandview E.
Garden City, KS 67846
620/855-3546

Current Responsibilities

Member, Agriculture, Agriculture and Natural
Resources Budget, and Appropriations Committees

Experience

Rancher

Sharon Schwartz

Title

Representative, 106th District

Affiliation

Kansas House of Representatives

Address and Telephone

2501 20th Rd.
Washington, KS 66968
785/325-2419
schwartz@house.state.ks.us

Current Responsibilities

Chair, Agriculture and Natural Resources
Budget Committee; Member, Appropriations,
Environment; Partner of Family Farm Corporation;
Business Manager

Don Steeples

Title

Vice Provost

Affiliation

University of Kansas

Address and Telephone

Strong Hall, Rm. 250
1450 Jayhawk Blvd.
University of Kansas
Lawrence, KS 66045
785/864-4904
don@ku.edu

Current Responsibilities

Space allocation on Lawrence Campus; Teach
Earthquakes and Natural Disasters at KU

Experience

Wheat farmer in Rooks County; Kansas Geological
Survey, 1975-93

Education

Kansas State University – BS, 1969
Kansas State University – MS, 1970
Stanford University – PhD, 1975

Susan Stover

Title

Manager/Environmental Scientist

Affiliation

Kansas Water Office

Address and Telephone

901 S. Kansas Ave.
Topeka, KS 66612
785/296-0876
sstover@kwo.state.ks.us

Current Responsibilities

Coordination and progress on management of High
Plains Aquifer

Experience

Licensed geologist; Worked for KDHE in
contamination remediation

Education

University of Nebraska – BA, 1979
University of Arizona – graduate studies
University of Kansas – MS, 1993

Tracy Streeter

Title

Director

Affiliation

Kansas Water Office

Address and Telephone

901 S. Kansas Ave.
Topeka, KS 66612
785/296-3185
tstreeter@kwo.state.ks.us

Current Responsibilities

Agency Head

Experience

State Conservation Commission, 18 years;
SCC Executive Director, 9 years

Education

Highland Community College – AS, 1983
Missouri Western State College – BS, 1985
University of Kansas – MPA, 1993

John Strickler

Title

Trustee / Treasurer

Affiliation

Kansas Chapter, The Nature Conservancy / KACEE
(Kansas Association for Conservation and Environ-
mental Education)

Address and Telephone

1523 University Drive
Manhattan, KS 66502-3447
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Current Responsibilities

Board of Trustees, The Nature Conservancy, Kansas Chapter; Treasurer, KACEE

Experience

Chair, The Nature Conservancy, Kansas Chapter; Executive Director, KACEE; Special Assistant for Environment and Natural Resources to Gov. Hayden, 2 years; Acting Secretary, Kansas Department of Wildlife and Parks, 1987 and 1995; Kansas State and Extension Forestry, KSU, 33 years; U.S. Forest Service, 4 years

Education

University of Missouri – BS, 1957
Kansas State University – MS, 1968

Josh Svaty**Title**

Representative, 108th District

Affiliation

Kansas House of Representatives

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1355 Highway 156
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Current Responsibilities

Member, Utilities, Environment, Ethics and Elections, and Public Safety Budget Committees

Experience

Family farming

Education

Sterling College - BA, 2002

Ruth Teichman**Title**

Senator, 33rd District

Affiliation

Kansas State Senate

Address and Telephone

434 E. Old Highway 50
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Current Responsibilities

Chair, Financial Institution and Insurance; Member, Education, Ways and Means, and Natural Resources Committees

Experience

20 years on school board; Director, Farmers National Bank; Farming and Ranching

Education

Kansas State University – BS, 1965

Mary Torrence**Title**

Assistant Revisor of Statutes

Affiliation

Revisor of Statutes Office

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State House, Suite 322-S
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Current Responsibilities

Legislative staff; Drafting legislation and legal advisor

Experience

Revisor of Statutes Office, 31 years

Education

University of Kansas – BA, 1971
University of Kansas – JD, 1974

Jim Triplett**Title**

Chair

Affiliation

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Pittsburg State University

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Biology Department
1701 S. Broadway
Pittsburg State University
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Current Responsibilities

Chair, Biology Department; Chair, Neosho BAC, Chair, Council of BAC Chairs; Chair, Crawford County Solid Waste Committee; Member, KGS Advisory Committee; Gov.'s Grants Advisory Committee

Experience

Solid Waste

Education

Pittsburg State University – BA, 1966
Pittsburg State University – MS, 1968
University Of Kansas – PhD, 1976

KANSAS GEOLOGICAL SURVEY STAFF**Bill Harrison****Title**

Interim Director and State Geologist

Affiliation

Kansas Geological Survey

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Current Responsibilities

Plan and initiate major research programs; Assess scientific quality of current programs

Experience

Kansas Geological Survey, 8 years; Lockheed Martin Idaho Technologies; EG&G Idaho, Inc.; ARCO Exploration & Technology; University of Oklahoma/Oklahoma Geological Survey, Faculty/Staff Geologist

Education

Lamar State College of Technology - BS, 1966
University of Oklahoma – MS, 1968
Louisiana State University – PhD, 1976

Rex Buchanan

Title

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Affiliation

Public Outreach, Kansas Geological Survey

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Current Responsibilities

Supervise publication and public outreach activities, media relations, and non-technical communications

Experience

Kansas Geological Survey, 27 years; University-Industry Research, University of Wisconsin, 3 years; Salina Journal, 4 years

Education

Kansas Wesleyan University – BA, 1975
University of Wisconsin-Madison – MA, 1978
University of Wisconsin-Madison – MS, 1982

Cathy Evans

Title

Publication Assistant

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Kansas Geological Survey

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Current Responsibilities

Work with coordinator of field conference and guidebook; news releases; Help produce non-technical or semi-technical publications

Experience

Kansas Geological Survey; University Press of Kansas; Spencer Museum of Art

Education

University of Kansas – BA, 1978
University of Kansas – MS, 1990

Jim McCauley

Title

Assistant Scientist

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Geologic Investigations Section, Kansas Geological Survey

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Current Responsibilities

Geologic mapping, remote sensing, public inquiries

Experience

Kansas Geological Survey, 28 years; KU Remote Sensing Laboratory, 6 years

Education

University of Kansas – BS, 1970
University of Kansas – MS, 1973
University of Kansas – PhD, 1977

Bob Sawin

Title

Research Associate

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Geology Extension, Public Outreach Section, Kansas Geological Survey

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Current Responsibilities

Geology Extension; Kansas Field Conference; geologic mapping

Experience

Kansas Geological Survey, 13 years; Petroleum Geology, 15 years; Engineering Geology, 6 years

Education

Kansas State University – BS, 1972
Kansas State University – MS, 1977

Central Great Plains Water, Recreation, and Economic Development 2005 FIELD CONFERENCE

June 8-10, 2005

Welcome to the 2005 Field Conference, co-sponsored by the Kansas Geological Survey (a division of the University of Kansas), the Kansas Water Office, the Division of Water Resources of the Kansas Department of Agriculture, and the Kansas Department of Wildlife and Parks. Previous field conferences have focused on specific natural-resource issues, such as water or energy, or different geographic or physiographic regions of the state, such as southwestern Kansas or the Flint Hills. This year the Field Conference takes aim at west-central and north-central Kansas, parts of the state that are tied together by various natural resource and economic issues.

Water is an important issue in any part of Kansas, but it is especially important here, where precipitation levels are relatively low and ground-water supplies are scarce in places. The area's lakes are expected to fill a variety of roles, from irrigation to recreation, which creates contention in a region where water is precious. The interaction of ground water and streamflow, and the impact of water-loving plants, are two timely topics that we'll address, along with conversations about the economic impact of nature-based tourism and the challenges created by changing demographics.

A Preview

This year's Field Conference will study the natural resource and economic issues that face west-central and north-central Kansas.

The High Plains cover most of the western third of the state. It's an area composed of the silt, sand, and gravel that washed off the face of the Rocky Mountains over the past few million years and out onto the plains of western Kansas. Because of the uplift of the Rockies to the west, the elevation here is generally higher than much of the rest of the state. In

addition, this is a generally flat landscape, dissected only in places by streams such as the Smoky Hill or Solomon. Thus, the name High Plains. This is generally an area of short-grass prairie, mainly because of the small amounts of precipitation. Surface water (lakes and streams) are rare here, one of the reasons that water will be a theme through this year's Field Conference. However, the Ogallala aquifer underlies much of this region.

We'll also spend considerable time in the Smoky Hills physiographic region, where the bedrock geology is Cretaceous in age, deposited about 80 to 100 million years ago by a shallow ocean or along the edge of that sea. These rocks are much older than those that make up the High Plains. There's also more precipitation, so much of the Smoky Hills are covered by mid-grass prairie and surface water is more common. Major sources of ground water are rare, however, so water is an issue throughout this region as well.

Because surface water is central to both areas, we'll look at issues around two reservoirs—Cedar Bluff and Webster—on the Conference's first day. Both are expected to fill a variety of sometimes-conflicting roles, including flood control, recreation, and, in some cases, irrigation. Attempting to balance these demands can lead to conflict, and we'll talk about the relationship between these reservoirs, recreation, irrigation, and downstream-water needs.

During the first day, we'll also convene a panel to discuss the population issues that have had a dramatic impact on this part of the state. Drive through rural Kansas with a long-time resident, and they'll often point out places where people once lived, but have since abandoned. A population that is both declining and aging presents basic challenges, including health care, schools, economic development, and culture. We'll talk over the issues,

and the responses, with a panel of four people who know intimately the struggles and opportunities facing rural Kansas.

On day two we'll head south to the Circle K Ranch, 6,900 acres of mostly irrigated farm ground along the Arkansas River south of Kinsley. The Circle K is owned by the cities of Hays and Russell. We were here in 1996, during the 2nd Field Conference, to discuss the possibility of transferring water from the ranch to these cities. That plan has since been shelved and the land and its water rights are now for sale. The state has considered purchasing the ranch. We'll talk about the role the Circle K could play in central Kansas water issues, and we'll walk the dry river bed of the Arkansas River here. Then we'll head downstream to Larned, where Survey researchers will discuss their work on phreatophytes, the water-loving plants like salt cedars, willows, and cottonwoods, that thrive on the water along the shallow river channel. Phreatophytes have long been blamed for dramatically depleting river flow, often based on relatively little scientific evidence. We'll end the day at Cheyenne Bottoms, another stop on that 1996 Field Conference. In the time since our last visit, residents have effectively promoted the Bottoms as a mecca for nature-based tourism, and plans are in the works for a new visitors center here. We'll hear about both these efforts.

On the third day, we'll begin with a geologic stop at the Vonada Stone Company, where the owners quarry the Fencepost limestone, a Cretaceous limestone that has been used for posts, buildings, bridges, even water towers in the area. They'll demonstrate the way fenceposts were quarried in the 1800's. We'll make a brief stop at the Grassroots Art Center in Lucas, then drive down to Wilson Lake. This U.S. Army Corps of Engineers lake is one of the clearest and saltiest in Kansas. It is being considered as a possible water-supply source for Russell and Hays and faces many of the same competing pressures related to development, recreation, and water supply that we have discussed throughout the trip.

Water, population, economic development. These are sustained, intertwined themes that we'll attempt to better understand on this year's Field Conference. Thank you for coming along.

About the Field Conference

Some issues are impossible to understand without seeing them for yourself. The 2005 Field Conference marks the 11th year the Survey has developed this opportunity for decision makers to experience, first-hand, many of the state's natural-resource issues. The participants have been selected to provide a range of legislative, governmental, education, and private business expertise. Local and regional experts in natural-resource issues will meet us at each site and describe the location and the issues related to it. The objective is to let participants see the results of their decisions and to talk with local, state, and federal governmental officials, environmental groups, business people, and citizens' organizations. The result should give participants a broader, more-informed perspective useful in formulating policies. In addition, the Field Guide you are holding provides background on sites and issues, and serves as a handy reference long after the Field Conference is over.

During the Field Conference, participants are expected to be just that—participants. You are encouraged to contribute to the discussion, to ask questions, and otherwise join in on deliberations. **The bus microphone is open to everyone, and everyone is encouraged to participate.**

Please remember that in the course of the Field Conference, we do not seek to resolve policy or regulatory conflicts. We do try to provide opportunities to familiarize policy makers with resource problems. By bringing together experts who examine the unique technical, geographical, geological, environmental, social, and economic realities of the region, we hope to go beyond merely identifying issues. We want this combination of first-hand experience and interaction among participants to result in a new level of understanding of the state's natural-resource issues.

In doing this, we attempt to present, as nearly as possible, all sides of contentious issues. Please know that the opinions presented during the Field Conference are not necessarily those of the KGS or the Field Conference co-sponsors. Nonetheless, we do believe it is important for participants to hear various viewpoints on complex issues.

The Kansas Field Conference is an outreach program of the Kansas Geological Survey, administered through its Geology Extension program. Its mission is to provide educational opportunities to individuals who make and influence policy about natural-resource and related social, economic, and environmental issues in Kansas. The Survey's Geology Extension program is designed to develop materials, projects, and services that communicate information about the geology of Kansas, the state's natural resources, and the products of the Kansas Geological Survey to the people of the state.

The Kansas Field Conference was begun in 1995 with the support of Lee Gerhard, then the Survey's director and state geologist. The Field Conference is modeled after a similar program of national scope, the Energy and Minerals Field Institute, operated by the Colorado School of Mines. The KGS appreciates the support of Erling Brostuen, Director of the Energy and Field Institute, in helping develop the Kansas project.

The KGS Field Conference has been recognized by:

- The National Institute of Standards and Technology as among 50 Best Practices for Communication of Science and Technology for the Public, 2001; and
- The Division of Environmental Geosciences of the American Association of Petroleum Geologists, which presented the Field Conference with its Public Outreach Award in 1998.

The KGS appreciates your attendance at this year's Field Conference and your willingness to share your insights for its improvements. Your input has helped make the Field Conference a model that has been adopted by other state geological surveys.

SPONSORS

Kansas Geological Survey

Since 1889, the Kansas Geological Survey has studied and reported on the state's geology. Today the Survey's mission is to study and provide information about the state's geologic resources and hazards, particularly ground water, oil, natural gas,

and other minerals. In many cases, the Survey's work coincides with the state's most pressing natural-resource issues.

By statutory charge, the Survey's role is strictly one of research and reporting. The KGS has no regulatory function. It is a division of the University of Kansas. The KGS employs about 70 full-time staff members and about 80 students and grant-funded staff. It is administratively divided into research and research-support sections. Survey programs can be divided by subject into water, energy, geology, and information dissemination.

Water—Water issues affect the life of every Kansan. Western Kansas agriculture and industry rely heavily on ground water; in eastern Kansas, growing populations and industry generally use surface water. The Survey's water research and service include an annual water-level measurement program (in cooperation with the Kansas Department of Agriculture, Division of Water Resources), studies of recharge rates, water quality in the Arkansas River, depletion of the Ogallala aquifer, the interaction between streams and aquifers, and a variety of other topics.

Energy—Kansas produces more than \$3 billion worth of oil and natural gas each year. Because much of the state has long been explored for oil and gas, maintaining that production takes research and information. The Survey studies the state's coal resources and one newly developed source of energy, coalbed methane. The Survey does research on the state's petroleum reservoirs, new methods of providing information (such as a digital petroleum atlas), and new methods of producing oil (such as the use of carbon dioxide flooding, a technique that was discussed during the 2001 Field Conference). The Survey is completing a multi-year study of the resources of the Hugoton Natural Gas Area and issues related to carbon dioxide sequestration. The Survey also has a branch office in Wichita, the Wichita Well Sample Library, that stores and loans rock samples collected during the drilling of oil and gas wells in the state.

Geology—Much of the Survey's work is aimed at producing basic information about the state's geology, information that can be applied to a variety of resource and environmental issues. The Survey develops and applies methods to study the

subsurface, such as high-resolution seismic reflection, undertakes mapping of the surficial geology of the state's counties, and studies specific resources, such as road and highway materials. The Survey reports on non-fuel minerals (such as salt, gypsum, aggregates, etc.) and is charged with studying geologic hazards, such as subsidence, earthquakes, and landslides.

Geologic Information—To be useful, geologic information must be disseminated in a form that is most appropriate to the people who need it. The Survey provides information to the general public, to policy makers, to oil and gas explorationists, water specialists, other governmental agencies, and academic specialists. Information is disseminated through a publication sales office, automated mapping, the state's Data Access and Support Center (located at the Survey), a data library, electronic publication, and Geology Extension.

Kansas Geological Survey Staff participating in the 2005 Field Conference:

Bill Harrison, Interim Director and State Geologist
Rex Buchanan, Associate Director, Public Outreach
Jim McCauley, Assistant Scientist, Geologic Investigations Section
Bob Sawin, Research Associate, Geology Extension
Jim Butler, Senior Scientist
Don Whittemore, Chief, Geohydrology Section
Cathy Evans, Publication Assistant

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Kansas Department of Agriculture Division of Water Resources

The Kansas Department of Agriculture is charged by law to ensure: a safe food supply, responsible and judicious use of pesticides and nutrients, the protection of Kansas' natural and cultivated plants, integrity of weighing and measuring devices in commerce, and, that the state's waters are put to beneficial use.

The Kansas Department of Agriculture's Division of Water Resources (DWR) provides sound management of the state's water resources. DWR administers twenty-eight state laws, including the Kansas Water Appropriation Act, and statutes concerning construction of dams, levees, and other changes to streams within Kansas. DWR administers the state's four interstate river compacts and coordinates the national flood insurance program in Kansas.

DWR undertakes the following programs:

- **Water appropriation**—The water appropriation program administers the Kansas Water Appropriation Act and rules and regulations about the management of water resources. This program issues permits to appropriate water, regulates water use, and maintains records of all water rights in the state.
- **Water structures**—The water structures program regulates human activities affecting the flows and overflows of any stream by ensuring, within limits imposed by laws and courts, that such activities are properly planned, constructed, operated, and maintained for their authorized purposes without adversely affecting the environment, public health and welfare, and public and private property.
- **Operations and technical services**—The operations and technical services program provides administrative and technical support to the Chief Engineer and the other programs within DWR. Major issues include interstate compact administration, geographic information systems (GIS), intensive groundwater use control areas (IGUCAs), flowmeter specifications, and water assurance districts.
- **Subbasin water-resources management**—This program is funded by the State Water Plan and implemented by DWR. The program is designed to take a proactive approach within subbasins identified in the Kansas Water Plan. Project teams of environmental scientists work to find resolutions to ground-water declines and streamflow depletion in the identified subbasins.

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Topeka, KS 66612
785-296-3556

Division of Water Resources
109 SW 9th Street, 2nd Floor
Topeka, KS 66612-1283
785-296-3710
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www.ksda.gov

Kansas Department of Wildlife and Parks

The Kansas Department of Wildlife and Parks is responsible for management of the state's living natural resources. Its mission is to conserve and enhance Kansas' natural heritage, its wildlife, and its habitats. The Department works to assure future generations the benefits of the state's diverse living resources; provide the public with opportunities for the use and appreciation of the natural resources of Kansas, consistent with the conservation of those resources; and inform the public of the status of the natural resources of Kansas to promote understanding and gain assistance in achieving this mission.

The Department's responsibility includes protecting and conserving fish and wildlife and their associated habitats while providing for the wise use of these resources, and providing associated recreational opportunities. The Department is also responsible for providing public outdoor recreation opportunities through the system of state parks, state fishing lakes, wildlife management areas, and recreational boating on all public waters of the state.

In 1987, two state agencies, the Kansas Fish and Game Commission and the Kansas Park and Resources Authority, were combined into a single, cabinet-level agency operated under separate comprehensive planning systems. The Department operates from offices in Pratt, Topeka, five regional offices, and a number of state park and wildlife area offices.

As a cabinet-level agency, the Department of Wildlife and Parks is administered by a Secretary of Wildlife and Parks and is advised by a seven-member Wildlife and Parks Commission. All

positions are appointed by the Governor with the Commissioners serving staggered four-year terms. As a regulatory body for the Department, the Commission is a non-partisan board, made up of no more than four members of any one political party, advising the Secretary on planning and policy issues regarding administration of the Department. Regulations approved by the Commission are adopted and administered by the Secretary.

Kansas Department of Wildlife and Parks
Secretary
Landon State Office Building
1020 S. Kansas Avenue
Topeka, KS 66612-1327
785-296-2281

Kansas Department of Wildlife and Parks
Operations Office
512 SE 25th Ave.
Pratt, KS 67124-8174
316-672-5911
316-672-6020 (fax)
www.kdwp.state.ks.us

Kansas Water Office

The mission of the Kansas Water Office (KWO) is to provide the leadership to ensure that water policies and programs address the needs of all Kansans. The KWO evaluates and develops public policies, coordinating the water-resource operations of agencies at all levels of government. The KWO administers the Kansas Water Plan Storage Act, the Kansas Weather Modification Act, and the Water Assurance Act. It also reviews plans of any state or local agency for the management of the water and related land resources of the state. The KWO advises the Governor on drought conditions and coordinates the Governor's drought response team. The Drought Monitoring Program collects climate data from a variety of sources, monitors drought activities, and publishes a weekly Drought Report during periods of drought.

The KWO develops the Kansas Water Plan, which is revised periodically and addresses the management, conservation, and development of the water resources of the state. Numerous water-related public and private entities, as well as the general public, are involved in its preparation and planning.

The Water Plan is approved by the Kansas Water Authority, a thirteen-member board whose members are appointed to their positions, along with eleven non-voting *ex officio* members who represent various state water-related agencies. Along with approving the Water Plan, the Authority approves water-storage sales, federal contracts, administrative regulations, and legislation proposed by the KWO. Much of the input for the Water Plan comes via twelve Basin Advisory committees. These committees are composed of volunteer members from each of the drainage basins in the state. During this year's Field Conference, we will be in the Smoky Hill/Saline, Solomon, Upper Arkansas, and Lower Arkansas basins.

The Water Plan Projects Initiative, endorsed by the Kansas Water Authority, sets out projects to:

- Conserve and extend the life of the Ogallala-High Plains aquifer

- Protect and restore Kansas watersheds
- Assure coordinated water-infrastructure development
- Trim debt for water storage in federal reservoirs

In addition, the Kansas Water Office has the statutory responsibility to develop and maintain guidelines for water conservation plans and practices, and to provide, or arrange to provide, technical assistance for water users required to adopt and implement conservation plans and practices. The Water Conservation program has developed guidelines for municipal, industrial, and irrigation water use.

Kansas Water Office
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785-296-3185
www.kwo.org

SCHEDULE & ITINERARY

Wednesday June 8, 2005

7:00 am	Breakfast at the Holiday Inn, Hays
7:20 am	Conference Overview <i>Bill Harrison</i> , Interim Director, Kansas Geological Survey
8:00 am	Bus Leaves Holiday Inn for Site 1
8:45 am	SITE 1 —Cedar Bluff Reservoir <i>Mike Hayden</i> , Kansas Dept. of Wildlife and Parks <i>David Pope</i> , Kansas Dept. of Agriculture, DWR <i>Tracy Streeter</i> , Kansas Water Office
12:00 pm	Lunch
1:00 pm	Bus to Site 2
2:15 pm	SITE 2 —Depopulation on the High Plains, Nicodemus National Historical Site <i>Marci Penner</i> , Kansas Sampler Foundation <i>Joe Aistrup</i> , Kansas State University <i>Janis Lee</i> , State Senator, Kensington <i>Mike Hayden</i> , Kansas Dept. of Wildlife and Parks
3:45 pm	Bus to Site 3
4:00 pm	SITE 3 —Webster Reservoir, Rooks County, KS <i>Scott Ross and Mark Billinger</i> , Kansas Dept. of Agriculture, DWR <i>Mike Hayden</i> , Kansas Dept. of Wildlife and Parks
4:45 pm	Bus to motel
5:30 pm	Arrive Holiday Inn, Hays
6:30 pm	Bus to dinner
6:35 pm	Refreshments and Dinner at the Golden Ox Pavilion, Hays
8:30 pm	Bus to motel

Cedar Bluff Dam and Reservoir

Located in the Smoky Hill River valley in Trego County, Cedar Bluff Dam and Reservoir are operated and maintained by the Bureau of Reclamation in coordination with other dams and reservoirs in the Kansas River basin. In addition, the Corps of Engineers furnishes data for regulation of water stored in the flood control pool, and the Kansas Department of Wildlife and Parks operates the recreation areas.

Cedar Bluff was developed as part of the Pick-Sloan Missouri Basin Program, formerly called the Missouri River Basin Project. The program was authorized by the Flood Control Act of December 22, 1944, which approved planning for the conservation, control, and use of water resources in the Missouri River basin.

Construction of Cedar Bluff Dam was begun in 1949, and the dam and reservoir were completed in 1951. Construction of the water-delivery system to serve lands in the Cedar Bluff Irrigation District No. 6 began in 1961, and water was available to the original 6,200 acres of project lands by July 1963. In 1969, the irrigable acreage was increased to 6,800. However, the system became depleted, and no irrigation water was available for delivery after 1978. In 1994 the Cedar Bluff Irrigation District disbanded and the Kansas Water Office and Kansas Department of Wildlife and Parks acquired use and control of portions of the reservoir capacity.

In 1966 the State of Kansas approved a water right granting the City of Russell a storage limit in Cedar Bluff Reservoir of 2,700 acre-feet and maximum releases from storage of 2,000 acre-feet per year. Releases are made directly into the Smoky Hill River for diversion by the City of Russell.

Before the construction of the dam and reservoir, numerous floods caused severe damage to crops, livestock, and property in the valley. Cedar Bluff Dam and Reservoir now control the floodwaters and ordinarily maintain the outflow at or below the channel capacity.

The drainage area of the Smoky Hill River above Cedar Bluff Dam is 4,980 square miles. The average annual runoff during the period 1919-1956 was 62,800 acre-feet. At the time the reservoir was constructed, the amount of water available had been reduced to 53,100 acre-feet because of depletion from upstream development.

The dam at Cedar Bluff is a rolled earthfill structure with rock riprap on the upstream face. It rises 134 feet above streambed, has a crest length of 12,560 feet, and a volume of 8,490,000 cubic yards. The 18-mile Cedar Bluff Canal with 25 miles of laterals was constructed between 1961 and 1963. It was built to deliver irrigation water on the north side of the river but is no longer operable.

Cedar Bluff State Park and the surrounding mixed-grass prairie provide a variety of recreational opportunities on the 6,100-acre lake and almost 9,000 acres of adjacent wildlife area. Just west of the park is Threshing Machine Canyon, where names and dates carved by travelers on the Butterfield Overland Dispatch Trail are still visible.

Geology

In general, the geologic section exposed in the area consists of surface alluvium, dune sand, and terrace deposits of Quaternary age. The older Ogallala (Tertiary) limestones and sandstones lie below these deposits, and the yet older Fort Hays limestone and the Carlile Shale, both of Cretaceous age, are below the Ogallala. The Smoky Hill River and its main tributaries have cut to a maximum depth of 300 feet into nearly horizontal beds of limestone, sandstone, chalk, and shale in the vicinity of Cedar Bluff Dam. This ancient river valley is about six miles long. Differential erosion causes a step-like or bench topography. Cliffs or steep slopes are formed by the more resistant beds and the less resistant beds form gentle slopes. The higher lands bordering the river valley are kept by relatively resistant limestone of the Ogallala formation. This limestone and an underlying section of loosely cemented sand "mortar

beds” appear as predominate white outcrops. These outcrops mark the edge of the “Ogallala upland.”

Sources

Kansas Department of Wildlife & Parks website:
www.kdwp.state.ks.us

Bureau of Reclamation website: www.usbr.gov/dataweb/html/cedarbluff.html

Cedar Bluff Unit, 1968, U.S. Department of the Interior,
Bureau of Reclamation Pamphlet

Resource Contacts

Cedar Bluff State Park
RR2, Box 76A
Ellis, KS 67637
785-726-3212 (Area Office)
785-628-8614 (Regional Offices)

Bureau of Reclamation
Nebraska-Kansas Area Office
P.O. Box 1607
Grand Island, NE 68802
308-389-4622
308-389-4780 (fax)
Area Manager: Alice Johns

Cedar Bluff Reservoir, the Smoky Hill River, and the Ground-water System

by Kansas Water Office

There is controversy over the management of the Smoky Hill River hydrologic system below Cedar Bluff Reservoir. The challenge to the State of Kansas is to provide recreation use of the reservoir while managing the Smoky Hill River, and the ground water in the alluvium, for the water users below the dam. The Artificial Recharge Pool and downstream operations are key to maintaining the river/reservoir system for all users. The Kansas Water Appropriation Act and associated rules are the basis for operating the hydrologic system and artificial recharge pool, as well as the refined accounting procedures for the pools in Cedar Bluff Reservoir.

Historical Activities

Construction of Cedar Bluff Reservoir was completed in 1951, with the original purposes of flood control, irrigation, fish, wildlife, municipal supply, and recreation. Ninety-two percent of the original storage was allocated for the operation of the Cedar Bluff Irrigation District located downstream of the dam. For the period 1963–1978, the Irrigation District utilized this storage to irrigate approximately 6,800 acres. Return flows from the operation of the irrigation district were utilized by water users downstream and water rights were developed based on this source of water. Due to lack of inflow the reservoir did not contain sufficient storage to sustain the district beyond 1978.

In 1984, in an effort to address the reduced water availability, the Chief Engineer of the Division of

Water Resources (DWR) issued the order establishing the Smoky Hill Intensive Groundwater Use Control Area (IGUCA) between Cedar Bluff and the Smoky Hill River's confluence with Big Creek. This closed the alluvium to new appropriations and establishes additional limitation on existing water rights.

Also in 1984, the State was contacted by the Irrigation District regarding the possible purchase of its water rights and storage. In 1987, a Memorandum of Understanding (MOU) was signed between the U.S. Department of Interior, the Cedar Bluff Irrigation District, and the State of Kansas to transfer the District's water rights and associated storage to the State. The purpose of the agreement was to relieve the Irrigation District of debt and provide increased recreation opportunities for western Kansas in Cedar Bluff Reservoir.

The change in primary use of the water rights and reservoir from irrigation to recreation required the approval of the Chief Engineer with regard to the Kansas Water Appropriation Act. The key provision of the Appropriation Act in this type of situation is K.S.A. 82a-708b which states "that any proposed change is reasonable and will not impair existing rights." To comply with this section of the act and ensure that downstream water rights that were built on irrigation return flows would not be impaired by the proposed change, an artificial recharge pool was established in the MOU.

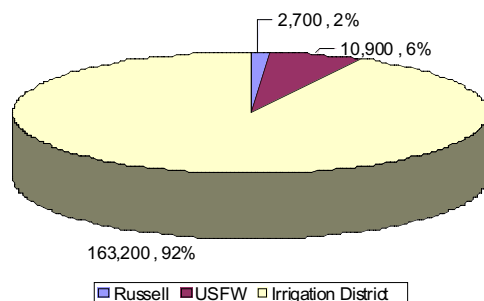
Two years later the contract based on the MOU was signed establishing new conservation pool allocations as well as pool purposes. In 1992, the U.S. Congress approved the reformulation of storage in Cedar Bluff Reservoir as:

Joint Use Pool – Primary purpose is lake recreation. This pool is also authorized for artificial recharge, municipal, and fish, wildlife, and recreation.

Fish and Wildlife Pool – Held by the Kansas Department of Wildlife and Parks, the pool

Original Sub-Pool Allocations

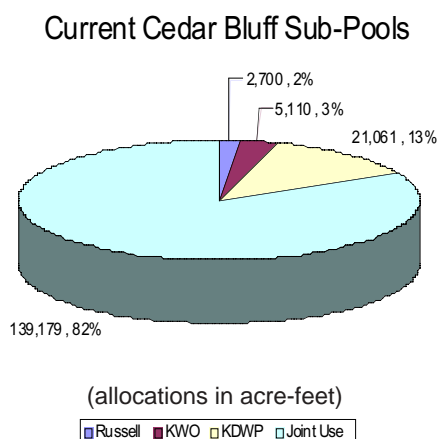
(allocations in acre-feet)



supported operation of the fish hatchery/goose-rearing facility below Cedar Bluff Lake. This pool is limited to 375 acre-feet of release based on the Smoky Hill IGUCA. The unused portion of this pool remains for lake recreation.

Artificial Recharge Pool – Intended to replace irrigation-return flows, and maintain other downstream water rights dependent on the overall system hydrology.

The City of Russell Pool – The City of Russell maintained their storage contained in the original allocation. The MOU did not establish detailed pool operational rules.

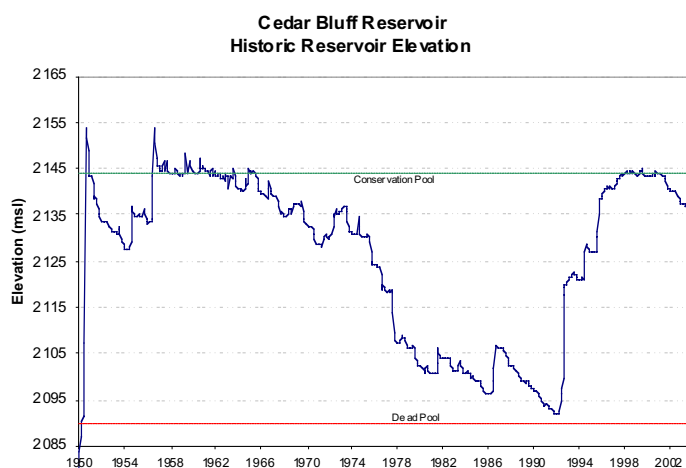


NOTE: The storage allocation of 5,110 acre-feet for the KWO in this illustration refers to the Artificial Recharge Pool. The reduction in some amounts is a result of adjustments made to the allocation due to sediment deposition in the reservoir as reflected in the Accounting Procedures adopted for the Reservoir.

Operation of the Artificial Recharge Pool was not developed during this time since there was no water in that pool. From 1988 to 1992, the area was in a drought. It was anticipated that operational rules would be developed.

Due to high-flow events in 1993, 1995, and 1998, Cedar Bluff Reservoir filled to conservation pool for the first time since the mid-1960's. KDWP and KWO developed an agreement regarding the management of the joint use pool in 1994.

Dry conditions beginning in 2000 led to water-right holders below the reservoir reporting that they could not withdraw their appropriated quantity. In 2003, a dispute between the State, the City of Russell, and the Bureau of Reclamation brought to



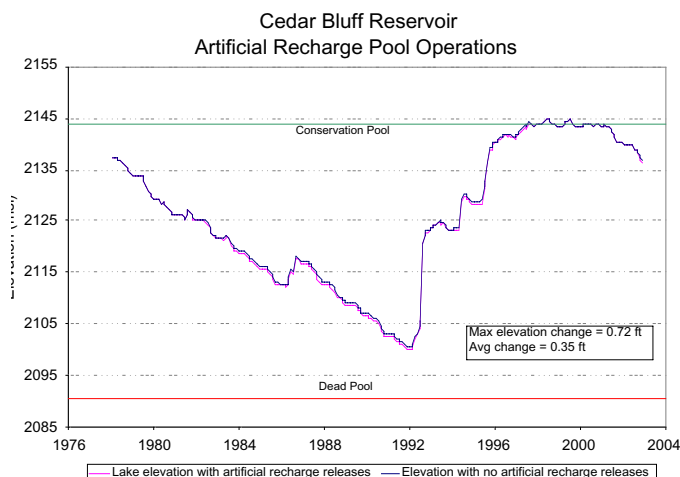
light the need to refine the accounting procedures for the various storage pools. Questions and concerns from downstream water-right holders led to the understanding that the Artificial Recharge Pool must be operated some years to comply with the Appropriation Act, but no operational plan had been developed. The State proceeded to develop the needed accounting policies with those holding storage rights in the reservoir. The development of a system to manage the hydrologic aspects also began to balance the rights of all water users of the system.

The KWO is the holder of the Artificial Recharge Pool, which is intended to replace the irrigation return to the river and alluvium from the Cedar Bluff Irrigation District. Operation of the Artificial Recharge Pool is needed for the following reasons:

1. The State of Kansas is obligated under the MOU, contractual agreement with the Federal government, and action of the United States Congress to operate Cedar Bluff Reservoir storage for the purposes stated.
2. As a result of the reformulation of the storage in the Reservoir, the Irrigation District was disbanded and ceased to operate. The Irrigation District had released water from the Reservoir for the years 1963 through 1978, applied that water to irrigated cropland below the dam, and returned unused water to the Smoky Hill River. A number of water rights were developed based on the return flows from the Irrigation District operations.
3. K.S.A. 82a-708b requires that a change to a water right cannot negatively impact other

water-right holders. In order to ensure there was no negative impact to other water-right holders downstream of the Reservoir, the Artificial Recharge Pool was created to make targeted releases and support downstream flow and ground-water levels.

4. If no releases are made from the Artificial Recharge Pool, the State of Kansas would be in direct conflict with:
 - a. A Memorandum of Understanding and contractual agreement with the Federal government and Congressional authorization of the reallocation of Cedar Bluff Reservoir storage.
 - b. The Kansas Water Appropriation Act relative to the impacts on other water-right holders.
5. Releases only occur when there is water in the Artificial Recharge Pool. The Pool must refill according to the accounting procedures before there can be a release. Analysis of the hydrology of the last twenty years indicates that releases from the Artificial Recharge Pool would average 242 acre-feet / year. The effect of releases is shown in the second illustration.



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Kansas Water Office, December 2002, Cedar Bluff Lake Level and Yield Analysis.

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Nicodemus

In many ways Nicodemus is no different from hundreds of other towns that popped up across the plains in the nineteenth century. Looking to make a profit, its founders lured dissatisfied people from other parts of the country, their promotional fliers promising more than they could deliver. Some of the migrants stayed, enduring hardships and eventually gaining ground. Others turned around and went home. Dugouts were built, followed by sod houses and eventually wooden structures. Businesses came. As with many hopeful townsites, the railroad passed Nicodemus by and decline eventually set in. In 1910, the population peaked at 595. By 1950, it was only 16. But while other similar settlements disappeared off the map, Nicodemus had a unique distinction that helped preserve its heritage and historical structures: it was the first and only remaining western town founded by African-Americans during Reconstruction.

In 1976 the U.S. Secretary of the Interior designated Nicodemus a National Historic Landmark District, a category of cultural resources considered exceptionally valuable in the illustration and interpretation of U.S. history. With the support of the Nicodemus community, research was conducted between 1981 and 1984 to record all known physical changes in the townsite since 1877 and provide for future historic preservation. The National Park Service received joint project sponsorship from the Kansas State Historical Society, Kansas State University College of Architecture and Design, and Entourage, Inc., a nonprofit organization specializing in historical research and preservation planning for minority communities. Financial support also was provided by National Endowment for the Arts and the National Trust for Historic Preservation. The Nicodemus Historical Society was established in 1988 to advance preservation efforts.

In 1996 Congress established the Nicodemus Historic Site as a unit of the National Park Service to assist the community in preserving historic structures and interpreting the town's history. The legislation directed the National Park Service to cooperate with the people of Nicodemus to preserve its five remaining historic structures—the Old First Baptist Church, A.M.E. Church, St. Francis Hotel/Fletcher-

Switzer residence, Nicodemus School District No. 1 building, and Nicodemus Township Hall—and illustrate the many roles African-Americans played in the American West.

History of Nicodemus

Black minister Rev. W. H. Smith and white land promoter W. R. Hill joined forces with five other Kansans to form the Nicodemus Town Company in 1877. Except for Hill—also co-founder of the Hill City Town Company with Smith—all the Nicodemus founders were African-Americans who had migrated from the South in search of free land and an open society without racial oppression. In just a few short weeks they set out enticing migrants, mostly from Kentucky and Tennessee.

When the Nicodemus Town Company's first recruits arrived in western Kansas, where sunflowers, willows, and buffalo chips were the most common sources of fuel, it didn't take them long to realize life on the High Plains could be hard. Members of the first colony to come contemplated hanging W. R. Hill. Sixty families from another colony turned around and headed back to Kentucky the day after arrival. Those who stayed worked industriously to survive. But starting off with an inadequate food supply and little money, they found they would not make it through the first year without assistance. The first aid came from the Osage Indians, who shared food from their annual Rocky Mountain hunt and subsidies they'd received from the army. Although some whites in the area resented the blacks, others helped out, and supplies also arrived from eastern Kansas and other states.

Between 1879 and 1886, poor crop years proved to be a serious challenge to the townsite, yet the town managed to survive and even prosper. By 1886, the local agricultural economy was healthy enough to support 200 residents, a bank, four general stores, three groceries, four hotels, three pharmacies, two millineries, a blacksmith shop, an ice cream parlor, two liverys, two barber shops, a baseball team, a literary society, a benefit society, and band and music teachers. In 1887 a bank was established. For a short time, Nicodemus even had two newspapers.

In 1888, despite the Township's willingness to pay \$16,000 to the first railroad to come through Nicodemus, no company took their offer. The Missouri Pacific stopped laying tracks to the east at Stockton. The Union Pacific ran south of the Solomon River, bypassing Nicodemus by six miles. Although the town's population remained fairly steady into the early 20th century, by the 1950's most of the people were gone and by 1960 the African-American population of Graham County was just 195, down from 500 (according to one census) or 700 (according to another) in 1880.

Despite the decline of Nicodemus and scattering of its people through the years, many descendants of the early Nicodemus residents maintain a bond with the town. Every year they come the last weekend in July from throughout the country to celebrate Homecoming. Originating in Nicodemus' earliest days as "Emancipation Day"—a time to observe freeing of slaves in the West Indies—Homecoming has evolved and endured for more than 100 years.

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Department of the Interior

National Park Service
www.nps.gov/nico/

Fort Hays State University
www.fhsu.edu/forsyth_lib/ksheritage/nicodemus.shtml

Walking Tour Map Guide: Historic Nicodemus

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Depopulation on the High Plains



A Johnson County legislator made the *Kansas City Star* this spring when he pointed out that the Oak Park Mall in Overland Park generated more sales tax revenue than 56 mostly rural Kansas counties combined.

Sales tax is just one indicator of economic activity, but it does point out issues of population, economy, and culture that face rural Kansas. Western Kansas in general and north-central Kansas in particular are undergoing demographic changes, changes that have consequences for the economy and culture of Kansas. With the exception of some locations such as Garden City, Dodge City, and Liberal, where meat packing and an irrigation-based economy have led to a growing population, and regional centers such as Colby, Hays, and Goodland, which are located along Interstate 70, the population in many of the region's towns and counties is declining and aging.

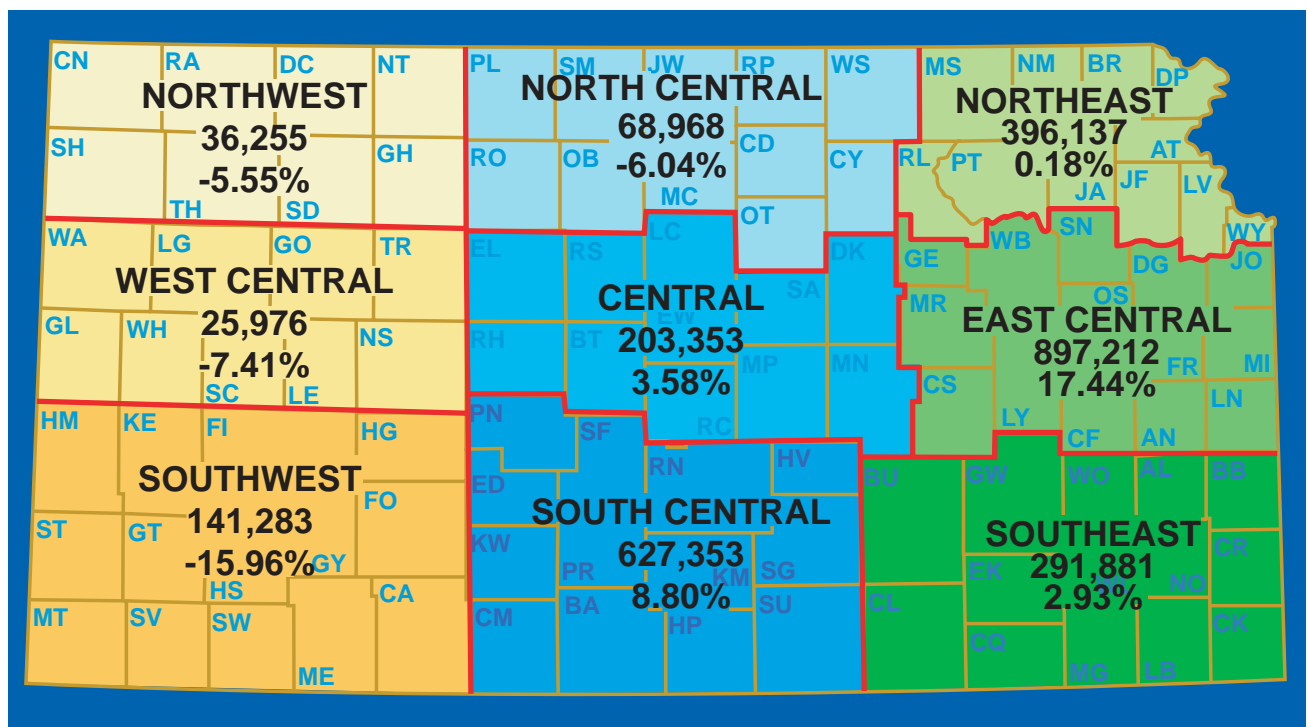
In very general terms, many parts of rural Kansas counties are emptying out:

- The state's eight northwestern counties declined in population by 5.55% from 1990 to 2000. (Policy Research Institute, 2004)
- The state's nine west-central counties declined in population by 7.41%.
- Southwestern Kansas counties declined in population by nearly 16%.
- North-central Kansas' population declined by 6%.

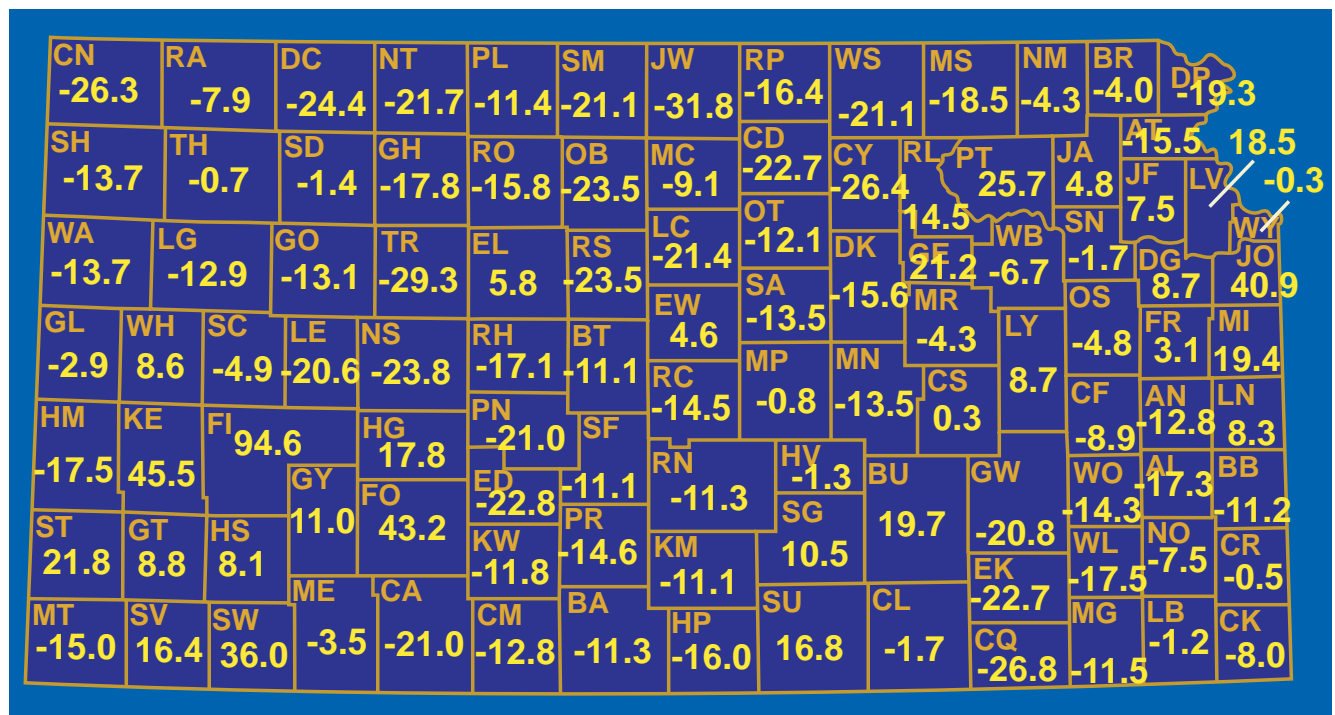
These population declines are occurring in an area that was relatively sparsely populated to begin with:

- Cheyenne County in extreme northwestern Kansas had a population of 3,165 in 2000.
- Sheridan County had a population of 2,813.
- Wallace County (the state's second-least populated county, ahead of only Greeley) had a population of 1,749.

At the same time these population decreases are taking place, the state's most populous counties are gaining people. One-third of the state's population currently lives in just two counties—Johnson and



Population by region, 2000, and percent change, 1990–2000 (KU Policy Research Institute).

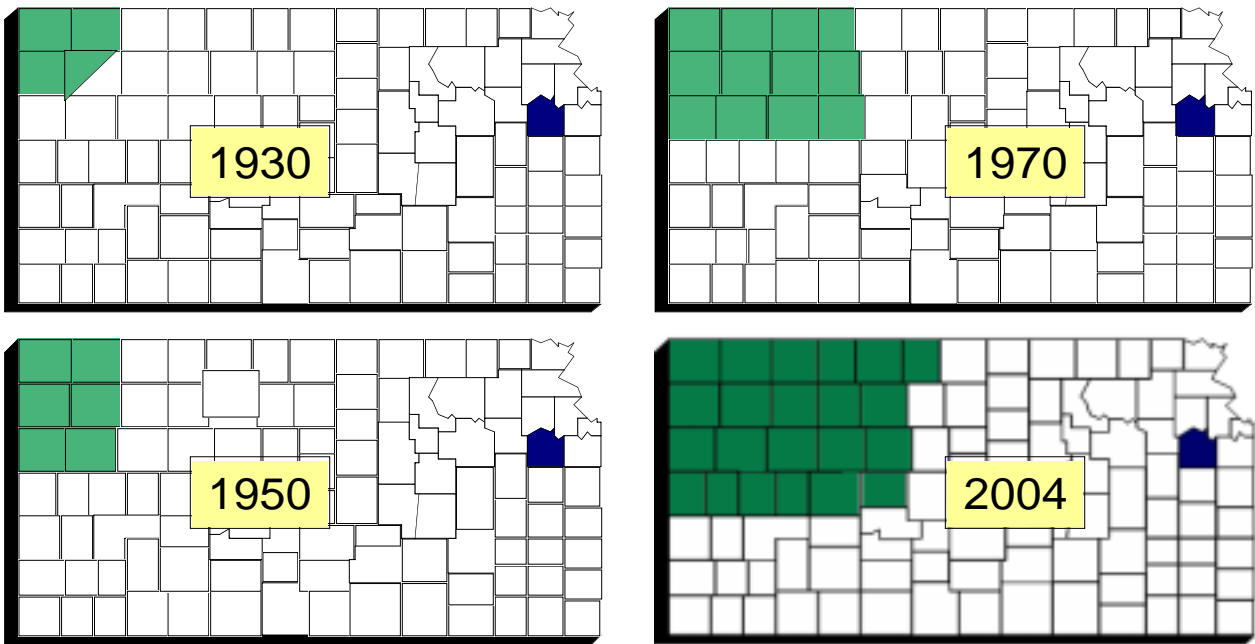


Projected population change, 2000–2030 (KU Policy Research Institute).

Sedgwick. One projection estimates that one-fifth of the state's population will live in Johnson County by 2025, and half of the population will live in just five counties: Johnson, Sedgwick, Shawnee, Wyandotte, and Douglas. This amounts to more than just a geographical shift in population. It also means that

the nature of the state's population has changed, from a predominately rural population to one that is far more heavily urbanized.

Much of the region's population is getting older at the same time:



Rural population decline and urban population growth, 1930–2000: Number of northwest Kansas counties it takes to equal the population of Douglas County. Johnson County has nearly five times the population of Douglas County. Based on U.S. census data.

- The percentage of the population age 65 or older is projected to increase by 11% in Cheyenne County from 2000 to 2015; for Gove County the increase is projected at 8.9%; in Sherman County the increase is projected at 22.9%.
- The average age in Jewell is 46.2 (the oldest in the state). The average age in Smith County is 46.0, in Graham it is 44.4, in Cheyenne it is 44.2, and in Republic it is 45.7. The state average is 35.2

Finally, per capita income is also relatively low in some of these counties:

- Cheyenne County ranked 86th in the state with per capita average income of \$21,650, Wallace is 90th at \$21,355, and Trego is 100th at \$20,668. The statewide average is \$28,905.

These numbers relate to much of what has gone on or will go on in rural Kansas over the next decade. They relate to issues ranging from school consolidation to health care, from economic development to public access to natural areas, from the role of government in helping to support these

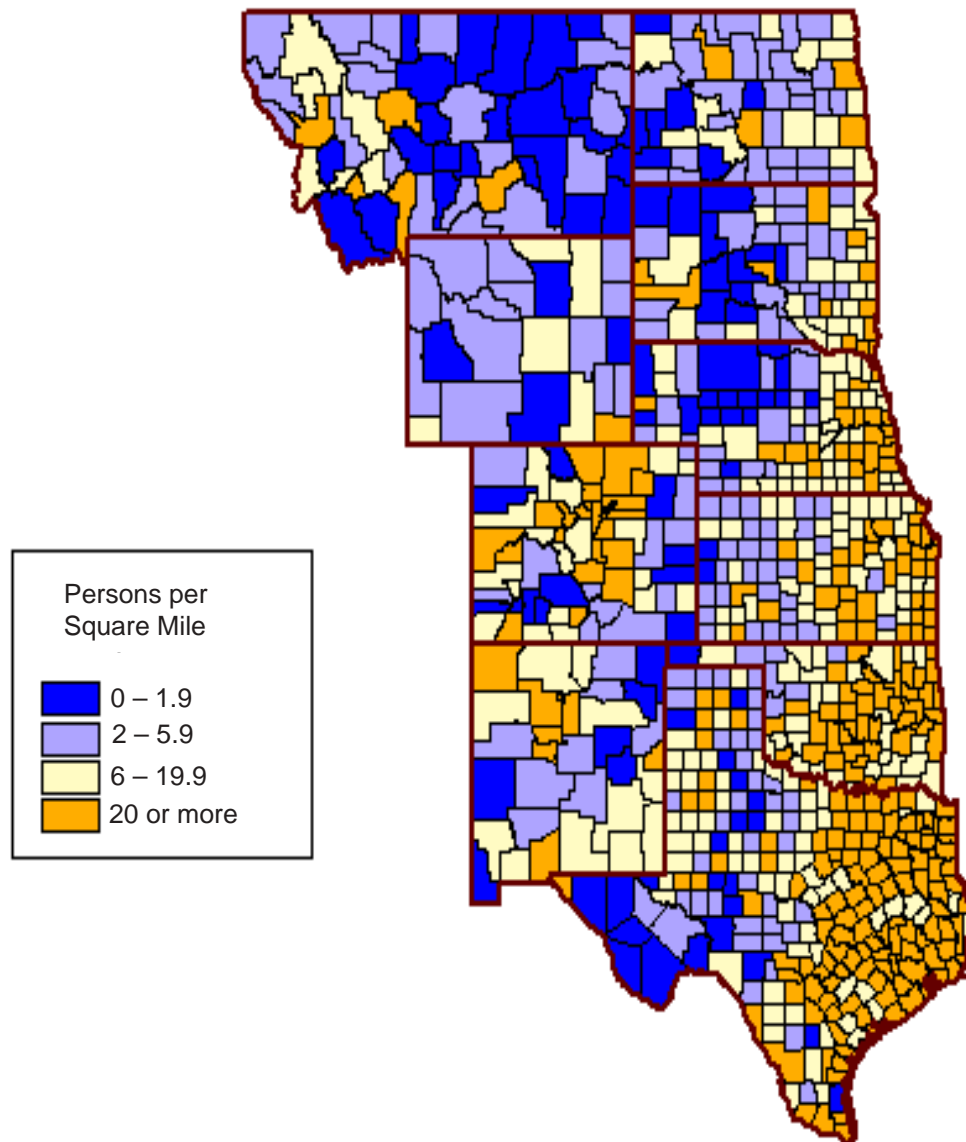
affected areas to the impact of declining natural-gas production and ground-water supplies in an area that is already struggling with economic and demographic issues.

Just for the record, Johnson County generated \$425,371,270 in sales tax in fiscal year 2003. Forty-three Kansas counties combined generated \$36,154,968 (Darling and Upendram, 2004).

References

Darling, David, and Sreedhar Upendram, 2004, County Trade Pull Factors FY 2003: Kansas State Research and Extension, Department of Agriculture Economics, CD Study Report 230. Also available on-line at www.agecon.ksu.edu/ddarling/D2002/StudyReports.htm

Policy Research Institute, University of Kansas, KU Center for Research, 2004, Kansas Statistical Abstract 2003. Available on-line at www.ku.edu/pri/ksdata/ksah/. The statistical information throughout this section is based on this same source.



Population density in Great Plains states by county, year 2000. Source: Proximity—<http://proximityone.com> based on Census Bureau decennial census data.

Resource Contacts

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Webster Dam and Reservoir

Webster Dam and Reservoir are located between Hill City and Stockton on the South Fork of the Solomon River. They provide flood control for areas downstream, irrigation water for 8,500 irrigable acres of the Webster Irrigation District No. 4, fish and wildlife conservation and enhancement, and recreational opportunities.

The Bureau of Reclamation operates and maintains the dam and reservoir in coordination with other dams and reservoirs in the Kansas River basin. The Corps of Engineers furnishes data and operational procedures for regulation of water in the flood-control capacity. Webster Irrigation District No. 4 operates and maintains the irrigation facilities. Kansas Park and Reservoir Authority manages the recreational facilities at the park, and Kansas Department of Wildlife and Parks manages the wildlife areas.

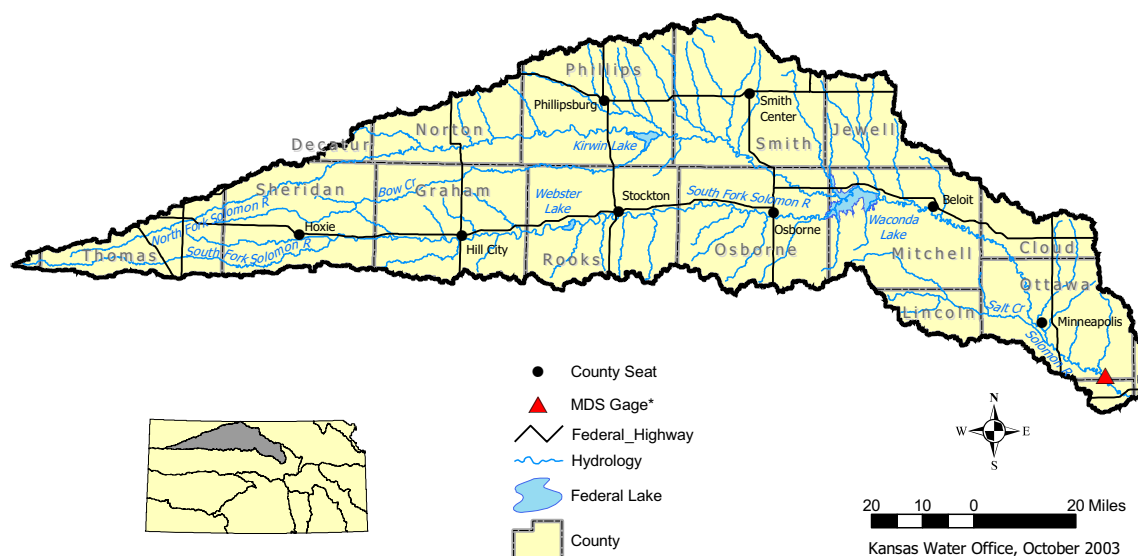
Good crop yields during the 1880's in Osborne and Rooks counties turned to disappointment in the following years when it became apparent that periods of favorable precipitation would be

interrupted by frequent droughts. Most of the Webster area has been dry-farmed since the initial settlement. A few farms on the South Fork of the Solomon River and its tributaries were irrigated after small pumping plants were installed. These irrigation systems were experimental and, for the most part, have been discontinued.

At the requests of local authorities, the Bureau of Reclamation initiated investigations for a dam and reservoir in 1939. The Corps of Engineers indicated that there would be substantial benefits from flood control. Webster was developed as part of the Pick-Sloan Missouri Basin Program, formerly called the Missouri River Basin Project. The program was authorized by the Flood Control Act of December 22, 1944, which approved the general comprehensive plan for the conservation, control, and use of water resources in the Missouri River basin.

The 1951 flood demonstrated the need for regulation of the basin's water resources. Investigations were accelerated and modifications to the initial development plan resulted in more than

Kansas Water Plan Solomon Basin Section



* Minimum Desirable Streamflow

doubling the flood-control capacity of the reservoir. Construction of Webster Dam began in January 1953, and was completed in June 1956. It is adjacent to the original townsite of Webster in Rooks County and is a modified homogeneous earthfill embankment 10,720 feet long with a structural height of 154 feet and a crest length of 1,944 feet. An earthfill dike fills a low saddle to the northwest of the north end of the dam.

Webster Reservoir has a capacity of 260,740 acre-feet, of which 72,070 acre-feet are for irrigation and 183,370 acre-feet are for flood control. As of 1998, it had prevented an estimated \$105.3 million in flood damages.

The Webster Unit also includes Woodston Diversion Dam and the Osborne Canal. Woodston Diversion Dam is located on the South Fork of the Solomon River 18 miles downstream from Webster Dam and 1.5 miles west of Woodston. The dam diverts water into the Osborne Canal, which is 32.6 miles long and has an initial capacity of 161 cubic feet per second. The canal has a 30-mile long lateral system and four pumping plants, which are used for land that cannot be fed by gravity. Construction of Woodston Diversion Dam was started in June 1957 and completed in February 1959. Osborne Canal was started in March 1958 and completed in April 1961.

The Webster Wildlife Area encompasses 7,622 acres of public land surrounding 1,678 surface acres of water. Along with the 880-acre Webster State Park and the Woodston Dam area, they provide numerous recreational opportunities, including camping, swimming, boating, wildlife viewing, fishing, and hunting.

Geology

The Webster Dam and Reservoir are located within the Smoky Hills physiographic region of Kansas. The geologic conditions involved are relatively simple, as all subsurface beds are nearly horizontal. No major faults or faulting is known in the area.

Unconsolidated Pleistocene deposits mantle the older consolidated sediments except for a few erosional hills and bluffs formed by the more resistant Fort Hays limestone. Tertiary deposits are not found at the damsite but do occur adjacent to the upper reaches of the reservoir. The Carlile Shale underlies the river alluvium; the overlying Fort Hays Limestone and Smoky Hill Chalk members of the Niobrara Formation form the uplands. The Fort Hays limestone, the lower member of the Niobrara, is composed of several massive chalky limestone beds separated by thin shale or bentonite layers.

Sources

Kansas Department of Wildlife and Parks
www.kdwp.state.ks.us

Bureau of Reclamation
www.usbr.gov/dataweb/html/cedarbluff.html

Resource Contacts

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SCHEDULE & ITINERARY

Thursday June 9, 2005

7:00 am	Breakfast at the Holiday Inn, Hays
8:00 am	Bus Leaves Holiday Inn for Site 4
9:20 am	SITE 4 —Circle K Ranch, Edwards County, KS <i>Susan Stover</i> , Kansas Water Office <i>Tina Alder</i> , Kansas Dept. of Agriculture, DWR <i>Mark Sexson</i> , Kansas Dept. of Wildlife and Parks <i>Sharon Falk</i> , Groundwater Management District #5 <i>Fred Burgess</i> , Edwards County Economic Development Corp.
12:00 pm	Lunch at Edwards County Fairgrounds
1:00 pm	Bus to Site 5
1:30 pm	SITE 5 —Arkansas River Phreatophytes, Pawnee County, KS <i>Jim Butler and Don Whittemore</i> , Kansas Geological Survey <i>Tina Alder</i> , Kansas Dept. of Agriculture, DWR
2:30 pm	Bus to Great Bend
3:00 pm	Great Bend's "Front Door" Facility
3:30 pm	Bus to Site 6
3:45 pm	SITE 6 —Kansas Wetlands Educational Center at Cheyenne Bottoms <i>Mike Hayden and Ken Brunson</i> , Kansas Dept. of Wildlife and Parks <i>Ted Eubanks</i> , Fermata, Inc. <i>Cris Collier</i> , Great Bend Convention and Visitors Bureau
5:00 pm	Bus to Dinner
5:15 pm	Refreshments and Dinner at Camp Aldrich
7:45 pm	Sunset tour of Cheyenne Bottoms <i>Karl Grover</i> , Kansas Dept. of Wildlife and Parks
9:00 pm	Arrive Best Western Angus Inn, Great Bend

The Arkansas River

Draining much of the southern half of the state, the Arkansas River is one of two major drainage systems in Kansas (the other being the Kansas River). Unlike the Kansas, which drains into the Missouri, the Arkansas flows to the south and joins the Mississippi River in southeastern Arkansas. At 1,459 miles, the Arkansas is the third longest river in the continental U.S.; it drains more than 160,000 square miles. The river gets its start in Lake County, Colorado, near the town of Leadville, and passes through the Royal Gorge at Canon City. In Kansas, it enters near Coolidge in Hamilton County and heads generally southeast. After jogging northeast in Ford County, it makes a big turn at Great Bend and heads generally southeast again before leaving the state in Cowley County.

The elevation at the river's edge at Dodge City is 2,483 feet, well above other major rivers in southwestern Kansas. At Garden City, the elevation is 2,830 feet, or about 200 feet higher than the Smoky Hill River to the north and the Cimarron River to the south, in spite of the fact that the Arkansas enters Kansas at a lower elevation than the other two rivers. That means the course of the Arkansas is not nearly as steep as the other streams. Because the Arkansas receives little additional flow as it moves onto the High Plains, it becomes an aggrading stream instead of a degrading stream. That is, it builds up its bed by dropping the load of sediment it carried out of the mountains rather than cutting into its channel.

In southwestern Kansas, the Arkansas has been used for irrigation since the 1880's when ditches were constructed to take water from the river. In addition, a number of wells were dug that took water out of the alluvial aquifer, the water-bearing sand and gravel deposits adjacent to the river. In a 1913 report, Erasmus Haworth, then director of the Kansas Geological Survey, wrote that "the water table throughout the valley is so near the surface an inexhaustible amount of water is available, and therefore there is no practical need of being concerned as to the actual amount of water-bearing sand, for the water will never become exhausted by pumping."

But water levels have become a problem in the Ark River valley. In Kansas, flow in the river decreased throughout the 20th century until in the late 1960's and early 1970's, it ceased flowing in a portion of the state. Except during extremely wet years or times of heavy snow-melt in the Rockies (as occurred in 1995), the river is usually dry from about western Finney County to near Great Bend. This lack of streamflow is caused by a combination of factors. Increased irrigation in eastern Colorado and southwestern Kansas has lowered water tables in the alluvial and Ogallala aquifers so that less water returns from the aquifers back into the river during times of low flow. In addition, the use of water for irrigation and construction of several large reservoirs in eastern Colorado has increased evaporation and made less water available in Kansas.

Today a small amount of water (usually 100-200 cubic feet per second) flows in the Arkansas River across the state line. It is released into the river from John Martin Reservoir, just across the border in eastern Colorado. That flow begins to disappear around Lakin in Kearny County because irrigation ditches divert the water onto fields. The remaining water soaks into the alluvial aquifer. Lack of water in the river led to a well-known court case that began in 1985 when Kansas filed suit against Colorado for failing to live up to terms of an interstate compact between the two states concerning water in the river. In May 1995, the U.S. Supreme Court ruled in Kansas' favor when it determined that wells in eastern Colorado were pumping too much water from the alluvial aquifer and causing the lessened streamflows. In April 2005, Colorado agreed to pay Kansas a settlement of \$34.7 million dollars. Court rulings have also forced Colorado to restrict well use and release water from John Martin Reservoir.

Quantity of water in the river isn't the only issue, however. Recent research has shown that the quality of Arkansas River water is also a problem. When it enters Kansas, water in the river is slightly salty because much of the streamflow is made up of return flow, or water that was used for irrigation. As the water moves over fields and back into the river, evaporation concentrates salts in the water. The large reservoirs on the Arkansas in Colorado also

contribute to evaporation and cause increased salinity. Although salinity levels are not extremely high (total dissolved solids concentrations are typically 2,000-4,000 mg/L), the slightly salty water is a problem because it moves from the river into the alluvial aquifer. It can still be used for irrigation because it usually mixes with fresher ground water, but it is a problem in situations where high-quality ground water is necessary for manufacturing, meat packing, and domestic uses. As the saline water moves into the underlying aquifer and slowly increases its salinity, it also could cause difficulties in irrigation. Additional releases of water from Colorado may help dilute the river salinity in the future, but the salinity will probably continue to be a problem.

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- Sherow, James Earl, 1990, Watering the Valley: Development Along the High Plains Arkansas River, 1870-1950: University Press of Kansas, 222 p.
- Whittemore, Donald, 1995, Upper Arkansas River Corridor Study: Problem Identification, Preliminary Research, and FY96 and FY 97 Plans: Kansas Geological Survey, Open-file Report 95-70, 30 p.



Arkansas River on the Circle K Ranch southwest of Kinsley (May 2005).



Arkansas River east of Larned (May 2005).

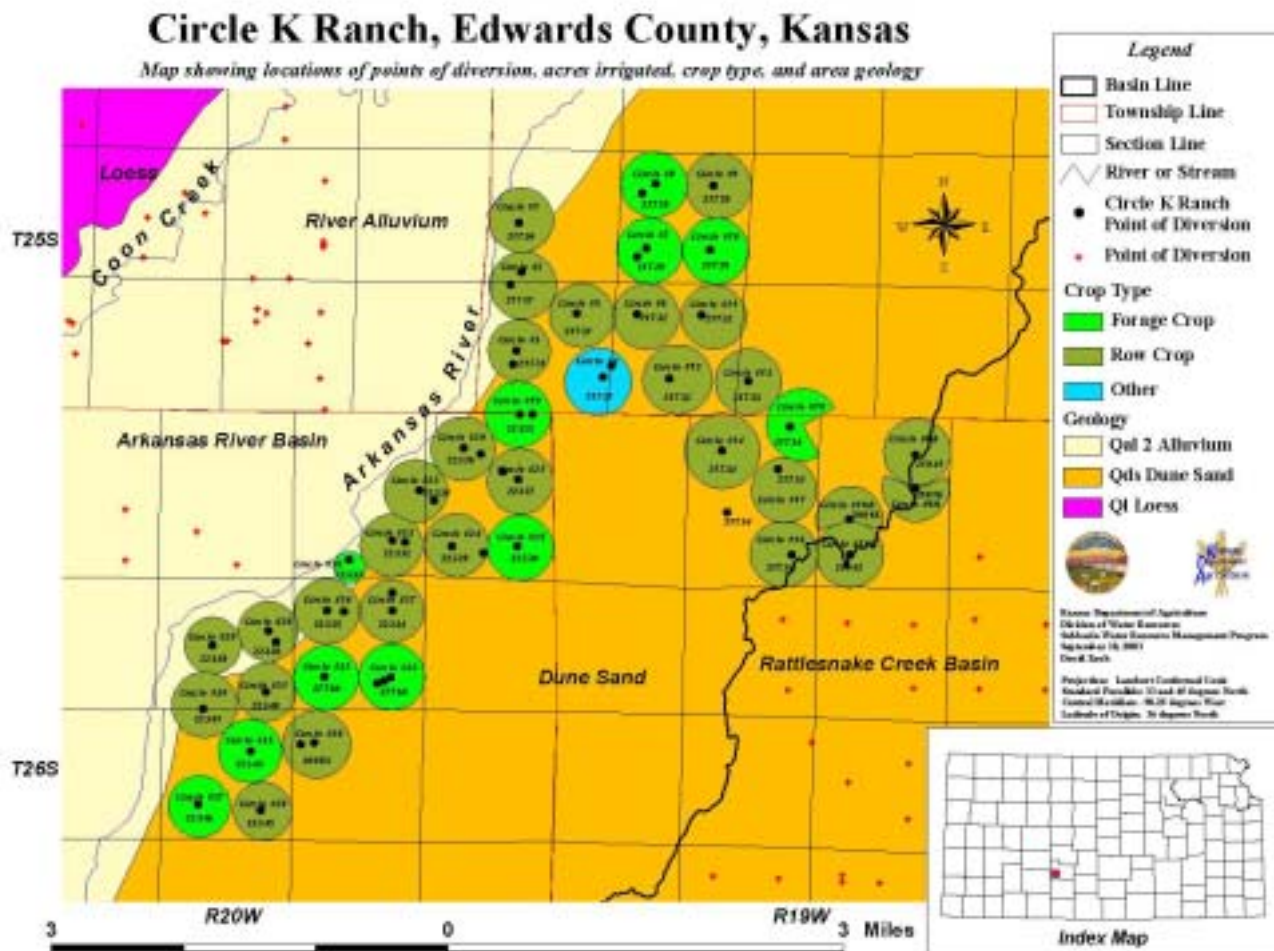
Circle K Ranch Water Retirement

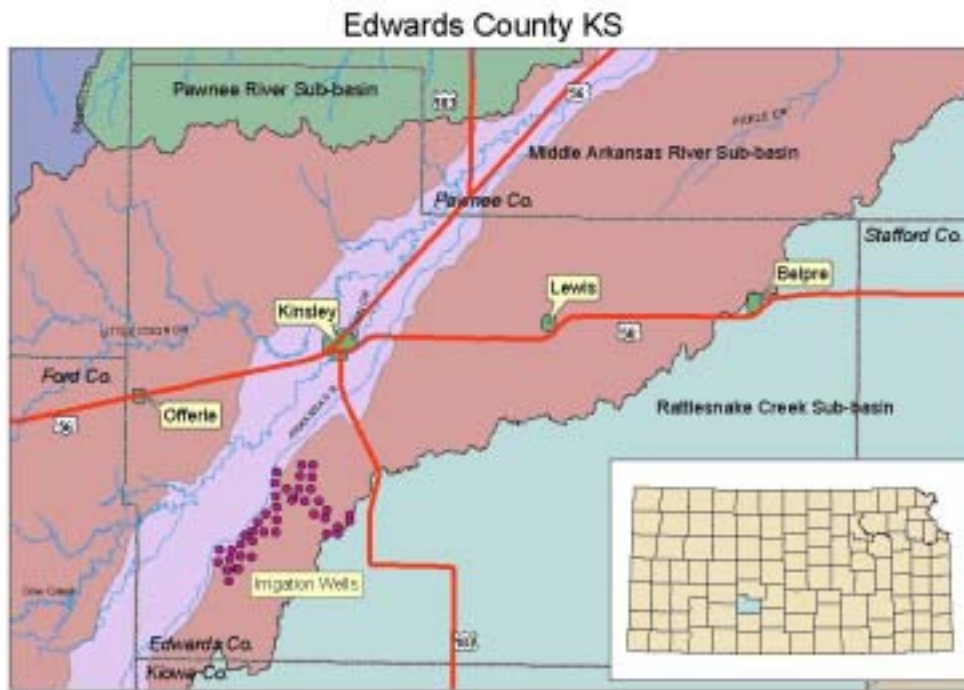
by Kansas Water Office

The Circle K Ranch is owned by the cities of Hays and Russell, having been purchased to supply their future water needs. The cities are exploring other options for long-term water supplies and have asked if the State would be interested in buying the property. The ranch is located in the Middle Arkansas subbasin, an area in which water is over-appropriated and usage needs to be reduced for long term stability. The ranch has 8,039 acre-feet of water rights appropriated for irrigation, with an average annual use of 6,600 acre-feet. Retiring water rights would significantly help stabilize the ground-water levels and reduce the regional shortages. Taking the land out of irrigation would require a land-management plan to prevent severe erosion of the dune-sand soils. If purchased by the State, the land

would be managed by the Kansas Department of Wildlife and Parks as a wildlife area open to hunting and other recreational uses. The goal is to reduce water use in this area while minimizing the economic impact to the region.

The proposal for the State to pursue purchase of the property to retire most of the water rights by 2015 and manage the property was approved by the Kansas Water Authority in August 2004, and adopted into the *Kansas Water Plan*. The recommendation indicates Kansas Department of Wildlife and Parks would pursue a partnership with Groundwater Management District (GMD) #5 for purchase and retirement of the water rights and seek funds to develop the property as a public wildlife area.





Physical Description: Circle K Ranch is located in Edwards County southwest of Kinsley. The ranch has 6,661 assessed acres, with 4,843 acres as pivoted irrigated cropland and 1,753 as native rangeland. The remainder is dry cropland and building sites. The Arkansas River forms the western boundary of the ranch. There are 57 wells under 30 water rights and 41 irrigated circles on the ranch. The ranch lies within Big Bend GMD #5.

The primary soils are sandy soils with some loam soils over sand, with a gently rolling to rolling topography. The soils are susceptible to blowing. The ranch is in good condition under current management but in the past has had problems due to blowing.

The ranch lies within the Middle Arkansas subbasin, which covers portions of Barton, Edwards, Kiowa, Rice, Rush, and Stafford counties. There are 1,797 points of diversion, with an average annual water use (1988–2000) of 155,000 acre-feet.

Ground water is withdrawn from both the High Plains alluvial and “Great Bend Prairie” aquifers. (The High Plains aquifer consists of several hydraulically connected aquifers. The Great Bend Prairie aquifer is geologically younger than the Ogallala, is closer to the land surface, and has greater potential recharge.) The High Plains aquifer has an

average depth of less than 20 feet below ground surface in the Middle Arkansas subbasin. Water levels tend to respond rapidly to significant precipitation events in some areas, with a delayed response in other areas, probably due to the presence of clay layers slowing the recharge. Ground-water flow direction is typically towards the Arkansas River—northwest south of the river and southeast north of the river. Overall, well measurements indicate a lowering of ground-water levels over the past 30 years.

Streamflow measurements of the Arkansas River from the Ford–Edwards County line to southeast of Offerle indicate this stretch has become a losing river 70 percent of the time. A river is considered “losing” when ground-water levels are below the channel elevation and the river loses water into the underlying sediments.

The river is poor-quality water with high levels of total dissolved solids and sulfates. The reversal of flow from the aquifer into the stream (“gaining”) to the stream recharging the aquifer (“losing”) has implications for water quality. When the river is losing, the poor-quality surface water mixes with the good-quality ground water and moves further away from the river corridor. The hard, high-sulfate water causes plugging and corrosion problems for wells and center pivots. The poor-quality water can be a

concern for domestic and public water supplies if it gets into the well field.

Water Management: A *Middle Arkansas River Subbasin Management Strategies* report, 2004, was prepared by the Division of Water Resources Subbasin Management Program with the Middle Arkansas stakeholder work group. It identifies voluntary strategies to achieve a water-use reduction goal of 13,980 acre-feet by 2015. The report identifies three priority areas, with the highest including the Circle K ranch. If the voluntary reductions goal is met, and water rights at Circle K Ranch are retired, the subbasin would reduce water use by 20,500 acre-feet. The Subbasin Management Strategies report is an effort to identify and implement pro-active solutions with local commitment. If additional reductions are necessary beyond what is achieved through voluntary means, the Chief Engineer will use regulations to protect senior water rights and the public interest.

The Division of Water Resource's water budget indicated a reduction of roughly 41,000 acre-feet was needed to reach long-term stability. Another water budget done by a Water PACK consultant determined a lower number for the amount of imbalance. Currently a ground-water model is being constructed by the Kansas Geological Survey that will more accurately define the quantity of water-use reduction needed to reach sustainable yield management, as well as help in water-management decisions.

Minimum Desirable Streamflow (MDS) levels of 1 to 5 cfs, depending on the season, have been established for the Kinsley gage. Similar to a water right, an MDS has a statutory priority date of April 12, 1984. Water rights permitted after that date are considered junior to the MDS and may be required to quit pumping if MDS is not met for a period of 7 days or more.

Land Management: The Circle K Ranch was purchased by the City of Hays in January 1995 as part of a long-term public water supply strategy to meet its projected needs with an eventual transfer of water up to the Hays well field. Hays later sold an 18 percent interest in the ranch to the City of Russell. Since purchase, the ranch has been leased to BET Farms for irrigated farming, recently under one-year contracts. The owners have not paid to maintain their irrigation systems, and the newer center pivots are

owned or leased by BET Farms. In 2003, Hays and Russell paid \$15,393 in taxes on the ranch.

If the State acquired the property, the land would be managed by the Kansas Department of Wildlife and Parks. The purchase of the ranch would be eligible for a 75% federal reimbursement with Pittman-Roberts Wildlife Restoration funds.

Wildlife and Parks has been evaluating the property for conversion to native grasses and forbs that will stabilize the soils, reduce water use, and create wildlife habitat. Much of the ranch is in native sandy land prairie, a habitat type important to many native grassland species, including the Lesser Prairie Chicken.

A management plan would be created that allows for the retirement of water rights except for what is needed to irrigate wildlife food plots. The land conversion would be done by irrigated circles. How many circles would ultimately be converted and how quickly that would happen, along with their sequence, would be worked out as a management plan and budget was prepared. Continued good farm management of all the circles prior to conversion to grass would be essential, and circles would be leased for irrigated production until conversion could occur.

Local residents have discussed ideas with the Kansas Department of Wildlife and Parks for land management, including roads, parking, bathrooms, trails, campgrounds, and other features that would make it a desirable destination for hunters, wildlife viewers, and other outdoor visitors.

Public Input: The retirement of water rights at Circle K Ranch continues to be explored for viable options. State agencies met four times with a local advisory committee to discuss options and development of the proposal. There were several public meetings on this topic, including three joint Upper and Lower Arkansas Basin Advisory Committee and public meetings in Kinsley. The Lower Arkansas Basin Advisory Committee voted to recommend the State pursue purchase of the ranch, retire most of the water rights but keep a portion of the land leased for agricultural production, and make it a goal to minimize economic impacts to the region. The Upper Arkansas Committee voted to recommend the State acquire the property and convert it all to grasses for a wildlife habitat, make GMD #5 the

recommending body on retirement of water rights, and provide a written guarantee of funding to fully develop the property as a wildlife area for the good of the community. An economic study of the impact of the BET Farms to the region, an economic study of the potential economic impact of a wildlife area at the ranch, and an appraisal of the ranch were all conducted and considered by the various committees.

The Kansas Water Authority considered the advice of the Basin Advisory Committees, the comments from the Edwards County Commissioners, Kinsley City Council, and others before deciding to recommend the State pursue purchase of the ranch. To date, the Kansas Water Authority has not approved any budget for the ranch purchase since no price has been proposed.

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Arkansas River Phreatophytes

Low flows are an increasing problem in streams and rivers in central and western Kansas (fig. 1). As a result, considerable attention is now being given to the identification of factors responsible for these low flows. The interactions between a river and an adjacent aquifer clearly play an important role, with ground-water pumping often being a major reason for periods of low flow. That, however, is not the entire story. At this stop we will consider the possible role of another mechanism – water consumption by plants that line Kansas waterways.

Phreatophytes are plants that can tap ground water for their water supply when other sources are

not available. These plants, which often make up a large proportion of the zones of vegetation along river corridors (riparian zones) when the water table is within 10 to 15 feet of the land surface, could be contributors to the increasing problem of low flows in central and western Kansas. Phreatophytes have always existed in Kansas, with the cottonwood and willow being the most notable of the native varieties. Over the last several decades, non-native phreatophytes, such as salt cedar and Russian olive, have occupied increasingly larger areas of riparian zones in Kansas, particularly in the western portion of the state.

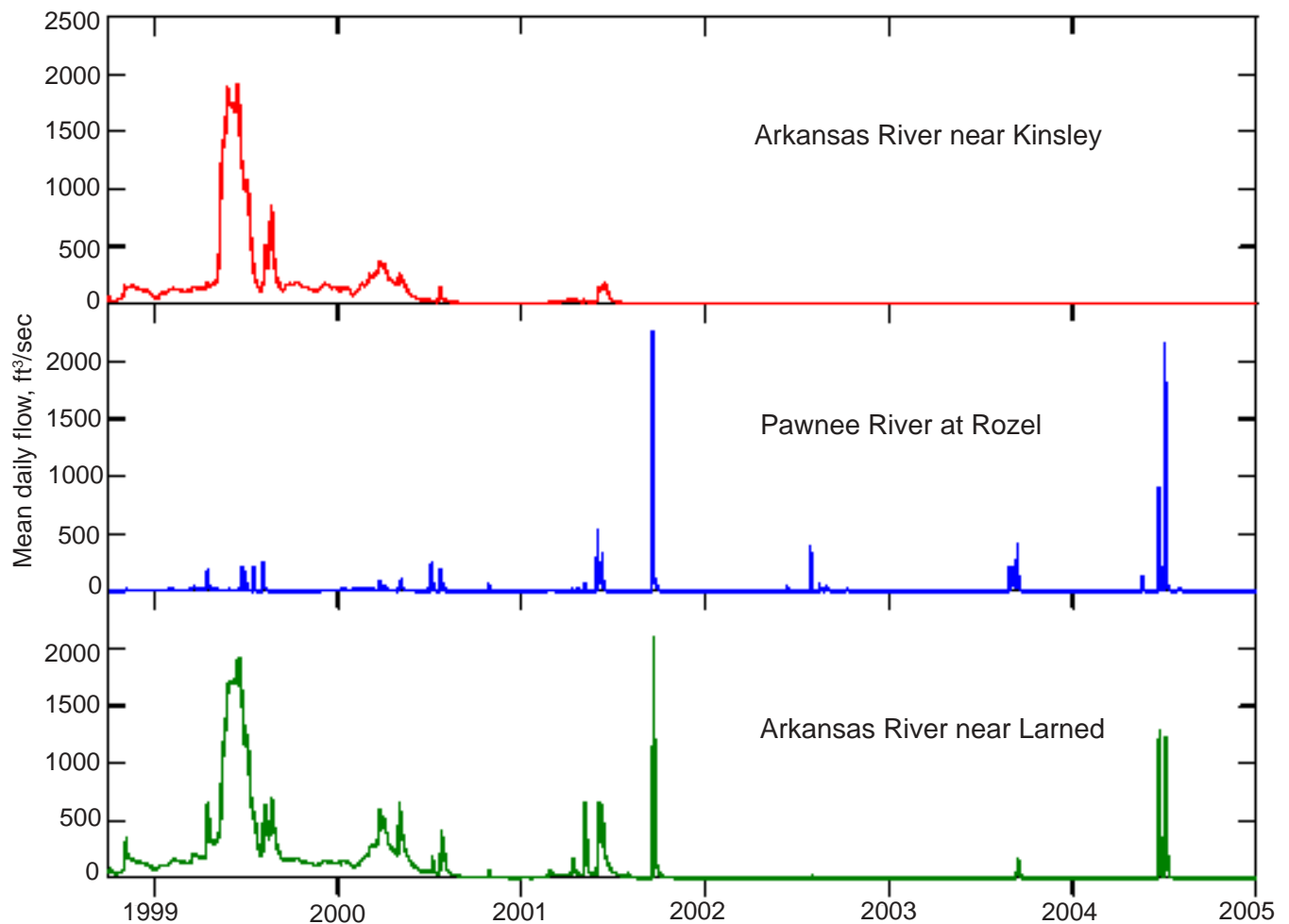


Figure 1 – Mean daily flow of the Arkansas River near Kinsley and Larned, and the Pawnee River at Rozel (see fig. 2 for map of stream-gage locations). Note that there has been essentially no flow at the Kinsley stream gage since mid-summer of 2001, while virtually all of the flow at the Larned stream gage since then has been produced by precipitation in the Pawnee River watershed.

Recently, partly in response to concerns about water consumption, expensive measures for control of the non-native phreatophytes have been advocated for stretches of rivers in western Kansas. However, reliable estimates of the magnitude of ground-water consumption by phreatophytes, its impact on stream-aquifer systems, and the water savings that could possibly be gained from control activities have yet to be obtained. There clearly is a critical need to develop methods that will enable the impact of phreatophyte activity on stream-aquifer systems in

Kansas to be quantified. At this stop, we will discuss how a team of Kansas Geological Survey (KGS) and Kansas State University (KSU) investigators are attempting to address that need.

A cooperative KGS–KSU research project is currently ongoing at the Larned Research Site, which is located along a stretch of the Arkansas River riparian zone near Larned (fig. 2). The major objectives of the KGS–KSU team are to develop practical field methods for identifying and

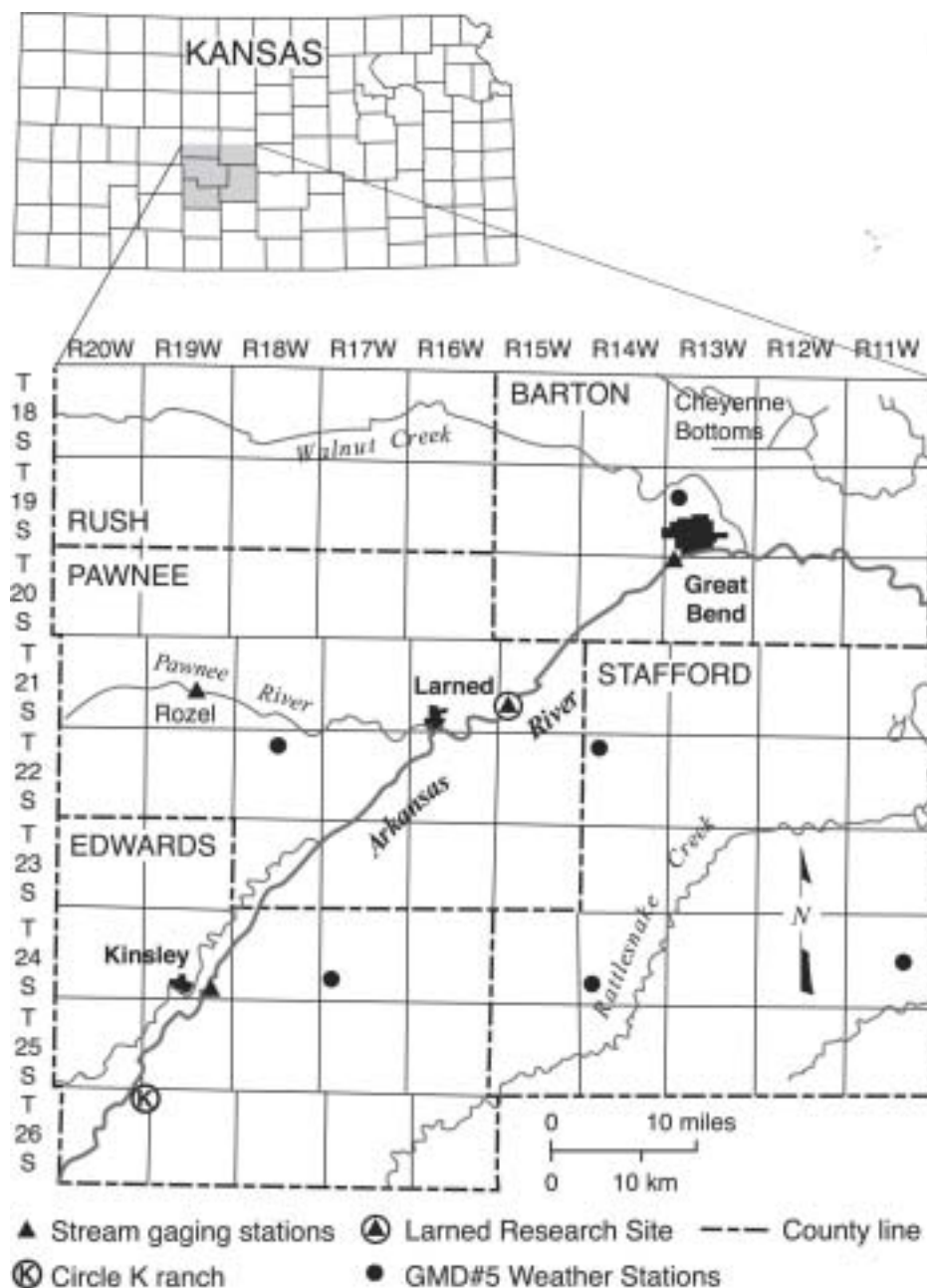


Figure 2 – Map of the Middle Arkansas River subbasin (flow measurements in fig. 1 taken at USGS stream-gaging stations shown on map).

quantifying phreatophyte consumption of ground water, and for assessing the water savings gained by phreatophyte control. These methods are based on a very simple idea—if plants are using ground water as a significant source of their water supply, wells screened across the water table should display daily fluctuations in water-table elevation as a result of the daily pattern of plant water use. These fluctuations should be restricted to wells in the riparian zone and should only occur during the growing season.

Monitoring of water levels at the Larned Research Site over the last three years has clearly revealed such fluctuations in the water table (figs. 3 and 4). Methods for analyzing these fluctuations to estimate the amount of ground water consumed by phreatophytes in the riparian corridor are currently

being refined. Associated research is also being pursued on using these fluctuations as a convenient and low-cost means of assessing the impact of phreatophyte control efforts on water resources. This latter work is being advanced by the KGS–KSU team at the Ashland Research Site, which is located in the riparian zone of the Cimarron River near Ashland in Clark County. At that site, the team is attempting to estimate the water savings achieved through various salt-cedar control measures. The products of the research at the Larned and Ashland sites should be techniques of demonstrated effectiveness for both identifying and quantifying phreatophyte activity. Projects aimed at quantifying phreatophyte activity in other river basins in central and western Kansas are expected to follow from this work.

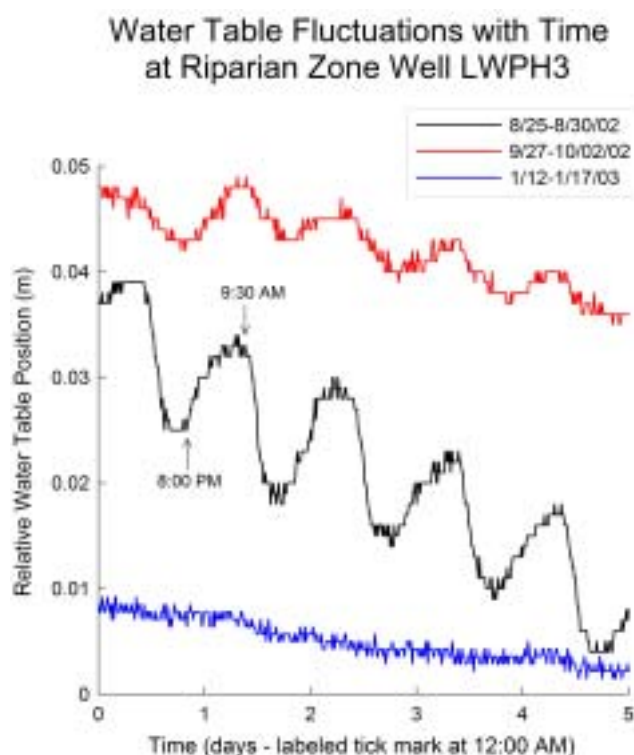


Figure 3 – Water-table fluctuations for three five-day periods in late summer through mid-winter of 2002–03. Water-table position was monitored at a well in a clearing in the riparian zone just west of the Arkansas River channel at the Larned Research Site.

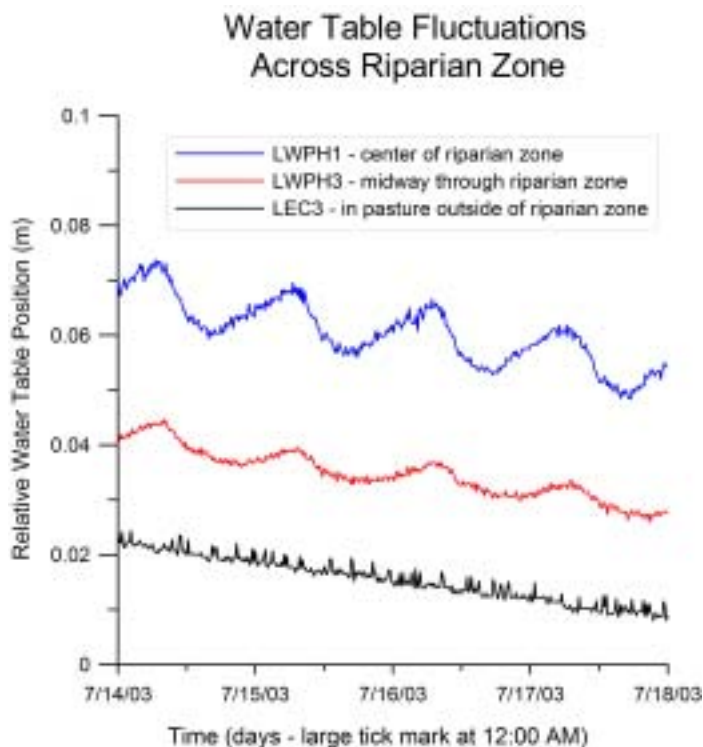


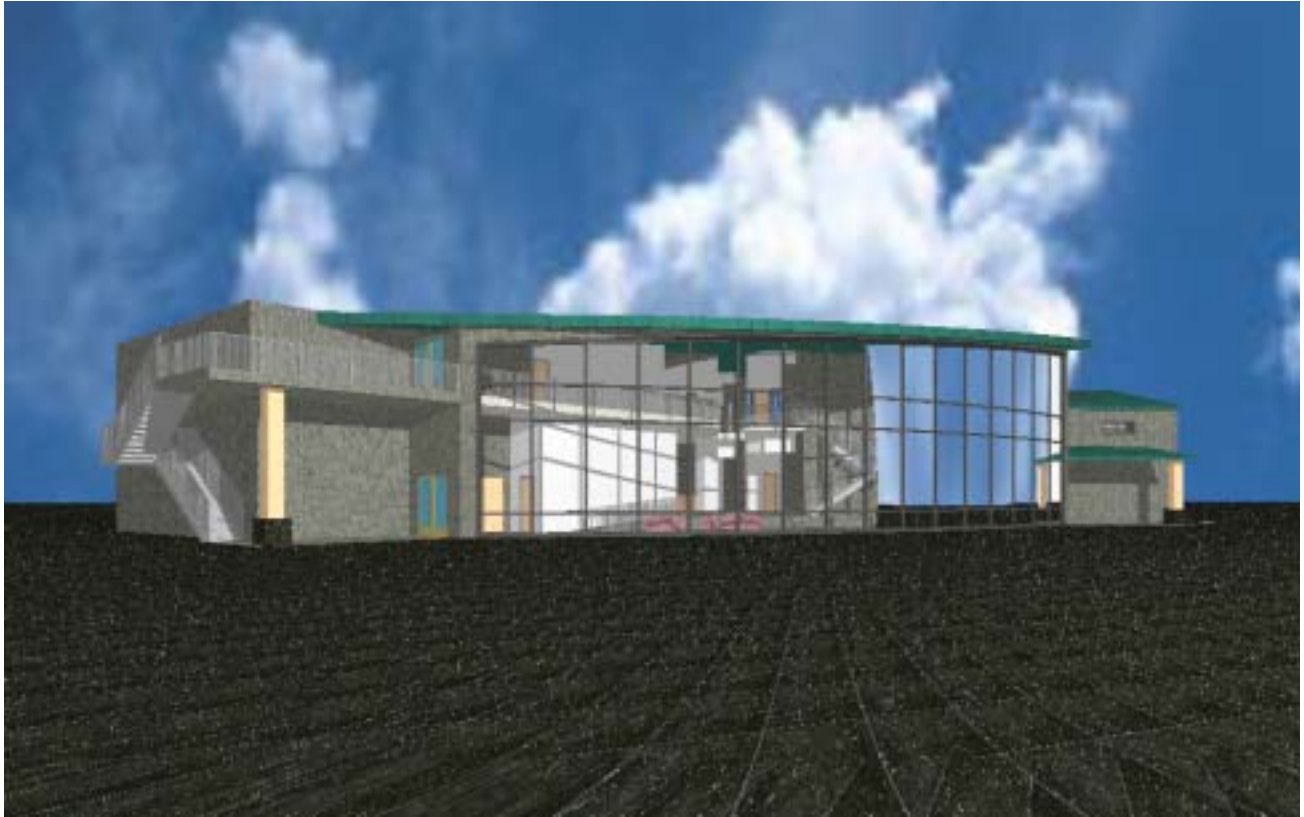
Figure 4 – Water-table fluctuations for four-day period in mid-summer of 2003 for three wells located within and adjacent to the Larned Research Site. Well LWP31 is located in the channel of the Arkansas River, while LWP33 is in a clearing just west of the channel. Well LEC3 is located in the pasture to the east of the riparian zone.

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Kansas Wetlands Educational Center



The creation of the Kansas Wetlands Educational Center at Cheyenne Bottoms in Barton County demonstrates the potential for nature-based tourism in Kansas and is expected to promote the growing importance of the region's natural resources in stimulating tourism.

The Center will interpret the Kansas Departments of Wildlife and Park's Cheyenne Bottoms Wildlife Area, The Nature Conservancy's adjacent Cheyenne Bottoms Preserve, and nearby Quivira National Wildlife Refuge. Based on visitation figures for similar regionally themed centers, the Kansas Wetlands Educational Center could anticipate at least 200,000 visitors in its first year of operation. The Center is projected to open in October 2006.

The facility will have a rooftop star-gazing deck and remote cameras for real-time wildlife viewing from within the building. Nature trails and observation decks will provide bird- and wildlife-viewing opportunities. Visitor programming and interpretation will focus on the theme of motion and

change in a wetland ecosystem involving topics such as bird-migration patterns, seasonal variation, species diversity and richness, and wildlife- and habitat-management practices. Exhibits will inform visitors about the wetlands and the need for conservation practices and also help interpret the wetlands for school groups, civic organizations, and the general public. The Center will offer organized tours, educational programming, literature, and scientific displays.

The \$5 million project includes \$4 million for construction and the creation of exhibits and \$1 million for an endowment to help fund future operations and programming. The Center has already attracted \$2 million in Federal funds for construction. Partners involved in raising additional funds include Fort Hays State University, Kansas Department of Commerce, Kansas Department of Wildlife and Parks, Kansas Department of Transportation, Kansas Wildscape Foundation, The Nature Conservancy, and several communities in the Cheyenne Bottoms area.

Kansas Nature-based Tourism Alliance

The Kansas Nature-based Tourism Alliance is an organization of individuals, businesses, and agencies who have joined forces to create and promote opportunities for people to experience the natural world in Kansas. The Alliance holds regular meetings throughout the state and is currently working to create two highway-based wildlife trails in western Kansas. The Alliance's web site, NaturalKansas.org, is a detailed guide to the best places in the state for wildflower tours, wildlife viewing, birding, hiking, canoeing, and other nature-based tourism opportunities. The Alliance's director is Ken Brunson.

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Kansas Wetlands Educational Center at Cheyenne Bottoms brochure.

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Cheyenne Bottoms



Cheyenne Bottoms is a natural basin lying just northeast of Great Bend near the geographic center of the state. Rimmed by bedrock on three sides, it appears like a bullseye on the geologic map of Kansas. Nearly 30 square miles of the Bottoms 64-square-mile area is a wildlife- management area maintained by the Kansas Department of Wildlife and Parks. Historically, runoff from the natural watershed around Cheyenne Bottoms, about 220 square miles, flowed into the lowest areas, creating an intermittent marsh. Because runoff was relatively low and sporadic, the marsh was likely dry about two years in every five prior to settlement in the late 1800's. During wet periods, it probably increased in size to over 40,000 acres.

The State of Kansas began purchasing land in Cheyenne Bottoms following the passage in 1937 of the Pittman–Robertson Act, which provided Federal aid to states for wildlife restoration. Much of the work to develop the area was done in the 1950's, and Cheyenne Bottoms was dedicated in 1958. The marsh was divided into a series of pools by dikes, and control gates were installed to facilitate water movement into the marsh, between pools, and to the overflow canal. Over the years canals were built to

divert water from the nearby Arkansas River and Walnut Creek into the basin to supplement water provided by two intermittent streams, Blood and Deception creeks. This was done to maintain water levels in the wetlands and secure a habitat for both the indigenous and migratory waterfowl.

Cheyenne Bottoms Wildlife Management Area

The Kansas Department of Wildlife and Parks operates a 19,857-acre wildlife-management area in the southeastern portion of the basin. About 12,000 acres are reliable wetlands.

Through the years, managers of the Bottoms were often frustrated by the cyclical availability of water for the marsh. A multi-million dollar renovation by the Department of Wildlife and Parks in the 1990's, however, substantially enhanced the department's ability to manage water and the marsh on the state-owned portion of the Bottoms.

Renovations and improvements included installation of pumps to facilitate water transfer between pools, division of pools into smaller units,

improvement of dikes to allow water to be stored in deeper pools, and installation of water-measurement devices. These improvements were designed to assure some water would be available in storage at all times so that at least 3,000 acres of wetlands could be maintained.

This renovation effort also provided increased water conservation to better meet wildlife needs during dry periods. Manipulation of water levels in the pools is a major tool in managing the marsh for water birds. Each year, one or more of the pools is drained as deemed necessary. Often these areas are seeded to millet and/or wheat and undesirable vegetation is controlled by burning, mowing, and disking while the pools are dry.

The Nature Conservancy's Cheyenne Bottoms Preserve

The Nature Conservancy—a private, nonprofit, conservation organization—owns and manages 7,300 acres in the northwest portion of Cheyenne Bottoms. It began purchasing marshland in the area in 1990, with the intent of restoring the wetland hydrology and native grasslands to their original state for the benefit of the wildlife. The Conservancy recognizes that during most of the year, the marsh is completely dry, and manages the wetlands in that manner. In contrast, the State's portion of the Bottoms is characterized by deeper pools, managed water levels, and supplementing the natural water supply to the Bottoms with outside water sources. Wildlife and Parks and the Conservancy work closely together at Cheyenne Bottoms to ensure the different management techniques are complementary.

To achieve the Conservancy's restoration goals, three main priorities have been established. First, the original hydrology of the area is to be restored to the extent possible by plugging the drainage systems put in place in the past for agricultural purposes. Second, the site is to be made more accessible to the public, especially for educational purposes. Third, the ability to manage the grazing activities necessary to maintain the birds' preferred habitat conditions must be improved by mimicking the effect bison had on the habitat.

If the grassland were not grazed to keep the height of the grass down, many of the shorebirds

would not use the habitat. Replicating the impact of bison, the Conservancy uses controlled rotational livestock grazing management as an effective and inexpensive way to alter the plants and soil conditions in the wetlands. That is why the Conservancy is building fences to keep cattle on the preserve rather than to keep them off.

The Conservancy also addresses another problem that plagues Cheyenne Bottoms—the invasion of non-native plants, mainly musk thistle, salt cedar, and Russian olive. These plants compete for sunlight, soil, and water resources, to the detriment of native species. The Conservancy believes the most cost-effective and environmentally benign way to remove these invaders is by hand.

Wildlife

The U.S. Fish and Wildlife Service has designated Cheyenne Bottoms as a critical habitat area for endangered wildlife species. The International Shorebird Survey, conducted by Manomet Bird Observatory in Massachusetts, concluded that of the 200 wetlands studied, Cheyenne Bottoms is the top shorebird staging area during migration in the 48 contiguous states. It attracts almost half of the entire populations of North American shorebirds whose path of migration is east of the Rockies. Some 320 species of birds frequent Cheyenne Bottoms, including the endangered whooping crane, bald eagle, peregrine falcon, least tern, and piping plover.

In addition, the area is home to raccoons, deer, beavers, muskrats, and mink as well as a variety of reptiles and amphibians.

Because Cheyenne Bottoms is such a diverse, large, and unique marsh, bird watching is one of the more popular activities on the area. The spring and fall migration periods offer the best opportunity to view large numbers of different species in this one location. In spring, waterfowl and sandhill cranes can begin arriving as early as February. Wading birds, such as herons and egrets, begin arriving in March and April. Most shorebirds arrive in late April and early May. By late May, the birds that are still present on the area will tend to remain and nest.

The fall shorebird migration can begin as early as July and extend well into September and October. The peak period for duck viewing in the fall occurs early to mid-October. Most wading birds remain on the area until the marsh freezes. This is especially true for the great blue heron. Whooping cranes are most apt to stop at Cheyenne Bottoms in late October into early November. Bald eagles winter on the area and are present from as early as November to as late as March.

Hunting is allowed in Cheyenne Bottoms Wildlife Area except in the refuge areas. In addition to waterfowl, other game may be legally taken at Cheyenne Bottoms, including pheasant, snipe, rail, quail, and deer. In the event of whooping crane activity, the pool the birds are in is closed to all hunting, and the goose hunting zones are closed to crane and light goose hunting.

Fishing at Cheyenne Bottoms is limited, for the most part, to carp and bullheads. Occasional catches of channel cat, crappie, and bass are made after several continuous years with water on the area. Trapping is permitted on the State wildlife area. A special permit is required. Trapping is not permitted at any time in the refuge area or during the waterfowl season.

Geology

The origin of Cheyenne Bottoms has long been debated among geologists. Erasmus Haworth of the early Kansas Geological Survey speculated in 1897 that stream erosion had carved out the elliptical hole in the bedrock. In 1901, W. D. Johnson of the U.S. Geological Survey postulated that dissolution of underground salt beds and subsequent collapse of overlying rocks created the basin. In the 1950's Bruce Latta of the Kansas Geological Survey advanced both processes as an explanation for Cheyenne Bottom's current surface expression.

Charles Bayne of the KGS did a study in the 1970's to determine whether the origin of Cheyenne Bottoms could be attributed to solution of salt and collapse, as Johnson and Latta had theorized, or to structural movement. The only subsurface evaporite sequence thick enough to support the amount of solution necessary to cause collapse was the Hutchinson Salt Member of the Wellington

Formation. However, by interpreting oil-and-gas well logs and constructing contour maps of subsurface rock layers, Bayne discovered that structural features associated with the basin were found at depths below the Hutchinson salt. If collapse had caused the basin, no structural changes would have been found below the salt. Therefore, he attributed the formation of Cheyenne Bottoms to structural movement.

Bayne's data show that the structural movement occurred after the deposition of the Greenhorn Limestone and before the basin was modified by erosion in the early Pleistocene time. This led him to conclude the movement occurred between the early Late Cretaceous (80 million years ago) and the late Pliocene (1.8 million years ago).

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SCHEDULE & ITINERARY

Friday June 10, 2005

7:00 am	Breakfast at the Best Western Angus Inn
8:00 am	Bus Leaves Best Western for Site 7
9:15 am	SITE 7 —Fencepost Limestone Quarry, Lincoln County, KS <i>Duane Vonada</i> , Vonada Stone Company
10:00 am	Bus to Lucas
10:15 am	Grassroots Art Center, Lucas
10:45 am	Bus to Site 8
11:00 am	SITE 8 —Wilson Lake, Russell County, KS Russell–Hays Water Supply <i>Gary Hobbie</i> , City of Russell Development on Lakes and Reservoirs <i>Earl Lewis</i> , Kansas Water Office
11:45 am	Bus to Hays via Scenic Drive
12:45 pm	Arrive Holiday Inn, Hays

Post-rock Country



In the late-eighteenth and early nineteenth centuries, limestone in sparsely timbered north-central Kansas was quarried for fenceposts as well as houses, businesses, churches, schools, and bridges. The best-suited stone, the top layer of the Greenhorn Limestone formation, also turned out to be the most convenient. Known as the Fencepost limestone, this layer was located directly under the topsoil, usually between a few inches and several feet deep, or exposed in ravines or on hillsides. Because the Fencepost layer extended in large slabs for many miles, was usually eight to twelve inches thick, and had few cracks and joints, it was ideal for making the five-to-six-foot long posts. Although extensive quarrying of the limestone eventually went out of favor as cheaper and lighter-weight materials became accessible, rows of post-rock fences and turn-of-the-century limestone buildings can still be seen throughout the region.

Post-rock country stretches about 200 miles from the Nebraska border in Washington County to a few miles north of Dodge City and covers about 5,000 square miles or more than 3 million acres. East to

west the boundaries range from less than ten miles to approximately 40 miles with Interstate 70 jogging through about 60 miles of it. Fencepost limestone outcrops are found in Republic, Jewell, Osborne, Mitchell, Cloud, Ottawa, Lincoln, Russell, Ellis, Ness, Rush, Barton, Ellsworth, Pawnee, and Hodgeman counties and are located almost exclusively within the Smoky Hills physiographic region. Just west of post-rock country a less-durable rock unit known as the Fort Hays limestone, which resembles the Fencepost limestone in texture, has been quarried to some extent for posts. This makes the western edge of the post-rock area hard to define.

In addition to migrants from the eastern United States, a substantial number of European immigrants—mainly Germans and Volga Germans along with Scandinavians, Czechs, Swedes, Norwegians, and Danes—moved into the area starting in the 1870's. Nearly every community had stoneworkers who could offer services and advice. By the mid-1880's stone posts were being used throughout north-central Kansas. In combination with newly invented barbed wire, the limestone

fencepost played an important role in the agricultural development of the area. Barbed-wire became legally sanctioned in Kansas in 1883 and was used almost exclusively by 1890. Stone posts around that time could often be bought for five to thirty-five cents each. In at least one instance, the thirty-five cents price included delivery up to four miles.

By the 1920's, the stone industry was in decline. Quarrying stone was time-consuming, the rock was heavy—fence posts could weigh 350 to 400 pounds each—and improved transportation made cheaper building materials readily available. In the 1930's a brief quarrying surge swept through the area because of the lack of financial resources during the Depression. This was particularly evident in the use of native stone in many WPA projects. By the 1940's, however, production in the area was scarce.

Geology

The rocks of the Smoky Hills include, from bottom to top, oldest to youngest, the brightly colored clays, siltstones, and sandstones of the Dakota Formation; a thin interval of gray shale known as the Graneros Shale; the Greenhorn Limestone topped by the Fencepost bed; and at least

the lower part of the Carlile Shale. These rocks were deposited during the Cretaceous Period.

Rocks in the Dakota Formation, well exposed in the eastern Smoky Hills, were deposited about a hundred million years ago near the edge of the sea. They contain fossil remains of land plants—some strikingly similar to the modern magnolia, sassafras, fig, willow, and conifer. Layers in the Greenhorn Limestone, exposed in the western Smoky Hills in post-rock country, on the other hand, were deposited in a broad, shallow sea that flooded over the Dakota deposits. Topped off by the Fencepost limestone bed, the Greenhorn Limestone consists of a series of thinly laminated beds of shaly chalk, chalk, chalky limestone, and bentonite. It contains many fossils, including clams, worm burrows, ammonites, fish remains, and sharks' teeth. The most common clam, *Inoceramus*, is abundant and readily seen in the Fencepost limestone.

Reference

Muilenberg, G. and Swineford, A., 1975, *Land of the Post Rock: Its Origins, History, and People*: University Press of Kansas.

Fencepost Limestone Quarry



The Vonada Stone Company, founded by the Vonada family, is located on a working third-generation family farm a few miles north of Sylvan Grove. Although today most limestone is quarried and split with power saws, the Vonada Company splits the local Fencepost limestone it quarries using the traditional feather-and-wedge method.

The feather-and-wedge method made quarrying the rock feasible before power tools were invented. Tools used in the quarrying and shaping process include feathers and wedges (plugs), stone drills and bits of various types, chisels, stone hammers, slips and scrapers, and scribes. To quarry the rock the soil overlay is removed, holes are drilled in the rock layer about eight to ten inches apart, and the feathers and wedges are driven into the drilled holes, causing the rock to split. The posts can be shaped easily with drill and hammer while still soft. After prolonged exposure to the air, the rock hardens into a durable building material.

A large portion of the company's orders are custom-engraved stone posts used for decoration, mailbox posts, and signs. Other custom products include benches, birdbaths, fountains, mounted statuary, headstones, and sundials.

Sources

Vonada Stone Company
www.vonadastone.com

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Resource Contact

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Grassroots Art Center in Lucas

Lucas, Kansas, was a natural choice for a center celebrating grassroots art. A farming community of just over 400 people, Lucas has had more than its share of prolific grassroots artists during the twentieth century. The Grassroots Art Center, opened in 1995, occupies three turn-of-the-century native limestone buildings on Main Street. It exhibits an extensive collection of work by Ed Root, a farmer from south of Lucas who created hundreds of concrete shapes embellished with glass, stones, and metal. More than 100 pieces of Root's works were moved and preserved before his home was inundated by Wilson Lake. The Center's collection also includes wood carvings by Glenn Stark, Warren Lingg, and Lawrence Reynolds, stone carvings by Inez Marshall of Portis, metal totems by M. T. Liggett of Mullinville, a painted environment by Leroy Wilson, aluminum pull-tab sculptures by Herman Divers, and the imaginative machines of Earl Slagle.

By its nature grassroots art is difficult to define. It encompasses diverse works made by people with no formal artistic training using ordinary materials—from concrete to cigarette wrappers—in extraordinary ways. Many people classified by others as grassroots artists don't even consider themselves artists. They merely are seeking creative ways to express themselves and their overt opinions—often political or religious. Unlike trained, professional artists, grassroots artists are not trying to make money. Unlike folk artists, grassroots artists don't build upon styles and standards established by communities and passed down from generation to generation. Although grassroots artists do tend to be highly individualistic and eccentric, they still almost always work within a community. And because their work tends to be large and environmental, it is there for everyone to see. The grassroots artists' goal, however, is self satisfaction, not community appreciation.

Grassroots art environments tend to be ephemeral, with 90 percent of the sites destroyed at the death of the maker. In Lucas two out of four sites—S. P. Dinsmoor's Garden of Eden and Florence Deeble's Rock Garden—have survived.

Samuel Perry Dinsmoor, a retired schoolteacher, Civil War veteran, farmer, and Populist politician,

began building the Garden of Eden and Cabin Home in 1907 at the age of 64. Over 22 years he fashioned 113 tons (2,273 sacks) of cement and many tons of limestone into his unique "log" cabin—built of Fencepost limestone—with its surrounding sculptures. Among the 50 sculptures in his Garden of Eden are Adam and Eve and an octopus shielded by the American flag depicting monopolies. He opened his home to guests, conducting tours on the first floor and through the yard from 1907 until a few years before his death in 1932. Now owned and operated by a group formed to preserve it, the site is listed in the National Register of Historic Places and welcomes more than 10,000 visitors annually.

Florence Deeble was a child watching with curiosity as S. P. Dinsmoor built up his Garden of Eden in Lucas. When she retired after a career as a high-school English and history teacher, she began constructing her own grassroots environment of colored concrete scenes around her home.

The two other Lucas grassroots environments now gone are Ed Root's inundated home and Miller Park, a re-creation of the Rocky Mountains on the west side of town that was dismantled in the 1960's.

The Grassroots Art Center exhibits and promotes the work of self-taught artists and offers tours, outreach classes, concerts, and lectures. The Kansas Grassroots Art Association (KGAA) served as a mentor to the Grassroots Art Center in developing its mission, facilities, and exhibits. KGAA, a nonprofit organization incorporated in 1974, is dedicated to documenting and preserving grassroots art. Thanks in large part to the Center and KGAA, Kansas ranks third among the states in the number of grassroots art sites after Wisconsin and California.

Sources

Grassroots Arts Center
213 S. Main St.
Lucas, KS 67648
785-525-6118
www.grassrootsart.net

Brackman, B., and Dwigans, C., 1999, *Backard Visionaries: Grassroots Art in the Midwest*: University Press of Kansas

Wilson Lake



Wilson Dam and Reservoir were authorized by the Flood Control Act of 1944 as an irrigation and flood-control unit and were assigned to the U.S. Bureau of Reclamation for construction and operation. However, based on the project's predominant flood-control component, the project was transferred by Congress in 1956 to the U.S. Army Corps of Engineers, which planned, designed, and built the dam and reservoir. Because of the high salt content from the Saline River, the use of Wilson Lake water for drinking and irrigation have been restricted. Construction of the dam was started in 1960, and the reservoir was completed in 1966.

Today the Corps of Engineers operates Wilson to provide flood-damage reduction, recreation, fish and wildlife management, and downstream water-quality improvement. It manages the 9,000 surface acres of water and an additional 13,000 acres of land surrounding Wilson Lake, including Minooka, Lucas, and Sylvan parks and 3,200 acres of native prairie and cropland for wildlife. The agricultural leasing program leases tracts of public land to

farmers who incorporate specific wildlife-management practices in their farming.

The Kansas Department of Wildlife and Parks leases 945 acres from the Corps of Engineers for Wilson State Park, a public recreation area. The State Park is located on the south side of Wilson Lake and consists of the Hell Creek and Otoe Park areas. Wildlife and Parks also oversees the nearly 8,000-acre Wilson Wildlife Area using methods such as food plots, controlled burns, rotational grazing, forb management, tree and shrub plantings, and an agricultural lease program. It also manages the lakes fish populations. Fisheries management activities include fish sampling, creel surveys, habitat work, aquatic-vegetation enhancement, and stocking. The public opportunities resulting from these endeavors include sportsman's fishing, wildlife viewing, and limited hunting.

Wilson Dam is rolled earthfill. It is 5,600 feet long and 160 feet high (above stream bed) with a 1,750-foot-wide base and 40-foot-wide crown. It was

completed in 1964 at a cost of \$20 million. Since then, the lake has saved an estimated \$1.4 billion in property damage downstream.

The reservoir's initial storage was 531,000 acre-feet for flood control and 248,000 acre-feet for conservation. It has a surface area of 9,000 acres, a drainage area of 1,917 square miles, and a 100-mile shoreline.

Geology

Some of the best spots to see the top four formations found in the Smoky Hills are in roadcuts along Wilson Lake's north and south shore roads. They provide a good view from bottom to top of the Dakota Formation, Graneros Shale, Greenhorn Limestone, and at least the lower portion of Carlile Shale.

The Dakota Formation exposed at Wilson Lake is a good source of fossils dating back to the Cretaceous Era, approximately 80 million years ago. Fossils from the area include a variety of plant material, large ammonites, and sharks' teeth. The most notable areas for fossil remains within the project area are along Southshore Drive, near the dam spillway, and north of Bunker Hill. Fossilized remains probably from the armored dinosaur *Silvisaurus* were discovered in the Dakota Formation at Wilson Lake and are currently on display at the Sternberg Museum of Natural History in Hays. Overlying the Dakota sandstone is the Graneros Shale, which consists of medium-gray to dark-gray shales that weather to gray or yellow-brown and a few thin sandstone beds. Fossils in the lower Graneros are mainly brachiopods that lived in brackish water while the upper layers contain marine fossils, including ammonites. Above the Graneros Shale is the Greenhorn Limestone which includes the

Fencepost limestone bed. The Fairport Chalk Member of the Carlile Shale overlies the Greenhorn Limestone. Like the Fencepost limestone bed, the Carlile Shale contains the clam *Inoceramus*.

Miles of stone fenceposts from the locally quarried Fencepost limestone layer can be seen throughout the Wilson Lake area. The communities and countryside surrounding the lake also have many interesting Fencepost limestone schools, churches, homes, barns, businesses, jails, and bridges.

Sources

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Liggett, Gregory A., 2005, A review of Kansas dinosaurs: Transactions of the Kansas Academy of Science, v. 108, no. 1/2, p. 174.

U.S. Army Corps of Engineers
www.nwk.usace.army.mil/wilson/wilson_home.htm

U.S. Army Corps of Engineers Wilson Dam and Reservoir brochures

Resource Contacts

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Russell/Hays Regional Water Supply

Russell and Hays have pursued a number of water-supply options in the past decades, including wells in the Dakota aquifer, water rights in Cedar Bluff Reservoir, and the Circle K Ranch. Other sources have been studied, including the Ogallala aquifer in Graham, Trego, and Rooks counties; ground-water supplies near Great Bend and along the Pawnee River and Wet Walnut Creek; and Waconda, Wilson, Kanopolis, and Cedar Bluff lakes.

Russell and Hays have recognized that they are linked in the management of water—they use the same hydrologic system—and must think regionally to maximize present resources. The current perception of a water-supply shortage is a major issue in the region.

Water treatment is the City of Russell's main concern. The current water-treatment plant is limited in capacity, and Russell needs the ability to treat lower-quality water. Upgrades to the existing plant and construction of a new plant that treats lower-quality water is scheduled to start in the spring of 2006. Russell also works cooperatively with the City of Hays to coordinate management of the Smoky Hill River system between Cedar Bluff and the Pfeiffer well field.

The City of Hays' main concern is management of the Smoky Hill and Big Creek ground-water supply sources. Hays' continuing conservation campaign focused on billing rates and water restrictions has reduced demand by 30%. The City has an adequate water supply for the next 20 years with a 2% annual growth rate in water usage, assuming all current factors remain unchanged.

Wilson Lake as a Future Water Source

Wilson Lake was originally authorized for construction by the Bureau of Reclamation for the

purposes of irrigation, navigation enhancement, flood control, recreation, fish and wildlife habitat, and water-quality assurance. Because of the impounded waters' naturally occurring high salinity, irrigation from the lake was impractical, so the construction and operation of the lake was transferred to the Corps of Engineers. In addition, because of Wilson Lake's distance to the Missouri River, navigation is no longer a specific consideration. Thus, storage capacity that had previously been planned for irrigation and navigation purposes is potentially available as a regional water supply. Reallocation of water from Wilson Lake into the State water-marketing program would secure additional water for the region.

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Kansas Water Office, November 2004, Wilson Lake Yield Analysis Report: http://www.kwo.org/Reports%20&%20Publications/wilson_yield_analysis.htm

Resource Contacts

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Economic Development Opportunities at Kansas Lakes and Reservoirs

Kansas has 26 Federal reservoirs that provide many beneficial uses, including flood control, increased water quality, recreation, and public water supply. These reservoirs also have a direct and positive impact on the Kansas economy. Recreational activities such as boating, fishing, hiking, and sight-seeing are in high demand. Admission to parks managed by the Kansas Department of Wildlife and Parks at Federal reservoirs is one of the leading producers of recreation revenue in the state. Local economies benefit from sales of materials and equipment used by reservoir visitors.

Development opportunities are currently restricted by Federal policies limiting access to property close to the shoreline. Public use of land immediately adjacent to reservoirs is generally limited to State Parks and wildlife areas. Because the reservoirs are designed for flood control, shoreline development is not practical, but property offering a lake view is desirable. The demand for lakefront property is led by retirement-age Kansans who might otherwise leave the state to live on or near the water.

In 1989, legislation was passed by the Kansas Legislature to allow resorts to be developed at Federal reservoirs; however, no development has occurred under these provisions. Spotty developments have sprung up in areas surrounding a few Federal reservoirs in Kansas, but without any specific allowance for access through the Corps of Engineers property or State Parks. These are often a mixture of individually owned homes and traditional planned residential developments.

Development interests extend to other lakes in Kansas as well. Private lakes and lakes owned by cities and counties have extensive residential development on their shores. Most of these have no defined approach to promote development and protect water resources.

The primary policy considerations facing the State are whether to support and promote development around lakes and reservoirs and, if so,

how to allow development to proceed while maintaining primary lake uses (flood control, public water supply, water quality, and public access). Some of the primary issues to be considered include:

- Preserving the “natural” attributes of lakes while allowing residential and resort development.
- Creating access to lakes and reservoirs from residential developments while maintaining access to lakes via current and new State Parks.
- Finding ways for homeowners and businesses benefiting from the lake to pay for its protection and maintenance.
- Determining where and what types of development should be around lakes and reservoirs, paying particular attention to its impact on the use of wildlife areas.
- Creating standards for density, drainage, and transportation access and finding the proper mechanism for enforcing them.
- Preserving current water quality as development increases (no-net pollutant load increases).
- Dealing with the expectations of recreational users when flood-control demands, drought, or other natural causes affect lake levels.
- Balancing the interests of home owners, farmers, ranchers, other local residents, anglers, hunters, and other lake users.
- Determining what, if any, economic incentives the State should provide to encourage development.
- Changing the ownership of reservoirs and lakes to facilitate their use for other purposes, including the conversion of some current public land for private development.

Several State agencies are preparing a report to the Kansas Water Authority that will be submitted in June 2005. The Department of Commerce is studying expected demand for shoreline development and available economic tools and provisions needed to encourage development at lakes and reservoirs; the Kansas Water Office will conduct background research on State and Federal policies that impact lake development; the Kansas Department of Wildlife and Parks will provide

information on development and access issues which involve State Parks; and the Department of Health and Environment will participate by providing information relevant to their role in water-quality protection.

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