



Unit 9) Wetlands

Wetlands provide significant ecological, economic, and social benefits. They provide many environmental functions that would be costly and difficult to replicate with man-made systems. Many wetlands offer income from products harvested there, such as hay or timber, or fees collected from those who visit wetlands. Wetlands provide places for hunting, fishing, bird watching, photography, and other recreational activities. Over 90 percent of the wetlands in Kansas are found on private property. State and federal agencies own or control 28,766 acres of wetlands in Kansas.

"Nature does nothing uselessly."

Aristotle, Greek philosopher, 4th century B.C.

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WETLAND WORDS

Hydro – from an Ancient Greek prefix meaning "water."

Hydrologic regime – when and how a wetland receives water.

Hydrophytes – water-tolerant plants found in wetlands.

Hydric – contains little or no oxygen.

Wetlands are very different from Kansas' other biomes. They are transition areas that lie between terrestrial and aquatic ecosystems. Three characteristics—hydrologic regime, hydrophytes, and hydric soils—are the criteria generally used to determine if an area is a wetland. These criteria all contain the root word *hydro*, which is Greek for water. "Hydrologic regime" refers to when and how a wetland receives water. A wetland has standing water or wet soils during at least part of the growing season of most years. These wet conditions hinder the growth of plants that are not adapted to wet conditions and causes the vegetation to change to water-tolerant plants called "hydrophytes." Common hydrophytes include cattails, bulrushes, sedges, saltgrass, willows, and cottonwoods. The standing water also causes the soil chemistry and soil bacteria to adapt and become "hydric," which means that the soil contains little or no oxygen.

Cattails

Source: USDA NRCS



KANSAS WETLANDS

"The marsh, to him who enters it in a receptive mood, holds, besides mosquitoes and stagnation, melody, the mystery of unknown waters, and the sweetness of Nature undisturbed by man."

Charles William Beebe, ornithologist, explorer, and author

There are four main types of wetlands located in Kansas: forested wetlands, shallow freshwater marshes, flooded basins or playa lakes, and wet meadows.

KANSAS WETLANDS

Forested wetlands – also known as riparian forests; generally located in temporarily flooded areas or shallow depressions that provide water to support tree species.

Shallow freshwater marshes – found in distinct depressions or around the perimeter of deep water; soils are saturated and there is usually standing water for extended periods.

Flooded basins – also called playa lakes; naturally occurring shallow depressions or sinkholes that hold water during wet years but may be dry at other times.

Wet meadows – lowland prairies that do not drain well; soils stay saturated even though standing water is only present for short periods of time.

FORESTED WETLANDS

A forested wetland supports many tree species. These wetlands are generally located in temporarily flooded areas or in shallow depressions. Often forested wetlands are adjacent to other types of wetlands. The soils are moist enough to support tree species that are absent in the adjacent uplands due to the lack of water there. Tree species that are commonly found in forested wetlands are cottonwood, green ash, pin oak, black willow, and hackberry. Cattails and smartweed are also well adapted to these areas. Forested wetlands provide habitat for black-winged damselflies, salamanders, gray tree frogs, wood ducks, raccoons, white-tailed deer, crayfish, and crayfish snakes. Most of the small wetlands in eastern Kansas are good examples of forested wetlands.



Barred Tiger Salamander

Credit: Bob Gress, GPNC



Wood Duck

Credit: Kayleigh Bitter



White-tailed Deer

Credit: Cheryl Payton, USACE

SHALLOW FRESHWATER MARSHES

A shallow freshwater marsh is found in distinct depressions or around the perimeter of deepwater habitats. The soils are saturated and there is often standing water for extended periods of time. Plant life is dominated by emergent species that are rooted in the soil but

have stems and leaves growing above the water, such as grass, arrowhead, cattails, spikerushes, and bulrushes. Submergent plant species, those that grow underwater except for the flowers, may be present if there is adequate standing water for their survival. The Marais des Cygnes and Neosho wildlife areas in Kansas are good examples of shallow freshwater marshes.



Source: USDA NRCS

FLOODED BASINS

Flooded basins are most commonly called playa lakes in Kansas. They are naturally occurring shallow depressions or sinkholes, occasionally referred to as buffalo wallows. Playa lakes usually contain a layer of clay which helps with water holding capacity. During wet years, they support perennial wetland plants such as spikerush and cattails. During dry years, they support annual wetland plants such as smartweed and barnyard grass. Kansas is home to approximately 10,250 playa lakes, found primarily in the western half of Kansas. Over 99 percent of the playa lakes in Kansas are privately owned. These wetlands are very important to Kansas because scientists have gathered data that suggests playa lakes are the primary source of recharge for the Ogallala Aquifer.

LAKE LOUISE

Vance and Louise Ehmke, Healy, own the largest playa lake in Lane County. The 172-acre wetland, affectionately called Lake Louise, fills with water about once every 20 years.

On a rise south of the wetland, the Kansas State Historical Society has found evidence of 11 different native cultures—going back 10,000 years—who camped near the wetland to hunt there.



Credit: Louise Ehmke



Source: USFWS, Wetlands Mapper

WET MEADOWS

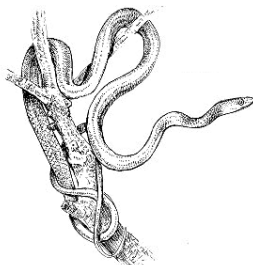
Wet meadows are lowland prairies that do not drain well; therefore, the soils remain saturated most of the year. Standing water is usually present for only short periods during the growing season.

Soils in wet meadows have a high clay content and are usually very rich in organic matter or saturated sands. Plants that grow well in wet meadows include foxtail, prairie cordgrass, eastern gamagrass, and sedges. Very few trees are adapted to grow in wet meadows. Animals that make their homes in wet meadows include crayfish, crayfish frogs, killdeer, common snipe, pectoral sandpipers, and rodents, which in turn attract snakes such as ribbon snakes, garter snakes, and massasauga rattlesnakes. Kansas wet meadow examples include road ditches, pond areas, retention basins that catch runoff water, and edges of larger wetland areas.



Killdeer

Credit: Kendra Goering



Rough Green Snake

Credit: Bob Savannah, USFWS

OTHER WETLANDS

Other types of wetlands, some of which may be found in Kansas, include salt marshes, streambed wetlands, groundwater seeps, prairie potholes, swamps, tidal marshes, montane wetlands, fens and bogs (peat forming), vernal pools, and rainforest wetlands.

THE IMPORTANCE OF WETLANDS

“Human subtlety will never devise an invention more beautiful, more simple, or more direct than does Nature, because of her inventions, nothing is lacking and nothing is superfluous.”

Leonardo da Vinci, 15th century Italian engineer, painter, and sculptor

ENVIRONMENTAL BENEFITS

Wetlands provide many ecological and environmental benefits. Wetlands provide habitat for one-half of the fish, one-third of the birds, one-fourth of the plants, and one-sixth of the mammals on the U.S. Threatened and Endangered Species lists. Kansas wetlands provide a crucial stopover for migrating birds in the Central Flyway of North America. The migratory birds can sometimes fly thousands of miles with little or no rest and use energy from stored body fat. When their fat reserves are depleted, the birds stop to rest and replenish their energy at wetland areas such as Cheyenne Bottoms and Quivira National Wildlife Refuge, both recognized as wetlands of international



Whooping Crane

Credit: Bob Gress, GPNP

WETLANDS FACT

Wetlands provide habitat for one-half of the fish, one-third of the birds, one-fourth of the plants, and one-sixth of the mammals on the United States' Threatened and Endangered Species lists.

importance. The wetlands are on the list of international importance not only because of the resting area and food supply they offer, but because they are extremely important to the life cycle of migratory birds since 75 percent of all waterfowl breed only in wetlands.

Wetlands also provide flood protection and improve water quality. The roots of wetland plants bind soil and water together to help protect water resources and surrounding lands from floodwaters. Often called natural sponges, wetlands absorb water during heavy rainfall, then slowly release it downstream. This process protects adjoining areas from flooding and protects the soil from eroding and washing away. Wetlands also serve as buffers between streambanks and water bodies. This buffer area helps improve water quality by absorbing and filtering nutrients, suspended materials, and other pollutants from the water before it gets to the stream or lake.



American Avocet

Credit: Bob Hines, USFWS



Canada Goose

Credit: Ken Hammond, USDA

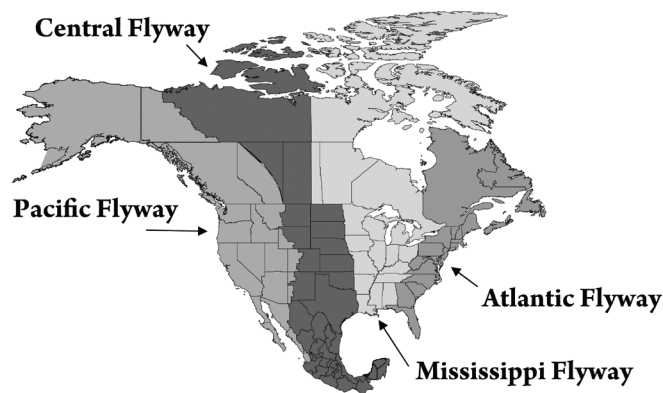
KANSAS WETLANDS OF INTERNATIONAL IMPORTANCE

Cheyenne Bottoms, including both the state-owned Cheyenne Bottoms Wildlife Area and The Nature Conservancy's Cheyenne Bottoms Preserve, was designated as a Wetland of International Importance in 1988. It was the first non-federal area in the United States to receive this recognition. Cheyenne Bottoms is located in Barton County.

In 2002, **Quivira National Wildlife Refuge** was designated as a Wetland of International Importance. Quivira National Wildlife Refuge is located in Stafford County.

In the United States, only 22 sites have been recognized as Wetlands of International Importance.

NORTH AMERICAN MIGRATORY BIRD FLYWAYS



Source: USDA

Wetlands

Wetlands provide environmental benefits beyond soil and water quality. Wetland plant communities store excess carbon within the plants and soil instead of releasing it into the atmosphere as carbon dioxide. This process is called carbon sequestration.

ECONOMIC BENEFITS

Wetland areas have provided many economic opportunities in Kansas. Before the availability of oil and gas, peat was used as an energy source and provided income for those who owned wetlands with peat bogs. Peat forms when plant material, usually in a marshy area such as a wetland, is inhibited from decaying fully by the acidic environment in the soil. Under the right conditions, peat is the earliest stage in the formation of coal. Most modern peat bogs formed in high latitudes after the retreat of the glaciers at the end of the last ice age some 9,000 years ago. They usually grow very slowly, at the rate of only about one millimeter per year. Today peat is rarely used as an energy source because of the convenience of other, more modern energy sources.

Although peat bogs no longer generate income, wetlands can still be a source of income for agricultural producers. Many well-maintained wet meadows with abundant grass species can supply pasture for livestock grazing or support hay production. Forested wetlands, when carefully managed, can be a valuable source of wood products.

The great diversity and abundance of wildlife found in wetland areas means there is income potential from fees collected from hunting leases and access to wildlife areas that include wetlands. Visitors at

many state and federally controlled wetland wildlife areas pay access fees for the privilege of participating in recreational activities such as photography, bird and wildlife viewing, and canoeing. They also purchase hunting and fishing licenses, which support the maintenance of wildlife habitat in Kansas.



Credit: USDA NRCS



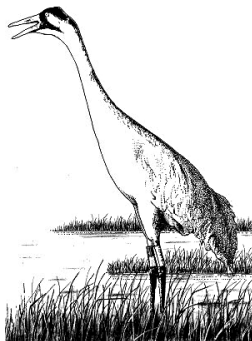
Credit: Paul Kerris, USFWS

SOCIAL BENEFITS

The social benefits of Kansas wetlands are vast. Wetlands offer space to enjoy the outdoors and provide the opportunity for aesthetic appreciation of one of Kansas' most diverse natural resources. Wetlands are among the richest and most biologically productive environments on earth. They provide habitat for some of Kansas' most unique flora and fauna. Even though only approximately 1 percent of Kansas' land area is in wetlands, the diversity of wildlife in or near those wetlands greatly exceeds that of the other 99 percent of Kansas' lands. Plants and animals that live in wetlands can adjust to the wet and dry cycles and flourish in the Kansas climate while less adaptable species, requiring permanent water for survival, suffer the consequences of their rigid habitat requirements.

Sandhill Crane

Credit: Bob Savannah, USFWS



WETLANDS HISTORY

"The wisest mind has something yet to learn."

George Santayana, Spanish-born American philosopher

DRAINING WETLANDS

In the past, the value of wetlands was not understood. They were not protected as an important natural resource. In America's past, many believed that wetlands were useful only if they were drained and the land used for the production of agricultural crops. One of the first large-scale drainage projects was undertaken by the Dismal Swamp Drainage Company in Virginia and North Carolina, which employed a young surveyor named George Washington. The "swamp projects" began the massive draining of wetlands on the east coast, which spread into the Midwest and Kansas as settlers looking for land to farm moved west.

Clay tile pipes, used to make subsurface drains to remove water from low areas and wetlands so that land can be converted to production agriculture, have been used in the United States for nearly 175 years. In 1835, the era of modern agricultural engineering began when the first factory for making clay tile pipe segments opened in Seneca County, New York. In 1835, John Johnston used tile drainage. He is generally recognized as the first person in the United States to use tile drainage. By 1880, there were 1,140 tile factories in the U.S.; most were located in Illinois, Indiana, and Ohio. The increase in the production of clay tile pipes made it easier to drain larger areas of wetlands faster and significantly sped the conversion of wetlands into cropland and areas for development.



Great Dismal Swamp, 1906

Source: Library of Congress

THE FEDERAL GOVERNMENT'S ROLE

The U.S. government assisted in the drainage of wetlands. The Swamp Land Acts of 1849, 1859, and 1860 gave 65 million acres of wetlands owned by the federal government to 15 states for reclamation, which, at that time, meant drainage. In the 1930s, the federal government's role in land drainage was accelerated through the emergency public works programs. These programs were designed to counter the effects of the Great Depression by creating jobs. Many of these jobs involved implementing conservation practices on public lands, including the drainage of wetlands. Today, many of those projects would not be approved as conservation

McPHERSON VALLEY WETLANDS

Nearly 100 years ago, the McPherson Valley wetlands, located primarily in the southern half of McPherson County, were drained like many of the nation's wetlands. However, unlike other wetland areas now lost to development, the McPherson Valley has become part of an unprecedented experiment in restoring a significant wetland area.

It is commonly believed that the McPherson Valley wetlands were at one time either part of a large inland sea, which dried up, or the original streambed and drainage area of the Smoky Hill River, which changed course to flow north into the Kansas River system rather than south into the Arkansas River system at some point in time. No matter which theory is correct, the result was a large wetlands complex consisting of a series of depressions, marshes and shallow lakes stretching from just northwest of McPherson nearly 18 miles to the southern border of McPherson County and on into what is now Harvey and northern Sedgwick counties.

Prior to 1900, the wetlands complex in McPherson County covered approximately 35,000 acres and boasted 9,000 surface acres of water held in 52 separate wetlands. The largest of these areas - still known as the Big Basin - covered approximately 2,000 acres and typically held water at a depth of three feet or less. With its eastern edge located two miles west of McPherson, the basin is approximately three miles wide and seven miles long. North of it is an area known locally as the Little Basin. A series of marshes and small lakes known as the Chain of Lakes, so named because of their appearance as irregularly shaped links on a chain, stretched south of the Big Basin. One of those lakes, Lake Inman, is the largest natural lake remaining in the state.

Before their destruction, the McPherson Valley wetlands were considered equal in importance to Cheyenne Bottoms. It was the only wetlands area in the state where giant Canada geese nested prior to their near extinction at the turn of the 20th century.

In the late 1800s, McPherson County was a popular destination for hunters from eastern cities, including Chicago and St. Louis, drawn by the huge flocks of geese and other migratory birds, as well as other game, which frequented the wetlands. It was said that within an hour, a man could shoot a week's worth of food in its marshes and lakes. Local citizens in the Conway and Inman area supplemented their farming income by guiding hunters. Hunting clubs were established on the shores of both Lake Inman and Lake Farland, and newspapers of the day featured pictures of hunters standing beside their day's harvest. But, the wetlands also posed problems for the county's residents. Swarms of mosquitoes bred in the marshes and pools. There were newspaper reports of large numbers of small animals drowning in the Big Basin and the resulting stench when rain events caused the basin to flood. Most importantly, the waterlogged area was seen as a potential source of valuable farmland if it could be drained. This view of wetlands as waste area was voiced by the United States Department of Agriculture as late as 1919 when it noted in its yearbook that Kansas had 296,000 acres of wetlands "in need of drainage."

McPherson County Commissioners contracted with Harvey County resident John Schrag, a respected self-trained engineer, to attempt drainage of the Big Basin. Schrag began purchasing property in and around the basin in 1901 and designed a system of dikes and ditches to drain the area into Blaze Fork Creek. Using a horse-drawn slip (a blade and scoop) and a Fresno (a larger blade and scoop), he and his sons began the earth work and in 1912 began draining the area into the Blaze Fork. In 1916, he designed and built a steam shovel to provide the power necessary to deepen the outlet ditch into Blaze Fork Creek. His system worked, and both the Little Basin and Big Basin were effectively drained for farming except for a few isolated depressions and Kubin's Clear Pond. While Schrag was successful in draining the basin, farmers who lived along the Blaze Fork experienced flooding as the basin no longer acted as a natural reservoir, but dumped more water into the Blaze Fork during major rain events than its streambed could handle. The farmers organized the Blaze Fork Drainage District and built their own ditch which blocked Schrag's. Judgments from the resulting lawsuits caused the Blaze Fork to be deepened and straightened, with the Schrag family doing the work, and a series of ditches and dikes were built up and down what is now known as the Blaze Fork ditch. By the mid-1930s, the drainage and destruction of the McPherson Valley wetlands was complete, with the exception of about 500 acres including Lake Inman and a few other isolated lakes and low spots, and the area was converted into productive farmland. At the time, John Schrag and his sons were considered to have achieved a monumental engineering feat.

By the mid-1900s, the importance of wetland areas was more clearly understood. In 1989, the McPherson Valley Wetlands project launched with the purchase of 160 acres in the Big Basin and a goal of acquiring and restoring at least 5,000 acres of the historic wetlands. The work has centered on the key areas of the Big Basin, Little Basin and Kubin's Clear Pond (where the project headquarters are located), an area two miles south of the Big Basin, and an area near Inman stretching from Lake Inman to historic Lake Farland, located southeast of Inman, which had been completely drained.

By 2007, the McPherson Valley Wetlands consisted of 4,260 acres of land, including 1,760 acres of restored wetlands, managed by the Kansas Department of Wildlife and Parks. The results have been impressive. In addition to the increasing numbers of geese and ducks that stop over and nest in the McPherson Valley Wetlands, other rare species which have been seen in the area include: whooping cranes, white-faced ibis, peregrine falcons, snowy plovers, piping plovers, the least tern and bald eagles. The area has also seen an increase in upland game birds.

When it began, the project was unprecedented in its size and scope. Scientists are watching the restoration progress and utilizing extensive monitoring of the changes in waterfowl and other wetland animal populations in an effort to add to the knowledge of marsh ecology.

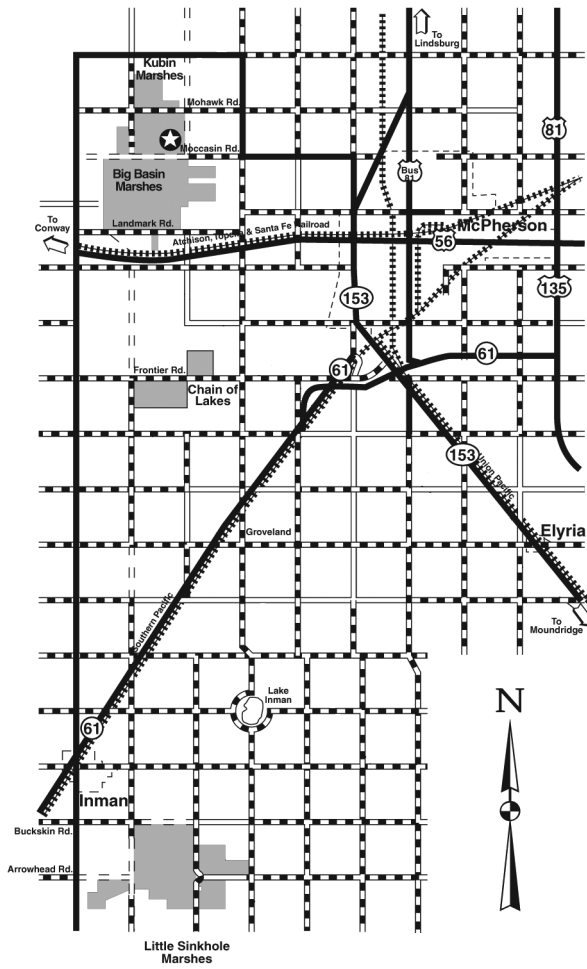
McPHERSON VALLEY WETLANDS



(left to right): Building Drainage Canal; Restoration at Farland Lake (2006); Aerial View (2007); Pheasant Nest with Eggs

Source: Kansas Department of Wildlife and Parks

MAP OF MCPHERSON VALLEY WETLANDS



Source: Kansas Department of Wildlife and Parks

projects. The drainage projects of the 1930s resulted in severe declines in wetland acres across the United States and in Kansas.

CHANGING ATTITUDES

In the 1970s, public understanding of the ecological value of wetlands increased and the federal government's policies on the conversion of wetlands to other land uses began to change. Federal legislation enacted in the mid-1980s slowed the conversion of wetlands for agricultural purposes and encouraged the restoration and protection of wetlands. Now there are federal regulations protecting some wetlands areas from being filled in and requiring mitigation (restoration or construction of new wetlands in a different location) of many wetlands affected by construction or development. In Kansas, there are no state regulations on wetlands but there are policies and programs to facilitate the protection of wetlands. Federal and state programs, such as the Wetlands Reserve Program and the Riparian and Wetland Protection Program, assist landowners in enhancing and restoring wetlands all across the state of Kansas.

WETLANDS CONSERVATION

"To cherish what remains of the Earth and to foster its renewal is our only legitimate hope of survival."

Wendell Berry, novelist, farmer, and philosopher

At one time, open prairie wetlands accounted for nearly a quarter of the total surface area of the Midwest. The estimated amount of wetlands in the conterminous United States in the 1780s was 221 million acres; in 1997, it was an estimated 105.5 million acres. According to the Natural Resources Conservation Service, it is estimated that there were approximately 841,000 acres of wetlands in Kansas in the 1780s and that only 435,400 acres of wetlands remained by 1980 (over 50 percent). Of the approximately 443,000 acres of wetlands now in Kansas, the state and federal government owns or directly controls 28,766 acres. The remaining acres are privately owned, found mostly in the middle of agricultural lands.

Nationally, significant progress has been made in reducing the rate of loss in wetland acres in the United States. There was an estimated 80 percent reduction in the wetland acres lost between 1986 and 1997 when compared to the previous decade. Across the United States, the losses from 1986 to 1997 were attributed to urban development (30 percent), agriculture (26 percent), silviculture - the cultivation and management of forest trees (23 percent), and rural development (21 percent). Today, reducing losses in wetland acreage remains a priority, along with promoting the restoration (and function) of impaired wetlands.



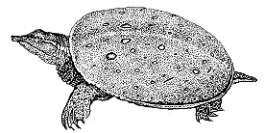
Playa Lakes, Scott County

Credit: Rolfe Mandel, KGS

IMPACTS ON WETLANDS

All impacts, whether due to human activities or natural processes, can affect the function of a wetland and the composition of the species that live there.

Many man-made features pose threats to the health of wetlands. Practices that disrupt the natural hydrologic cycle in wetlands include drainage, dredging and stream channelization, depositing fill material, building dikes and dams, construction, and mining. When the natural physical features of a wetland area are changed, the wetland's water filtering and holding capacities are diminished. Areas that once held and slowed floodwaters no longer perform that function. As runoff moves more rapidly, it can erode the soil, carrying sediment and nutrients into streams and lakes. Changes in a wetland's water holding capacity can destroy aquatic plant and animal life and alter the biodiversity of an area by disrupting the food chain. The survival of every plant and animal that lives within a wetland community depends on the other plants and animals that live there.



Spiny Softshell Turtle

Credit: Bob Savannah, USFWS



Great Blue Heron

Credit: USACE

WETLAND LOSSES

Compared to the previous decade, U.S. losses in wetland acres were reduced by 80 percent between 1986 and 1997.

From 1986 to 1997, wetland losses in the United States were attributed to:

Urban development	30%
Agriculture	26%
Silviculture	23%
Rural development	21%



Source: USFWS

When a wetland's water storage capacity is diminished, ground-water supplies may also be affected.

Wetlands also face many threats from natural processes that alter the earth's physical systems. These physical processes occur naturally without human interaction and change the way land holds water and the amount of water land can hold. Natural physical processes include erosion, changes in sea levels, droughts, hurricanes and other storms, or overgrazing by wildlife. When water levels in wetlands change due to drought or storms, it affects the plant and animal species that live there. Wetland plant and animal communities are adapted to live in specific conditions. They need just the right mix of water and land to survive.

PROTECTING KANSAS WETLANDS

"The joy of looking and comprehending is nature's most beautiful gift."

Albert Einstein, physicist

Knowledge about the ecological value of wetlands has increased. Today, the importance of wetlands to the Kansas environment and the state's economy is widely recognized. Properly functioning wetlands provide water quality benefits, such as filtering nonpoint source pollution or collecting debris and other pollutants. Re-establishing wetland areas and creating alternative solutions to improve water quality is expensive and time-consuming. Protecting and enhancing Kansas wetlands involves the cooperation of private landowners and state and federal agencies. Continuing these efforts is vital to the future of Kansas. ■

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TEACHER RESOURCES

BOOKS:

* *Teachers & Advanced Readers*; AR - Accelerated Reading Level

America's Wetlands: Guide to Plants and Animals

Wallace, Marianne D. 2004

Amphibians

Stewart, Melissa. 2001 (AR - 5.0)

Animal Survivors of the Wetlands

Somervill, Barbara A. 2004 (AR - 7.2)

Birds: Nature's Magnificent Flying Machines

Arnold, Caroline. 2003 (AR - 5.2)

Frogs

Tyler, Michael. 1997 (AR - 5.2)

Kansas Wetlands: A Wildlife Treasury*

Collins, Joseph T. 1994

Marshes and Swamps: A Wetland Web of Life

Johansson, Phillip. 2007 (AR - 5.7)

Near One Cattail: Turtles, Logs, and Leaping Frogs

Fredericks, Anthony D. 2005 (AR - 5.5)

North American Cranes

DuTemple, Lesley A. 1999 (AR - 6.6)

A Pocket Guide to Great Plains Shorebirds*

Fellows, Suzanne and Bob Gress. 2006
(online version: www.gpnc.org/peeps.htm)

Starting Life: Duck

Llewellyn, Claire. 2004 (AR - 4.2)

Así nace un pato. 2004 (AR - 3.9)

Career Profile:**BRIAN HANZLICK***Natural Resource Officer, Kansas Department of Wildlife and Parks*

By the time he was five or six years old, Brian Hanzlick knew that he wanted to be a game warden when he grew up. Now a natural resource officer with the Kansas Department of Wildlife and Parks (KDWP), Hanzlick attributes his career choice to being around his uncle's friends who were game wardens and biologists. Hanzlick's family lived near a creek in Russell County and he grew up hunting, fishing, trapping, and interested in "anything that dealt with the outdoors." He pursued a degree in natural resource management through the College of Agriculture at Kansas State University, working for KDWP while attending college. After a two-year stint working in Colorado, he returned to Kansas. Today, he mainly works with agencies throughout the Midwest and the states surrounding Kansas, as well as the U.S. Fish and Wildlife Service. He has statewide jurisdiction and can enforce any state or federal law.

As a law enforcement officer, Hanzlick participates in both state and federal investigations—hunting down people who violate fish and wildlife laws and take advantage of the natural resources. "We deal with everything from little lizards to leopards," says Hanzlick. "In one case, we cold-camped in Stafford County for seven days—all day and all night—to break up a major deer poaching ring involving people from North Carolina. Later, after testifying in North Carolina, we went to Florida to confiscate a leopard as part of an investigation into an illegal operation back in Kansas City."

The challenge of catching poachers by understanding their methods drives Hanzlick, although his job encompasses much more. He assists KDWP biologists in enhancing wildlife areas and collecting biological research materials. However, he says that the most rewarding part of his job is the educational component—working with young people, teaching safety and trying to get them interested in the outdoors. In his work in the outdoors, he does not see many young people—a trend that KDWP is working to reverse.

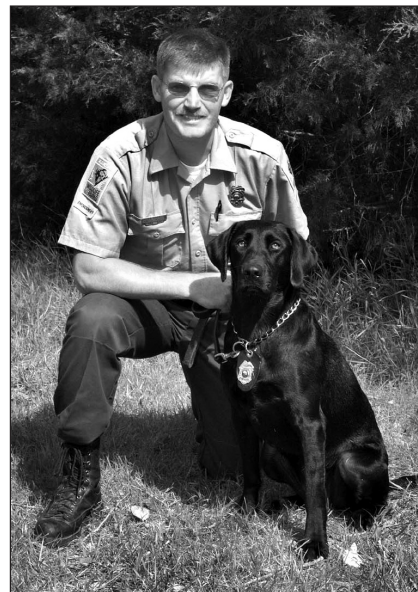
Hanzlick enjoys working in a rural area where most of his law enforcement tips come from honest hunters and farmers and ranchers. His equipment includes a four-wheel drive pickup, a 4-wheeler, airboats, "go-devil" boats (marsh boats made to go in muddy areas), a jet ski, and a regular "lake" boat. Even so, he says that the most fun part of his job is working with the KDWP canine that lives with his family. Hanzlick and the dog spent eight weeks and over 400 hours training in tracking, evidence recovery, and wildlife detection. In addition to working investigations and crime scenes, the team presents demonstrations to a wide variety of audiences. "You have to be a people person, able to talk to both large and small groups," says Hanzlick.

Hanzlick recommends students concentrate on the sciences, math, and writing, as well as presentation and communication skills. As part of his job, he writes the reports used by lawyers to prosecute crimes. He also testifies in federal court. "You want to prove the crime was committed so you have to be really accurate and have confidence in yourself."

Hanzlick's assigned counties (Barton, Rush, and Ness) includes the Cheyenne Bottoms Wildlife Area, which hosts from 200 to 800 or 1,000 hunters on opening day of duck season. According to Hanzlick, the three major hunting seasons in Kansas are duck, pheasant, and deer seasons. Opening days of all three seasons generate money for many rural communities in Kansas.

"Ninety percent of the people I work with are very good people," says Hanzlick, who enjoys working out of his home and having flexible hours. He spends much of his spare time at his family's sporting events and activities. However, it is obvious that he still loves hunting, fishing, trapping, and "anything that deals with the outdoors."

Note: In 1987, KDWP's certified law enforcement officers—formerly known as game wardens or game protectors—became known as natural resource officers.



Courtesy: Brian Hanzlick

TEACHER'S RESOURCES (CONTINUED)**Starting Life: Frog**

Llewellyn, Claire. 2003 (AR - 4.2)

Así nace una rana. 2003 (AR - 4.1)

Wetland Food Chains

Kalman, Bobbie. 2006 (AR - 6.4)

Wetlands Journey

Weaver, Jeanne. 2007

What is a Reptile?

Kalman, Bobbie. 1998 (AR - 5.3)

Que son los reptiles? 2005 (AR - 4.6)

What is an Arthropod?

Smithyman, Kathryn. 2002 (AR - 6.2)

The Wildlife Detectives: How Forensic Scientists Fight Crimes Against Nature

Jackson, Donna M. 2002 (AR - 7.4)

Career Profile:**MARY PAT HADDICAN***Birder and Quivira National Wildlife Refuge Volunteer*

People from all over the world come to Quivira National Wildlife Refuge just to see the birds that migrate through central Kansas. Although she had never visited Quivira, Mary Pat Haddican decided to move to St. John, Kansas, when she retired—based on Quivira's reputation for birding (bird watching). Now she can go birding at one of the best places in the country anytime she wants.

Haddican was raised in Satanta, Kansas, and earned degrees in chemistry from the University of Kansas and law from the University of Kansas School of Law. She worked as a patent attorney for an oil company in Houston, Texas. When a colleague returned from a birding trip to Africa, Haddican decided that taking a birding trip sounded like an interesting vacation. Her first birding trip to Arizona got her hooked. While living in Texas, she enjoyed birding at Big Bend National Park in west Texas, southern Arizona, and even studied owls during a trip to Montana.

"All a beginning birder needs is a decent pair of binoculars and a field guide. Just start noticing birds," Haddican said. "There are birds all over the place, but we usually don't see them even if they're right in front of us." Because Kansas is located in the Central Flyway, many birds that are not native to Kansas stop over at Quivira National Wildlife Refuge (NWR) during the spring and fall migrations. As a result, birders can find shorebirds in central Kansas in numbers that exceed those in many other parts of the country.

The U.S. Fish and Wildlife Service named Haddican the 2006 Volunteer of the Year at Quivira NWR. In addition to her weekly visits, she helps with the shorebird counts during the spring and fall migrations. In fact, that is how she became involved with Quivira NWR as a volunteer. When there was an opening for a volunteer to do the shorebird counts, the superintendent approached Haddican, telling her that since she was out there all the time anyway, she might as well be doing the shorebird counts.

Haddican also helps monitor the whooping crane migration through the refuge. During the whooping crane migration, staff and volunteers watch for whooping cranes every morning and evening. Detailed records and photographs have been kept of the movements of all the whooping cranes in the United States. At one time, there were only 14 whooping cranes in existence. Today, the species has come back from the brink of extinction and 338 whooping cranes were recorded in the wild in a recent count.

In the fall of 2006, Haddican experienced a spectacular sight when she was covering the evening watch for whooping cranes. "It was getting dark and nothing was happening. A group of people from Wichita were out there on the wildlife drive watching the thousands of sandhill cranes with me," Haddican said. "All of a sudden, a group of five birds started coming towards us. The whooping cranes—three adults and two young—landed in the water very near to where we were standing. We were just staring, with our mouths open. It was the most whooping cranes I had ever seen in one group." According to Haddican, most whooping cranes travel in family groups, usually two adults with one young bird. As it quickly turned dark, Haddican notified the refuge staff of the location of the whooping cranes. The next morning, the birds were still there and detailed information was recorded about the individual birds.

Haddican also participates in the annual Christmas bird counts at Quivira NWR. Year after year, these December or January counts are held in the same locations, providing a long-running record of bird population changes and other information. In addition to helping with birding activities, Haddican volunteers with the city of St. John—planting and weeding flowerbeds, working in the parks, and helping the city's forester. She is active in the Kansas Ornithological Society, an organization for birders in the state of Kansas, and the Friends of Quivira.

"Quivira is not just birds," Haddican said. "It's also wildflowers, butterflies, dragonflies, snakes, and other wildlife. Dragonfly watching is getting to be very popular. Quivira NWR is a great birding spot, an incredible natural resource, and an example of how beautiful Kansas is. I really try to emphasize what a treasure Quivira is." Her enthusiasm is contagious and her volunteer work helps maintain that treasure for Kansans and people all over the world.



Courtesy: Mary Pat Haddican

**Whooping Crane**

Credit: Bob Gress, GPC

WEBSITES:**Kansas Department of Wildlife & Parks**<http://www.kdwp.state.ks.us/>

Cheyenne Bottoms Wildlife Area

(Locations>Wildlife Areas>Region 3)

McPherson Valley Wetlands

(Locations>Wildlife Areas>Region 4)

National Wetlands Inventory

U.S. Fish & Wildlife Service

www.fws.gov/nwi/**Quivira National Wildlife Refuge**www.fws.gov/quivira/**Shorebird Sister Schools Program**

U.S. Fish & Wildlife Service

<http://66.241.214.202/index.cfm>**Wetlands**

U.S. Environmental Protection Agency

www.epa.gov/owow/wetlands

Wetlands Showcase:**CHEYENNE BOTTOMS**

The Cheyenne Bottoms basin is located in central Barton County. It includes two internationally recognized wetland areas that attract visitors—both birds and people—from around the world. The Wetlands and Wildlife National Scenic Byway passes through the basin on the north and east sides.

The basin is an oval-shaped natural area about 13 miles long (east to west) and six miles wide (north to south). It includes approximately 41,000 acres of land, covering nearly 64 square miles. Cheyenne Bottoms Wildlife Area, owned and managed by the Kansas Department of Wildlife and Parks, covers 19,857 acres within the larger basin. The Nature Conservancy's Cheyenne Bottoms Preserve, 7,300 acres, borders the state-owned property on the north and west sides. The remainder of the land in the basin—a mixture of cropland, pastures, and wetlands—is privately owned. The city of Hoisington and the historic communities of Redwing and Boyd lie inside the Cheyenne Bottoms basin.

On the north, west, and south sides, rocks rise abruptly from the floor to form the 100-foot walls of the basin. Two streams, Blood Creek and Deception Creek, cut through the basin's walls and periodically replenish the wetlands in the basin with floodwaters.

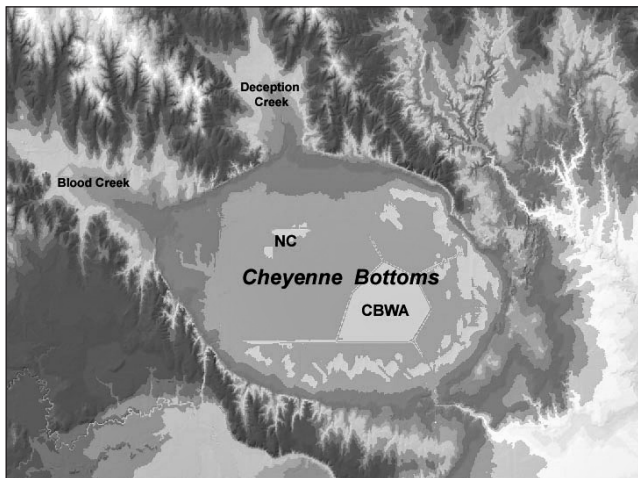
The term "Cheyenne Bottoms" is generally attributed to the Cheyenne Indians' association with the basin.

CHEYENNE BOTTOMS BASIN

In ancient times, Blood Creek was connected to the upper Smoky Hill River. Water from the Smoky Hill River flowed down Blood Creek, through the Cheyenne Bottoms basin, and into the Arkansas River. Sometime between 100 million years ago and just 5 million years ago, movements far below the surface of the earth dropped the floor of the Cheyenne Bottoms basin. Geologic forces that created the Rocky Mountains and other features of the High Plains formed a divide between Blood Creek and the Smoky Hill River, which began to drain into the Kansas River. The forces of wind and water erosion on the newly formed Rocky Mountains supplied fine-grained silt and sand that filled in the ancient streambed through the Cheyenne Bottoms basin. Sand dunes formed on the north and east sides of the basin, enclosing the area more completely.

According to the Kansas Geological Survey, sediments in core samples show that there have been wetlands in the Cheyenne Bottoms basin for as long as 100,000 years. Fossils in the sediments include trees, animals, and pollen from marsh plants and grasses. There is also evidence of intermittent dry periods, times when the area was dry enough to ignite and burn.

In 1806, Lt. Zebulon Pike camped on the north side of the Cheyenne Bottoms basin during his explorations of the southwestern region of the Louisiana Purchase. In 1821, the opening of the Santa Fe Trail just south of the basin increased awareness of the area's existence. From 1821 to 1880, the Santa Fe Trail was a vital commercial and military highway to the southwest. Military trails connecting forts which were built to protect traffic along the Santa Fe Trail skirted the perimeter of the Cheyenne Bottoms basin.



Elevations – Cheyenne Bottoms Basin

Credit: Andy Schmidt, NASA EPSCoR at ESU

Prior to the 1860s, buffalo, deer, elk, and antelope migrated through the basin, drifting into the sheltered basin during fierce winter storms. As the plains were settled, cattle also drifted into the basin in search of protection, grass, and water during severe winter weather. In the spring, ranchers from the southwest (today's states of Texas and New Mexico) came to Cheyenne Bottoms hoping to find that part of their herds had survived the brutal blizzards.

Following passage of the Homestead Act in 1862, land in the Cheyenne Bottoms basin transferred from the federal government into private ownership through homestead claims or the purchase of land awarded to the railroads as an incentive to construct railroads throughout Kansas.

RANCHING AND FARMING

Most of the land in the lowest areas of the basin, especially any land that tended to stay wet, was used for haying and grazing. Other areas were planted to crops, a practice that continues today. There were several large cattle ranches in the Cheyenne Bottoms basin. In the early 1880s, the Uhl and Carney Ranch—located near the southwestern corner of the basin and stretching north to Hoisington—covered over 8,000 acres of land. Beginning in 1886 and continuing into the late 1890s, this ranch hosted international greyhound coursing meets attended by thousands of people. The Brinkman Ranch—another early ranch in the basin—was located south of Redwing, which is where cattle were loaded onto railroad cars for transport to the Kansas City Stockyards.

Periodically, the Cheyenne Bottoms basin would experience a drought. When the area was dry, cattle would graze large areas during the day and cowboys tending the cattle would drive them to water tanks at night. A large concrete tank, filled each day by hauling water in a horse-drawn wagon from a farm over a mile away, can still be seen in the southeast corner of Cheyenne Bottoms Wildlife Area.

Since grazing and haying were the predominant agricultural uses for the area, the landowners and neighbors cooperated in the annual spring burning of the wetlands. Each property owner was responsible for protecting his own buildings and property by burning off or plowing up strips of ground before the whole

Cheyenne Bottoms (continued)

area was set on fire. The neighbors took turns managing the annual spring burning, which removed dead plant materials and encouraged the growth of new grasses and plants that cattle would eat. The fire would eventually burn itself out but small fires might flare up for as long as a month. It was much safer to plan and manage the burning of the area rather than risk having a lightning strike start an uncontrolled fire.

A GRAND LAKE

In the early 1890s, central Kansas entered a dry period and investors formed the Grand Lake Reservoir Company to turn Cheyenne Bottoms into a reservoir for irrigation. They constructed a canal from the Arkansas River to the Cheyenne Bottoms basin, which is lower in elevation than the river. The next time the Arkansas River ran at flood stage, water flowed downhill through the canal and filled Cheyenne Bottoms—including property not covered by the project's flood easements. Proposals for an even larger lake surfaced and construction began on a related project to build a huge water wheel that would have generated electricity for nearby towns. Then the drought ended and plans for the irrigation reservoir were abandoned. The state of Kansas owns a portion of the original 1890s canal, which is used when the Kansas Department of Wildlife and Parks transfers water from the Arkansas River to Cheyenne Bottoms Wildlife Area.

OIL FOUND AT CHEYENNE BOTTOMS

Drilling started in 1917 on the first "successful" oil well in Barton County. The well, known as the Sooy No. 1, was located in the Cheyenne Bottoms basin. The drilling took six years, partially due to flooding in the basin. In Kansas, the Sooy No. 1 was the first well west of Butler County to bring oil to the surface. On a single Sunday, over 10,000 people were reported to have visited the site to watch oil flow out of the hole, but not enough oil was produced to justify completing the well.

Saltwater (brine) was mixed with the oil brought to the surface. At the time, saltwater disposal was not a concern and the hole was not plugged (properly sealed). The hole (an open shaft over 3,500 feet down into the ground) was covered with dirt until the 1960s. Several similar open holes in the Cheyenne Bottoms area were also plugged at that time. Before that, when conditions were right,



Pelicans at Cheyenne Bottoms

Credit: Dr. Dan Witt

saltwater flowed from some of the unplugged holes, changing the chemistry of the soil and making it less productive.

In 1942, Mr. Sooy's estate sold the site of the Sooy No. 1 oil well, along with other land purchased for oil exploration in the Cheyenne Bottoms basin, to the state of Kansas. The success of the Sooy No. 1 also sparked additional exploration that led to the development of the petroleum industry in Barton, Russell, and other central Kansas counties.

WATERFOWL HUNTING

Cheyenne Bottoms has always drawn waterfowl hunters. In the 1880s, commercial (market) hunting became common in the area. Wagonloads of ducks and geese were harvested and shipped to restaurants and markets in the eastern United States. In 1904, an estimated one-half million ducks were harvested in the Cheyenne Bottoms basin. Market hunting at Cheyenne Bottoms declined following the passage of state legislation in 1905 that established the Kansas Fish and Game Department and gave state game wardens the power to enforce hunting and fishing laws.

Over the years, hunters formed gun clubs and leased the rights to hunt on specific parcels of land. In 1904, members of the Black Swamp Shooting Club actually camped on their leased land during prime hunting periods to keep trespassers from hunting there. Other early groups included the Hoisington Gun Club, the Mallard Gun Club, and the Barton County Sportsmen's Association. Today, groups and individuals continue to lease or own private land in the Cheyenne Bottoms basin for the hunting privileges.

PLANS FOR FEDERAL REFUGE

In 1923, Frank Robl of Ellinwood began banding ducks and geese—catching the birds and placing a small engraved metal ring around their legs before releasing them. This allowed him to track the birds' migration patterns and proved that Cheyenne Bottoms was an important site along the Central Flyway. (The Central Flyway is the pathway migratory birds follow during their spring and fall flights between their breeding and wintering grounds.)

In 1927, a two-day, 14-inch rain flooded Blood and Deception creeks and filled the Cheyenne Bottoms basin with water. In 1927 and 1928, the water in the basin attracted enormous numbers of waterfowl. That, along with data collected by Robl, helped convince the U.S. Congress that a federal wildlife refuge should be planned at Cheyenne Bottoms. In 1930, Congress passed legislation providing \$250,000 for the project but nearly all of the federal funding was diverted to another project. The remaining funds were spent on property title searches and engineering studies, but once that money was gone, plans for the Cheyenne Bottoms project were placed on hold.

In 1937, Congress passed the Federal Aid in Wildlife Restoration Act, also known as the Pittman-Robertson Act. This legislation placed a federal excise tax on sporting arms (guns) and ammunition. Still in effect today, the U.S. Fish & Wildlife Service collects this money and uses it to assist state wildlife agencies with projects for wildlife habitat restoration. In 1942, the Kansas Forestry, Fish, and Game Commission began using this new funding source to acquire land in the Cheyenne Bottoms basin.

Cheyenne Bottoms (continued)

WORLD WAR II BOMBING RANGE

In 1942, the U.S. Army Air Corps leased an area of privately owned land approximately four miles wide and six miles long in the Cheyenne Bottoms basin to provide bombing and gunnery practice during World War II. The land was leased for the “duration of the war” and the military began using the bombing range in 1943.

The Army Air Corps placed targets on the leased land, including large pyramid shapes, airplanes made of thin wood, and 5-6 foot tall silhouettes of towns and buildings. Aircraft flew in from Salina, Pratt, Walker, Hays, Great Bend, and other airbases in Kansas for training. While 10-pound sacks of flour were used for target practice, live ammunition was also used on the bombing range for both daytime and nighttime runs. The targets built to resemble buildings were used for high altitude bombing practices and trained crews who later flew over cities in Japan. At night, people who lived very close to Cheyenne Bottoms lived behind special “blackout” shades, as any escaping light could have caused a pilot to mistake their house as a target.

On the south side of the bombing range, the military trained on the ground, aiming machine guns at large radio-controlled airplanes or canvas targets pulled behind other planes. The machine guns were mounted on concrete stands that are still visible on the state-owned property.

While few people outside the Cheyenne Bottoms basin realized the extent of the military's activities there, area citizens had front row seats for the action. Mock air fights between fighter jets and bombers were described in the Hoisington newspaper but no photographs were published due to concerns about the presence of spies in the United States. Sometimes, the action was a bit too close for comfort as bombs landed in farmers' fields, next to country schoolhouses, and bounced across roadways outside the bombing range. Machine gun shells went through silos and homes—including the parsonage of the Christian Church in Hoisington. Duck hunters gave up hunting when their decoys were strafed and farmers reported being peppered with machine gun fire while working in their own fields or bringing their cows in for milking—all of which happened outside the military's bombing range.

Amazingly, there were no serious injuries among the civilians in the area. When a fighter pilot spotted two young boys hiding under a pyramid-shaped target south of Redwing, he canceled target practice for the day. The boys (now retired) reported that they missed over 30 recesses for skipping school that morning and inconveniencing the U.S. military.

STATE LAND ACQUISITION

In October 1942, the state of Kansas announced the first purchase of land for a waterfowl refuge at Cheyenne Bottoms—6,800 acres from the Sooy estate. The state leased the land, already inside the boundaries of the bombing range, to the U.S. Army Air Corps until after World War II ended.

In 1943, the Kansas Legislature passed a law giving the Kansas Forestry, Fish, and Game Commission the power of eminent

CHEYENNE BOTTOMS HISTORY TIMELINE

100 million–5 million years ago—formation of the Cheyenne Bottoms basin.

100,000 years ago—wetlands exist in basin.

1806—Pike's expedition crosses Cheyenne Bottoms.

1862—Homestead Act.

1886—greyhound coursing meets organized at Cheyenne Bottoms.

1896—construction of canal from Arkansas River to form Grand Lake Reservoir.

1897—first federal waterfowl hunting laws passed.

1905—Kansas Fish and Game Department established; first hunting licenses issued in Kansas.

1917–1923—drilling of Sooy No. 1 oil well.

1927–1928—floodwaters form 20,000–30,000 acre lake in basin.

1930—Congress passes legislation for federal wildlife refuge.

1937—Federal Aid in Wildlife Restoration Act (Pittman-Robertson Act).

1942—U.S. Army Air Corps leases land for bombing and machine gunnery ranges.

1942—state's land acquisition begins.

1950—construction of dikes and “lakes” begins.

1956—first duck hunting season at Cheyenne Bottoms Waterfowl Refuge and Public Shooting Area (now known as Cheyenne Bottoms Wildlife Area).

1965–1966—U.S. Army Corps of Engineers plans brine lake in Deception Valley.

1988—designated “Wetland of International Importance” and “Hemispheric Shorebird Reserve.”

1990s—major renovation project.

2006—groundbreaking for Wetlands Education Center.

2007—water at highest levels since 1927–1928.

Cheyenne Bottoms (continued)

domain: the power to condemn land when the owner chooses not to sell. Landowners in the Cheyenne Bottoms basin, particularly those whose land was included in the military's bombing range, were left with few options. They had no idea how long the war would last, when they would be able to use their property again, or what condition the land would be in after the military left the area. In addition, the state was threatening to use the power of eminent domain against those who did not want to sell their land. Against that backdrop, the state's acquisition of land in the Cheyenne Bottoms basin continued at a steady pace, and by 1948, the state had purchased most of the 17,000 acres it planned to acquire.

CHEYENNE BOTTOMS WATERFOWL REFUGE AND PUBLIC SHOOTING AREA

Until the 1950s, there was only one area known as Cheyenne Bottoms. That changed when the Kansas Forestry, Fish, and Game Commission and the U.S. Fish and Wildlife Service announced plans to convert the land acquired by the state into a waterfowl refuge. The plans called for the erection of a series of dikes that would form lakes ranging in depth from six to eight feet, the largest of which would cover more than 3,000 acres. Part of the area would be open for hunting migratory waterfowl and fishing would be a big feature of the refuge.

The project included the construction of 23 miles of dikes, which formed the five lakes. The dikes were topped with roads: driving areas that allowed the public access to the lakes and hunting and refuge areas.

New structures and channels to transfer water from the Arkansas River to the refuge area moved the water through Wet Walnut Creek. On the creek, a concrete dam (with locks) allowed the state to divert water flowing down the creek into a canal running from the creek to the refuge. The channel connecting the creek to the inlet canal at the refuge included a portion of the canal built in the 1890s. This system is still in use. It is a 24-mile journey for water diverted from the Arkansas River at a point southwest of Great Bend to Cheyenne Bottoms Wildlife Area.

The state also constructed an outlet canal for the new refuge, which required the building of seven bridges. The outlet canal—still in use today—allowed the state to release water when the refuge was flooding, to drain areas for seeding crops to attract waterfowl, or to reduce stocks of undesirable fish in certain lakes. Released water eventually makes its way back to the Arkansas River.

On October 13, 1957, the Kansas Forestry, Fish, and Game Commission dedicated Cheyenne Bottoms Wildlife Refuge and Public Shooting Area. The cost of the project, about \$2.8 million, was paid for by the sales of Kansas hunting licenses and funding through the Federal Aid in Wildlife Restoration Act (the Pittman-Robertson Act).

DECEPTION VALLEY BRINE LAKE

In 1965, farmers in Deception Valley, along Deception Creek just north of the Cheyenne Bottoms basin, uncovered plans that would have seriously damaged both Cheyenne Bottoms Waterfowl Refuge in Barton County and Quivira National Wildlife Refuge

in Stafford County. On the north rim of the Cheyenne Bottoms basin, the U.S. Army Corps of Engineers was planning to build a dam and fill the new lake with saltwater (brine) from Rattlesnake Creek near St. John, Kansas, over 50 miles away. (Rattlesnake Creek is the primary source of water for Quivira National Wildlife Refuge.) The lake would serve as an evaporation pond and eventually would have been filled with salt, rather than water. The purpose of the master plan, which involved other dams on the Rattlesnake and diversions of water affecting both Quivira National Wildlife Refuge and the Arkansas River, was to reduce the salinity of the Arkansas River for municipal and industrial uses downstream. The brine lake (saltwater evaporation pond) would have covered 20,000-50,000 acres of high-quality farmland and eliminated any flow of water into the Cheyenne Bottoms basin through Deception Creek.

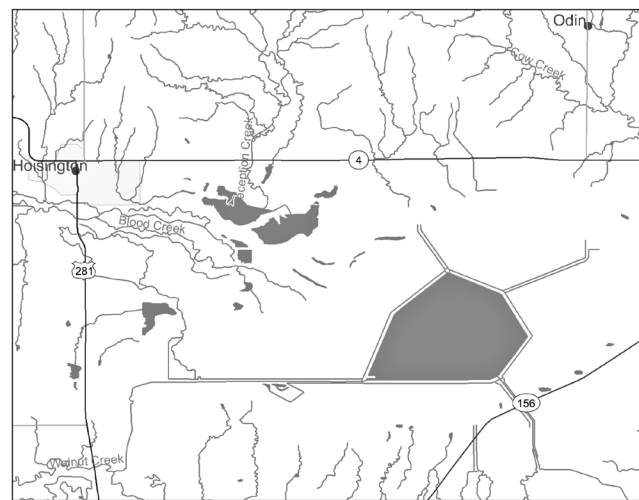
The Deception Valley farmers pooled resources, hired an attorney to fight the plan, and eventually succeeded in their opposition to the Deception Valley Brine Lake. Instead, the Corps of Engineers developed plans involving Clark and Comanche counties to address the water quality issues.

CHEYENNE BOTTOMS WILDLIFE AREA

Over the years, many changes have taken place on the state-owned property now known as Cheyenne Bottoms Wildlife Area. The term "pools" replaced "lakes" and some pools were designated refuge areas (with no public access). Fishing became a minor use of the area, limited mainly to the inlet and outlet canals or areas of deeper water.

For much of its history, the Cheyenne Bottoms area was dry—on average, two out of every five years. Migratory birds stopped at rivers or other wetlands during those dry periods. As many of those alternatives disappeared over time, maintaining the remaining areas, such as those found in the Cheyenne Bottoms basin, became very important.

While Cheyenne Bottoms remained one of the top waterfowl hunting areas in the Central Flyway (and still is today), there was a growing awareness of the importance of the area to other migratory birds, particularly shorebirds. Shorebirds spend the



Map of Cheyenne Bottoms

Source: USFWS, Wetlands Mapper

Cheyenne Bottoms (continued)

winter in South America and nest in the Arctic, flying nonstop for as long as 60 hours and traveling as far as 2,500 miles before stopping to feed and refuel at Cheyenne Bottoms.

In 1988, Cheyenne Bottoms Wildlife Area was designated as a “Wetland of International Importance” and a “Hemispheric Shorebird Reserve.” It was the first non-federal area to receive such designations. The Nature Conservancy’s Cheyenne Bottoms Preserve is now included in the designations.

Cheyenne Bottoms Wildlife Area underwent extensive renovation during the 1990s that increased the ability to conserve water, manipulate water levels and manage the area to meet wildlife needs during peak migration periods and dry spells.

Today, Cheyenne Bottoms Wildlife Area is recognized as the most important ecosystem in Kansas. More bird species are seen there than anywhere else in the state: 100 species of birds breed and nest on the area, 95 species winter on the area, and 65 species are permanent residents. It is estimated that 45 percent of the shorebirds in the Western Hemisphere stop at Cheyenne Bottoms during the spring migration. These birds go on a feeding frenzy at Cheyenne Bottoms, trying to quickly regain up to 50 percent of their lean weight in order to arrive at the Arctic and be assured of breeding and nesting success.

Many shorebird species are attracted to Cheyenne Bottoms by the area’s abundance of midge larvae—commonly referred to as “bloodworms.” Bloodworms are the “caterpillar” stage of the midge and appear blood red because of the high concentration of hemoglobin in their bodies. At Cheyenne Bottoms, bloodworms have been found in unusually high densities—as high as 50 per square inch. The bloodworms feed on nutrients from bird droppings.

A new Wetlands Education Center is being built along U.S. 156 on the east side of the Cheyenne Bottoms Wildlife Area. The center will expand the research and education programs offered in Cheyenne Bottoms.

FACING THE FUTURE

The pioneers who settled in the Cheyenne Bottoms basin enjoyed the hunting and fishing opportunities provided by the area. They learned to live with the intermittent dry spells and periodic floods, while building their lives, homes, farms, and new towns around the opportunities offered by Cheyenne Bottoms. As the times and needs of the country changed, both the people and the basin adapted.

The area had experienced many changes even before the state built the first dikes that divided the area into pools in the 1950s. Today, it is hard to imagine that plans were in place over a century ago to develop the area as a large reservoir, but part of the canal built back then to transfer water from the Arkansas River into that lake is still in use today. Today, it is hard to imagine that the federal government used an internationally recognized wetland as a bombing range, but back in the 1940s, the water-filled bomb craters provided habitat for ducks and geese. Once manipulated to improve fishing opportunities, the state now manages water levels to provide mudflats for feeding grounds for migrating shorebirds.

Some things have not changed all that much. Area residents still mark the changing of seasons by the first flights of ducks and geese. Local landowners and residents keep a close eye on sandhill cranes, whooping cranes, and eagles when the birds pass through the area. Dry periods—and wet periods—affect both the state-owned property and the crops and pastures of area farmers and local landowners. In 2007, an exceptionally wet spring and summer covered the Cheyenne Bottoms with water, at levels last seen in 1927 and 1928.

The people who live and work in the Cheyenne Bottoms basin have always placed a high value on the ecosystem now recognized worldwide. As priorities for the area continue to change, new challenges and opportunities will be created to sustain that ecosystem and educate future generations about the importance of the Cheyenne Bottoms.

NOTES:

