

# KENDRICK WATERSHED PLAN

## PROJECT UPDATE

### SUMMER 2010



#### THE KENDRICK WATERSHED

The Kendrick Watershed Plan is a 10-year initiative of the Natrona County Conservation District (NCCD) to improve the quality of the surface waters in the Kendrick watershed to meet the designated use of waterways that drain to the North Platte River. The Plan addresses the priorities identified in the Wyoming Water Quality Nonpoint Source Program (NSP) to work through voluntary and incentive methods to preserve and restore the quality of Wyoming's surface and groundwater resources.

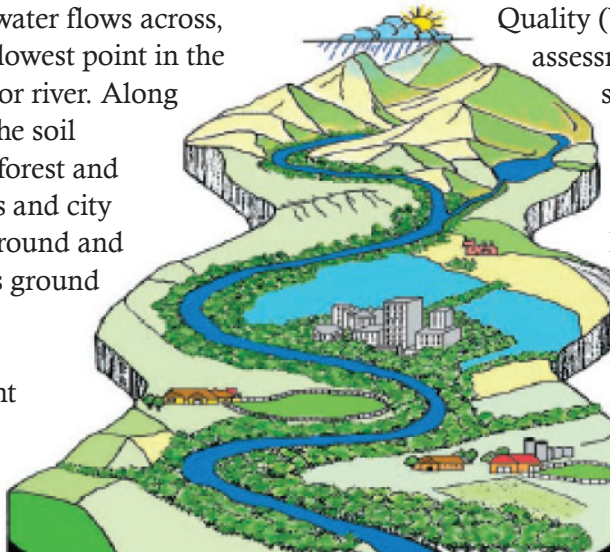
#### WHAT IS A WATERSHED

*Everyone lives in a watershed but not the same watershed!* A watershed is the landscape water flows across, or under, as it travels to the lowest point in the topography: a stream, lake, or river. Along the way, water travels over the soil surface - across farm fields, forest and ranch lands, suburban lawns and city streets, or it seeps into the ground and travels to the lowest point as ground water.

Watersheds come in different shapes and sizes, all with different features. Some have hills or mountains, others are nearly flat.

In Wyoming we have more than 80 different watersheds throughout the state; Natrona County contains a portion of 12 unique watersheds all draining directly or indirectly to the lowest point, the North Platte River.

Regardless of the name or location of the watershed, we all influence what happens in a watershed, good and bad, by how we treat the naturally occurring resources: soil, water, air, plants, and animals. All of



the watersheds on the continent are inter-related basins, so what happens in one watershed effects a larger watershed downstream ~ all the way to the oceans.

#### EVERYTHING FLOWS TO THE PLATTE

The North Platte River is a valuable and important resource to all who live near it. It provides drinking water, irrigation water for farms and ranches, urban lawns and gardens, recreational opportunities for residents and tourists, important wildlife habitat, and a beautiful scenic feature to the local landscape.

In 1998, the Wyoming Department of Environmental Quality (WDEQ), as a result of a water quality assessment of surface water throughout the state, placed the North Platte River on it's list of impaired waterways due to high concentrations of selenium. Subsequently, several local tributaries of the North Platte were also placed on the impaired waterways list due to high concentrations of selenium: Casper Creek, Poison Spider Creek, Oregon Trail Drain, Goose Lake, Rasmus Lee Lake, Ilco Pond, and Thirtythree Mile Reservoir.

The Kendrick Watershed Plan was developed to address and reduce these high concentrations of selenium in surface water runoff and ground water migration. Plan implementation, funded in part by a WDEQ 319 Grant, is a long-term collaborative by those who have influence or guardianship of surface water runoff areas and discharge locations in the Kendrick watershed, such as: Casper Alcova Irrigation District (CAID), Natural Resources Conservation Services (NRCS), landowners, sportsmen and environmental groups.



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Remember me? I'm Willy the Watershed Wonk. Wonks are watershed stewards. Let's look at what's going on in the Kendrick watershed.

## THE KENDRICK WATERSHED

The Kendrick Watershed area is approximately 188 sq. miles (120,320 acres) in east central Natrona County. The watershed contains numerous small streams, drainages and ponds with the North Platte River being the major water feature. Land use in the watershed is primarily farm, ranch and range land. The semi-arid climate requires irrigation to supplement naturally occurring moisture to support crops and pasture land.

Wetlands and associated riparian areas occur within the Kendrick watershed. These wetlands range from marshes to open water, large closed basins, seep areas, small reservoirs, stock ponds and riparian areas saturated with groundwater. The wetlands are important resources to migratory birds, including waterfowl, shorebirds, waders and other birds and provide natural habitat for other wildlife.

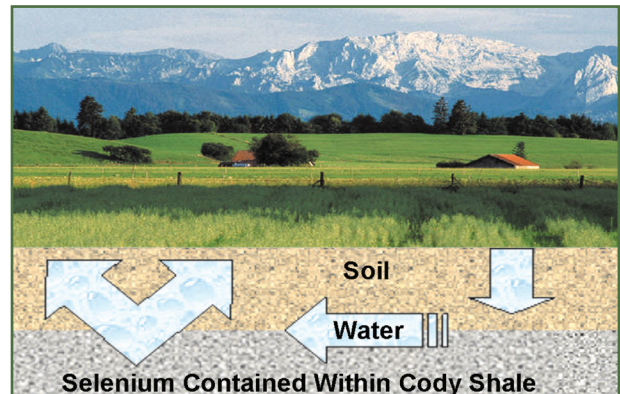


The North Platte River and the alluvium along the river are sources of water for domestic and industrial uses, and municipal water for the City of Casper and other communities.

## Se~WHERE DOES IT COME FROM

Selenium is a naturally occurring element. In Wyoming, and throughout the West, the geological occurrence of selenium is widespread, found naturally in volcanic tuff, coal deposits, and marine shales. In Natrona County, it is most often associated with Cody Shale, a geological characteristic common throughout the area.

Selenium weathered from rocks and contained in the soil can be metabolized by plants or dissolved and carried along by storm water and irrigation runoff, or groundwater. The primary factor influencing the level of selenium found in the soil is the composition of the bedrock under the soil. Where the topsoil is thin or the bedrock (Cody Shale) is exposed it can be easily eroded by wind, water, or development projects releasing encapsulated selenium.



The presence of Cody Shale can also facilitate the movement of selenium in groundwater. As soil absorbs water from precipitation or irrigation, the water percolates down and comes into contact with the dense Cody Shale (bedrock). The groundwater flows along the shale surface, carrying the selenium that has been leached from the soil while leaching more selenium from the shale bedrock, resulting in an increasing concentration of selenium as the groundwater migrates through the watershed.

The challenge for land owners and residents is to manage and control the selenium in the soil to minimize its migration to wetlands and waterways, reduce the amount metabolized by plants and crops to increase land productivity, and protect livestock and wildlife.

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## SELENIUM ON FARM & RANCH LAND

The management and control of selenium migration into local waterways is not unique to central Wyoming. The assumption that selenium was being transported by irrigation water has been discussed and studied throughout the rural West where surface or shallow subsurface selenium has been identified.

In early 2003, NCCD initiated a comprehensive sampling and analysis program in the Kendrick watershed to identify the concentrations and movement of selenium directly related to irrigation water conveyance systems and application practices used in the area. The sampling program was funded in part by a 319 Grant from the WDEQ.

Working in cooperation with the CAID and local landowners in the watershed, NCCD investigated and field tested alternative irrigation water delivery systems to reduce selenium migration. Existing scientific studies and local field demonstrations indicated that certain irrigation practices implemented as alternatives to the standard furrow (flood) irrigation, decreased selenium migration through the soil and to runoff drainages and groundwater. Several landowners volunteered to employ these new irrigation methods and participated in ongoing soil and water sampling to assess the effectiveness of the alternative methods.



Efficient and effective irrigation water delivery

systems are a primary emphasis of the Kendrick Watershed Plan. Historically, furrow irrigation has been the principle water delivery methods used by area farmers and ranchers. Furrow irrigation is relatively cost effective, however, studies have shown that it is a relatively inefficient use of water as more than half the water is lost to deep percolation, runoff, or evaporation. The resulting deep saturation and surface runoff was determined to

contribute to selenium migration to waterways and into ground water.

Two alternative irrigation methods were tested and monitored: Center Pivot and Linear Move Side Roll systems, similar to existing sprinkler irrigation systems. These delivery systems were determined to be the most cost effectiveness and efficient irrigation methods for landowners, while reducing surface runoff to inhibit selenium migration.



## WATERSHED PLAN UPDATE

NCCD began implementing the Kendrick Watershed Plan in mid-2008, in cooperation with CAID and NRCS, to establish more efficient and effective irrigation water delivery. CAID has replaced two sub-lateral open canals with underground pipeline and lined numerous other canals. Nearly 9,000 acres of farm land has been reclaimed for alfalfa production through the transition from furrow irrigation to alternative irrigation methods, primarily pivot irrigation, decreasing the migration of selenium to the waterways used by migrating birds, wildlife and livestock, and for recreation and sport.

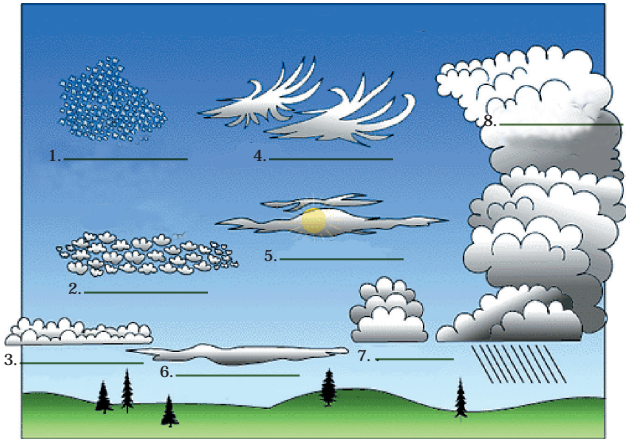
Tom Walters, Chairman of the NCCD Board of Directors, acknowledges, "There are no simple solutions when we are charged with managing nature; however, it is essential to the health of our watershed. Reducing high accumulation of selenium in the soil and its migration to waterways creates a healthier Kendrick watershed and contributes to healthier watersheds downstream." For more information, contact NCCD at 307-234-4022.



# Fun & Games for Watershed Wonks



CAN YOU IDENTIFY THESE COMMON TYPES OF CLOUDS?



Match the name of each cloud type and altitude where each is found with the shape of the cloud above.

- A. Cumulus - below 6,000 ft.
- B. Altostratus - 6,000 up to 20,000 ft.
- C. Cumulonimbus - up to 50,000 ft.
- D. Cirrocumulus - above 18,000 ft.
- E. Cirrus - above 18,000 ft.
- F. Stratus - below 6,000 ft.
- G. Altocumulus - 6,000 up to 20,000 ft.
- H. Stratocumulus - below 6,000 ft.

*Yeah, I did it! My answers were all correct, check yours!*



*I'll include the answers in the next newsletter.*

Complete each blank by matching the number to the letter to write out the message below:

1	2	3	4	5	6	7	8	9
A	B	C	D	E	F	G	H	I

10	11	12	13	14	15	16	17	18
J	K	L	M	N	O	P	Q	R

19	20	21	22	23	24	25	26
S	T	U	V	W	X	Y	Z

19 15 9 12 9 19 20 8 5

6 15 21 14 4 1 20 9 15 14

15 6 1 12 12 12 9 6 5

15 14 5 1 18 20 8



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