

From the Mountains to the Seas, The Earth Needs Rivers

**LB 517 - Water Funding Task Force Meeting
Howard Johnson Motel
Grand Island, Nebraska
September 5, 2013**

Instream Flows In Nebraska

Gene Zuerlein



State of Nebraska

Nebraska Game and Parks Commission

Mission

“*Stewardship* of the state’s fish, wildlife, park, and outdoor recreation resources in the best long-term interests of the people and those resources”

Our Living Breathing Planet



Why is there only one speck of dust that looks like this in the universe?

U.S. Eras

The U.S. has passed through four eras of public land and resource management, each with its own legislation, policies, and environmental ethic. **First - settlement and development** of the original public domain; **Second - a public land resource stewardship with a conservation ethic** began by President Theodore Roosevelt in the early 1900s; **Third -** after WW II there was an ensuing national growth including **many water development projects (1941-1962)**; and **Fourth -** there was the **environmental law era of 1962-1990**. The above time frames have led to the **present era of watershed restoration and collaborative stewardship.**

Source: Dombeck et al. 1997. Changing roles and responsibilities for federal land management agencies. Pages 134-144 *in* J.E. Williams, C.A. Wood, and M.P. Dombeck, editors. Watershed restoration: principals and practices. American Fisheries Society, Bethesda, Maryland.

Building Sustainability and Resiliency Into Management of Nebraska Water Resources ?

- **Ecosystem resilience** is the capacity of an ecosystem to tolerate disturbance without collapsing into a qualitatively different state controlled by a different set of processes. A resilient ecosystem can withstand shocks and rebuild itself when necessary, ecosystems naturally evolve to a fairly resilient state.
- **Resilience as applied to ecosystems** is the buffer capacity or ability of a system to absorb perturbation , or the magnitude of disturbance that can be absorbed before a system changes its structure by changing its variables.

Source: Government and Academic Institutional Involvement in Gulf Coast Resiliency. Sea Grant Law and Policy Journal, Vol. 1, No. 1 (June 2008).

**University of Kansas Professor, an Environmental
Historian, worth your time to listen to:**

<http://enthompson.unl.edu/2011-2012-schedule#worster>

Click on [Don Worster](#), then click on video of his talk

The Making of the Great Plains, 1862-2012

2011-2012 UNL - E.N. Thompson Forum on World Issues

**Prof. Donald Wooster, “An Unquenchable Thirst: How the Great Plains
Created a Water Abundance and Then Lost It”**

Topic content: Platte, Ogallala / Highplains Aquifer, pumping of groundwater, Kansas, Nebraska, *End of infinite abundance in water and many resources.*

Market Economy-Threat is resurgent of putting a price on water etc. Only dollar concern. Put all water up for sale. Inequality will increase. Many environmental consequences.

Verus

Moral Economy-Public good and interest are also factored in.

And the Question is ?

Moral economy v. Market economy

(public trust)

(only dollar value)

Which one does Nebraska have/need?

Historical Legislation /Activities

- 1895 - Prior appropriation doctrine adopted for surface water (Policy Issue #3).
- 1933 - Correlative use doctrine adopted for ground water (Policy Issue #4).
- 1984 - **Instream flow bill passed by the Nebraska Legislature (LB 1106).**
- 2004 - Conjunctive use recognized (LB 962).
- 2006 - **NGPC, Board of Commissioners, pass May 24th resolution in Bassett to pursue instream flows on the Niobrara River & protect existing instream flows.**

Missouri River Recovery Program

Water Resource Development Act 1986 and 1999

- Bank Stabilization Navigation Project - Mitigation Program
- 50 + projects
- Aquatic and Terrestrial
- IA, NE, KS, MO
- 166,750 acres authorized
- Monitoring program implemented

2000 and 2003 Amended Biological Opinion

- Master Manual Revised
- Flows/spring rise/pulse
- Adaptive Management adopted
- Habitat (Emergent Sandbar and Shallow Water habitats)
- Propagation of pallid sturgeon
- Science program established

Water Resource Development Act 2007

- MR Ecosystem Recovery Program
- MR Recovery Implementation Committee-advisory to USACE & USFWS
- Authority for work above Sioux City
- Intake, Montana fish bypass
- **Update 83 Principles & Standards. All federal agencies abide by and environmental equality established.**

2009 Omnibus Appropriation Act

- Missouri River Authorized Purpose Study

2013 New Principles and Requirements adopted for federal investments in water resources

FY13 MRRP Work Plan

Program Elements	FY12	FY13Pbud	FY13
Program Integration	\$5.8M	\$6.1M	\$5.4M
Integrated Science Program	\$12.3M	\$17.7M	\$8.2M
Habitat Creation – SWH	\$31.0M	\$25.3M	\$35.2M
Habitat Creation - ESH	\$3.0M	\$2.0M	\$2.0M
Site Acquisition	\$17.5M	\$14.0M	\$14.4M
Yellowstone Intake	\$2.5M	\$20.0M	\$0.6M
Management Plan	\$0.8M	\$4.9M	\$6.1M
Total	\$72.9M	\$90.0M	\$71.9M



Missouri River Mitigation

- Fish and Wildlife Coordination Act of 1958.
- Corps is obligated to mitigate for the loss of fish and wildlife habitat due to BSNP.
- WRDA 1986 authorized the Missouri River Bank Stabilization and Navigation Fish and Wildlife Mitigation Project.
- Acquisition and development of 48,100 acres of fish and wildlife habitat.

Missouri River Mitigation cont.

- WRDA 1999 authorized an additional 118,650 acres for acquisition and development of fish and wildlife habitat.
- Total of 166,750 acres (25% of habitat lost).
- Includes 7,000 to 20,000 acres of Shallow Water Habitat (SWH).

Upper Hamburg Bend, RM 555 looking south, NE First Mitigation Site, increasing floodplain storage capacity



NEBRASKAland Magazine



Omaha

Bottleneck

Flood of 2011 image



—receding flood waters

DeSoto Bend NWR

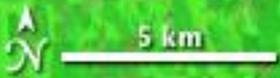
Blair, RM 648

—receding flood waters

Boyer Chute

Missouri River

Landsat 5 satellite 1 Aug 2011 false color



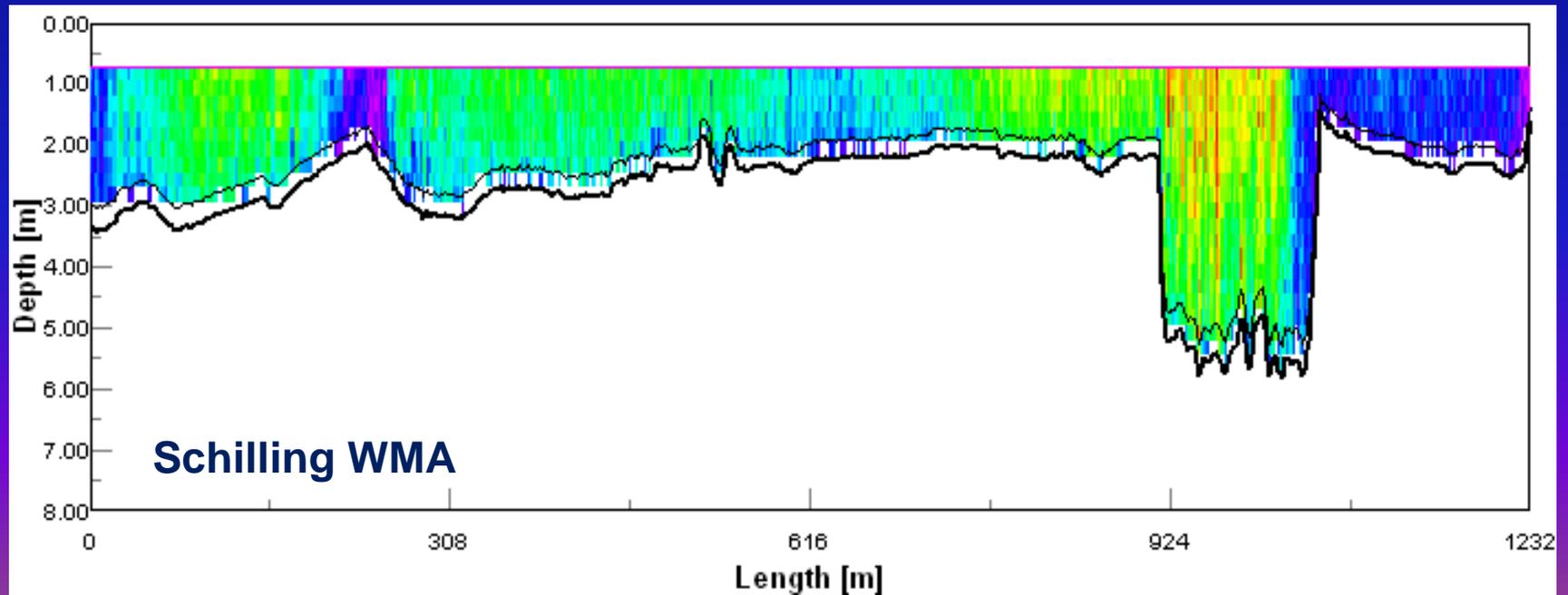
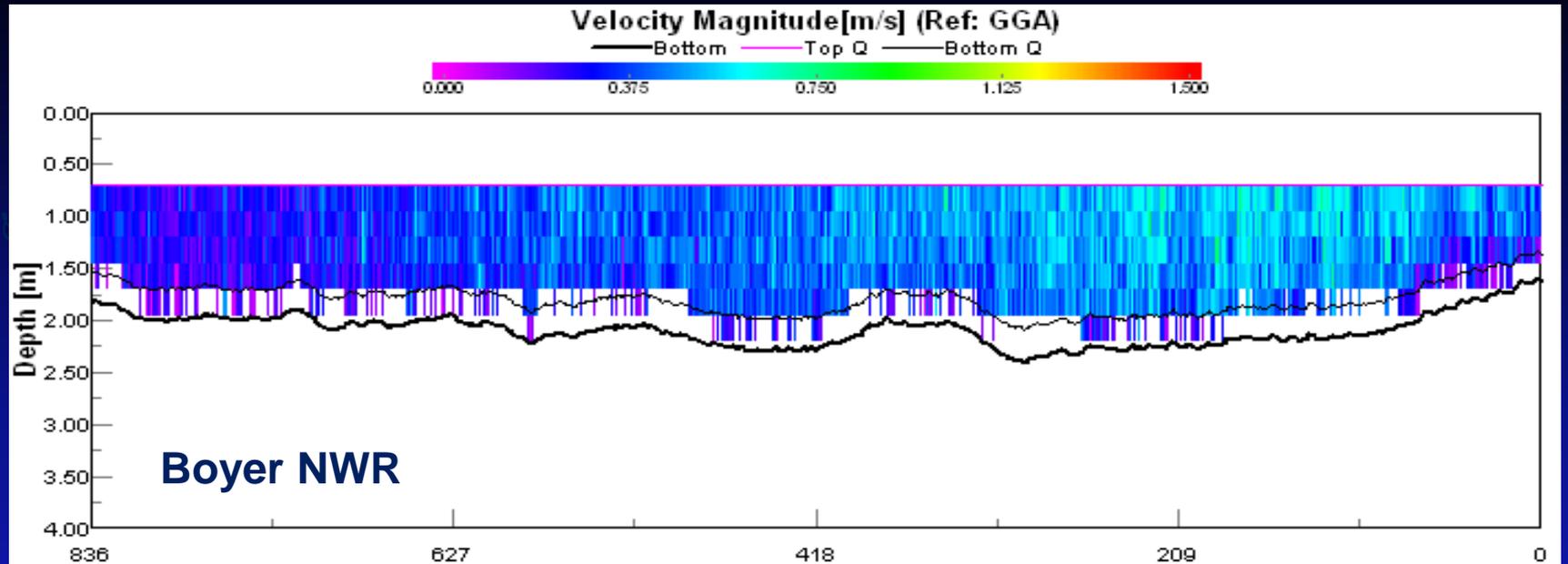
NGPC Shilling Wildlife Management Area

9 – 22 -2011



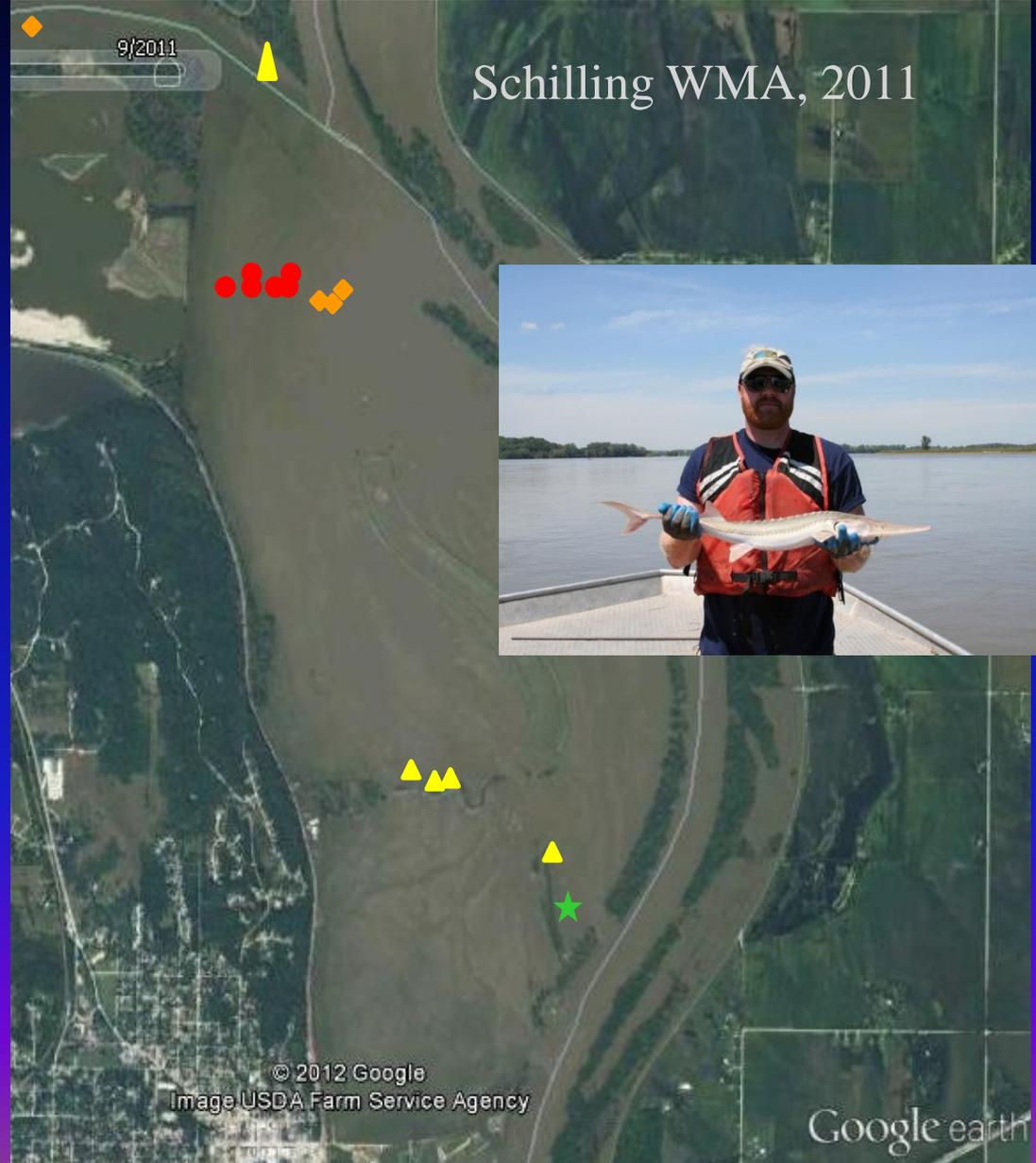
Storage of flood waters on the floodplain

Water Depth and Velocity



Pallid Sturgeon Telemetry Project

- Documented pallid sturgeon using the floodplain for the first time
- Four different pallid sturgeon observed on the floodplain at Schilling WMA on multiple occasions
- Sampled pallid and shovelnose sturgeon on floodplain



NEW – replaces 1983 Principles and Standards!

**Principles and Requirements for Federal Investments in
Water Resources, March 2013**

Federal Objective, WRDA 2007, specifies investments shall reflect national priorities, encourage economic development, and protect the environment by:

1. Seeking to maximize sustainable economic development;
2. Seeking to avoid the unwise use of floodplains and flood-prone areas & minimizing adverse impacts and vulnerabilities in any case in which a floodplain or flood-prone area must be used; and
3. Protecting and restoring the functions of natural systems and mitigating any unavoidable damage to natural systems.

Source: Council on Environmental Quality. 2013.

The Nebraska Legislature

Instream Flows

- LB 1106 passed in 1984 authorized instream flows for recreation or fish and wildlife purposes.
- § 46-2,108 further states instream use of water for recreation or fish and wildlife purposes shall be considered a beneficial use of water.

What is missing in Nebraska water law?

Answer

The **obligation** to protect rivers and streams.

For the path forward, we need **Water Balance**
because we are all part of the solution and we are all
investing in our future.

Although Nebraska is an **agriculture state**, it is **not a**
rural state, most people live in urban areas.

Question ?

Q. When streams and rivers can legally be diverted or diminished via some combination of surface and/or ground water depletions to the point where they no longer function, has the State of Nebraska fulfilled its obligation of protecting *The Public Trust*?

Public Trust Doctrine

The public trust doctrine revolves around the concept that government owes its citizens special duties of stewardship regarding common property resources which the state holds in trust for the public. The public trust doctrine holds that government must act as a fiduciary (one to whom property or power is entrusted for the benefit of another) in its management of the trust resources. The beneficiaries of this trust are the citizens of the state, including future generations. Common property resources, including water, fish, wildlife, air, and land, are held by the states in their sovereign capacity and are subject to the public trust.

Greg Cooke, Environmental Law Attorney
Juneau, Alaska (also Nebraska Policy Issue #4 for groundwater)

The NGPC

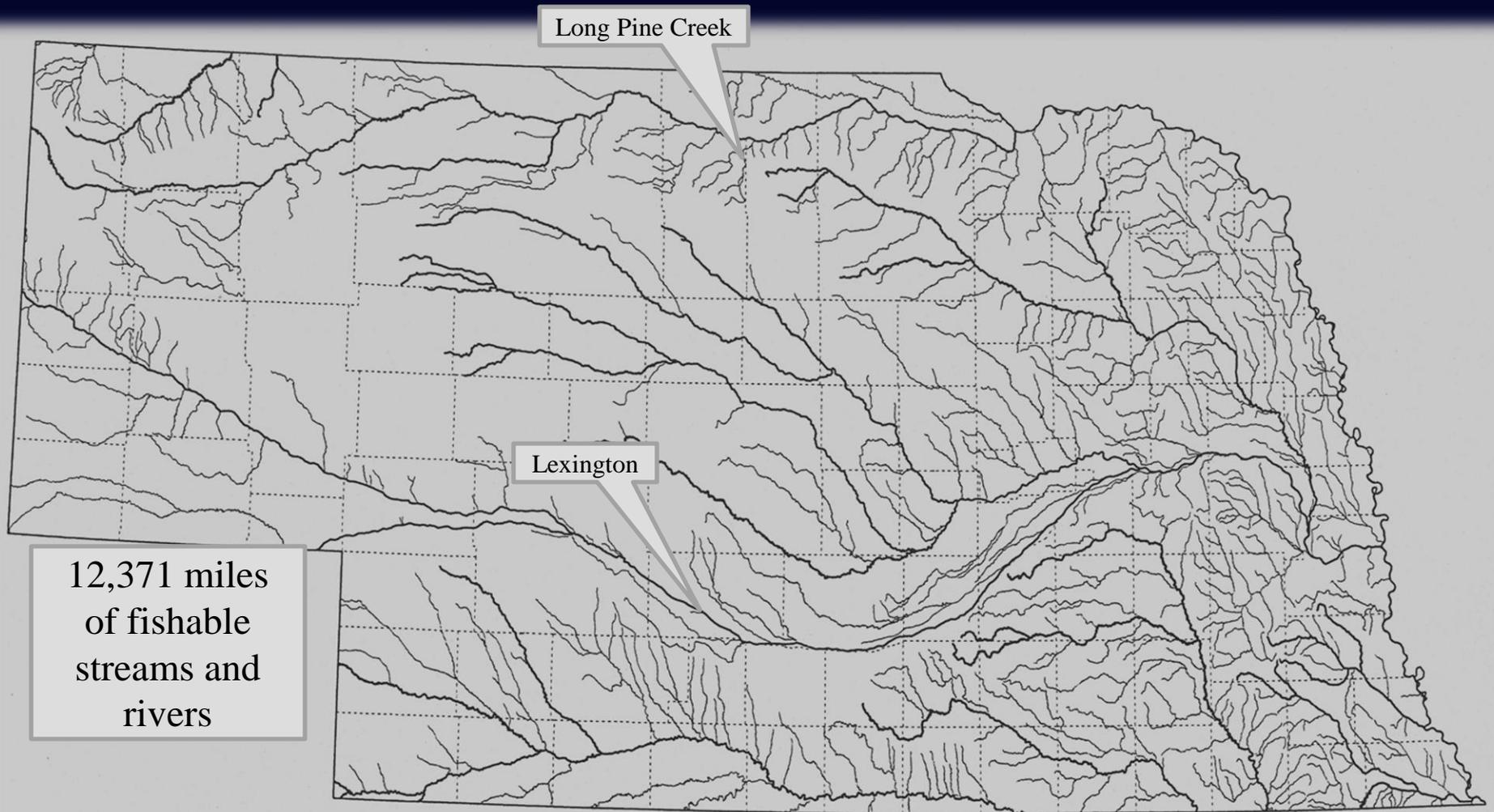
Has a long tradition of doing what is in the best interest of Nebraskans. Our business is helping people enjoy opportunities to hunt, fish, and enjoy the outdoors using public trust natural resources throughout Nebraska and thus contribute to the quality of life enjoyed by citizens and their visitors.

River Flows: an effort to protect *The Public Trust!*

The use of the water of every natural stream within the State of Nebraska is hereby dedicated to the people of the state for beneficial purposes (Article XV, Sec. 5, Constitution of the State of Nebraska). The right to divert unappropriated water of every natural stream for beneficial use shall never be denied except when such denial is demanded by the public interest (Article XV, Sec. 6, Constitution of the State of Nebraska)

This language has been construed by the Nebraska Supreme Court as allowing the Legislature to define the “public interest” (Zellmer and Harder 2007)

Major Streams and Rivers



Zuerlein, G. 1983. 23,686 miles of streams and canals in Nebraska. Nebraskaland, J/F Issue.

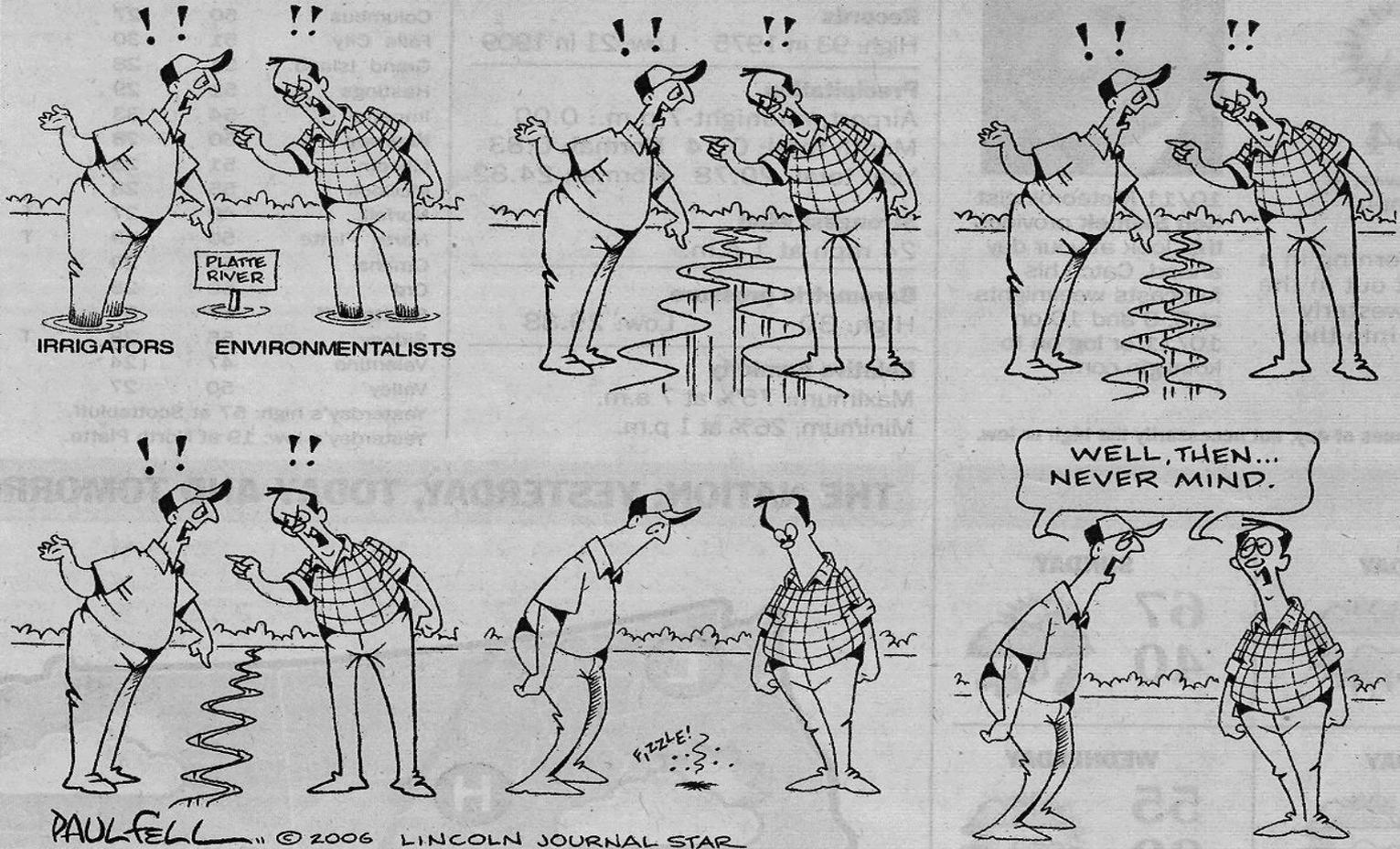
9 Projects requested
2.3 MAF from SP
and PR (handout)

JOURNAL STAR
Friday, October 13, 2006

5B

Annual Grand
Island gage, 1942-
1993, is 1.1 MAF

www.paulfellcartoons.com



See handout for Platte River , 1976 - 1990

Issues - Dead fish and dying streams and rivers!

**Middle Platte Sub-basin – Cozad to Columbus – 74, 75, 76, 80, 83, 85, 87, 88, 89, 90, 91, 94, 96,
Middle and Lower Platte-2012**



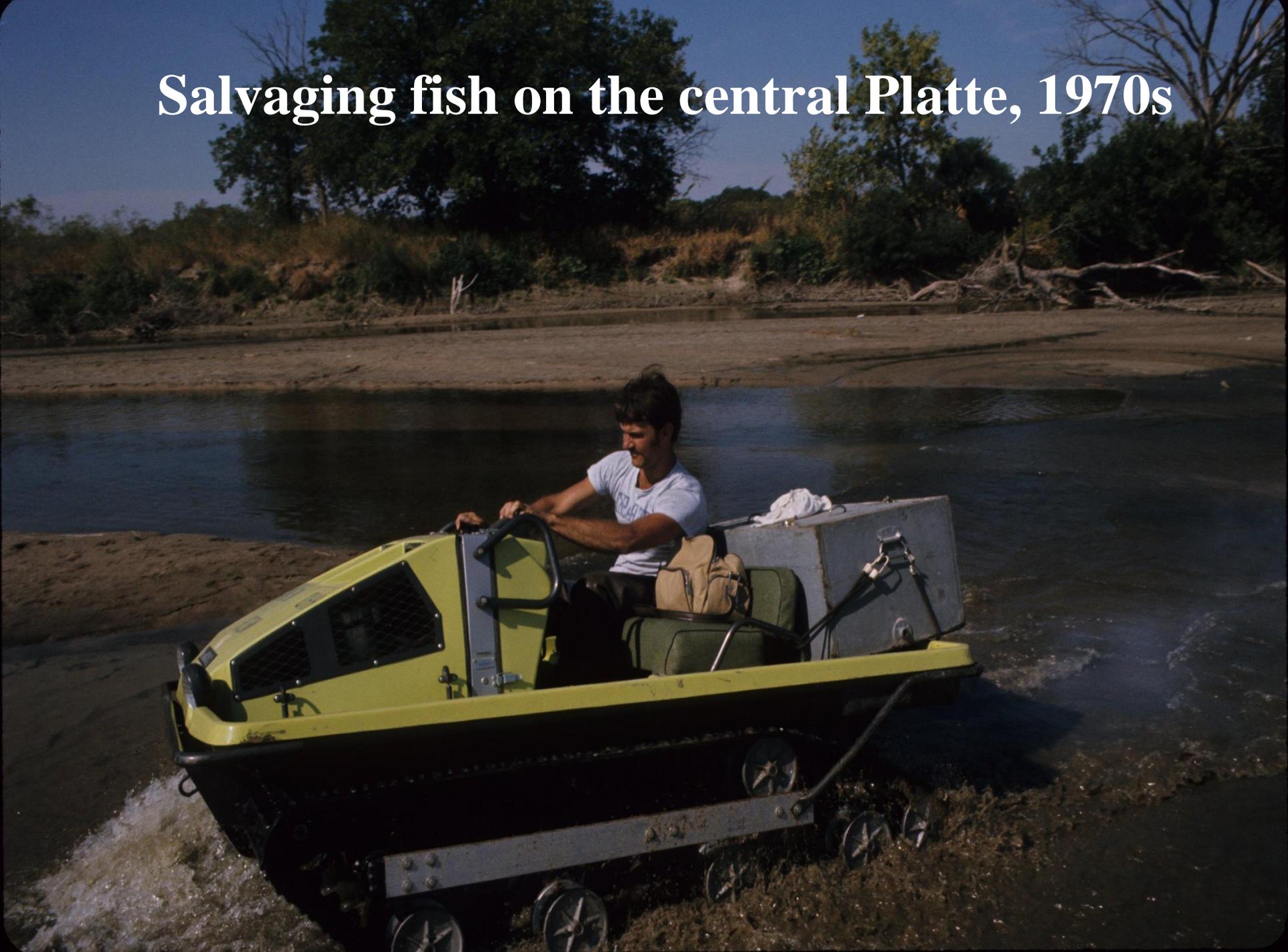
Three State Cooperative Agreement signed July 1, 1997

Platte River near Central City mid 1970s



Dry central Platte River, 1970s, prior instream flow law

Salvaging fish on the central Platte, 1970s





Platte River near Central City – mid 1970s

Channel catfish on dry Platte River 1970s



Fish Community Utilized for Platte River Instream Flows, 1993 (NGPC-Instream Flow Incremental Methodology with PHABSIM)

Species	Life stage	River Reach	
1. Western silvery minnow*	Adult	Central	Lower
2. Plains minnow*	Adult	Central	Lower
3. Speckled chub*	Adult	Central	Lower
4. Flathead chub*	Adult		Lower
5. River shiner*	Juvenile, Adult	Central	Lower
6. Red shiner*	Juvenile, Adult	Central	Lower
7. Sand shiner*	Juvenile, Adult	Central	Lower
8. River carpsucker*	Juvenile	Central	Lower
9. Channel catfish	Juvenile, Adult	Central	Lower
10. Flathead catfish	Adult		Lower
11. Plains killifish*	Adult	Central	Lower
12. <u>Carp*</u>	Adult	Central	Lower

* Potential least tern forage/prey species

Platte River 15 Year Review - NGPC

Instream Flow Appropriations in 2013

- Criteria/standard to meet: Is the beneficial purposes for which they were obtained still being served and are they still in the public interest?
- See: Outdoornebraska.gov
 - Click on Conservation
 - Click on Water, scroll down to Platte River
- Approved by NDNR Order dated 6 June 2013

Table 2. NGPC Platte River instream flow appropriation applications in cubic feet per second approved with provisions in the June 26th, 1998 NDNR Order.

Original Application		Approved	Approved	Approved Central Platte		Approved Lower Platte	
Flow requested by time period	Purpose	River Reach	Time Period	Odessa & Grand Island gages	Duncan gage	North Bend gage	Louisville gage
A-17329 1,000 cfs Jan-Dec	Maintain fish community	Kearney Canal Diversion Dam downstream to Loup Power Canal return at Columbus	Jun 1- Jun 23 Jun 24- Jul 31 Aug 1- Aug 22 Aug 23- Aug 31	500 400 200 300	500 400 300 400		
A-17330 1,800 cfs Jan-Dec	Maintain fish community	Loup Power Canal return downstream to confluence with Elkhorn River	Entire year			1,800	
A-17331 3,700 cfs Jan – Dec.	Maintain fish community	Elkhorn River downstream to mouth of Platte River	Jan 1 - 31 Feb 1- Jul 31 Aug 1 - 31 Sept 1 - 30 Oct 1- Dec 31				3,100 3,700 3,500 3,200 3,700
A-17332 2,400 cfs Apr 1-May 10 2,000 cfs Oct 1-Nov 10	Maintain whooping crane roosting habitat	Kearney Canal Diversion downstream to U.S. Hwy 281 bridge at Grand Island	Apr 1- Apr 14 May 4 - May 10 Oct 1- Oct 11	50 1,350 1,350			

Table 3 (purposes specified). Total instream flows in cubic feet per second granted for the central and lower Platte River when CPNRD appropriations (effective priority date of July 25, 1990) are combined with NGPC appropriations (effective priority date of November 30, 1993) by time period (calendar date sequence) and gage location. Yellow = NGPC appropriations and non-yellow = CPNRD appropriations.

Time Period	Central Platte River reach					Lower Platte River reach				
	Overton gage		Odessa & Grand Island gages		Duncan gage		North Bend gage	Louisville gage		
	Purpose ¹		Purpose ^{1,3}		Purpose ^{1,3}		Purpose ³	Purpose ³		
January 1 - 31	500	Maint. Fish & macroinvert for t & p	500 ¹	Maint. Fish & macroinvert for t & p	500 ¹	Maint. Fish & macroinvert for t & p	1,800	Fish community	3,100 ¹⁰	Fish community
February 1 - 28	500	Maint. Fish & macroinvert for t & p	500 ¹	Maint. Fish & macroinvert for t & p	500 ¹	Maint. Fish & macroinvert for t & p	1,800	Fish community	3,700	Fish community
March 1 - 31	1,100	Maint. Sandhill crane habitat	1,100 ¹	Maint. Sandhill crane habitat	500 ¹	Maint. Fish & macroinvert for t & p	1,800	Fish community	3,700	Fish community
April 1 – 14	1,300	Maint. WC & Sandhill crane habitat	1,350 ²	Maint. WC & Sandhill habitat	500 ¹	Maint. Fish & macroinvert for t & p	1,800	Fish community	3,700	Fish community
April 15 – 30	1,500	Maint. WC & Sandhill crane habitat	1,500 ¹	Maint. WC & Sandhill habitat	500 ¹	Maint. Fish & macroinvert for t & p	1,800	Fish community	3,700	Fish community
May 1 – 3	1,500	Maint. WC & Sandhill crane habitat	1,500 ¹	Maint. WC & Sandhill habitat	500 ¹	Maint. Fish & macroinvert for t & p	1,800	Fish community	3,700	Fish community
May 4 – 10	500	Maint. Fish & macroinvert for t & p	1,350 ³	Maint. Whooping Crane habitat	500 ¹	Maint. Fish & macroinvert for t & p	1,800	Fish community	3,700	Fish community
May 11 – 31	500	Maint. Fish & macroinvert for t & p	500 ¹	Maint. Fish & macro for t & p	500 ¹	Maint. Fish & macroinvert for t & p	1,800	Fish community	3,700	Fish community
June 1 – 23	500	Maint. Fish & macroinvert for t & p	1,000 ⁴	Maint. Fish comm. & macro for t & p	1,000 ⁴	Fish comm. & macroinvert for t & p	1,800	Fish community	3,700	Fish community
June 24 – 30	600	Maint. Fish & macroinvert for t & p	1,000 ⁵	Maint. Fish comm. & macro for t & p	1,000 ⁵	Fish comm. & macroinvert for t & p	1,800	Fish community	3,700	Fish community
July 1 – 31	600	Maint. Fish & macroinvert for t & p	1,000 ⁵	Maint. Fish comm. & macro for t & p	1,000 ⁵	Fish comm. & macroinvert for t & p	1,800	Fish community	3,700	Fish community
August 1 – 22	600	Maint. Fish & macroinvert for t & p	800 ^{6,10}	Maint. Fish comm. & macro for t & p	900 ^{8,10}	Fish comm. & macroinvert for t & p	1,800	Fish community	3,500 ¹⁰	Fish community
August 23 – 31	500	Maint. Fish & macroinvert for t & p	800 ^{7,10}	Maint. Fish comm. & macro for t & p	900 ^{9,10}	Fish comm. & macroinvert for t & p	1,800	Fish community	3,500 ¹⁰	Fish community
Sept 1 - 30	500	Maint. Fish & macroinvert for t & p	500 ¹	Maint. Fish & macroinvert for t & p	500 ¹	Maint. Fish & macroinvert for t & p	1,800	Fish community	3,200 ¹⁰	Fish community
October 1 – 11	1,100	Maint. Sandhill crane habitat	1,350 ³	Maint. Whooping Crane habitat	500 ¹	Maint. Fish & macroinvert for t & p	1,800	Fish community	3,700	Fish community
October 12 -31	1,500	Maint. WC & Sandhill crane habitat	1,500 ¹	Maint. Whooping Crane habitat	500 ¹	Maint. Fish & macroinvert for t & p	1,800	Fish community	3,700	Fish community
Nov 1 – 10	1,500	Maint. WC & Sandhill crane habitat	1,500 ¹	Maint. WC & Sandhill habitat	500 ¹	Maint. Fish & macroinvert for t & p	1,800	Fish community	3,700	Fish community
Nov 11 – 30	500	Maint. Fish & macroinvert for t & p	500 ¹	Maint. Fish & macroinvert for t & p	500 ¹	Maint. Fish & macroinvert for t & p	1,800	Fish community	3,700	Fish community
December 1 – 31	500	Maint. Fish & macroinvert for t & p	500 ¹	Maint. Fish & macroinvert for t & p	500 ¹	Maint. Fish & macroinvert for t & p	1,800	Fish community	3,700	Fish community

Superscript notes for Table 3 (purposes specified) continued:

1 = CPNRD

2 = NGPC (50 cfs for maintaining whooping crane roost habitat) plus CPNRD (1,300 cfs for maintaining staging and roosting stopover habitat for whooping and sandhill cranes).

3 = NGPC

4 = NGPC (500 cfs for maintaining the fish community) plus CPNRD (500 cfs for maintaining fish and macroinvertebrates as food for least terns and piping plovers).

5 = NGPC (400 cfs for maintaining the fish community) plus CPNRD (600 cfs for maintaining fish and macroinvertebrates as food for least terns and piping plovers).

6 = NGPC (200 cfs for maintaining the fish community) plus CPNRD (600 cfs for maintaining fish and macroinvertebrates as food for least terns and piping plovers).

7 = NGPC (300 cfs for maintaining the fish community) plus CPNRD (500 cfs for maintaining fish and macroinvertebrates as food for least terns and piping plovers).

8 = NGPC (300 cfs for maintaining the fish community) plus CPNRD (600 cfs for maintaining fish and macroinvertebrates as food for least terns and piping plovers).

9 = NGPC (400 cfs for maintaining the fish community) plus CPNRD (500 cfs for maintaining fish and macroinvertebrates as food for least terns and piping plovers).

10 = NDNR reduced the instream flow request because it was higher than the 20 percent exceedance probability flow limit set by statute.

Note: WC = Federal and State listed Endangered Whooping Crane, Interior Least Tern = Federal and State listed Endangered, Piping plover = Federal and State listed Threatened.

Note: For an additional reference for Table 3, see NDNR (2010). Table A – 1 of this reference combines NGPC and CPNRD instream flow quantity numbers and consolidates some time frames, otherwise all numbers are the same as in Table 3 above. This reference also contains Tables A – 2 and A – 3 which depict Platte River Recovery Implementation Program (PRRIP) Species Target Flows during wet, normal, and dry periods for the critical reach between Lexington and Chapman, Nebraska.

CPNRD species as food for least terns included : sand shiner, plains killifish, and fathead minnow (all small minnow species).

Overall

***Human health, economic health,
and social health are tied to
ecosystem health !***

Environmental flows: describe the quantity, timing, and quality of water flows required to sustain freshwater ecosystems and the human livelihoods and well-being of those that depend on these ecosystems¹

¹ The Brisbane Declaration, 2007: > 750 scientists from > 50 countries.

The Good

An aerial photograph showing a wide, blue river winding through a lush green landscape. In the foreground, a large, well-maintained park area with green lawns and a prominent red tower is visible. The river flows through a valley with dense forests and some agricultural fields. A bridge crosses the river in the middle ground. The overall scene is bright and clear, suggesting a healthy environment.

A healthy looking lower Platte River with Platte River State Park in foreground

The Bad

Platte River near Louisville, July 2012



Loup Public Power Canal return at Columbus 24 August 2012



24/08/2012

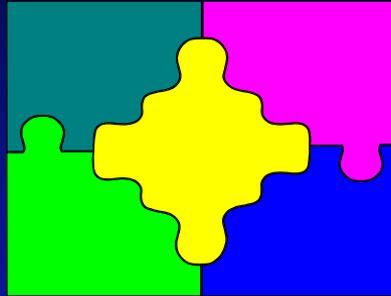
The Ugly

Pallid sturgeon, spawned in 1999, pit tagged and stocked in 2002 at Sunshine Bottoms, traveled down MR through Gavins Point Dam, down the MR and up the lower Platte River, found dead in July 2012 near Louisville.



During 2009, 69 pallids were sampled in lower Platte during spring, summer, and fall; 66 were below mouth of Elkhorn and 3 were above it.

Ecosystem Management



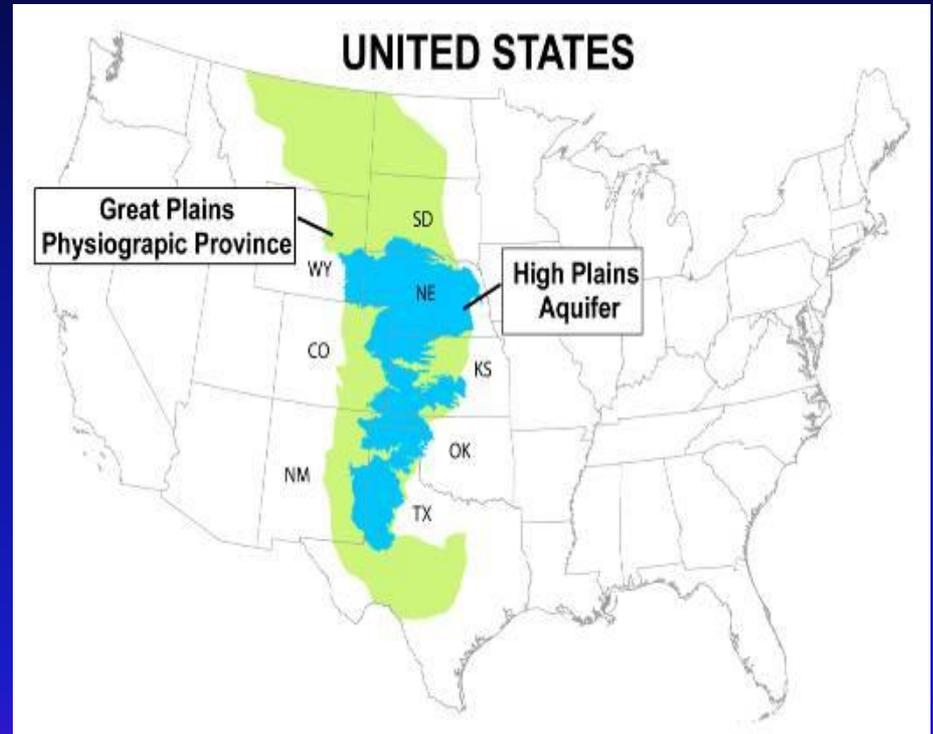
Rule number one:

- ★ Thou shall not throw away any of the parts!

Ground Water

The HIGH PLAINS AQUIFER

- The High Plains Aquifer underlies about 173,000 square miles in parts of eight states.
- The GPPP is a vast east-tilted surface formed by deposition of sediment eroded from the ancestral Rocky Mountains, beginning about 65 million years ago.
- The GPPP is characterized by gently sloping, smooth plains.

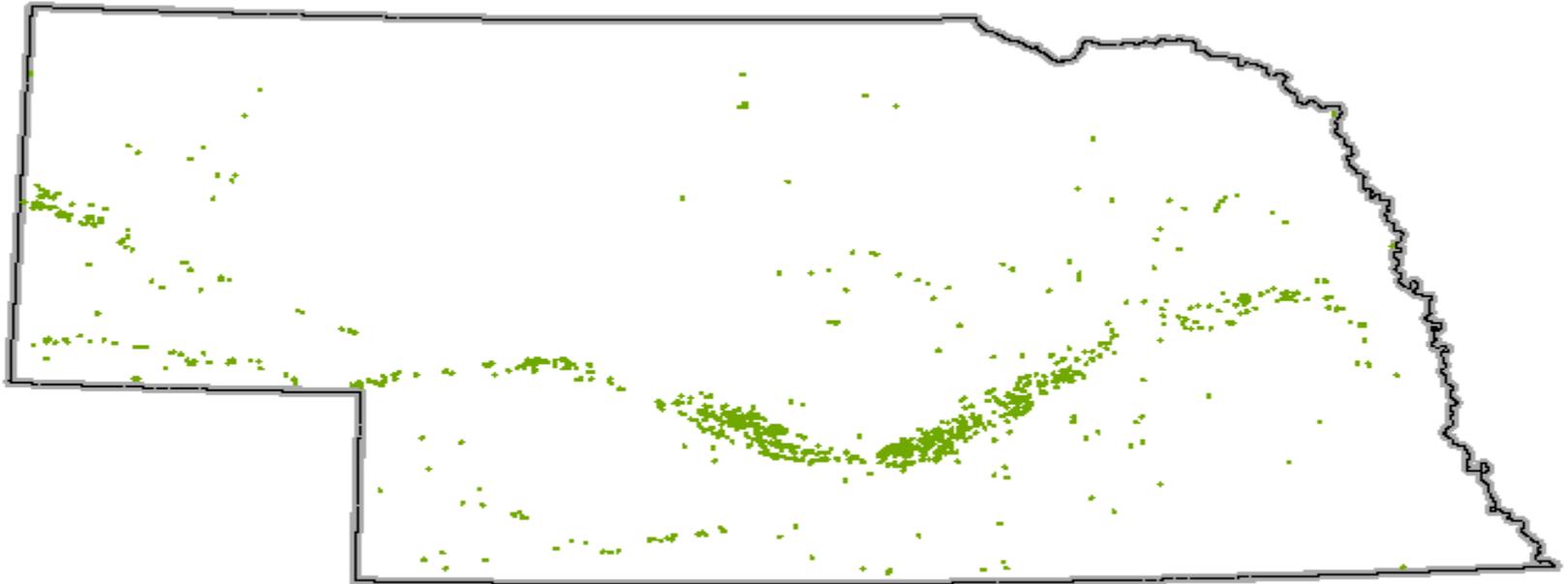


Reference: Fenneman (1931); and Gutentag and Weeks (1981)



Planning and Assistance Division

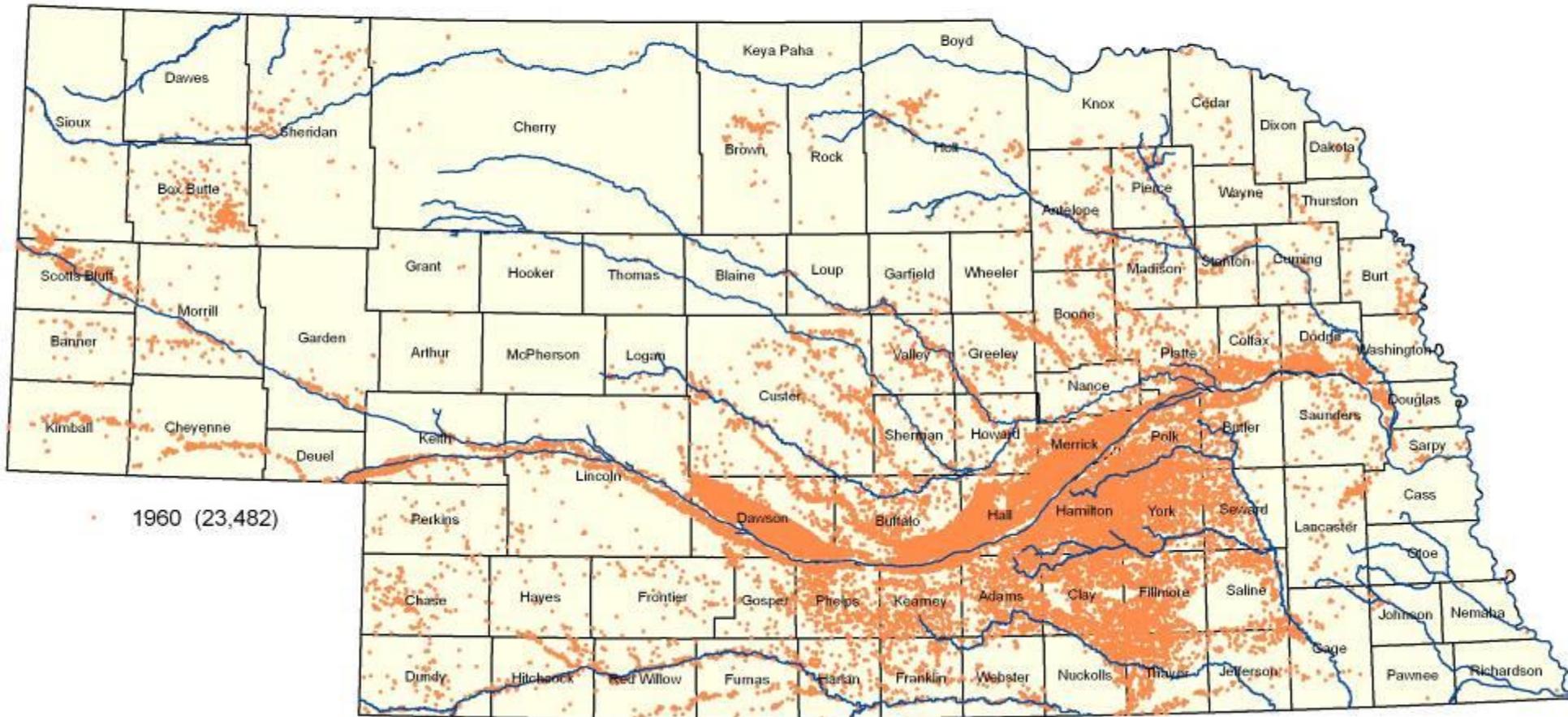
Registered Irrigation Wells Completed Prior to 1940



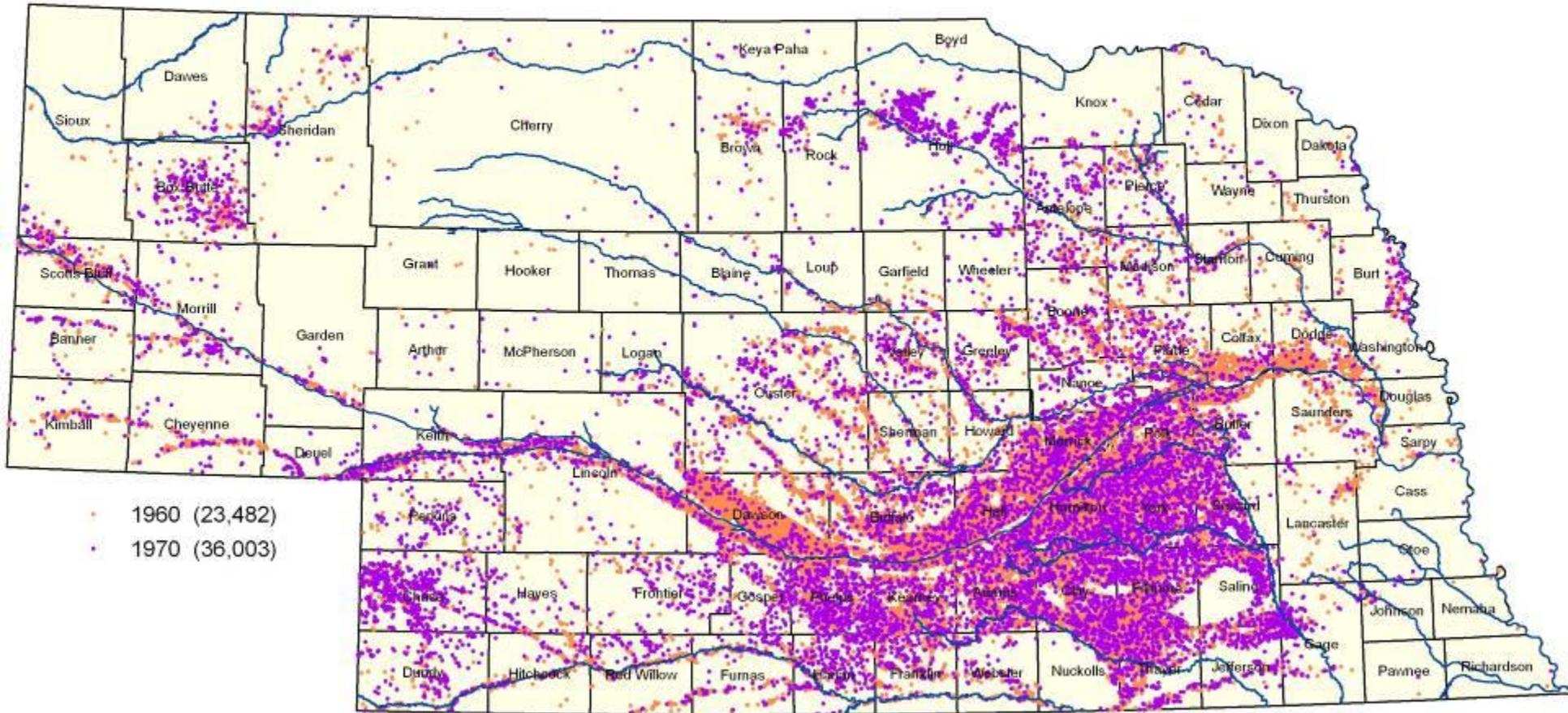
0 25 50 100 150 200 Miles

Source: Nebraska Department of Natural Resources Registered Well Database

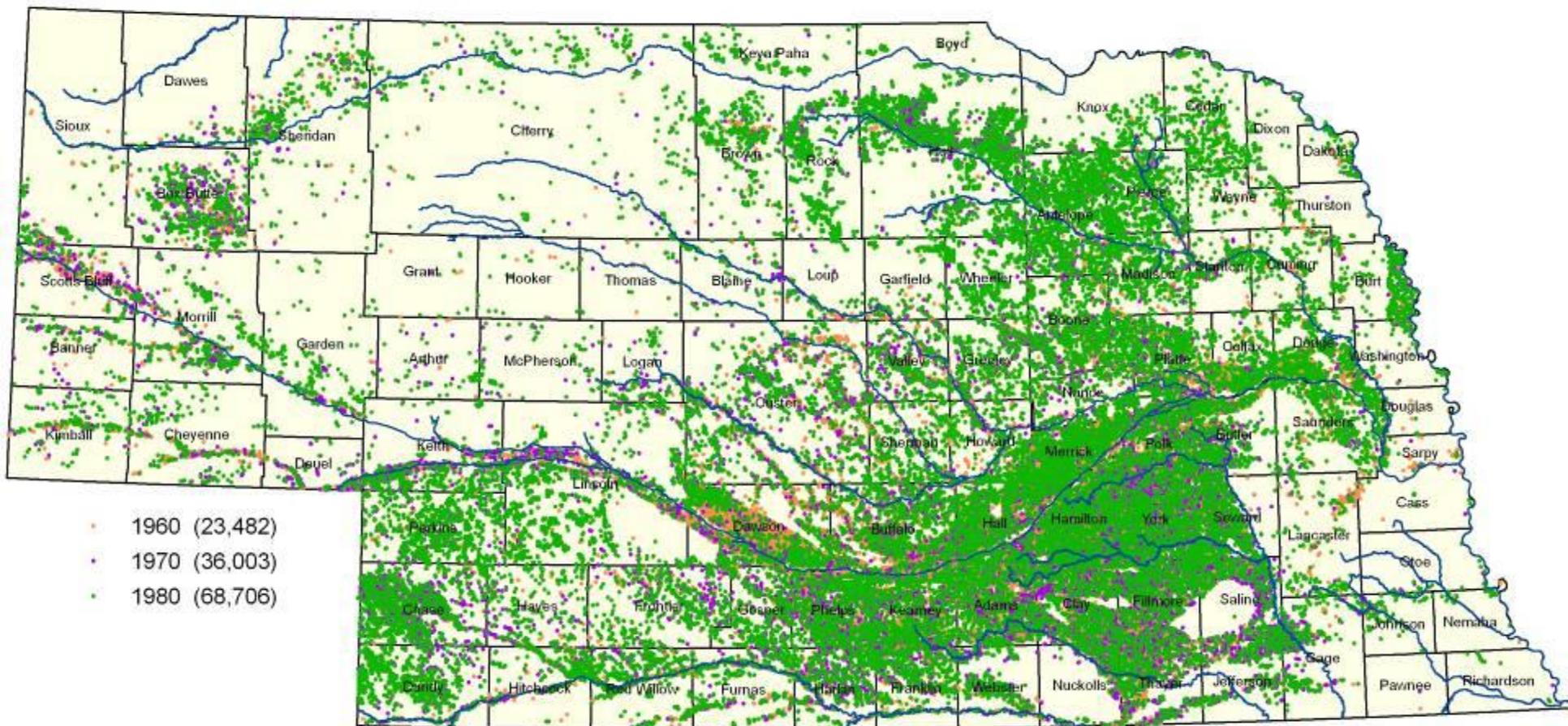
Registered Irrigation Wells in Nebraska 1960



Registered Irrigation Wells in Nebraska 1970

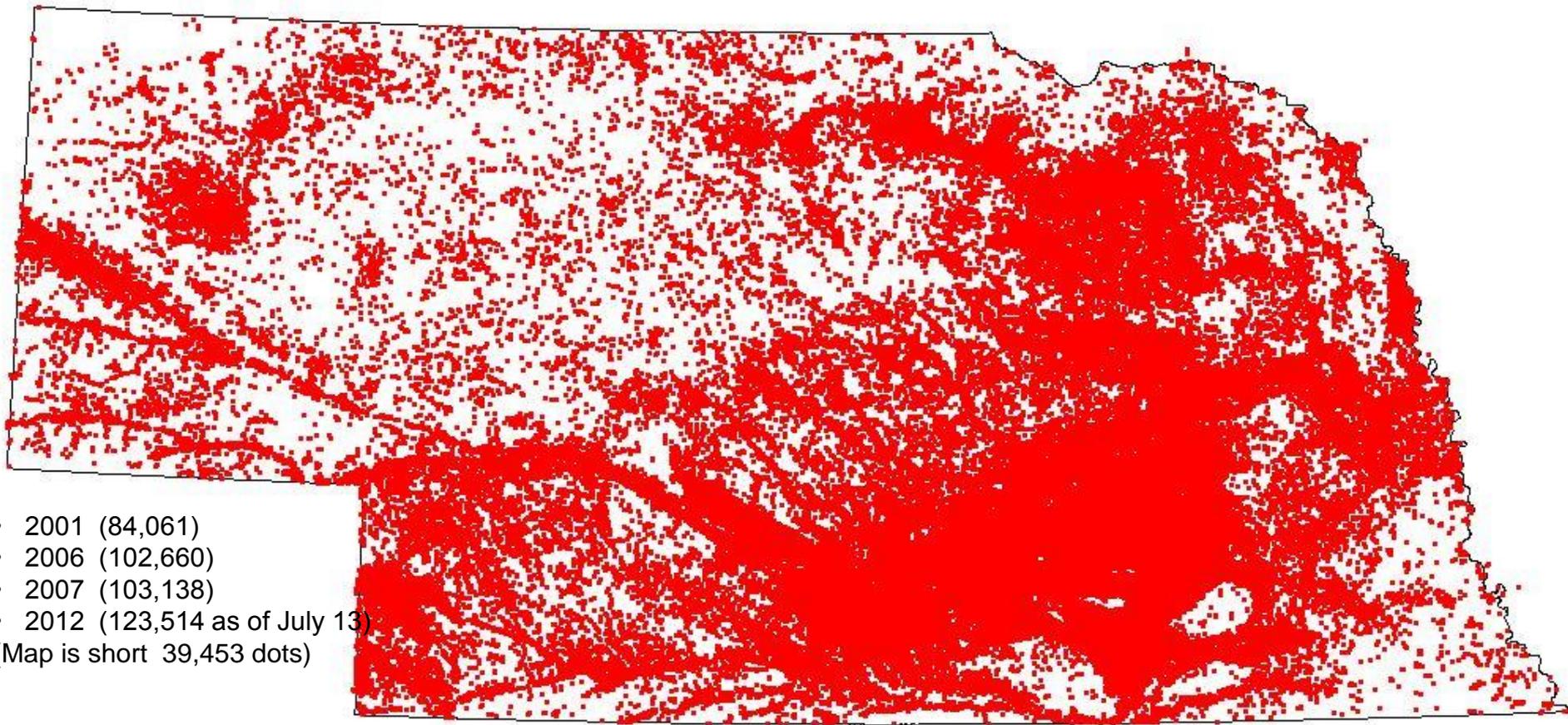
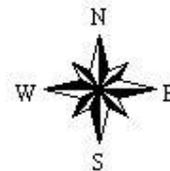


Registered Irrigation Wells in Nebraska 1980



Wells Completed in 2000 or Earlier

As Recorded in the Registered Well Database



- 2001 (84,061)
 - 2006 (102,660)
 - 2007 (103,138)
 - 2012 (123,514 as of July 13)
- (Map is short 39,453 dots)



Natural Resources Districts

Years

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	
Central Platte	264	257	309	891	714	813	352	324	306	389	217	95	98	56	46	51	82	249	233	175	245	124	167	
Lewis & Clark	15	6	20	60	81	128	18	8	10	31	25	5	5	0	0	2	3	10	16	6	16	4	13	
Little Blue	140	123	156	304	295	241	105	125	138	183	80	42	61	29	21	17	37	94	70	67	89	53	44	
Lower Big Blue	37	41	46	105	114	137	39	34	31	53	23	15	11	6	3	4	5	21	20	18	21	15	8	
Lower Elkhorn	126	66	142	340	597	540	113	110	92	253	82	41	39	11	6	25	52	96	149	59	108	41	68	
Lower Loup	340	220	287	450	676	594	213	318	359	368	143	80	85	34	10	35	41	89	102	106	119	44	49	
Lower Niobrara	112	78	101	145	125	152	86	69	31	78	28	29	27	6	7	7	10	24	28	21	21	19	30	
Lower Platte North	120	30	80	255	320	337	80	65	83	129	45	20	20	17	7	12	22	73	59	63	79	67	45	
Lower Platte South	4	1	7	19	37	48	9	9	7	13	7		1	2	2	0	1	5	2	0	11	3	3	
Lower Republican	96	81	93	202	250	215	82	127	86	91	36	17	29	16	17	9	23	41	31	92	108	45	35	
Middle Niobrara	38	69	81	91	102	111	32	10	16	21	10	3	2	2	0	2	0	3	3	3	7	13	8	
Middle Republican	152	124	150	219	206	193	103	168	155	72	26	16	9	8	4	17	15	31	42	69	37	48	27	
Nemaha	5	4	5	33	53	65	16	5	11	6	13	2	2	1	1	0	0	1	7	3	2	1	5	
North Platte	38	55	115	172	150	94	43	56	43	77	28	31	30	18	12	4	6	61	76	46	47	25	61	
Papio-Missouri River	8	9	16	76	110	179	24	16	21	30	4	2	8	0	3	4	10	23	25	15	21	5	8	
South Platte	40	29	52	83	100	47	33	17	20	33	19	9	9	4	3	2	4	10	16	11	7	9	16	
Tri-Basin	181	143	175	256	235	197	103	99	98	134	80	54	58	35	24	26	44	87	67	89	128	62	65	
Twin Platte	73	95	81	129	136	96	69	108	88	121	44	45	20	9	9	1	6	37	19	27	22	26	24	
Upper Big Blue	287	317	352	629	685	609	211	188	264	314	150	53	76	53	37	30	68	135	134	98	135	76	66	
Upper Elkhorn	139	162	181	364	394	319	99	118	131	180	34	29	38	20	9	3	20	41	59	41	58	40	25	
Upper Loup	28	54	46	40	61	29	10	22	36	21	16	5	1	2	0	0	3	7	2	4	3	0	4	
Upper Niobrara-White	52	59	81	113	126	83	56	35	57	112	72	39	24	20	9	11	7	35	41	26	28	13	26	
Upper Republican	103	158	280	352	250	259	109	156	121	98	69	82	82	30	11	13	7	22	37	25	54	12	6	
Yearly Totals	2398	2181	2856	5328	5817	5486	2005	2187	2204	2807	1251	714	735	379	241	275	466	1195	1238	1064	1366	745	803	
<i>continued</i>	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012						
Central Platte	128	178	176	307	298	305	314	386	572	488	397	241	183	134	123	89	131	163						
Lewis & Clark	5	14	12	26	21	14	34	16	21	45	71	30	43	66	81	24	66	149						
Little Blue	54	97	86	98	61	111	96	91	164	158	179	121	89	95	59	80	150	150						
Lower Big Blue	21	35	31	24	19	42	59	32	49	68	78	50	59	64	37	32	57	67						
Lower Elkhorn	45	105	93	123	67	90	79	68	145	218	326	155	174	155	108	84	88	131						
Lower Loup	62	136	119	129	85	120	192	133	257	257	531	185	244	138	48	86	109	163						
Lower Niobrara	12	18	43	32	19	16	17	23	48	78	95	15	81	73	41	36	76	167						
Lower Platte North	57	101	70	70	35	45	95	85	97	132	337	87	81	67	43	43	64	81						
Lower Platte South	6	5	13	7	7	5	16	11	8	11	9	11	9	9	3	8	10	6						
Lower Republican	60	128	130	134	86	85	76	297	87	126	24	12	9	23	21	17	9	25						
Middle Niobrara	1	4	1	3	1	6	6	7	16	21	26	19	51	61	13	2	9	28						
Middle Republican	36	59	95	106	64	62	85	115	33	33	10	6	1	7	8	10	5	10						
Nemaha	2	2	3	4	1	2	26	12	16	16	35	64	24	30	17	16	26	33						
North Platte	52	73	40	74	41	83	127	89	205	55	25	28	38	44	7	4	12	5						
Papio-Missouri River	8	16	13	27	22	21	30	13	10	21	50	19	17	10	19	15	8	36						
South Platte	19	16	15	17	16	11	33	70	36	42	13	9	3	6	4	4	0	4						
Tri-Basin	72	104	77	101	44	61	69	70	138	253	251	81	49	62	39	30	63	71						
Twin Platte	28	66	54	39	35	46	93	99	135	212	49	24	39	21	38	24	29	37						
Upper Big Blue	97	170	112	125	85	113	144	144	259	287	222	156	176	134	91	89	150	202						
Upper Elkhorn	23	49	65	79	28	35	37	58	83	108	212	73	102	88	53	52	82	85						
Upper Loup	0	7	3	5	3	2	11	2	17	10	13	3	16	23	9	3	13	14						
Upper Niobrara-White	21	17	18	32	18	39	34	42	142	103	27	16	26	12	17	13	9	13						
Upper Republican	10	19	18	10	7	10	41	12	13	24	7	4	7	7	6	8	7	23						
Yearly Totals	819	1418	1287	1572	1063	1324	1714	1875	2551	2766	2987	1409	1521	1329	885	769	1173	1663						

Registered Irrigation Wells
(including replacement wells)
Between the Years 1972-2012
by Natural Resources Districts



published by the
Nebraska Department of Natural Resources
301 Centennial Mall-South
P.O. Box 94676
Lincoln, NE 68509-4676
Phone 402-471-2363
www.dnr.ne.gov



NRD Location Map

Registered Irrigation Wells by River Basin/NRDs

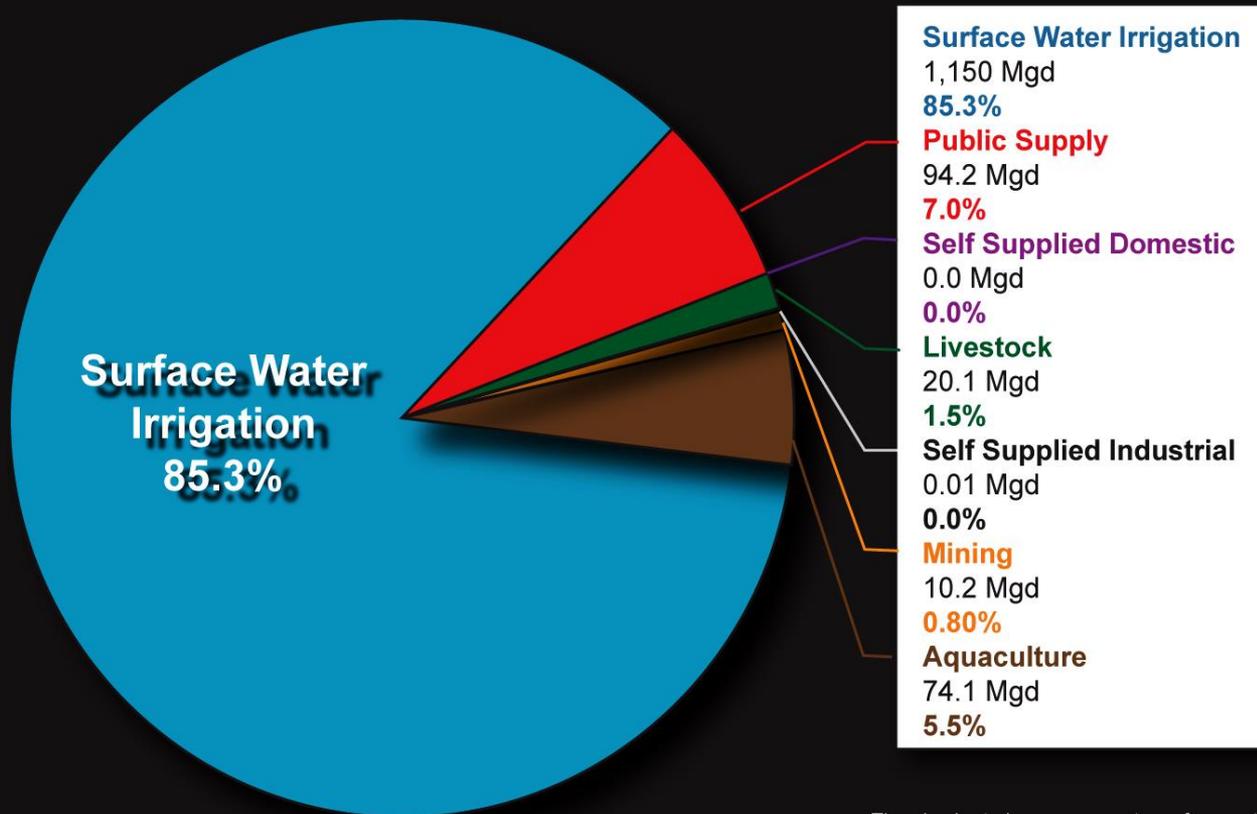
(Source: NDNR Data Bank through 7/13/2012)

	Niobrara	(UNW, MN, LN)	8,070	} 53 %
	Platte	(NP, SP, TP, CP, LPN, LPS, P-MR)	40,194	
	Loup	(UL, LL)	13,643	
	Elkhorn	(UE, LE)	11,594	
	Tribasin	(TB)	6,734	
	Republican	(UR, MR, LR)	12,959	
	Little & Big Blue	(LB, UBB, LBB)	28,432	
	Missouri	(L & C, NEMAHA)	<u>1,888</u>	
			123,514	

<http://dnrdata.dnr.ne.gov/wellscs/reports/summary.asp?type=nrd>

Estimated Total Surface Water Withdrawals

by water use category for the year 2005

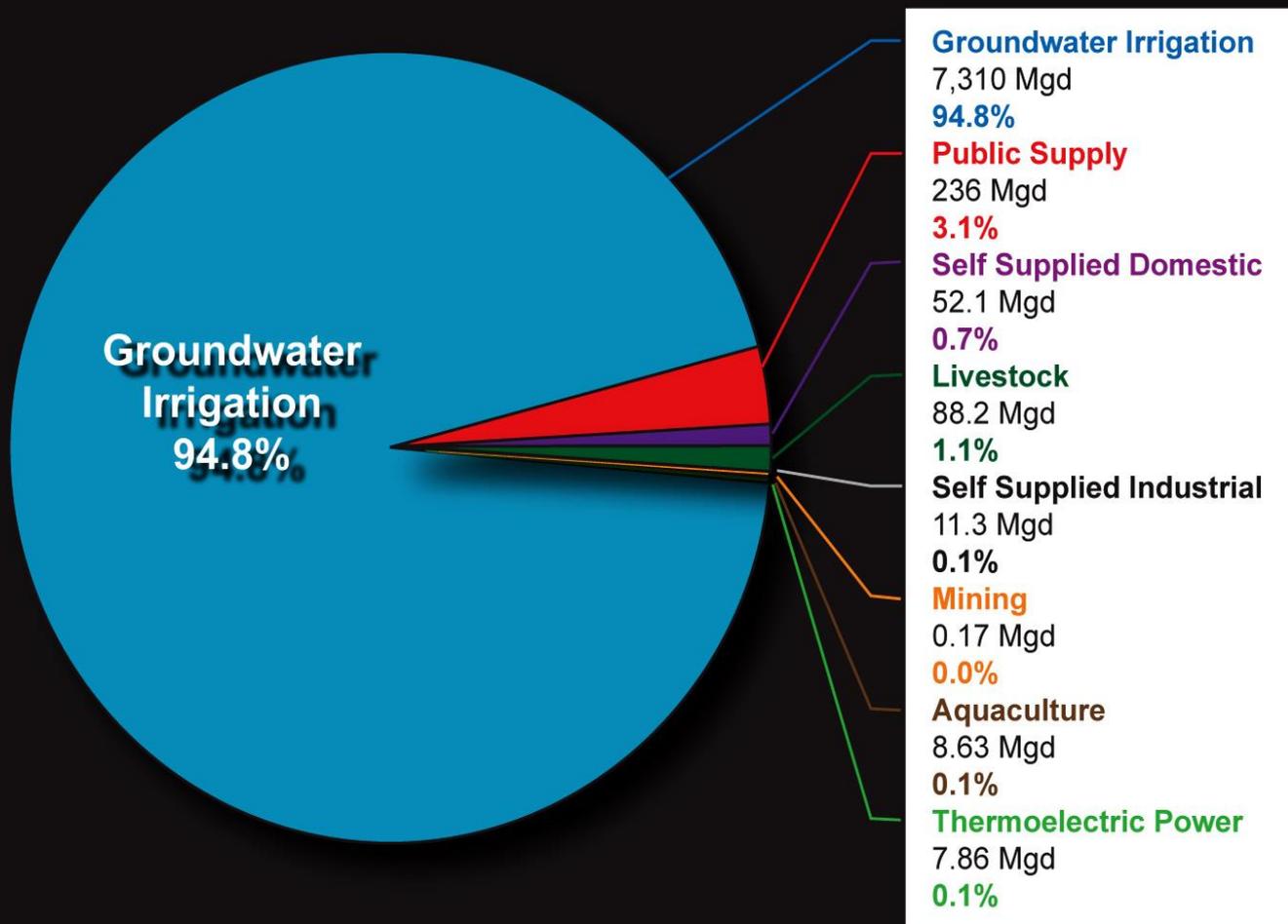


Source for charts: Kenny, J.F., Barber, N.L., Hutson, S.S., Linsey, K.S., Lovelace, J.K., and Maupin, M.A., 2009, Estimated use of water in the United States in 2005: U.S. Geological Survey Circular 1344, 52 p.

The pie chart above represents surface water withdrawals by water use category-2005 without thermoelectric or hydroelectric power.

Estimated Total Groundwater Withdrawals

by water use category for the year 2005



Source for charts: Kenny, J.F., Barber, N.L., Hutson, S.S., Linsey, K.S., Lovelace, J.K., and Maupin, M.A., 2009, Estimated use of water in the United States in 2005: U.S. Geological Survey Circular 1344, 52 p.

**Most streams and rivers are still
not protected with instream
flows!**

Miles of Fishable Streams/Rivers*

Missouri Tributaries	651
Nemaha	1,278
Big Blue	1,600
Little Blue	905
Republican	1,136
Lower Platte	694
Middle Platte	630
North Platte	412
South Platte	280
Elkhorn	1,259
Loup	1,626
Niobrara	1,555
<u>White River/Hat Creek</u>	<u>345</u>
Total	12,371

*(Source: Bliss and Schainost 1971)

Miles of Streams/Rivers Protected with Instream Flows

1. Long Pine Creek (Trib to Niobrara) 8

2. Middle and Lower Platte 277

285

Percent of state total 2.3 %

(285 divided by 12,371)

The Nebraska Water Resources Association (UNL Winter 2013 Vol. 45, No. 1)

- **Vision** – achieve a sustainable water supply for all interests in Nebraska.
- Promote the following **Principles**:
 - Responsible environmental stewardship;
 - Protect public health and the environment;
 - Use sound science in H₂O management;
 - Reasonable economic benefits & costs for H₂O projects;
 - Advocate public education on water issues; and
 - Recognized leadership in addressing H₂O issues.

Watershed Fundamentals

- **Landscape conditions – land mgmt, fish & wildlife habitat etc.**
- **Biotic conditions – species presence etc.**
- **Chemical/physical parameters – dissolved O₂ and temp.**
- **Natural disturbance regimes – landslides, ice, fire etc.**
- **Hydrology/geomorphology – the hydrologic cycle etc.**
- **Ecological processes – production, composition and decomposition of organic matter; energy flow; nitrogen cycling, aquatic food chains.**

Surface water irrigation diversion between Nenzel and Anderson WMA on Niobrara River

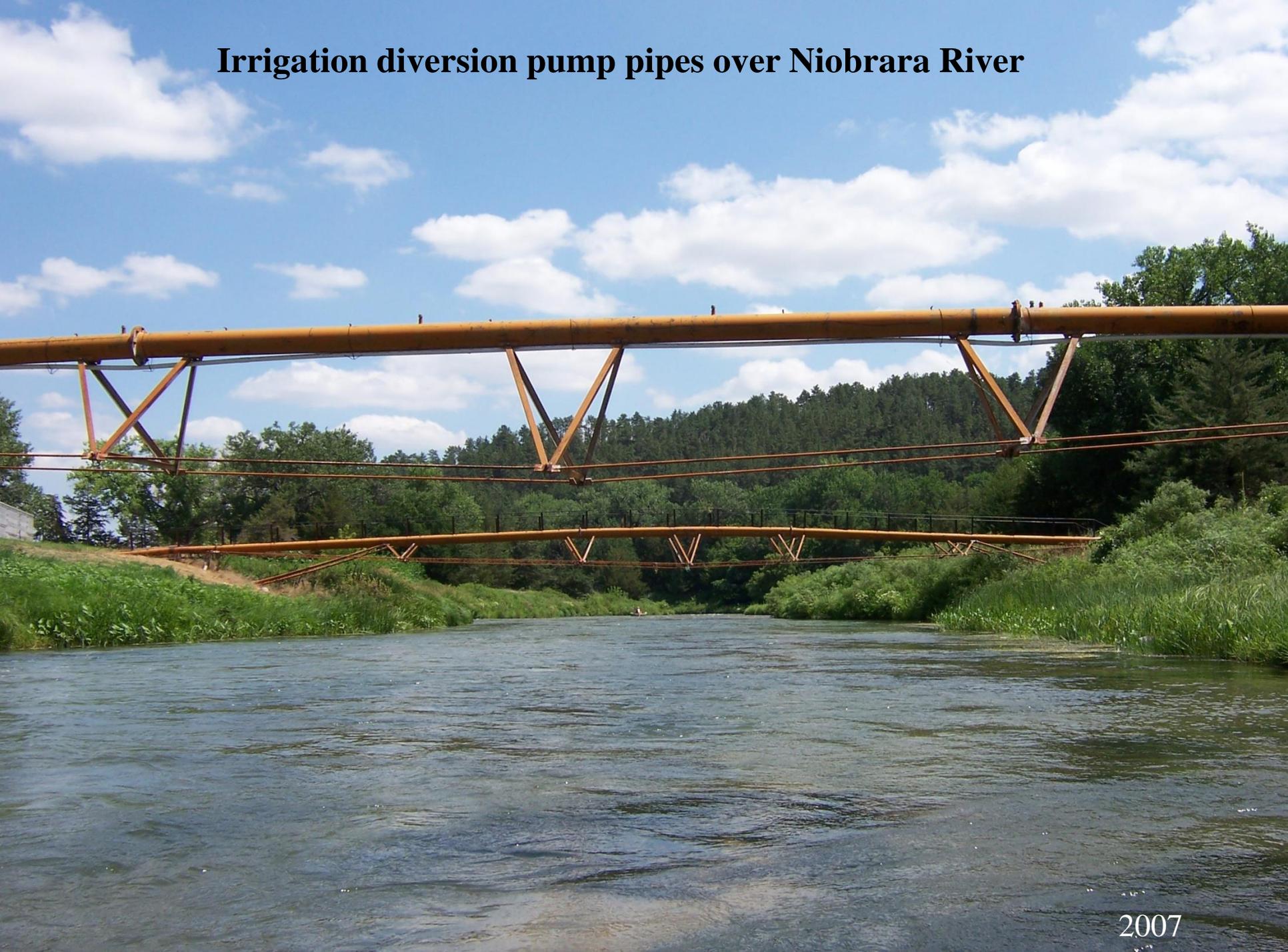


Irrigation diversion pumps on Niobrara

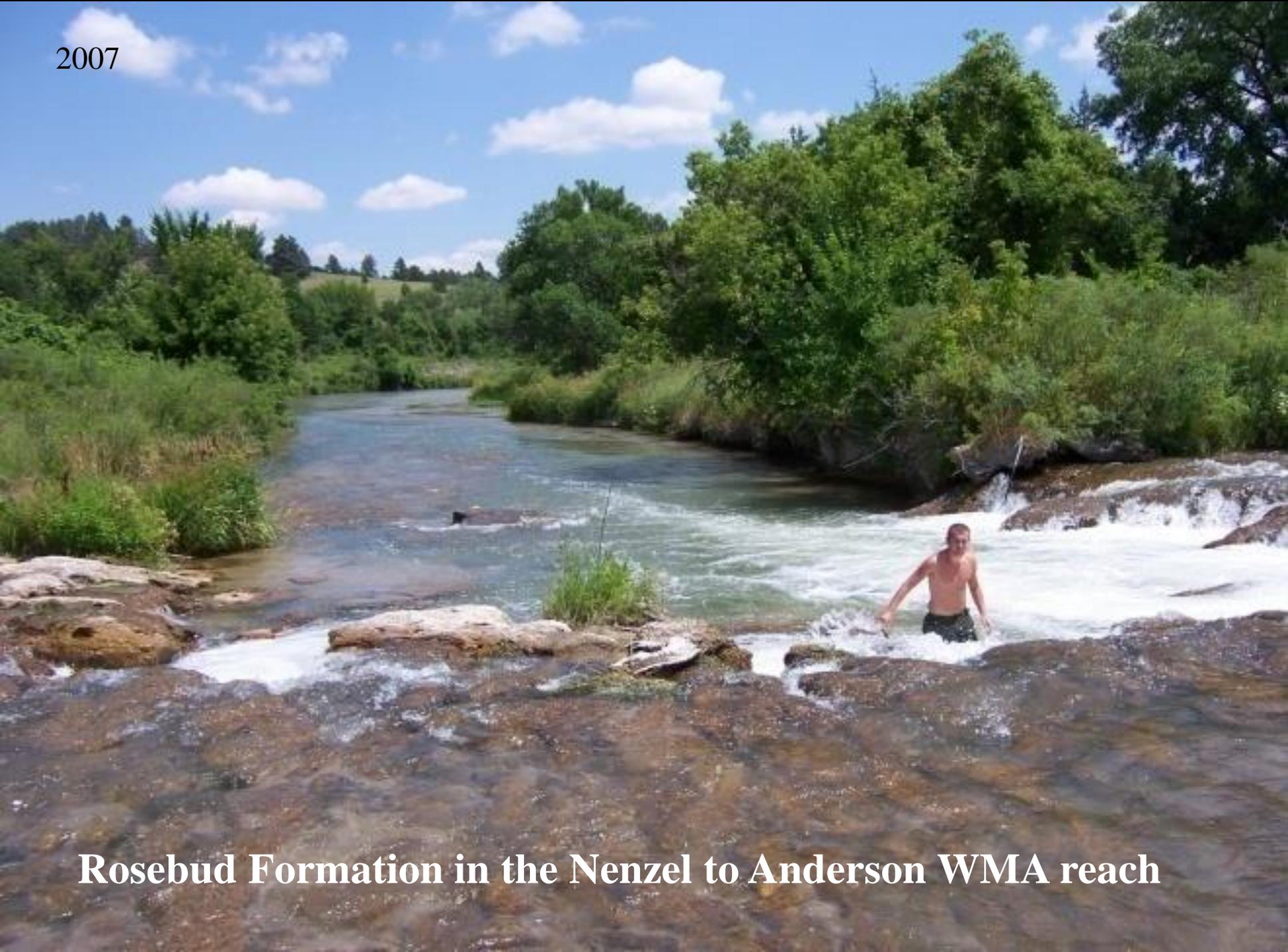


2007

Irrigation diversion pump pipes over Niobrara River

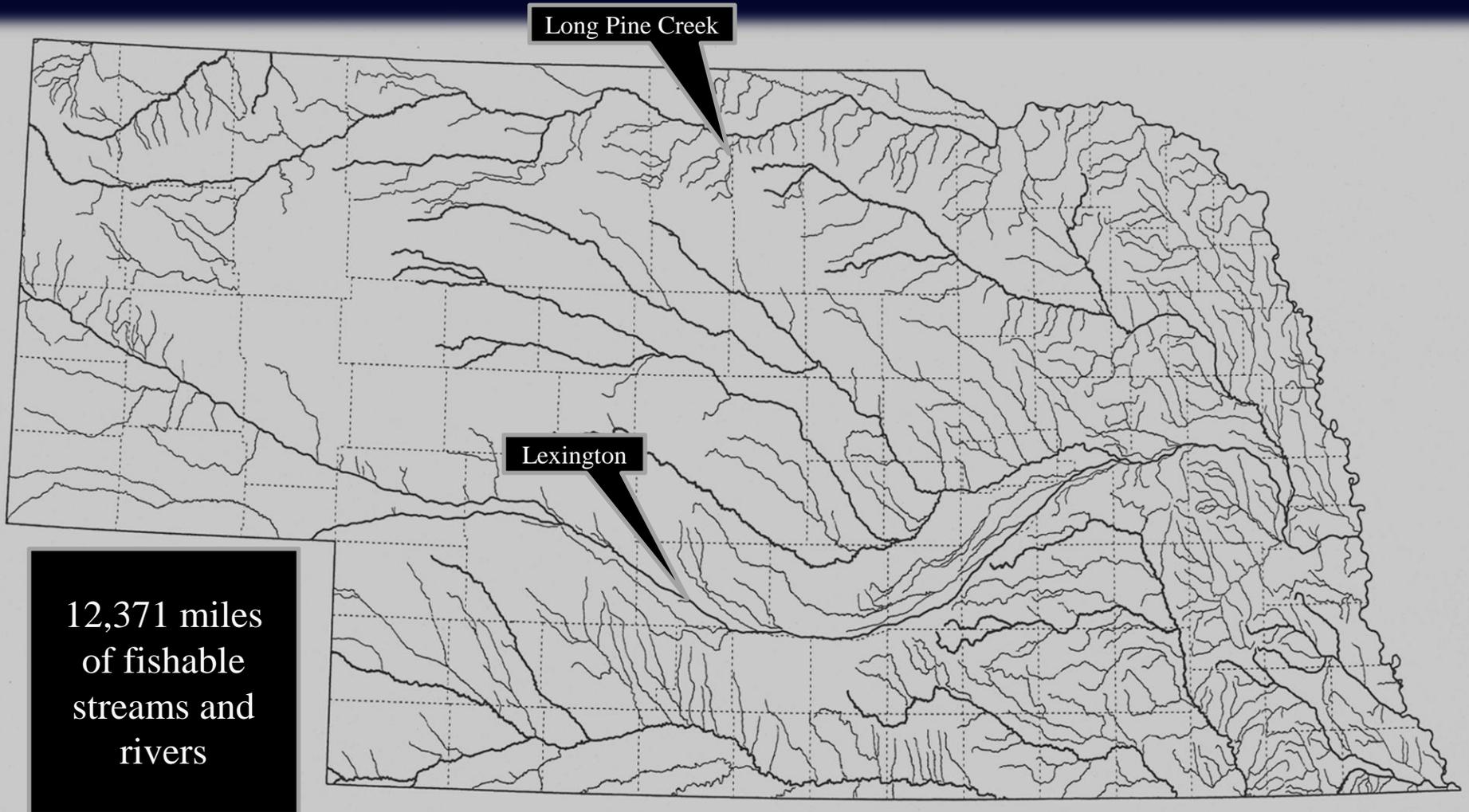


2007



Rosebud Formation in the Nenzel to Anderson WMA reach

Surface Water - Major Streams and Rivers



Zuerlein, G. 1983. 23,686 miles of streams and canals in Nebraska. Nebraskaland, J/F Issue.

NGPC Niobrara River Instream Flow Resolution, May 24, 2006

Key Points

- Maintain or improve instream flow statutes
- Protect instream flows already granted
- Develop instream flow recommendations for Niobrara and high quality tributaries

In fulfillment of the agencies Stewardship responsibilities for the citizens of Nebraska

Wild and Scenic Rivers of Nebraska and South Dakota

Niobrara
National Scenic River

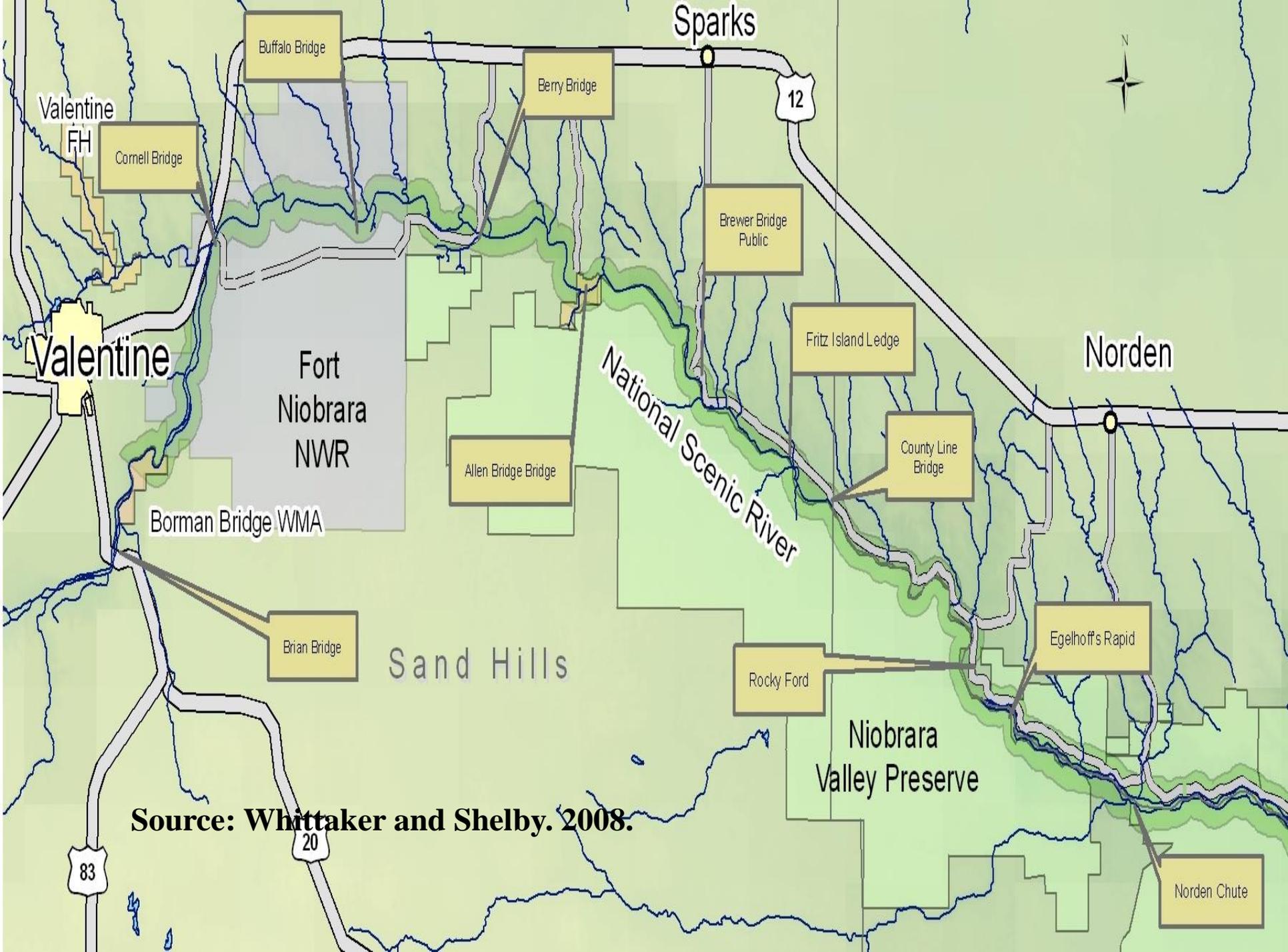
59 Mile District
Missouri National
Recreational River

39 Mile District
Missouri National
Recreational River

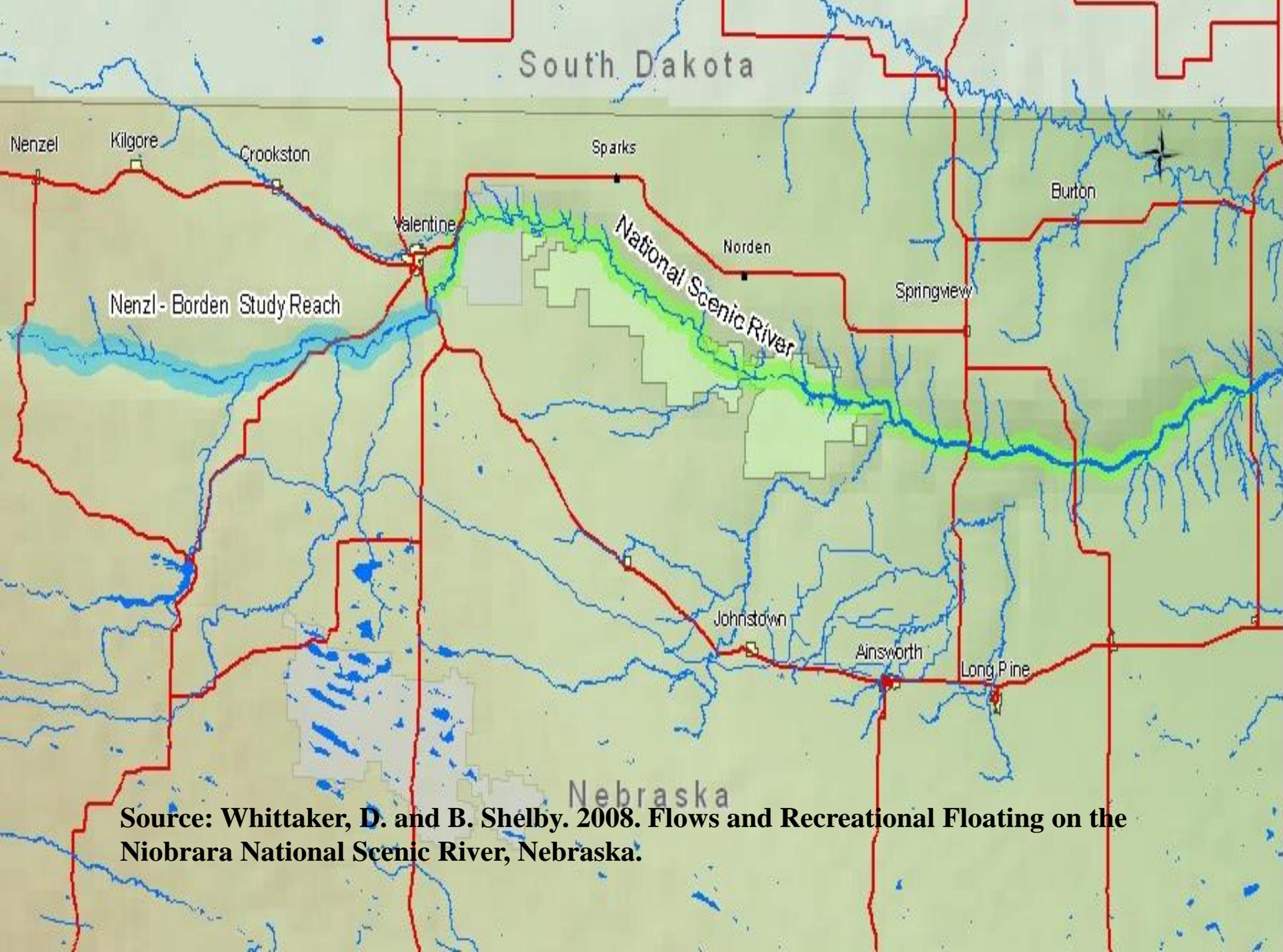
Lower 25 miles of
Niobrara River and
Verdigre Creek part of
**Missouri National
Recreation River**



0 25 50 100 Miles

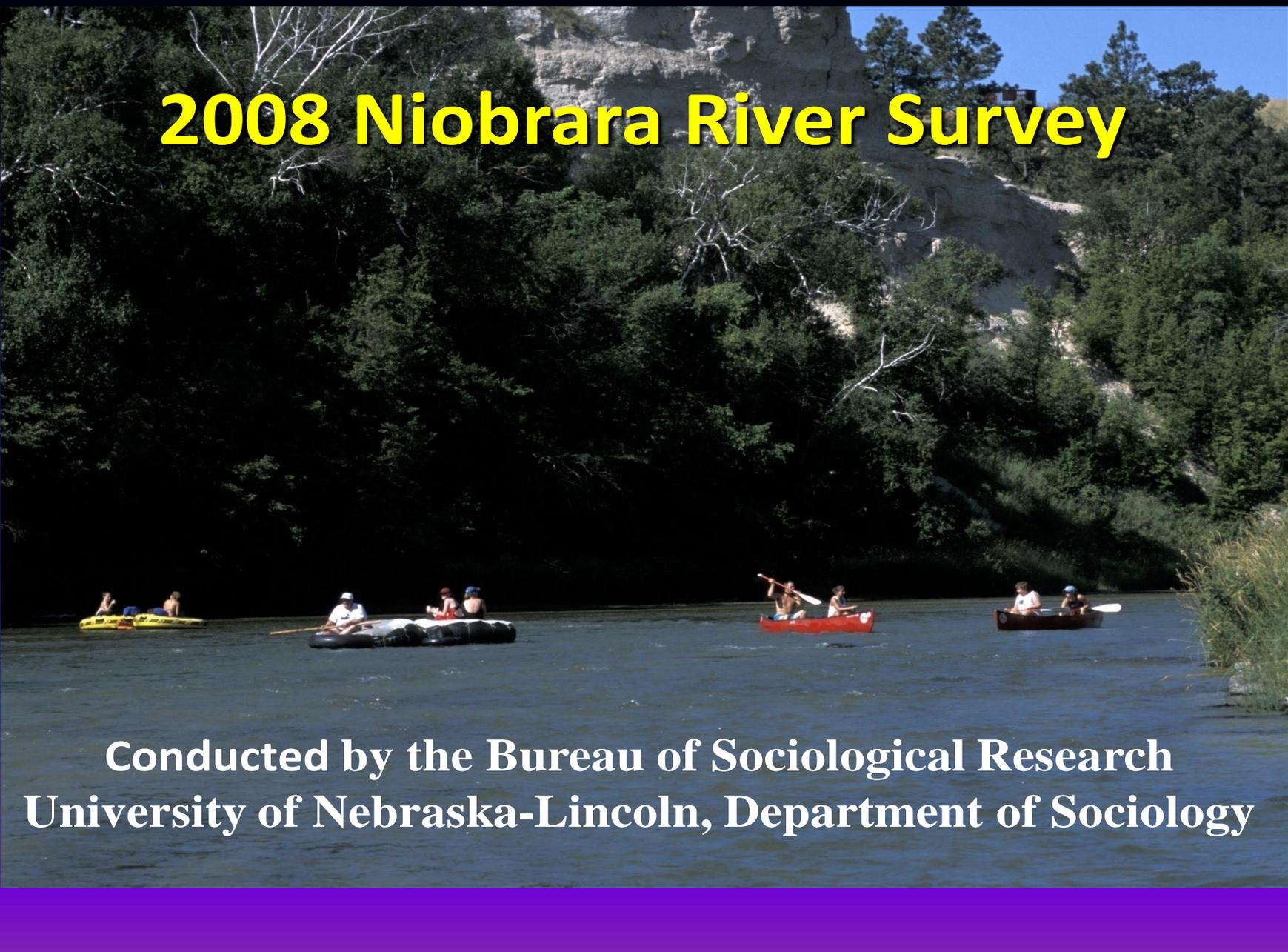


Source: Whittaker and Shelby. 2008.



Source: Whittaker, D. and B. Shelby. 2008. Flows and Recreational Floating on the Niobrara National Scenic River, Nebraska.

2008 Niobrara River Survey

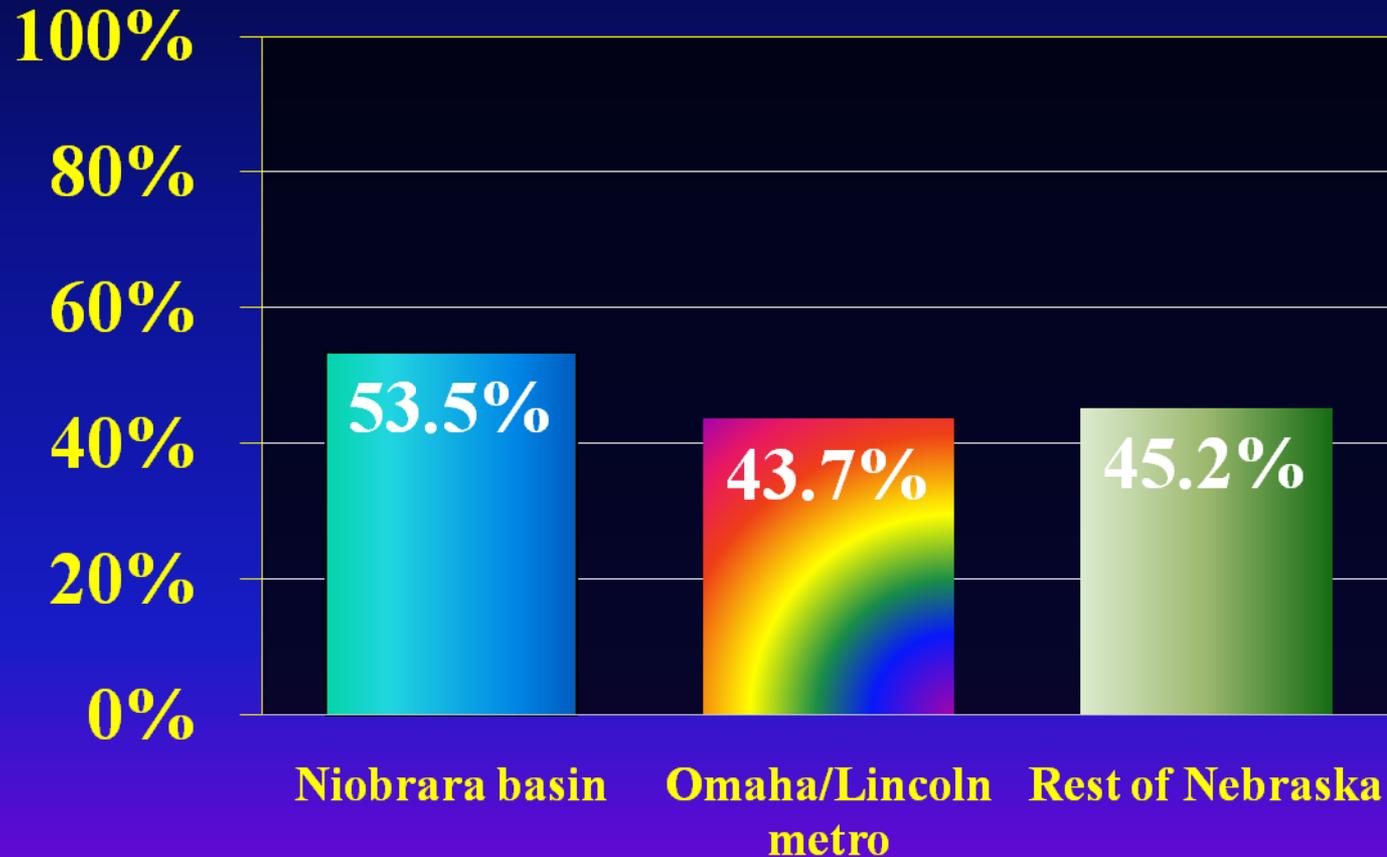
A scenic view of the Niobrara River. The river flows through a lush, green forest. In the background, a large, light-colored rock formation or cliff rises above the trees. Several people are enjoying the river: a yellow inflatable raft with two people on the left, a black inflatable raft with three people in the center, a red canoe with two people on the right, and a dark canoe with two people further right. The sky is clear and blue.

Conducted by the Bureau of Sociological Research
University of Nebraska-Lincoln, Department of Sociology

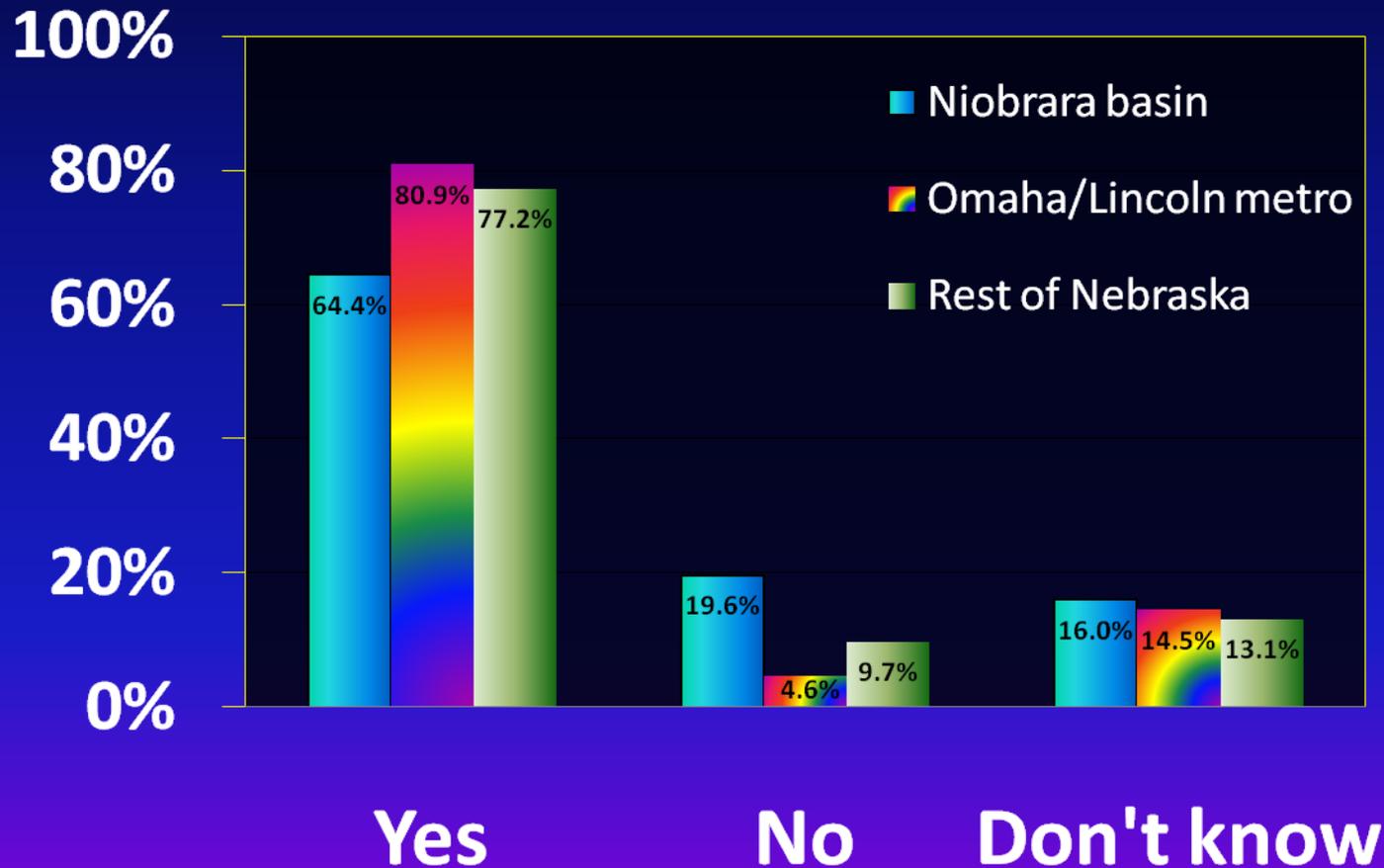
UNL Bureau Sociological Research Stakeholder Survey

- On October 21, 2008 a cover letter, a survey, and a postage-paid envelope were mailed to 2,850 randomly selected households (950 in the Omaha and Lincoln metro area; 950 in counties surrounding the Niobrara River; and 950 in the remainder of the state).
- On November 5, 2008 non-respondents were mailed a reminder postcard and on November 13, 2008 they received a second cover letter and survey.
- To ensure a sample of individuals (rather than households) the cover letter included instructions to have the household member age 19 or older who most recently celebrated a birthday complete and return the survey.

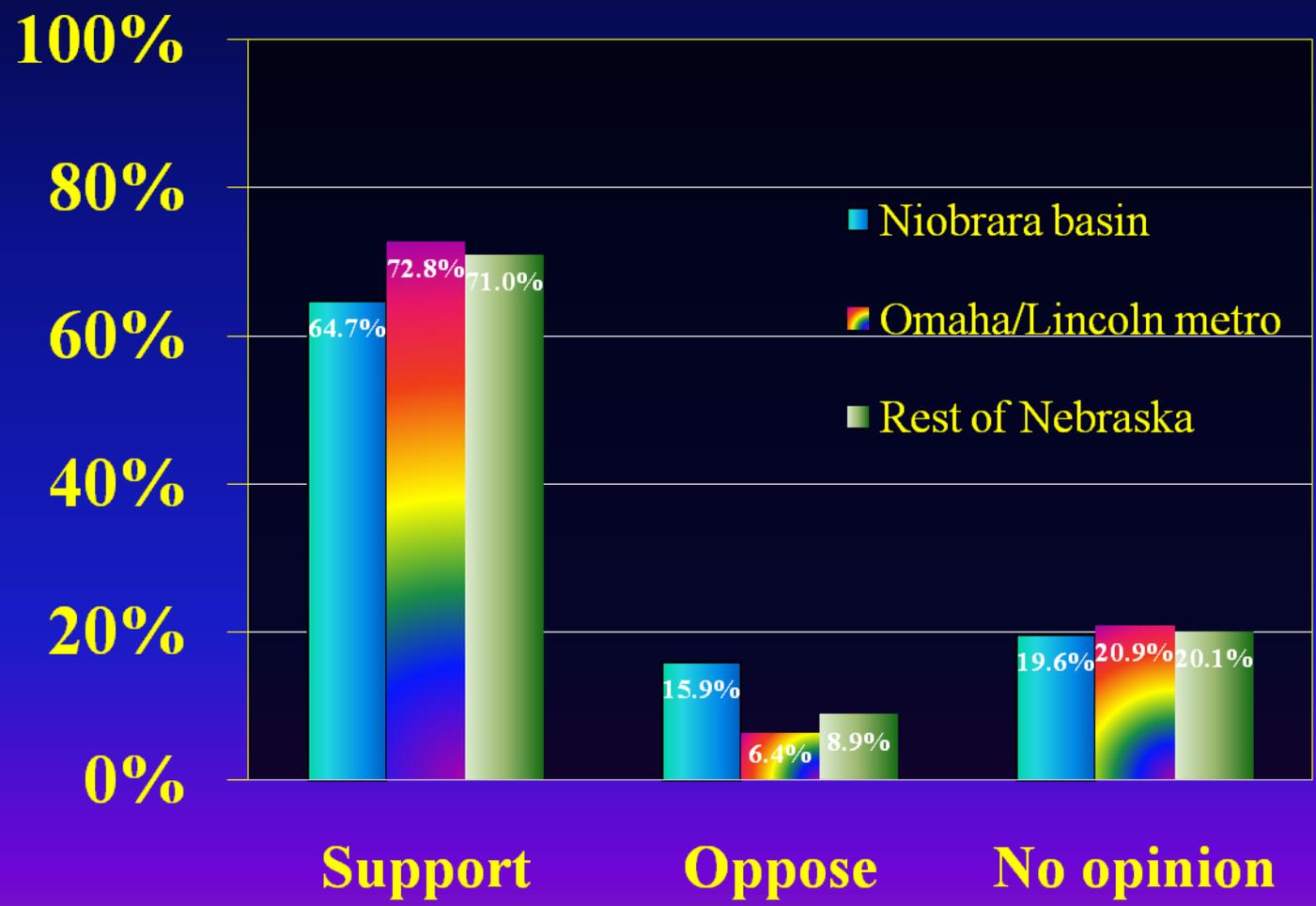
Percent Response



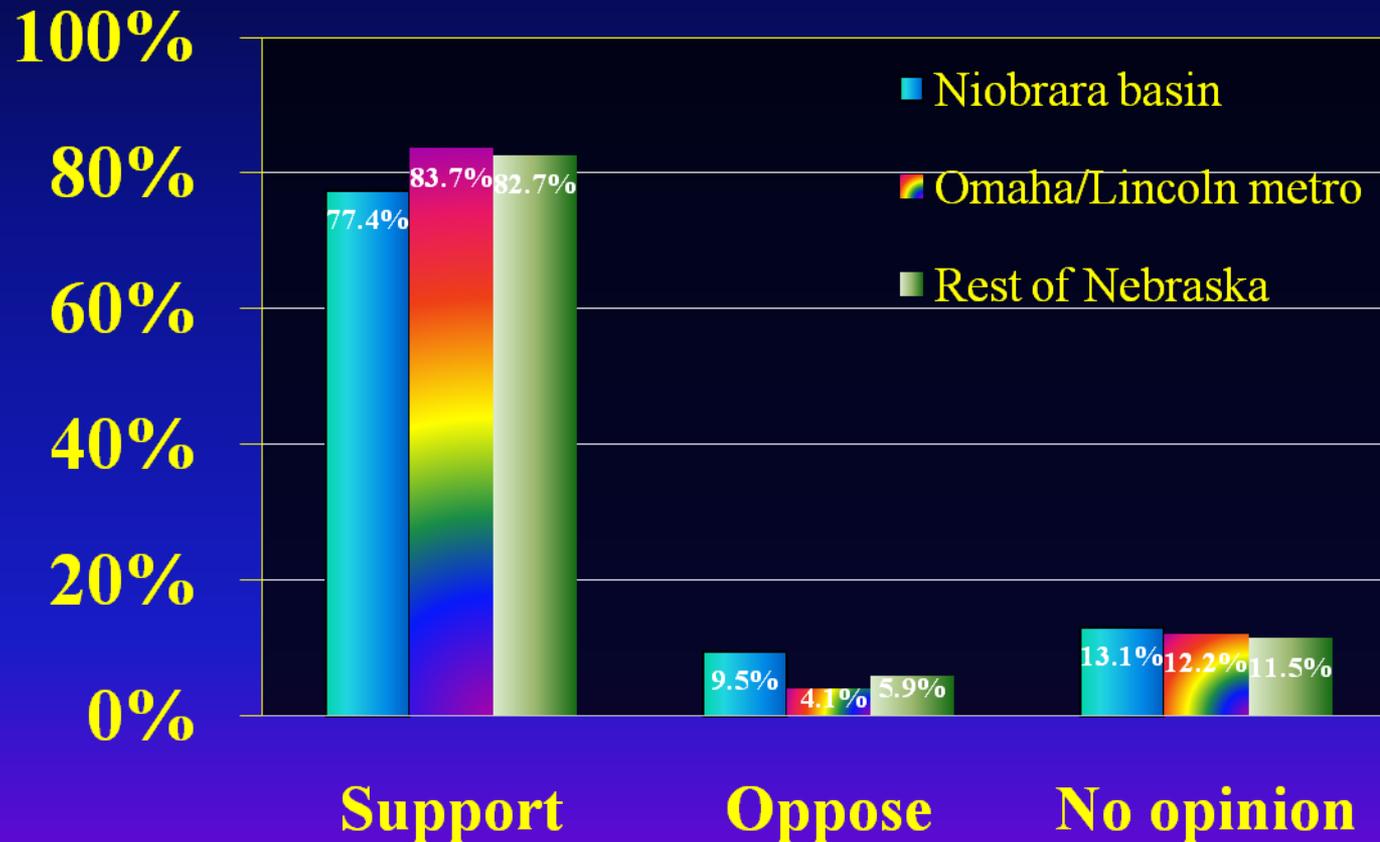
Do you think the State of Nebraska should actively be working to preserve water levels (stream flows) to protect recreational opportunities on the Niobrara River?



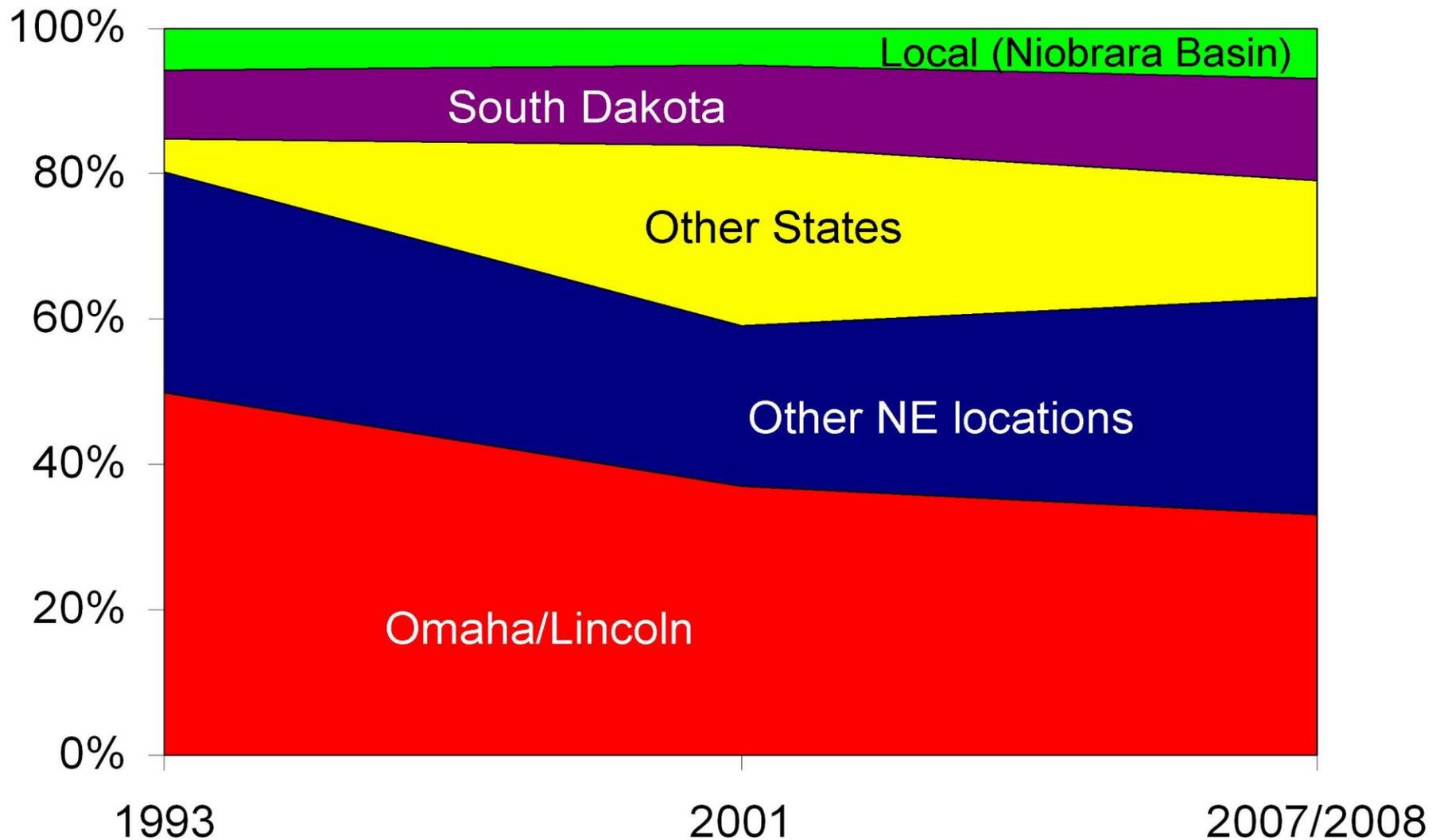
Do you support or oppose protecting adequate stream flows for recreational uses such as canoeing, swimming, and/or wading in Nebraska streams?



Do you support or oppose protecting adequate stream flows for fish and wildlife in Nebraska streams?



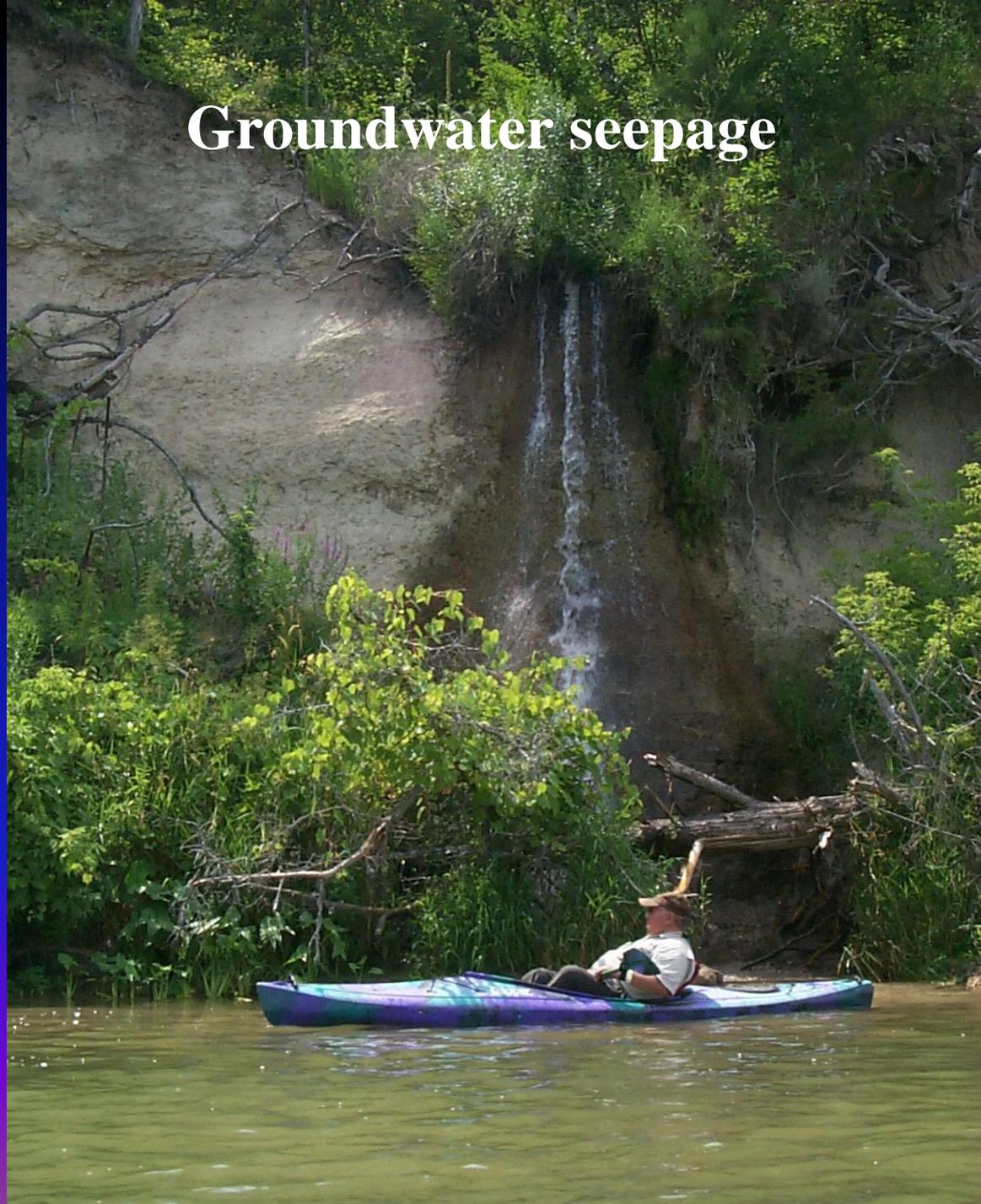
Origins of Niobrara floaters over time



NGPC. 2008. Recreational users survey.
Bureau Sociological Research, UNL.

Year

Groundwater seepage





Berry Falls in fall (Cornell Dam to Norden Chute reach)

Cracked Cliff (Cornell Dam to Norden Chute reach)



River Bluffs (Cornell Dam to Norden Chute reach)



Quiet river



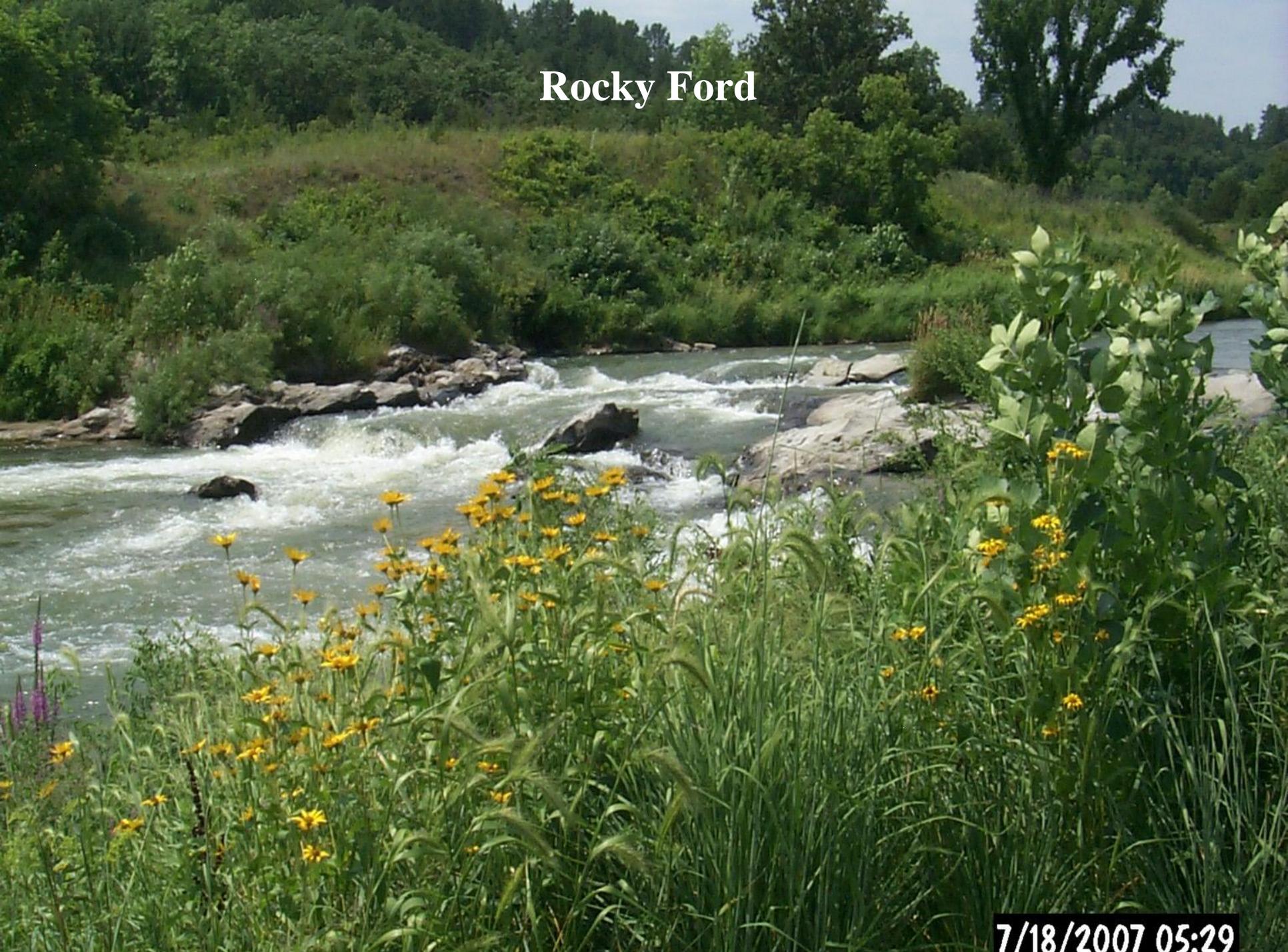


Smith Falls State Park



Smith Falls in winter (Smith Falls State Park)

Rocky Ford



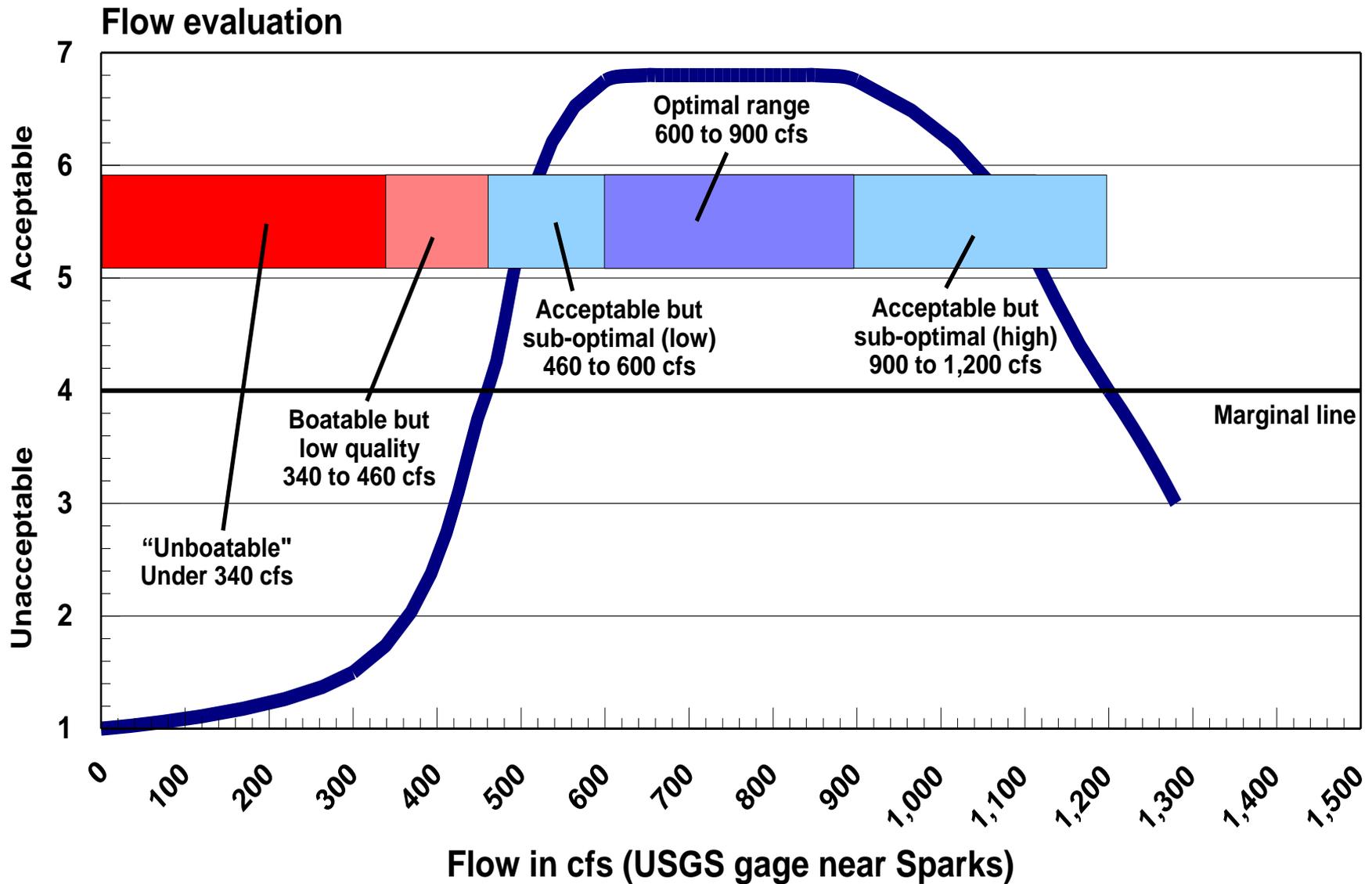
7/18/2007 05:29



Rocky Ford rafters



Fall Overlook (Cornell Dam to Norden Chute reach)



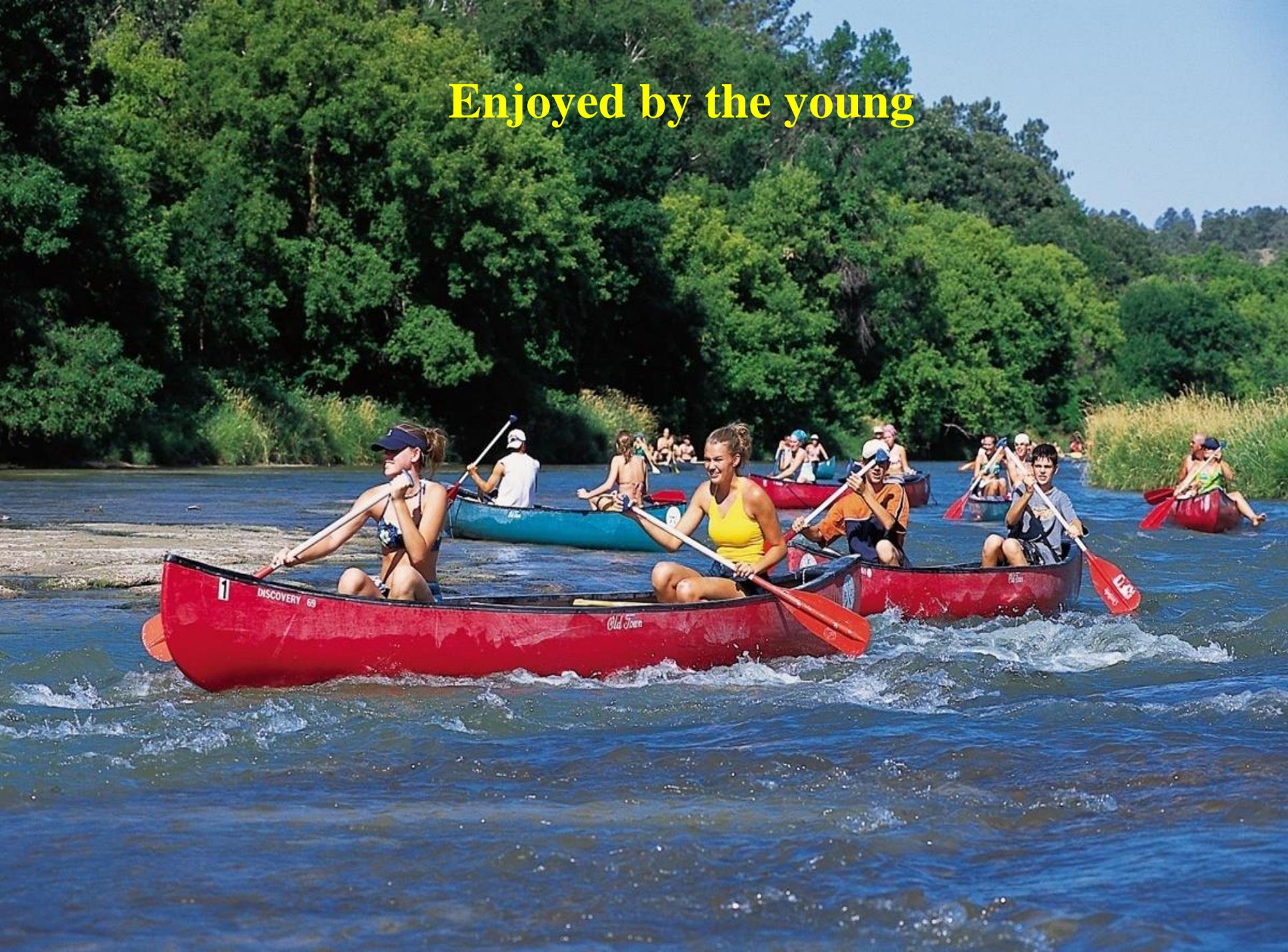
Flow evaluation curve and range bar for “scenic floating” opportunities on Niobrara National Scenic River.

Recreational Users Survey and Socioeconomic Studies of the National Scenic River Reach Study

- Estimated the value of recreational floating to the local community.
- Boatable but low quality flows are in the range of 340-460 cfs; acceptable, but low flow range is 460-600 cfs; optimal flow range is 600-900 cfs; and acceptable but high range flows are 900-1,200 cfs.
- **Note: Up to 509 cfs (enough water for acceptable floating) is diverted out of the Snake River into the Ainsworth Canal for irrigation. Merritt operations have affected mean monthly flows at Norden, NE by up to 15 percent .**

Source: Schultz, S. 2010. Economic & social values of recreational floating on the Niobrara National Scenic River. June 22, 2009. University of Nebraska Omaha. Phase I final report.

Enjoyed by the young

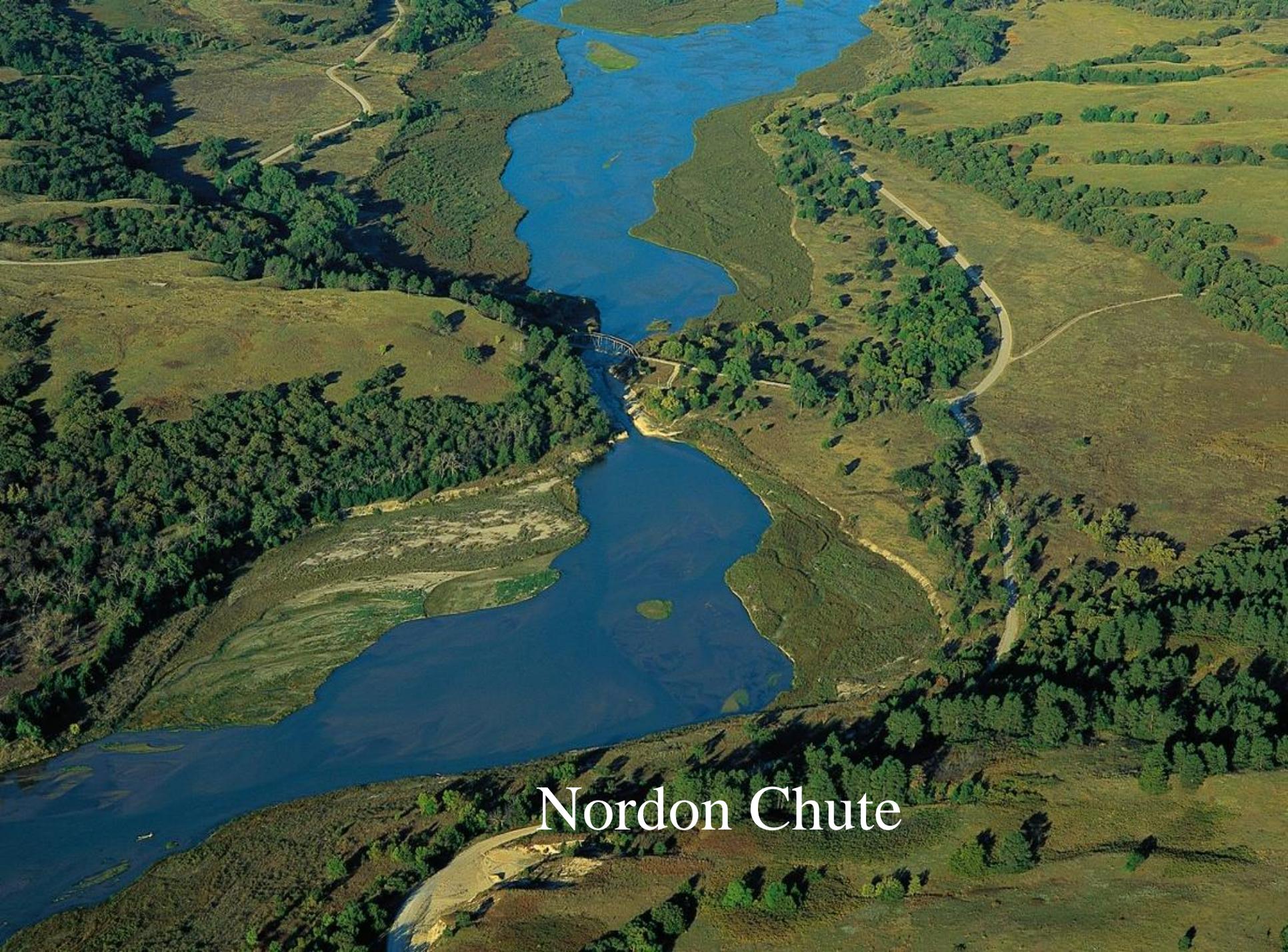


As well as senior citizens



Example of ecosystem goods and service





Nordon Chute

What value are instream flows to society?

🐉 Streams and rivers provide ecosystem goods and services of tremendous value to the quality of life. The more affluent a society becomes, the more awareness there is to manage public trust natural resources for sustainability and future generations.

The Evolution of Rivers - As Used by Mankind

- Source food and drink
- Transportation
- Disposal
- Irrigation
- Flood control
- Recreation
- Aesthetics
- Environment
- Habitat

Low standard of living



High standard of living

Overall

Human health, economic health, and social health are tied to ecosystem health !

“In the end, our society will be defined not only by what we create, but by what we refuse to destroy”



John Sawhill

The Nature Conservancy

September/October 2000

Niobrara Acknowledgements

- In-kind partners-USFWS (Ft. Niobrara NWR), The Nature Conservancy, NPS (Niobrara National Scenic River), other NGOs
- Other involved stakeholders-NRDs, NGOs

Funding Sources

- Nebraska Game & Parks Commission (Sport Fish and Wildlife Restoration)
 - Nebraska Environmental Trust
 - National Park Service

Contractor List

- University of Nebraska-Lincoln (School of Natural Resources)
- University of Nebraska-Lincoln (Bureau of Sociological Research)
- University of Nebraska-Omaha (Economics Department)
- U.S. Geological Survey Water Resource Center, Lincoln
- Confluence, Research and Consulting, Inc.
- U.S. Fish and Wildlife Service
- Friends of the Niobrara





What Are Federal Reserved Water Rights?

William R. Hansen
Chief, Water Rights Branch
NPS Water Resources Division
Fort Collins, CO

Informational Meeting on Instream Flows
Kearney, NE
December 5, 2012

OUTLINE



- Case Law Creating Reserved Rights
- Wild and Scenic River Policy/Water Rights
- Difficulties of Federal Reserved Rights
- NPS Support for State-based Instream Flows
- Appropriative Water Rights



APPROPRIATIVE RIGHTS

- “First in Time, First in Right”
- Beneficial Use (e.g., irrigation)
- Location
- Amount (cfs or acre-feet/yr)
- Priority Date (used to enforce calls/administration)



FEDERAL RESERVED RIGHTS

Created by U.S. Supreme Court rulings as follows (Case Law):

- ***Winters v. U.S. (1908)***: Federal government reserved enough water to effect the purpose of the Indian Reservation (“*Winters*” rights).
- ***Arizona v. California (1964)***: Extended the doctrine to federal reservations (national forest, national parks, etc.).



FEDERAL RESERVED RIGHTS cont.

➤ ***Cappaert v. U.S. (1976)***: *Extended the doctrine to groundwater.*

➤ ***Potlatch Corp. v. U.S. (2000)***: Idaho Supreme Court concluded that Congress reserved water on the Snake River to fulfill the purposes of the Wild and Scenic Rivers Act.



FEDERAL RESERVED RIGHTS cont.

as well as Wild and Scenic Rivers Act:

*Sec. 1(b): ...hereby declared **to be the policy of the US** that certain selected rivers of the Nation...*

*possess **outstandingly remarkable** scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar **values**, shall be preserved in **free-flowing condition**, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations."*



FEDERAL RESERVED RIGHTS cont.

Wild and Scenic Rivers Act cont.

*Sec. 13(c): “Designation of **any stream or portion thereof** as a national wild, scenic or recreational river area shall not be construed as a **reservation of the water** of such streams for purposes other than those specified in this Act, or in **quantities greater than necessary to accomplish these purposes.**”*



FEDERAL RESERVED RIGHTS

Wild and Scenic Rivers Act cont.

- **Purpose:** Limited to the purpose/s of the reservation (ORVs on the Niobrara River).
- **Amount:** Amount necessary to effect purpose/s of the reservation; quantities not specified in the act—requires adjudication.
- **Priority:** Date the reservation was created by Congress (May 24, 1991 for Niobrara River).



FEDERAL RESERVED RIGHTS

What's the problem with federal reserved rights?

- Unquantified until adjudicated
- Other appropriators don't know the value of their rights until the FRR is quantified
- Very controversial
- Very time consuming and costly



NPS Preference

- Support NGPC efforts to secure state-based instream flows for the Niobrara River in the Niobrara NSR and Missouri NRR reaches.
- Utilize State process through NGPC to complete necessary studies and to file instream flow application/s.

Enjoying/Kayaking Rivers



Besides terns and plovers, sandbars are good for people too



Becoming an Outdoors Woman (BOW)



The Water Cycle



The water vapor condenses into clouds.

Volcanoes emit steam, which forms clouds.

Air currents move clouds all around the Earth.

Water drops form in clouds, and the drops then fall to Earth as precipitation (rain and snow).

In cold climates, precipitation builds up as snow, ice, and glaciers.

Snow can melt and become runoff, which flows into rivers, the oceans, and into the ground.

Some rain soaks into the ground, as infiltration, and if deep enough, recharges groundwater.

Water from lakes and rivers can also seep into the ground. Water moves underground because of gravity and pressure.

Groundwater close to the land surface is taken up by plants.

Some groundwater seeps into rivers and lakes, and can flow to the surface as springs.

Plants take up groundwater and evapotranspire, or evaporate, it from their leaves.

Some groundwater goes very deep into the ground and stays there for a long time.

From the mountains to the seas, the earth needs rivers !

UN WATER
World Water Day

GROUNDWATER FLOW

NGPC Commissioners and staff putting in at Berry Bridge on the Niobrara River, 29 August 2013





NGPC Director Jim Douglas kayaking the Niobrara, 29 August 2013



Outfitter Graham briefing Commisioners at Smith Falls, 29 August 2013



Commissioners and Director, 29 August 2013

Floaters stopping to see Smith Falls on the Niobrara, 29 August 2013



**Missouri River from Niobrara State Park at
confluence of Niobrara River**





Questions ?