

DOCUMENT 143

DOCUMENT 144

DOCUMENT 145

Conservation Practices to Increase Water Yield in the Republican River Basin

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Introduction: Soil and water conservation measures have been widely utilized by landowners in the Republican River Basin, because many of these landowners remember the devastation of the Dust Bowl and drought of the 1930s. Concerns have been raised recently that some of these soil and water conservation practices have reduced streamflows, making it more difficult for Nebraska to maintain compliance with the Republican River Compact. I believe that adoption of new conservation techniques and practices, along with modification of certain existing conservation structures, could significantly increase water yield from Republican River tributary watersheds, while protecting the environment and involving the citizenry in compact compliance in a positive way. Below is a short, incomplete list of conservation measures that could increase water yield. Implementation of these measures will require cost-share funds, technical assistance to farmers and landowners from government, industry and UN-L Extension.

I. Improved riparian land management techniques

- A. Eradicating vegetation in stream channels (reduces consumptive water use and reduces water losses to streambed and bank storage)
- B. Improved riparian forest management through selective logging (reduces consumptive water use, improves wildlife habitat)
- C. Eradication of invasive riparian plants (reduces consumptive water use, improves wildlife habitat)
- D. Intensify grazing on riparian lands (reduces consumptive water use, improves wildlife habitat)
- E. Improve pasture condition, reduce brush using prescribed fire (increases runoff, reduces consumptive water use due to trees, brush)

II. Soil, irrigation water conservation measures

- A. Modify water-holding terraces to allow water to flow out through grassed waterways or tile outlets (reduces consumptive water use, increases streamflows in tributaries)
- B. Educate irrigators about dryland, ecofallow farming techniques (reduces irrigation water consumption, potential to increase net profits for farmers)
- C. Encourage irrigation efficiency improvements (reduces irrigation water consumption, potential to increase net profits for farmers)
- D. Educate irrigators about no-till farming techniques (reduces irrigation water consumption, increases soil structure and water-holding capacity, potential to increase net profits for farmers)

E. Educate irrigators about the value of crop rotation (reduces irrigation water consumption, increases soil structure and water-holding capacity, potential to increase net profits for farmers)

III. Range, pasture management

A. Encourage landowners to remove or reduce storage capacity of certain small dams, particularly in watersheds immediately upstream from Harlan County Reservoir and downstream from Harlan to the state line. Cost-share would assist landowners with removing or modifying dams, and with providing alternative livestock water supplies (reduces water consumption due to evaporation, increases streamflows in tributaries, potential to increase net profits for cattlemen due to lower rates of internal parasites and disease in cattle)

B. Improve range condition through prescribed fire (increases runoff, reduces consumptive water use due to trees, brush)

IV. Urban, industrial conservation

A. Educate homeowners about xeriscaping techniques (reduces consumptive water use)

B. Work with industries to increase water use efficiency (reduces consumptive water use)

Ann's Handouts 8/1/2007

URNRD	MRNRD
Certified Acres	313,198
448,924	
If Pumped at Allocation	13
13.5	
505,040	339,298
Pumping by NRD	
503,415	297,421
380,234	135,750
663,490	350,069
466,841	307,861
644,833	426,294
531,763	309,479
120,537	110,633

Depletions	URNRD	MRNRD	LRNRD	Total
SW	72,091			
1998	185,460			297,750
1999	203,490			302,890
2000	184,020			296,530
2001	212,870			292,320
2002	180,440			265,910
Average	193,256			291,080
StDev	14,140			14,567

- 2003
- 2004
- 2005
- 2006

Inches/Certified Acre	URNRD	MRNRD	LRNRD	Total
13.5	11.4			7.1
10.2	5.2			5.6
17.7	14.6			9.6
12.5	11.8			8.7
17.2	16.3			13.2
Average	14.2			8.9
StDev	3	4		3

pumping volume / acres

Dec target depl AF =	URNRD	MRNRD	LRNRD	Total
200,000	185,000	13000	24000	57000
25,000	26000	40000	48000	114000
10,000	375000	150000	125000	650000
Total	388000	170000	149000	707000
	401000	190000	173000	764000

Inches/Certified Acre	URNRD	MRNRD	LRNRD	Total
QR	2.8	2.7	2.4	
Average Q	5.7	5.3	4.8	
UP	4.25	4	3.6	
NRD	11.3	9	9.6	
Average Q	10.2	7	6.5	
	10.6	7.9	7.5	

Reduction Scenarios	Impact Reduction	Depletion GW	Depletion SW	Total	Impact Reduction	Depletion GW	Depletion SW	Total
Average Pumping Reductions	0	174,000	74,000	248,000	0	163,500	50,000	213,500
1	3,500	170,500	76,500	247,000	1	161,000	51,500	212,500
2	5,500	168,500	77,500	246,000	2	158,500	53,000	211,500
3	9,000	165,500	80,000	245,500	3	155,000	55,000	210,000
4	12,000	162,000	82,000	244,000	4	151,500	57,500	209,000
5	15,000	159,000	83,000	242,000	5	149,000	59,000	208,000

DOCUMENT 146

DOCUMENT 147

DOCUMENT 148