



Urban & Rural  
Water Management,  
Conservation  
And  
Water Developments for  
Nebraska's Economic Future

# Contents

- LWS/Water Use/Conservation
- Cost of Water in Lincoln
- Drought Review – 2012
- Supply - Deficiency vs Usage
- What's Ahead

# LWS/Water Use/ Conservation

# LWS MISSION

- Lincoln Water System's mission is to
- produce and distribute
- an adequate supply of
- high-quality water to
- meet the needs of customers
- efficiently and at the least cost.

# Water Supply & Treatment

- 100% of Annual Supply from Ashland
- Water pumped from wells to Treatment Plant
- West Plant – 1930s – Aeration & Filtration
- East Plant – 1994 – Ozonation & Filtration
- Iron & Manganese Removal
- Add Fluoride and Chloramines
- Total Treatment Capacity – 120 MGD
- Water Pumped to Lincoln – Total Transmission Capacity - 100 MGD

# How Does Lincoln Use Water

- Health and Sanitation
- Industry
  - Food
  - Manufacturing (commercial)
  - Factories (cooling, cleaning, etc)
- Fire Protection
- Watering Lawns & Gardens

# Water Conservation Task Force

- Public Education
- Encourage Indoor & Outdoor Conservation
- Trade Shows
- Printed Material
- 5<sup>th</sup> Grade Coloring Contest
- Water Management Plan

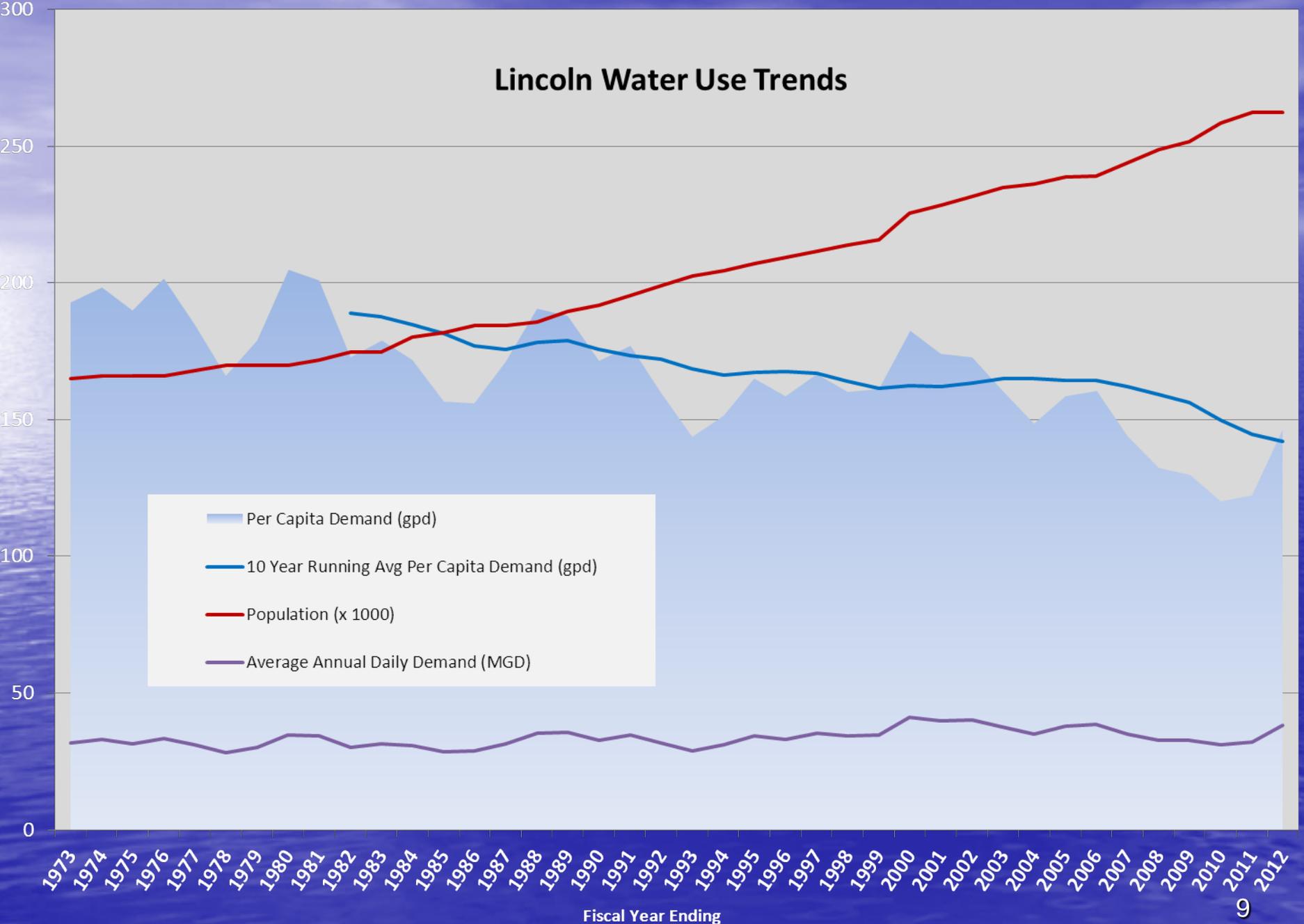


# Observed Trends in Water Use

- Shift in Peak Hour Usage from PM to AM
- Reduction in Peak Hour
- Conservation of Water – Less Wasted
- Residential Per Capita Consumption Down from 110 gpd (gal/person/day) to 95 gpd
- Summer peak demands are from outdoor use

**Note** – these factors led to delaying building new wells to meet peak demands

# Lincoln Water Use Trends



# Cost of Water in Lincoln

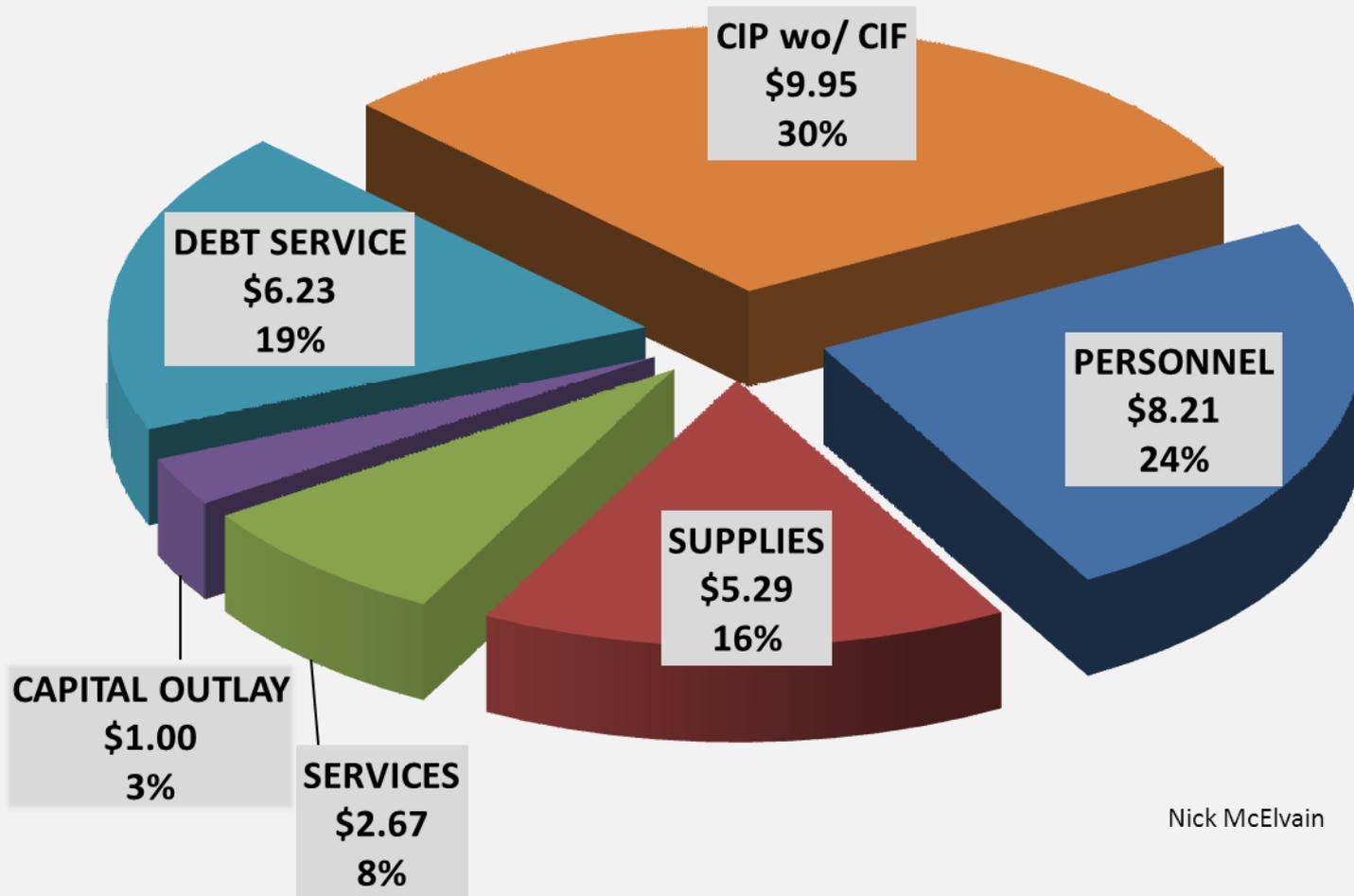
# Water User Fees

- Water Utility Fee based on Water Meter Size and Water Usage
- Monthly Service Charge - \$4.55/month
- Increasing Block Rate Structure – Encourages Conservation
- Competitive Rates with Local and Regional Cities
- Ten Top Water Users of System account for 15% of Usage

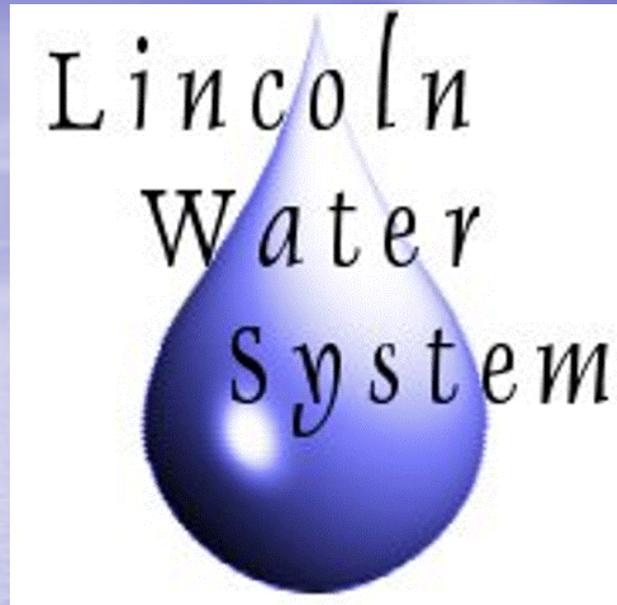
# How Much Does that Water Cost?

- 16 oz bottle at quick shop - \$1.25
- 8 bottles = 1 gallon = \$10.00
- LWS delivers 750 gallons -  
enough to fill 6000 water bottles -  
to your house for \$1.35
- Average home - \$20.00 per month  
Summer bills over \$100.00 per month

# LWS - 2012-13 Budget w/ CIP



Nick McElvain

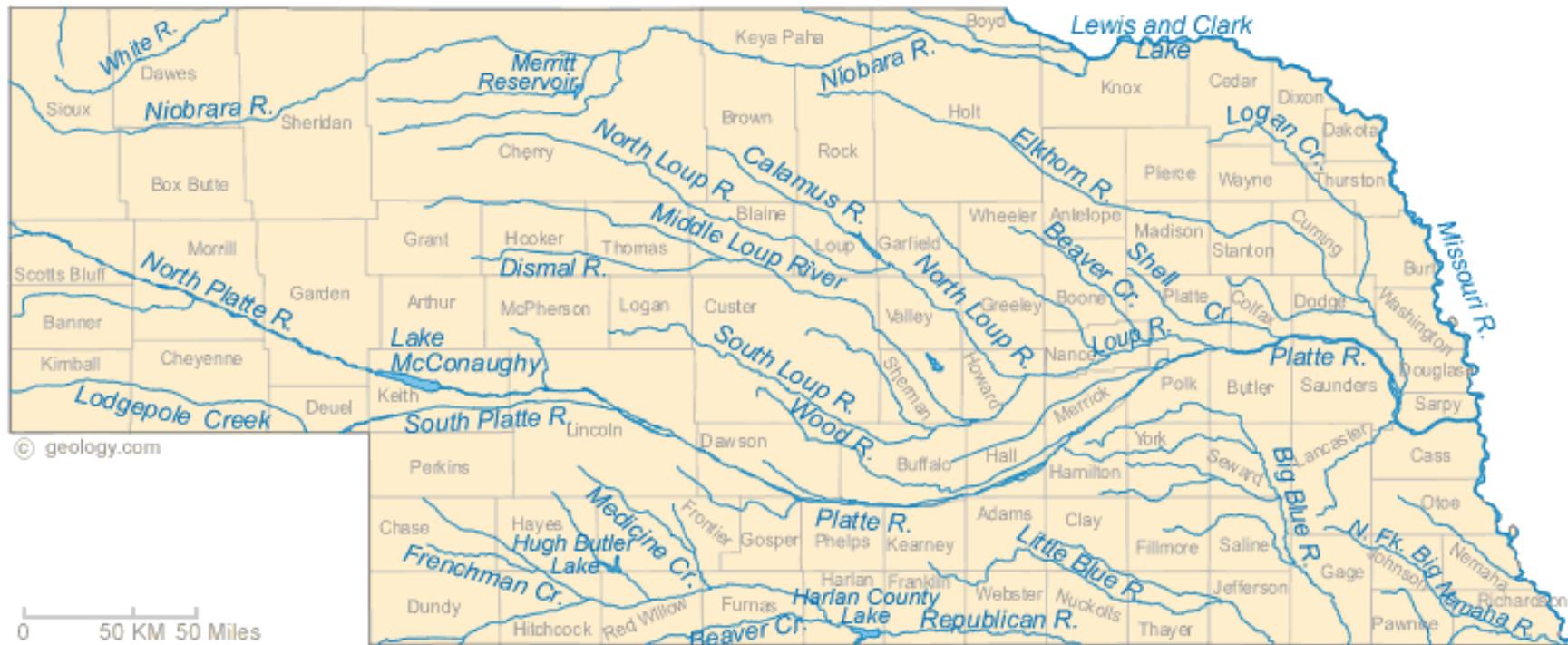


2012/2013

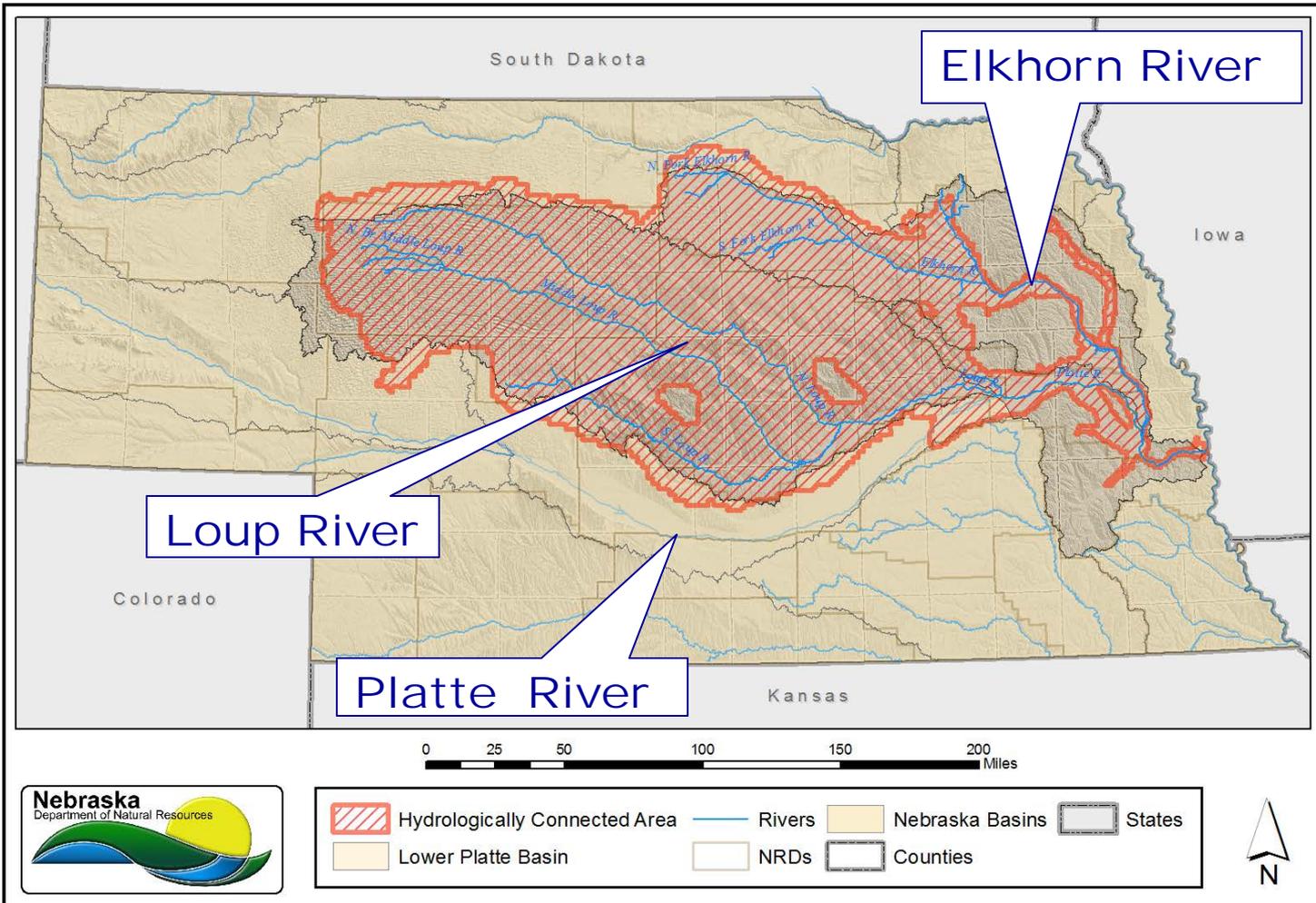
# DROUGHT REVIEW

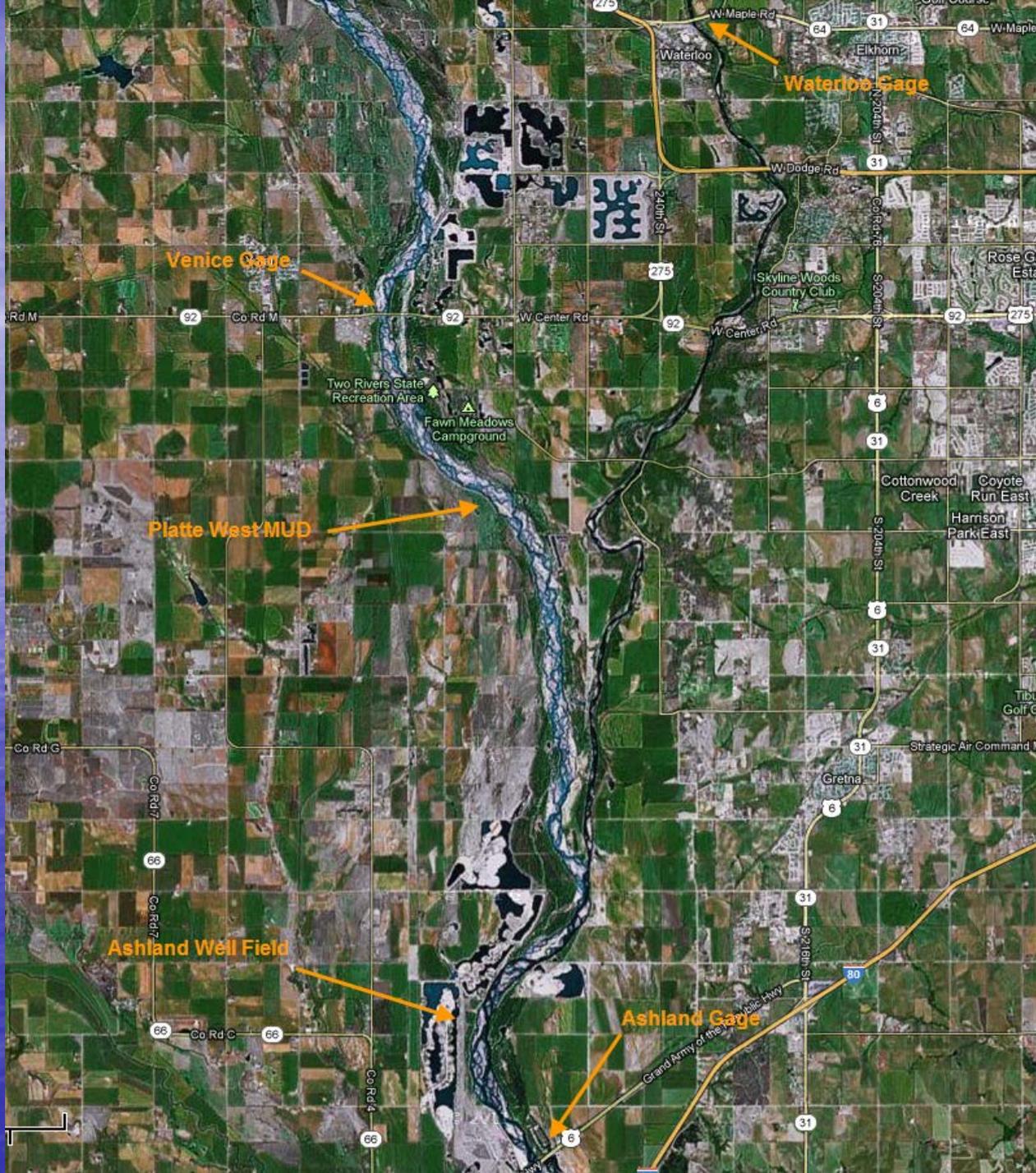
# So What Happened This Summer?

○ Average Rain	Average	2012	2013
○ June	4.8	3.6	2.5
○ July	3.9	0.3	1.0
○ August	3.9	0.3	1.1
○ September	<u>3.0</u>	<u>1.7</u>	
○ TOTALS	15.6	5.9	

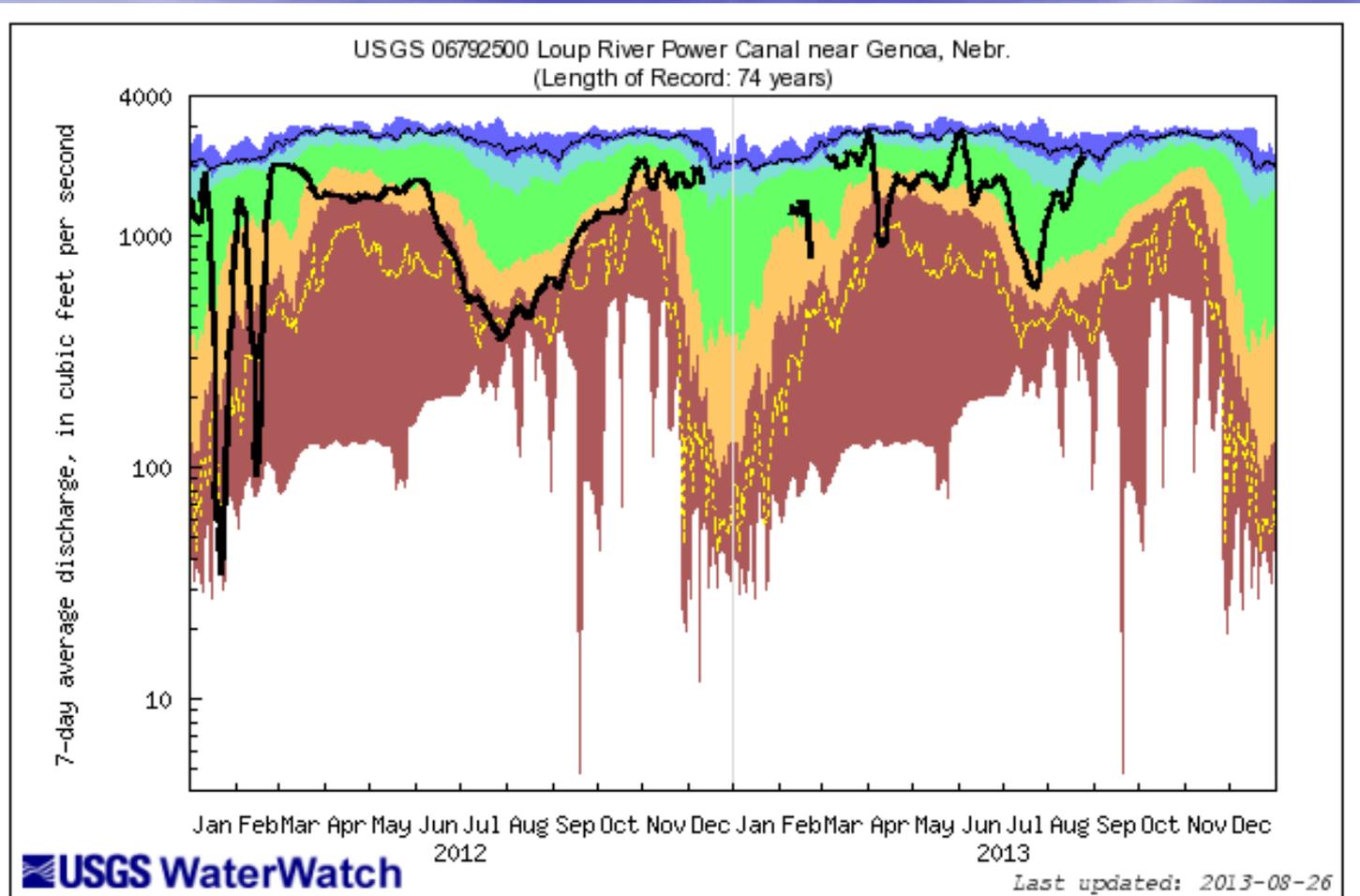


# LOWER PLATTE RIVER BASIN





# Loup River Power Canal near Genoa

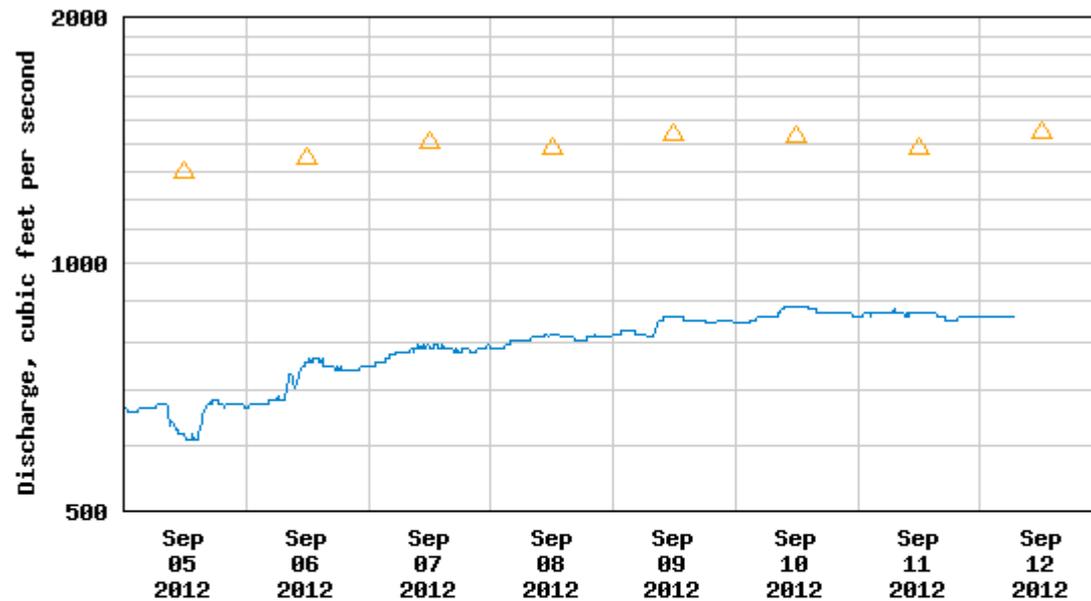


Explanation - Percentile classes						
lowest-10th percentile	5	10-24	25-75	76-90	95	90th percentile - highest
Much below Normal	Below normal	Normal	Above normal	Much above normal		Flow

## Discharge, cubic feet per second

Most recent instantaneous value: 864 09-12-2012 06:45 CDT

USGS 06792500 Loup River Power Canal near Genoa, Nebr.



---- Provisional Data Subject to Revision ----

△ Median daily statistic (74 years) — Discharge

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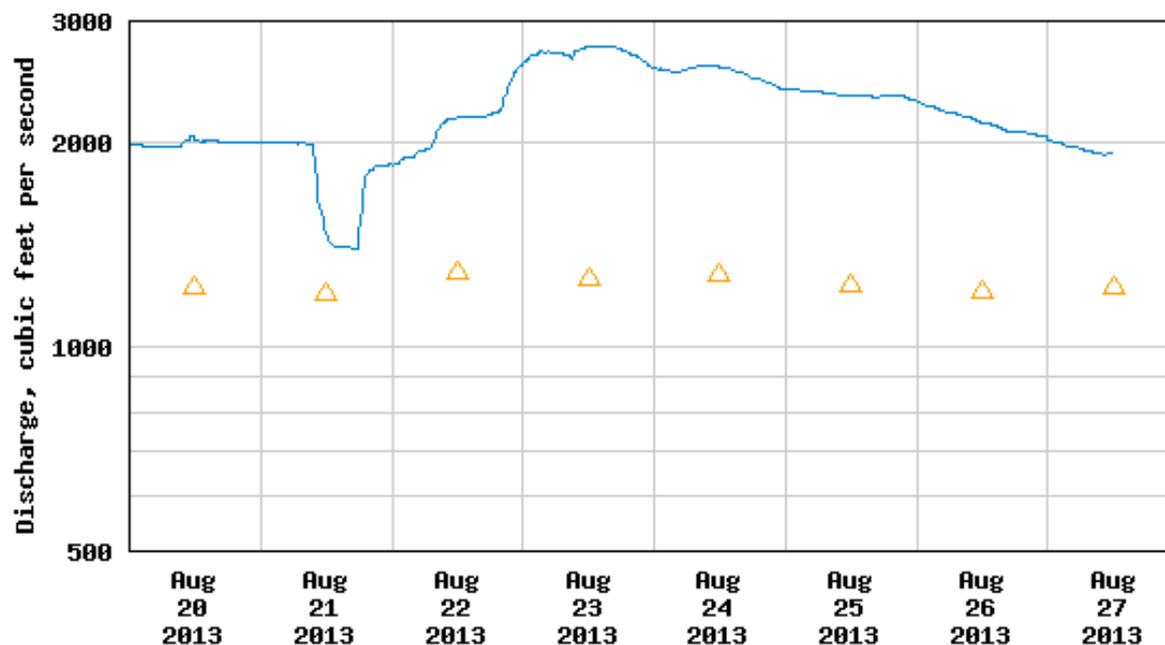
Daily discharge, cubic feet per second -- statistics for Sep 12  
based on 74 years of record [more](#)

Min (2005)	Most Recent Instantaneous Value Sep 12	25th percentile	Median	Mean	75th percentile	Max (1951)
0.00	864	1030	1450	1530	2040	2870

## Discharge, cubic feet per second

Most recent instantaneous value: 1,920 08-27-2013 11:45 CDT

USGS 06792500 Loup River Power Canal near Genoa, Nebr.



----- Provisional Data Subject to Revision -----

△ Median daily statistic (75 years) — Discharge

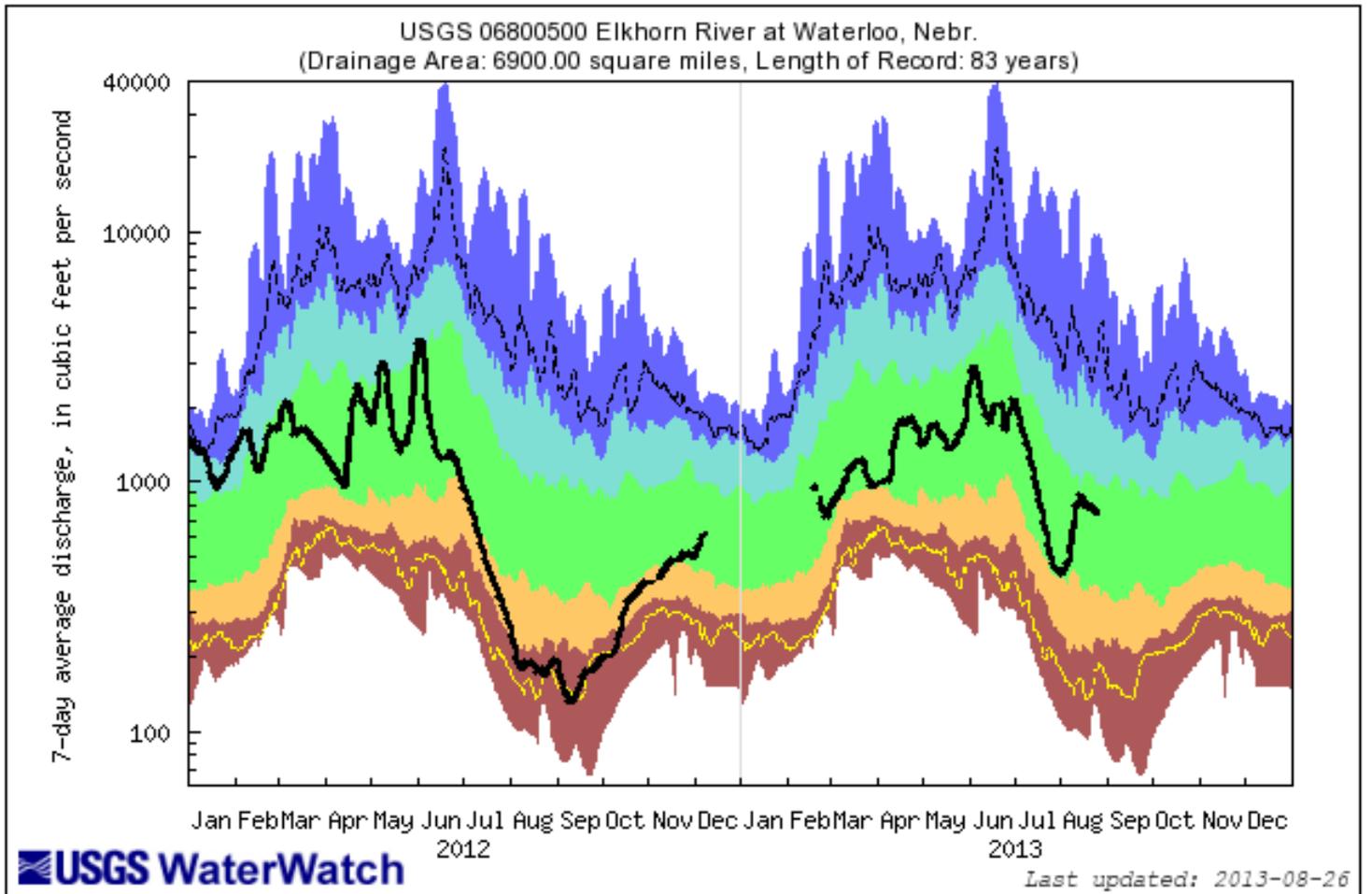
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Daily discharge, cubic feet per second -- statistics for Aug 27  
based on 75 years of record [more](#)

Min (1966)	25th percentile	Median	Mean	75th percentile	Most Recent Instantaneous Value Aug 27	Max (1977)
0.00	822	1220	1310	1790	1920	3050

# Elkhorn River at Waterloo

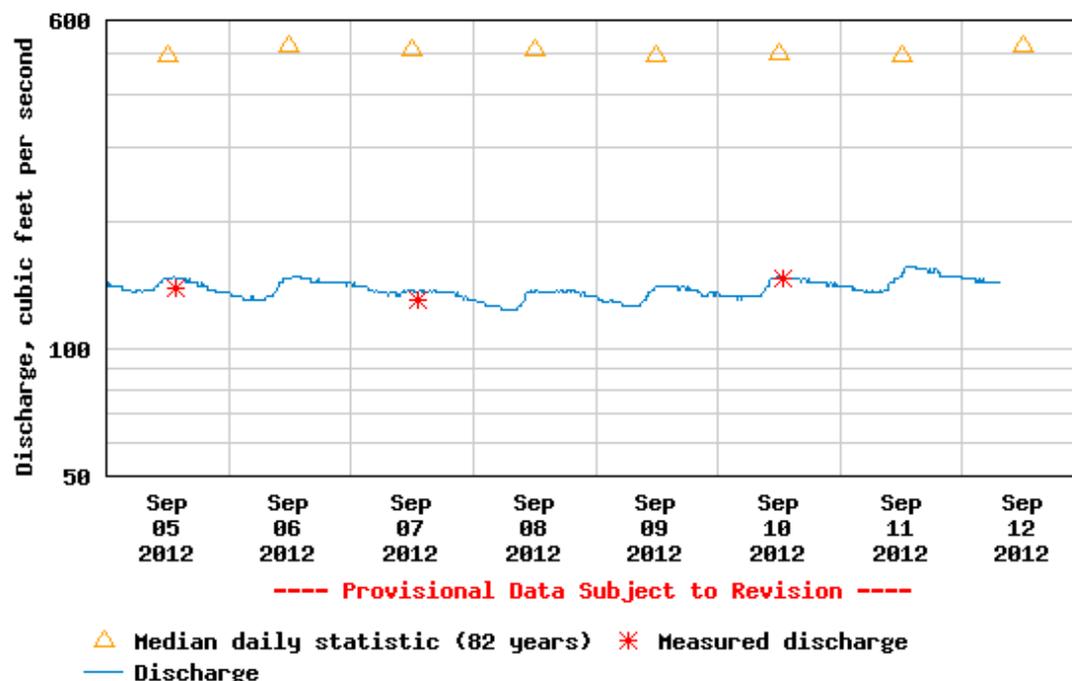


Explanation - Percentile classes						
lowest-10th percentile	5	10-24	25-75	76-90	95	90th percentile -highest
Much below Normal	Below normal	Normal	Above normal	Much above normal		Flow

## Discharge, cubic feet per second

Most recent instantaneous value: 143 09-12-2012 07:15 CDT

USGS 06800500 Elkhorn River at Waterloo, Nebr.



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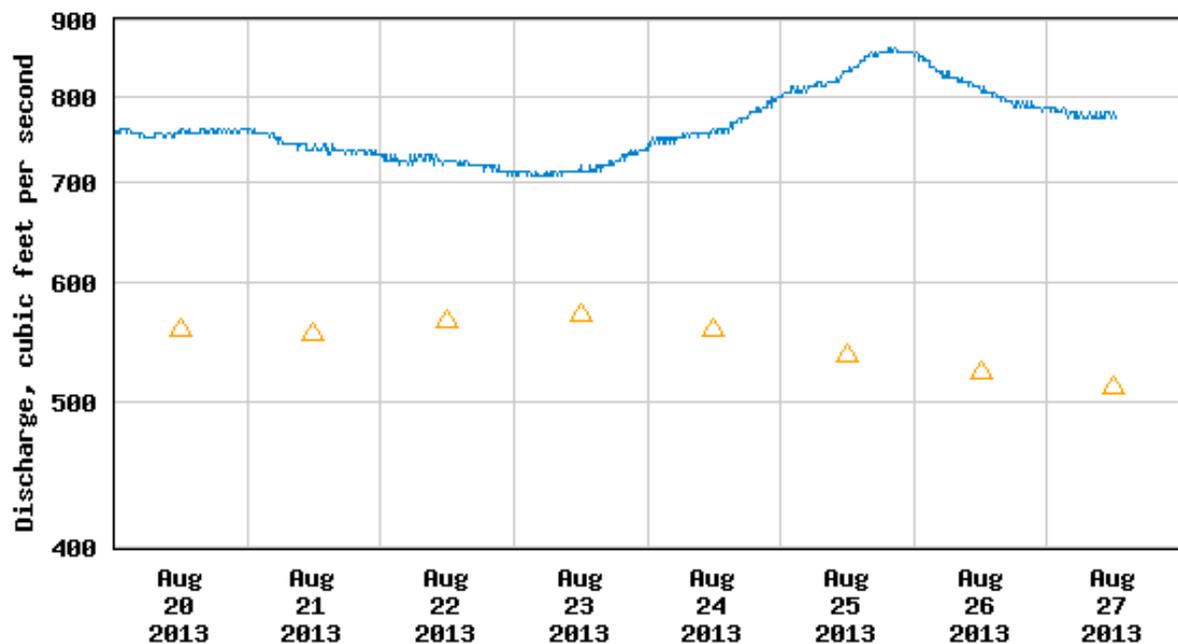
Daily discharge, cubic feet per second -- statistics for Sep 12  
based on 82 years of record [more](#)

Min (1939)	Most Recent Instantaneous Value Sep 12	25th percentile	Median	Mean	75th percentile	Max (1951)
86	143	341	521	754	908	4050

## Discharge, cubic feet per second

Most recent instantaneous value: 774 08-27-2013 12:15 CDT

USGS 06800500 Elkhorn River at Waterloo, Nebr.



----- Provisional Data Subject to Revision -----

△ Median daily statistic (83 years) — Discharge

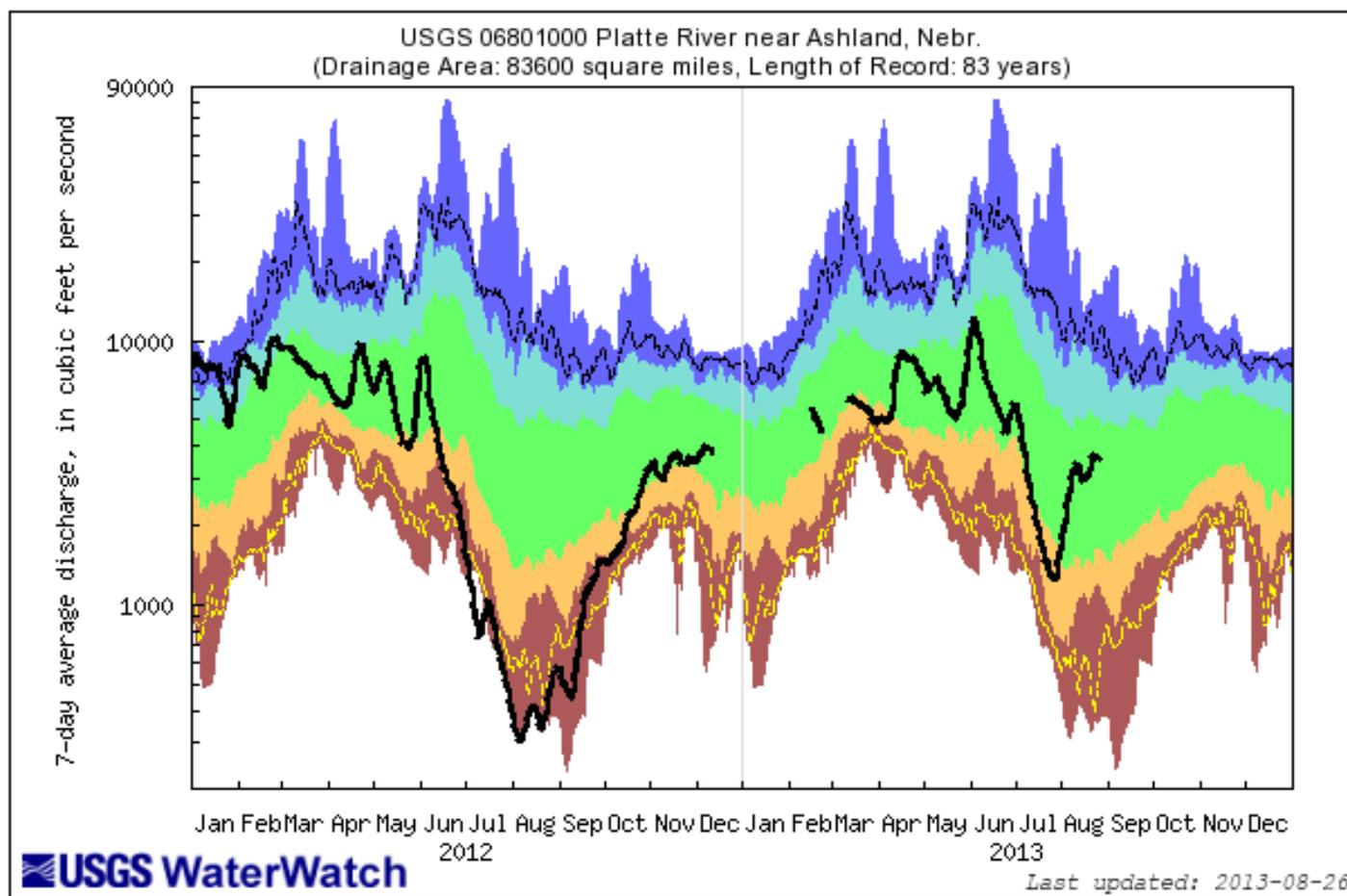
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Daily discharge, cubic feet per second -- statistics for Aug 27  
based on 83 years of record [more](#)

Min (1976)	25th percentile	Median	Most Recent Instantaneous Value Aug 27	Mean	75th percentile	Max (2007)
89	329	512	774	786	896	4030

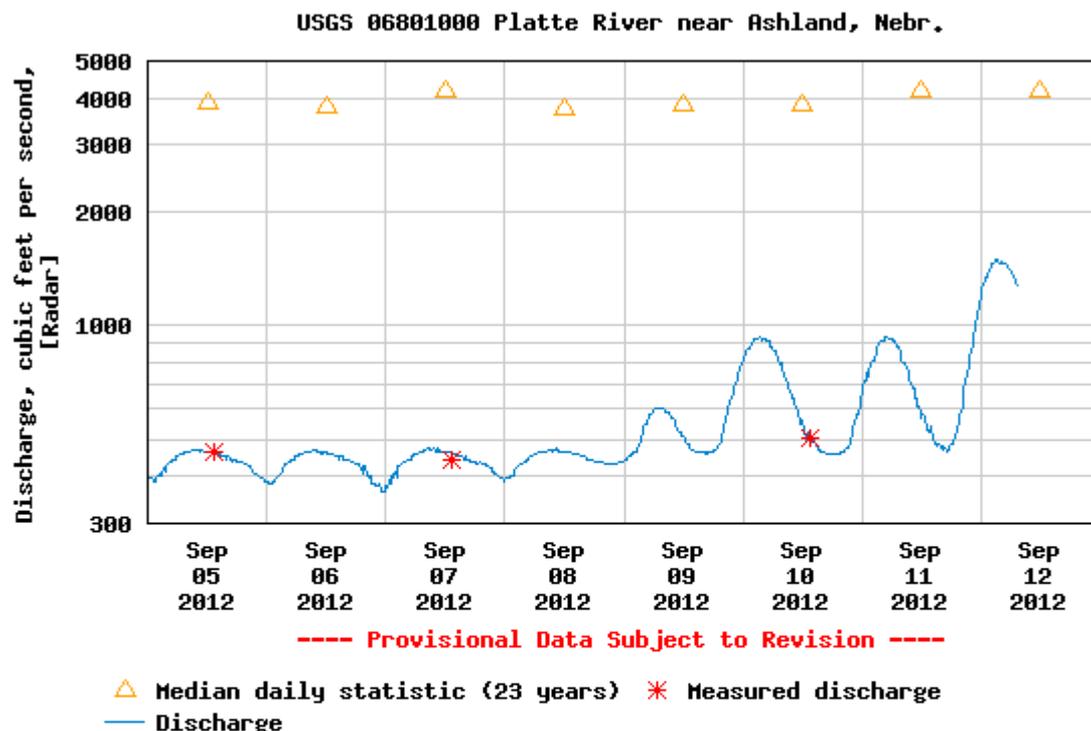
# Platte River near Ashland



Explanation - Percentile classes						
lowest-10th percentile	5	10-24	25-75	76-90	95	90th percentile -highest
Much below Normal	Below normal	Normal	Above normal	Much above normal		Flow

## Discharge, cubic feet per second, [Radar]

Most recent instantaneous value: 1,270 09-12-2012 07:15 CDT



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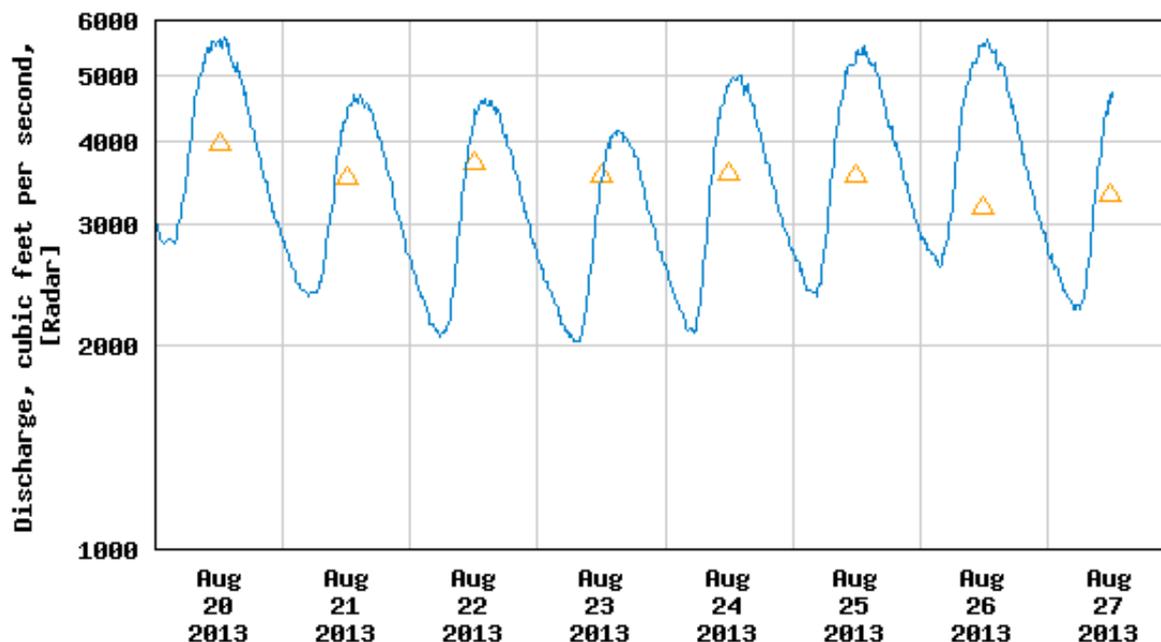
Daily discharge, cubic feet per second -- statistics for Sep 12  
based on 23 years of record [more](#)

Min (1991)	Most Recent Instantaneous Value Sep 12	25th percentile	Mean	Median	75th percentile	Max (1989)
1210	1270	2270	4070	4160	5870	7470

## Discharge, cubic feet per second, [Radar]

Most recent instantaneous value: 4,690 08-27-2013 12:15 CDT

USGS 06801000 Platte River near Ashland, Nebr.



---- Provisional Data Subject to Revision ----

△ Median daily statistic (24 years) — Discharge

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Daily discharge, cubic feet per second -- statistics for Aug 27 based on 24 years of record [more](#)

Min (2012)	25th percentile	Median	Mean	Most Recent Instantaneous Value Aug 27	75th percentile	Max (2007)
576	1660	3320	4250	4690	6500	12000

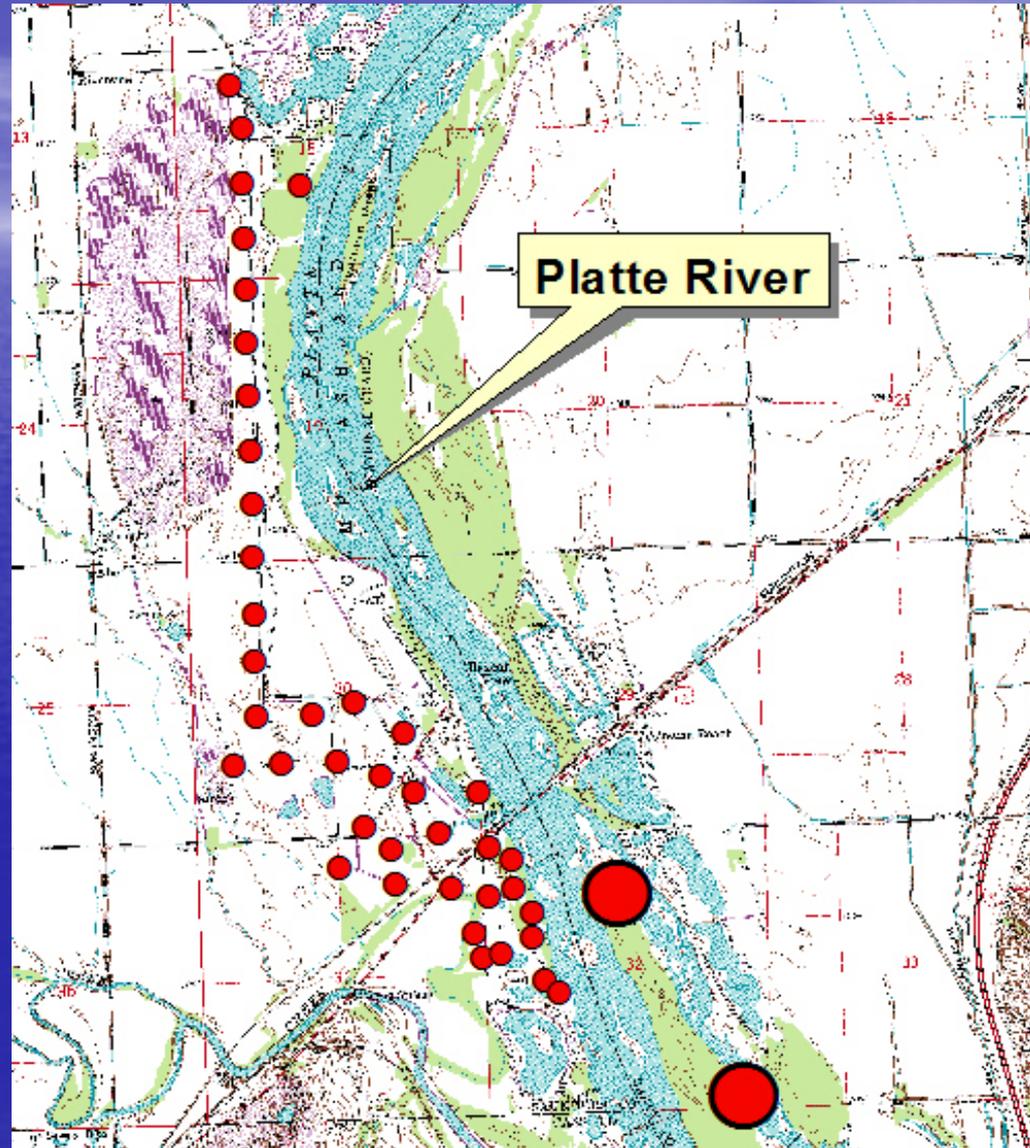
## Ranking of Lowest Recorded Precipitation – Lincoln, NE 1887 - 2012

RANK	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1	1936	1.64	0.68	0.18	2.29	1.95	1.13	0.08	1.63	3.38	0.19	0.06	0.88	14.09
2	1890	0.86	0.06	0.72	0.33	3.43	3.14	1.72	1.84	0.98	1.12	0.61	0.00	14.81
3	1895	0.20	0.71	0.50	2.51	1.09	4.35	1.05	4.00	0.64	0.05	0.79	0.05	15.94
4	1894	0.39	1.80	1.13	1.60	0.74	6.99	1.11	0.45	0.00	1.57	0.00	0.36	16.14
5	1934	0.25	0.78	0.80	0.35	0.49	2.47	0.40	2.59	4.47	1.93	2.26	0.44	17.23
6	1953	0.44	0.50	0.74	3.07	1.80	1.90	0.92	2.09	1.47	0.38	3.21	1.03	17.55
7	1976	0.36	1.15	2.59	3.60	3.03	0.63	2.99	0.07	3.09	0.32	0.03	0.04	17.90
8	1955	1.31	0.64	0.59	2.21	1.23	4.97	0.61	0.55	4.81	0.57	0.26	0.42	18.17
9	1988	0.47	0.14	0.13	2.43	3.25	0.65	1.16	2.27	6.18	0.03	1.09	0.57	18.37
10	1887	0.30	1.27	0.52	0.98	3.79	2.87	0.69	2.59	2.70	0.85	1.16	0.80	18.52
11	2012	0.16	2.10	0.89	3.49	3.00	3.57	0.33	0.30	1.73	1.92	0.15	1.50	19.14
65	2002	0.64	0.36	1.35	2.42	5.20	0.17	1.57	8.29	1.47	4.90	0.24	0.01	26.62
	2013	0.73	0.54	2.12	4.02	8.44	2.49	1.00	1.11					20.45

# Supply Deficiency vs Usage

# Wellfield Overview

- 40 vertical wells
- 2 collector wells
  - Yield of 60 to over 100 mgd, depending on conditions
- VERY DEPENDENT ON RIVER FLOW



Hwy 6 Bridge Looking South 7/27/12



East Channel looking North 7/27/12

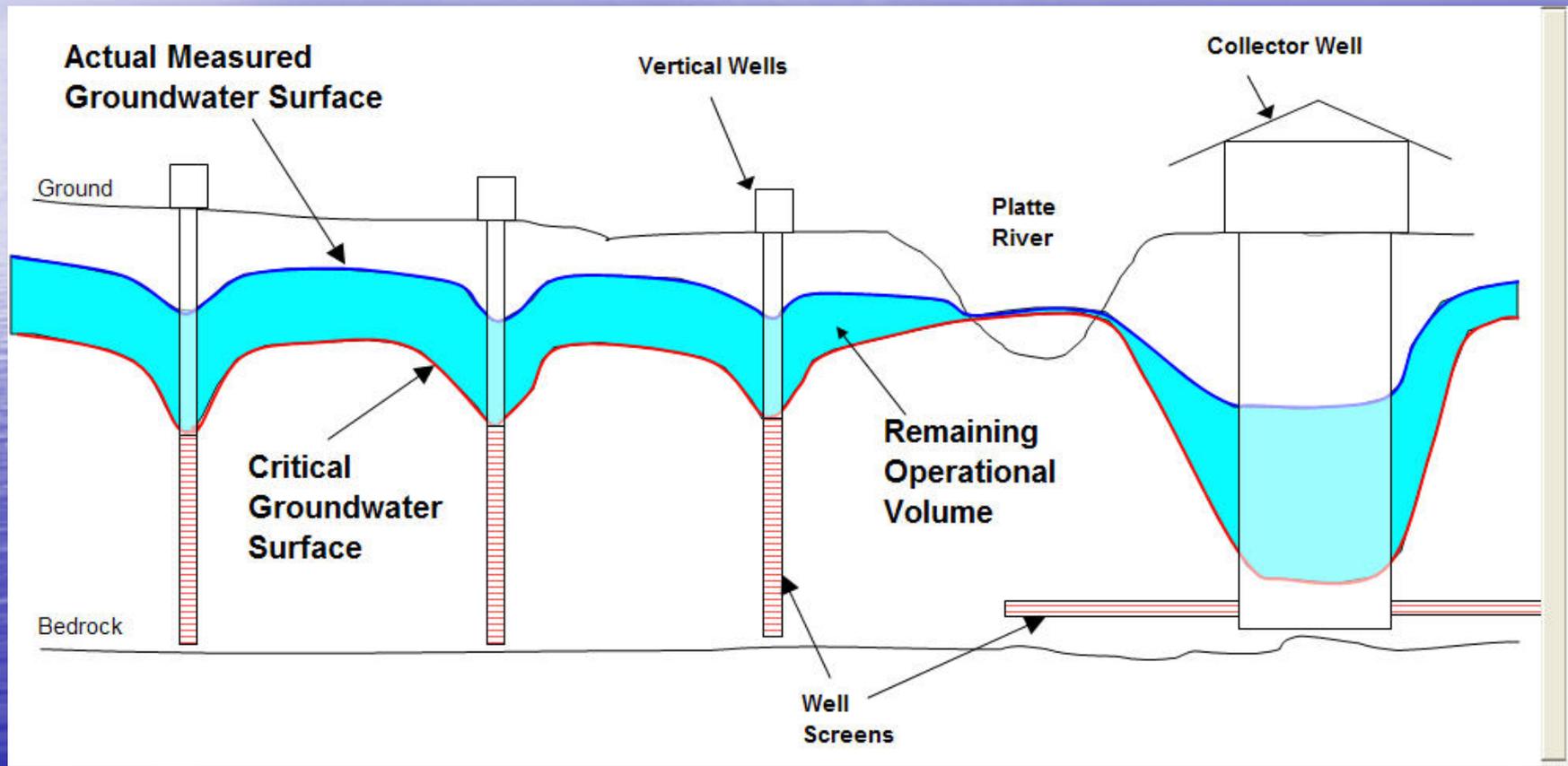


East Channel looking South

7/27/12

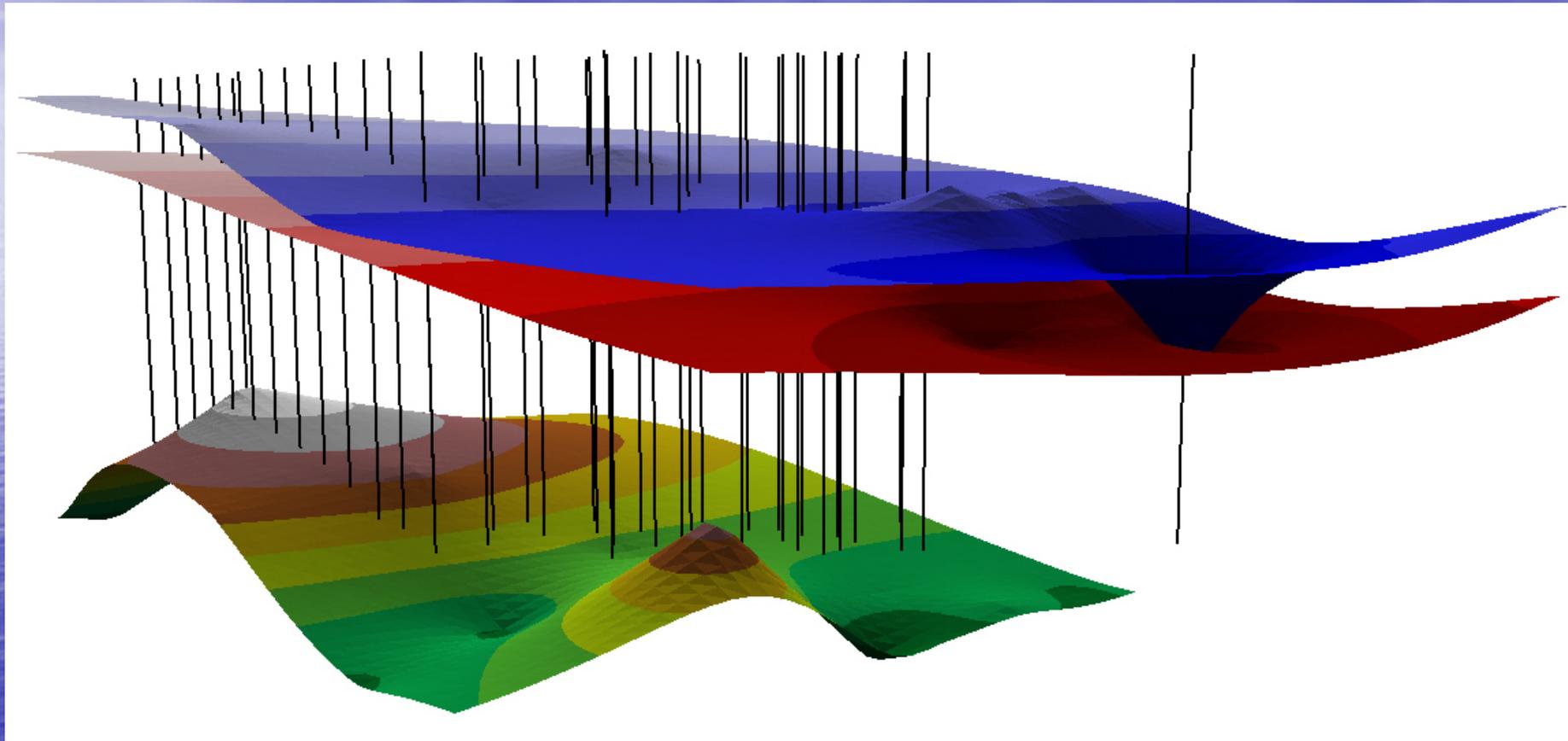


# Well Field Drawdown

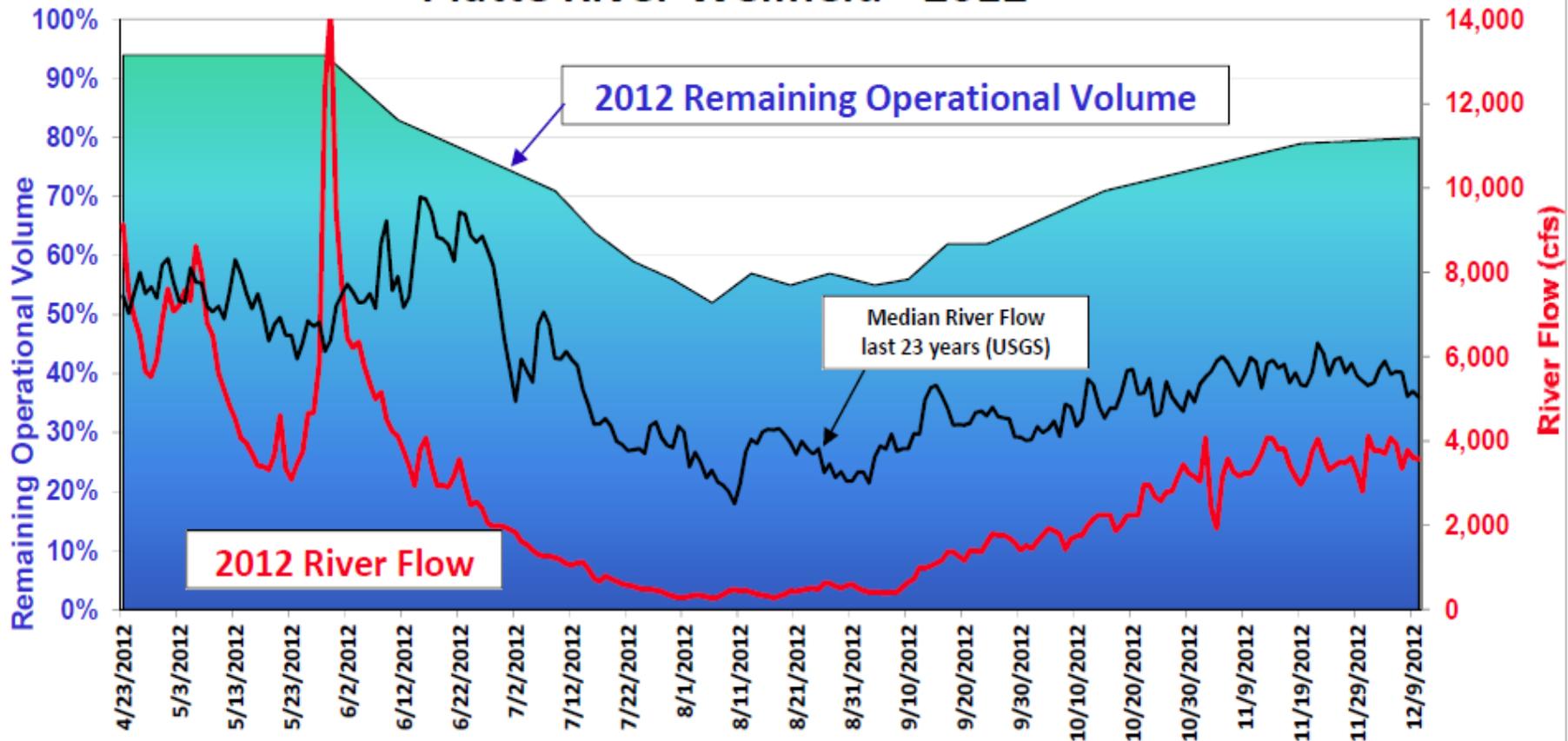


# LWS WELLFIELD 3-D SURFACES – LOOKING NORTHEAST

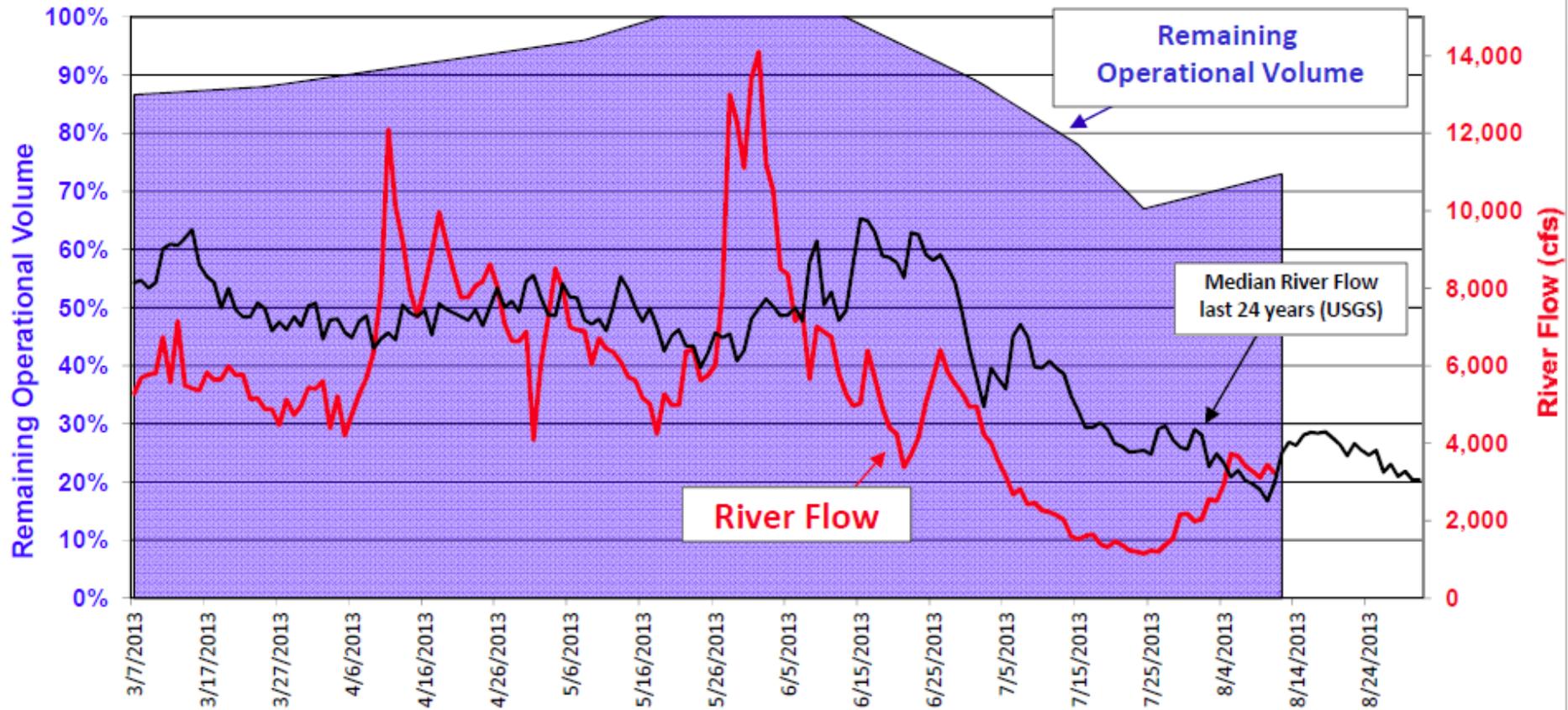
- Blue = Monday's (7/23) groundwater surface
- Red = Critical surface



# Platte River Wellfield - 2012



# Platte River Wellfield 2013

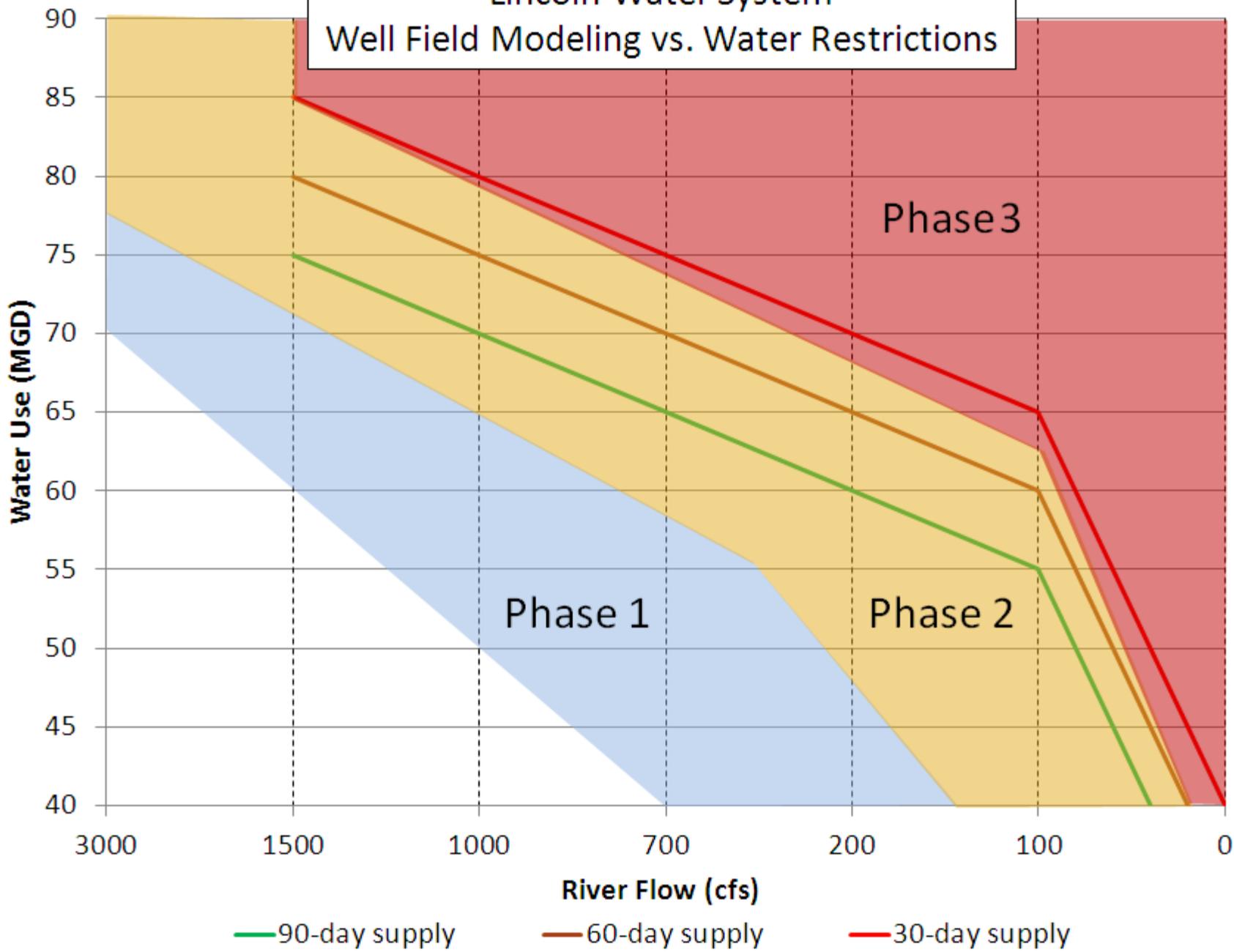


- Water Restriction Decision Criteria
  - Previous precipitation
  - Weather forecasts
  - River flow/water usage
  - Temperature
  - Time of year (June 1 thru Sept. 15)
  - Remaining operational volume
  - Well field modeling
  - Past experience

**Table 2. Groundwater Modeling Results**

<b>Table 2. Groundwater Modeling Results</b>				
<b>River Flow: 1,500 cfs</b>	<b>Pumping Rate</b>			
<i>Simulation Period</i>	<b>75 MGD</b>	<b>80 MGD</b>	<b>85 MGD</b>	<b>90 MGD</b>
<i>30 days</i>	OK	OK	OK	Failed
<i>60 days</i>	OK	OK	Failed	Failed
<i>90 days</i>	OK	Failed	Failed	Failed
<b>River Flow: 1,000 cfs</b>	<b>Pumping Rate</b>			
<i>Simulation Period</i>	<b>70 MGD</b>	<b>75 MGD</b>	<b>80 MGD</b>	<b>85 MGD</b>
<i>30 days</i>	OK	OK	OK	Failed
<i>60 days</i>	OK	OK	Failed	Failed
<i>90 days</i>	OK	Failed	Failed	Failed
<b>River Flow: 200 cfs</b>	<b>Pumping Rate</b>			
<i>Simulation Period</i>	<b>65 MGD</b>	<b>70 MGD</b>	<b>75 MGD</b>	<b>80 MGD</b>
<i>30 days</i>	OK	OK	OK	Failed
<i>60 days</i>	OK	OK	Failed	Failed
<i>90 days</i>	OK	Failed	Failed	Failed

# Lincoln Water System Well Field Modeling vs. Water Restrictions



## River Flow Usage

## Maximum Sustainable

> 3,000 cfs  
greater

85 MGD or

< 3,000 cfs

80 MGD

< 1,500 cfs

75 MGD

< 1,000 cfs

70 MGD

< 700 cfs

65 MGD

< 200 cfs

60 MGD

< 100 cfs

55 MGD

0 cfs

30 MDG or less

MONTH

July

## ASHLAND WELLFIELD, TRANSMISSION, AND DISTRIBUTION REPORT

2012

[click for >](#)[USGS River flow](#)[Daily Weather](#)[Monthly Norms](#)

DATE		ASHLAND	ASHLAND	FILTER	VINE ST	LINCOLN	LINCOLN	MAXIMUM	MINIMUM	AIRPORT	RIVER
		PUMPAGE	TRANSMISSION	BACKWASH	TRANSFER	USAGE	MAX. HOUR			RAINFALL	
		MGD	MGD	MGD	MGD	MGD	MGD	TEMP.	TEMP.		CFS
SUN	1	65.363	60.407	1.198	11.417	60.561	103.598	93	66	0.00	2,390
MON	2	68.566	62.758	0.597	11.412	65.535	123.581	95	70	0.00	1,880
TUE	3	73.547	67.307	0.790	9.104	67.788	125.316	98	73	0.00	1,880
WED	4	75.886	71.151	0.403	12.304	72.051	137.638	98	75	0.00	1,750
THU	5	75.014	69.747	0.568	16.193	69.548	121.391	100	75	0.00	1,630
FRI	6	73.973	68.124	0.776	9.140	74.147	148.776	102	74	0.00	1,370
SAT	7	83.821	78.548	0.569	9.303	68.718	127.637	87	70	0.00	1,270
SUN	8	71.605	65.221	1.150	9.091	64.714	112.524	85	71	0.00	1,290
MON	9	71.145	65.243	1.126	9.429	66.285	121.042	90	69	0.00	1,290
TUE	10	68.808	64.349	0.757	10.545	68.515	140.318	87	63	0.00	1,040
WED	11	73.894	69.017	0.478	6.739	71.560	141.909	89	57	0.00	967
THU	12	77.137	71.022	1.140	4.672	68.995	133.986	95	62	0.00	1,060
FRI	13	77.839	72.785	0.291	11.013	71.331	156.342	97	70	0.00	1,210
SAT	14	78.605	72.353	1.144	11.943	72.250	123.139	99	67	0.00	1,390
SUN	15	78.618	72.851	0.291	13.992	73.899	126.357	100	69	0.00	1,120
MON	16	79.090	72.471	1.145	15.207	72.731	147.139	95	69	0.00	736
TUE	17	81.979	75.802	0.483	10.357	75.278	149.033	100	71	0.00	667
WED	18	84.358	77.367	1.143	5.022	77.618	162.595	99	74	T	871
THU	19	79.940	73.726	1.531	8.061	74.893	140.610	101	71	0.00	667
FRI	20	83.571	76.199	1.231	12.127	77.462	155.731	98	71	0.00	623
SAT	21	89.590	82.852	0.395	14.897	76.521	142.646	101	69	0.00	550
SUN	22	82.246	74.996	1.142	15.932	77.997	127.139	105	70	0.00	520
MON	23	80.468	75.215	0.467	17.597	76.323	145.826	104	89	0.00	520
TUE	24	83.307	76.284	1.145	12.967	80.027	151.192	104	73	0.00	481
WED	25	84.002	77.472	1.023	10.404	76.116	161.072	104	76	0.06	443
THU	26	78.363	75.522	1.978	11.212	65.376	132.152	99	69	0.25	449
FRI	27	70.242	64.574	1.050	8.486	65.609	150.063	89	65	0.00	437
SAT	28	64.638	59.084	0.558	12.495	65.752	124.583	95	67	0.00	400
SUN	29	77.147	71.218	0.579	12.421	71.724	125.438	100	66	0.00	382
MON	30	70.429	63.892	1.044	3.350	60.986	151.432	98	67	0.02	334
TUE	31	73.421	67.404	0.945	6.824	70.434	142.953	97	65	0.00	299
<b>TOTAL</b>		<b>2376.612</b>	<b>2194.961</b>	<b>27.137</b>	<b>333.656</b>	<b>2200.745</b>	<b>DAY AVG.</b>	<b>97</b>	<b>70</b>	<b>0.01</b>	<b>965</b>
<b>Max High</b>		<b>89.590</b>	<b>82.852</b>	<b>1.978</b>	<b>17.597</b>	<b>80.027</b>	<b>162.595</b>	<b>105</b>			<b>2,390</b>
<b>Min Low</b>		<b>64.638</b>	<b>59.084</b>		<b>3.350</b>	<b>60.561</b>	<b>103.598</b>		<b>57</b>		<b>299</b>
<b>Average</b>		<b>76.665</b>	<b>70.805</b>	<b>0.875</b>	<b>10.763</b>	<b>70.992</b>	<b>137.199</b>	Normal Monthly Average Rainfa			<b>3.54</b>
								Total Rainfall for the Month			<b>0.33</b>

Reservoirs		Operational Range	50%	70%	24Hr Avg
Air Park		91.0-63.3	72.2	82.7	83.4
N.W. 12th	(Highlands)	72.5-50.0	61.3	65.8	68.0
S.E.		58.0-40.0	49.0	52.6	54.5
Yankee Hill		73.0-63.0	68.0	70.0	67.2
So.56th		60.0-41.3	50.7	54.4	55.0
Pioneers		52.0-36.0	44.0	47.2	49.5

LINCOLN WATER SYSTEM

MONTH July 2013 ASHLAND WELLFIELD, TRANSMISSION, AND DISTRIBUTION REPORT

click for > [USGS River flow](#) [Daily Weather](#) [Monthly Norms](#)

DATE		ASHLAND	ASHLAND	FILTER	VINE ST	LINCOLN	LINCOLN			AIRPORT	RIVER
		PUMPAGE	TRANSMISSION	BACKWASH	TRANSFER	USAGE	MAXIMUM	MAXIMUM	MINIMUM	RAINFALL	CFS
		MGD	MGD	MGD	MGD	MGD	HOUR	TEMP.	TEMP.		
MON	1	46.187	43.129	0.680	11.532	45.723	80.248	82	50	0.00	4,090
TUE	2	50.187	45.724	0.994	10.322	52.800	105.710	83	55	T	3,480
WED	3	57.821	54.820	0.470	16.756	55.341	104.117	87	55	0.00	3,180
THU	4	62.062	57.876	1.054	13.966	54.231	93.708	87	56	0.00	3,070
FRI	5	63.770	60.546	0.476	6.590	56.056	107.030	89	63	T	2,950
SAT	6	58.514	54.060	1.238	11.256	57.074	91.131	88	69	0.00	2,790
SUN	7	63.427	58.646	0.860	13.242	65.333	98.026	94	72	0.00	2,660
MON	8	64.647	60.200	1.046	11.557	55.735	103.516	90	75	T	2,480
TUE	9	61.847	58.065	1.129	11.815	66.231	114.793	98	75	T	2,560
WED	10	75.332	70.471	0.582	12.134	66.206	127.804	87	66	T	2,460
THU	11	76.456	72.175	0.378	3.893	64.921	124.331	89	65	0.00	2,580
FRI	12	72.015	67.517	0.763	8.399	69.335	138.142	95	70	0.00	2,500
SAT	13	78.905	72.300	0.954	8.279	68.101	122.339	96	76	T	2,310
SUN	14	79.636	74.286	0.195	7.226	70.446	121.773	88	72	T	2,080
MON	15	66.532	61.907	1.331	4.689	62.196	107.364	91	60	0.00	1,560
TUE	16	72.299	66.828	1.367	6.072	72.398	146.163	91	66	0.00	2,050
WED	17	75.629	69.718	1.515	15.316	71.458	151.982	93	68	0.00	1,700
THU	18	76.549	71.152	0.763	9.961	70.272	135.872	95	69	0.00	1,900
FRI	19	77.399	71.359	0.759	6.053	72.541	148.741	96	71	0.00	1,740
SAT	20	81.449	74.351	0.964	9.064	67.206	130.789	90	65	0.00	1,410
SUN	21	74.455	69.148	1.144	10.231	72.454	124.146	92	68	0.00	1,920
MON	22	69.374	64.342	0.378	4.929	62.463	110.300	97	67	0.00	1,260
TUE	23	59.556	53.899	1.995	7.668	53.147	124.755	82	64	0.28	1,200
WED	24	56.309	50.741	1.613	7.632	54.776	115.848	88	59	0.00	1,130
THU	25	60.616	56.149	0.870	13.463	53.616	110.658	82	66	T	1,540
FRI	26	61.872	57.125	0.831	11.563	58.858	129.833	81	55	0.00	1,280
SAT	27	63.218	59.508	0.570	12.885	58.308	102.236	76	52	0.00	1,760
SUN	28	67.672	62.792	0.661	14.531	61.484	117.719	80	47	0.00	1,820
MON	29	46.414	42.136	1.048	3.760	38.707	76.799	67	60	0.72	2,120
TUE	30	37.556	33.985	0.193	9.937	40.205	82.186	79	64	0.00	2,240
WED	31	52.562	47.545	0.750	10.785	43.198	144.789	87	61	0.00	2,050
<b>TOTAL</b>		<b>2010.267</b>	<b>1862.500</b>	<b>27.571</b>	<b>305.506</b>	<b>1860.819</b>	<b>DAY AVG.</b>	<b>88</b>	<b>64</b>	<b>0.04</b>	<b>2189</b>
<b>Max High</b>		<b>81.449</b>	<b>74.351</b>	<b>1.995</b>	<b>16.756</b>	<b>72.541</b>	<b>151.982</b>	<b>98</b>			<b>4,090</b>
<b>Min Low</b>		<b>37.556</b>	<b>33.985</b>		<b>3.760</b>	<b>38.707</b>	<b>76.799</b>		<b>47</b>		<b>1,130</b>
<b>Average</b>		<b>64.847</b>	<b>60.081</b>	<b>0.889</b>	<b>9.855</b>	<b>60.026</b>	<b>115.898</b>	<b>Normal Monthly Average Rainfall</b>			<b>3.54</b>
								<b>Total Rainfall for the Month</b>			<b>1.00</b>

Reservoir Level, ft.	Operational Range	50%	70%	24Hr Avg
	100%-66%	Operational Range	Operational Range	Operational Range
Air Park	91.0-63.3	72.2	82.7	85.6
N.W. 12th (Highlands)	72.5-50.0	61.3	65.8	66.7
S.E.	58.0-40.0	49.0	52.6	54.5
So.56th	60.0-41.3	50.7	54.4	54.6
Vine	27.5-15.0	21.2	23.8	20.7
Pioneers	52.0-36.0	44.0	47.2	48.3
Yankee Hill	73.0-63.0	68.0	70.0	68.2
Cheney	39.5-26.0	32.8	35.5	30.6

MONTH August 2012 ASHLAND WELLFIELD, TRANSMISSION, AND DISTRIBUTION REPORT

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DATE		ASHLAND	ASHLAND	FILTER	VINE ST	LINCOLN	LINCOLN		AIRPORT	RIVER	
		PUMPAGE	TRANSMISSION	BACKWASH	TRANSFER	USAGE	MAXIMUM	MAXIMUM	MINIMUM	RAINFALL	CFS
		MGD	MGD	MGD	MGD	MGD	HOUR	TEMP.	TEMP.		
WED	1	82.971	75.979	1.310	14.066	72.747	158.071	100	72	0.00	260
THU	2	71.741	64.600	1.864	13.258	61.421	122.982	96	70	0.11	266
FRI	3	69.829	65.067	0.546	12.275	68.676	148.883	99	69	0.00	288
SAT	4	70.753	64.015	1.437	15.689	61.059	125.577	84	59	T	288
SUN	5	70.600	64.756	1.047	8.176	65.515	119.697	89	55	0.00	266
MON	6	68.548	62.093	1.134	11.708	58.342	117.914	97	60	0.00	244
TUE	7	68.652	63.019	1.220	10.995	66.212	136.110	102	69	T	248
WED	8	73.133	67.164	1.329	12.430	66.935	140.028	103	67	0.00	282
THU	9	66.991	62.950	0.542	8.555	63.471	132.602	87	65	0.00	456
FRI	10	69.049	62.242	0.880	11.478	61.244	136.932	82	55	0.00	530
SAT	11	61.973	56.551	0.670	8.658	57.802	116.258	83	51	0.01	468
SUN	12	65.405	58.752	1.834	11.110	58.143	110.332	84	63	0.00	530
MON	13	45.183	41.464	0.391	6.461	38.028	65.947	80	57	0.00	437
TUE	14	57.471	51.281	1.634	11.624	60.289	123.657	87	57	0.00	376
WED	15	71.783	65.326	1.633	13.528	62.430	130.998	94	58	0.00	305
THU	16	63.874	59.099	0.384	9.537	61.240	125.000	77	49	T	260
FRI	17	64.129	58.282	0.953	10.083	53.874	173.037	82	44	0.00	244
SAT	18	59.736	54.065	1.147	8.736	53.502	103.980	78	45	T	244
SUN	19	57.475	52.053	1.240	11.658	60.139	104.601	83	46	0.00	299
MON	20	44.851	40.356	1.522	9.724	35.706	59.715	89	48	0.00	494
TUE	21	62.471	57.624	0.956	4.807	61.328	131.166	94	53	0.00	382
WED	22	71.588	65.567	0.857	11.636	63.883	134.572	93	58	0.00	481
THU	23	67.808	61.814	1.149	9.914	59.796	115.363	93	66	0.00	487
FRI	24	55.651	49.743	1.137	10.738	46.654	119.048	77	68	0.13	540
SAT	25	41.107	38.041	0.764	4.444	40.181	77.311	76	65	0.05	400
SUN	26	45.366	42.239	0.763	8.295	42.736	74.585	85	62	0.00	690
MON	27	41.134	37.792	0.571	7.324	33.276	53.006	93	57	0.00	808
TUE	28	55.513	50.801	0.946	4.894	53.837	106.074	85	61	0.00	634
WED	29	57.744	52.636	1.613	13.110	60.048	117.928	98	63	0.00	500
THU	30	64.495	59.304	0.571	9.070	58.626	112.366	100	66	0.00	784
FRI	31	65.955	60.811	2.280	10.456	57.790	122.113	99	58	0.00	736
<b>TOTAL</b>		<b>1932.979</b>	<b>1765.486</b>	<b>34.324</b>	<b>314.437</b>	<b>1764.931</b>	<b>DAY AVG.</b>	<b>89</b>	<b>59</b>	<b>0.01</b>	<b>427</b>
<b>Max High</b>		<b>82.971</b>	<b>75.979</b>	<b>2.280</b>	<b>15.689</b>	<b>72.747</b>	<b>173.037</b>	<b>103</b>			<b>808</b>
<b>Min Low</b>		<b>41.107</b>	<b>37.792</b>		<b>4.444</b>	<b>33.276</b>	<b>53.006</b>	<b>44</b>			<b>244</b>
<b>Average</b>		<b>62.354</b>	<b>56.951</b>	<b>1.107</b>	<b>10.143</b>	<b>56.933</b>	<b>116.640</b>	<b>Normal Monthly Average Rainfa</b>		<b>3.35</b>	
								<b>Total Rainfall for the Month</b>		<b>0.30</b>	
<b>Reservoirs</b>		<b>Operational Range</b>			<b>50%</b>	<b>70%</b>	<b>24Hr Avg</b>				
Air Park		91.0-63.3			72.2	82.7	86.5				
N.W. 12th (Highlands)		72.5-50.0			61.3	65.8	66.6				
S.E.		58.0-40.0			49.0	52.6	55.8				
Yankee Hill		73.0-63.0			68.0	70.0	69.0				
So.56th		60.0-41.3			50.7	54.4	56.9				
Pioneers		52.0-36.0			44.0	47.2	48.5				



MONTH August  
2013

LINCOLN WATER SYSTEM  
ASHLAND WELLFIELD, TRANSMISSION, AND DISTRIBUTION REPORT

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DATE	ASHLAND PUMPAGE		ASHLAND TRANSMISSION	FILTER BACKWASH	VINE ST TRANSFER	LINCOLN USAGE	LINCOLN MAXIMUM	MAXIMUM	MINIMUM	AIRPORT RAINFALL	RIVER CFS
	MGD	MGD	MGD	MGD	MGD	MGD	TEMP.	TEMP.	TEMP.		
THU 1	55.160	50.328	0.754	10.360	45.467	134.016	89	62	0.69	2,050	
FRI 2	44.162	40.634	0.470	5.867	39.064	126.459	84	65	0.06	2,330	
SAT 3	41.484	34.795	2.092	4.274	38.499	76.991	80	62	0.00	2,360	
SUN 4	41.689	37.104	0.442	5.686	43.248	81.258	79	61	0.00	2,580	
MON 5	48.508	43.944	0.846	11.015	40.963	74.037	86	70	0.00	2,680	
TUE 6	54.984	51.541	0.697	12.161	49.456	95.809	88	67	T	2,710	
WED 7	57.374	51.731	1.265	5.487	50.775	114.113	85	66	0.00	2,740	
THU 8	56.063	50.635	1.226	9.459	47.691	95.849	79	65	0.00	2,560	
FRI 9	47.404	43.377	0.557	4.224	51.951	108.559	83	60	0.00	3,150	
SAT 10	54.660	49.882	0.659	12.154	50.093	88.143	84	54	0.00	2,950	
SUN 11	58.367	53.439	0.469	11.835	55.351	107.036	87	61	0.01	2,980	
MON 12	50.547	45.344	0.942	8.351	39.762	66.544	85	65	0.09	2,560	
TUE 13	54.344	49.978	0.374	9.771	51.331	105.249	80	60	0.00	2,260	
WED 14	55.429	50.984	0.754	7.731	47.652	112.704	78	56	T	2,610	
THU 15	46.474	41.111	1.726	5.787	39.219	87.306	70	63	0.25	2,260	
FRI 16	40.191	36.078	1.041	8.422	39.503	83.097	75	62	0.00	2,760	
SAT 17	43.071	38.995	0.319	10.136	42.118	78.794	80	60	0.00	2,840	
SUN 18	52.767	47.356	0.849	10.523	49.918	95.147	81	52	0.00	2,630	
MON 19	54.820	49.920	0.758	12.282	45.431	87.755	87	63	0.00	2,740	
TUE 20	62.319	56.779	1.441	10.544	58.513	118.879	91	70	0.00	2,870	
WED 21	63.453	58.987	0.481	10.512	58.595	119.946	93	69	0.00	2,480	
THU 22	62.971	57.481	0.946	11.180	55.468	117.063	86	68	0.01	2,330	
FRI 23	63.810	59.293	0.567	13.054	60.137	113.884	92	71	T	2,380	
SAT 24	67.453	61.387	0.950	10.280	61.551	103.530	94	75	0.00	2,280	
SUN 25	68.681	62.113	1.322	11.712	65.827	116.455	96	73	0.00	2,430	
MON 26	62.182	56.351	1.014	8.258	56.450	101.233	97	75	0.00	2,710	
TUE 27	70.151	65.524	0.568	12.788	70.550	146.254	98	72	0.00	2,480	
WED 28										2,500	
THU 29											
FRI 30											
SAT 31											
<b>TOTAL</b>	<b>1478.518</b>	<b>1345.091</b>	<b>23.529</b>	<b>253.853</b>	<b>1354.584</b>	<b>DAY AVG.</b>	<b>85</b>	<b>65</b>	<b>0.05</b>	<b>2579</b>	
<b>Max High</b>	<b>70.151</b>	<b>65.524</b>	<b>2.092</b>	<b>13.054</b>	<b>70.550</b>	<b>146.254</b>	<b>98</b>			<b>3,150</b>	
<b>Min Low</b>	<b>40.191</b>	<b>34.795</b>		<b>4.224</b>	<b>38.499</b>	<b>66.544</b>		<b>52</b>		<b>2,050</b>	
<b>Average</b>	<b>54.760</b>	<b>49.818</b>	<b>0.871</b>	<b>9.402</b>	<b>50.170</b>	<b>102.078</b>	<b>Normal Monthly Average Rainfall</b>			<b>3.35</b>	
							<b>Total Rainfall for the Month</b>			<b>1.11</b>	

Reservoir Level, ft.	Operational Range	50%	70%	24Hr Avg
	100%-66%	Operational Range	Operational Range	Operational Range
Air Park	91.0-63.3	72.2	82.7	83.9
N.W. 12th (Highlands)	72.5-50.0	61.3	65.8	65.0
S.E.	58.0-40.0	49.0	52.6	53.5
So.56th	60.0-41.3	50.7	54.4	53.7
Vine	27.5-15.0	21.2	23.8	17.1
Pioneers	52.0-36.0	44.0	47.2	49.0
Yankee Hill	73.0-63.0	68.0	70.0	66.6
Cheney	39.5-26.0	32.8	35.5	30.6

MONTH September ASHLAND WELLFIELD, TRANSMISSION, AND DISTRIBUTION REPORT  
2012

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DATE		ASHLAND	ASHLAND	FILTER	VINE ST	LINCOLN	LINCOLN			AIRPORT	RIVER
		PUMPAGE	TRANSMISSION	BACKWASH	TRANSFER	USAGE	MAXIMUM	MAXIMUM	MINIMUM	RAINFALL	CFS
		MGD	MGD	MGD	MGD	MGD	HOUR	TEMP.	TEMP.		
SAT	1	64.232	59.251	0.955	14.447	58.136	103.321	95	63	0.00	510
SUN	2	66.222	60.454	0.834	13.752	57.888	106.223	99	62	0.00	468
MON	3	37.134	31.970	1.999	6.523	33.222	59.680	87	67	T	425
TUE	4	54.080	49.194	0.774	7.260	53.497	108.908	102	63	0.01	437
WED	5	63.510	57.669	1.434	10.294	55.053	120.789	90	54	0.00	437
THU	6	62.341	56.419	1.519	6.786	54.141	108.495	94	46	0.00	431
FRI	7	54.724	50.165	0.479	2.514	51.173	105.725	75	56	T	443
SAT	8	54.827	50.659	0.285	6.664	54.660	92.140	87	42	0.00	437
SUN	9	57.714	52.734	0.942	1.997	57.299	91.251	78	42	0.00	520
MON	10	45.695	41.657	0.848	5.836	32.898	52.765	89	48	0.00	871
TUE	11	58.575	52.814	1.515	10.195	57.094	114.157	97	55	0.00	909
WED	12	58.332	53.840	0.580	14.719	51.302	122.660	78	54	1.63	1,500
THU	13	43.659	39.990	1.017	8.754	35.917	74.087	69	50	0.08	1,360
FRI	14	38.965	36.709	0.000	6.022	39.188	79.349	81	44	0.00	1,190
SAT	15	42.060	39.731	0.380	6.387	42.886	73.475	79	42	0.00	1,460
SUN	16	43.624	41.788	0.188	8.360	46.279	75.672	80	54	0.00	1,430
MON	17	42.557	39.481	1.252	3.674	32.455	59.051	69	45	0.01	1,680
TUE	18	45.857	42.766	0.568	9.859	46.653	95.285	74	37	0.00	1,740
WED	19	55.602	49.684	2.126	10.553	50.634	104.117	94	48	0.00	1,410
THU	20	61.721	57.960	0.290	11.563	49.926	92.239	77	44	0.00	1,550
FRI	21	52.567	47.302	1.033	11.391	49.398	109.230	78	46	0.00	1,340
SAT	22	47.228	45.026	0.193	8.439	48.670	95.770	67	36	0.00	1,630
SUN	23	51.351	47.905	1.687	12.833	52.449	88.059	71	32	0.00	1,390
MON	24	47.727	44.883	0.484	5.941	37.427	58.230	75	39	T	1,520
TUE	25	49.208	46.326	0.861	5.659	52.774	98.270	85	49	T	1,610
WED	26	57.440	55.225	0.285	12.812	53.028	109.890	78	42	0.00	1,610
THU	27	56.768	52.762	1.602	6.851	50.674	92.851	79	37	0.00	1,720
FRI	28	56.801	52.492	0.097	7.832	50.918	105.539	78	37	0.00	1,700
SAT	29	55.283	50.944	0.840	11.685	53.537	85.566	78	38	0.00	1,640
SUN	30	54.234	50.164	0.760	14.332	54.181	88.052	81	42	0.00	1,590
<b>TOTAL</b>		<b>1580.038</b>	<b>1457.964</b>	<b>25.827</b>	<b>263.934</b>	<b>1463.357</b>	<b>DAY AVG.</b>	<b>82</b>	<b>47</b>	<b>0.07</b>	<b>1165</b>
<b>Max High</b>		<b>66.222</b>	<b>60.454</b>	<b>2.126</b>	<b>14.719</b>	<b>58.136</b>	<b>122.660</b>	<b>102</b>			<b>1,740</b>
<b>Min Low</b>		<b>37.134</b>	<b>31.970</b>		<b>1.997</b>	<b>32.455</b>	<b>52.765</b>		<b>32</b>		<b>425</b>
<b>Average</b>		<b>52.668</b>	<b>48.599</b>	<b>0.861</b>	<b>8.798</b>	<b>48.779</b>	<b>92.362</b>	<b>Normal Monthly Average Rainfa</b>			<b>2.92</b>
								<b>Total Rainfall for the Month</b>			<b>1.73</b>



Reservoirs	Operational Range	50%	70%	24Hr Avg
Air Park	91.0-63.3	72.2	82.7	84.6
N.W. 12th (Highlands)	72.5-50.0	61.3	65.8	66.8
S.E.	58.0-40.0	49.0	52.6	52.2
Yankee Hill	73.0-63.0	68.0	70.0	65.8
So.56th	60.0-41.3	50.7	54.4	53.3
Pioneers	52.0-36.0	44.0	47.2	48.2

# What's Ahead

# New Source of Supply

- Existing Ashland Area Resources should be adequate until 2040 or beyond
- Approx. 210 MGD = half a million population
- Preliminary Evaluation of Locations
- Reliability with Increasing Drought Conditions
- Redundancy for catastrophic events
- Expensive Compared to Adding Increments on Existing System

# Statewide Water Use, Conservation & Development

- Urban

- Have in place an active long term water conservation plan
- Water restrictions in times of drought
- Urban water systems common design for some level of restrictions once every 12 years
- Deliver quality water to provide for “minimum essential needs” of the community (i.e. health, sanitation, fire protection, businesses, etc.)

- Agriculture

- Continued development of irrigation efficiencies in delivery systems
- “Stress Irrigation” in water shortage years
- Will be necessary to increase the number of irrigators to utilize “stress irrigation” in the long term to assure availability of water

- Water Development in State

- Addition of water storage facilities above and below ground to supplement supplies and flows in water shortage years
- Determine the water balance – usage vs supply of surface and groundwater over long term to ensure water for posterity
- Utilize water efficiently to maintain economic viability of state

# Water is Essential for Life!

## Use it Wisely.....

