

Lake Levels

The water levels of all lakes fluctuate, some more than others. The primary factor that affects water level changes is the quantity and distribution of precipitation (rain & snow). Other factors that contribute to water level changes are outlet conditions, beaver dams, ground water movement and watershed characteristics (Figure 1). Knowing and understanding the history of water level fluctuations can help lake users deal with problems associated with the changing levels.

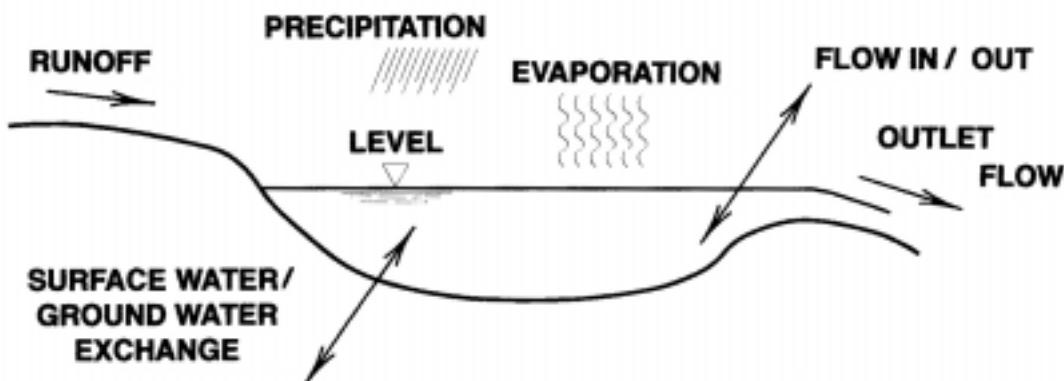
Historical water level data are useful in calibrating hydrologic and hydraulic computer models. These data also benefit watershed management authorities and other governmental units in preparing local water management plans and to locate building and sewage treatment sites.

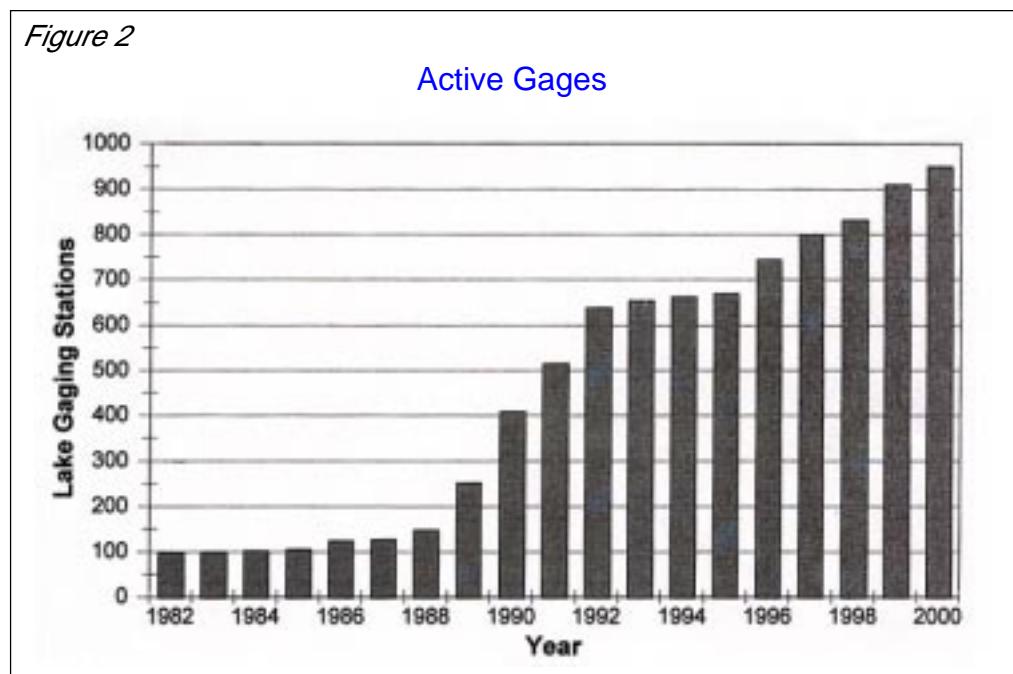


The success of monitoring water levels is greatly dependent on citizen volunteers and cooperating organizations who participate in the DNR Waters Lake Level Minnesota (LLM) program. Lake levels were actively monitored at nearly 1000 sites in 2000 by citizen volunteers and cooperative organizations (Figure 2). Volunteer observers usually live on or near a lake, which makes it convenient to obtain weekly or more frequent readings. There is no cost to the volunteers to be in this program as the gage and installation are provided by DNR Waters. Each year the volunteer receives an updated water level graph and summary sheet that contains the information they provided.

Figure 1

Factors That Cause Lake Levels to Fluctuate





Lake level monitoring has also been accomplished in cooperation with various public and private organizations including:

- Federal (USGS, COE, NRCS)
- State (DNR)
- Counties
- Cities
- Soil & Water Conservation Districts
- Watershed Districts
- Consulting Land Surveyors and Engineers
- Power and Mining Companies

In order to improve geographic coverage, pull together all available data and eliminate possible duplication of efforts, DNR Waters has initiated cooperative programs with these organizations. This component of LLM accounts for approximately 290 lakes, up 20 percent from WY1998.

All lake level readings received are entered into Lakes-db®, a database program for easy management and access of recorded lake levels and other useful information. This information is now available on the internet (see “Lake Finder” sidebar on page 28).

Annual Lake Level Fluctuation

Minnesota lakes typically fluctuate one to two vertical feet in a given year., but historical fluctuations have been recorded in excess of ten feet. Water Year 1999 saw a statewide average fluctuation of 1.24 feet, which corresponds to the above-normal precipitation received during the year. Water Year 2000 had an average fluctuation of 1.05 feet (averages for six years are shown in Figure 3). The tables on pages 34 to 40 display fluctuations for Water Year 1999, Water Year 2000, an average fluctuation for the indicated period of record and the range between the historical high and low.

Figure 3

Water Year	Average Fluctuation Statewide (ft)
1995	1.03
1996	1.24
1997	1.55
1998	1.04
1999	1.24
2000	1.05

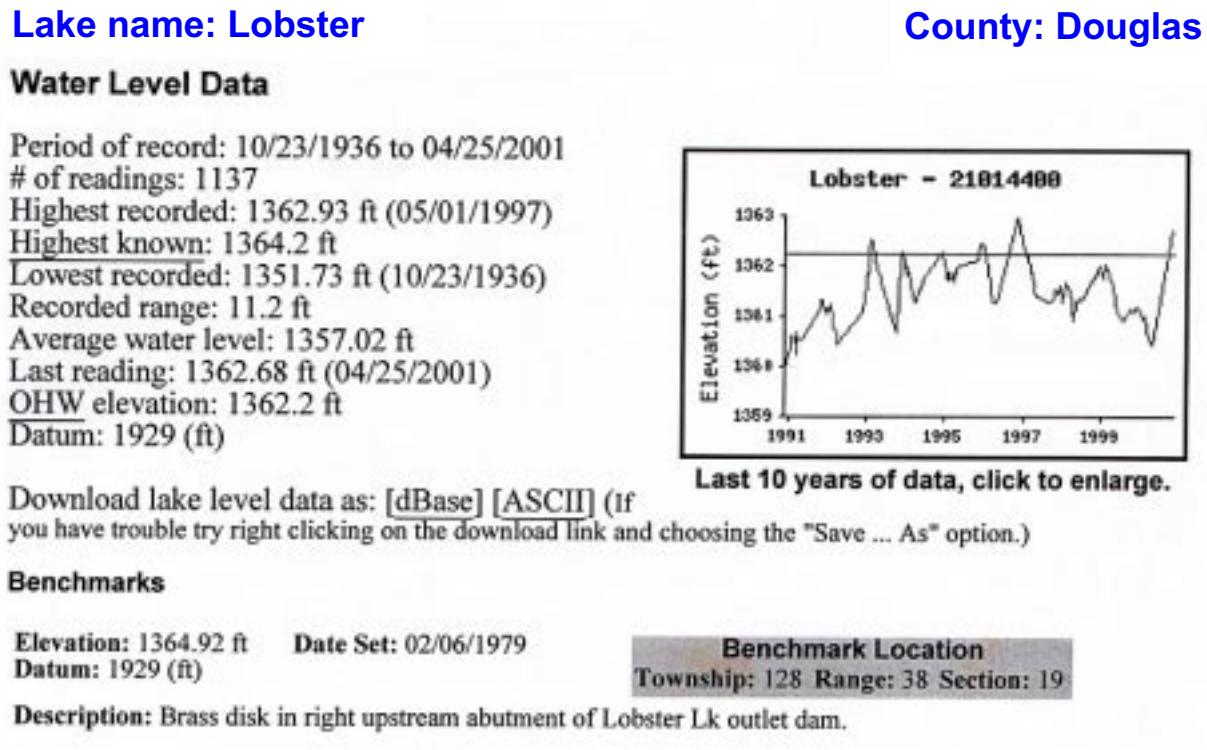
Lake Level Data on the DNR Website

“Lake Finder” is a feature of both the DNR website (www.dnr.state.mn.us) and the DNR Waters website (www.dnr.state.mn.us/waters). Lake Finder provides access to DNR Fisheries lake surveys and lake maps, Pollution Control Agency water quality and clarity data and the Health Department fish consumption advisory.

In 2000, DNR Waters added a new option titled “lake water levels”. A single click on the checkmark below “lake water levels” will display a concise summary of recorded lake levels for the indicated period of record, a lake level graph for the last ten years (if enough data points are available), the ordinary high water (OHW) elevation, datum adjustment and reference benchmark (see Figure 4).

Most of the recorded water levels for each lake are collected by volunteers involved with the Lake Level Minnesota program. DNR Waters presently has water level information for approximately 3300 lakes.

Figure 4

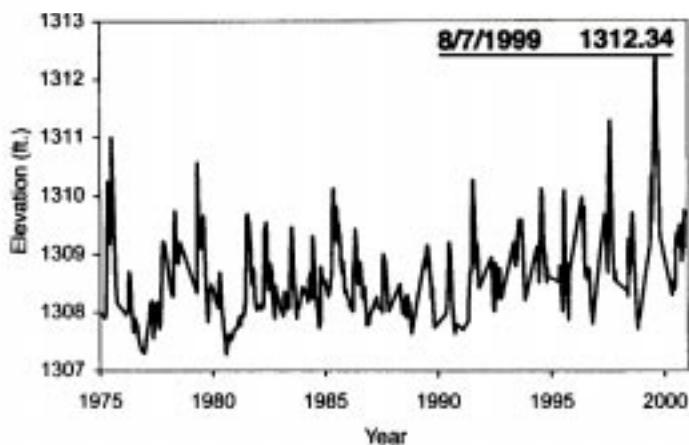


Lake Level Trends

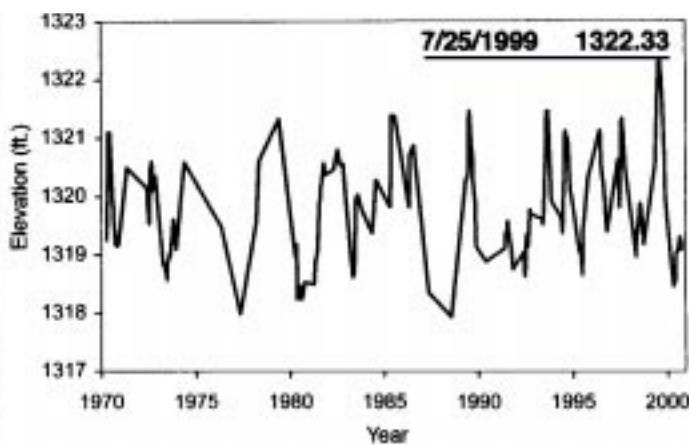
Many lakes, primarily located in the northern half of the state, experienced their highest recorded levels during 1999. Lake level hydrographs for five representative lakes are shown on page 29, with their peak levels and corresponding dates highlighted.

May 2001

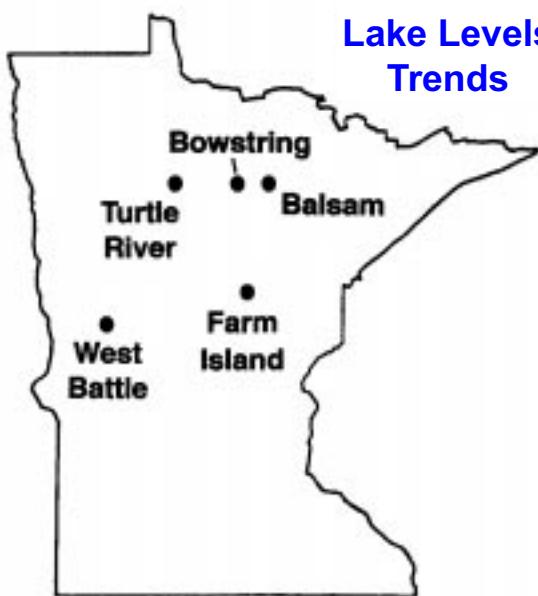
Turtle River Lake (4-111) Beltrami County



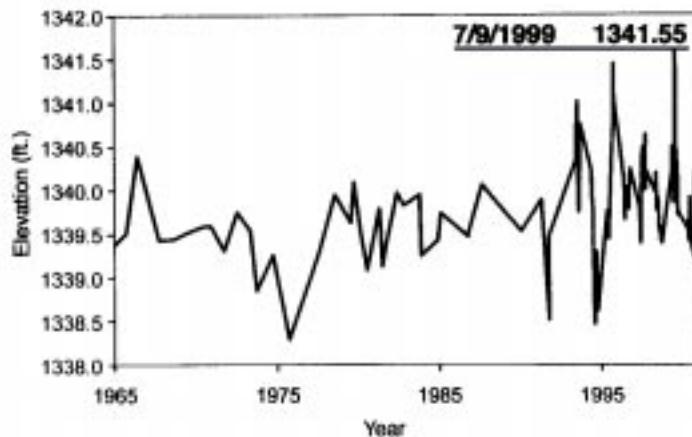
Bowstring Lake (31-813) Itasca County



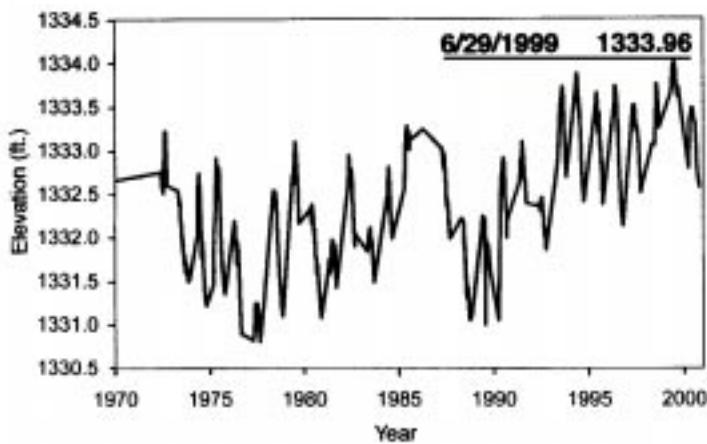
Lake Levels Trends



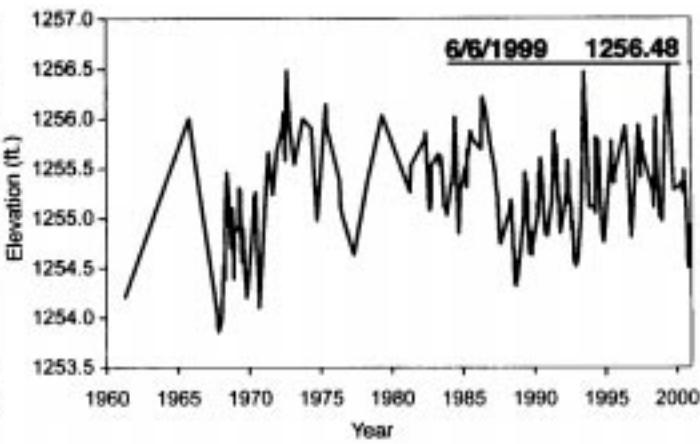
Balsam Lake (31-813) Itasca County



West Battle Lake (56-239) Otter Tail County



Farm Island Lake (1-159) Aitkin County



Landlocked Basins

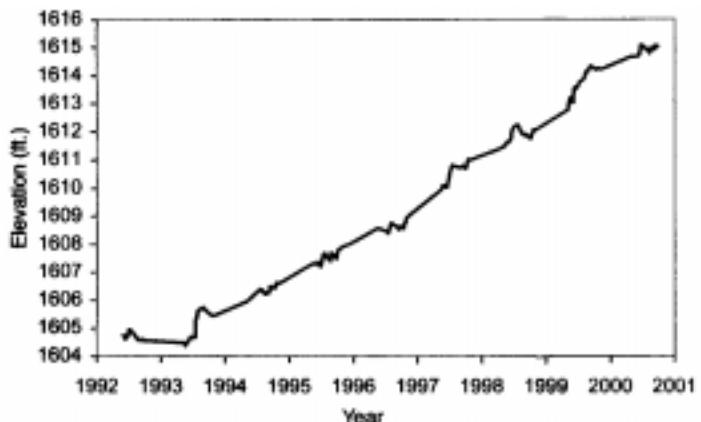
A landlocked lake has no regularly-functioning surface outlet channel, a small watershed, and typically experiences large, long-term water level fluctuations. The importance of ground water contributions to landlocked lakes can make them a good indicator of local ground water levels and movement.

The graphs on page 31 represent water levels for five landlocked basins that experienced their highest levels during 1999.

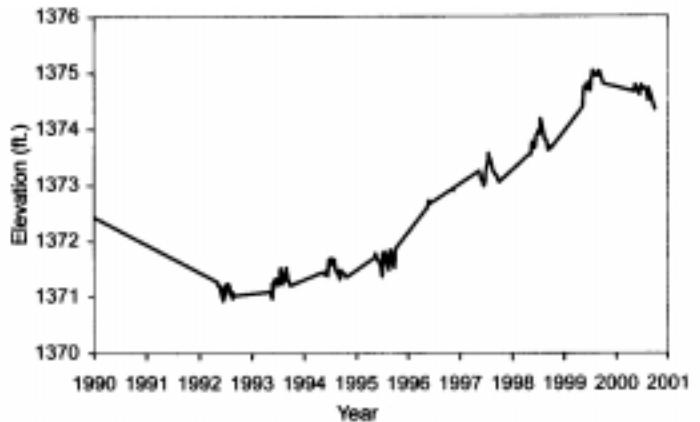
Ten-Year Trends

For many lakes that are presently monitored, reliable information has been collected for more than ten years. A ten-year average is used as a reference mark when comparing water year data to a longer-term average, and is useful in locating trends in a particular basin. Lakes graphed on pages 32 and 33 show above average levels in WY1999 in response to above average precipitation (see Figure 5 on page 5). With sharp geographical differences in precipitation in WY2000 (see Figure 14 on page 12), lakes in the northern half of the state continued to be above their ten-year average while lakes in central and southwestern Minnesota were below average.

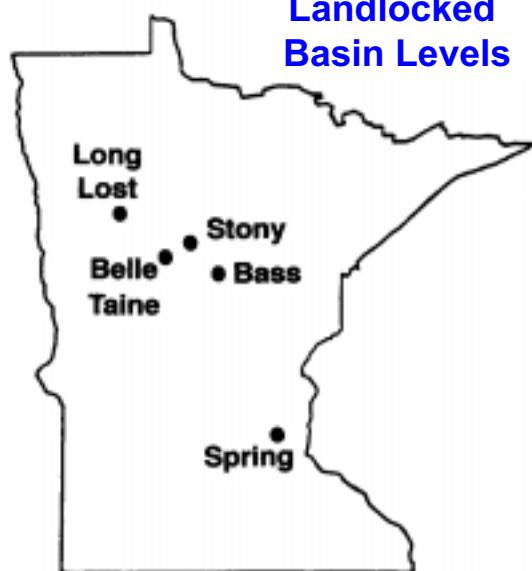
Long Lost Lake (15-68) Clearwater County



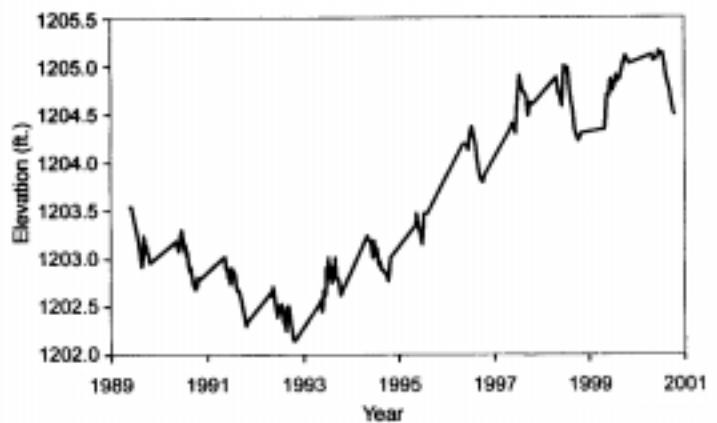
Stony Lake (11-371) Cass County



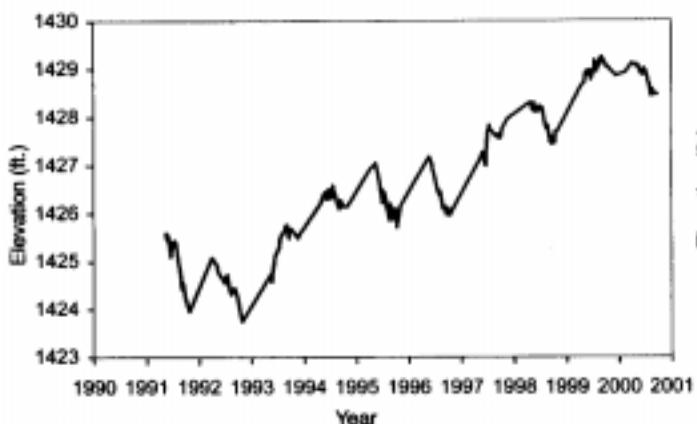
Landlocked Basin Levels



Bass Lake (18-256) Crow Wing County



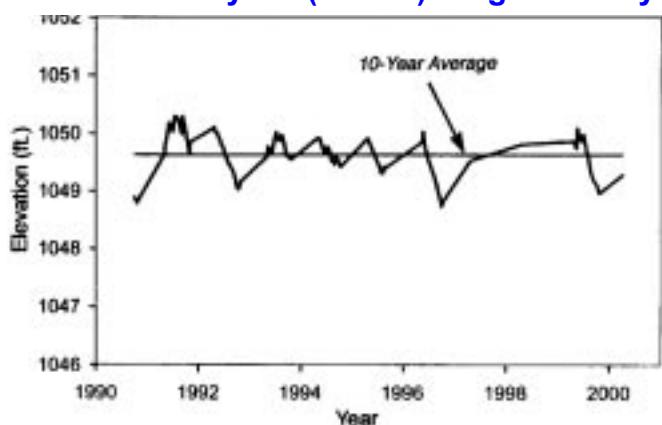
Belle Taine Lake (29-146) Hubbard County



Spring Lake (2-71) Anoka County



Lake Sylvia (86-289) Wright County



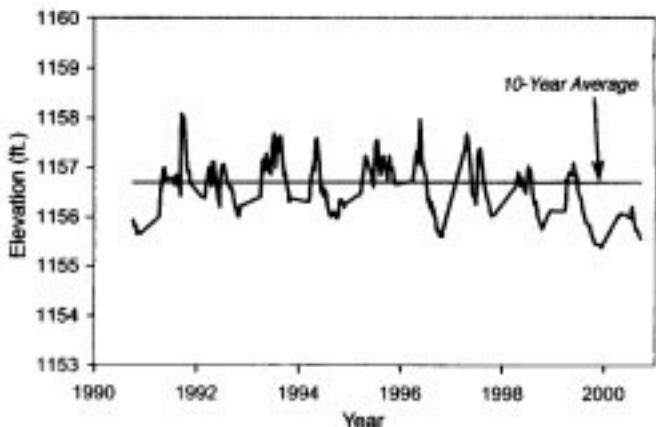
White Bear Lake (2-167)
Washington County



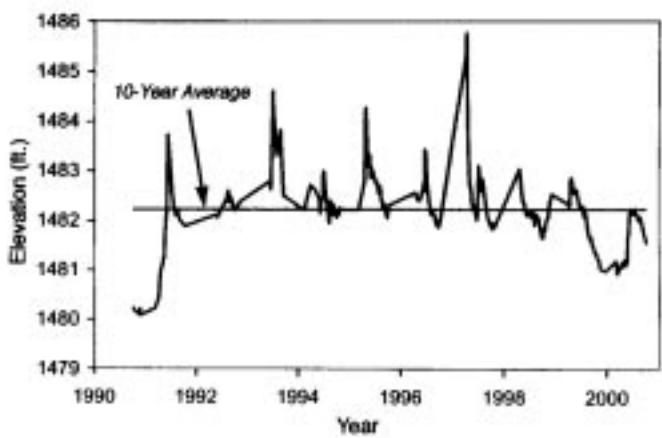
Ten-Year
Trends



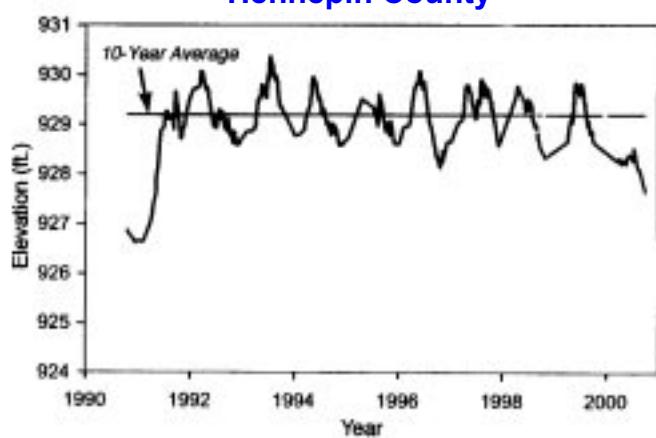
Green Lake (34-79) Kandiyohi County



Lake Shetek (51-46) Murray County



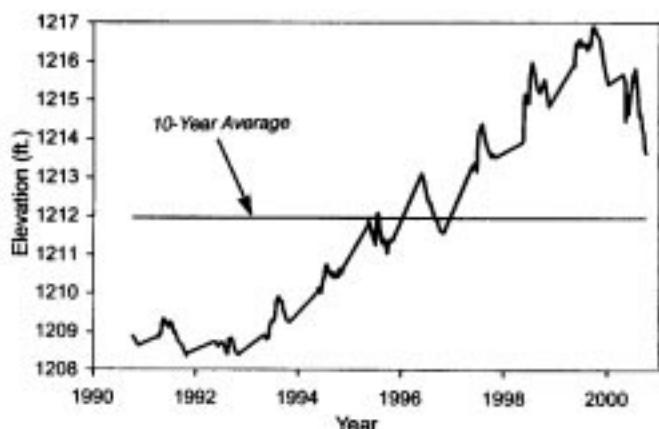
Lake Minnetonka (27-133)
Hennepin County



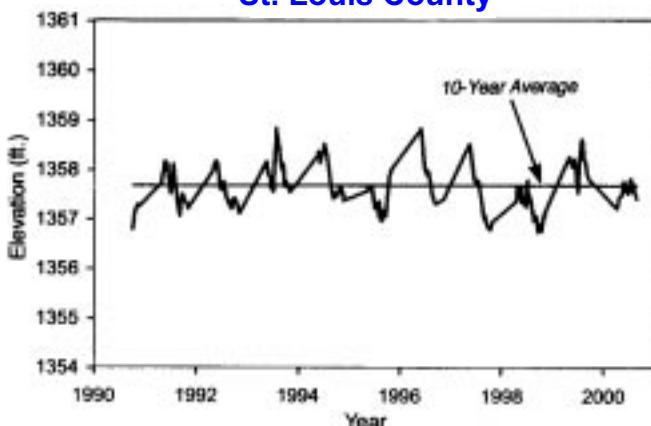
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**Water Year
Data Summary,
1999 and 2000**

Union Lake (60-217) Polk County



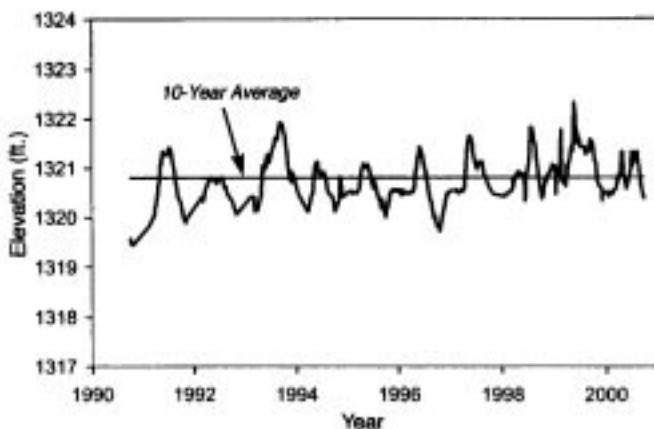
**Lake Vermillion (69-37)
St. Louis County**



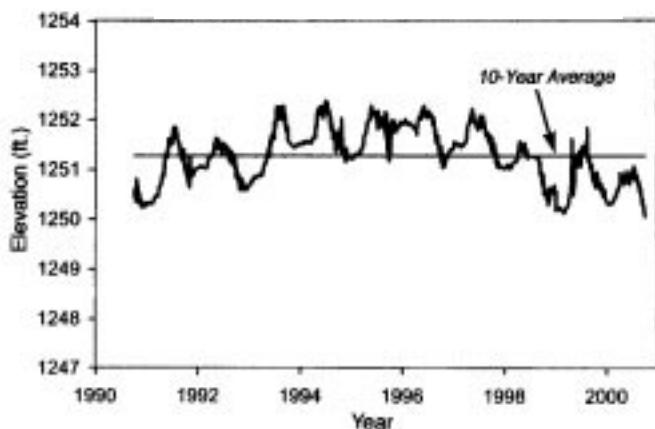
**Ten-Year
Trends**



**Otter Tail Lake (56-242)
Otter Tail County**



**Lake Mille Lacs (48-02)
Mille Lacs County**



Annual Lake Level Fluctuation (feet)

Lake Name	WY99	WY00	WYAv.	# Yrs.	Range	Lake Name	WY99	WY00	WYAv.	# Yrs.	Range				
AITKIN COUNTY															
Big Sandy (1-62)	3.36	2.40	5.31	(102)	16.83	Elbow (3-159)	0.88	0.87	1.23	(9)	3.33				
Blackface (1-45)	0.80	0.79	0.75	(9)	1.25	Eunice (3-503)	0.34	0.26	0.58	(10)	1.87				
Cedar (1-209)	2.06	0.74	1.61	(50)	Height of Land (3-195)	1.68	0.98	1.53	(43)	4.45					
Clear (1-93)	0.75	0.43	0.85	(30)	Ice Cracking (3-156)	0.85	0.98	1.11	(11)	4.64					
Dam (1-96)	1.42	0.97	1.23	(17)	Ida (3-582)	1.11	0.68	0.97	(13)	4.50					
Elm Island (1-123)	1.46	1.12	1.33	(7)	Juggler (3-136)	0.56	0.54	0.78	(8)	4.93					
Farm Island (1-159)	1.51	0.82	1.01	(23)	Little Bemidji (3-234)	0.68	0.70	0.97	(6)	2.74					
Fleming (1-105)	0.50	0.84	0.73	(9)	Little Toad (3-189)	0.95	0.62	0.69	(7)	1.79					
Gun (1-99)	0.99	0.77	0.71	(11)	Long (3-383)	0.38	0.44	0.53	(14)	1.64					
Hanging Kettle (1-170)	1.43	0.40	1.47	(15)	Maud (3-500)	0.66	0.30	0.74	(9)	1.86					
Horseshoe (1-34)	0.50	0.59	0.70	(6)	Melissa (3-475)	1.05	1.63	1.09	(25)	6.30					
Lone (1-125)	0.22	0.74	0.64	(10)	Muskrat (3-360)	0.53	0.64	0.88	(28)	2.81					
Long (1-101)	0.52	0.32	0.52	(8)	Pickerel (3-287)	1.40	0.72	1.00	(9)	5.83					
Minnewawa (1-33)	1.52	0.67	0.83	(18)	Rock (3-293)	1.76	1.10	1.26	(6)	2.01					
Rat (1-77)	1.12	0.57	1.09	(8)	Round (3-155)	0.84	2.66	1.19	(18)	2.97					
Rock (1-72)	0.68	0.94	0.76	(7)	Sallie (3-359)	1.08	0.84	1.24	(33)	5.58					
Round (1-23)	0.58	0.57	0.64	(8)	Straight (3-10)	0.48	0.35	0.52	(15)	6.16					
Round (1-204)	1.33	0.80	0.94	(10)	Talac (3-619)	0.59	0.98	1.29	(8)	9.72					
Spirit (1-178)	0.47	0.25	0.53	(20)	Toad (3-107)	0.98	1.14	1.21	(20)	5.20					
Sugar (1-87)	0.77	0.62	0.73	(30)	Two Inlets (3-17)	0.95	1.21	1.24	(19)	3.91					
Waukenabo (1-136)	1.38	1.50	1.36	(19)	Upper Cormorant (3-588)	0.48	0.90	1.06	(25)	3.89					
ANOKA COUNTY															
Baldwin (2-13)	3.14	1.34	2.97	(26)	White Earth (3-328)	1.02	1.52	1.01	(20)	3.34					
Bunker (2-90)	0.94	3.38	1.69	(15)											
Coon (2-42)	0.73	1.29	1.07	(32)	BELTRAMI COUNTY										
Crooked (2-84)	1.01	1.77	0.94	(16)	Bemidji (4-130)	2.04	1.43	1.77	(17)	4.25					
Fawn (2-35)	0.56	1.06	1.00	(12)	Big Bass (east basin) (4-132)	2.67	2.81	1.18	(6)	4.25					
Golden (2-45)	1.14	0.84	0.87	(12)	Big Bass (west basin) (4-132)	0.70	1.49	0.59	(6)	2.05					
Ham (2-53)	0.82	1.98	1.08	(16)	Cass (4-30)	2.51	2.15	1.91	(54)	4.83					
Howard (2-16)	0.83	0.69	0.95	(11)	Gallagher (Rhoda)(4-92)	1.13	1.21	0.80	(28)	2.39					
Itasca (2-110)	0.71	3.45	1.57	(11)	Long (4-76)	1.06	0.42	0.76	(14)	2.85					
Laddie (2-72)	0.83	2.20	1.03	(9)	Red (4-35)	3.03	1.70	1.63	(55)	6.93					
Martin (2-34)	0.84	0.60	1.14	(22)	Stump (4-130)	1.74	1.60	2.24	(17)	5.70					
Moore (2-75)	0.79	0.75	0.93	(12)	Turtle River (4-111)	4.62	1.20	1.83	(28)	5.06					
Netta (2-52)	0.68	1.85	1.11	(17)	BENTON COUNTY										
Otter (2-3)	1.12	1.04	1.63	(78)	Little Rock (5-13)	0.38	0.56	0.63	(7)	1.17					
Reshanau (2-9)	1.92	0.66	1.88	(11)	BIG STONE COUNTY										
Rice (2-8)	3.14	1.34	3.08	(12)	Big Stone (6-152)	1.30	1.20	2.37	(31)	10.83					
Rogers (2-104)	1.39	2.35	1.43	(12)	East Toqua (6-138)	0.89	0.95	1.56	(10)	4.90					
Rondeau (2-15)	0.60	0.70	0.86	(9)	BLUE EARTH COUNTY										
Round (2-89)	0.82	2.54	1.22	(16)	Duck (7-53)	1.18	0.96	1.08	(10)	3.17					
Sand Shore (2-102)	0.96	1.12	0.91	(9)	BROWN COUNTY										
Sandy (2-80)	0.80	0.89	1.36	(9)	Sleepy Eye (8-45)	0.80	0.70	1.49	(13)	5.54					
Spring (2-71)	0.95	2.25	1.59	(46)	Somson (8-18)	1.19	1.56	3.09	(10)	8.88					
BECKER COUNTY															
Bad Medicine (3-85)	1.31	0.71	0.90	(14)	Surface Water										
Big Cormorant (3-576)	0.48	0.98	1.09	(35)											
Cotton (3-286)	0.60	0.82	0.98	(34)											
Detroit (3-381)	0.70	1.01	0.96	(22)											

May 2001

**Water Year
Data Summary,
1999 and 2000**

Annual Lake Level Fluctuation (feet)

Lake Name	WY99	WY00	WYAv.	# Yrs.	Range	Lake Name	WY99	WY00	WYAv.	# Yrs.	Range						
CARLTON COUNTY																	
Big (9-32)	0.76	0.63	0.59	(8)	1.52	Itasca (15-16)	0.44	0.44	0.71	(33)	2.21						
Chub (9-8)	0.69	1.09	0.96	(14)	3.47	Long Lost (15-68)	2.58	0.87	1.38	(9)	10.76						
Eagle (9-57)	1.35	0.93	0.79	(8)	1.88	COOK COUNTY											
Eddy (9-39)	2.57	1.78	2.58	(7)	4.17	Clearwater (16-139)	1.55	0.90	1.11	(6)	1.55						
Little Hanging Horn (9-35)	3.02	1.61	2.20	(10)	3.53	Flour (16-147)	0.74	0.54	0.64	(11)	1.88						
Park (9-29)	0.90	0.79	0.69	(10)	1.65	Gunflint (16-356)	1.25	1.33	1.68	(10)	3.33						
Torch Light (9-25)	1.46	0.77	0.93	(8)	1.86	Poplar (16-239)	1.33	0.27	1.12	(12)	3.70						
CARVER COUNTY																	
Berliner (10-103)	1.46	1.20	1.19	(10)	3.95	Saganaga (16-633)	1.02	1.24	1.80	(10)	5.15						
Hydes (10-88)	1.16	1.03	0.76	(7)	3.83	Sea Gull (16-629)	1.19	0.97	1.72	(9)	3.44						
Lotus (10-6)	1.22	0.56	1.38	(30)	3.90	COTTONWOOD COUNTY											
Minnewashta (10-9)	1.44	0.80	1.30	(15)	3.40	Cottonwood (17-22)	1.77	2.27	1.94	(13)	9.90						
Oak (10-93)	0.77	1.49	1.09	(6)	3.26	CROW WING COUNTY											
Patterson (10-86)	1.50	0.76	1.23	(11)	3.40	Bass (18-256)	0.80	0.54	0.67	(12)	3.00						
Riley (10-2)	1.29	0.70	1.41	(30)	4.74	Bonnie (18-259)	0.83	0.58	0.65	(11)	2.90						
Waconia (10-59)	1.34	0.87	1.13	(32)	Clark (18-374)	0.94	0.30	0.82	(12)	1.73							
CASS COUNTY																	
Ada (11-250)	0.65	0.66	0.78	(11)	2.36	Crooked (18-41)	0.87	1.28	0.77	(11)	2.38						
Agate (11-216)	0.85	0.50	0.67	(10)	3.05	Crow Wing (18-155)	2.07	0.52	1.43	(9)	3.85						
Barnum (11-281)	0.99	0.62	0.68	(7)	2.12	East Twin (18-407)	0.70	0.50	0.62	(10)	2.57						
Big Rice (11-73)	2.80	1.90	2.17	(33)	Edward (18-305)	1.15	0.71	0.89	(33)	7.13							
Birch (11-412)	0.56	0.79	0.93	(10)	Garden (18-329)	0.78	0.32	0.48	(12)	1.29							
Blackwater (11-274)	1.38	0.31	0.57	(6)	Gilbert (18-320)	2.10	0.64	1.13	(11)	4.71							
Child (11-263)	1.24	0.82	0.92	(11)	Gladstone (18-338)	0.84	0.46	0.65	(12)	1.21							
Hay (11-199)	0.85	0.64	0.88	(10)	Goodrich (18-226)	0.47	0.54	0.52	(8)	1.30							
Horseshoe (11-358)	0.95	0.84	0.54	(10)	Hamlet (18-70)	1.90	0.88	1.03	(37)	6.70							
Inguadona (11-120)	1.68	1.69	1.43	(9)	Hartley (18-392)	0.52	0.65	0.68	(12)	3.28							
Laura (11-104)	1.10	1.00	0.72	(15)	Horseshoe (18-251)	1.01	0.76	0.69	(12)	2.49							
Leech (11-203)	1.92	1.73	1.40	(36)	Hubert (18-375)	1.03	0.70	0.97	(20)	3.50							
Little Boy (11-167)	1.24	0.48	1.10	(8)	Island (18-183)	1.95	0.94	1.45	(12)	2.98							
Long (11-142)	1.50	0.71	0.96	(10)	Little Hubert (18-340)	1.61	1.14	0.96	(12)	3.29							
Lower Trelipe (11-129)	1.46	1.19	1.11	(21)	Little Pelican (18-351)	0.91	0.79	0.68	(12)	1.94							
Mud (11-100)	5.40	4.20	2.61	(26)	Lougee (18-342)	1.16	0.67	0.72	(12)	2.40							
Paquet (11-381)	0.33	1.23	1.08	(8)	Lower Mission (18-243)	0.61	0.42	0.67	(24)	2.20							
Portage (11-476)	1.96	0.80	0.96	(10)	Mollie (18-335)	1.21	0.70	0.75	(12)	2.94							
Stony (11-371)	0.66	0.44	0.55	(9)	North Long (18-372)	1.09	0.95	0.90	(30)	2.88							
Sylvan (11-304)	0.88	0.60	0.84	(19)	O'Brien (18-227)	0.38	0.31	0.55	(9)	1.89							
Ten Mile (11-413)	0.62	0.47	0.78	(26)	Olander (18-91)	1.37	1.02	1.14	(39)	7.25							
Vermillion (11-29)	2.46	1.10	1.97	(7)	Ossawinnamakee (18-352)												
Winnibigoshish (11-147)	2.44	1.90	2.00	(41)		0.72	0.40	0.78	(17)	1.81							
Woman (11-201)	1.02	0.70	0.83	(11)	Pelican (18-308)	0.97	0.56	0.87	(44)	4.51							
CHISAGO COUNTY																	
Goose (13-83)	1.70	0.50	1.55	(13)	Perch (18-304)	0.80	0.62	0.74	(12)	2.86							
Green (13-41)	0.72	0.68	1.05	(23)	Portage (18-50)	0.80	1.51	0.90	(10)	3.11							
North Center (13-32)	0.70	1.10	1.58	(28)	Rabbit (18-93)	0.55	0.35	0.95	(43)	3.24							
Rush (13-69)	1.32	0.91	1.39	(34)	Roger (18-184)	1.14	0.77	0.81	(13)	2.30							
Sunrise (13-31)	0.70	0.77	0.96	(13)	Ross (18-165)	1.70	1.36	1.42	(17)	3.05							

Annual Lake Level Fluctuation (feet)

Lake Name	WY99	WY00	WYAv.	# Yrs.	Range	Lake Name	WY99	WY00	WYAv.	# Yrs.	Range					
CROW WING COUNTY (cont):																
Upper South Long (18-96)	2.14	0.60	1.11	(31)	3.42	Fish (27-118)	1.78	1.94	1.47	(13)	2.87					
West Twin (18-409)	0.82	0.71	0.61	(10)	2.28	Harriet (27-16)	0.97	1.32	1.22	(70)	4.57					
Whitefish (18-1)	0.85	1.24	1.16	(9)	2.91	Hiawatha (27-18)	2.18	2.41	2.78	(34)	12.00					
Young (18-252)	1.14	0.98	0.78	(12)	2.36	Independence (27-176)	1.90	0.86	1.64	(20)	7.81					
DAKOTA COUNTY																
Marion (19-26)	1.40	1.94	2.09	(42)	13.22	Indianhead (27-44)	1.12	1.28	1.24	(8)	3.19					
Orchard (19-31)	3.40	0.58	1.05	(9)	3.58	Langdon (27-182)	1.31	0.84	1.30	(9)	3.38					
Sunfish (19-50)	0.92	0.71	1.00	(10)	3.42	Long (27-160)	1.72	1.07	1.36	(15)	3.35					
DOUGLAS COUNTY																
Aaron (21-242)	0.40	0.62	0.77	(7)	2.34	Loring (27-655)	0.95	0.62	0.92	(18)	3.57					
Andrew (21-85)	0.64	0.74	0.94	(9)	3.79	Medicine (27-104)	1.40	1.52	1.56	(28)	5.08					
Chippewa (21-145)	1.54	1.36	1.20	(17)	3.30	Minnetoga (27-88)	0.70	0.46	0.98	(27)	2.94					
Christina (21-375)	1.05	0.54	0.94	(28)	Minnetonka (27-133)	1.50	0.87	1.39	(95)	8.73						
Geneva (21-52)	1.11	0.45	0.94	(7)	Nesbitt Pond (27-1018)	1.72	1.19	1.00	(7)	1.85						
Ida (21-123)	0.46	0.76	1.08	(18)	Nokomis (27-19)	0.56	2.13	2.07	(51)	8.76						
Irene (21-76)	0.68	0.61	0.69	(11)	Parkers (27-107)	3.63	1.54	2.58	(28)	11.65						
Latoka (21-106)	0.25	0.20	0.50	(8)	Powderhorn (27-14)	1.38	3.55	3.10	(16)	10.84						
Le Homme Dieu (21-56)	0.74	0.48	0.94	(10)	Rice (27-116)	1.31	0.64	1.84	(13)	10.88						
Lobster (21-144)	0.75	1.15	1.18	(28)	Sarah (27-191)	2.41	0.60	1.69	(7)	3.38						
Louise (21-94)	2.47	1.56	1.49	(14)	Twin (27-42)	2.21	0.99	1.35	(10)	3.98						
Maple (21-79)	0.77	0.43	0.76	(7)	Weaver (27-117)	0.66	0.51	0.94	(13)	3.19						
Mary (21-92)	0.38	0.70	1.32	(10)	Wirth (27-37)	0.25	2.60	1.59	(46)	5.86						
Mill (21-180)	1.15	0.36	1.14	(8)	HUBBARD COUNTY											
Miltona (21-83)	1.28	0.54	1.08	(25)	Belle Taine (29-146)	1.80	0.68	1.36	(47)	13.84						
Moon (21-226)	1.40	0.66	1.28	(16)	Big Sand (29-185)	1.39	0.52	0.84	(10)	2.50						
Moses (21-245)	0.80	0.38	1.52	(16)	Big Stony (29-143)	0.90	0.88	0.69	(7)	1.52						
Red Rock (21-291)	1.98	1.30	1.46	(10)	Blue (29-184)	0.71	0.85	0.58	(6)	1.07						
Victoria (21-54)	1.45	0.54	1.16	(19)	Eagle (29-256)	2.08	1.72	1.55	(10)	2.78						
Winona (21-81)	0.74	0.38	0.69	(7)	East Crooked (29-101)	0.89	0.41	0.84	(7)	3.54						
FREEBORN COUNTY																
Albert Lea (24-14)	1.10	2.25	2.09	(19)	Fifth Crow Wing (29-92)	0.68	0.56	0.73	(7)	1.26						
Bear (24-28)	0.95	1.74	1.18	(17)	Fish Hook (29-242)	1.88	1.64	1.12	(10)	2.12						
Fountain (24-18)	1.32	4.14	1.93	(6)	Gilmore (29-188)	0.46	0.32	0.49	(7)	0.89						
Geneva (24-15)	3.95	3.18	1.50	(8)	Grace (29-71)	0.49	0.44	0.70	(10)	2.75						
Lower Twin (24-27)	0.80	1.48	1.14	(8)	Island (29-254)	1.68	2.34	2.15	(10)	3.92						
Upper Twin (24-31)	0.90	1.10	1.33	(8)	Little Sand (29-150)	0.48	0.52	0.71	(27)	3.08						
GRANT COUNTY																
Elk (26-40)	0.64	0.78	0.75	(6)	Long (29-161)	0.53	0.67	0.51	(14)	1.18						
Pelican (26-2)	0.58	0.41	1.00	(12)	Middle Crooked (29-101)	0.88	0.41	0.69	(6)	2.03						
HENNEPIN COUNTY																
Calhoun (27-31)	1.26	1.78	1.86	(73)	Palmer (29-87)	1.39	0.70	0.84	(10)	2.91						
Cedar Island (27-119)	1.04	0.74	1.13	(14)	Plantagenet (29-156)	2.32	1.02	1.40	(19)	3.47						
Eagle/Pike (27-111)	0.79	0.44	1.01	(14)	Stocking (29-172)	0.56	0.48	0.51	(6)	1.08						
Edward (27-121)	0.63	0.64	0.99	(13)	West Crooked (29-101)	1.37	0.77	0.68	(7)	2.01						
ISANTI COUNTY																
Green (30-136)	1.60	0.60	1.42	(18)	7.04											
Skogman (30-22)	0.72	1.02	1.22	(22)	4.29											
Spectacle (30-135)	0.38	1.10	0.65	(8)	2.68											
Typo (30-9)	0.76	0.52	1.54	(12)	3.57											

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Lake Name	WY99	WY00	WYAv.	# Yrs.	Range	Lake Name	WY99	WY00	WYAv.	# Yrs.	Range
ITASCA COUNTY											
Ball Club (31-812)	2.34	5.84	3.13	(10)	6.93	JACKSON COUNTY					
Balsam (31-259)	2.16	0.66	1.13	(18)	3.26	Fish (32-18)	0.75	0.67	1.26	(12)	7.45
Bass (31-576)	1.24	0.60	0.82	(21)	2.47	Heron (Duck) (32-57)	1.40	1.28	1.51	(10)	5.58
Beatrice (31-58)	1.52	0.90	0.85	(9)	1.92	KANABEC COUNTY					
Bello (31-726)	1.56	0.39	0.76	(6)	1.87	Fish (33-36)	2.84	0.82	1.82	(9)	4.82
Bowstring (31-813)	3.16	3.17	1.62	(22)	4.40	Knife (33-28)	1.80	0.30	2.12	(33)	11.99
Buck (31-69)	1.06	0.46	0.52	(16)	1.33	KANDIYOHI COUNTY					
Burrows (31-413)	1.15	0.80	0.71	(11)	2.18	Andrew (34-206)	0.91	0.84	1.48	(33)	13.60
Caribou (31-620)	0.50	0.60	0.60	(12)	2.28	Calhoun (34-62)	1.22	0.80	1.35	(29)	6.83
Carlson (31-366)	1.45	1.22	0.85	(6)	1.62	Diamond (34-44)	0.89	0.42	0.99	(19)	3.95
Crooked (31-193)	9.40	4.28	6.02	(8)	9.40	Eagle (34-171)	0.41	0.74	1.15	(31)	5.22
Deer (31-719)	0.28	0.70	0.52	(7)	1.20	Elizabeth (34-22)	1.05	0.91	1.13	(20)	3.11
Dixon (31-921)	3.78	2.06	2.78	(7)	4.41	Elkhorn (34-119)	0.33	0.54	0.88	(19)	4.11
Dora (31-882)	3.49	3.14	1.98	(20)	4.35	Florida (34-217)	0.74	0.94	1.37	(20)	5.22
Forest (31-374)	0.68	0.22	0.69	(35)	2.94	Florida Slough (34-204)	0.18	0.32	1.41	(14)	4.95
Grave (31-624)	1.10	0.27	0.58	(8)	1.27	Foot (34-181)	0.66	0.92	1.18	(18)	3.93
Hale (31-361)	0.46	1.04	1.03	(8)	2.36	George (34-142)	0.52	0.92	1.02	(25)	3.88
Hale (31-373)	1.15	0.49	0.83	(42)	3.16	Green (34-79)	1.34	0.82	1.53	(45)	4.91
Jessie (31-786)	3.44	0.55	1.16	(11)	3.44	Henderson (34-116)	0.81	0.92	0.91	(15)	5.24
Johnson (31-586)	1.33	1.02	0.91	(11)	3.01	Long (34-66)	0.45	0.71	0.50	(18)	1.61
Lawrence (31-231)	10.98	2.64	4.74	(6)	10.98	Long (34-192)	0.72	0.80	1.13	(19)	5.07
Little Bowstring (31-758)						Mud (34-158)	0.61	0.94	1.30	(33)	3.64
	1.59	1.00	1.17	(7)	2.08	Nest (34-154)	1.21	1.58	1.31	(32)	5.20
Little Long (31-266)	1.70	0.35	1.01	(9)	2.32	Norway (34-251)	0.91	0.78	1.24	(18)	4.29
Little Long (31-613)	1.45	1.07	0.76	(10)	5.68	Skataas (34-196)	0.87	0.78	1.19	(13)	4.81
Little Winnibigoshish (31-850)						Sunburg (34-359)	0.41	0.86	1.02	(6)	3.00
	6.05	4.55	5.42	(12)	7.92	Swenson (34-321)	0.53	1.02	1.14	(13)	5.63
Long (31-570)	1.19	0.82	0.92	(35)	3.39	Unnamed (Golden Pond) (34-355)					
Loon (31-571)	1.59	0.88	1.05	(36)	3.62		1.03	1.44	0.97	(6)	2.54
McGuire (31-78)	2.60	2.29	2.64	(9)	4.80	Wagonga (34-169)	0.68	0.80	1.49	(16)	4.40
Moose (31-722)	1.65	0.44	0.76	(12)	1.77	LAKE COUNTY					
North Star (31-653)	1.10	0.40	0.61	(12)	1.40	Farm (38-779)	0.44	0.28	0.44	(8)	0.78
Owen (31-292)	1.06	0.63	0.72	(11)	2.28	Garden (38-782)	0.63	0.44	1.31	(9)	3.67
Pigeon Dam (31-894)	1.65	1.50	1.25	(13)	3.30	LE SUEUR COUNTY					
Pokegama (31-532)	4.51	3.28	3.06	(47)	8.89	Emily (40-124)	1.28	1.00	1.35	(23)	7.34
Ruby (31-422)	0.80	0.65	0.59	(11)	2.21	Frances (40-57)	1.07	0.78	0.85	(9)	13.14
Sand (31-438)	1.06	0.80	0.82	(9)	3.14	Volney (40-33)	1.24	0.98	1.28	(10)	3.60
Sand (31-826)	3.56	3.56	1.65	(18)	4.40	Washington (40-117)	1.82	1.26	1.48	(22)	5.35
Shallow (31-84)	0.41	0.53	0.61	(9)	1.12	West Jefferson (40-92)	1.53	1.15	1.39	(26)	6.92
Shoal (31-141)	1.20	0.58	1.00	(7)	1.85	MCLEOD COUNTY					
Siseebakwet (31-554)	0.82	0.48	0.74	(52)	2.19	Marion (43-84)	0.72	0.90	1.02	(11)	3.05
Smith (31-650)	1.67	1.12	0.80	(11)	3.17	Winsted (43-12)	1.97	0.44	1.58	(10)	3.31
Snaptail (31-255)	1.59	0.84	1.01	(9)	1.91	MAHNOMEN COUNTY					
South Sturgeon (31-3)	2.51	1.37	1.36	(7)	3.40	Tulaby (44-3)	0.68	0.80	1.10	(8)	2.44
Spider (31-538)	1.32	0.82	0.79	(11)	2.40						
Split Hand (31-353)	2.12	1.98	1.55	(19)	3.65						
Swan (31-67)	0.86	0.68	1.51	(52)	4.65						
Trout (31-216)	1.56	1.10	1.16	(40)	6.09						
White Swan (31-260)	0.80	0.50	0.58	(11)	2.25						

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Lake Name	WY99	WY00	WYAv.	# Yrs.	Range	Lake Name	WY99	WY00	WYAv.	# Yrs.	Range						
MARTIN COUNTY																	
Amber (46-34)	2.20	1.38	1.40	(8)	3.89	East Leaf (56-116)	2.52	1.48	2.10	(6)	3.22						
Budd (46-30)	2.56	2.16	1.48	(7)	5.32	East Lost (56-378)	2.01	1.38	2.00	(8)	3.38						
George (46-24)	1.82	1.32	1.31	(8)	8.84	Jewett (56-877)	0.70	0.66	0.64	(6)	3.37						
MEEKER COUNTY																	
Belle (47-49)	0.80	1.26	1.19	(9)	11.84	Lida (56-747)	0.52	0.41	0.89	(7)	2.10						
Clear (47-95)	0.90	0.82	1.27	(11)	4.21	Little McDonald (56-328)	1.04	1.02	1.05	(9)	4.26						
Francis (47-2)	0.86	0.88	0.87	(18)	4.31	Little Pine (56-142)	1.09	0.64	1.07	(36)	3.30						
Jennie (47-15)	0.75	0.92	0.91	(9)	9.04	Lizzie (56-760)	0.58	1.08	1.19	(53)	4.56						
Long (47-26)	0.65	0.55	0.50	(6)	1.08	Long (56-388)	0.86	0.66	0.77	(17)	6.20						
Manuella (47-50)	0.85	0.69	1.40	(12)	4.47	Middle Leaf (56-116)	1.79	1.30	1.83	(6)	3.61						
Minnie-Belle (47-119)	0.71	1.06	1.30	(12)	5.92	Otter Tail (56-242)	1.95	1.00	1.43	(71)	4.63						
Ripley (47-134)	0.85	0.80	0.91	(8)	9.61	Pelican (56-786)	0.79	0.64	1.29	(27)	4.94						
Stella (47-68)	0.70	0.90	0.99	(12)	2.48	Pickerel (56-204)	1.65	0.94	1.16	(7)	2.66						
Thompson (47-159)	0.86	0.90	1.35	(11)	6.61	Pickerel (56-475)	0.51	0.54	0.69	(22)	3.03						
Washington (47-46)	0.52	0.66	0.65	(12)	2.03	Prairie (56-915)	1.06	0.34	0.82	(20)	4.70						
MILLE LACS COUNTY																	
Mille Lacs (48-2)	1.70	1.01	1.33	(70)	7.69	Rush (56-141)	1.40	1.50	1.55	(61)	3.87						
Onamia (48-9)	1.72	0.92	1.63	(35)	6.12	Rush (TW) (56-141)	1.88	1.10	1.83	(16)	5.08						
MORRISON COUNTY																	
Alexander (49-79)	1.20	0.89	0.99	(19)	3.82	Star (56-385)	0.95	0.76	1.04	(24)	3.79						
Round (49-56)	1.07	0.62	0.78	(6)	1.46	Swan (56-781)	0.91	0.79	1.02	(9)	3.63						
Shamineau (49-127)	0.81	0.77	0.83	(7)	4.51	Twenty-one (56-728)	1.12	0.58	0.95	(6)	3.73						
Sullivan (49-16)	2.00	0.74	1.35	(22)	Wall (56-658)	0.50	0.32	0.39	(9)	0.75							
MOWER COUNTY																	
East Side (50-2)	0.80	1.56	0.96	(7)	1.73	West Battle (56-239)	0.35	0.70	1.07	(28)	7.22						
MURRAY COUNTY																	
Currant (51-82)	1.50	0.65	1.36	(7)	4.56	West Lost (56-481)	0.92	1.67	1.76	(6)	4.61						
Sarah (51-63)	0.46	0.64	1.12	(6)	4.25	West McDonald (56-386)	1.64	1.32	1.03	(7)	2.00						
Shetek (51-46)	1.46	1.32	2.00	(51)	7.67	PINE COUNTY											
NOBLES COUNTY																	
Indian (53-7)	1.42	1.80	1.72	(13)	4.48	Grindstone (58-123)	0.50	1.02	1.06	(24)	2.72						
Ocheda (53-24)	1.59	1.51	1.38	(33)	5.42	Pokegama (58-142)	3.70	1.76	3.71	(21)	8.20						
OLMSTED COUNTY																	
Shady (55-5)	0.74	1.88	2.10	(7)	6.30	Sand (58-81)	1.81	1.17	1.41	(26)	5.99						
OTTER TAIL COUNTY																	
Beers (56-724)	1.15	0.58	1.01	(7)	3.78	Sturgeon (58-67)	0.60	0.43	0.92	(25)	4.04						
Big McDonald (56-386)	0.85	1.00	0.93	(6)	1.60	Upper Pine (58-130)	0.65	0.46	0.63	(8)	1.18						
Big McDonald, West (56-386)	1.86	0.80	1.05	(7)	8.66	POLK COUNTY											
Big Pine (56-130)	1.19	1.13	1.53	(51)	4.73	Breeze (60-144)	1.37	0.85	0.95	(8)	3.65						
Blanche (56-240)	0.60	0.47	0.56	(8)	1.56	Cable (60-293)	0.56	0.86	0.88	(9)	7.90						
POPE COUNTY																	
Gilchrist (61-72)	2.38	1.30	2.15	(10)	4.44	Cameron (60-189)	0.54	0.58	0.73	(8)	3.08						
Leven (61-66)	2.02	1.00	1.58	(7)	2.86	Cross (60-27)	1.59	0.94	1.45	(12)	3.46						
Linka (61-37)	0.60	0.76	0.86	(7)	1.61	Hill River (60-142)	1.02	0.46	0.99	(9)	1.94						
Marlu (61-60)	0.92	0.60	0.95	(7)	1.75	Maple (60-305)	1.17	0.90	1.16	(24)	11.22						

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Lake Name	WY99	WY00	WYAv.	# Yrs.	Range	Lake Name	WY99	WY00	WYAv.	# Yrs.	Range
POPE COUNTY (cont):											
Minnewaska (61-130)	0.66	1.58	1.17	(56)	10.01	Eagles Nest #1 (69-285)	2.00	1.24	0.81	(8)	3.10
Villard (61-67)	1.73	0.80	1.57	(7)	3.33	Eagles Nest #2 (69-285)	2.00	1.24	0.81	(8)	3.10
RAMSEY COUNTY											
Bald Eagle (62-2)	0.88	0.59	1.27	(78)	6.88	Eagles Nest #3 (69-285)	1.18	0.89	0.82	(9)	1.41
Beaver (62-16)	0.98	1.28	1.95	(46)	7.10	Eagles Nest #4 (69-218)	0.35	0.20	0.42	(8)	0.97
Bennett (62-48)	1.83	3.17	2.85	(14)	6.60	Ely (69-660)	0.68	1.32	0.84	(47)	2.80
RAMSEY COUNTY											
Birch (62-24)	0.87	1.23	1.32	(71)	7.13	Island Lake Reservoir (69-372)		1.70	10.26	18.87	(25)
Como (62-55)	1.14	2.40	1.67	(23)	32.25	Jacobs (69-231)	1.66	1.04	0.77	(10)	2.31
Gervais (62-7)	1.08	1.40	2.15	(77)	Long (69-509)	0.30	0.70	0.77	(8)	2.99	
Grass (62-74)	3.86	2.96	3.26	(19)	Long (69-653)	0.70	1.54	0.98	(11)	2.24	
Island (62-75)	0.96	0.73	1.40	(55)	Maple Leaf (69-700)	1.02	0.61	0.78	(9)	1.47	
Johanna (62-78)	0.96	1.62	1.98	(78)	St. Louis County	0.67	0.52	0.81	(10)	1.64	
Josephine (62-57)	0.78	0.90	1.17	(77)	Merrill (69-891)	0.58	0.53	0.67	(8)	1.38	
Long (62-67)	1.54	1.48	1.72	(77)	Nichols (69-627)	0.47	0.80	0.66	(12)	1.71	
McCarron (62-54)	0.74	0.89	1.15	(77)	Perch (69-932)	0.58	0.75	0.55	(10)	2.23	
Owasso (62-56)	1.12	0.98	1.15	(77)	Prairie (69-848)	1.13	1.22	1.23	(17)	2.85	
Phalen (62-13)	1.91	3.20	3.49	(77)	Sand (69-736)	0.68	0.42	0.66	(9)	1.55	
Pike (62-69)	0.94	1.75	1.38	(32)	Schubert (69-546)	1.00	0.41	1.00	(6)	2.13	
Round (62-9)	1.84	2.32	2.00	(67)	St. Mary's (69-651)	2.15	0.92	1.22	(43)	4.57	
Silver (East) (62-1)	1.05	0.99	1.71	(76)	Stone (69-27)	0.81	0.62	0.80	(11)	1.64	
Silver (West) (62-83)	1.01	1.43	1.72	(67)	Stone (69-686)	2.36	1.28	1.17	(8)	3.01	
Snail (62-73)	1.39	1.42	1.60	(77)	Sturgeon (69-939)	2.60	1.57	1.52	(17)	3.00	
Turtle (62-61)	0.72	0.88	0.98	(78)	Vermilion (69-378)	1.85	0.60	1.61	(50)	3.15	
Valentine (62-71)	1.11	1.75	1.82	(76)	Wild Rice (69-371)	1.38	1.35	1.64	(6)	2.81	
Wabasso (62-82)	1.33	1.10	1.40	(63)							
Wakefield (62-11)	1.18	1.71	2.30	(48)							
Willow (62-40)	0.62	0.92	1.00	(14)							
RENVILLE COUNTY											
Allie (65-6)	1.05	0.94	1.25	(11)	8.28	SCOTT COUNTY					
Preston (65-2)	0.86	0.78	1.28	(8)	3.70	Cedar (70-91)	1.00	0.56	0.92	(7)	2.42
RICE COUNTY						O'Dowd (70-95)	1.04	1.08	1.12	(8)	5.08
Cannon (66-8)	1.32	0.40	1.04	(7)	Spring (70-54)	2.16	1.44	1.58	(10)	2.86	
Cedar (66-52)	0.91	0.96	1.07	(13)	Upper Prior (70-72)	2.74	1.27	2.31	(29)	12.20	
Circle (66-27)	0.73	1.98	1.64	(18)							
Fox (66-29)	0.85	2.00	1.47	(19)							
French (66-38)	1.32	1.42	1.10	(10)							
Rice (66-48)	0.78	0.83	1.58	(15)							
ST. LOUIS COUNTY											
Beaver (69-501)	0.99	0.56	0.83	(12)	2.88	SHERBURNE COUNTY					
Big Rice (69-669)	1.71	1.22	1.11	(11)	3.70	Elk (71-141)	2.50	1.20	1.57	(6)	4.87
Birch (69-3)	1.66	1.58	3.09	(18)	Long (71-159)	0.63	1.86	1.15	(9)	9.04	
Burntside (69-118)	1.12	0.70	0.98	(10)	Rush (71-147)	1.49	0.52	1.54	(11)	5.37	
Colby (69-249)	3.34	2.79	2.53	(35)							
Comstock (69-412)	2.04	1.58	1.56	(7)							
						STEARNS COUNTY					
						Big (73-159)	1.16	0.76	1.29	(11)	5.20
						Big Fish (73-106)	1.25	0.84	0.98	(24)	4.06
						Big Watab (73-102)	0.82	0.60	0.73	(16)	1.90
						Carnelian (73-38)	0.70	0.92	1.53	(9)	10.56
						Eden (73-150)	2.68	0.82	2.41	(13)	10.38
						Grand (73-55)	0.82	0.82	1.06	(20)	3.21
						Horseshoe (73-157)	2.10	0.80	1.71	(15)	5.28
						Koronis (73-200)	1.72	0.81	2.05	(20)	6.00
						Long (73-4)	1.45	1.36	1.24	(8)	3.38
						Pearl (73-37)	0.46	0.32	0.69	(15)	3.70
						Rice (73-196)	2.79	1.33	3.03	(15)	6.94

Water Year
Data Summary, 1999 and 2000 May 2001

Annual Lake Level Fluctuation (feet)

Lake Name	WY99	WY00	WYAv.	# Yrs.	Range	Lake Name	WY99	WY00	WYAv.	# Yrs.	Range												
STEVENS COUNTY																							
Long (75-24)	0.60	0.71	1.34	(21)	7.48	Eagle Point (82-109)	1.28	0.81	2.16	(26)	7.40												
Page (75-19)	0.88	1.01	1.43	(21)	8.08	Egg (82-147)	0.34	0.26	0.79	(11)	3.41												
Perkins (75-75)	0.26	1.13	1.27	(18)	4.86	Elmo (82-106)	0.64	0.43	1.23	(26)	9.58												
SWIFT COUNTY																							
Camp (76-72)	1.44	2.28	1.78	(6)	4.42	Forest (82-159)	0.38	0.62	0.74	(26)	2.78												
Oliver (76-146)	1.41	4.05	1.32	(6)	18.91	Goose (82-59)	0.92	1.75	1.38	(7)	6.00												
TODD COUNTY																							
Beauty (77-35)	0.84	0.73	0.75	(7)	2.40	Halfbreed (82-80)	0.86	0.72	0.95	(11)	2.92												
Big (77-63)	1.22	0.72	0.89	(8)	1.61	Horseshoe (82-74)	0.39	0.36	1.72	(23)	15.74												
Big Birch (77-84)	0.92	0.90	1.01	(24)	3.03	Jane (82-104)	0.54	0.27	1.63	(33)	8.99												
Big Birch,HW (77-84)	0.80	0.68	0.68	(10)	1.48	Lily (82-23)	1.53	2.13	1.43	(6)	11.98												
Fairy (77-154)	0.83	1.64	1.22	(12)	9.91	Little Carnelian(82-14)	1.49	1.72	3.75	(9)	35.17												
Little Birch (77-89)	0.75	0.48	1.01	(21)	3.39	Long (82-118)	3.64	1.78	3.25	(27)	10.34												
Long (77-27)	0.70	0.40	0.73	(8)	1.80	McDonald (82-10)	0.62	0.96	1.03	(7)	3.92												
Maple (77-181)	1.44	0.60	1.29	(12)	2.61	Mud (82-26)	0.50	0.35	0.67	(6)	1.80												
Mound (77-7)	0.39	0.54	0.58	(8)	0.94	Oneka (82-140)	0.27	1.19	0.95	(22)	4.13												
Osakis (77-215)	0.42	0.70	1.51	(40)	7.39	Square (82-46)	0.47	0.22	0.72	(24)	5.34												
Sauk (77-150)	1.88	0.72	1.74	(18)	5.20	Sunfish (82-107)	0.62	1.43	1.59	(26)	18.15												
WADEA COUNTY																							
Hazel (80-5)	0.94	1.01	0.92	(21)	3.33	Sunnybrook (82-133)	1.62	1.24	1.90	(8)	3.40												
Stocking (80-37)	0.50	0.47	0.55	(13)	1.52	Sunset (82-153)	1.28	1.11	1.13	(7)	2.70												
WASHINGTON COUNTY																							
Bass (82-35)	2.61	1.42	1.48	(6)	3.75	Tanners (82-115)	0.66	1.25	1.27	(10)	2.80												
Battle Creek (82-91)	1.46	0.85	1.36	(11)	3.02	Turtle (82-36)	0.76	0.64	1.04	(7)	3.41												
Big Carnelian (82-49)	0.66	0.47	1.28	(24)	West Boot (82-44)	0.59	0.53	0.73	(6)	2.78													
Big Marine (82-52)	1.10	0.61	1.00	(27)	White Bear (82-167)	0.94	1.24	1.17	(84)	7.07													
Bone (82-54)	1.20	0.78	1.25	(20)	WATONWAN COUNTY																		
Carver (82-166)	1.47	0.75	1.43	(10)																			
Clear (82-163)	1.18	0.71	1.14	(27)																			
Cloverdale (82-9)	1.52	1.42	2.21	(7)																			
DeMontreville (82-101)	1.00	0.73	1.47	(33)																			
Downs (82-110)	1.21	1.81	2.52	(19)																			
WRIGHT COUNTY												RIGHT COUNTY											
												Augusta (86-284)	1.06	0.56	0.99	(7)	2.85						
												Birch (86-66)	1.01	1.34	1.15	(8)	6.19						
												Charlotte (86-11)	0.50	1.47	1.39	(16)	8.68						
												Collinwood (86-293)	0.90	0.90	0.93	(6)	3.88						
												Indian (86-223)	0.52	1.12	1.49	(15)	9.76						
												Maple (86-134)	1.44	1.22	1.20	(15)	5.34						
												Pelican (86-31)	0.69	0.47	0.57	(6)	8.00						
												Sugar (86-233)	1.20	0.86	0.77	(24)	4.34						
												Sylvia (86-289)	0.96	0.32	0.87	(22)	3.65						