



UNITED STATES GOVERNMENT

MEMORANDUM

Date: January 20, 1995

From: Des Lacs NWR Complex
P.O. Box 578
Kenmare, ND 58746

To: N. D. Refuge Supervisor, Denver, CO

Subject: Annual Water Use Report/Management Plans

Attached are the subject reports for review and forwarding to Engineering for the Des Lacs NWR Complex. Included are reports for Des Lacs NWR, Lake Zahl NWR, Shell Lake NWR, Sikes Dam WPA, and three reports for Lostwood NWR. If you have any questions please call Dan Severson at 701-385-4046.

A handwritten signature in black ink, appearing to read "Michael Blenden".

Michael Blenden
Project Leader

DES LACS NATIONAL WILDLIFE REFUGE

WATER MANAGEMENT PLAN

1995

Prepared by: Dan Severson
Refuge Manager

Date: 20 January, 1995

Concurrence: Mickael Flaudin
Project Leader

Date: 25 January, 1995

Regional Approval: _____

Date: _____

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1994 WATER MANAGEMENT

Precipitation for the October 1993-April 1994 winter period was 3.4" above normal. The winter of 1993-94 was very wet with 58.55" of snow fall and 8.46" of moisture. Spring run-off, came early and was heavy due to good moisture in September 1993 and a good frost seal in the winter. All units except Units 1 and 2 reached objective levels in March. Precipitation during spring and summer was slightly below normal, but enough to keep units at desired levels. Fall and early winter had above normal precipitation with October through December being wet and soil conditions were excellent for a good frost seal. Snow began piling up early with approximately 20" total in November and December and all indications are pointing to excellent run-off in spring of 1995. A week long thaw occurred in early December but little water entered the soil and most is still on the ground in the form of ice sheets.

The "big thaw" came slowly in 1994, but still provided most of the area with good to excellent water conditions. The water started running in early March with peak flow from March 15-22. All wetlands on Des Lacs were at or above spring target levels, with downstream releases occurring. The 1300 acre Unit 2 rose over 3.5' during the month, the 700 acre Unit 7 rose over 4.5', and emergency spillways on Units 3, 4a, 5, 6, 7 and 8 also ran over.

All three Bureau of Reclamation built 0.25 acre islands in Unit 7 were rip-rapped and seeded during the winter. Spring run-off filled Unit 7 and we then realized that the islands were not built to the correct elevation by the contractor. BOR was notified and efforts were made in the spring to keep water conditions lower than planned to reduce erosion of the islands. The northern most island was under water at about 1782.50' msl. BOR said they will fix the islands in the winter of 1994-95.

A good stand of emergent vegetation continued to increase in Unit 2, and if we can keep water levels moderate, they will continue to expand and not be flooded out.

Water levels in Units 3, 4, 5, and 6 had to be lowered in late summer in order to repair the Unit 3 WCS damaged by floodwaters in July 1993. A coffer dam had to be built in November on the Unit 4 side of the WCS and bridge and water pumped out of structure. The cause of the problem was found to be a large 4'X8' hole in concrete sheet piling weir. The contractor did not drive all the pilings to the same depth but drove them to refusal, which was not far enough. The refuge and Ward County combined to repair the hole and refill both sides of the weir with clay dirt and rip-rap on the top. Spring run-off in 1995 will determine whether repairs were sufficient.

TABLE 1. CLIMATIC CONDITIONS ON DES LACS NWR IN 1994
MEASURED AT KENMARE, ND

MONTH	TEMPERATURES		PRECIPITATION (inches)		
	HIGH	LOW	SNOW	MOISTURE	AVERAGE MOISTURE
JANUARY	35	-31	19.80	2.55	0.47
FEBRUARY	35	-32	13.30	2.12	0.49
MARCH	60	-1	1.50	0.18	0.62
APRIL	80	14	4.00	0.87	1.64
MAY	91	33		1.92	2.44
JUNE	86	45		3.38	3.83
JULY	91	42		1.95	2.32
AUGUST	95	38		1.12	2.02
SEPTEMBER	99	31		1.85	2.06
OCTOBER	77	19	2.00	2.66	0.85
NOVEMBER	54	7	4.00	0.83	0.51
DECEMBER	50	-25	16.85	1.96	0.47
TOTAL			61.45	21.39	17.72

WATER MANAGEMENT PLAN FOR 1995

Prospects for significant run-off are good in 1995. There is a fair snowpack in the Drift Plain and in the Missouri Coteau. Soil conditions are excellent with an excellent frost seal so an adequate spring run-off is anticipated. We will enter spring with good water conditions in Units 1, 2 and 7, and excellent conditions in Units 4, 5, 6 and 8.

Water level objectives for 1995 are the levels specified in the Long Range Water Management Plan which was approved in 1990. If run-off is available we will try to fill up all units beginning in the north, according to the Plan.

Unit 1

The objective levels after spring run-off will be 1782.5. This level can only be obtained with a heavy run-off. If the objective level of 1782.5 is met achieved, excess water will be released into Unit 2. The water level froze in the fall at 1779.5'.

Unit 2

The Des Lacs Long Range Water Management Plan calls for an objective level of 1782.5. The Plan also states that "If this objective is met and exceeded by spring run-off, excess water will be released into Units 4 and 5 and farther downstream in an attempt to meet the objective levels of those pools, and to keep Unit 2 low enough to allow the emergents that have become established to continue to grow". It is unlikely though, that with the current water control system that any water will be released into Unit 4, which was at 1782.60 in December. This is higher than the spring objective level for Unit 2. Unit 4 is sure to rise to the 1784-1786 level in the spring. Water level at freeze-up in fall 1994 was 1781.40, up 1.7' from fall 1993 level. We do not have the capability to manage the water in the spring at any lower level than Unit 4, unless low run-off simply does not fill the unit.

Unit 3

The objective level after spring run-off will be the spillway level of 1787.0. Except for temporarily removing stop logs to release excess water if needed during peak run-off periods, the Unit 3 water control structure will not be changed. Water levels below 1787.0 will be obtained by evapotranspiration. This unit is expected to fill to spillway levels in the spring. Cattail in the unit will be removed by mowing or cutting with dozer if possible to open up areas during the winter.

Unit 4

The objective level after spring run-off will be 1783.5. The Unit 4 water control structure boards and gate will be closed. The water level at freeze-up in the fall 1994

was 1782.60. After spring objectives are attained, water will be released into Unit 5. Water levels are expected to rise above objective levels in the spring to about 1784-1785 and water will be slowly released downstream. Fall objective levels are 1782.50.

Unit 4A

The objective level after spring run-off will be the spillway level which is 1788.0. It is anticipated that flash boards will need to be pulled to release excess water during spring run-off. Water levels below 1788.0 will be determined by precipitation and evapotranspiration. A staff gauge needs to be installed in this unit in 1995.

Unit 4B

This is a new unit that resulted from the ditch cleanout between Unit 4 and Unit 5 water control structures. Beginning at the Unit 4 dike, spoil from the cleanout created an embankment that continued to the Soo Line Railroad bridge. This 15-acre area is surrounded by dikes and elevated railroad track with no water source. If adequate run-off occurs in 1995, water will be pumped into the unit until a two-foot depth is obtained over the majority of the area. If water is available, this level will be maintained until fall.

Unit 5

The objective level after spring run-off is 1783.5. Spring 1994 levels rose to 1785.60. The Unit 5 water control structure boards and gate will be closed. The water level at freeze-up in fall 1994 was at 1782.80. Additional water above 1783.5 will be released into Unit 6. Fall objective level is 1782.5 or lower.

Unit 6

The objective level after spring run-off will be 1783.5. The water level at freeze-up in fall 1994 was just below target level at 1782.90. This unit will go above objective level in spring 1995. Additional spring run-off will be released into Unit 7. Water levels below 1783.0 will be attained by evapotranspiration.

Unit 7

Target level for the unit is 1780.5 after spring run-off. Fall freeze-up level was 1780.6 and it is expected to go to at least 1783.0. Excess water will be released through the bypass ditch. Water flow down the bypass ditch is slow and often cannot keep up with inflow during spring run-off.

Unit 8

The objective level after spring run-off will be the spillway level which is 1784.0. Water levels below 1784.0 will be determined by evapotranspiration. Water level at fall 1994 freeze-up was 1782.00. Target level is expected to be reached easily.

The ditch downstream of the outlet WCS is becoming choked with cattails and will be cleaned out on contract if money available.

DES LACS NWR IMPOUNDMENT DATA

UNIT 1

PROGRAM YEAR 1994

WATER SURFACE ELEVATION FOR 1994		PLANNED WATER SURFACE ELEVATION FOR 1995
PLANNED:		HIGH: <u>1782.5</u> LOW: <u>1778.5</u>
JANUARY	FROZEN 1778.9	
FEBRUARY	FROZEN 1778.9	
MARCH	1779.0	
APRIL	1779.0	1782.5
MAY 31	1780.8	
JUNE 30	1780.8	
JULY 22	1781.0	
AUGUST 31	1781.0	
SEPTEMBER 30	1780.0	
OCTOBER 27	1779.90	
NOVEMBER	FROZEN AT 1779.50	
DECEMBER	FROZEN AT 1779.50	
HIGH (AFTER SPRING RUN-OFF): <u>1781.0</u>		
LOW: <u>1778.9</u>		
MAXIMUM ELEVATION PERMISSABLE (CREST OF SPILLWAY): <u>1786.0</u>		
BOTTOM OF OUTLET: <u>1779.0</u>		

DES LACS NWR IMPOUNDMENT DATA

UNIT 2

PROGRAM YEAR 1994

WATER SURFACE ELEVATION FOR 1994		PLANNED WATER SURFACE ELEVATION FOR 1995
PLANNED:		HIGH: <u>1782.5</u> LOW: <u>1780.0</u>
JANUARY	FROZEN 1779.10	
FEBRUARY	FROZEN 1779.10	
MARCH 31	1782.80	
APRIL 29	1783.74	
MAY 10	1783.80	1782.5
JUNE 20	1782.60	
JULY 22	1782.40	
AUGUST 3	1782.08	
SEPTEMBER 26	1781.50	
OCTOBER 27	1781.40	
NOVEMBER 16	FROZEN AT 1781.40	
DECEMBER	FROZEN AT 1781.40	
HIGH (AFTER SPRING RUN-OFF): <u>1783.80</u>		
LOW: <u>1779.10</u>		
MAXIMUM ELEVATION PERMISSABLE (CREST OF SPILLWAY): <u>1787.0</u>		
BOTTOM OF OUTLET: <u>1780.0</u>		

DES LACS NWR IMPOUNDMENT DATA

UNIT 3

PROGRAM YEAR 1994

WATER SURFACE ELEVATION FOR 1994		PLANNED WATER SURFACE ELEVATION FOR 1995
PLANNED:		HIGH: <u>1787.0</u> LOW: <u>1785.0</u>
JANUARY	DRY	
FEBRUARY	DRY	
MARCH 14	1787.10	
APRIL 20	1784.60	1787.0
MAY 31	1783.50 ¹	1787.0
JUNE 30	1783.50	
JULY 7	1783.90	
AUGUST 31	DRY ¹	
SEPTEMBER 30	DRY	
OCTOBER 31	DRY	
NOVEMBER	1783.70	
DECEMBER	1783.70	
HIGH (AFTER SPRING RUN-OFF): <u>1787.10</u>		
LOW: <u>DRY</u>		
MAXIMUM ELEVATION PERMISSABLE (CREST OF SPILLWAY): <u>1787.0</u>		
BOTTOM OF OUTLET: <u>1783.5</u>		

¹DRAWDOWN TO REPAIR EROSION ON BRIDGE AND WATER CONTROL STRUCTURE.

DES LACS NWR IMPOUNDMENT DATA

UNIT 4

PROGRAM YEAR 1994

WATER SURFACE ELEVATION FOR 1994		PLANNED WATER SURFACE ELEVATION FOR 1995
PLANNED:		HIGH: <u>1783.5</u> LOW: <u>1780.5</u>
JANUARY	FROZEN AT 1783.20	
FEBRUARY	FROZEN AT 1783.20	
MARCH 20	1785.80	
APRIL 20	1784.70	1783.5
MAY 24	1784.30	
JUNE 15	1784.00	
JULY 22	1784.00	
AUGUST 3	1783.60 ¹	
SEPTEMBER 6	1782.90 ¹	1780.5
OCTOBER 1	1782.50	
NOVEMBER 16	FROZEN AT 1782.60	
DECEMBER	FROZEN AT 1782.60	
HIGH (AFTER SPRING RUN-OFF): <u>1785.80</u> HIGH FOR YEAR: <u>1785.80</u> LOW: <u>1782.60</u>		
MAXIMUM ELEVATION PERMISSABLE (CREST OF SPILLWAY): <u>1787.0</u> BOTTOM OF OUTLET: <u>1780.5</u>		

Drawdown for repair of Unit 3 WCS

DES LACS NWR IMPOUNDMENT DATA

UNIT 4A

PROGRAM YEAR 1994

WATER SURFACE ELEVATION FOR 1994		PLANNED WATER SURFACE ELEVATION FOR 1995
PLANNED:		HIGH: <u>1788.0</u> LOW: <u>1785.5</u>
JANUARY	FROZEN AT 1786.60	
FEBRUARY	FROZEN AT 1786.60	
MARCH 18	1789.60	
APRIL 20	1788.00	1788.0
MAY 24	1788.00	
JUNE 20	1788.00	
JULY 7	1788.00	
AUGUST 31	1786.80	
SEPTEMBER 29	1786.30	1786.0
OCTOBER 27	1786.30	
NOVEMBER 16	FROZEN AT 1786.20	
DECEMBER	FROZEN AT 1786.20	
HIGH (AFTER SPRING RUN-OFF): <u>1789.60</u> HIGH FOR YEAR <u>1789.60</u>		
LOW: <u>1786.20</u>		
MAXIMUM ELEVATION PERMISSABLE (CREST OF SPILLWAY): <u>1788.0</u>		
BOTTOM OF OUTLET: <u>1779.5</u>		

DES LACS NWR IMPOUNDMENT DATA

UNIT 5

PROGRAM YEAR 1994

WATER SURFACE ELEVATION FOR 1994		PLANNED WATER SURFACE ELEVATION FOR 1995
PLANNED:		HIGH: <u>1783.5</u> LOW: <u>1781.0</u>
JANUARY	FROZEN AT 1783.50	
FEBRUARY	FROZEN AT 1783.50	
MARCH 19	1785.66	
APRIL 21	1784.70	1783.5
MAY 10	1784.36	
JUNE 20	1784.32	
JULY 7	1784.12	
AUGUST 3	1783.80	
SEPTEMBER 6	1783.20	1782.5
OCTOBER 27	1782.84	
NOVEMBER 16	FROZEN AT 1782.80	
DECEMBER	FROZEN AT 1782.80	
HIGH (AFTER SPRING RUN-OFF): <u>1785.66</u>		HIGH FOR YEAR <u>1785.66</u>
LOW: <u>1782.80</u>		
MAXIMUM ELEVATION PERMISSABLE (CREST OF SPILLWAY): <u>1783.5</u>		
BOTTOM OF OUTLET: <u>1778.0</u>		

DES LACS NWR IMPOUNDMENT DATA

UNIT 6

PROGRAM YEAR 1994

WATER SURFACE ELEVATION FOR 1994		PLANNED WATER SURFACE ELEVATION FOR 1995
PLANNED:		HIGH: <u>1784.0</u> LOW: <u>1780.0</u>
JANUARY	FROZEN AT 1783.34	
FEBRUARY	FROZEN AT 1783.34	
MARCH 20	1785.20	
APRIL 21	1784.10	1783.5
MAY 10	1783.90	
JUNE 20	1783.80	
JULY 7	1783.62	
AUGUST 3	1783.20	
SEPTEMBER 29	1782.74	1780.5
OCTOBER 27	1782.88	
NOVEMBER 16	FROZEN AT 1782.88	
DECEMBER	FROZEN AT 1782.88	
HIGH (AFTER SPRING RUN-OFF): <u>1785.20</u>		
LOW: <u>1782.88</u>		
MAXIMUM ELEVATION PERMISSABLE (CREST OF SPILLWAY): <u>1784.0</u>		
BOTTOM OF OUTLET: <u>1777.5</u>		

DES LACS NWR IMPOUNDMENT DATA

UNIT 7

PROGRAM YEAR 1994

WATER SURFACE ELEVATION FOR 1994		PLANNED WATER SURFACE ELEVATION FOR 1995
PLANNED:		HIGH: <u>1780.5</u> LOW: <u>1778.5</u>
JANUARY	FROZEN AT 1778.20	
FEBRUARY	FROZEN AT 1778.20	
MARCH 25	1782.78	
APRIL 1	1782.40	178 ³ 0.5
MAY 10	1780.66	
JUNE 20	1780.20	
JULY 7	1780.00	
AUGUST 3	1779.84	
SEPTEMBER 29	1780.20	1178.5
OCTOBER 27	1780.30	
NOVEMBER 16	FROZEN AT 1780.60	
DECEMBER	FROZEN AT 1780.60	
HIGH (AFTER SPRING RUN-OFF): <u>1782.78</u>		HIGH FOR YEAR <u>1782.78</u>
LOW: <u>1778.20</u>		
MAXIMUM ELEVATION PERMISSABLE (CREST OF SPILLWAY): <u>1784.0</u>		
BOTTOM OF OUTLET: <u>1778.5</u>		

DES LACS NWR IMPOUNDMENT DATA

UNIT 8

PROGRAM YEAR 1994

WATER SURFACE ELEVATION FOR 1994		PLANNED WATER SURFACE ELEVATION FOR 1995
PLANNED:		HIGH: <u>1784.0</u> LOW: <u>1782.0</u>
JANUARY	FROZEN AT 1782.64	
FEBRUARY	FROZEN AT 1782.64	
MARCH 18	1784.00	
APRIL 21	1784.10	1784.0
MAY 31	1783.26	
JUNE 7	1783.26	
JULY 7	1782.98	
AUGUST 3	1782.60	
SEPTEMBER 6	1782.20	1782.0
OCTOBER 27	1782.00	
NOVEMBER 16	FROZEN AT 1782.00	
DECEMBER	FROZEN AT 1782.00	
HIGH (AFTER SPRING RUN-OFF): <u>1784.10</u>		HIGH FOR YEAR <u>1784.10</u>
LOW: <u>1782.00</u>		
MAXIMUM ELEVATION PERMISSABLE (CREST OF SPILLWAY): <u>1784.0</u>		
BOTTOM OF OUTLET: <u>1778.5</u>		