MISSISQUOI NATIONAL WILDLIFE REFUGE

SWANTON, VERMONT

ANNUAL WATER MANAGEMENT PROGRAM

1999

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MISSISQUOI NATIONAL WILDLIFE REFUGE
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I.A. ANNUAL WATER MANAGEMENT PROGRAM OUTLINE for CRANBERRY POOL
Refuge: MISSISQUOI Water Unit Name or Number: #2
Maximum Elevation Permissible: APPROXIMATELY 99.25'MSL
Flowline Elevation of Lowest Drain Structure: 93.00'MSL
Elevation of General Pool Bottom (not borrow pit bottom): 95.50'MSL

	A.1. Water Surface Elevations & Salinity for Past Year		B.2. Planned Elevation & Salinity for Program Year	
Date	Water Surface Elevations	*Salinity (%SeaWater)	Water Surface Elevation	*Salinity Objective
Jan. 1	NVAL		NVAL	
15	NVAL		NVAL	
Feb. 1	NVAL		NVAL	
15	NVAL		NVAL	
Mar. 1	NVAL		NVAL	
15	NVAL		NVAL	
			(ice-out expected)	
Apr. 1	not taken		Same as Missisquoi River	
15	not taken		while lake level is > 98.5'msl	
May 1	not taken		97.2' msl	
15	92.34' msl	5/18/98	97.2' msl	
June 1	97.10' msl		97.2' msl	
15	97.10' msl	6/18/98	97.2' msl	
July 1	97.59' msl	6/29/98	97.2' msl	
15	99.17' msl		97.2' msl	
Aug. 1	97.79' msl	8/3/98	97.2' msl	
15	97.78' msl		97.2' msl	
Sept. 1	97.45' msl		97.2' msl	
15	not taken		97.2' msl	
Oct. 1	96.38' msl	10/5/98	97.2' msl	
15	not taken		97.2' msl	
Nov. 1	not taken		96.2' msl	
15	95.85' msl	11/13/98	96.2' msl	
Dec. 1	not taken		Freeze up expected	
15	95.54' msl	12/11/98	96.0' msl til spring	
31				

*To be used for pools approved for brackish water management

I.B. ECOLOGICAL EFFECTS OF THE PAST YEAR'S WATER LEVELS ON WATER MANAGEMENT UNIT #2

1. Water Supply and Use During 1998

Lake Champlain surface elevation peaked at 101.83 in April . The water level in the Cranberry Pool is uncontrollable while the lake lever is above approximately 98.8' msl. At that elevation, the Missisquoi River overtops its bank of the west side of the pool and the pool level directy related to the lake level. When the lake level has subsided below 98.8' msl, the water level in Cranberry Pool is controllable with two water control structures located near Dead Creek.

The Cranberry Pool WCS was repaired in 1997. The operable control structure made it possible to keep the water level in the pool at or near the desired level. Some leakage from defective and misaligned stop logs was corrected in November. New stop logs were made and installed in the structures as needed during the spring and summer. The misaligned stoplogs did allow water levels in Cranberry pool to drop below desired levels in November/December

2. Related Biological Conditions and Wildlife Use

The current water management plan for the Cranberry Pool (WMU#2) requires lowering the spring/early summer high water levels to 97.20'MSL as soon as possible, and holding that level throughout the year until November. In November, the levels are dropped down to 96.00'MSL, to reduce the flooding impacts of the following spring. Getting the levels down to the 97.20'MSL objective is intended to provide ground-nesting waterfowl with nesting hummocks and grassed edge habitat that are otherwise underwater during the early April-May duck-nesting season here. This level also provides an optimum amount of interspersion of emergent vegetation and water. Water levels outside the Pool are 1-3' lower.[2] This outside level is influenced by the effects of heavy precipitation on the Missisquoi River watershed. During periods of low rainfall, the river is essentially at the same level as Lake Champlain. However, during heavy run off the river level may be one or two feet higher than the lake for a brief period of one or two days. * dry conditions

This procedure has been shown to meet the objectives of the station "Water Management Plan" best, in that waterfowl, food and cover plants, mammals and wading birds respond favorably to it.

Spring flooding is usually higher than the 97.2'msl objective

until sometime in late May or early June.

In 1998, the lake level subsided to below the 98.8' threshold by mid-May. Water levels in Unit 2 were managed successfully except during a period of frequent precipitation in July. The pool level was up to a foot above objective during two weeks from mid-July to early Auguust.

I.C. STATEMENT OF OBJECTIVES FOR THE PROPOSED LEVELS IN UNIT #2

It may be desirable to evaluate the current water management plan for this pool in light of the site visit by moist soil experts in 1994. A periodic pool drawdown rather than a high water season may be considered in the future. In any case it will not be desirable to operate the pool at a static water level indefinitely. Periodic fluctuations in water levels help to maintain wetland diversity. The Cranberry Pool essentially was in drawdown status during the summer of 1996 due to a low lake level and disabled water control structure. A planned drawdown will be attempted at five year intervals.

There are four places to monitor water levels: Charcoal Creek, Mac's Bend Bulkhead, Dead Creek side of WCS, and a ~~gage~~ gauge mounted on a post inside the Cranberry Pool. The lake level at Charcoal Creek and the Pool Level inside the Cranberry Pool will be monitored at least twice a month. More frequent monitoring will be encouraged at these sites and at the river elevations during the spring ice-out and high water run-off periods.
The pool level will be taken using the WCS measurement because the gauge needs to be reset for adequate accuracy.

II.A. 1999 ANNUAL WATER MANAGEMENT PROGRAM OUTLINE FOR WATER MANAGEMENT UNIT (WMU) #1 - BIG MARSH SLOUGH & GOOSE BAY POOL

Not applicable.

II.B. ECOLOGICAL EFFECTS OF THE PAST YEAR'S WATER LEVELS ON WATER MANAGEMENT UNIT (WMU) #1

Big Marsh Slough and Goose Bay Pool continue to be treated as a single water management unit (WMU#1). They remain connected by a man-made ditch between the two systems dug during the late 1960's. Incomplete dikes, or "gut plugs," around the perimeter of these areas hold water levels once they drop below the 96.25' - 96.50' MSL elevation.

The stop-logs in the Big Marsh Slough dike cannot be manipulated because the WCS at Big Marsh Dike is

completely silted in. To our knowledge, the WCS has not been functional for over 20 years. Management has been centered around retaining as much water as possible, for as long as possible. The original plans called for complete diking of the periphery of this unit, but that has yet to occur and might not be a viable project from a cost/benefit analysis. Therefore, this unit functions in accordance with the water levels of Dead Creek and Lake Champlain, until its water level drops below the approximate perimeter elevation of 96.25'MSL. *

In addition
The connecting ditch between Big Marsh Slough and Goose Bay Pool was dammed by beavers during 1969, and has been repaired periodically up to 1998. Since the dam holds 2"-4" more water in Goose Bay Pool, it has never been removed. Waterfowl habitat in Goose Bay Pool is improved by the slightly higher water levels.

Water levels in WMU#1 are not presently measurable since no known benchmark elevation is located nearby. However, if it is assumed that the levels in Big Marsh Slough are similar to those of Lake Champlain, and that Goose Bay Pool levels are slightly higher than the Lake Champlain-Big Marsh Slough levels, then the 1998 water levels can be deduced from Lake Champlain's water level readings.

By referring to the monthly gauge readings for Lake Champlain, it can be inferred that the water level in the Big Marsh Slough was equal to Lake Champlain until the lake level dropped below the level of 96.25' msl. 1998 was a "high water" year for Lake Champlain. The lake was above 97' msl most of the year until October. The weather in 1998 was characterized by frequent rains throughout the spring and summer. Annual precipitation for Vermont was about 15 inches above the average. This increased precipitation distributed throughout the growing season helped to keep the lake above 97' msl.

2. <u>Related Biological Conditions and Wildlife Use</u>

The higher water level during the year held back the onset of growth of emergents in the deeper areas of Big Marsh Slough. Good brood rearing cover was however provided in button bush thickets and stands of cattail, wild rice, and burreed growing in shallower areas.

The stable water level in this pool during the fall allowed access to wild rice for use by migrating waterfowl. Submergents and emergents, such as pickerelweed, arrowhead, pondweeds, spikerush and duckweed added to the food source for the ducks using this unit during the annual waterfowl population peak in October. As in past years, water lilies, watershield and burreed were also common throughout the unit.

WMU#1 continues to provide the highest concentration of ring-necked ducks on-refuge during October and November, and is well used by mallards and black ducks. Pied-billed grebes, moorhens, rails and black terns are also known to breed and feed in this unit.

There is an area in Big Marsh Slough where Common Reedgrass was aerially sprayed in 1988. To date, there has been no regrowth of this pest plant. The area should be monitored annually to detect any resurgence of the plant.

II. C. A STATEMENT OF OBJECTIVES FOR THE PROPOSED LEVELS

Not applicable.

III.A. 1998 ANNUAL WATER MANAGEMENT PROGRAM OUTLINE FOR THE REMAINING REFUGE AREAS

Not applicable.

III.B. ECOLOGICAL EFFECTS OF THE PAST YEAR'S WATER LEVELS ON THE REMAINING REFUGE AREAS

1. Water Conditions During 1998

Lake Champlain had higher than average water levels throughout most of the year. Water access through much of the marsh in 1998 was possible by boat. Vegetation growth in the refuge marshland bordering the lake was robust. Dominant species include Hardstem Bullrush, Wild Rice, Pickerel Weed, Water Lily, and Burweed. Submerged aquatics are dominated by Eurasian Water Milfoil and beds of wild celery.

Muskrat and beaver populations appeared healthy. The Shad Island Great Blue Heron/Double-crested Cormorant rookery did not appear to be affected by 1998 water levels.

III.C. A STATEMENT OF OBJECTIVES FOR THE PROPOSED LEVELS

Not applicable.