OTTAWA NATIONAL WILDLIFE REFUGE COMPLEX
(OTTAWA, CEDAR POINT, WEST SISTER ISLAND NWR'S)
OAK HARBOR, OHIO

ANNUAL WATER MANAGEMENT PROGRAM
1983

NATIONAL WILDLIFE REFUGE SYSTEM
FISH AND WILDLIFE SERVICE
U.S. DEPARTMENT OF THE INTERIOR

AREAS WHERE WATER LEVELS CAN BE CONTROLLED

Annual Water Management Program Year 19 83

Refuge Ottawa NWR Water Unit or Number Pool 1 (275 Acres)

Maximum elevation permissible Est. 574

Flowline elevation of lowest drain structure 570

Elevation of general pool bottom (not borrow pit bottom). 569.5

A.1 Water Surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevation
Jan. 1	571.5	572.3
15	571.5	572.3
Feb. 1	571.5	572.3
15	571.5	572.3
Mar. 1	571.4	572.3
15	571.3	572.3
Apr. 1	571.0	572.3
15	570.8	572.0
May 1	570.7	571.7
15	570.6	571.7
June 1	570.7	571.7
15	570.6	571.7
July 1	570.6	571.7
15	570.5	571.7
Aug. 1	570.5	571.6
15	570.5	571.5
Sept. 1	570.6	571.5
15	570.8	571.6
Oct. 1	570.9	571.7
15	571.0	571.8
Nov. 1	571.6	571.0
15	572.0	572.2
Dec. 1	572.2	572.3
15	572.3	572.3
31	572.3	572.3

A.2. Effects of past year's water levels on the ecology of the management unit.

Part 1. Excess spring water was gravity drained from Pool 1 starting March 15, 1982. High Lake Erie water levels and a lack of an automatic water control structure with a flap to allow water to be removed only when Lake Erie water level is down, precluded more than 4" being removed. No pumping to remove any additional water was undertaken as in 1981. An unusually dry spring and summer kept Pool 1 water level down and extensive evaporation in July and August further reduced the water elevation. Water levels were not lowered as much as in 1981 when almost a complete drawdown occurred also no carp control using Rotenone as in 1981 was undertaken. A modification of Pool 1 structure adding a concrete crosswall and 2 flaps in the summer of 1982 will now allow water to be added or removed from Pool 1 or Pools 2a, 2b, 2c automatically when Lake Erie water level elevation allows it. This eliminates the old system of constantly monitoring water levels and opening or closing structures. 12" of rain in November and December brought Pool 1 back up without adding through the water control structure.

Part 2. The partial drawdown along with good evaporation allowed a good vegetation response in 1982. Smartweed stand in NW corner is expanding and also some expansion of cattail areas. Excellent utilization of area by waterfowl in November and a good healthy population of muskrats. Trappers harvested close to 400 muskrats 82-83 season.

B.2. Excess spring water will be removed from Pool 1 early April to bring Pool to a level 4-6" below top of inside concrete tube. Water will be maintained at this level all summer by adding and removing water when necessary. Fall precipitation will be allowed to fill the Pool up again to top of concrete tube and then maintained at this level all winter.

[illegible] 83

[illegible] Ottawa NWR [illegible] Number Pool 2a (70 Acres)

[illegible] elevation permissible Est. 573

Flowline elevation of lowest drain structure 569.2

Elevation of general pool bottom [illegible] below pit bottom. 568.5

[illegible] Water Surface Elevations for Past Year.

[illegible] Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevation
Jan. 1	570.5	570.5
[illegible]	570.5	570.5
[illegible]	570.5	570.5
[illegible]	570.5	570.5
[illegible]	570.6	570.6
[illegible]	570.7	570.7
15	570.6	570.5
[illegible]	570.5	570.4
[illegible]	570.4	570.3
[illegible]	570.3	570.2
[illegible]	570.2	570.0
July 1	569.9	569.7
15	569.6	569.5
[illegible]	569.4	569.3
[illegible]	569.2	569.2
[illegible]	569.0	569.0
[illegible]	569.0	569.0
[illegible]	569.1	569.2
[illegible]	569.5	569.4
[illegible]	570.1	569.5
[illegible]	570.4	569.5
[illegible]	570.5	569.5
[illegible]	570.5	569.5
[illegible]	570.5	569.5

A.2 Effects of past year's water levels on the ecology of the management unit.

Part 1. Pool 2a water levels were maintained fairly stable in 1982. Some excess water was gravity drained through Pool 2b in early spring and a dry spring and summer lowered the water levels 8-10" more. Heavy rainfall in November and December brought the pool level back up.

Part 2. Vegetation response in Pool 2a is still very poor, both in species composition and in density. Waterfowl and muskrat useage in 1982 was low. Carp are also very apparent in this pool.

B.2 A statement of the objectives for the proposed levels.

A good system to gravity drain this pool is not present. The water has to first be discharged into Pool 2b before going to Lake Erie. Excess spring water will be discharged into Pool 2b in April and Pool 2a and Pool 2b both will be gravity lowered as much as possible all summer utilizing the water control structure rehabilitated last summer to facilitate automatic discharge whenever Lake Erie is down. Water levels will be left low in the fall if not enough vegetation response occurs.

Annual Water Management Program Year 19 83

Refuge Ottawa NWR Water Unit or Number Pool 2b (90 Acres)

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure 569.2

Elevation of general pool bottom (not borrow pit bottom). 567.5

A.1 Water Surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevation
Jan. 1	570.5	570.5
15	570.5	570.2
Feb. 1	570.5	570.1
15	570.5	570.1
Mar. 1	570.5	570.0
15	570.5	570.5
Apr. 1	570.5	570.2
15	570.2	570.0
May 1	570.1	569.8
15	570.3	569.6
June 1	570.4	569.5
15	570.2	569.4
July 1	570.3	569.3
15	570.2	569.2
Aug. 1	569.9	569.2
15	569.6	569.1
Sept. 1	569.6	569.0
15	569.2	569.0
Oct. 1	569.0	569.1
15	569.2	569.2
Nov. 1	569.7	569.3
15	570.2	569.4
Dec. 1	570.5	569.5
15	570.5	569.5
31	570.5	569.5

A.2 Effects of past year's water levels on the ecology of the management unit.

Part 1. Pool 2b was lowered 2-4" in early spring to facilitate lowering Pool 2a. After this was accomplished Pool 2c was also lowered 2-4" by putting its water into Pool 2b. This brought Pool 2b back up to reduce the spread of saplings especially in the S.E. corner. The water was left high the rest of 1982 except for reduction due to evaporation. The elevated water level was to control cottonwood and willow saplings and to aid survivorship of stocked predator fish for carp control. 2,000-3½" northern pike fingerlings were stocked May 20, 1982 and 12,500-1" largemouth bass June 17, 1982 for a grand total of 14,500 fish.

Part 2. Two years of elevated water levels has successfully killed off a majority of the cottonwoods in Pool 2b, especially the S.E. corner. The high water level has however caused some damage due to wave action to the inside toe of the north dike. Stone riprap was added the whole length of the north dike of Pool 2b Dec. 1982-Feb. 1983. Vegetative response is very poor in this pool with only remnant clumps of cattail and submergent aquatics. The Ohio Coop Fishery Research Unit at Columbus, Ohio electro-shocked fish in Pool 2b on July 12, 1982 and found that the 1981 stock of bass had reasonably good survival and excellent growth.

B.2 A statement of the objectives for the proposed water levels.

The water control structure will be set to gravity discharge all year whenever Lake Erie water level allows it. A majority of the saplings have been killed out so the water level can now be kept lower to encourage more emergent vegetation. This will also reduce dike damage due to wave action.

Annual Water Management Program Year 19 83

Refuge Ottawa NWR Water Unit or Number Pool 2c (80 Acres)

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure 567.1

Elevation of general pool bottom (not borrow pit bottom). 568.5

A.1 Water Surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevation
Jan. 1	570.0	570.0
15	570.0	570.0
Feb. 1	570.0	570.0
15	570.0	570.0
Mar. 1	570.0	570.0
15	570.0	570.1
Apr. 1	570.2	570.2
15	570.2	570.0
May 1	570.3	569.8
15	570.2	569.8
June 1	570.0	569.8
15	569.7	569.7
July 1	569.6	569.6
15	569.5	569.6
Aug. 1	569.5	569.5
15	569.4	569.4
Sept. 1	569.2	569.2
15	569.2	569.2
Oct. 1	569.3	569.3
15	569.5	569.4
Nov. 1	569.8	569.5
15	569.9	569.5
Dec. 1	570.0	569.5
15	570.0	569.5
31	570.0	569.5

Note: All Elevations T.G.S.

A.2 Effects of past year's water levels on the ecology of the management unit.

Part 1. Excess spring water was discharged from Pool 2c into Pool 2b in May and June then evaporation allowed to further lower this pool another 10-12". Fall precipitation was allowed to refill the pool and remain all winter. 14,500 fingerling predator fish were stocked in Pool 2c in 1982: 2,000-3½" northern pike on May 20, 1982 and 12,500-1" largemouth bass on June 17, 1982.

Part 2. The Ohio Coop Fishery Research Unit at Columbus, Ohio electro-shocked fish in Pool 2c on July 12, 1982. Bass stocked in 1981 were scarce and no northerns were found. Carp were more abundant than Pool 2b and covered 4 year classes in Pool 2c. Vegetative response in Pool 2c far exceeds that of Pools 2a and 2b. No woody vegetation is present and numerous smartweed beds have been expanding.

B.2 A statement of the objectives of the proposed water levels.

A few areas on the south and east dike have eroded back into the dike and need both clay and some riprap in 1983.

Erosion around the new water control structure also needs some riprap in 1983.

Water levels will be maintained at a low level in 1983 to continue to increase the emergent vegetation.

Annual Water Management Program Year 1983

Refuge Ottawa NWR Water Unit or Number Pool 3

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure Est. 569

Elevation of general pool bottom (not borrow pit bottom). 570.0

A.1 Water Surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevation
Jan. 1	571.8	
15	571.8	
Feb. 1	571.8	
15	571.8	
Mar. 1	571.8	
15	571.8	Water level will fluctuate with changes in Lake Erie water level but at a slower rate:
Apr. 1	571.8	
15	572.3	
May 1	572.4	
15	572.4	
June 1	572.4	
15	572.3	
July 1	572.3	
15	572.2	
Aug. 1	571.9	
15	571.8	
Sept. 1	571.6	
15	571.4	
Oct. 1	571.3	
15	571.0	
Nov. 1	571.0	
15	571.0	
Dec. 1	571.3	
15	571.4	
31	571.5	

A.2 Effects of past year's water levels on the ecology of the management unit.

Part 1. Pool 3 water level, stabilized by completion of dike rehabilitation on the North side in 1981, was again destroyed when an April 6th flood opened holes in the south dike and overtopped the east dike. No water control structure exist for this pool either. The water level fluctuated throughout the year in this pool due to the holes in the S.E. corner but to a less degree than it did prior to the north dike repair.

Part 2. A gradual increase in emergent as well as submergent aquatic vegetation has developed since the north dike rehabilitation. The muskrat population is increasing in this pool as well as degree of waterfowl utilization. Ducks take refuge in this pool when adjacent Lake Erie is rough and during the waterfowl hunting season in adjacent Metzger's Marsh.

B.2 A statement of the objectives of the proposed water levels.

No water manipulation will be possible in 1983 with the holes in the south dike allowing water to enter and leave at random. Construction work on adjacent Pool 4 in 1983 will also rehabilitate the common dike between the two pools (east dike of Pool 3). Pool 3 definitely needs not only the south dike repaired in the future but also a control structure to make this pool functional.

Annual Water Management Program Year 19 83

Refuge Ottawa NWR Water Unit or Number Pool 6 (6A-110 acres)

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure Est. 569

Elevation of general pool bottom (not borrow pit bottom). 570.0

A.1 Water Surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevation
Jan. 1	571.5	
15	571.5	
Feb. 1	571.5	
15	571.5	
Mar. 1	571.5	
15	571.6	
Apr. 1	571.6	
15	571.6	
May 1	571.5	
15	571.5	No water manipulation until dikes are repaired
June 1	571.4	Water will be allowed to accumulate and refill
15	571.3	unit after last years drought.
July 1	571.2	
15	570.9	
Aug. 1	570.8	
15	570.5	
Sept. 1	570.4	
15	570.4	
Oct. 1	570.5	
15	570.5	
Nov. 1	570.9	
15	571.0	
Dec. 1	571.1	
15	571.2	
31	571.2	

A.2 Effects of past year's water levels on the ecology of the management unit.

Part 1. This management unit is in poor shape with no water control. This is due in part to no control structure in certain areas and breaks in dikes in other areas, allowing water to drain out. Water does not fluctuate to extremes like Lake Erie due to being back away from Lake Erie connected by numerous ditches which connect with Turtle Creek running into Lake Erie. A dry spring and summer coupled with high summer evaporation dried up most of this unit. The southern zone of this unit has extensive willow and cottonwood saplings so needs control of its expansion. Small areas of extensive cattails need water also to attract muskrat. Fall precipitation and some free water from the adjacent Magee Marsh Wildlife Area brought the ditches and low areas up but failed to flood a majority of it.

Part 2. A good majority of the area with saplings on the south was chopped in 1982. These areas need to be chopped again in 1983 and burned either in 1983 or 1984, to reduce the saplings and encourage grass. In other areas good stands of cattail need to be flooded to encourage muskrats to eat out pockets thus making the area more attractive to waterfowl.

B.2 A statement of the objectives for the proposed levels.

Without funding this area will be left at status quo with no water control. This will mean low muskrat levels, low waterfowl utilization and an increase in woody vegetation. Dikes need repair, water control structures added or repaired, and a cooperative agreement with Crane Creek Wildlife Experiment Station to get water to make this unit functional.

+1 more of Tank Ditch

Annual Water Management Program Year 19 83

Refuge Ottawa NWR Water Unit or Number Moist Soil Unit 3 (213 Acres)

Maximum elevation permissible Est. 575

Flowline elevation of lowest drain structure Est. 567

Elevation of general pool bottom (not borrow pit bottom) Est. 571.5

A.1 Water Surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevation
Jan. 1	(NO WATER GAUGE PRESENT)	
15		
Feb. 1	- Left flooded from winter.	
15		
Mar. 1		
15		
Apr. 1		Unit will be kept flooded all year to reduce the spread of woody vegetation.
15		
May 1	-MSU ditch lowered to allow	
15	clogged tile in MSU-3 to pop open then marked the tile.	
June 1	-Gravity drained into MSU ditch,	
15	then ditch pumped with crisafulli into MSU-5.	
July 1	-Contractor escavates silt in	
15	tank ditch along MSU-3.	
Aug. 1		
15	-Airguard worked on leveling silt from Tank Ditch,	
Sept. 1	escavation	
15		
Oct. 1		
15	-Heavy fall rains add 6-8" in lowest sections of unit.	
Nov. 1		
15		
Dec. 1		
15		
31		

A.2 Effects of past year's water levels on the ecology of the management unit.

Part 1. Water management went as planned in this unit except for gravity flooding in October. Air Guard was still working in this unit leveling the silt from Tank Ditch escavation. Heavy rainfall late October and early November put water over a majority of it.

Part 2. Mowing and a prescription burn over a part of this unit the past years has stimulated the growth of willows. Tall woody vegetation has been reduced but basal and root sprouting has caused an increased density of willow stems. However waterfowl utilization of this unit was excellent with a shallow layer of water coupled with an interspersion of smartweed, grasses, etc.

B.2 A statement of the objectives for the proposed levels.

The dense pockets of willows need to be knocked back this year. If funding and time is available the area may be drained, chopped, then reflooded. If funding and time is not available to chop the woody vegetation the area will not be drained. The willows and cottonwoods given a moist condition would skyrocket in growth and perhaps get "Out of Control."

Short willows and cottonwoods left flooded for 2-3 years will be stressed enough to knock back their growth and kill a large percent of them.

1' more possible to tank done

Annual Water Management Program Year 1983

Refuge Ottawa NWR Water Unit or Number Moist Soil Unit 4 (106 acres)

Maximum elevation permissible Est. 574

Flowline elevation of lowest drain structure Est. 567

Elevation of general pool bottom (not borrow pit bottom) Est. 570.5

A.1 Water Surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevation
Jan. 1	(NO WATER GAUGE PRESENT)	
15		
Feb. 1		
15		
Mar. 1		
15		
Apr. 1		Unit will be kept flooded all year to eliminate woody vegetation. Water lost by evaporation will be replaced using the new moist soil pump.
15		
May 1		
15	- Flood unit with crisafulli pump - 18-20" deep	
June 1		
15		
July 1		
15		
Aug. 1	- Evaporation lowered pool 8-10"	
15		
Sept. 1		
15		
Oct. 1		
15		
Nov. 1	- Heavy fall rains elevate pool 10-12"	
15		
Dec. 1		
15		
31	- Left flooded all winter	

A.2 Effects of past year's water levels for the ecology of the management unit.

Part 1. This unit was flooded in late May with water from Lake Erie with a crisafulli pump. It was left flooded all year to knock back the growth of woody vegetation. Discing and chopping in 1981 was accomplished on a major portion of the unit but water was needed to kill out the untreated woody vegetation and to eliminate new sprouts in mowed and disced areas. Water lost by evaporation in July and August was replaced by heavy rainfall in October and November.

Part 2. The flooding of this unit was very successful. All summer an increasing amount of yellow foliage was observed. By September a major portion of the cottonwoods were yellow or severely stressed and a dense stand of cattail had replaced the woody vegetation in the disced and mowed areas. A very good population of muskrats moved into the unit with some extra big "lodges."

B.2 A statement of the objectives for the proposed levels.

At least one more year of flooding is needed to farther reduce the woody vegetation present. This year any water lost by evaporation, can be replaced using the new moist soil pump. Water levels will be maintained at a stable high level so they won't stress new cattail stands yet flood out new sprouting cottonwoods.

x1 Table done

Annual Water Management Program Year 1983

Refuge Ottawa NWR Water Unit or Number Moist Soil Unit 5 (250 acres)

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure 567

Elevation of general pool bottom (not borrow pit bottom) Est. 570

A.1 Water Surface Elevations for Past Year.		B.1 Planned Elevations for Program Year.
Date	Water Surface Elevations	Water Surface Elevation
Jan. 1	(NO WATER GAUGE PRESENT)	
15		
Feb. 1	- Spring water left in	
15		
Mar. 1		
15		
Apr. 1		Unit will be kept flooded for second year for woody vegetation control. Any water lost by evaporation will be replaced using the new moist soil pump.
15		
May 1		
15		
June 1	- Pump water from MSU-3 into this unit with crisafulli pump plus water from Lake Erie	
15		
July 1		
15		
Aug. 1		
15		
Sept. 1	- Left flooded for woody vegetation control all year	
15		
Oct. 1		
15		
Nov. 1		
15		
Dec. 1		
15		
31	- Left flooded all winter	

A.2 Effects of past year's water levels on the ecology of the management unit.

Part 1. Water management of this unit went as planned. Water was first added by gravity, then MSU-3 water was added using a crisafulli pump, then finally water from Lake Erie was left in this unit all year. A major portion of this unit has very tall woody vegetation, only a small portion was chopped in 1981. Water lost by high evaporation in July and August was almost all regained by very high rainfall in October and November.

Part 2. The die off of woody vegetation in this unit isn't as noticeable as in MSU-4. Very little was chopped in 1981 compared with a major portion of MSU-4 prior to flooding so a 1981 set back wasn't present. Also the taller woody vegetation will take longer with its extra flood reserves. Very minimal growth of cattail was present by fall in contrast to the dense expansion in MSU-4.

Waterfowl useage was excellent all fall in this unit. The flooded cottonwoods and willows made an ideal secluded place for a sanctuary. Large concentrations of waterfowl would fly in and out of this unit.

B.2 A statement of the objectives for the proposed levels.

At least two more years of flooding will be necessary to knock back the woody vegetation in this unit.

Water lost by evaporation will be replaced with the new moist soil pump.

Annual Water Management Program Year 19 83

Refuge Ottawa NWR Water Unit or Number Moist Soil Unit 6

Maximum elevation permissible Est. 572

Flowline elevation of lowest drain structure 567

Elevation of general pool bottom (not borrow pit bottom). 570

A.1 Water Surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevation
Jan. 1	(NO WATER GAUGE PRESENT)	
15		
Feb. 1		
15		
Mar. 1		
15	- Minimal water level fluctuations all year due to precipitation and evaporation.	
Apr. 1		
15		
May 1		Unit left at status quo unless funding repairs the dike. If dike repaired and unit flooded, dense cattail areas would attract muskrats with ducks soon to follow the opening up effect by the muskrats.
15		
June 1		
15		
July 1	- Dike leaks bad along County Line Road near the moist soil pump.	
15		
Aug. 1		
15		
Sept. 1		
15		
Oct. 1		
15		
Nov. 1		
15		
Dec. 1		
15		
31		

A.2 Effects of past year's water levels on the ecology of the management unit.

Part 1. No water management was undertaken in this unit in 1982. A poor dike along County Line Road near the moist soil pump allows water to pass back and forth with Lake Erie fluctuations. No water control structure is present either in this unit. Lack of funds in 1980 precluded hooking this unit up to the moist soil pumping station which is only a few feet away.

Part 2. A very excellent dense stand of cattail comprises most of this unit with grassland on the upper end. Only minimal dike repair is needed to make this unit functional. Water could be pumped in using a crisafulli pump until a control structure is added later. A stable level of water would attract muskrats which would open the cattail up for waterfowl utilization.

B.2 A statement of the objectives for the proposed levels.

Lack of funding will not allow a pipe extension from the moist soil pump station but may allow repair of the dike in CY 83 or CY 84. Once repaired and water added this area will be a very productive unit both for muskrats and waterfowl.

Annual Water Management Program Year 19 83

Refuge Ottawa NWR Water Unit or Number Moist Soil Unit 7a, 7b (49 acres) (44 acres)

Maximum elevation permissible Est. 572

Flowline elevation of lowest drain structure Est. 568

Elevation of general pool bottom (not borrow pit bottom). Est. 570

A.1 Water Surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevation
Jan. 1	(NO WATER GAUGE PRESENT)	
15		
Feb. 1		
15		
Mar. 1		
15	- Spring melt off and rain filled both units	Water left in units all spring.
Apr. 1	- Flood April 6th overtopped	
15	stange rd. and filled both pools. Both pools pumped	
May 1	down 6" with 1" left.	
15		
June 1	- Electric pump lowering 7a.	Both units gravity drained and pumped dry (moist condition)
15		
July 1	- 7a and 7b both dry	
15		
Aug. 1		
15		Water added so moist condition all summer
Sept. 1	- 7a structure riprapped, and	
15	dike built around Q-3.	
Oct. 1	- Flood 7b with crisafulli	Water added by gravity or crisafulli pump
15	pump.	so 6" deep
Nov. 1	- Heavy fall rain fills, adds	
15	8-10" in both units.	
Dec. 1		
15		
31		Water left in all winter

Note: All elevations [illegible]

A.2 Effects of past year's water level on the ecology of the management unit.

Part 1. MSU-7a and MSU-7b were filled by spring melt off coupled with eary spring rains while the ground was still frozen. On March 17, 1982 MSU-7a was only 7" from going over Stange Rd. The April 6th flood over-topped Stange Rd. and flooded both units. Some damage to Stange Rd. occurred and extensive debris was piled on the road. Both pools were pumped down 6" in April and the rest removed in June. Both areas were left dry all summer. MSU-7a water control structure was riprapped in September, and a rim dike built around Q-3 then unit was gravity filled 2-3" from Crane Creek, with 8-10" more added late October with heavy rains. MSU-7b was flooded early October using a crisafulli pump on the NE corner of the unit pumping from Pool 7 which is open to Lake Erie. Extensive waterfowl useage occurred in this unit all fall and into winter.

Part 2. Very high evaporation and a drought most of the spring and summer caused most of these units to become too dry for moist soil plants. Numerous species of grasses, forbs, and other upland prairie species were seen in these areas.

B.2 A statement of the objectives for the proposed levels.

This year a moist condition will be maintained by adding or discharging water as needed. After the initial June drawdown. A wetter condition than 1982 hopefully will encourage moist soil plants and reduce the amount of grassland prairie species.

Annual Water Management Program Year 19 83

Refuge Ottawa NWR Water Unit or Number Moist Soil Unit 7c

Maximum elevation permissible Est. 572

Flowline elevation of lowest drain structure Est. 568

Elevation of general pool bottom (not borrow pit bottom). Est. 570

A.1 Water Surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevation
Jan. 1	(NO WATER GAUGE PRESENT)	
15		
Feb. 1		
15		
Mar. 1		
15		
Apr. 1	April 6th flood filled unit 6-8" deep. Unit pumped out by Lodge pump to get water off parking lot and Lodge bridge.	Unless funding is available, unit will be left status quo. Low level dikes are needed and tubes with water control flaps to make this unit functional.
15		
May 1		
15		
June 1	Moist condition.	
15		
July 1		
15		
Aug. 1	Dry-due to high evaporation and no rainfall.	
15		
Sept. 1		
15		
Oct. 1		
15		
Nov. 1		
15		
Dec. 1		
15		
31		

A.2 Effects of past year's water level on the ecology of the management unit.

Part 1. The April 6th flood filled this unit with water from 6-8" deep. Water covering the visitor parking lot and bridge at Butternut Lodge was pumped off with the Lodge pump. This also pulled the water off this unit. Summer evaporation and no rainfall completely dried up this unit. Numerous dry land forbs grew in this unit but very few moist soil plants.

Part 2. Area was too dry for moist soil plant production. Unit needs a low level dike on the west side and tubes with flaps and/or dike work on the NW and NE corners.

B.2 A statement of the objectives for the proposed levels.

Unit will be left as it was in 1982 unless funding is available to develop this unit. Waterfowl do not use this unit but deer, pheasant, and rabbits do.

Annual Water Management Program Year 19 83

Refuge Ottawa NWR Water Unit or Number Moist Soil Unit 8a (47 acres)

Maximum elevation permissible Est. 571

Flowline elevation of lowest drain structure Est. 569

Elevation of general pool bottom (not borrow pit bottom). Est. 569.5

A.1 Water Surface Elevations for Past Year.		B.1 Planned Elevations for Program Year.
Date	Water Surface Elevations	Water Surface Elevation
Jan. 1	(NO WATER GAUGE PRESENT)	
15		
Feb. 1		
15	Unit 3/4 full all winter	
Mar. 1		
15		
Apr. 1	April 6th flood overtops NW	Excess water will be removed (6-8")
15	corner. Floods unit and damages NW corner tube area.	
May 1		
15		
June 1	Pump it down to ditches with	Unit gravity drained and pumped out.
15	crisafulli pump and electric pump.	
July 1		
15		
Aug. 1	Mow cocklebur and repair dike	Unit kept moist. Water added or discharged as necessary.
15	damage and add a water control flap. Gravity flood unit	
Sept. 1	24" water added in ditches	
15	3/4 unit covered.	
Oct. 1		Unit flooded 8-12" deep.
15		
Nov. 1	Heavy rainfall adds 6-8"	
15		
Dec. 1		
15		
31	Flooded all winter	Flooded all winter

Notes: All elevations I.G.S.D.

A.2 Effects of past year's water levels on the ecology of the management unit.

Part 1. MSU-8a started out 1982 with it 3/4 full but was flooded during the April 6th flood. Dike damage occurred around the tube on the NW corner. The unit was pumped down in June with water left in the ditches. Extensive evaporation along with a dry summer completely dried most of the moist areas. Cocklebur was mowed in August and the unit flooded soon after. Heavy rainfall in October and November further flooded the unit until over 90% was covered.

Part 2. A dry summer and high evaporation dried up this unit more than we wanted for moist soil plant production. Cockleburs came up in solid dense stands. Mowing these areas followed with a complete layer of water up to 12" deep over most of the cocklebur areas essentually knocked out the cocklebur before it seeded out. A tremendous stand of millet came in and grew up in the water. Tremendous waterfowl utilization of this unit occurred from then on. All the geese on this end of the refuge were seen grazing on the millet heads.

B.2 A statement of the objectives for the proposed levels.

Excess water will be removed in April then the balance pumped out the first week of June. The unit will be kept moist this year by adding or discharging water as necessary. Water will be gravity added in October and left on the unit all winter.

Annual Water Management Program Year 19 83

Refuge Ottawa NWR Water Unit or Number Moist Soil Unit 8b (85 Acres)

Maximum elevation permissible Est. 571

Flowline elevation of lowest drain structure Est. 569

Elevation of general pool bottom (not borrow pit bottom). Est. 569.5

A.1 Water Surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevation
Jan. 1	(NO WATER GAUGE PRESENT)	
15		
Feb. 1		Unit left flooded all spring.
15		
Mar. 1		
15		
Apr. 1		
15	Pump out 2"	Excess water gravity discharged.
May 1	Pump out 3"	
15	Pump it completely dry	
June 1	Dry - Disc up most of unit	Gravity discharge and pump dry.
15		
July 1	Rim dike constructed	Boardwalk and observation platform construction.
15	around woods SE corner	
Aug. 1		
15		
Sept. 1		
15		
Oct. 1	Put in 1 tube and flap SW	Reflood unit.
15	corner and 1 flap NW corner	
	Put in water control structure	
Nov. 1	SE corner	
15	Flood with crisafulli	
Dec. 1		
15		
31		Leave flooded all winter.

A.2 Effects of past year's water level on the ecology of the management unit.

Part 1. Excess water was discharged April and May and the rest pumped out the end of May.

A rim dike was constructed around the woods and visitor parking lot on the SE corner of this unit in July. This dike will hold water out of this area when the moist soil unit is flooded. The dike along the west end of this unit was leveled and extended on the south end to connect with the old shop road. A tube and flap was also put in on this SW corner. A flap was added on the tube at the NW corner. These two flaps will hold water into the MSU yet allow drainage of the woods to the west. A tube with a slide-flap water control structure was added close to the SE corner to gravity add or discharge water to this unit. The final drainage of this unit is accomplished by way of a stationary farm pump. This unit was flooded with a crisafulli pump late November and pulled in approximately 10,000 ducks and geese for several weeks.

Part 2. Unit was completely dried up for construction of rim dike and work on water control structures in three corners of unit. This complete dry up plus a discing wasn't conducive to moist soil plant establishment. Some pockets of smartweed and millet grew in low areas but a majority of the area had velvetleaf, cocklebur, foxtail, and other annuals and forbs.

B.2 A statement of the objectives for the proposed levels.

This unit will have excess water removed in April and it will be drained by early June. If funds and time allow it, a boardwalk and observation platform will be constructed in July. By mid October this unit will be reflooded for waterfowl.

Annual Water Management Program Year 1983

Refuge Cedar Point NWR Water Unit or Number Pool 1 (1460 acres)

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure ~~568~~ 569.1 IGLD

Elevation of general pool bottom (not borrow pit bottom). 569.0

A.1 Water Surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevation
Jan. 1	572.1	571.9
15	572.1	571.9
Feb. 1	572.1	571.9
15	572.1	571.9
Mar. 1	572.1	571.9
15	572.2	571.9
Apr. 1	571.7	571.7
15	571.6	571.5
May 1	571.5	571.5
15	571.4	571.5
June 1	571.3	571.5
15	571.1	571.5
July 1	570.9	571.5
15	570.8	571.5
Aug. 1	570.6	571.5
15	571.1	571.5
Sept. 1	571.1	571.5
15	571.2	571.5
Oct. 1	571.2	571.7
15	571.3	572.0
Nov. 1	571.4	572.0
15	571.5	572.0
Dec. 1	571.9	572.0
15	571.9	572.0
31	571.9	572.0

A.2 Effects of past year's water level on the ecology of the management unit.

Part 1.

Pool 1 water control structures were opened up and set to gravity discharge on March 18, 1982. Water discharge was heavy from March 18-April 1 then a slow gradual process with water lowered .1' to .2' a month. A dry summer also helped to keep the pool elevation down. A low of 570.6 was reached by the first week of August when the water control structure was switched around to gravity fill. Low lake levels prevented reaching a full pool elevation by October 1 as planned. Logs and debris periodically caught in a flap, also caused some water to be discharged instead of held in the pool. Trash guards were constructed and attached to the tube ends to eliminate this problem

Part 2. A very good drawdown was accomplished with numerous dry bays and pockets. Emergent vegetation expanded on the edges in most areas. Water lilies and the American lotus is expanding in open pockets of water. Carp control with Rotenone wasn't possible due to the size of the pool but their population and perhaps reproduction were stressed with low water and warmer than normal water temperatures. The muskrat population was excellent with approximately 4,600 muskrats harvested in this pool.

B.2 A Statement of the objectives for the proposed levels.

In 1983 this pool will be gravity drained down to 571.5 starting the end of March then held at that level all summer. Water will be added or discharged as needed to maintain that level. Water will be brought back up to 572.0 late September.

Annual Water Management Program Year 19 83

Refuge Cedar Point NWR Water Unit or Number Pool 2 (155 Acres)

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure 569

Elevation of general pool bottom (not borrow pit bottom). 569

A.1 Water Surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations		Water Surface Elevation
Jan. 1	571.8		571.9
15	571.8		571.9
Feb. 1	571.8		571.9
15	571.8		571.9
Mar. 1	571.8		571.9
15	571.8		571.9
Apr. 1	571.8		571.8
15	571.7		571.7
May 1	571.7		571.5
15	571.6		571.5
June 1	571.4		571.5
15	571.0		571.5
July 1	570.9		571.5
15	570.8		571.5
Aug. 1	570.7		571.5
15	570.5		571.5
Sept. 1	570.3	Rotenone	571.5
15	570.4		571.7
Oct. 1	571.0		571.8
15	571.2		572.0
Nov. 1	571.6		572.0
15	571.8		572.0
Dec. 1	571.9		572.0
15	571.9		572.0
31	571.9		572.0

Note: All elevations U.S.G.S.

A.2 Effects of past year's water level on the ecology for the management unit.

Part 1. Cedar Point Pool 2 had a complete drawdown in 1982. The little water that remained was very shallow and warm. This condition was severe enough that the carp that conceatrated in these pockets died. The water control structure to this pool is plugged on the lake side with sand and gravel. The whole intake area is silted in from wave action of Lake Erie. Late in the summer a hole in the center of the dike appeared by this water control structure. It is believed the tube separated at that point and material above it has washed into the tube. A small pocket of carp in this pool right in front of the water control structure was Rotenoned September 1. A complete kill of carp and gizzard shad was accomplished.

Part 2. The complete drawdown and Rotenone treatment removed all the carp. New ones will come in from Lake Erie so it is only a temporary care. It is hoped the set back will allow vegetation to reestablish itself before the carp population gets high again. Lots of spike grass and sedges grew on the exposed mud flats this year. Cattails also expanded on its edges. Muskrats moved in after the unit was reflooded and a harvest of close to 400 was taken. Waterfowl useage also was excellent in late November.

B.2 A statement of the objectives for the proposed level.

This pool needs its water control structure repaired in 1983 - tube cleaned. Tube separation repaired, and intake area cleaned out. This pool will be lowered to 571.5 and held stable all year, then back to 572.0 by fall.

Annual Water Management Program Year 19 83

Refuge Cedar Point NWR Water Unit or Number Pheasant Farm

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure Est. 568

Elevation of general pool bottom (not borrow pit bottom). 569

A.1 Water Surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevation
Jan. 1		
15	(NO WATER GAUGE PRESENT)	
Feb. 1		
15	Water left in unit all year for purple loosestrife control	
Mar. 1		
15		
Apr. 1		(Drawdown by pumping, chemical treatment for purple loosestrife control, possible chop some of this unit, then reflood and hold stable for a few years.)
15		
May 1		
15		
June 1		
15		
July 1		
15		
Aug. 1	Evaporation lowers pool 10-12"	
15		
Sept. 1		
15		
Oct. 1		
15		
Nov. 1	High rainfall raises pool 8-10"	
15		
Dec. 1		
15		
31	Pool 4" below full pool heigth.	

Note: All elevations [illegible]

A.2 Effects of past year's water levels on the ecology of the management unit.

Part 1. This unit was left full in the spring with the hope it would slow down the expansion of the dreaded purple loosestrife. The western section of this unit has a large block of purple loosestrife and it has expanded every year. It has expanded along the north and south dikes and on into Pool 1 and Pool 2. Manpower and a lack of time didn't allow adding more water during the summer and fall. Evaporation lowered this pool 10-12" over the summer but fall rains raised it 8-10".

Part 2. The purple loosestrife seemed stressed a bit with the high water, although it didn't seem to kill any. A good interspersion of emergent vegetation and open water exist in this pool. Close to 1,000 muskrats were harvested from this 120 acre unit. Waterfowl useage also was excellent. Chemical control definitely is needed in 1983 before purple loosestrife gets any worse in this unit.

B.2 A statement of the objectives to the proposed water levels.

This unit needs deep water levels most of the growing season. However, it will first be drained and pumped down so a chemical treatment of purple loosestrife can be made and then reflooded to cover up possible new plants.

Water will be held stable the next few years to eliminate the purple loosestrife.

Annual Water Management Program Year 19 83

Refuge Ottawa NWR Darby Division Water Unit or Number Pool 1 (200 acres)

Maximum elevation permissible 573.5

Flowline elevation of lowest drain structure 566.6

Elevation of general pool bottom (not borrow pit bottom). 569.0

A.1 Water Surface Elevations for Past Year.		B.1 Planned Elevations for Program Year.
Date	Water Surface Elevations	Water Surface Elevation
Jan. 1	572.5	572.7
15	572.5	572.7
Feb. 1	572.5	572.7
15	572.5	572.7
Mar. 1	572.5	572.7
15	572.6	572.7
Apr. 1	572.7	572.7
15	572.2	572.2
May 1	571.9	572.0
15	571.9	571.8
June 1	571.8	571.5
15	571.7	571.5
July 1	571.6	571.5
15	571.5	571.5
Aug. 1	571.3	571.5
15	571.2	571.5
Sept. 1	571.7	571.5
15	572.0	571.5
Oct. 1	572.1	571.8
15	572.2	572.0
Nov. 1	572.5	572.2
15	572.6	572.2
Dec. 1	572.7	572.2
15	572.7	572.2
31	572.7	572.2

Note: All elevations T.G.I.D.

A.2 Effects of past year's water level of the ecology for the management unit.

Part 1. Darby Pool 1 was full all winter up until the first week of April when the water control structure was set to gravity discharge whenever Lake Erie water level would allow it. Pool 1 water level dropped from 572.7 to 571.28 over the summer. The water control structure was changed to take on water from late August until late September. Water was also added late August with a crisafulli pump using water from Pool 4 in conjunction with work on Pool 4 water control structure.

Late October rainfall also increased Pool 1 water level.

Part 2. An excellent growth of aquatic vegetation occurred in 1982 with a good drawdown and low rainfall. Cattail clumps already established expanded on their edges. No new vegetation started in open pool areas. Water was either still too deep or carp disturbance prevented new plant establishment. Stable water levels from late September on, pulled in a very good population of muskrats. Muskrat cabins were seen all over this pool by the end of the year. Waterfowl utilization was also very good.

B.2 A statement for the objectives for the proposed levels.

Plans for 1983 include taking excess water off in April plus 6" more, then holding the water level stable the rest of the summer. The water control structure won't be set to discharge all summer to get the pool as low as possible as in past years. Once a level has been set, water will be added or discharged as necessary to maintain that level. The pool will be re-filled to full pool level late September or early October and held there all winter.

Annual Water Management Program Year 19 83

Refuge Ottawa NWR Darby Division Water Unit or Number Pool 2 (25 Acres)

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure Est. 569

Elevation of general pool bottom (not borrow pit bottom). 570.0

A.1 Water Surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevation
Jan. 1	571.5	571.3
15	571.5	571.3
Feb. 1	571.5	571.3
15	571.5	571.3
Mar. 1	571.5	571.3
15	571.3	571.3
Apr. 1	571.2	571.3
15	571.1	571.0
May 1	571.0	571.0
15	571.0	571.0
June 1	571.0	571.0
15	571.0	571.0
July 1	570.9	571.0
15	570.9	571.0
Aug. 1	570.8	571.0
15	570.8	571.0
Sept. 1	570.8	571.0
15	570.8	571.0
Oct. 1	570.8	571.5
15	570.9	571.5
Nov. 1	571.1	571.5
15	571.2	571.5
Dec. 1	571.3	571.5
15	571.3	571.5
31	571.3	571.5

A.2 Effects of past year's water level of the ecology for the management unit.

Part 1. Excess water was removed from this pool in March 1982, then no water manipulation the rest of the year. The water level decreased some due to low rainfall and high evaporation all summer. High rainfall in October and November raised the water level 8-10" which was left in the unit all winter. Two catwalks at the water control structure to this pool were rehabilitated.

Part 2. This pool contains the second poorest habitat of the four pools. Open areas of water exist along the dikes and dry areas on the high end. Some course reeds and cattails exist but very little utilization by muskrats or waterfowl occurs.

B.2 A statement of the objectives for the proposed water levels.

A good year of steady water levels will be maintain in 1983. Excess water will be gravity drained to protect the dikes then a steady level will be maintained by adding or discharging water. A full pool will be obtained by reflooding in late September to attract waterfowl.

Annual Water Management Program Year 19 83

Refuge Ottawa NWR Darby Division Water Unit or Number Pool 3 (25 Acres)

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure Est. 569

Elevation of general pool bottom (not borrow pit bottom). 570.0

A.1 Water Surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevation
Jan. 1	(NO WATER GAUGE PRESENT)	
15		
Feb. 1	Low water levels all spring	Pool left flooded all spring.
15		
Mar. 1		
15		
Apr. 1		
15		
May 1		
15		Water level maintained constant using the ford pump to add water when needed.
June 1		
15		
July 1	Drought and high evaporation	
15	lowers pool	
Aug. 1		
15		
Sept. 1	Catwalks repaired. Water	Additional 6-8" of water added in late
15	added from Pool 4, using crisafulli pump.	September. Water level maintained at 12-18" depth over whole unit.
Oct. 1		
15		
Nov. 1	Heavy rains add 6-8" of water	
15		
Dec. 1	High useage by muskrats and	
15	waterfowl.	
31	Full pool.	

Notes: All elevations [illegible]

A.2 Effects of past year's water level on the ecology of the management unit.

Part 1. This pool had low water levels all year with no adequate method to fill it. A dry year and high evaporation further reduced the water level. Water was added from Pool 4 with a crisafulli pump in August while rehabilitation work was done on the three tubes going from Pool 4 into the center ditch. This water was left in it all fall with October and November rains adding 8-10" more. One new catwalk was made and another repaired at NW corner of pool.

Part 2. This pool has the thickest growth of vegetation of all the four pools. Excellent cattail stands exist but it has had the least amount of water of all the pools. Without water, muskrats have not utilized this pool or opened it up for waterfowl useage. In 1982 by filling the pool early and holding water at a full pool level, made it a tempting piece for muskrats. A minimum of 80-100 muskrat houses were counted from the dike with many more unseen. This was beyond a doubt a muskrat paradise as houses grew up everywhere over night. Waterfowl useage of the area also was good with areas of dense vegetation opened up.

B.2 A statement of the objectives for the proposed water levels.

No water will be removed in the spring. The water level will be left as it is with some added when needed with the Ford pump. An additional 6-8" will be added over last year in the fall to extend into some areas left shallow last year.

Annual Water Management Program Year 1983

Refuge Ottawa NWR Darby Division Water Unit or Number Pool 4 (170 Acres)

Maximum elevation permissible 573.5

Flowline elevation of lowest drain structure 566.6

Elevation of general pool bottom (not borrow pit bottom). 567.5

A.1 Water Surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevation
Jan. 1	571.7	570.5
15	571.7	570.5
Feb. 1	571.7	570.5
15	571.7	570.5
Mar. 1	571.7	570.5
15	571.7	570.4
Apr. 1	571.8	570.0
15	571.9	569.8
May 1	571.9	569.5
15	571.8	569.4
June 1	571.7	569.3
15	571.6	569.3
July 1	571.6	569.2
15	571.6	569.2
Aug. 1	571.5	569.0
15	571.0	569.0
Sept. 1	569.0	569.2
15	569.0	569.4
Oct. 1	569.0	569.5
15	569.5	569.7
Nov. 1	570.5	570.0
15	570.5	570.5
Dec. 1	570.5	570.5
15	570.5	570.5
31	570.5	570.5

A.2 Effects of past year's water level on the ecology of the management unit.

Part 1. The water control structure was set all spring and summer to gravity drain this pool whenever Lake Erie water level was down.

High lake levels prevented very little water discharge. A Ford pump and crisafulli pump were used in August to drain this pool as low as possible. Water was pumped into Pools 1 and 2. A large pocket of water was still left in Pool 4 with no channel to get the water to the pumps. Two tubes were removed and a third tube (48") had a flap added to the west end. This will allow water manipulation to Pools 2 and 3 without affecting Pool 4. Before the three tubes had open ends with only plywood to attempt to block the flow of water.

Part 2. Pool 4 has the poorest vegetation of all the pools. A majority of the pool is open water with no emergent vegetation and the high end has woody vegetation.

While the water was down for tube rehab in 1981 rotenone was used to treat the pool for carp. It is hoped a reduction in carp, coupled with low water for a few years will allow an increase in emergent vegetation.

B.2 A statement of the objectives for the proposed water levels.

The water control structure on the center ditch will be set to gravity drain Pool 4 all year. Woody vegetation on the high end may have to be cut and/or burned. No water will be added in the fall.

Annual Water Management Program Year 19 83

Refuge Ottawa NWR Navarre Division Water Unit or Number Pool 1 (130 acres)

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure No Data

Elevation of general pool bottom (not borrow pit bottom). 568.5

A.1 Water Surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevation
Jan. 1	571.7	571.4
15	571.5	571.4
Feb. 1	571.5	571.4
15	571.5	571.5
Mar. 1	571.5	571.5
15	571.7	571.0
Apr. 1	570.5	571.0
15	569.8	569.7
May 1	569.5	569.5
15	569.5	569.5
June 1	569.5	569.5
15	569.5	569.5
July 1	569.5	569.5
15	569.5	569.5
Aug. 1	569.5	569.5
15	569.5	569.5
Sept. 1	569.5	569.5
15	570.9	569.7
Oct. 1	571.0	571.0
15	571.0	571.0
Nov. 1	571.5	571.0
15	571.4	571.2
Dec. 1	571.3	571.2
15	571.5	571.2
31	571.4	571.2

A.2 Effects of past year's water level of the ecology for the management unit.

Part 1. Pool 1 Navarre was pumped down as low as possible the latter part of March and first week of April. Shallow pockets of water still remained in this pool but lacked channels to divert it to the pump. Low rainfall plus high evaporation in 1982 allowed the pool to stay at 569.5. Water was added to Pool 1 the latter part of September to reach full pool by October 1. Heavy rainfall late October increased the pool level another 0.5'.

Part 2. A limited amount of vegetation expansion occurred in this pool as the result of the drawdown. There still is a large open area of this pool without emergent vegetation but it may always stay that way. A large island of dense grass needs to be burned next year in this pool. A meeting is needed with Davis Besse Nuclear Plant personnel to discuss the proposed burn. The muskrat population in this area was only fair, probably due to the drawdown, lack of a good cattail stand, and due to the large open area of water. Waterfowl utilization also was average for this pool.

B.2 A statement for the objectives for the proposed levels.

Excess water down to 571.0 will be pumped off by Davis Besse personnel the first part of March. The rest of the drawdown will be the first week of April. Any increase in elevation due to rain over the summer will be pumped off. Mid September Pool 1 will be pumped full and held stable all fall and winter.

Annual Water Management Program Year 19 83

Refuge Ottawa NWR Navarre Division Water Unit or Number Pool 2 (340 Acres)

Maximum elevation permissible Est. 573

Flowline elevation of lowest drain structure No Data

Elevation of general pool bottom (not borrow pit bottom). 568.5

A.1 Water Surface Elevations for Past Year.

B.1 Planned Elevations for Program Year.

Date	Water Surface Elevations	Water Surface Elevation
Jan. 1	571.6	571.5
15	571.7	571.5
Feb. 1	571.9	571.5
15	572.0	571.5
Mar. 1	572.0	571.5
15	572.0	571.2
Apr. 1	571.6	571.0
15	571.6	570.5
May 1	571.5	569.5
15	571.4	569.5
June 1	570.2	569.5
15	569.5	569.5
July 1	569.5	569.5
15	569.5	569.5
Aug. 1	569.5	569.5
15	569.5	569.5
Sept. 1	569.5	569.7
15	570.6	570.5
Oct. 1	570.9	571.0
15	571.0	571.2
Nov. 1	571.6	571.4
15	571.5	571.4
Dec. 1	571.6	571.4
15	571.6	571.4
31	571.5	571.4

.1 pumping per day
1.0 foot in two weeks
with no rain & discharge

Noted 10/28 - helicoptor check - Pool 2 low on east - Called Iro to add .1 to .2 (AM reading on 571.4), stiff SW wind

A.2 Effects of past year's water levels on the ecology of the management unit.

Part 1. The water was left in Pool 2 longer in 1982 than Pool 1. The major drawdown did not occur until the first of June in Pool 2. The pool elevation was then held at 569.5. Periodic pumping was done throughout the summer to remove water added from precipitation. A complete drawdown could not be obtained due to pockets of water with no channels to reach the pump. The pool was refilled in September and late October rains added another 6-8".

Part 2. Some expansion of existing emergent vegetation occurred in this pool but not as much as perhaps on earlier drawdown.

Large open areas of water with no emergent vegetation exist but have American lotus and pond lilies expanding in them. Rice cut grass and millet was less in 1982 but still present in fair abundance. A fair population of muskrats was present in this pool in 1982 but not as high as in past years.

Waterfowl useage was excellent all fall but fewer numbers of coot and widgeon than previous years.

B.2 A statement of the objectives to the proposed water levels.

Excess water will be removed the first two weeks of March to lower the pool to 571.0. The balance will be removed the first week of April two months earlier than 1982 drawdown. Some water will be added early September and the balance by late September. This pool with early flooding will possibly hold early migrant teal and also establish a higher muskrat population.

AREAS WHERE WATER LEVELS CANNOT BE CONTROLLED

A. Water conditions the past year.

Water fluctuates constantly in both Pool 4 and Pool 5 dependent on the level of Lake Erie. Both pools have broken dikes caused by wind generated seiches in 1972 and 1973. Wave action year after year has gradually eroded away at the remaining dikes. $1,225,000 have been appropriated in FY 83 to rehabilitate the dikes around Pool 4. The 1978 Master Plan Update does not include plans to rehabilitate Pool 5 dikes, however recent discussions have raised advantageous possibilities of rerouting the east end to Tank Ditch southward to Crane Creek and rehabilitating the creekside dike of Pool 5 and connecting it to the Pool 4 dike. This would allow management of old Pools 4 and 5 as one large pool with fewer dikes to maintain.

B. The effects of water conditions on the area.

The pools are in very poor condition with Lake Erie water going in and out of both pools causing the water levels to change whenever the wind changes speed or direction.

With unstable water levels, plant growth is very restricted and only in small sheltered pockets. Water levels sometimes reach two or more feet while other times its non-existant with only mudflats. Wildlife useage of these areas also varies tremendously. Wading birds will be numerous one day while mudflats exist and waterfowl will be present other days when the water is in. With the unstable water levels, food production is minimal so waterfowl only use it for a resting area and muskrats very seldom use it without enough vegetation.

Ottawa National Wildlife Refuge Pool 7 and 8

A. Water conditions the past year.

Water levels fluctuate constantly in both these pools whenever Lake Erie water level changes. Breached dikes due to wind generated switches of Lake Erie plus constant wave action has caused dikes to deteriorate to the extent that water passes freely from Crane Creek into these pools. Per the Refuge Master Plan, Pool 7 is not planned to be repaired but Pool 8 may be repaired if funding is available in the future.

B. The effects of water conditions on the area.

Vegetation is confined to woody shrubs on remnant dikes, and scattered clumps of cattails and reeds in sheltered locations. With water constantly fluctuating, new vegetation is hard pressed to get established. Very little food production occurs so wildlife use the pools for loofing and resting sites. Shorebirds use the area when the water is down where as waterfowl use the area when the water comes up. With unstable water levels and a lack of vegetation, muskrat populations are very low, being confined to old dike remnants.

West Sister Island National Wildlife Refuge

A. Water conditions the past year.

No water management occurs on this unit. It is designated a Wilderness Area and has water level fluctuation on its shoreline due to changes in Lake Erie water level as the wind changes speed and direction. Minor changes would also take place on its surface as precipitation and evaporation levels change each year.

B. The effects of water conditions on the area.

Management of this unit is confined only to protection, as it is a Wilderness Area. The vegetation changes that occur on the island are due to seasonal as well as long term changes in the weather patterns. Large stands of hackberry and poison ivy in association with one of the largest heronry in the Great Lakes Region dominates the Island.