ANNUAL REPORT

2005

Annual Report of Biological Activities

2005

Marsh and Water Management:
The annual water management plan was prepared and submitted in late winter of 2005. A discussion of objectives and accomplishments based on that plan follows here. Other summaries are also included for the various wildlife population point counts or surveys.

Marsh and Water Management Program Goal

Provide high quality wetlands for nesting, and migration resting and feeding areas for migratory birds.

Objectives and Strategies

Objective 1:

Protect and monitor the 3000+ acres of lakeshore wetlands that provide breeding resting and feeding areas for migratory birds and migrating waterfowl.

Strategy:
Post refuge water boundaries as necessary to warn boaters away from sensitive nest areas used by Black Terns, Great Blue Herons and Osprey.

Continue to monitor breeding birds in refuge wetlands following established protocols.

2005 Accomplishments

The areas around Osprey nests were posted with Bird Nesting Area signs or Closed Area Signs. Places posted were: Martindale Point around to the Head of Gander Bay, The tree nest on the north tip of Metcalf Island, and the tree nest in the northeast part of Long Marsh Bay. The Martindale Point nest fledged 0; the Metcalf nest fledged 3 young, and the Long Marsh Bay nest fledged unknown young. Black tern nesting areas were posted with boundary signs and bird nesting area signs in the spring along Charcoal Creek north of rt 78. Closed area signs were posted at the entrance to Long Marsh channel to protect both Osprey and Black Terns. There seemed to be numerous fishing derbies this year. It used to be only the Lake Champlain International that we had to deal with. Nat Shambaugh reported a record nesting population of Black Terns in 2005 with 52 pairs in Charcoal Creek, 28 pairs in Long Marsh, 4 pairs south of 78, and 19 pairs in Cranberry Pool. This is a total of 103 pairs.

Bird Nesting Area signs were posted along the west side of Shad Island and entrance to Shad Island Bay. These signs were also posted back from the tree line of Metcalf Island where Great Blue Herons also nested. Zoe thinks that we had a good year last year. We won't have her report until January or February.

Andrew Webbe conducted Osprey monitoring and Marsh Bird point surveys. He documented that at least a total of 48 Ospreys fledged. The data from the Marsh Bird point counts is in raw form and will be entered into the new web based database when it is available. The raw data is in the biologist's bookcase.

Objective 2

Provide 1200 acres of secure waterfowl nesting and brood rearing habitat in the Cranberry Pool, Big Marsh Slough, and Goose Bay Pool to supplement that which is naturally provided throughout the refuge.

Strategy: Manage water levels in the Cranberry Pool to maintain a stable level of 98.0 ft from mid-May until mid-July to serve as a stable nesting area for Black Terns especially when the lake level in the surrounding delta marshes is unfavorable for successful nesting.

Manage the water level in Cranberry Pool to maintain a hemi-marsh ratio of emergent and open areas for migrating birds during the late summer and fall months. Lowering the water level after Black Terns have fledged will stimulate emergent aquatic plants such as wild rice and sedges and smartweeds.

Monitor the water levels in Goose Bay Pool and Big Marsh Slough at least monthly to better understand the range of management capability for Goose Bay Pool now that a water level control structure separates this impoundment from Big Marsh Slough. .

Establish a benchmark for the Young Marsh impoundment to collect elevation measurements for use in future management of this area.

2005 Accomplishments

The water level of the Cranberry Pool was successfully maintained at the planned elevation in the spring. It appears from Nat's observations that the Cranberry Pool was not needed as a refugium for the terns this year. The best use by Black Terns was in the Clark Marsh

The attempted draw down of the Cranberry pool in 2005 was marginally successful. The target was not reached but the pool was down to 95.98 on Sept. 1st. There was an abundance of wild rice in the impoundment. The rice did not initially seem to be as robust as the previous year but flowering and seed production was obvious in late summer.

Monitoring of the water levels in Big Marsh Slough and Goose Bay Pool on a monthly basis is not necessary if one knows that the lake level is higher than 97 feet since that would mean that these pools will be at least at that level.

The water could not be lowered in Goose Bay Pool in 2005. The stop logs in the sheet pile structure are stuck in place so that they can not be pulled to observe water or vegetation response that could be compared with a similar year when the logs are in place.

No work was done at the Young Marsh in 2005. It may be necessary to set an arbitrary bench mark as 100 and measure from it to monitor changes during the year. Two stop logs were removed in the late spring to relieve flooding on a neighbor's land.

Objective 3:

Suppress additional non-native invasive species from becoming established and prevent the further spread of any that are already present.

Strategy:
Monitor Invasive species on wetlands in the Missisquoi River Delta.
Spray Rodeo on 0.50 acres of Japanese Knotweed in 2005 if this weed reappears in the areas that were treated in 2004.
Plant a grass/forb mixture as soon as possible on disturbed soil whenever repairing dikes or installing structures in wetlands.
Use biological control agents when available and likely to be effective.

2005 Accomplishments

Water Chestnut was discovered by Chris Smith while fishing at the east branch of the river. He and the biologist returned to the site and pulled all plants found in the area.

Japanese Knotweed was sprayed with a 1 ½ % solution of Rodeo herbicide on three sites: the two sites sprayed in 2004 and the Terry Rice property on Dead Creek. The Japanese Knotweed was almost totally gone from the sites treated the previous year. Any surviving plants were sprayed again in 2005. The Rice property has a relatively large established patch of Japanese Knotweed on it. This site was sprayed on three occasions in 2005. The Rice property will need to be retreated again in 2006 to kill surviving plants.

The required pesticide use reports for the State and the Service were submitted in December. These are filed in the file system. An electronic copy of the Service report is located at C:\My Documents\2005 Pesticide Use Report.

Planned and Actual Water Levels for CY 2005

Date Lake Champlain Cranberry Pool Big Marsh Goose Bay Pool Young Marsh Missisquoi River Average Actual Planned Actual Planned Actual Planned Actual Planned Actual Actual 1-Jan 96.20 96.32 full 15-Jan 96.00 full 1-Feb 96.00 96.42 full 15-Feb 95.90 95.98 full 1-Mar 96.20 95.75 lake level lake level full 15-Mar 96.60 95.42 lake level lake level full 1-Apr 97.50 96.33 98.00 100.56 lake level 96.33 lake level 96.33 full 100.56 15-Apr 98.70 98.93 98.00 99.05 lake level 98.93 lake level 98.93 full 99.05 1-May 99.00 99.16 98.00 99.33 lake level lake level full 15-May 98.60 98.39 98.00 lake level 98.39 lake level 98.39 full 98.45 1-Jun 97.70 97.36 98.00 lake level lake level drain full 15-Jun 97.30 96.62 98.00 98.33 lake level 96.77 lake level 96.93 drain draining 1-Jul 96.50 97.6 98.00 98.12 lake level 97.6 drained drain 97.51 15-Jul 96.25 97.34 97.00 97.71 96.25 97.47 96.25 97.53 drain 1-Aug 95.80 96.64 96.00 96.25 96.25 drain 15-Aug 95.60 96.02 95.00 96.24 96.25 96.25 drain 1-Sep 95.50 95.4 95.00 95.98 96.25 96.25 drain 15-Sep 95.25 95.5 95.50 96.56 96.25 95.61 96.25 96.75 drain 1-Oct 95.20 95.26 96.00 96.25 96.25 drain 15-Oct 95.30 95.94 96.00 96.74 96.25 96.25 drain 1-Nov 95.50 98.66 96.00 98.81 96.25 96.25 drain 99.06 15-Nov 95.70 98.68 96.00 96.25 96.25 drain 99.19 1-Dec 96.00 98.97 96.00 99.48 96.25 96.25 full 99.48 15-Dec 96.10 98.21 96.00 frozen 96.25 frozen 96.25 frozen full logs are removed Jan 1/06 96.20 frozen

Goose Bay Pool2005 Management Strategy:The Goose Bay impoundment might also function as a Black Tern nesting area in the spring as well as a safe resting and feeding area during the fall waterfowl migration.In order to decide whether or not to manipulate the water level in Goose Bay Pool, it will be necessary to evaluate habitat suitability regarding planned objectives of this impoundment. Raising or lowering the pool by about 6 inches may slightly change the distribution of emergent vegetation versus open water in the impoundment. Almost all the open water is in one area behind the dike. There are some channels into the Button Bush on the west side and in the connector channels to Big Marsh. The water depth or the presence of any water in these shallow back water locations of the pool will be monitored in 2005 with the stop logs removed so that the water elevation between Big Marsh and Goose Bay Pool are equal. Similar observations will again be done in 2006 with all the stop logs in place. To date we have measured the water level but we have not related that level to habitat conditions in the impoundment. Once we understand the amount of vegetative change that might be possible with such a small range of manipulation, a decision can be made about what if any changes to make. This strategy was not implemented in 2005 as planned because it was not possible to remove the steel stop logs from the sheet pile structure. Only a few measurements of relative levels between the two impoundments were made. The maximum difference that was measured was 1.19 feet in mid-September. (See table for 2005 above.)Goose Bay Pool will be favorable to nesting black terns if there is sufficient thatch or other floating substrate for nest building. Site selection by black terns is variable from year to year depending on suitability of the extensive lake shore marshlands that are traditionally used when lake levels are optimal for these birds. This impoundment might function as a nesting area when the lake level is very low and predation is more likely to occur on the lakeshore marsh.**Big Marsh Slough**2005 Management Results:There appeared to be no obvious variation in the overall appearance of the vegetation distribution in Big Marsh Slough from previous years. The vegetation is a mixture of shrub wetland, emergent wetland and open water containing floating and submerged aquatic plants. There is a small population consisting of a few bunches of the non-invasive haplotype of Phragmites toward the Dead Creek side of this impoundment. The continued existence of the Phragmites non-invasive haplotype was not verified in 2005. Large concentrations of Ring-necked Ducks were using the open water part of the marsh during October. The Big Marsh Slough levels were monitored as shown in the 2005 table. Big Marsh Slough was the same as Lake Champlain well into the summer months. The level did drop in late summer to a low of 95.56 by mid-September. **Cranberry Pool**2005 Management Results:Habitat Response:2005: The attempt to drain the impoundment was partially successful in 2005. The lowest water level was 95.94 ft on September 1st. It would have been desirable to have lowered it to 95 ft but the pool can only drain as low as the Dead Creek part of the river. There was no vegetation survey work undertaken in 2005 in the Cranberry Pool. The wild rice did not grow as tall as in previous years but seed production was still abundant.Wildlife Response:The Cranberry Pool was used by 19 pairs of Black Terns in 2005. Waterfowl broods observed from two vantage points totaled: 6 Wood Duck Broods with 37 young; 1 Black Duck brood with 10 young; 2 Canada Geese broods with 4 young; 2 Pied-billed Grebe broods with 6 young; and 1 Hooded Merganser brood with 5 young. Though it is a small sample it does indicate significant use of the area for brood rearing habitat. The station water management plan calls for a drawdown of the Cranberry Pool at an interval of every 5 years. The last drawdown occurred naturally in 1999 when the impoundment was totally dewatered by a record low lake level that year. The seasonal fluctuation of the water level of the Cranberry Pool is important to the long term health of the aquatic community that it supports. The over topping of the west side of the pool by spring flooding combined with a variable amount of sustained high water from year to year may be an important factor pertaining to the health of the wetlands enclosed by the Cranberry Pool dike. In 2005, the impoundment will be held at 98.0 ft until July 15th to provide a safe and stable location for black tern nesting. The Cranberry Pool is critical to black terns in Vermont because: a) It can serve as a refugium during high water years. When the lake is above 98.80ft, the Cranberry Pool level is the same as Lake Champlain. The pool can provide stability from extreme fluctuations in water levels during the breeding season and if held at 98.0 ft, it can provide good predator protection to nest sites. b) It is protected from human disturbance. c) Water levels can be controlled. d) Vegetation can be managed if necessary. e) The Vermont population is now almost entirely on the Refuge.f) The Cranberry Pool is one of the few remaining area where black terns consistently nest.The draw down was partially successful. The lowest water level achieved was 95.94 ft. At the end of the year the stop logs are set at 96.00 ft. **Stephen Young Marsh**This small wetland was enhanced by the construction of small berm on the north end of this tract in 1994 through funding from the Ducks Unlimited MARSH Program. To date, a formal management strategy is not in effect for this small 8 acre impoundment. It is used to provide a visitor accessible site where wetland dependent wildlife can be observed and wetland characteristics can be studied by students from local schools. A formalized approach to the management of the water elevation in this impoundment will be established to maintain a quality wetland habitat that exemplifies the best values of wetlands. Visitors should see healthy native emergent vegetation but not a monoculture of any particular type. This wetland is utilized by a variety of wildlife: wood ducks, common goldeneye, blue-winged teal, and green-winged teal. Tree swallows nest in dead tree cavities and muskrats and amphibians use the water. The surrounding area of this tract is managed to maintain early succession cover for species such as woodcock.Habitat Response:Since the construction of the berm in 1994, a permanent wetland has been established where a seasonally, intermittent wetland existed. The increased duration of flooding has killed many of the old maple trees in the impoundment. The rotting trunks have been occupied by tree swallows. An area of cattails located near the north end of the impoundment has increased during the past

10 years. Habitat characteristics in 2005 remain unchanged from the previous year.Wildlife Response:The Young Marsh Impoundment is used by a variety of birds: waterfowl breeding pairs, nest box use, tree swallows nesting in tree cavities, Virginia Rails in the emergent cover, Marsh Wrens, and Red-winged Blackbirds. The most common aquatic mammal is the muskrat. A beaver lodge was established at the time of the berm construction. It is currently unoccupied. Leopard Frogs are the most common amphibian. Numerous invertebrates are found in the pond sediment when sampled by school classes.There was no observable change in 2005.2005 Management Strategy:Manipulation of the water level and disturbance is necessary to avoid the formation of a cattail monoculture. In 2005, the pool will be drained when the cattail is dormant. During the fall or winter period, the cattail can be mechanically mowed as weather and ground conditions permit. If the marsh is frozen with little to no snow cover, a brush hog mower can be used to remove the above water growth. Otherwise, a bulldozer may be used to scrape off the above ice growth. The marsh will be reflooded in the spring and held higher to stress the cattail during the growing season. In the future, prescribed burning will also be a potential option for managing the cattail growth.2005 Accomplishment:None of the above was done in 2005 due to other priorities. All the stop logs will be removed in Dec 2005 to allow as much draw down as possible. If time allows, the dense emergents will be scraped off with the dozer. Some sort of bench mark will be established for the purpose of monitoring water level changes within the impoundment. In the future, the level will be monitored regularly during the year and managed towards maintaining a diverse small wetland. The range of water level manipulation is constrained by the need to avoid excessive flooding of adjacent private property. No water level gauge or benchmark was installed in 2005. **The Rest of the Refuge in General**2005 was an excellent year for the growth of wild rice throughout the refuge. There seemed to be abundant seed production during late August and early September. The lake level changes during the year were unusual in that the two highest levels during the spring to fall period were in April as expected and in mid-September as not expected. Emergence of the wild rice was slightly delayed by the generally higher than normal level of Lake Champlain in 2005. However, though the height of the plants was diminished, seed production was very good and the timing of seed drop was synchronous with the onset of the late summer/fall migration of waterfowl. A survey of the extent of purple loosestrife was not done in 2005. During the period from 1985 until 1992, Purple Loosestrife was sprayed by use of back pack sprayers. A concerted effort utilizing two temporary employees in the summer was barely able to change the status quo. For example, purple loosestrife might be almost eradicated from Shad Island one year but the abundant seed bank would sprout a new infestation almost as dense as occurred before control. Hence, it was necessary to repeat coverage of prior treated areas before extending the control effort further into other infestations. There were some notable successes. A small patch of purple loosestrife located in the south side of the Cranberry Pool impoundment was sprayed in 1985 and has not reappeared. Spraying was discontinued in the early 90s as research efforts at developing biological control methods began to be implemented in the field. Biological control agents have not been able to establish self sustaining populations due to the extreme flooding of sites where Purple Loosestrife occurs.2005 was also an excellent year for wild rice production. However, high water levels occurred during late October and November. This resulted in an increase of the water depth in areas that are usually shallow and accessible for puddle ducks for feeding. Water Chestnut was found near the east branch of the Missisquoi River. All plants that could be found there were removed before seed set could occur. **Muskrats:**Muskrat house counts were done on the usual areas: Cranberry Pool, Big Marsh Slough, Goose Bay Pool, and the Clark Marsh. House counts were also done on as many of the other areas of the refuge as possible during the 2005 winter. The 2004-5 winter count was the highest ever recorded. This represents a ten fold increase from the very low house count the previous year. **Beavers:**Active Beaver Lodges were counted during muskrat house counts in 2005. A total of 25 active lodges were counted (Table 4). Trapping permits were issued to allow beaver trapping in the Maquam Creek area, Unit 1, and in the Cranberry Pool, Unit 3. The trapping season began on Dec 1st but actual trapping might not start until later when there is sufficient ice.

Figure 1 Comparison **of Planned Water Levels with the Actual Levels during 2005.Cranberry Pool Impoundment levels during CY 2005**

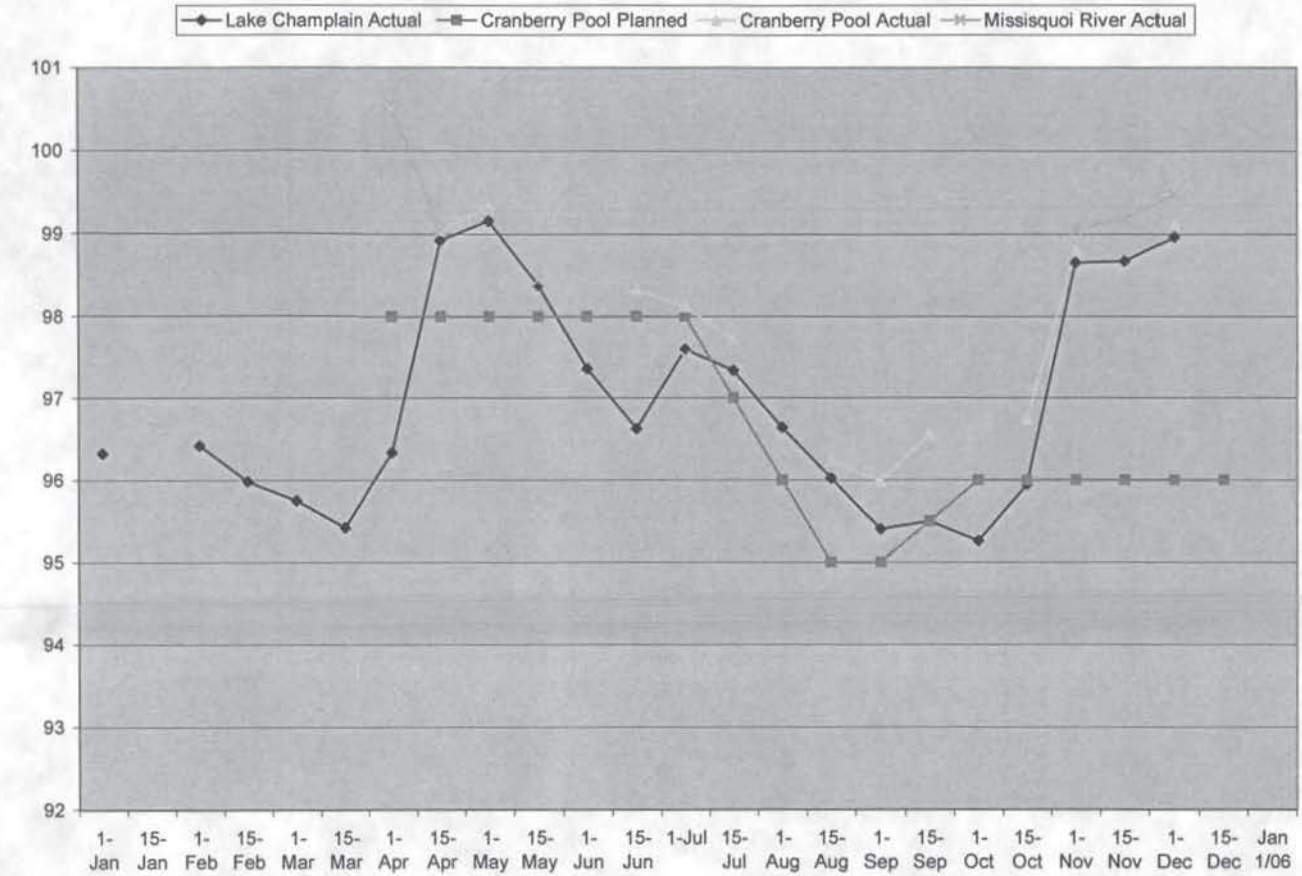


Figure 2 **Big Marsh Slough levels during CY 2005**

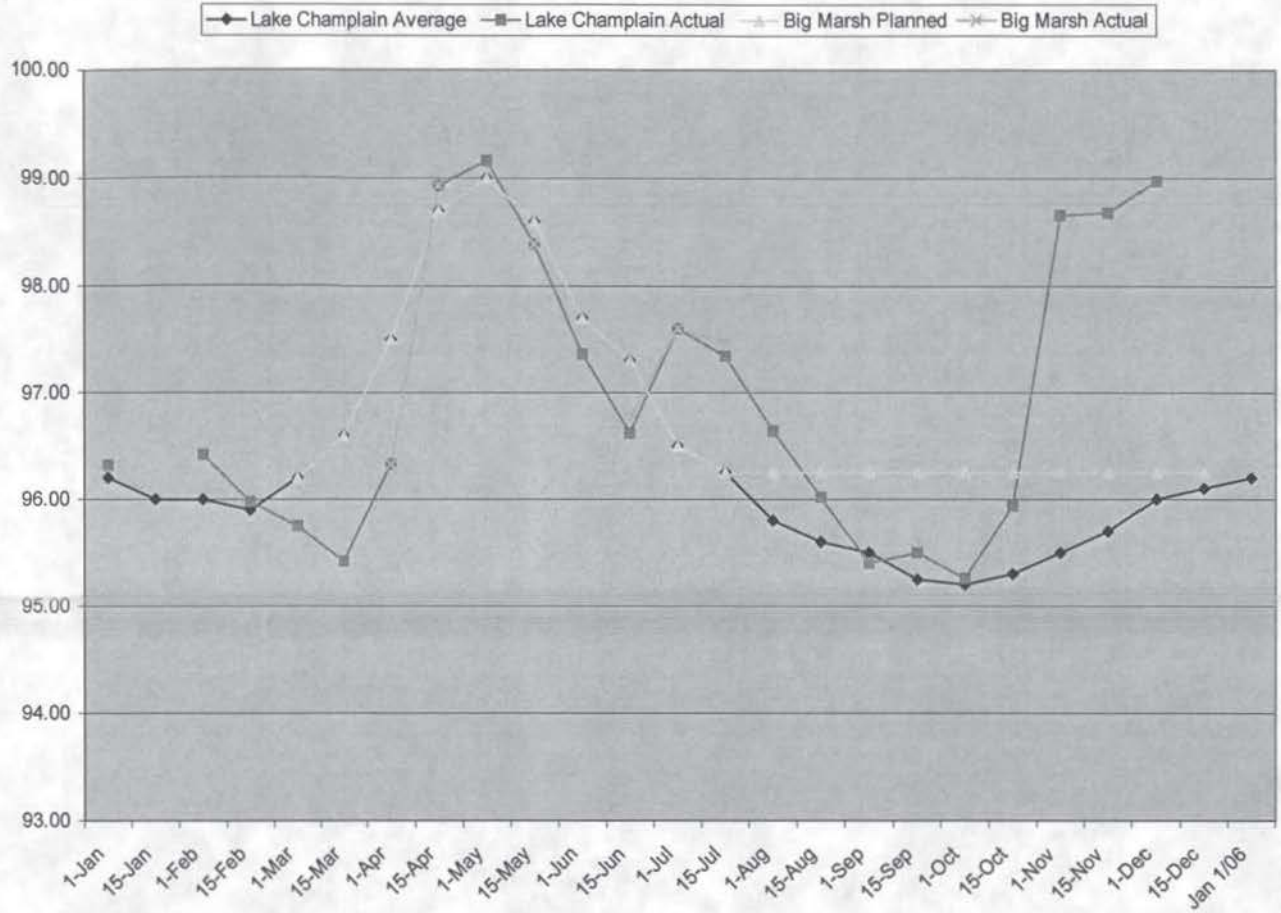
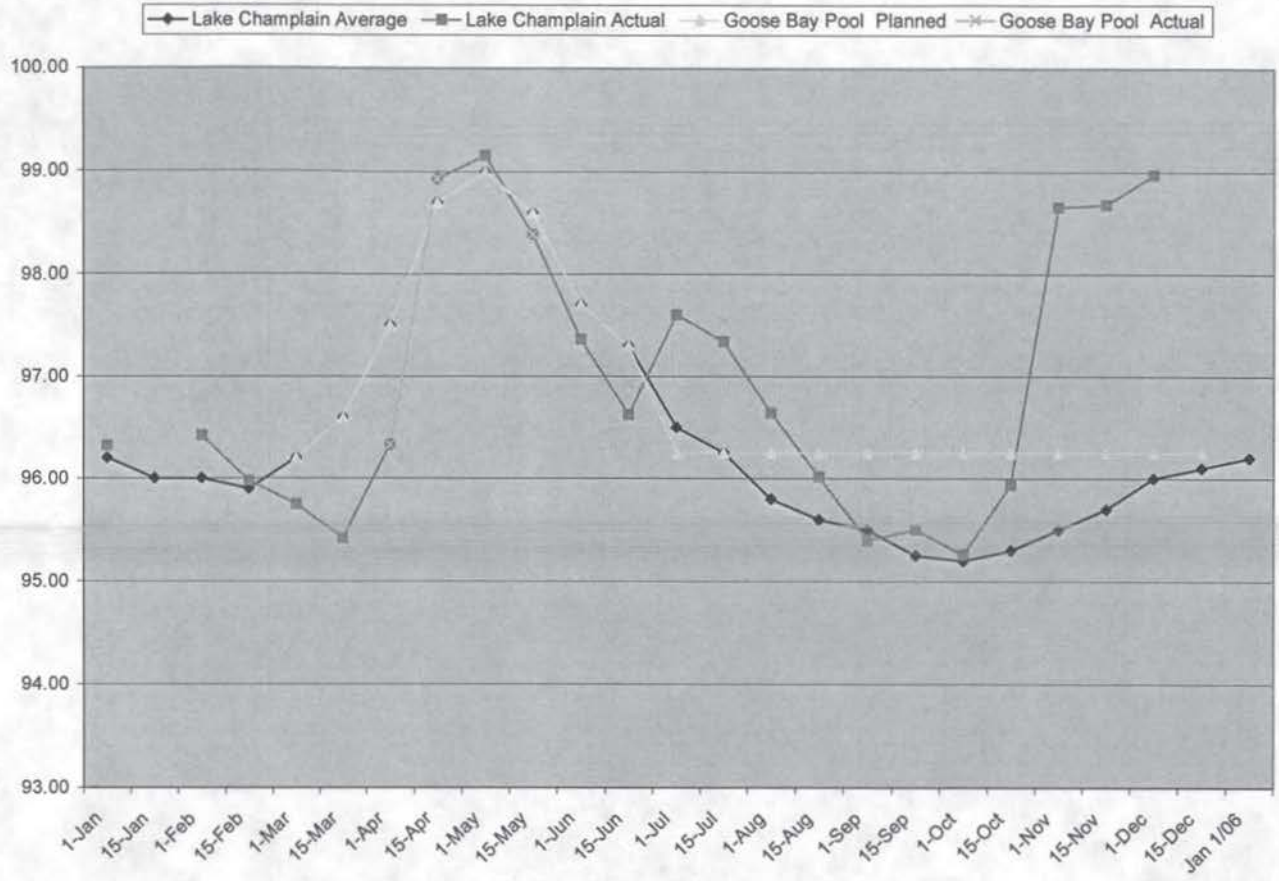


Figure 3 **Goose Bay Pool levels during CY 2005**



Appendix A Wildlife Survey Information Table 2 Marsh Bird Survey Summary 2005

	Average Number of Individuals Observed per Transect after 3 Visits			
Transect	**Cranberry Pool**	**Dead Creek**	**Goose Bay**	**Long Marsh**
Virginia Rail			1	1.5
Common Moorhen	8	1.5	10	15.5
Sora		1.5		
Pied-billed Grebe	14	1.5	7.5	7
American Bittern	1	5.5	1	1
Gr. Blue Heron		0.5	1	
Marsh Wren		1.5	3	0.5
swamp sparrow		1		
	*indicates an actual average of <1 individuals per visit			

Table 3 **Winter Muskrat House Counts**

Year	Cranberry Pool	# trapped	Big Marsh Slough	Goose Bay Pool	Clark Marsh	Other Areas	Total Count
2001	78	361	not surveyed	not surveyed	not surveyed	not surveyed	
2002	397	none*	46	26	30	not surveyed	499
2003	525	149	61	31	97	not surveyed	714
2004	71	606	11	7	26	not surveyed	115
2005	279	149	226	114	543	686	1848
2006							

Table 4 Active Beaver Lodges in 2005

	Trapping Unit #1	Trapping Unit #2	Trapping Unit #3	Rest of the Refuge	Total Lodges
Active Lodges	3	3	4	15	25

Grassland and Woodland Songbird Surveys;

Land Bird Survey: Carl Anderson completed the annual land bird breeding bird survey on the several routes on the refuge. The point count raw data is on the biologist's bookcase and will be entered into the new database. Some changes were made in the point count route for the Tabor Road area. The points along the paved road were replaced by a series of new points that follow the shrub ecotone between the open fields and the woods. The only comment of note from previous years it that this year Cerulean Warblers were not detected on the routes as has occurred in other years. This species is one of high importance in BCR 13.

Grassland Breeding Bird Survey: Maeve Kim and Ken Copenhaver volunteered to complete these surveys following the regional protocol. The raw data is filed with grassland surveys in file drawer D at this time and will be entered into the new database when it is ready. Survey routes are located on the Tabor Road fields,

from Mac's Bend to the old HQ, through the old field area west of Cranberry Pool, and the on the Rock River easement. Bobolinks were abundant on the Tabor Road fields and at the Rock River easement.
The continued involvement of these skilled birders will be crucial to maintaining these song bird surveys as budgets get tighter and tighter. They did the surveys without compensation in 2005. If it helps to attract and maintain some of these volunteers, some small reimbursement for gas or other expenses might be possible under the volunteer services agreement. They could submit a claim on an SF 1164. This subject hasn't come up but as we become more dependent on volunteers it may need to be addressed.

The marsh bird survey routes were completed by Andrew Webbe in 2005. The raw data in on the biologist's book case. The usual species were detected: Pied-billed Grebes, Common Moorhens, Least Bittern, Am. Bittern, Virginia Rails, and Marsh Wrens. The raw numbers indicate that Pied-billed Grebes were more numerous in Cranberry Pool and Common Moorhens were more common in Long Marsh.

Osprey:

At least 48 young fledged from 32 nests. The breeding population is well established here.
Nest platforms are not necessary except to encourage nest locations in relatively safe parts of the refuge.
Eighteen of the active nests were on tree snags.

Osprey Nesting Results
2005

Nest #	Location	year erected	X coordinate	Y coordinate	Nest Type	Young Fledged
3	Clark Marsh North	2000	644458	4981495		0
4	Cranberry Pool North	1992	645056	4981025		2
6	Goose Bay Tree	1998	647027	4981577		3
7	BM Tree	1999	646299	4981661		0
8	GB Dike	1997	646081	4982255		2
9	LM North	2000	645639	4983621		1
10	Dead Tree at #2 access	2004	645437	4982579		3
13	Long Marsh Pole	1989	645426	4983402		1
16	N. Metcalfe Tripod	1992	645800	4985250		3
17	Char Crk Bend	2000	643125	4980385		1
18	Burton's Pothole	2000	646963	4979491		0
20	BM Platform #2	2000	646155	4980876		3
21	Cran Pool East	2001	645751	4980409		1
22	Long Marsh Center					0
23	1st Creek North	2001	645087	4977579		3
24	South Char Crk	2002	644734	4978628		0
25	LM Black Duck Ridge	2001	645064	4982802		1
29	Martindale Point Tree	2003	646431	4982774		0
34	Cran Pool NW	2003	644911	4981151		2
36	1st Creek	2004	644911	4976514		0
38	Gander Bay East Tree					0

39	S. Metcalfe Tripod	2004	645913	4984270	2
40	Long Marsh Entrance	2004	644974	4983815	3
41	Maquam Crk	2003	642015	4980799	2
42	Long Marsh	2004			
44	Cran Pool snag	2004			0
45	Long Marsh	2004			
46	Gander Bay Head	2004			0
47	GB Pool	2004	646051	4981879	2
48	W Maquam Pond	2005	641915	4977232	0
49	Clark Marsh tripod	2005	644267	4980510	3
50	Shad Island stub	2005	646365	4985266	3
51	W. Metcalf Dead Tree	2005	645581	4984659	3
54	Clark Marsh tripod	2005	644189	4980442	
55	Metcalf Tree N. Tip	2005	645796	4985393	3
56	Long Marsh Black Duck Ridge N	2005	645134	4983238	1
Total					48

Bald Eagles:

Bald Eagles have been frequently observed for several years now around the Missisquoi Delta. The table below lists recorded observations during 2005. The most remarkable observations were made in June near the Cranberry Pool when 5 to 9 immature bald eagles were sighted.

Bald Eagle Observations				
Date	age		location	observer
	immature	adult		
3/9/2005		1	Mac's Bend	Dan S.
3/10/2005		1	Patrick Marsh	Lisa S.
5/5/2005	1	1	Clark Marsh	AZ
5/13/2005	1		Goose Bay Pool	AZ
5/27/2005	1		Charcoal Creek (Coleman's)	AZ
5/27/2005	1		Clark Marsh	AZ
5/27/2005		1	Dead Creek perched on snag	AZ
6/13/2005	9		vicinity of Cranberry P. WCS	AZ
6/18/2005	5		vicinity of Cranberry P. WCS	Mark
6/29/2005	1		Dead Creek perched on snag	Mark, Joan, Steve Parren
6/29/2005	2		Missisquoi River	same as above
7/2/2005	1		Cranberry Pool	Ken Copenhaver
7/3/2005	1		Goose Pen Channel	Ken Copenhaver
7/4/2005	1		Missisquoi River	Chris & Julie on birder list server
8/4/2005	1		middle branch Missisquoi R.	AZ
9/5/2005	1		west branch Missisquoi R.	AZ
10/31/2005	1		Cranberry Pool	AZ

Amphibians:

Wood Frog egg mass counts were done in late April. Wood Frogs are explosive breeders and all the egg laying can sometimes occur in only a few warmer days in the spring.

Date	Vernal Pond	Wood Frog egg masses	Spotted Salamander egg masses
4/25/2005	Henry's Pond	25	0
4/25/2005	Field 10 Pond	7	0
4/25/2005	Field 8 Pond	0	0
4/26/2005	Field 4b Pond	0	0

The wood frog egg mass count almost missed the peak timing. There were egg masses with hatching occurred in Henry's Pond. In previous years, over 70 or more egg masses might be counted in Henry's Pond. The lower counts in 2005 can not be easily explained. The water appeared turbid in Henry's Pond on the day of the count.

Anuran call count routes were not done in 2005. The biologists were afflicted with sciatica at that time. Deformed frog collections were made again in 2005 from the Cranberry Pool dike and the Young Marsh area by researchers from UNH. *(need to get their summary to mention amount of deformities found)*

Waterfowl:

Breeding Pair Count:

Breeding pair counts were done during April, 2005. There were a total of 7 routes allocated to volunteers. Five of these routes were completed.

Dick Thompson	Maquam Creek canoe route (Dick was unable to do the survey)
Ken Copenhaver	Tabor Road
Maeve Kim	Charcoal Creek south of route 78
Dan and Lisa Metcalfe	Boat routes; both the dead creek to Shad Isl. and the route 78 to route
Dave Greenough	rte 78 to Metcalfe boat route
Chris Smith	walk Cranberry Dike (Chris was unable to do survey)
Dave Frisque	Mac's Bend to HQ walking route
Greg Simard	Maquam shoreline canoe/kayak route.

The pair counts for each route are on the spreadsheet in at C:\Al's Stuff\Biological Surveys General\...

Summary of 2005 Breeding Pair Counts

Species	Totals	% of Total
Mallard	8	6.722689
Black Duck	2	1.680672
Wood Duck	23	19.32773
Am. Goldeneye	18	15.12605
Hooded Merg.	0	0
Common Merg.	0	0
BW Teal	1	0.840336
GW Teal	12	10.08403
Ring-necked Duck	42	35.29412
Canada Geese	5	4.201681
Bufflehead	2	1.680672
Widgeon	1	0.840336
N. Shoveler	1	0.840336
unknown duck	4	3.361345
Lesser Scaup	0	0
Grand Total	119	100

Brood Counts

Summary of Brood Counts

Species	Total Broods	Total Ducklings
Mallard	10	62
Wood Duck	21	149
Goldeneye	7	36
Hooded Merganser	2	13
Black Duck	2	19
Canada Geese	2	4
Pied-Billed Grebe	2	6

The Canada Goose broods were observed in Goose Pen Channel. More than half the ducklings were cavity nesting species.