

**A COMPARISON OF TWO POPULATION MONITORING TECHNIQUES
FOR UPLAND SANDPIPER IN VERMONT**

**A report submitted to the Nongame & Natural Heritage Program
Vermont Fish and Wildlife Department**
by
Judith Peterson

**Christopher Rimmer
Vermont Institute of Natural Science**

**Christopher Fichtel
Vermont Nongame & Natural Heritage Program**

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ABSTRACT: A comparison between roadside surveys and more intensive surveys in 3 Addison County towns from 2-10 June, 1990 indicated that the roadside survey method is almost as effective as the intensive method in locating the upland sandpiper (Bartramia longicauda). Lack of complete coverage by observers and the scarcity of birds in 2 of the towns limited the precision of this test. Because the volunteer effort was focused in the 3 target towns, only 17 of the 35 towns censused by roadside in 1989 were covered again in 1990. However, 50 birds were observed during the survey period and another 38 were reported in later surveys through 15 July, for a total of 88. We now estimate 60-70 breeding pairs statewide. Habitat observations in 1990 indicated that upland sandpipers nesting in Vermont appear to prefer pasture and neglected or abandoned hayfields in both flat and rolling terrain. Annual roadside surveys of all towns with suitable sandpiper habitat would provide us with more accurate information regarding the status of upland sandpiper populations in Vermont. Early and late June surveys in 4-6 Champlain Valley towns would allow us to ascertain the most productive time for surveying. More data are needed before specific management guidelines can be formulated, but a landowner education program could be commenced in conjunction with 1991 field work.

INTRODUCTION

In eastern North America, breeding populations of the upland sandpiper, once encouraged by the clearing of forests and increased agricultural land use, are now under pressure from residential, commercial and industrial development (Carter 1989, Rimmer and Fichtel 1989). Of the land remaining in agriculture, much of the species' preferred grassland habitat, including hayfields and pasture, is being converted to more intensive cropland uses (Carter 1989). Throughout most of its eastern breeding range the upland sandpiper is declining, stable at low levels, or absent (Tate 1986). Its distribution within the range is spotty, and breeding occurs only where enough suitable habitat exists to maintain viable populations (Carter 1989).

Breeding populations of upland sandpipers in Vermont are confined to the Champlain Valley and the flat agricultural areas surrounding Lake Memphremagog (Kibbe 1985). Their decline from a probable statewide peak abundance in the late 1800's has been precipitated by the continuing reforestation of the state during the 1900's and the conversion of farmland to other types of use (Rimmer and Fichtel 1989). The pressure of increased human population and resulting

development has also been a contributing factor. Although upland sandpipers show flexibility in adapting to local changes in their habitat (White 1983), the continued conversion of old hayfields and rough pastures to other uses may bring about a further decline in the species in Vermont. It is now classified as "threatened", pursuant to the Vermont Endangered Species Law.

The present study was built upon the 1988 census of 11 towns and the more comprehensive 1989 roadside survey of 35 towns, both conducted by the Vermont Institute of Natural Science (VINS) and the Vermont Nongame and Natural Heritage Program (VNNHP). The 1990 field project was designed with two primary objectives: 1) to target 4 Champlain Valley towns for saturation censusing, both roadside and off-road, and to compare the results with those from a concurrent roadside survey of each town, and 2) to identify and monitor an upland sandpiper nest site to collect preliminary data on habitat, movements, breeding success and behavior during the nesting period.

METHODS

Our original objectives were scaled back due to constraints of volunteer and staff time and to a limited budget. We selected only 3 of the 4 target towns for censusing and omitted the nest site monitoring portion of the study. Available staff time was used to coordinate the volunteer effort, to observe the behavior of several pairs and colonies, to locate breeding sites outside of the target towns, and to categorize habitat in as many Champlain Valley nesting locations as possible.

The towns of Shoreham, Addison and Ferrisburgh were selected as the 3 target towns. Representing a sample of the Champlain Valley towns adjacent to Lake Champlain, they contained extensive suitable habitat for upland sandpipers and supported sandpiper breeding populations in the past. We omitted St. Albans because of difficulties coordinating adequate volunteer coverage for it. A concentration of 30 volunteers in the 3 target towns meant that only 13 of the 35 towns surveyed in 1989 were surveyed again from roadside in 1990 during the survey period, and those 13 included 2 partial surveys. A search for additional nesting locations continued until mid-July and consisted partly of revisiting sites discovered in previous years. One roadside survey was conducted after the official survey period, and 3 additional towns were partially surveyed. Five incidental sightings of birds in suitable habitat during the 1990 nesting season were received and recorded.

We conducted roadside surveys in the 3 target towns using the same methods as in 1989 (Rimmer and Fichtel 1989), during the same time period (2-10 June) and wherever

possible using the same observers. Each observer was provided with 1) a town map outlining the area to be covered and showing previous sandpiper sightings; 2) instructions on how to proceed; 3) field data forms (Appendix A); and 4) a cassette tape of the upland sandpiper "chatter" call to be played at regular intervals in suitable breeding habitat. This taped recording had more volume and carried farther than the tape used in 1989. Data recorded for each sighting included exact location, a description of habitat, number and ages of birds, observed behavior, and ownership and use of the land. All data forms and maps were completed, even if there were no sightings, and returned to the field coordinator for compilation.

To test the precision of the roadside survey method, we assigned teams of two volunteers, each team to cover a "quadrant" (roughly a quarter of a town) in Shoreham and Ferrisburgh. The Addison quadrants were covered by teams of VINS and VNNHP personnel. The quadrant teams were instructed to play the taped call in all suitable habitat, both on and off road, which necessitated walking to gain access to interior fields. Each team member carried a tape player. Otherwise the forms, cassettes and instructions for these teams were the same as for the roadside surveyors.

Two weeks prior to the survey period we placed an informative article in the Addison Independent to alert landowners to the fact that we would be walking on private land. We also posted this information on public bulletin boards in the target towns. We gave all teams identifying signs to display in their car windows and requested the censusers to stop and request permission to go onto the land whenever it was possible to do so. No landowner opposition was reported.

Our objective was to coordinate the effort so that all censusing of each target town would be done on the same day. This proved to be impossible due to the varying availability of volunteer time, but all censusing was completed within the survey period. The Addison quadrant survey was done entirely in one day, with the roadside survey having been conducted the previous day.

We compared results of the roadside surveys in each target town with results of the quadrant surveys to evaluate the relationship between them. We also compared all results from the 13 roadside surveys done in 1990 during the survey period with the 1988 and 1989 roadside surveys to maintain an on-going data base for those towns. Finally, we compiled a master map and tabulation of all breeding locations reported in the state from 1988-1990, including sight records outside the survey periods. This will serve as a foundation for future investigations of site fidelity and shifts in colony locations.

RESULTS

A total of 88 upland sandpipers were sighted during the 1990 breeding season in suitable nesting habitat. Of these, 50 birds were located during the 2-10 June survey period. The remaining 38 birds were counted up to 15 July during surveys of additional towns or as incidental sightings (Figs. 1-4, Table 1).

In Shoreham east of Route 22A the roadside survey located 2 sandpipers, 1 each at 2 sites documented in 1989. The 2 quadrant surveys in this area did not locate any birds. In Shoreham west of Rt. 22A a different roadside surveyor did not find any sandpipers. One quadrant team located a single individual close to a road.

In Addison the roadside survey located 1 sandpiper. The quadrant teams found that same bird and an additional pair at an off-road location.

The Ferrisburgh roadside survey recorded 10 birds in 7 locations. The quadrant teams found 6 of these birds in 4 locations, and an additional 6 on-road and 1 off-road for a total townwide count of 17 birds at 11 sites. Further observation after the survey period added 6 individuals, 3 at an entirely different location and 3 additional birds at 2 sites previously reported in 1990.

Fourteen additional roadside surveys were conducted in towns adjacent to the target towns and in other locations where volunteer help was available and as time permitted. Because so much volunteer effort was concentrated in the target towns, 18 towns surveyed in 1989 were not covered in 1990 (Table 2). The additional roadside surveys, or partial surveys, conducted within the survey period added 27 birds for a period total of 50.

In addition to the known colonies in Williston, Glover, Coventry, St. Albans, and Weybridge, a colony of 5 adults was found in Cornwall, another of 8 in Salisbury, and a loose colony of 7 in Ferrisburgh. The colony at Taft's Corners in Williston continued to nest successfully in spite of encroaching development. Six birds were counted there in 1990, including 1 downy chick seen very late in the breeding season (7 July), possibly indicating a re-nesting after the loss of a first nest.

Most habitat descriptions reported on the 1990 data sheets indicated either hayfield or pasture. In returning to check on the habitat at these locations, we often found a combination of hayfield and pasture in excess of 100 acres. The hayfields chosen by upland sandpipers in Vermont were dry and sparse with grasses less than 24 inches in height, not the tall thick stands of commercially grown hay commonly

found on Champlain Valley farms. Pasture of all types comprised the other important habitat element, providing short grass for feeding as well as tall grass clumps for cover.

Upland sandpipers were observed feeding in pastures with livestock in New Haven, Weybridge, Williston and Orwell in 1990, although the birds were never seen in close proximity to the animals. Uplands were observed feeding in hilly and rolling terrain, even on the sides of ravines. They were sometimes seen feeding in pastures dotted with shrubs and trees, as well as in pure grassland.

Upland sandpipers responded to a taped call in several ways. The usual response was for 1 or more birds to fly toward the source of the call, circle overhead and call. They either landed on the ground nearby, landed on a perch, or flew out of sight again. A common behavior of birds attracted by the tape was to look for the source of the call, and if the call was not repeated, to resume feeding, while walking slowly away from the observer. In the Salisbury colony, 3 individuals responded to the tape while 5 did not. In a group of 3 Orwell birds only 1 responded. Another Orwell bird preening on a fence post paid no attention to the taped call broadcast from fairly close range. On the other hand, an observer's intrusion into a colony's nesting area invariably elicited an alarmed response from all adult birds, whether or not a taped call was played.

Field observation of pair and colony behavior confirmed the birds' colonial tendencies. Groups of 2 to 5 birds walked together feeding for upwards of a half hour. The Cornwall colony, when scattered by the intrusion of an observer, always re-assembled as a group shortly after the disturbance ceased. Birds in the Salisbury colony ran to rejoin the rest of the colony about 15 minutes after the last taped call. Up to 3 uplands were frequently seen perched atop tall elm snags.

DISCUSSION

The 87 adult upland sandpipers found in 1990 are an increase from the 77 observed in the 1989 survey (Rimmer & Fichtel, 1989), even though fewer towns were surveyed in 1990. In 1990 there were 18 sightings of single birds, 10 sightings of 2 birds together, and 11 observations of groups of 3-8 sandpipers. Based on Rimmer & Fichtel's formula for estimating breeding pairs (1989), we can assume that 12-15 of the single birds were members of nesting pairs, that all 10 pairs sighted were in fact nesting pairs, and that colonies included more than one nesting pair with an occasional unmated bird. Applying these assumptions we conservatively estimate that the 87 adults sighted in 1990

represent 45-50 breeding pairs. Given the probability that some birds escaped detection on survey routes, and the fact that only 17 of the 35 towns surveyed in 1989 were covered in 1990, and that 5 of the 17 were only partially surveyed, we estimate that the statewide breeding population is probably 60-70 pairs and could easily be as high as 80 pairs.

It seems probable that recent increases in numbers of upland sandpipers observed during the breeding season are a function of more observer hours in the field, improved survey techniques, and a better understanding of the preferred nesting habitat of the species. At this time we cannot make a direct correlation between our increased estimates and actual sandpiper population dynamics. Annual nesting surveys over regular routes are needed in order for us to draw valid conclusions about the status of upland sandpiper populations in Vermont.

Of the 23 upland sandpipers observed in the 3 target towns, 20 were located from a road. If the relative abundance of sandpipers is accurately recorded using the two survey methods, then 87% of the birds in a given area can be detected using roadside censuses alone. However, we do not presently feel justified in extrapolating this year's results because of the limited scope of this survey and the small number of birds encountered.

The main factor adversely affecting 1990 quadrant survey results was lack of anticipated coverage. The large blocks of suitable off-road habitat were time-consuming to cover on foot. All the volunteer teams gave a full day of effort, but large sections of some quadrants remained unsurveyed. If these assignments had been completed, more off-road birds might have been located.

Optimal upland sandpiper breeding habitat contains a mixture of short and tall grass areas, the tall grass being less than 24 inches high and sparse enough to allow adults and chicks to walk through it easily (Carter 1989). The diversity of agricultural land use in the Champlain Valley gives upland sandpipers an opportunity to select sites where hayfield, pasture, and sometimes even airports and lawns come together to provide both short and long grass habitats. Little-used or abandoned fields or even fallow ground appear to be attractive to uplands as nesting habitat (Carter 1989). Regularly planted and fertilized hayfields grow too tall (24-48 inches) and dense for uplands and are usually mowed while the birds would be incubating. The 1990 quadrant censusers in Addison reported haying in progress on these fields on 4 June. Repeated early mowing of a field would probably discourage birds from nesting in it, especially if nests were disturbed.

The quality and value of a hayfield as sandpiper habitat may change as the season progresses. A field of tall lush hay may not be a suitable nesting field, but sandpipers will often use it for feeding in early May before the grasses grow too tall. They may return again after mowing as the second growth is starting (pers. obs.).

We need to adjust the definition of "suitable habitat" in our instructions to roadside surveyors. They may well find it more productive to spend less time on commercially farmed hayfields and to concentrate instead on pasture, dry meadow and abandoned fields, flat or rolling, with fence posts or other good perches in the area.

Slight changes in nesting habitat brought about by heavy grazing, early grazing, standing water, burning, and manuring could cause upland sandpipers to reject a nesting location that they had accepted in previous years (Buss and Hawkins 1939). In 1990 only 2 upland sandpipers were found in the flat Addison County farmland between Route 22A and Lake Champlain, an area where sandpipers had been much more common in previous years. The spring of 1990 was very wet, and many low-lying fields were saturated or even under water through most of May. It is possible that sandpipers arriving at the end of April encountered submerged or muddy fields and were forced to move from their traditional locations to higher ground to the east. A re-survey of this area in a year of average spring rainfall would show whether or not upland sandpipers return to nest in these traditional locations. It is also possible that the current relocation represents a permanent shift from an area of increasing intensity of agricultural use, the prime farmland west of Rt. 22A, to an area of less intensive agricultural use to the east of Rt. 22A where more suitable habitat might be available.

Upland sandpipers require a relatively large home range for successful breeding (Carter 1989). A pair in New Haven was protecting a territory at least .75 mile in diameter. The birds are strong fliers and will move around from field to field within their territory. An observer playing a taped call from a particular location may elicit a response one day and not the next. Even though the birds are very sensitive to the taped call, they may be entirely out of range on any given day.

Upland sandpipers typically use exposed perches such as fence posts, poles and tree snags during courtship and to watch for intruders (Carter 1989). Many dead elm trunks remain standing in Champlain Valley fields and hedge rows, and sandpipers have been frequently seen perched on top of these 6-18 meter (20-50 foot) high snags. Colonies of uplands in Williston, Cornwall and Salisbury were observed in 1990 using these old trunks, and such a perch may well

give an advantage to a colony in terms of communication and defense of territory.

During the early June survey period most breeding upland sandpipers are probably incubating and thus presumably less conspicuous and responsive than at other times. By late June the young have hatched and family groups move into pasture and other short grass habitats. A late June survey might detect a higher proportion of the birds present in an area, including young, and might permit some estimates of breeding success. Two annual roadside surveys in several towns, one conducted in early June and one in late June, would allow us to compare results and refine the timing of future surveys.

The 1990 field surveys increased our knowledge of upland sandpiper habitat and behavior and added to our inventory of known nesting locations. The comparative surveys also established that the roadside survey method produced useful results with a level of volunteer effort that could be continued on a yearly basis. Establishing an ongoing and consistent annual roadside survey program is essential to determine the status of the upland sandpiper population in Vermont. Studies of colonial behavior, nesting and habitat requirements, and breeding chronology and success are important before a statewide management program is undertaken. However, with the data gathered to date we can proceed with a limited educational effort in order to secure the understanding and cooperation of farmers and landowners in areas of highest upland sandpiper density.

RECOMMENDATIONS

1. Continue annual or biennial roadside surveys of all towns in the known upland sandpiper breeding areas, to be done in late June.
2. Conduct additional roadside surveys in early June in Ferrisburgh, Shoreham, Addison, Charlotte and Orwell, to compare with the later survey. These towns appear to have the greatest amount of suitable habitat for breeding upland sandpipers at the present time. Early June surveys in Addison and Shoreham could ascertain whether or not birds will return to nest there in a spring of normal rainfall. Comparison of the early and late June surveys may indicate whether timing of the survey has any effect on the number of birds detected.
3. Undertake a detailed study of nesting habitat and colony dynamics in three or more chosen colonies.
4. Contact the landowners in areas supporting the largest upland sandpiper concentrations. Make them aware of the

bird, its habits, needs and status. Let them know what they can do to protect it.

ACKNOWLEDGMENTS

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Table 1. UPLAND SANDPIPER BREEDING SEASON OBSERVATIONS

1988-1990

Site numbers correspond to numbered locations on maps
(Figs. 1-4)

Site #	Town	Birds seen			Location and Habitat
		88	89	90	
1	Fe	4	0	3	Claflin Farm, Hollow Rd. rough pasture
2	Fe	0	2	3	Spooner Farm, Fuller Mt Rd, pasture, hay
3	Fe	0	0	1	Fuller Mt Rd at Ledge Ln, scrubby field
4	Fe	0	0	2	Little Brook, pasture, hayfield
5	Fe	0	0	2	Monkton Rd, E of RR tracks, grass island
6	Fe	0	1	0	Millbrook E of Town, cleared field
7	Fe	3	0	1	Greenbush Rd. hayfields
8	Fe	0	0	1	Hawkins Rd, meadow behind barn
9	Fe	1	0	0	Little Chicago Rd. mowed field
10	Fe	1	0	1	Webster Rd N, pasture, mixed habitat
11	Fe	0	0	4	Webster at Cross, corn stubble, grass
12	Fe	0	0	1	Webster S of Cross, pasture, hayfield
13	Fe	0	0	1	S end Webster, hayfield
14	Fe	0	1	3	Sand Rd N of Ft Cassin access, hayfield
15	Pa	4	0	0	Near Stone Bridge access, now alfalfa
16	Ad	0	2	0	Jersey St, alfalfa, sparse hay
17	Ad	0	0	1	Grandey Rd, pasture, hay
18	Ad	0	2	0	Rt 17 E of Creek, scrubby hayfield
19	Ad	2	0	0	DCWMA Headquarters area, mixed habitat
20	Ad	0	0	2	Otter Cr Rd, off-road, hayfields
21	Ad	2	0	0	Spaulding Rd. now cultivated
22	Sb	N	1	N	Spear St Cemetery
23	Nh	N	2	2	Off Field Days Rd, rough pasture
24	Nh	N	1	0	Quaker Village Rd at Rt 17, hayfield
25	Wy	N	7	6	Lemon Fair Rd. pasture, hayfield
26	Br	N	1	0	Off of East St, large hayfield
27	Br	1	1	0	Market Rd W of Rt 125, pasture
28	Br	0	1	0	Basin Harbor Rd at Middle Rd, pasture
29	Sh	0	1	1	Cram Rd E of Jones Brook, meadow, past
30	Sh	0	1	1	Webster Rd near Whiting, old hayfield
31	Sh	10	0	1	Just W of Cream Hill, hayfield
32	Sh	0	1	0	Richville Rd E of 22A
33	Sh	0	2	0	1.5m S of Cream Hill
34	Sh	1	0	0	S of Larrabee's Pt, mown hayfield
35	Sh	1	0	0	E of rd near 5 Mile Point
36	Sh	1	0	0	Intersection between Cream Hill & 22A
37	Co	5	0	5	Peet Rd at airport, pasture, old hay
38	Co	2	0	0	Sperry Rd E of Beaver Brook, meadow

- 39 Mi N 0 1 Cady Cross Rd, rough hayfield
 40 Sa N 1 8 Creek Rd, pasture
 41 Or N 1 0 S of Larrabee's Pt, see Shoreham 34
 42 Or N 3 3 Rt 73 E of Abell's Corner, hayfield
 43 Or N 1 0 Rt 22A N of crossroad to 73, pasture
 44 Or N 2 0 Rt 73, 2m S of Shoreham, hayfields
 45 Or N 0 2 Abell's Corner area, pasture
 46 Or N 0 1 Abell's Rd near Sudbury Line, hay
 47 Or N 0 2 22A just N of 73, ball field
 48 Or N 0 1 Smith Rd at Royce Hill Rd, pasture
 49 Be 4 0 3 22A .6m S of turn to Benson, pasture
 50 We N 3 0 22A at Benson line, mown hayfield
 51 We N 1 0 22A 1m S of Benson line, hayfield
 52 Su N 0 2 Rt 30 between exits of 73, hayfield
 53 Ch N 2 N Ferry Rd at Lake Rd, grassy field
 54 Ch N 1 N N from Ferry near Lake Champ. field
 55 Ch N 2 N S of Ferry on Lake Rd, large field
 56 Ch 1 1 N Guinea Rd. at Brigham Brook Rd, field
 57 Ch N 2 N Rt 7 at Thompson Pt Rd, pasture
 58 Ch N 0 1 Hinesburg-Charlotte Rd. near Mt. Philo
 59 A1 N 2 1 Rt 2, 2m before bridge, hayfields
 60 A1 N 0 1 Rt 2, 1.5m before bridge, hayfields
 61 A1 N 1 2 Rt 2, 1m before bridge, open hayfields
 62 No N 4 0 Road to State Park, 1.5m N of Rt 2
 63 Wi N 0 3 Tafts Corners area, horse pasture
 64 Wi N 0 2 I 89 Exit 12 on 2A, field
 65 Wi N 2 1 .4m E of Tafts Corners, open field
 66 Ho N N 2 Intersection 1m N of town
 67 G1 4 4 4 Canosa Farm N of Lake Parker, pasture
 68 Cv N 3 5 Airport, east side
 69 Np N 2 N Crossroad .6m from Jct. with Niles, past
 70 Np N 1 N No.12 Rd at Searles Rd, pasture
 71 Np N 1 N Armstrong Rd at Vance Hill, lawn
 72 St N 7 1 Interstate 89 Exit, mown hayfield
 73 Is N 1 N E-W rd S of center island, hay, lawn
 74 Ri N 1 N NE of Fay's Corner, horse pasture

75 Ly N 1 N Near Miller Run NW of town
76 Fa N 2 N End of crossroad from Rt 104, meadow
77 Cs 1 N N Rt 103 at Log Cabin Model Home, lawn, hay

Fe - Ferrisburgh	Br - Bridport	Be - Benson
Pa - Panton	Sh - Shoreham	We - West Haven
Ad - Addison	Co - Cornwall	Ch - Charlotte
Sb - Shelburne	Mi - Middlebury	Su - Sudbury
Nh - New Haven	Sa - Salisbury	A1 - Alburg
Wy - Weybridge	Or - Orwell	No - North Hero
Wi - Williston	Ho - Holland	G1 - Glover
Cv - Coventry	Np - Newport	St - St. Albans
Ri - Richmond	Ly - Lyndon	Is - Isle La Motte
Fa - Fairfax	Cs - Chester	

Table 2. Vermont upland sandpiper survey results, 3-11 June, 1989 and 2-10 June, 1990

S - Full survey conducted within survey period

P - Partial survey conducted within survey period

N - No survey conducted

SX - Full survey outside survey period

PX - Partial survey outside survey period

SI - Full survey but sighting incidental

NI - No survey; incidental sighting within survey period

NIX - No survey; incidental sighting outside survey period

Town	1989		1990	
	# UPSA	Survey	# UPSA	Survey
Fair Haven	0	S	0	N
Benson	1	SI	3	PX
West Haven	4	S	0	N
Orwell	6	S	9	SX
Shoreham	5	S	3	S
Whiting	0	S	0	N
Cornwall	0	S	5	S
Bridport	3	S	0	S
Addison	2	S	3	S
New Haven	3	S	2	S
Panton	0	S	0	S
Ferrisburgh	4	S	17	S
			6	NIX
Weybridge	9	S	6	S
Waltham	0	S	0	S
Salisbury	1	S	8	PX
Middlebury	0	S	1	NIX
Hinesburg	0	S	0	N
Charlotte	8	S	1	NIX
Williston	2	S	6	P
Shelburne	1	SI	0	N
Burlington	2	NI	0	N
St. Albans	7	SI	1	NIX
Swanton	0	S	0	N
Fairfax	2	SI	0	N
Fairfield	0	S	0	N
South Hero	0	S	0	N
Grand Isle	0	S	0	N
North Hero	4	SI	0	S
Alburg	3	S	4	S
Isle La Motte	1	S	0	N
Newport	4	S	0	N
Coventry	3	S	5	PX
Irasburg	0	S	0	N
Albany	0	S	0	N
Glover	4	S	4	P
Lyndon	1	NI	0	N
Sudbury	0	N	2	NIX
Holland	0	N	2	NIX

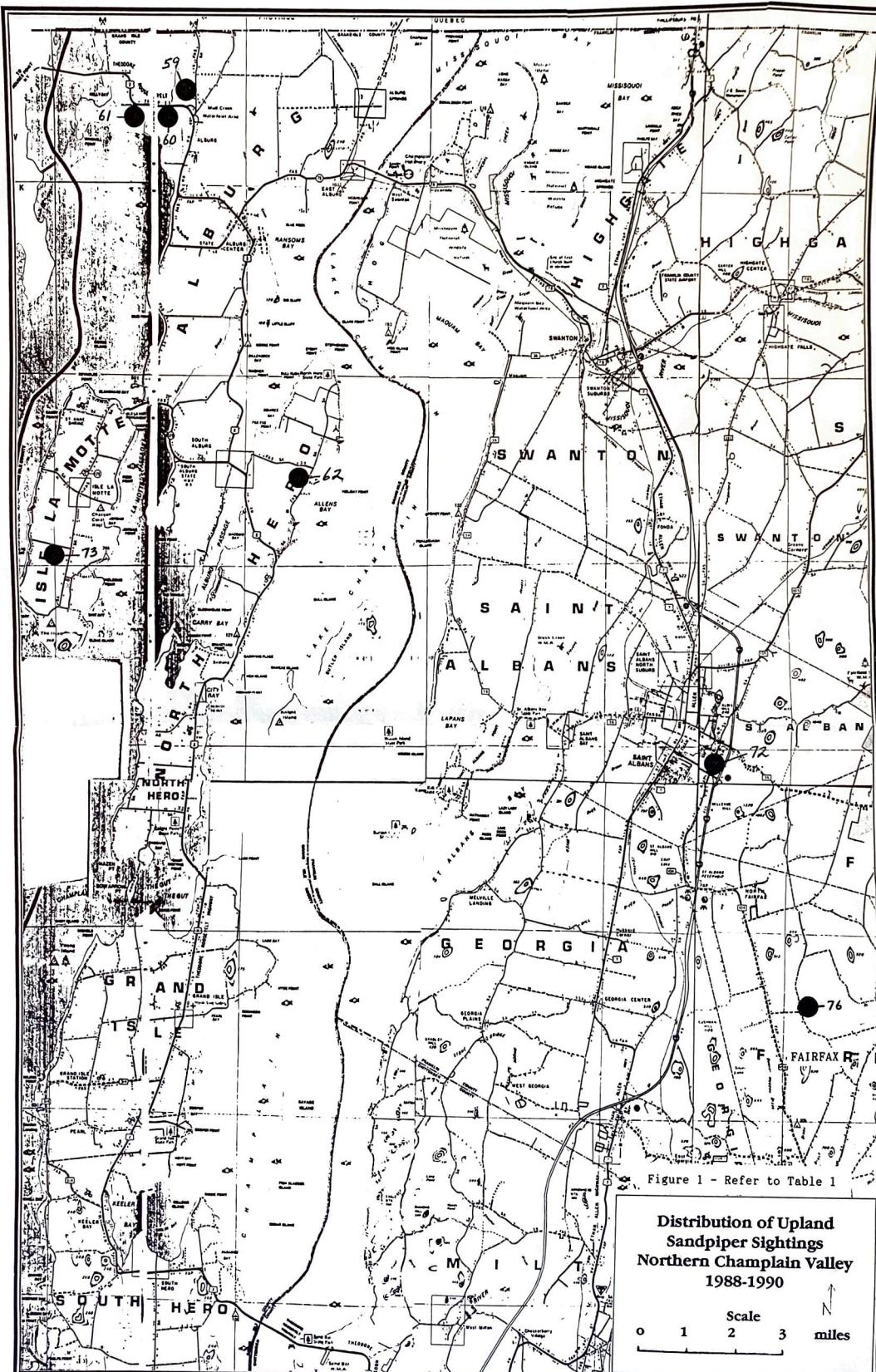
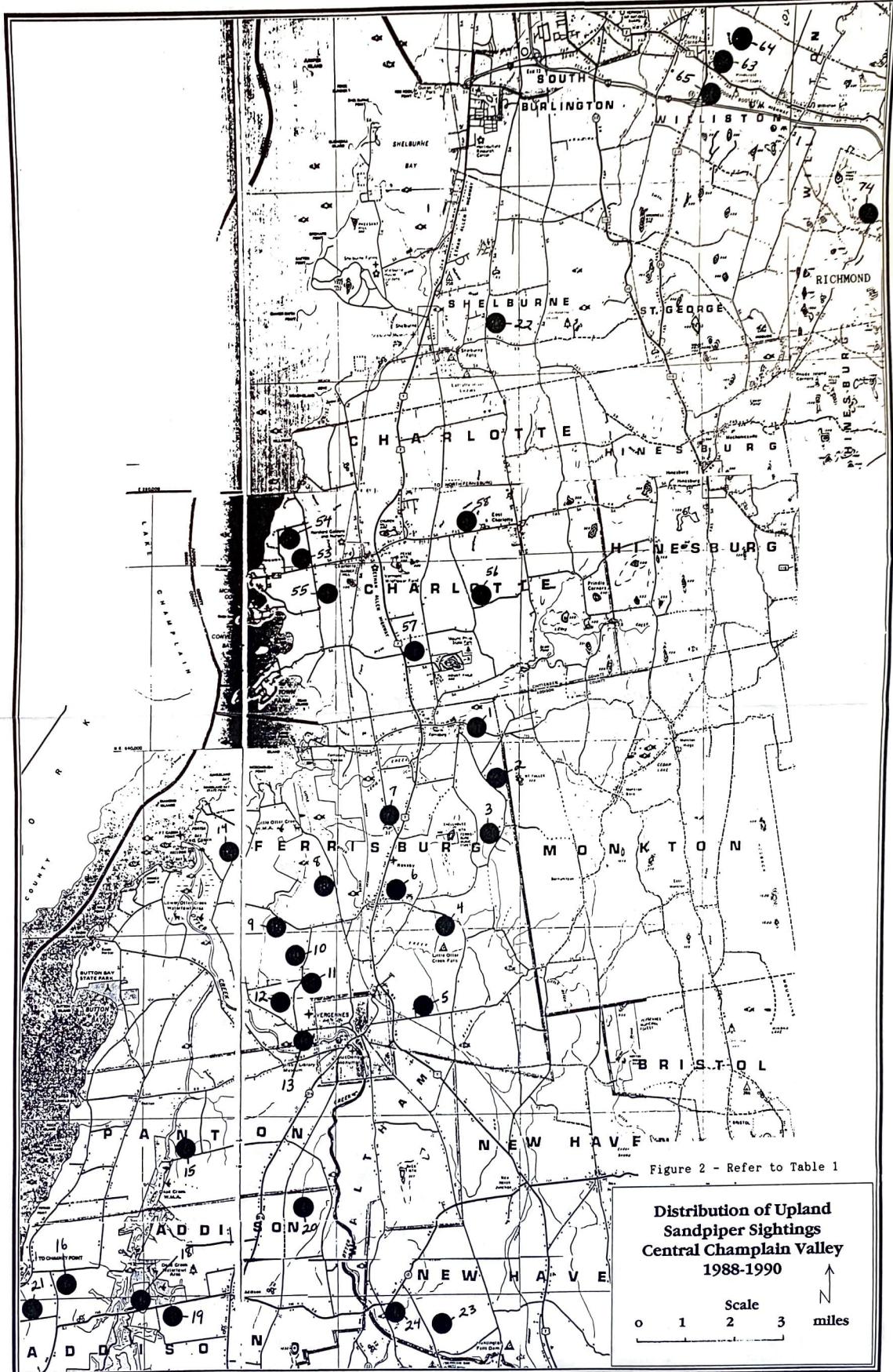


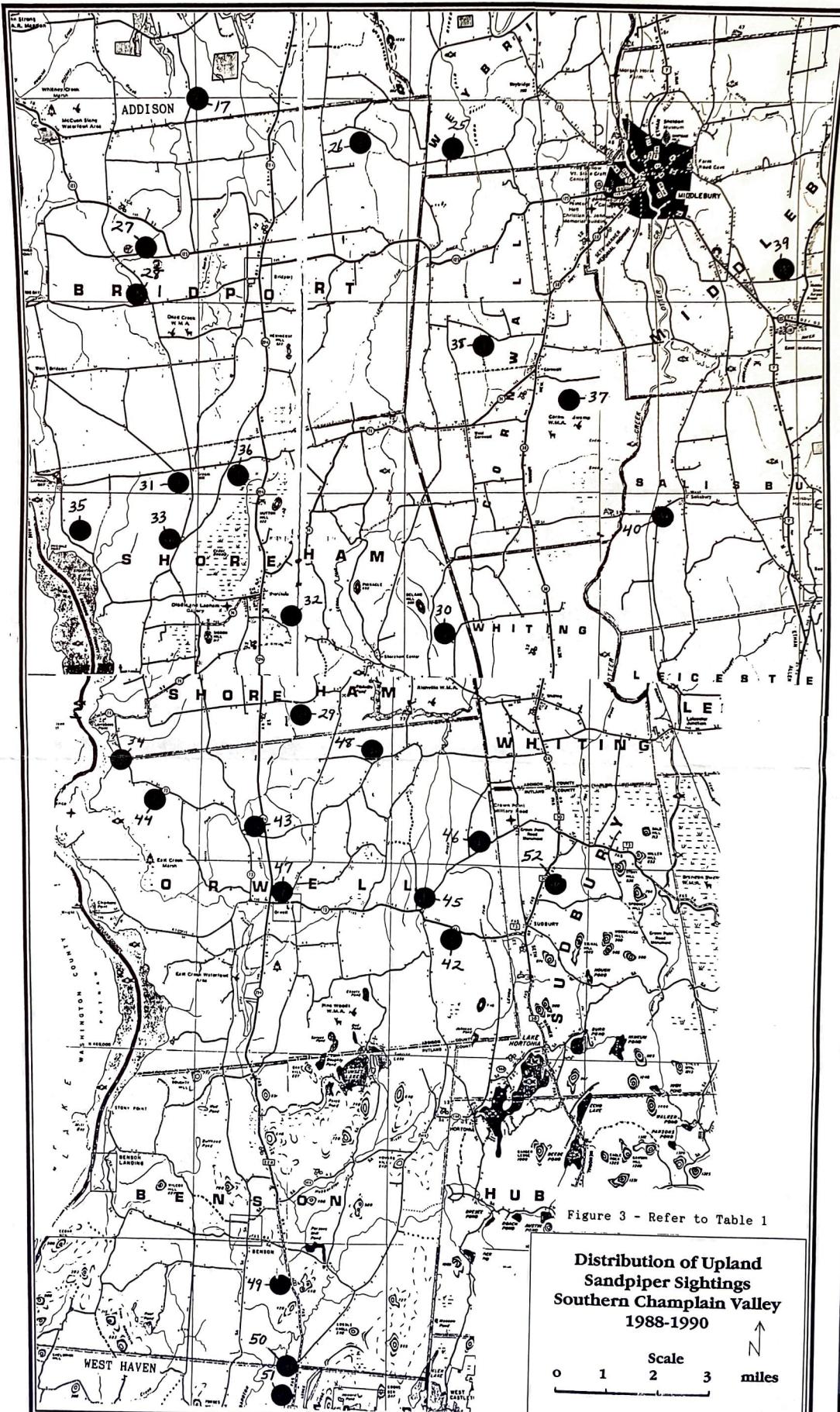
Figure 1 - Refer to Table 1

**Distribution of Upland
Sandpiper Sightings
Northern Champlain Valley
1988-1990**

Scal

o 1 2 3 miles





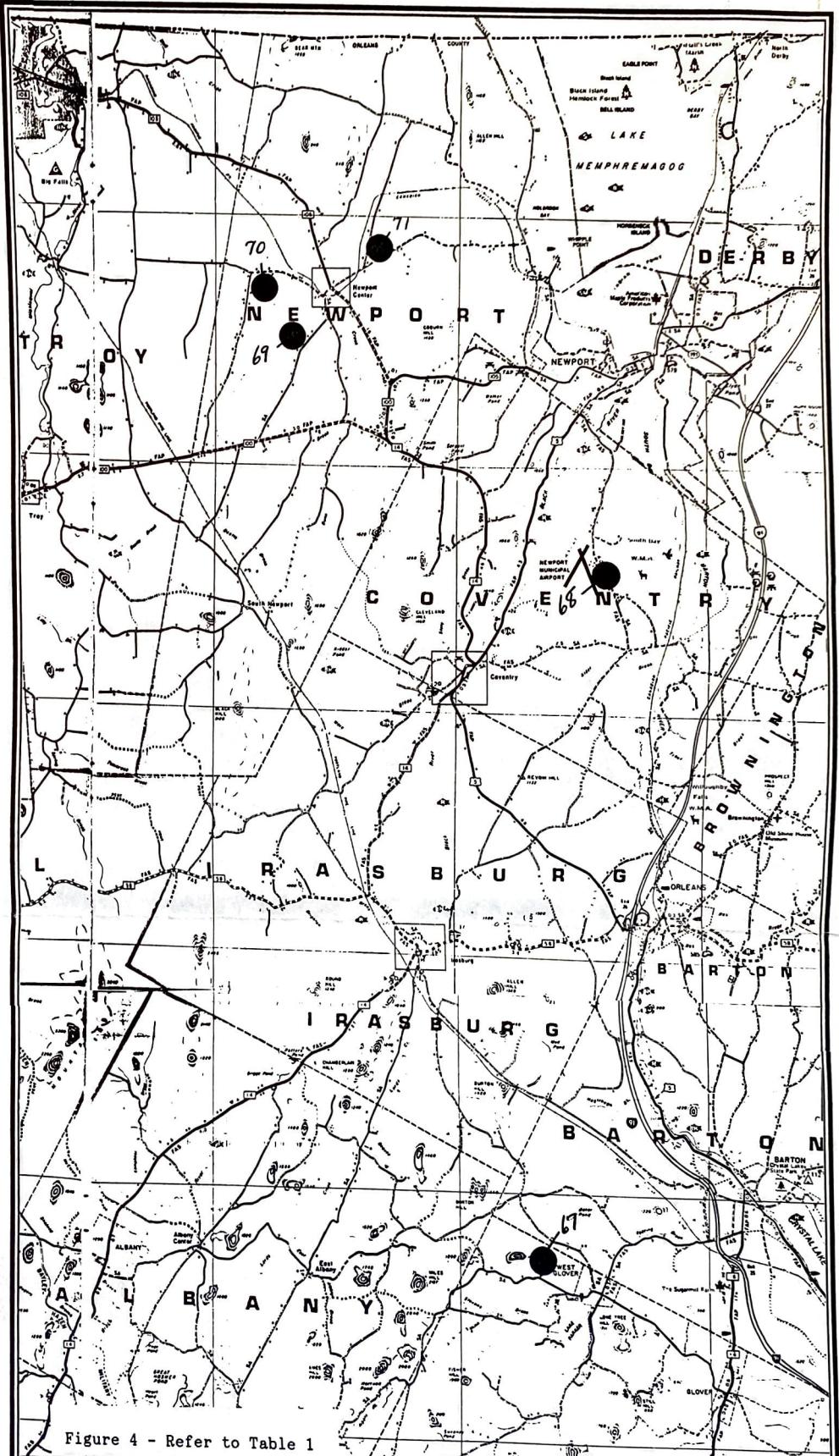


Figure 4 - Refer to Table 1

**Distribution of Upland
Sandpiper Sightings
Memphremagog Region
1988-1990**

Scale
0 1 2 3 miles
N