



MONITORING BOBOLINK IN *rare's* SOUTH FIELD:
A FIVE-YEAR PERSPECTIVE, 2013 – 2017

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This report which completes and highlights five-years of Bobolink (*Dolichonyx oryzivorus*) monitoring by *rare* volunteer bird monitors, may provide background to assist i) *rare* staff in attracting researcher(s) to study certain aspects of grassland bird life history/ecology; ii) *rare* staff in educating students/public about anthropogenic grassland habitats and Species at Risk; iii) *rare* volunteer bird monitors/banders in future who wish to observe Bobolink nesting phenology and estimate population size at *rare*.

Background Summary of South Gate Fields

Since the mid-'00s, agricultural croplands accessed from South Gate have become available for research purposes (Table 1).

Table 1: Former and current use of four fields at *rare* CRR accessed by South Gate

Cropland Field Designated number*	Current <i>rare</i> Designated name	Current Use
#12	South Field West (SFW)	Hayfield established in 2007; <i>rare</i> Bobolink monitoring since 2013
#11	South Field East (SFE)	Hayfield established in 2016; <i>rare</i> Bobolink monitoring since 2016; monitoring at Bank Swallow structure along adjacent hedgerow; established 2017
#10	Sparrow Field 1) regeneration sector 2) research sector	<i>rare</i> bird monitoring since 2008; 1) alien spp. removal, native species planting scheduled for September 2017 along Grande Allee/hedgerow boundary 2) A. MacDougall research (36 study plots) Fall 2012-?; H. Van Vliet research (Savannah Sparrow) 2016-17
#8	Middle Field	Crop rotation: soy, corn, winter wheat Cropland leased to B. Domm Farms Ltd.

* Cropland management maps used by B. Domm Farms Ltd. during lease with University of Guelph, later *rare* CRR, i.e. "Lower" #8 and "Upper" #4 maps; Note: Fields #s 10, 11 and 12 were leased by *rare* to B. Domm Farms Ltd. prior to their current status and were agricultural croplands (soy, corn, winter wheat; not always rotational).

Background Summary of Bobolink occurrence at *rare*

The first recorded Bobolink observation was a female, 6 June 2009, during monitoring of the Sparrow Field (M. Armstrong, J. Guenther and B. Wilson). At the same time, L. Hubble and B. and G. Mockford monitored SFW; none was observed. Sightings of dispersing or migrating Bobolink were made throughout August and September, 2012, by Brett Fried et al. during banding at Springbank Gardens. Sightings were made of Bobolink in SFW, a potential nesting habitat for this species, in May 2013 by J. Guenther and B. Wilson during monitoring and during birding by Guenther. This prompted Wilson to contact *rare* staff to discuss how to proceed.

The decision to monitor Bobolink was based upon the following:

- 1) The SFW hayfield was 6 years old. Studies in New York State found vegetative characteristics of hayfields ≥ 8 years old provided nesting habitat for Bobolink (Renfrew, Rosalind et al. 2015).

- 2) Bobolink was designated a Species at Risk in Ontario, specifically at this time, “Threatened”.
- 3) South Field is designated a research field at **rare** for both experimental and manipulative research (pending application approval).

Following consultation with **rare** staff and field lessee Brian Domm, monitoring was undertaken on 1, 4, 8 July and during hay mowing on 11 and 12 July. Bobolink were observed throughout this period. Monitoring on 15, 16 and 24 July 2013 of both SFW and Sparrow Field, found none (Bobolink reports 2013); however, during August 2013, both banders and bird monitors observed Bobolink during fall migration monitoring and banding (Bobolink report 2014).

Based upon these 2013 observations the decision was taken to monitor during the following breeding season, 2014; to contractually establish an annual mowing date of no earlier than 15 July with Brian Domm Farms Ltd.; and to solicit researchers for this site.

In 2014 and 2015, monitoring was undertaken by **rare** volunteer bird monitors to assist researchers, Rob Milne, Wilfrid Laurier University, and Lorne Bennett, University of Guelph, with their research, *Monitoring of Bobolink (*Dolichonyx oryzivorus*) Ecology and Agricultural Practices: A Proposal of Research Directives for Southfield Property* (on file at **rare**). The monitoring of SFW was non-invasive with six to eight observers using telescopes and binoculars and in communication with FRS radios; monitors stood at designated positions to monitor assigned sectors (6) of the field during a fixed period of time (Bobolink reports 2014 and 2015). After two seasons, the lead researcher was unable to continue due to unforeseen circumstances; the research was terminated. (fide J. Quinn).

Volunteer bird monitors continued the non-invasive monitoring of Bobolink in SFW in 2016 to confirm that the selected mowing date, 15 July or after, minimized, if not eliminated, nestling disturbance and mortality (Bobolink report 2016).

Table 2: Overview of Bobolink Monitoring Reports, 2013-2017 (Wilson): the 2017 report reviews several aspects of the five years of Bobolink monitoring; however, each report should be consulted in order to ascertain the observed activities of Bobolink in South Field.

YEAR	DATE OF REPORT SUBMITTED TO <i>rare</i>	MONITORING PERIOD (DATE/MONTH) # OF MONITORING DATES PRIOR TO MOWING	HAY MOWING DATES	COMMENTS: each annual report (Wilson) contains information concerning observations on mowing date
2013	July 2013 + October 2014*	22 May – 24 July (7)	11, 12 July	Data collected + summarized in report (Wilson); observations in B. Wilson's journal; summary of summer, fall observations in <i>rare's</i> grassland fields.
2014	October 2014* + December 2014	4 June – 16 July (7)	17 July	Monitoring data sheets collected by R. Milne; summary (Wilson) of South Gate fields - observations 13 Apr – 29 Sep.
2015	July 2015	3 June – 15 July (7)	20 July	Monitoring data sheets collected by R. Milne; summary (Wilson) of mowing date observations only.
2016	July 2016	30 April – 9 July (7)	19 July	Data collected by B. Wilson; bulleted report pre- & post-mowing observations and post-mowing ground searching.
2017	August 2017	24 April-11 July (12)	17 July	Summary of all observations April to post - mowing date; data collected by B. Wilson (6) & R. Dickson (1), April-May data to R. Unruh.

* same report

Bobolink Monitoring 2017

In 2017 both SFW, ~14 ha., and SFE, ~10 ha., (collectively referred to in this report as SF) were monitored. Dimensions of SFW are approximately 550m X 270m with a three-sided buffer (not mowed) on the periphery of the northern half; dimensions of SFE are approximately 550m X 200m.

Five monitoring dates, weekly from 24 April to 31 May 2017, were undertaken in SF as part of the spring migration monitoring; six monitoring dates occurred weekly (Tuesdays) from 6 June to 11 July in SFW (and in SFE on 27 June) specifically for Bobolink; and lastly, monitoring of SFW only was undertaken during mowing, 17 July, and a post-mowing walk about the field by R. Dickson, 18 July.

Monitors attempted to ensure coverage of all sectors of SFW, designated 1 to 6 on the SFW data sheet prepared in 2014 by R. Milne with input from *rare* volunteer bird monitors (Appendix A). Monitors maintained communication with each other by using FRS radios. Discussion among monitors on-site at the end of each monitoring session led to consensus about numbers of males and females observed. Table 3 summarizes numbers of individuals observed during each monitoring date, 24 April to 18 July, 2017.

Spring Migration Monitoring Procedures in South Field from 24 April to 31 May 2017

As part of the Spring migration monitoring, SF was monitored according to spring migration protocols. All species observed were tallied and numbers of individuals recorded. Data were submitted to data compiler for spring migration as per usual. Bobolink numbers are included in this report.

- From 24 April to 15 May, two monitors walked approximately 70-80m apart in a North to South direction in SFE and in a South to North direction in SFW.
- On 22 May, two observers scoped SFW from South Lane (30 minutes) and traversed SFW from West to East then East to West when about 150-200m apart.
- On 31 May, two observers traversed SFE and SFW walking East to West about 200 m apart.
- Spring migration monitoring of SF took place between 6:35 a.m. and 8:20 a.m. for 45 to 90 min., average 64 min.

Bobolink Monitoring Procedures from 6 June to 11 July 2017

- The protocol followed was based upon the number of observers available (three observers on 13 June; eight on 27 June; five to seven on other dates). Monitoring during June and early July took place between 9: 15 a.m. and 10:45 a.m. for 43 to 70 min., average 54.6 min. Starting time was delayed so that monitors could avoid the considerable traffic congestion in the area resulting from road and bridge reconstruction. Since SFE is a two-year-old hay field and unlikely to attract nesting Bobolinks (Renfrew, Rosalind et al. 2015) it was only monitored in June on the 27th to confirm Bobolink presence/absence.

Bobolink Monitoring Procedures during Hay Mowing on 17 July 2017

- Mowing began about 10:30 a.m. and ended at 1:51 p.m. About a dozen swaths were mowed around the field while the remaining cuts were made from east to west continuing along the north-south axis.
- During initial mowing, monitors including the recorder, D. DeBruin, were stationed along the north end of SFW; when peripheral mowing was completed and mowing began from north to south and moving in a westerly direction, monitors repositioned themselves: three monitors on each side spaced 100+m apart moving westerly as mowing progressed. Monitors were present from 10:15 a.m. to at least 2:30 p.m.
- Monitors observed with binoculars and, when feasible, telescopes. Two or three monitors with binoculars walked East to West while others observed from a fixed position with telescopes and binoculars within or along the periphery of the field.

Identifying Bobolink during monitoring

- Identifying males in breeding plumage is straight forward for birders who volunteered to monitor Bobolink. Two males were observed in moult during the mowing, 17 July 2017.
- Identifying females in May and early June is straightforward until young are capable of sustained flight, i.e. >200m, about 16 days after hatching. Female and “full-grown” juveniles appear similar under monitoring conditions because of distance from observer, light conditions and foliage.
- Identifying juvenile Bobolink at distance is problematic unless they are 1) “bob-tailed”; 2) observed within approximately 13 days after fledging when they are capable of only

short, sometimes awkward flights; 3) receiving food from an adult (female or male). Adults, even those within flocks after successful nesting, will continue to feed their own young for up to at least 28 days (Renfrew, Rosalind et al. 2015).

- Bobolink song is readily identifiable by observers. Description of male behaviours associated with song is available in Renfrew, Rosalind et al. (2015); Stokes and Stokes Vol.3 (1989).
- Nine different call notes have been identified (Renfrew, Rosalind et al. 2015), eight of which are not known to occur outside of the breeding season. The “pink” call is given throughout the year, particularly in flight.
- Although sonograms for several of these calls are available on-line, specific playback and recordings, if available, were not made available to monitors.

Table 3: SF Bobolink monitoring observations, 24 April to 18 July 2017.

Dates	Males	Females	Juveniles	Nests	Comments
24 APRIL	0				2 abreast SF lengthwise (4 transects)
3 MAY	2(3)				2 abreast SF lengthwise (4 transects)
8 MAY	5				2 abreast SF lengthwise (4 transects)
15 MAY	10	4			2 abreast SF lengthwise (4 transects))
22 MAY	9	5			2 observers with scopes, ½ hour from South Lane; then 2 abreast W to E; E to W
26 MAY*	3	3			2 observers from South Lane observed 1 pair BOBO in SFE
31 MAY	9 (13)	1			2 abreast SF E to W
6 JUNE	9	2			6 observers; 2 abreast E to W; 4 on periphery
13 JUNE	11 (13)	6 (7)			3 abreast E to W
20 JUNE**	15 (21)	8 (11)		1 nest/5 eggs	2 abreast E to W; 5 on W & N periphery
27 JUNE	9 (10)	1 (2)			3 abreast E to W in SF; 3 on W periphery & 1 at N end of SFW
4 JULY	5 (6)	3			3 abreast walking E to W; 2 standing mid-field; 1 in NW corner; 1 W side
11 JULY	5 (6)	3 (4)			2 abreast walking N-S, S-N; 2 standing mid-field; 1 in NW corner; 1 N end
17 JULY	5 (6)	2 (4)	0 (1)	1 nest/1egg	7 observers at N end; then 3 W & 3E sides, 1 N
18 JULY	1	1	2		1 walkabout

Legend:

- x (y) where x = number observed with high confidence e.g. # observed at the same time and y = maximum number possibly observed. After each monitoring period, discussion among monitors contributed to consensus of number of males, females and juveniles observed in terms of x(y).
- *Observations made during monitoring of South Lane (R. Dickson, B. Wilson).
- **See Appendix B for sample of data summary based on observations recorded by monitors on this date.
- Note: Only SFW monitored June 6, 13, 20 and during July.

Observations during Spring Migration Monitoring, 24 April to 31 May 2017

Two (possibly three) males were first observed in song flight and on perches, 3 May. By 15 May, the first females were observed and 10 males were present, seven males and three females in SFW, three males and one female were observed in SFE. The latter were considered birds from the hedgerow between SFE and SFW and from SFW. Similarly, a sighting of one pair in SFE during South Lane monitoring on 26 May, was assumed to be from SFW. In previous years, Bobolink were observed perched in the hedgerow between SFW and SFE and occasionally in SFE when it was planted in soy or wheat, presumably foraging.

Observations during June and early July Bobolink Monitoring, 6 June to 11 July 2017.

Throughout this period, sightings of males outnumbered sightings of females, understandably, since only females incubate the eggs (Renfrew, Rosalind et al. 2015). On 20 June, 23 Bobolink were observed, possibly as many as 32, the most at one time, of which 8, possibly 11, were identified as female. As well on this date, one nest with 5 eggs was discovered by R. Dickson. On 27 June, the number of females observed during the monitoring period was the fewest since 6 June. On 23 June, between monitoring dates 20 and 27 June, 120 mm of rain fell across the northern portion of the Grand River watershed in the span of two to three hours (*Grand Actions July 2017*). Were females on or off nest on 27 June? Could the weather have negatively impacted nesting/incubation? Cold, rainy weather can substantially increase nestling mortality (Renfrew, Rosalind et al. 2015). See below for further discussion and questions concerning Bobolink observations during the second half of June.

Bobolink Observations during Mowing of the Hay, 17 July 2017

July observations, including numbers and flock make-up, suggest that at least one, possibly a few, family groups remained in the field to the mowing date. Observations of agitated males remaining in specific locations within the field before and after mowing of that portion of the field and an agitated female with food before and after mowing, suggest that some pairs or a pair was attempting to raise a second brood. Although one brood per season is the norm, Bobolink will re-nest after a successful fledging of the first brood or after nest failure (Renfrew, Rosalind et al. 2015). On mowing day, R. Dickson found a nest with one egg and an agitated male and female with food nearby. Young of this nest could be dispersed in the field, e.g. nearby swale. This single egg may or may not have been viable.

Bobolink nesting phenology in Ontario based on available literature.

The information in Table 4, selected from available literature, provided a guide to possible nesting behaviour that might be observed by monitors in SF. The information was also used to assist in determining whether “full-grown” juveniles (i.e. capable of sustained flight and resembling females) might be present in mid-June (see below). For further information about Bobolink breeding and behaviour consult the references used.

Table 4: Nesting Phenology Information selected from Literature Sources (in Ontario and upper tier of US Great Lakes states).

Bobolink Activity and Nesting	Timing of Activity
Older, experienced males return/arrive	Early May
Younger or “new” males arrive	Several days later
Females arrive; males polygynous	4-8 days after arrival of initial group of territorial males
Nest is constructed	Over 1-2 days
Eggs laid according to egg dates in ON	7+/- days; 19 May to 16 July; norm = one brood/season; in 1 study 7.2 % re-nested after 1 st nest failed or young fledged
Incubation	10-12 days; females only
Fledge	10-11 days; many fledge within interval of 3-4 days; remain under cover* for days; depart nest unable to fly; may scatter - walk/run - 70m first day out of nest
Short, weak flights	by 13 th day; fed by both parents; each parent feeding specific fledglings; may feed young for ~4 weeks after fledging
Sustained flight	>200m by 16 th day; size & plumage similar to female; pursue adults repeating Begging Calls
Flocking	flocks increase in size as fledglings and breeders join as early as 6 days after 1 st young leaves nest; immatures may begin foraging as early as 26 days after fledging; eventually flock departs breeding field.

*Observations in previous years suggest that the swale with its dense clusters of forbs (e.g. goldenrod) likely provide cover for fledglings. Frequently adults were observed perched atop forb stems in the swale. See Appendix B for sample of compiled monitoring data (20 June) and note distribution of observations with respect to the swale.

Extrapolating from the arrival dates of males in SF by using the information gleaned from the literature concerning Bobolink phenology (Table 4), the estimated date for sustained flight by fledglings is 23 June +/- three or four days. Considering that the largest number of Bobolink observed in SFW in “non-male plumage”, 8(11) was on 20 June, could any of these individuals have been “full grown” juveniles? Recall that by the time juveniles are capable of sustained flight (> 200m), they are difficult to distinguish from females when viewed in the field at distance because of similarity of plumage and the difficulty can be compounded by distance between observer and bird, light conditions and/or foliage interference not to mention the birds’ activities.

Resulting questions include:

- Had family groups with young of sustained flight departed SFW?
- Were nest activities still on-going? Were no fledglings capable of sustained flight?
- Was the weather a mitigating factor (see above)?
- Do the data or lack of data gathered by monitors on the 20th and 27th suggest that monitoring only once/week is insufficient at this time of the month to observe fledglings of first broods?

On the two monitoring dates, closest to 23 June, monitors did not report observing bob-tailed young chasing adults, weak fliers or any feeding between birds, all of which suggest that the non-male plumaged birds were adult females and not “full-grown” juveniles. Whittington (1982) never observed a male feed an adult female during any season. Parent birds will feed young up to 28 days after fledging (Renfrew, Rosalind et al. 2015). No observer reported an assemblage of Bobolink that indicated flocking of family group(s) that invariably form(s) a week or two after young leave their nests.

Potential for Research in South Field

- SFW and SFE are hayfields of different ages, 10-years-old and 2-years-old respectively, separated by a hedgerow of a few mature trees, some shrubbery, forbs and grasses.
- A buffer of mixed vegetation, some planted in 2006-07, delineates the north half on three sides of SFW.
- Grassland species Savannah Sparrow and Bobolink are present in number.
- SFW has a swale running its length North to South down the middle providing microhabitat for mixed forbs.
- Mowing of hay does not occur until 15 July or later (contractual agreement).
- Volunteer bird banders (2) at **rare** have in the past expressed interest in mist netting and banding grassland birds. A Motus Tower at **rare** supports research involving GPS trackers.
- As a research field, both experimental and manipulative research is possible pending project approval for long term.
- An identified priority for future Bobolink research (Renfrew, Rosalind et al. 2015) includes seasonal survival during post-fledging. Currently such research is being undertaken (2015-16) with Savannah Sparrows at **rare** in an adjacent research field.
- SF is a suitable research field for MSc thesis involving either Bobolink or Savannah Sparrow or both.

Potential for further Bobolink Field Study by **rare** Volunteer Bird Monitor(s)

Two objectives of Bobolink monitoring have been to 1) establish the hay mowing date that would best reduce/eliminate nestling mortality/disturbance, 2) assist researchers gathering data following a non-invasive protocol to identify portions of the field in which Bobolinks tend to be observed. Weekly monitoring during June to mid-July did not, however, capture the success/failure of first broods. The extrapolation from arrival of males in SFW in terms of available nesting phenology (Table 4) suggests that increasing monitoring in early-mid June is necessary to estimate the reproductive output.

rare Volunteer Bird Monitors of South Field in 2017.

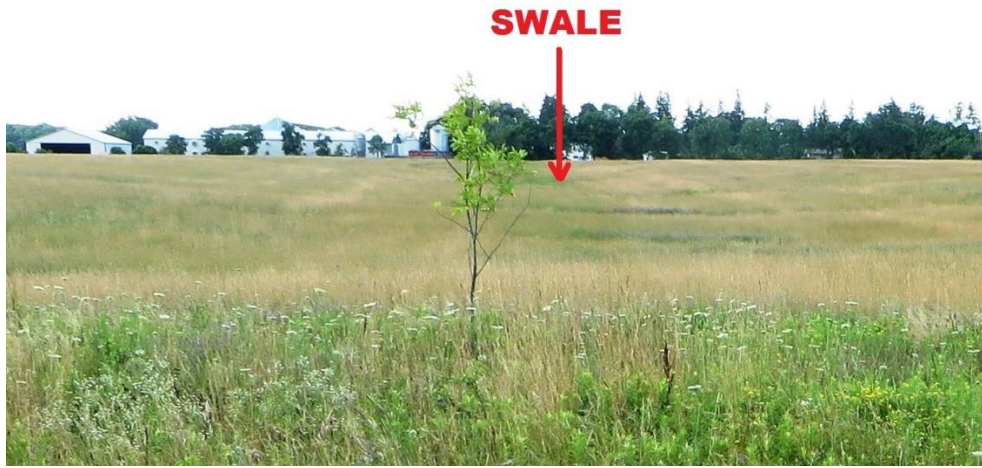
- Spring migration monitoring, 24 April to 31 May: Ross Dickson, Bill Wilson.
- Bobolink monitoring, 6 June to 11 July (6 monitoring dates): Brian DeBruin (1), Donna DeBruin (5), Marco DeBruin (5), Ross Dickson (6), Randy Fowler (5), Barb Mockford (1), Glenn Mockford (4), Julie Mercer (1), Michelle Tomins (3), Bill Wilson (5), Heather Wilson (1).
- Monitoring during mowing (17 July 2017): Donna and Marco DeBruin, Ross Dickson, Ruth Kroft, Anne McLagan, Glenn Mockford, Bill Wilson.

In 2017, the observations of the aforementioned **rare** volunteer bird monitors provided both the numerical data and descriptions of observed Bobolink behaviour.

Acknowledgements:

Many thanks to the **rare** bird monitoring volunteers whose commitment to field work and whose discussions concerning protocols made this five-year effort possible. Unavailable during the fifth year of this monitoring, Jerry Guenther's contribution during the first four years was both instrumental and most appreciated. Ross Dickson and Heather Wilson made significant contributions to this report. Photos were provided by Ross Dickson, Randy Fowler and Heather Wilson. Bobolink reports over the five years were compiled, written and submitted to **rare** by Bill Wilson.

Photos:



SFW July 2014 (photo H. Wilson)



Bobolink nest in SFW with 5 eggs, 20 June 2017 (photo R. Dickson).



Bobolink nest in SFW with 1 egg, 25 June 2017 (photo R. Dickson).



Four Bobolink perched on forbs in swale of SFW on 15 July 2017. Distance, light conditions, foliage and similar plumages makes sorting females from full-grown juveniles difficult at distance (photo R. Fowler).



One of two male Bobolinks observed 17 July 2017 showing molt (photo R. Fowler).



Female with fledgling moments after a feeding, 15 July 2017 (photo R. Fowler).

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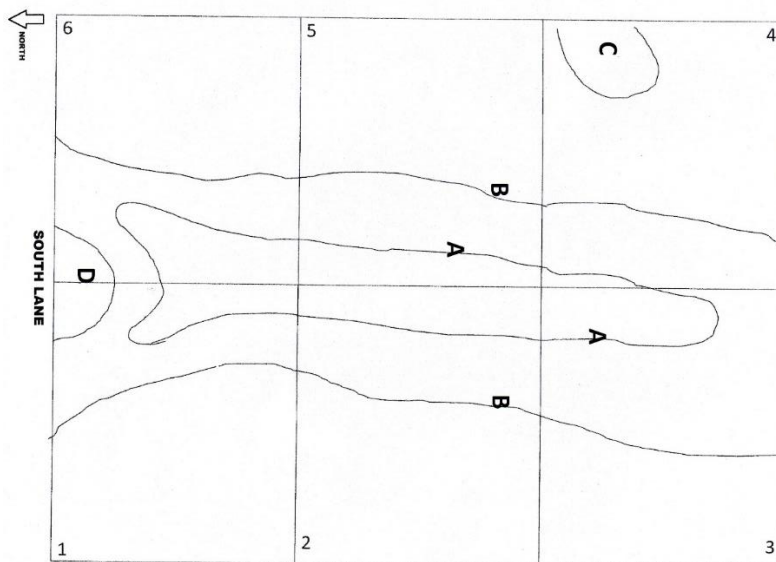
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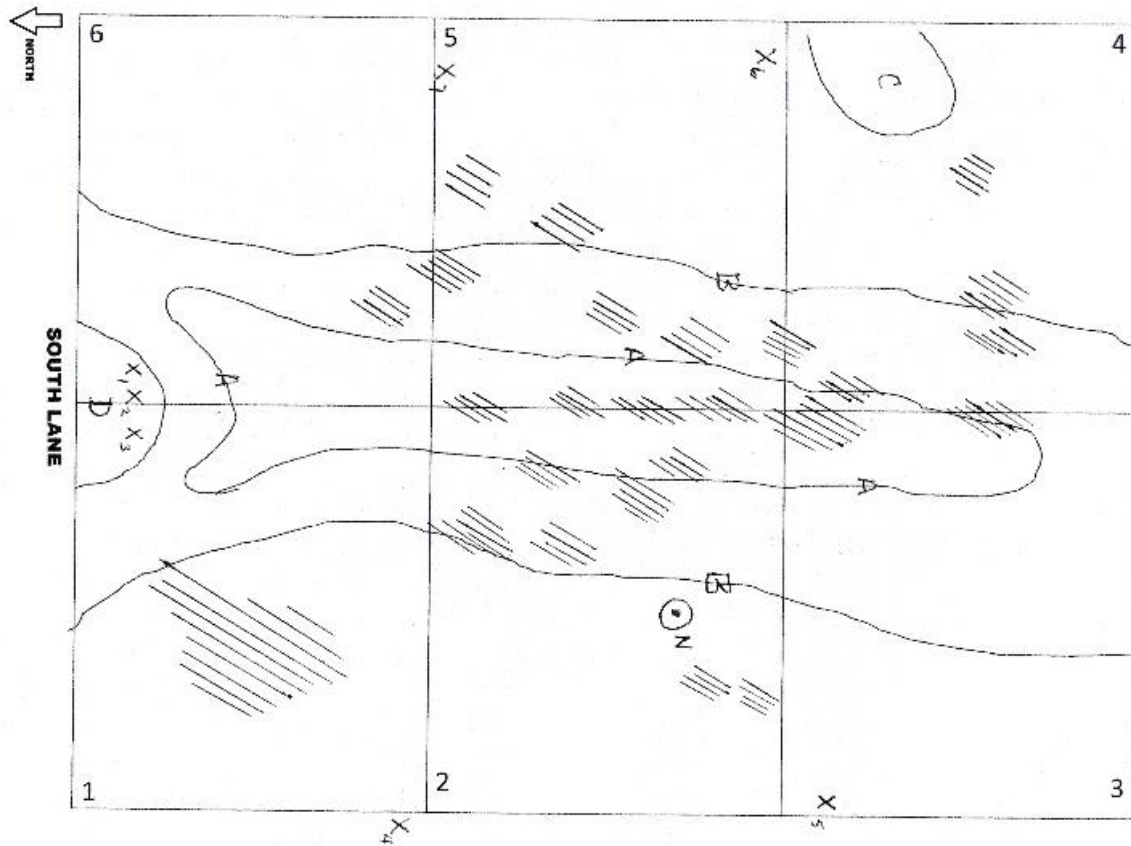
Appendix A: South Field West data sheet for recording observations during Bobolink monitoring

The data sheet used by Bobolink monitors was designed by R. Milne based upon discussions with **rare** volunteer bird monitors in 2014. Approximate contour lines, drawn by Milne, illustrate the swale running N – S the length of the field (A), brow of slopes (east-facing and west-facing) on each side of the swale (B), and two small hillocks (C and D).

Six sectors of equal dimension, labelled one to six on the data sheet assisted in positioning the monitors and positioning sightings made.



Appendix B: Sample data showing approximate location of sightings during monitoring, 20 June 2017, the monitoring date during which the largest number of Bobolink were reported during 2017.



Legend:

- (N) = location of nest found 20 June 2017.
- X 1-7 = location of monitors during monitoring period, 9:15 to 10:06 a.m.
- // // // // = approximate spatial location of Bobolink(s) sighting by monitor(s).

The tendency of Bobolink sightings to be made along either east-facing or west-facing slopes of the swale or within the swale was evident to monitors throughout the five-year monitoring of SFW and continues to raise several questions. See R. Milne's research proposal on file at *rare*.