Final Report for Illinois Department of Natural Resources, Special Wildlife Funds Grant – Illinois Wildlife Preservation Fund.

Grant Agreement: #12-L11W

Grantee: Midewin Tallgrass Prairie Alliance
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Timeframe of Project: September 5, 2011 to June 30, 2013

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Project Objectives:

Funding was received from the Illinois Department of Natural Resource's Wildlife Preservation Fund to address the following objectives:

1. Locate Loggerhead Shrike during the breeding season in the Midewin National Tallgrass Prairie.
2. Assess site re-use/fidelity rates.
3. Assess band status of adult shrikes.
4. Trap and band adult shrikes.
5. Recapture previously banded adult shrikes.
6. Determine age ratio of shrike population.
7. Quantify number of breeding pairs and single birds.
8. Quantify reproductive effort and nesting success.

Completed Project Description:

During the tenure of the Grant to which this report corresponds (Grant Agreement #12-L11W), the Midewin National Tallgrass Prairie has been surveyed for breeding Loggerhead Shrike, an endangered species in Illinois. Survey effort has been focused on historic breeding sites, due to the species tendency toward site re-use, but also areas of suitable habitat. Reproductive success has been quantified by behavioural monitoring and nest checks. Adult shrikes were trapped and banded with a stainless steel US Geological Survey (USGS) bird band, thereby facilitating assessment of immigration rates and over-winter survival of this small, isolated, but significant breeding population. Age ratios of returning breeders was quantified using trapping efforts and behavioural observation, allowing more detailed assessment of over-winter survival by age cohort and sex. The results from this project will assist in delineating limiting factors and facilitate conservation efforts for the species both in Illinois, and more broadly.

Summary of Project Accomplishments: *Introduction*

The Loggerhead Shrike (*Lanius ludovicianus*) is one of two species of shrike that occur in North America. The species includes from 7 to 13 subspecies (reviewed in Yosef 1996), with 11 subspecies generally recognized (Millers 1931, Figure 1). The Loggerhead Shrike is the only species of shrike that has an exclusively North American range.

The species utilizes a variety of shrubland and grassland habitats that vary from shrub-steppe in western United States to unimproved pastureland associated with limestone plains in the eastern Canadian province of Ontario (Pruitt 2000). The range of the Loggerhead Shrike in North America prior to European colonization is unknown. It is believed that in the late 1800s, the species expanded into northeast North America with the clearing of land for agricultural purposes (Cadman 1985). By the mid-1900s, the shrike was considered to be common throughout its continental North America range. But, by the 1950s, Loggerhead Shrike populations were noted to be in decline, in particular in northeastern North America (Pruitt 2000).

Shrikes breeding in northern portions of their range, including the Midewin National Tallgrass Prairie, are believed to migrate to areas in which there is less than 10 days of snow cover each winter (Yosef 1996, Figure 2). Those areas that support breeding populations of Loggerhead Shrikes in the southern United States and Mexico are also areas where the species is known to over-winter – i.e. resident and migrant populations mix on the wintering grounds.

The Loggerhead Shrike epitomizes the dire conservation status of many grassland birds in North America.

Populations have been declining range-wide for the last 50 years (Cade and Woods 1996, Figure 3) and the species is now largely extirpated in northeastern North America, even where apparently suitable habitat still exists (Pruitt 2000, Figure 4). The Loggerhead Shrike has experienced the 6th largest decline of any of the 341 species of Neoptropical migratory birds since the inception of the Breeding Bird Survey (79%; Berlanga et al. 2010). The United States Fish and Wildlife Service considers the Loggerhead Shrike to be a bird of Conservation Concern and it is listed as an Endangered, Threatened, Species of Concern or a Watch List species in 26 states (Pruitt 2000). The species is listed as "Endangered" in Illinois and is now rare in the northern half of the state (Figures 3 and 4).

The Midewin National Tallgrass Prairie supports a small, apparently isolated population of shrike that has ranged up to 13 breeding pairs and up to five single birds annually since 2005. This population represents one of the few remaining migratory populations of LOSH in eastern North America (Figure 4) and thus is an important stronghold for the species.

Many reasons have been cited as potentially contributing to the decline of the Loggerhead Shrike, including loss of habitat on the breeding and wintering grounds, pesticides, mortality associated with roads, adverse weather conditions and inter-specific competition. It is likely that a combination of factors is affecting the species, possibly at different times throughout their life cycle. For example, adverse climatic trends on the breeding grounds may reduce nesting success, while road mortality may decrease the survival rate during migration. Further research is required to better understand the cause(s) of the decline and seasonal interactions.

Materials and Methods

Fieldwork activities were carried out under appropriate permits, including an Illinois Department of Natural Resources Scientific Permit, Illinois Department of Natural Resources Permit for Possession of Endangered or Threatened Species, and Federal bird banding permit 21072-R.

Shrikes were located by Dr. Chabot, and by volunteers and staff of the Midewin National Tallgrass Prairie participating in the Loggerhead Shrike and Upland Sandpiper Survey and/or the Grassland Bird Survey. Breeding pairs and single birds were monitored throughout the season by Dr. Chabot but the outcome of some (re)nesting attempts are unknown. Two nests checks were undertaken at each nest to determine the number of eggs laid and number of nestlings hatched. Fledging success was determined by the presence of young birds.

Adult shrikes were trapped using a walk-in live trap similar to a combination Potter and Chardonneret trap. Traps were baited with a small, live pet-store mouse protected in a hardware cloth cage and placed on roads or in pastures near routinely used perches.

Adult shrikes were banded with a stainless steel band on their right leg from 2005 to 2012. From 2005 to 2007, nestling shrikes were also banded with a stainless steel band, but on their left leg. In 2013, adult shrikes received the stainless steel band on their left leg, to help in determining return rates and age structure more accurately in the population (i.e. shrikes will be banded on the left leg in odd years and on the right leg in even years as of 2013).

The band status of returning birds was determined by visual observation of individuals, with the aid of a birding spotting scope.

Adults were sexed based on the presence (female) or absence (male) of a brood patch and aged based on the retention of juvenile (Hatch Year) plumage as Second Year (SY – first breeding season) or After Second Year (ASY – second or subsequent breeding season) (Pyle 1997).

Morphological measurements (e.g. wing chord length, tail length, bill width, bill depth, etc.) were taken

from all adult birds before they were released at the location of their capture. Two tail feathers (the outer right rectrice – R6 and/or the inner right rectrice – R1) were obtained from each adult for use in genetic assays as per Chabot (2011).

Shrikes were released at their point of capture. Handling time was less than 15 minutes per bird.

Results

Objective 1: Locate nesting territories of Loggerhead Shrike in the Midewin National Tallgrass Prairie.

A list of occupied territories (2005 – 2013) is provided in Table 1. A total 27 sites have had breeding pairs. A further 5 sites have had a single adult bird, but no breeding activity. Figure 5 depicts the location of the territories used between 2005 and 2013. Universal Transverse Mercator system coordinates have been provided to William Glass, Midewin National Tallgrass Prairie, US Forest Service (USFS).

Objective 2: Assess site re-use/fidelity rates.

Site re-use by Loggerhead Shrike at Midewin National Tallgrass Prairie from 2006 to 2013 is presented in Table 1.

Ten of the total 27 (37%) sites used by breeding pairs of shrikes have been used only once in the 9 year window of study (Table 1). A breakdown of the number sites re-used is as follows: 1 site has been used for 8 of the 9 total years, including 5 consecutive years ("South" site along West Patrol Road); 1 site has been used for 7 consecutive years (Bunkers Northwest of Gate 10 on the west side of Midewin); 1 site has been used for 6 out of 9 years, including 4 consecutive years; 1 site has been used for 5 of 9 years; 5 sites (19%) have been used for 4 out of the 9 years; 6 sites (22%) have been used for 3 years, 4 of which were used consecutively over the 3-year period; 2 sites (7%) have been used for 2 of the total 9 years during which monitoring has occurred (Figure 5).

Site fidelity, versus site re-use, has been difficult to determine due to low retrapping rates – two shrikes banded as adults, both male, returned as breeders in the subsequent year, one to the same site (MacArthur Road) an one to a different site (South Patrol Road to Bunkers Northwest of Gate 10). Two nestlings – both females – returned as breeders in the year after hatch – one returned to breed at a nearby adjacent site (MacArthur Road to Baseline Road South) and the other to a more distant site (Powerline to Railway and Bike Path). Additionally, one bird banded as an independent Hatch Year bird was retrapped – this bird, a female, nested within a short distance of her natal site (Crap Pile Road West to Bike Path West End).

Objective 3: Assess band status of adult shrikes.

Banding has been undertaken annually in Midewin since 2005 with varying success (i.e. total number of adults in the population that could be trapped and banded) (Table 2). In total, 68 adult and 2 independent Hatch Year shrikes were trapped and banded between 2005 and 2013. The percentage of the total known breeding age population (i.e. not including independent Hatch Year birds) that has carried bands at the end of the season (i.e. both returning banded birds and birds banded in the year) has ranged from 44% to 96% (Table 2). However, only 17% to 59% of the adults have been found to be banded at the start of any season (Table 2). Of the 40 returning banded birds, 16 (40%) were female and 24 (60%) were male.

An annual breakdown of return banded birds is as follows:

2013: 6 (38%) shrikes were confirmed as returning banded birds, including 3 males and 3 females, all of which were banded as adults, presumably in Midewin.

2012: 5 (59%) shrikes were confirmed as returning birds, including 2 males and 3 females. One returning female was banded in 2011 as an independent Hatch Year bird.

2011: 8 (31%) shrikes were confirmed as returning breeders to Midewin, including 6 males and 2 females, all of which were banded as adults.

2010: 5 (31%) shrikes were confirmed as returning breeders to Midewin, including 4 males and 1 female.

2009: 3 (19%) shrikes were confirmed as returning breeders to Midewin, including 2 males (one of which was banded as a SY bird in Midewin in 2008) and 1 female. All were banded as adults.

2008: 4 (24%) shrikes were confirmed as returning breeders to Midewin including 2 males (one of which was banded as a SY bird in Midewin in 2007) and 2 females. One (7%) of 15 nestling banded in 2007 returned in 2008 – a female – but was not found again in subsequent years.

2007: 4 (17%) shrikes were confirmed as returning adult birds, including 2 males and 2 females. Additionally, 1 (6%) of 18 nestlings banded in 2006 returned to breed in Midewin – again female and also not found in subsequent years.

2006: 5 (21%) adults were confirmed as returning birds including 3 males and 2 females. None of the 7 nestlings banded in 2005 returned in 2006, or thereafter.

Objective 4: Trap and band adult shrikes using a stainless steel USGS bird band.

A total of 70 shrikes have been trapped in Midewin between 2005 and 2013 (Tables 2 and 3). Of these, 35 (50%) were female and 35 (50%) were male.

A breakdown of banding effort by year is as follows:

2013: 4 shrikes (1 female, 2 male and 1 Hatch Year) were banded. A total of 38% of the adult population was banded at the start of the season and 63% of the known adult population was banded at the end of the season.

2012: 3 adult shrikes (2 female and 1 male) were banded. A total of 59% of the adult population was banded at the start of the season and 96% of the known adult population was banded at the end of the season.

2011: A total of 10 shrikes were banded: 9 adult shrikes (6 female and 3 male), as well as one independent Hatch Year (later determined to be female). A total of 31% of the adult population was banded at the start of the season and 65% of the known adult population was banded at the end of the season.

2010: 8 adult shrikes (5 female and 3 male) were banded. A total of 31% of the adult population was banded at the start of the season and 72% of the known adult population was banded at the end of the season.

2009: 10 adult shrikes (7 female and 3 male) were banded. A total of 19% of the adult population was banded at the start of the season and 81% of the known adult population was banded at the end of the season.

2008: 6 adult shrikes (2 female and 4 male) were banded. A total of 24% of the adult population was banded at the start of the season and 59% of the known adult population was banded at the end of the season.

2007: 13 adult shrikes (5 female and 8 male) were banded. A total of 17% of the adult population was banded at the start of the season and 71% of the known adult population was banded at the end of the season. Fifteen nestlings were banded from 5 nests. 2007 was the last year in which nestlings were banded.

2006: 7 adult shrikes (2 female and 5 male) were banded. A total of 21% of the adult population was banded at the start of the season and 44% of the known adult population was banded at the end of the season. Eighteen nestlings were banded from 4 nests.

2005: 9 adult shrikes (3 female and 6 male) were banded. None of the adult population was banded at the start of the season and 56% of the known adult population was banded at the end of the season. Seven nestlings were banded from 2 nests.

Objective 5: Recapture previously banded adult shrikes.

Forty (61%) of the 66 shrikes banded between 2005 and 2012 in Midewin have been resighted in subsequent years (2006 to 2013) (Table 4). However, the actual return rate is likely lower than 61% as it is possible that birds have returned in more than 1 year and thus are being 'double counted'. Of the returning birds, only 2 (3%), both banded as SY males, were retrapped. Two (5%) of 40 shrikes banded as nestlings have returned, both of which were retrapped. One (100%) bird first banded as independent Hatch Year birds was retrapped.

Objective 6: Determine age ratio of breeding shrikes.

The proportion of SY shrikes (i.e. first year breeders) in Midewin has ranged from 6% to 44% of the total known population between 2005 and 2013 (Table 4). The ratio of SY male to SY female shrikes has varied – in general more SY birds were males (62%) (Table 4). Overall, of those birds that were aged as SY or ASY, 13% to 50% of the population has been first time breeders (Second Year birds). The overall lower percentage of SY birds in 2005 and 2006 is likely due to observer skill. Excluding these years, SY birds have comprised 35% to 50% of the total population of SY and ASY birds.

Objective 7: Quantify number of breeding pairs and single birds.

During the period of 2005 to 2013, the population of Loggerhead Shrike in the Midewin National Tallgrass Prairie ranged from 4 to 13 breeding pairs and 0 to 5 single birds annually for a total of 77 breeding pairs and 14 single breeding-age adult shrikes (Table 5).

Objective 8: Quantify reproductive effort and nesting success of breeding population.

Reproductive effort has been quantified through a combination of nest checks (to count eggs during incubation and nestlings after hatch and prior to fledge) and behavioural observations (to determine fledging success). A summary of overall reproductive success by pair is presented in Table 1 – success (i.e. a nest that has made it to nestling or fledging stage, which may be a slight over-estimate of overall success as not all nests with nestlings may have fledged young) has varied annually from a low of 55% (2007) to a high of 100% (2005 and 2012).

Objective 9: *Obtain feather samples for genetic and stable isotope analysis* .

Two tail feathers (the outer right rectrice – R6 and/or the inner right rectrice – R1) were obtained from each adult trapped. DNA has been extracted from the proximal tip of one feather and has been used in genetic assays of 10 nuclear genetic markers (i.e. microsatellite loci). Remaining feather tissue has been archived in the laboratory of Dr. Stephen Lougheed, Associate Professor, Queen's University, Kingston, Ontario, Canada, who is a collaborator with Dr. Chabot on genetic research on Loggerhead Shrike.

Objective 10: *Prepare peer-reviewed publication* .

Information obtained from this project and prior research on Loggerhead Shrike has been compiled into a draft manuscript for publication. Completion of this draft will be undertaken upon review and approval by IDNR, USFS and other project partners. Results of research on the Loggerhead Shrike in Midewin, including that funded by the Wildlife Preservation Fund, was conveyed to Midewin staff and volunteers on April 11, 2013 as part of the organization's lecture series.

Discussion and Summary

Population Size

The population of Loggerhead Shrike has varied more than three-fold from 2005 to 2013, with no steady increasing or decreasing trend (Figure 6). Further, the number of singles and pairs do not appear to be experiencing similar trends. As single birds cannot be reliably sexed, it is not possible to determine if sex-biased mortality, leading to a bias in singles of a particular sex, may be impacting population size. Although, it would seem unlikely that single birds of opposite sex would not eventually pair.

Generally, when the population of After Second Year birds increases, overall population size also increases (Figure 7). The overall number of SY birds has remained relatively steady across years, despite fluctuations in population size and reproductive success. Results suggest that differences in over-wintering success between age cohorts, in particular of ASY birds, may be important to the long-term viability of this population. However, reproductive also appears to have an impact on population size in the subsequent year – population size tends to decrease following years in which reproductive success is lower (Figure 8), suggesting that the species is limited based on factors throughout the annual cycle.

Site Fidelity and Re-Use

A pattern of high site re-use has been noted in Midewin, which appears to be common in the species (Pruitt 2000, Chabot, unpublished data). Low retrapping success and the current banding scheme, in which individuals are not uniquely identified, has made it difficult to compare site fidelity and re-use rates. Historically, authors reported the Loggerhead Shrike to be site-faithful (Atkinson 1901, Bent 1950, Porter et al. 1975, Kridelbaugh 1983). However, most of the earlier evidence for site fidelity in the species resulted from observations of the reuse of nests or nest sites by unmarked birds, with observers assuming that if a site was occupied in two consecutive years, the adults previously occupying the site had returned. More recently Haas (1989) reported low return rates in a North Dakota population of Loggerhead Shrike, which was attributed to low site fidelity, rather than over-wintering mortality. Similarly, in Ontario data from colour-banding studies, in which individuals can be uniquely identified, indicates that site fidelity is lower than site reuse rates (Chabot, unpublished data). Haas (1989) concluded that there was a need to re-evaluate site fidelity in Loggerhead Shrikes, in particular in light of the decline of the species. In particular, when evaluating the cause of decline, low site fidelity and return rates should not necessarily be taken as evidence of high winter mortality in this species.

Site re-use in Midewin appears to be related to nesting success, with sites at which reproduction was successful being reused more often than those at which it was not (Figure 9). Research by Etterson (2003) indicated that social factors were partly responsible for the spatial distribution of shrikes – breeding sites were shown to be spaced more close together than expected if nest site choice were random. The apparent non-random re-use of sites by shrikes may indicate that social factors are also important in site reuse. Specifically, individuals may be taking social cues based on the presence of successfully fledged young as a proxy measure for territory quality.

Returns and Recaptures of Adult Shrikes

To date, only two shrikes banded as adults have been re-trapped – once trapped as adults, shrikes become 'trap-shy'. Nonetheless, resighting of banded birds is not difficult, allowing for estimation of return rates in the population. Estimates of this nature depend upon many factors, including search effort, the detectability of the species, the ease in which a returning bird can be identified by reading a marker and the permanence of the marker.

The return rate of adult shrikes to Midewin (61%) is similar, but somewhat higher (although as noted above, the rate may be somewhat elevated due to 'double counting' among years), to that noted elsewhere: 27.3% in 2000, 27.6% in 2001, 13% in 2002, 11% in 2003 in Ontario (Okines and McCracken 2003); 14% in North Dakota (Haas 1989), 16% in Manitoba (Collister and DeSmet 1997), 32% in Alberta (Collister and DeSmet 1997), 41% in Indiana (Burton and Whitehead 1990) and 47% in Missouri (Kridelbaugh 1983). The larger proportion of unbanded shrikes at the start of each breeding season, in particular when compared to the proportion of the total population banded at the end of the prior year (Table 2, Figure 10), suggests either a significant level of recruitment into the population or that a large number of shrikes are not located in (or around) Midewin annually. The results of breeding dispersal distance for the species, the large number of unbanded birds that are ASY (and thus less likely to disperse very far from the previous year's breeding site), and the isolated nature of the population of Loggerhead Shrike in the Midewin National Tallgrass Prairie suggests that most of these birds were either born, or bred in the vicinity the previous year

The higher return rate of male versus female shrikes in Midewin (60:40 male:female) (Table 2) is not unexpected. In general, the higher return rate of male birds is to be expected in birds where males gain a greater advantage by re-occupying sites that are familiar to them (Greenberg 1980). Whereas for female birds, the advantage is gained in mating with the most fit male and/or male with the best territory (Greenberg 1980).

Nestling Return Rates

To date, 2 (5%) of the 40 shrikes banded as nestlings have been found to return to breed at Midewin, both of which were female. In addition, one bird banded as an independent Hatch Year bird returned the subsequent year to breed in Midewin, which was also female. The natal return rate for shrikes in Midwein is similar, but somewhat higher, to that noted elsewhere: 3.1% to 12% in Ontario (Okines and McCracken 2003); 3.6% and 1.7% in Virginia (Luukkonen 1987 and Blumton 1989), 2.4% in Indiana (Burton and Whitehead 1990), 1.2% in Alberta (Collister and DeSmet 1997), 1.1% in Missouri (Kridelbaugh 1982), 0.8% in Manitoba (Collister and DeSmet 1997), 0.8% in North Dakota (Haas 1995) and 0.0% in Minnesota (Brooks and Temple 1990). However, the bias in returns toward females is unexpected since males tend to be the more philopatric sex in birds (Greenberg 1980). Further, studies to date have reported a male bias in site fidelity and female bias in dispersal in shrikes (Kridelbaugh 1983, Haas 1989, Collister and Wicklum 1996, Okines and McCracken 2003), with as much as a five-fold difference between the sexes in some areas (Kridelbaugh 1983, Haas 1989). It is possible that our results suggest a bias in over-wintering survival in which young males have higher mortality rates than females. Alternatively, it is possible that skewed sex ratios of nestlings is leading to a higher proportion of females, and thus higher return rate. However, this does not appear to be the case (Chabot, unpublished data).

Dispersal

Although data are limited, the natal and breeding dispersal distances of shrikes in Midewin is similar to that noted in other portions of the species range. In Ontario, adult birds returned to within 0 – 47 km (mean of 2.2 km in 2000, 3.8 km in 2001, 8.5 km in 2002 and 18.6 km in 2003) of the breeding site at which they were banded and young returned to within 0 – 145 km (mean of 9.9 km in 2000, 10.6 km in 2001, 47.0 km in 2002 and 15 km in 2003) of their natal site (Okines and McCracken 2003). In western Canada, Collister and DeSmet (1997) found that returning adults dispersed an average of 2.7 km, with 95% of adult shrikes returning to within 4.7 km of their previous year's nest site, and young birds moved

an average of 14.7 km from their natal site.

Age Ratios

The proportion of SY to ASY shrikes (in Midewin has ranged greatly over the 9-year study period (Table 4, Figure 11). Overall, the number of SY birds has remained more constant than that of ASY birds, which may be driving overall population trends. Since 2007, when the majority of the population could be aged as SY or ASY, an equal or greater number of the SY birds have been female (with the exception of 2008) (Table 4, Figure 11). The result is unusual based on dispersal patterns of birds in general (Greenberg 1980) and data from shrike in other populations (Kridelbaugh 1983, Haas 1989, Collister and Wicklum 1996, Okines and McCracken 2003) and may suggest lower over-wintering survival of young males in this population. It is unknown if the lower return of SY males has driven the overall small population size (versus population fluctuations).

The ratio of Second Year to After Second Year individuals can be a valuable metric for estimating avian productivity because it does not require monitoring individual breeding sites and can often be estimated across large geographic and temporal scales (Peery et al. 2007). Ratios of juveniles to adults have been used to estimate productivity for a range of animal taxa for both theoretical and applied purposes (Ricklefs 1997, Miller 2000, Rodway et al. 2003, Flanders-Wanner et al. 2004, Peery et al. 2004, Rohwer 2004). The degree to which the age structure of the shrikes in Midewin matches that elsewhere is unknown. Data exists for shrike populations sampled in Ontario from 1999-2003 and 2008 to 2013, elsewhere in the United States between 2004 and 2007 on both the wintering and breeding grounds (Chabot, unpublished data), from Colorado over consecutive breeding seasons from ~1980 to date and from Florida and Texas over multiple winter seasons (S. Craig, pers. comm.). Comparison among data sets would help to determine if the decreasing population trend in shrikes across their range is being experienced in synchrony within age and sex cohorts, suggesting broad-scale limiting factors versus local factors. Further, data on age ratio could be used in conjunction with Breeding Bird Survey data to assess if population trend can be correlated to age ratios, validating the interpretation of age-ratio data as a predictor of population trend for shrikes.

Reproductive Success

The population of Loggerhead Shrike at Midewin has experienced a high degree of nest loss in several years. Despite this, due to the species persistence at nesting, at least 50% of the breeding pairs have produced young that have reached the nestling phase (Table 1, Figure 12).

Clutch size ranged from 4 to 6 eggs, which similar to that noted elsewhere (Yosef 1996). While reproductive effort is average, overall reproductive success appears to be low due to egg and nestling predation. This factor, rather than fledgling survival (which appears high based on behavioural observations) is likely contributing to the low population size, at least in recent years. Predation of eggs appears to be more common than that of nestlings, and predation of first nests appears more common than predation of nests later in the season. This could be due to experience gained by breeders over the breeding season, better nest concealment later in the breeding season after trees have leafed out, or increased nest height noted in renesting attempts.

Nest loss due to predation has been identified as a cause for concern elsewhere in the species' range. Predation rates can be determined by various factors, including density of predators, the occurrence of novel predators, biophysical aspects of the habitat (e.g. grass height which may provide more or less cover to potential predators) and landscape effects (e.g. increased edge effect in smaller patches of suitable habitat can lead to increased predation). These and other potential questions related to predation and its impact on Loggerhead Shrike and other grassland bird warrants further study.

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Table 1. Breeding sites occupied and reproductive success for Loggerhead Shrike in the Midewin National Tallgrass Prairie: 2005-2013. Fail = nesting attempt not successful. Nest = nest building observed, outcome unknown. Incubation = survived to incubation, outcome unknown. Nestling = survived to hatch, outcome unknown. Fledge = young successfully fledged from nest. Blank indicates site not active in that year.

Site #	Site Name	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total Years Used
1	Baseline Road North (Gate 10)	Nestling	Nestling	Fledge							3
2	Baseline Road South	Nestling	Nestling	Fail		Nestling		Fail			5
3	Bike Path E and Road Two West					Fledge	Unknown	Nestling			3
4	Bike Path West						Fledge				1
5	Bunker 63-20						Fledge				1
6	Bunkers NW of Gate 10			Fail	Fledge	Fledge	Fledge	Fledge	Fledge	Fail	7
7	Central Road West			Fledge	Nestling	Incubation	Incubation				4
8	Central Road and Road Two West						Nest	Fledge	Fledge	Fledge	4
9	East Bike Path		Fail								1
10	East Bunkers		Nestling								1
11	Jordan Creek		Nestling								1
12	Landfill North	Nestling	Nestling	Fledge				Fledge			4
13	Landfill South							Fail			1
14	MacArthur Rd		Fledge	Fail[1]	Unknown	Nestling					4
15	NE Bunkers	Nestling	Nestling	Fail				Fail			4
16	Crap Pile Rd East							Fledge		Fledge	2
17	Crap Pile Rd West					Fledge		Fledge		Fail	3
18	Powerline		Nestling	Fledge							2
19	Railway and Road Two West	Nestling			Fledge		Fail	Fledge	Fledge	Fledge	6
20	S Patrol Rd	Nestling	Fail	Fail							3
21	SE Bunkers		Nestling								1
22	W Corner NE Bunkers			Fail							1
23	W Patrol Rd – Army									Fail	1
24	W Patrol Rd Central		Nestling	Fledge	Fail						3
25	W Patrol Rd North				Fail		Fledge	Fledge			3
26	W Patrol Rd – Remediation	Nestling									1
27	W Patrol Road South	Fledge	Unknown	Nestling		Fledge	Fledge	Fledge	Fledge	Fledge	8
Percent Successful Pairs		100%	77%	55%	50%	86%	56%	75%	100%	57%	

Table 2. Annual banding status of Loggerhead Shrike population at start and end of breeding season in the Midewin National Tallgrass Prairie: 2005 - 2013.

Year	Banded Adult Population			Adults			Nestlings
	Returned banded (M:F) (% of total adults)	Banded in year	Total adults with bands (% of total adults)	Pairs	Singles	Total	Banded in year
2005	0	9	9 (56%)	8	0	16	7
2006	5 (3:2) (21%)	7	12 (44%)	13	1	27	18
2007	4 (2:2) (17%)	13	17 (71%)	11	2	24	15
2008	4 (2:2) (24%)	6	10 (59%)	6	5	17	0
2009	3 (2:1) (19%)	10	13 (81%)	7	2	16	0
2010	5 (4:1) (31%)	8	13 (72%)	9	0	18	0
2011	8 (6:2) (31%)	9	17 (65%)	12	2	26	0
2012	5 (2:3) (59%)	3	8 (96%)	4	1	9	0
2013	6 (3:3) (38%)	4	10 (63%)	7	2	16	0

Table 3. Adult and independent hatch year Loggerhead Shrike banded annually in the Midewin National Tallgrass Prairie: 2005 - 2013.

Age	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**Total**
Adult/Independent hatch year	9	7	13	6	10	8	10 [1]	3	4[1]	70
Nestlings	7	18	15	0	0	0	0	0	0	40
Total	16	25	28	6	10	8	10	3	4	110

[1]Totals include one independent hatch year bird.

Table 4. Age ratio of all adult (singles and breeding birds) Loggerhead Shrike population in the Midewin National Tallgrass Prairie: 2005 -2013.

Site Name	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Second Year (F:M)	1 (0:1)	2 (1:1)	8 (4:4)	5 (1:4)	6 (3:3)	8 (5:3)	8 (6:2)	2 (2:0)	5 (3:2)
After Second Year (F:M)	7 (2:5)	10 (3:7)	10 (4:6)	5 (3:2)	10 (5:5)	8 (3:5)	15 (6:9)	6 (2:4)	7 (3:4)
After Hatch Year (F:M:Unk)	8 (6:2:0)	15 (9:5:1)	5 (3:1:2)	7 (2:4:1)	0 (0:0:0)	0 (0:0:2)	3 (0:1:2)	2 (0:0:2)	4 (0:1:3)
Total SY:ASY:AHY	1:7:8	2:10:15	8:10:6	5:5:7	6:10:0	8:8:2	8:15:3	4:4:2	6:7:3
Percentage SY	6%	7%	33%	29%	38%	44%	31%	40%	37%
Percentage ASY	44%	37%	42%	29%	62%	44%	58%	40%	44%
Percentage AHY	50%	56%	25%	42%	0%	12%	11%	20%	19%

Table 5. Number of breeding pairs and single Loggerhead Shrike located annually in the Midewin National Tallgrass Prairie: 2005 - 2013.

Age	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**Total**
Pairs	8	13	11	6	7	9	12	4	7	77
Singles	0	1	2	5	2	0	2	2	2	14

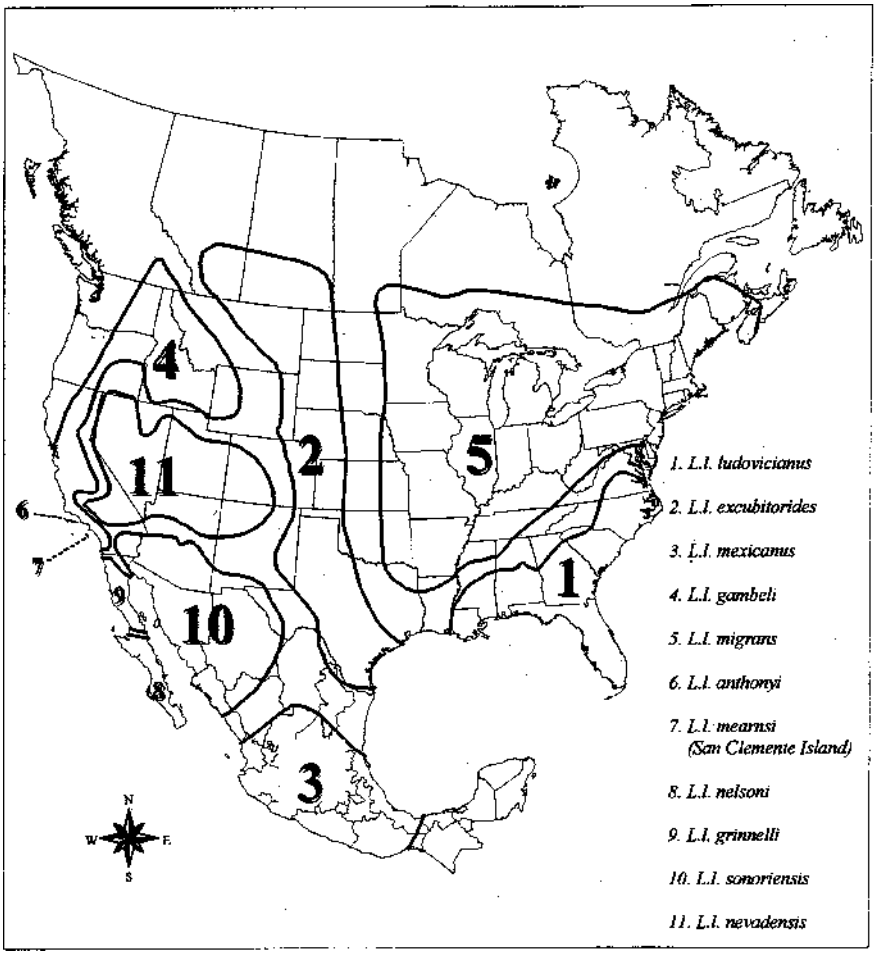


Figure 1. Subspecies designation for Loggerhead Shrike in North America as depicted by Miller 1931.

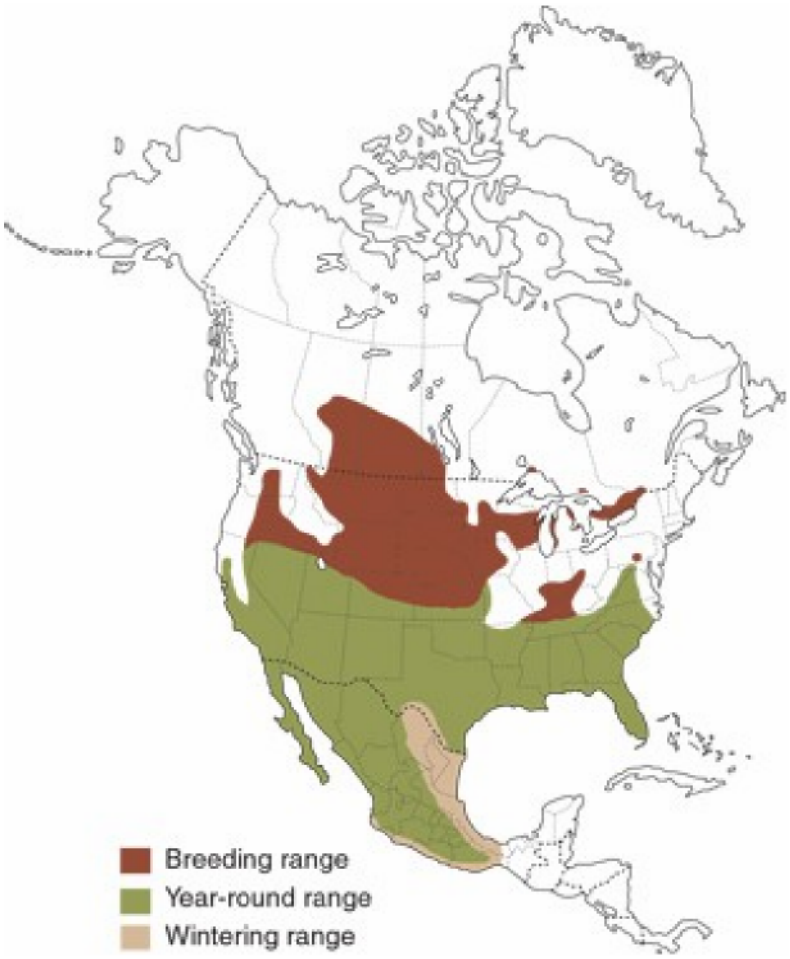


Figure 2. Breeding and wintering range for the Loggerhead Shrike in North America. Reproduced based on Yosef 1996.

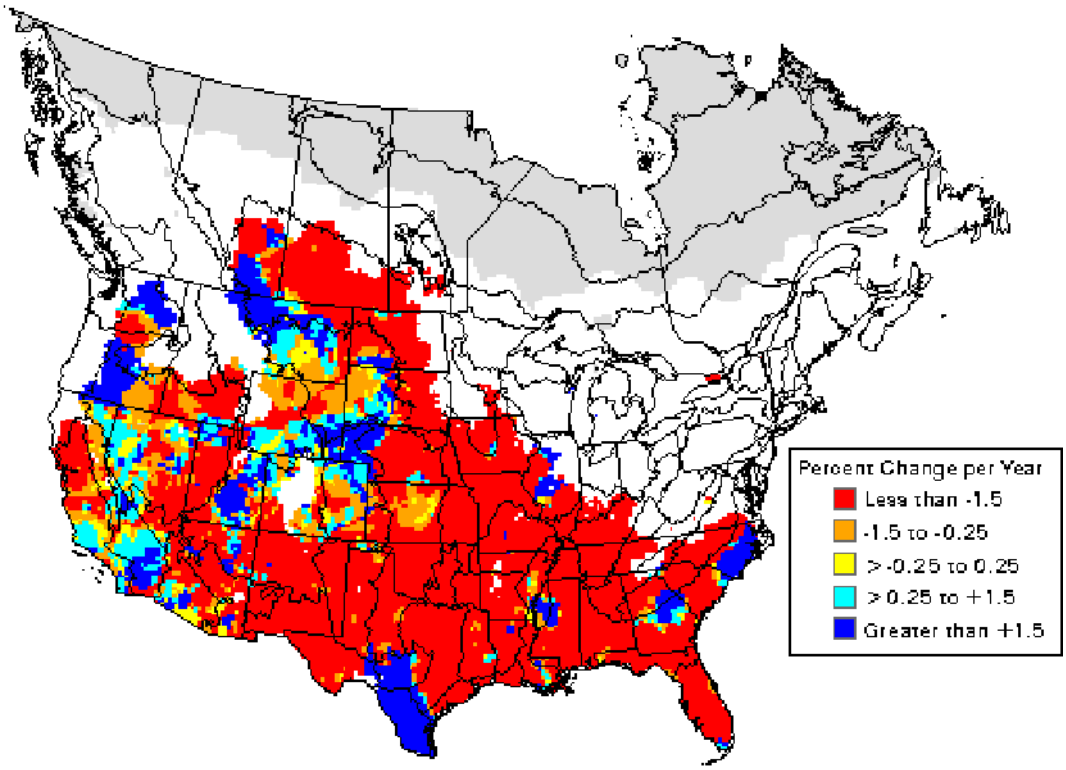


Figure 3. Population trend map of the Loggerhead Shrike in the United States and southern Canada, based on Breeding Bird Survey data, 1966-2011. Map from Sauer, J. R., J. E. Hines, J. E. Fallon, K. L. Pardieck, D. J. Ziolkowski, Jr., and W. A. Link. 2012. *The North American Breeding Bird Survey, Results and Analysis 1966 - 2011. Version 07.03.2013*.

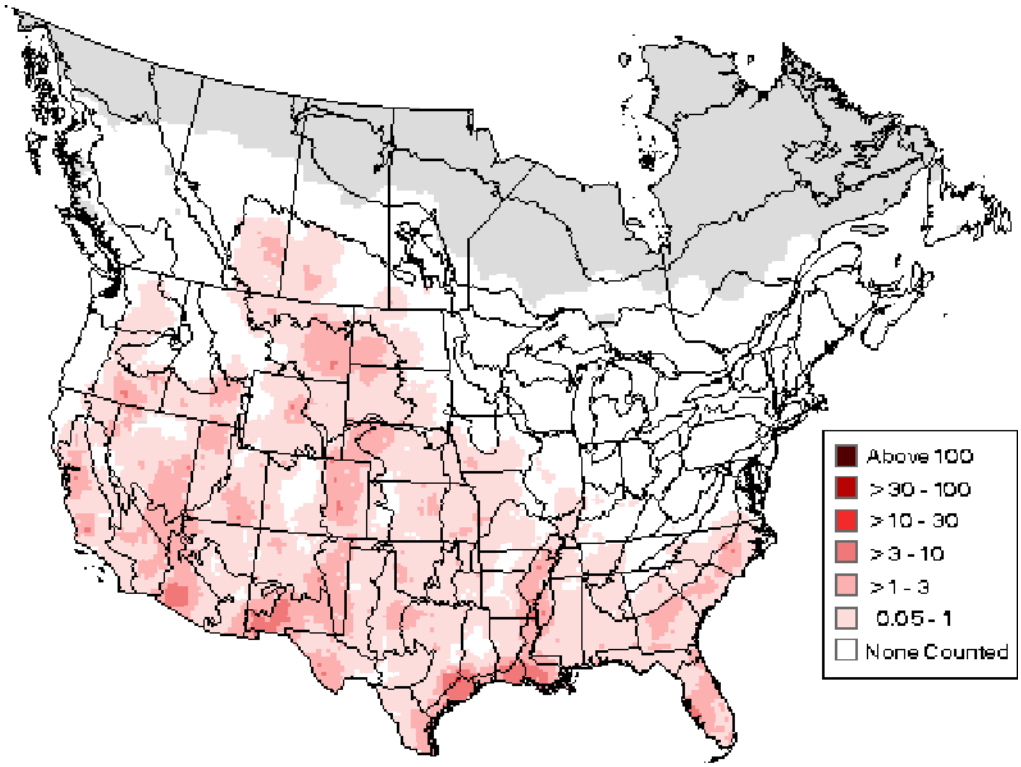


Figure 4. Breeding distribution of the Loggerhead Shrike in the United States and southern Canada, based on Breeding Bird Survey data, 2006-2011. Scale represents average number of individuals detected per route per year. Map from Sauer, J. R., J. E. Hines, J. E. Fallon, K. L. Pardieck, D. J. Ziolkowski, Jr., and W. A. Link. 2012. *The North American Breeding Bird Survey, Results and Analysis 1966 - 2011. Version 07.03.2013*.

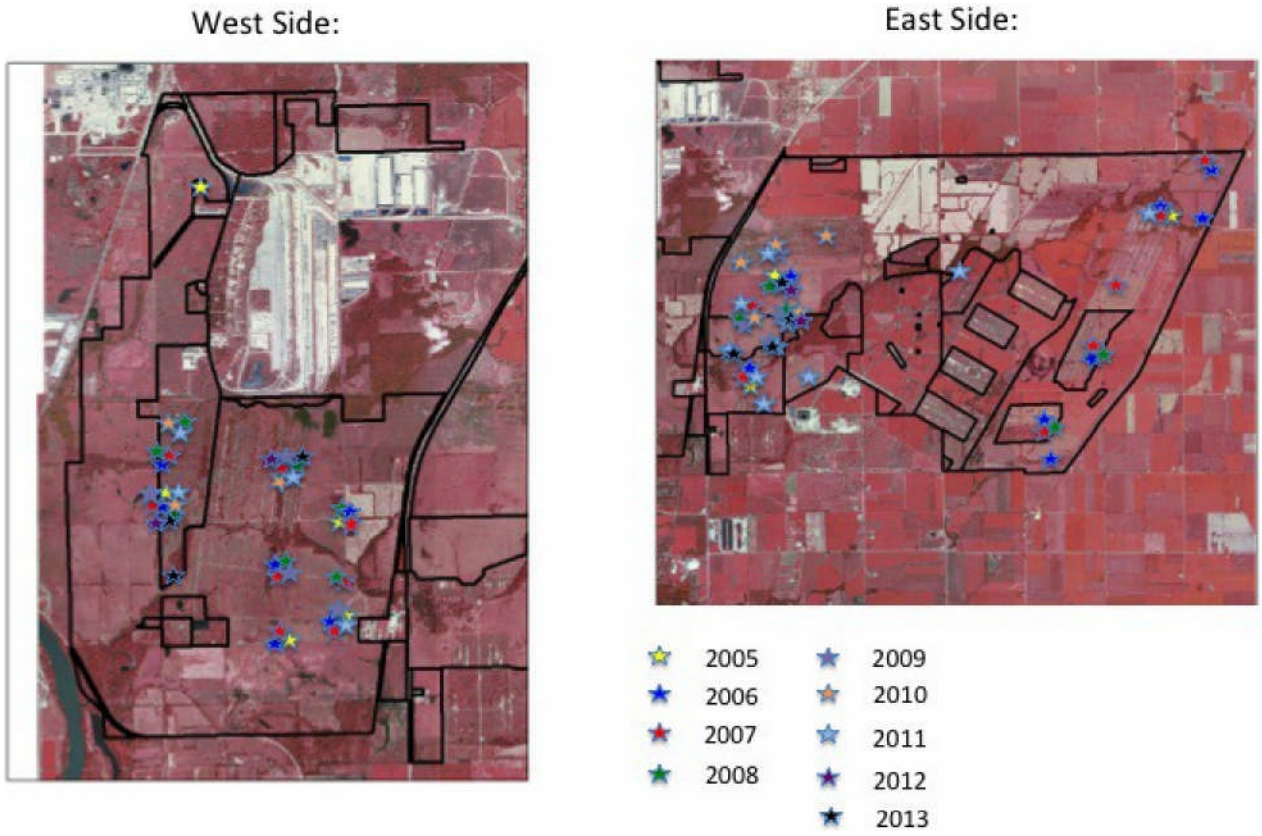


Figure 5. Nest sites used by Loggerhead Shrike in the Midewin National Tallgrass Prairie: 2005 – 2013. Note, locations are not exact but rather intended to show site re-use patters. Exact UTM coordinates for all nest sites have been provided to William Glass, Midewin National Tallgrass Prairie, USFS.

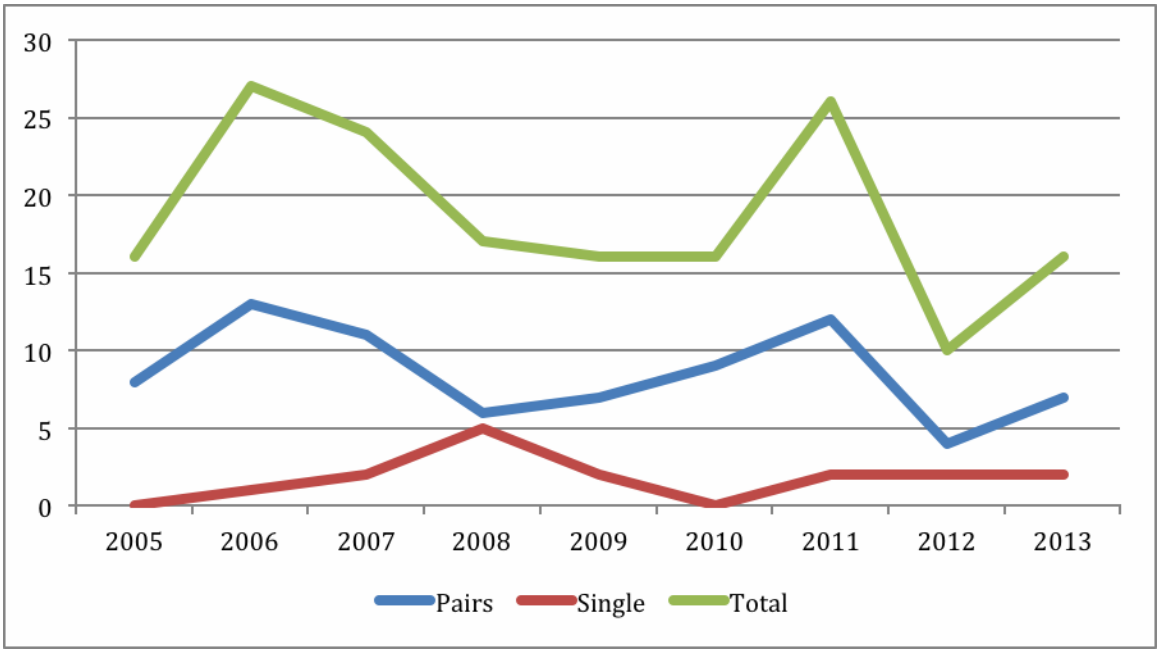


Figure 6. Population trend for Loggerhead Shrike in the Midewin National Tallgrass Prairie: 2005 – 2013

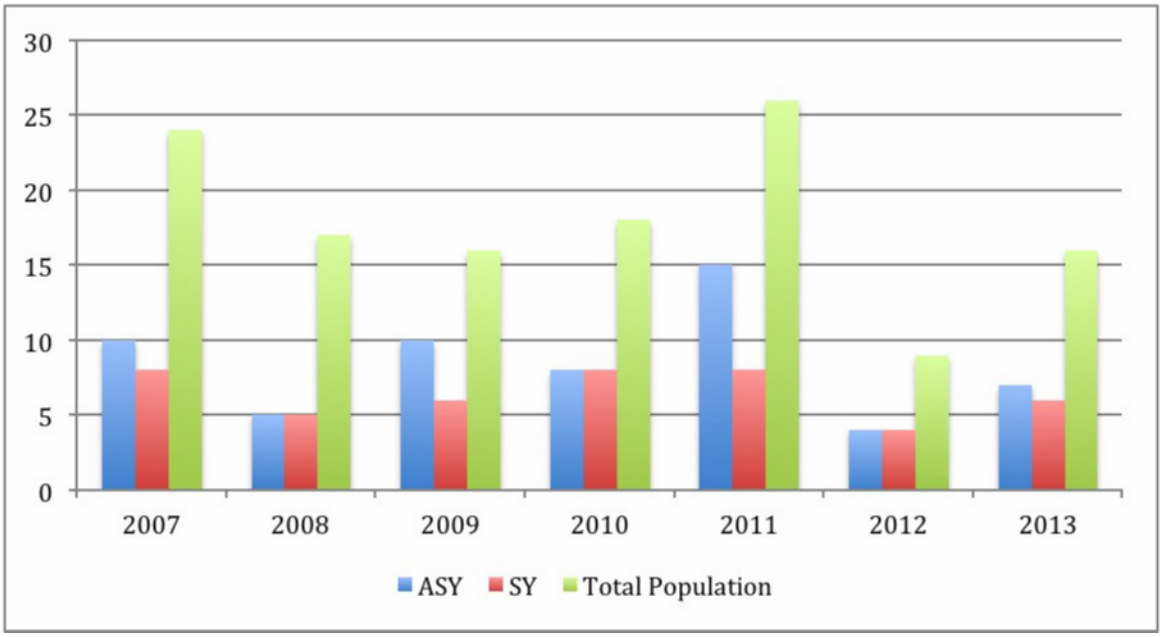


Figure 7. Age ratios of Loggerhead Shrike in the Midewin National Tallgrass Prairie: 2007 – 2013.

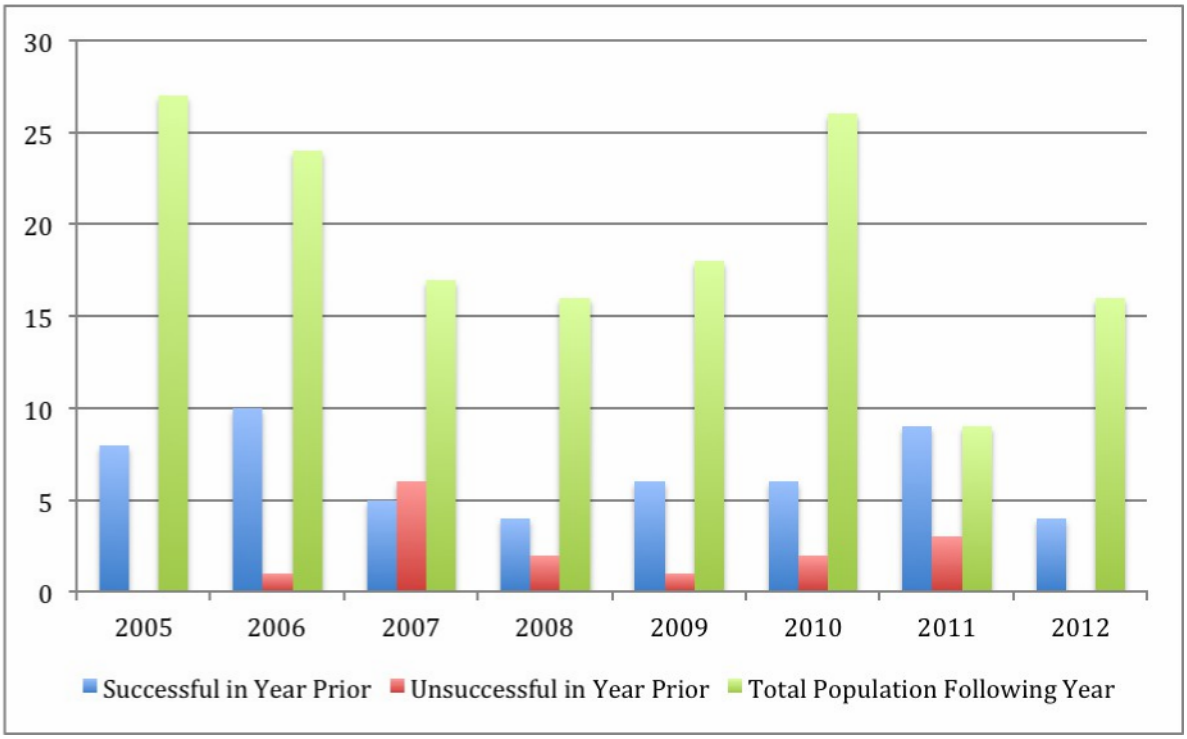


Figure 8. Population size and trend in comparison to reproductive success for Loggerhead Shrike in the Midewin National Tallgrass Prairie: 2005 – 2013.

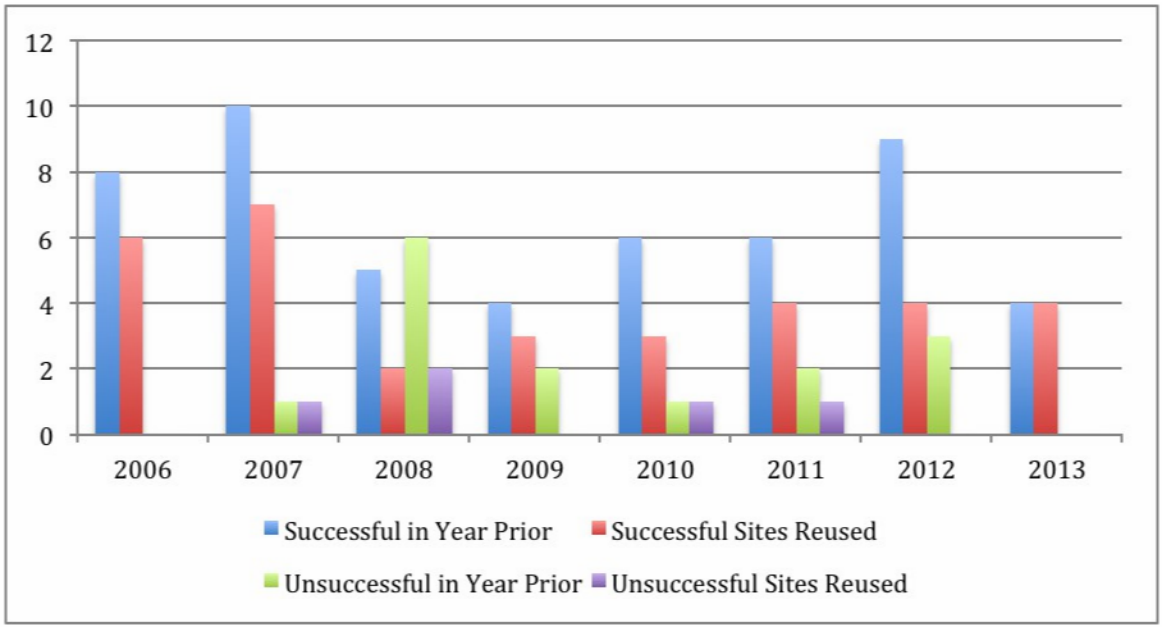


Figure 9. Site re-use in comparison to reproductive success for Loggerhead Shrike in the Midewin National Tallgrass Prairie: 2005 – 2013.

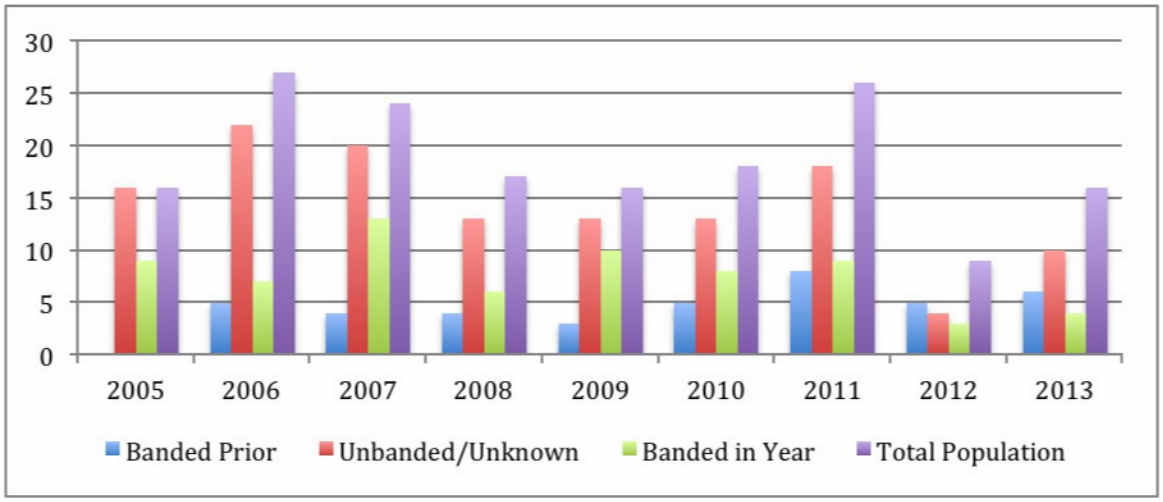


Figure 10. Adult banding status at start (banded prior and unbanded/unknown) and end (banded in year) of breeding season for Loggerhead Shrike in the Midewin National Tallgrass Prairie: 2005 – 2013.

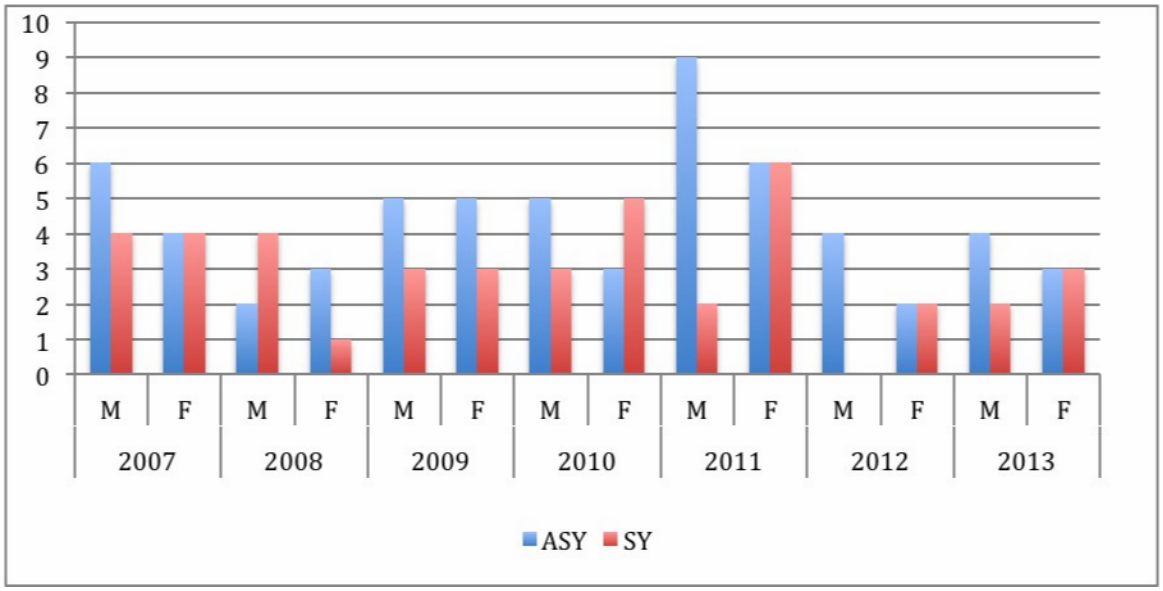


Figure 11. Age ratio of male and female Loggerhead Shrike in the Midewin National Tallgrass Prairie: 2005 – 2013.

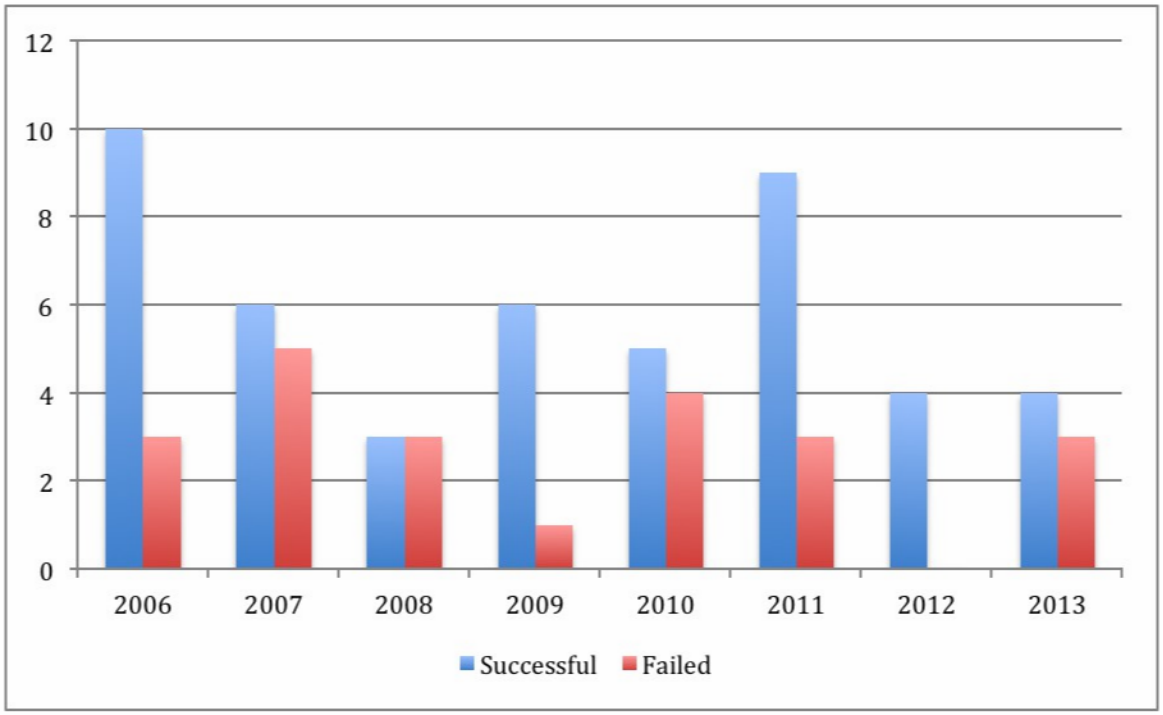


Figure 12. Reproductive success for Loggerhead Shrike in the Midewin National Tallgrass Prairie: 2005 – 2013.

Appendix 1: Digital Images depicting study species, project site, activities and other aspects of the project.

Typical shrike nesting habitat in the Midewin National Tallgrass Prairie. (Photo credit: A. Chabot).

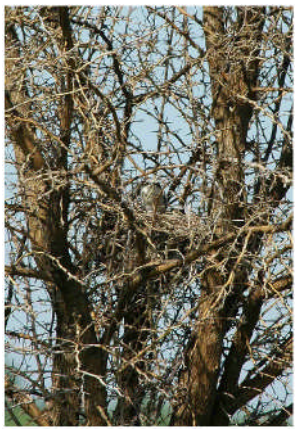
Loggerhead Shrike (Photo credit: A. Chabot).

Second Year Loggerhead Shrike, showing retained juvenile plumage on wing (brown feathers) (Photo credit: A. Chabot).

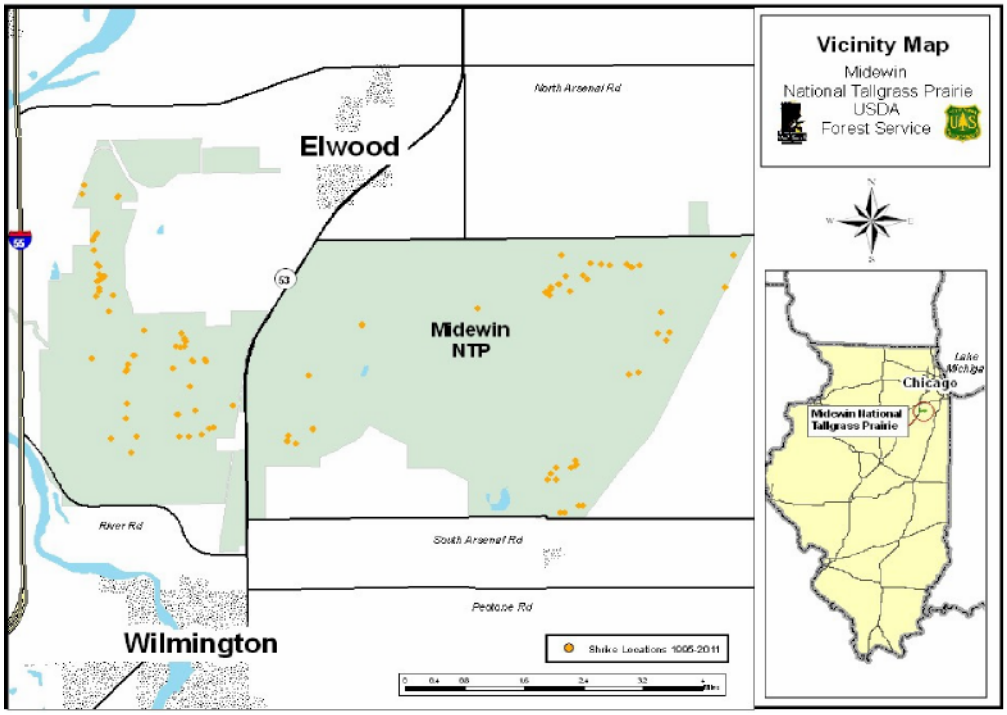
Loggerhead Shrike leg with stainless steel USGS band applied to right leg (Photo credit: A. Chabot).

Morphometric measurements (bill depth) of Loggerhead Shrike (Photo credit: A. Chabot).

Loggerhead Shrike eggs (Photo credit: A. Chabot).



Loggerhead Shrike young ready to fledge from nest in Midewin National Tallgrass Prairie (Photo credit: A. Chabot).



Midewin National Tallgrass Prairie, Historic Loggerhead Shrike nesting sites (Image courtesy of William Glass, Midewin National Tallgrass Prairie, USFS).

Appendix 2. Wildlife resources that benefitted from the project.

This project was directed specifically at the Loggerhead Shrike, with the overall goal of filling information gaps on the species population demographics in the Midewin National Tallgrass Prairie, a stronghold for this endangered species in the state of Illinois. The information gained will benefit the species by providing information on nesting site location within the Prairie, which can help guide management activities (e.g. shrub clearing) to ensure that the species is not negatively affected. The information can also be used to help guide visitors to sites where they can observe the species, and providing opportunities for education of the general public on the plight and needs of this, and other grassland bird species. The species shares habitat with many grassland bird species that have experienced drastic population declines in Illinois and North America, including, but not necessarily limited to: Eastern Meadowlark (*Sturnella magna*), Field Sparrow (*Spizella pusilla*), Dickcissel (*Spiza americana*), Savannah Sparrow (*Passerculus sandwichensis*), Grasshopper Sparrow (*Ammodramus savannarum*), Brown Thrasher (*Toxostoma rufum*), Northern Mockingbird (*Mimus polyglottos*), Upland Sandpiper (*Bartramia longicauda*). Therefore, while directed specifically at the Loggerhead Shrike, management for this species will likely benefit a broader range of grassland birds. Products resulting from this research include: compilation of demographic data (age ratios, population turnover, over-wintering survival, reproductive success) over a 9-year window for the species in Midewin, which will be conveyed to interested partners (e.g. Illinois DNR, Midewin staff); coordinates of nest site locations, including renesting and double brooding attempts; presentation of results to staff and volunteers of Midewin National Tallgrass Prairie (April 11, 2013); production of an article summarizing the project in local news media; training and demonstration of methodology to Midewin seasonal staff; and education of the general public as opportunity presented during field work activities. A publication in a peer-reviewed journal (to be determined) will be completed after review of this report and incorporation of suggestions and revisions provided by IDNR and USFS personnel.

Appendix 3: Financial Summary for Project

Category	Rates	Amended Budget	Actual Expense	WPF Funds	Cost-share	Totals
September 5, 2011 to June 30, 2013						
Personnel						**25,000**
Dr. A. Chabot (based on 7 trips)	$500/day (35 days)	17,500	17,500	**9,000**	**8,500**	
Dr. A. Chabot (lab work)	$500/day (10 days)	5,000	5,000		**5,000**	
Dr. A. Chabot (analysis/write-up)	$500/day (5 days)	2,500	2,500		**2,500**	
Travel (based on 7 trips)		6,776	5,511	**4,840**	**671**	**5,511**
* Rental car		2,100	2,634			
Gas		1,400	1,000			
Tolls		56	66			
Lodging		2,240	1,392			
Food		980	419			
Contractual services				**0**	**0**	**0**
Stable isotope (deuterium) lab assay consumables (3 feathers/bird x 10 birds @ $25/feather)		0	0			
Materials/supplies						**3,028**
DNA (microsatellite) lab assay consumables (1 sample/bird for 15 loci x 10 birds @ $50/sample) (amended cost is the actual cost of chemicals)		2,750	3,028	**1,000**	**2,028**	
Subtotal				**14,840**	**18,699**	**33,539**
Match						**18,699**
WPF Total						**14,840**

***** Used personal car on one of 7 trips. The Illinois CMS Travel Reimbursement Schedule, effective January 2013, was used to compute the use of personal car which includes fuel costs.

Notes:

Expenditure itemization details, including name of vendor and dates of purchase are provided as Appendix 4.
Receipts available upon request.
For expenses incurred in Canadian dollars, an exchange rate of $0.95, the official rate on June 30, 2013, was used.

Financial Summary:

Funding source	Personnel	Travel	Contractual	Materials	Total	% Cost
Other Cost-Sharing	16,000	671	0	2,028	**18,699**	**55.8**
WPF	9,000	4,840	0	1,000	**14,840**	**44.2**

Appendix 4: Itemized Total Project Expenditures

Date	Vendor	Rental Car	Lodging	Food	Gas	Tolls
TRAVEL EXPENSE						
RENTAL CAR/PERSONAL CAR						
4 trips - 2012	Avis	979.34				
4/ 10-14/2013	Personal car	991.58				
5/21-28/2013	Avis	335.54				
6/6-12/2013	Avis	327.29				
* TOTAL RENTAL CAR		2,633.75				
* includes 1 time use of personal car						
TOLLS						
4/24/2012	Ambassador Bridge					4.00
4/28/2012	Ambassador Bridge					4.00
5/24/2012	Ambassador Bridge					4.75
7/7/2012	Ambassador Bridge					4.75
7/9/2012	Ambassador Bridge					4.75
6/25/2012	Ambassador Bridge					4.75
5/22/2013	Ambassador Bridge					4.51
6/21/2012	Ambassador Bridge					4.51
5/27/2013	Ambassador Bridge					4.75
4/14/2013	Ambassador Bridge					4.51
6/10/2013	Ambassador Bridge					4.75
4/10/2013	Ambassador Bridge					4.75
6/7/2013	Illinois Tollway					1.10
4/14/2013	Illinois Tollway					1.10
5/29/2012	Illinois Tollway					1.10
5/27/2013	Illinois Tollway					1.10
4/11/2013	Illinois Tollway					1.10
6/7/2013	Ambassador Bridge					4.51
6/10/2013	Illinois Tollway					1.10
TOTAL TOLLS						65.89
LODGING						
Check-out dates	*# of nights in ( )*					
4/10/2013	Red Roof (1)		58.82			
4/27/2012	Howard Johnson (4)		248.97			
5/25/2012	Super 8 (1)		78.77			
6/21/2012	Braidwood Motel (4)		168.00			
5/25/2012	Braidwood Motel (3)		127.20			
4/11/2013	Braidwood Motel (3)		133.20			
5/27/2012	Braidwood Motel (1)		42.40			
6/7/2012	Braidwood Motel (3)		135.00			

5/22/2013	Braidwood Motel (5)	222.00	
6/7/2013	Braidwood Motel (4)	177.60	
TOTAL LODGING		1,391.96	

GAS

4/24/2012	Value Market	30.13
4/26/2012	Fast N Fresh	40.65
4/28/2012	CTC Fuelco	49.32
6/25/2012	CTC Fuelco	33.23
4/24/2012	Esso	49.55
4/28/2012	Shell	29.84
5/25/2012	Speedway	29.43
5/24/2012	Esso	36.86
5/27/2012	Mobil (Dipti Gas)	34.77
5/25/2012	Chelsea Mobil	39.68
6/21/2012	Esso	39.09
6/24/2012	Casey General	37.23
6/25/2012	Petro Canada	23.75
6/21/2012	Value Market	40.00
7/7/2012	Casey General	33.08
7/7/2012	CTC Fuelco	36.24
7/9/2012	TR Travel Center	32.15
7/9/2012	Ultramar Ltd.	38.87
	Kingston	38.49
4/14/2013	Petro Canada	*31.26
4/10/2013	Speedway	*49.35
4/14/2013	Mobil (Dipti Gas)	*33.89
5/25/2013	Mobil (Dipti Gas)	35.98
5/22/2013	Esso	40.66
5/22/2013	Speedway	34.13
5/27/2013	CTC Fuelco	35.12
6/10/2013	TD Petes	29.87
6/7/2013	Pilot	40.84
6/7/2013	Esso	37.84
6/10/2013	CTC Fuelco	53.42
TOTAL GAS		1,000.22

* FOR REFERENCE ONLY - NOT INCLUDED IN GAS TOTAL - INCLUDED IN FORMULA FOR PERSONAL CAR

(PERSONAL CAR CMS ALLOTMENT OF .565/ PER MILE INCLUDES GAS)

FOOD

4/25/2012	Carry Out	9.54
4/24/2012	Fast N Fresh	14.32
4/24/2012	Monical's Pizza	11.00
4/24/2012	Wendy's	8.58

4/27/2012	Dunkin Donuts	2.88
4/27/2012	Howard Johnson	22.70
4/26/2012	Taco Bell	3.91
4/26/2012	Fast N Fresh	8.69
5/25/2012	McDonald's	3.95
5/25/2012	Burger King	6.28
4/25/2012	Monical's Pizza	9.54
4/28/2012	Taco Bell	5.45
5/26/2012	McDonald's	9.60
5/27/2012	Café China	11.45
5/25/2012	Café China	6.90
5/26/2012	Café China	6.90
5/28/2012	McDonald's	8.74
5/26/2012	McDonald's	5.76
5/27/2012	McDonald's	7.90
5/29/2012	McDonald's	6.82
5/29/2012	Wendy's	9.62
5/27/2012	Café China	11.45
7/9/2012	McDonald's	2.66
7/?/2012	Fresh Subs	4.69
7/6/2012	McDonald's	2.66
6/29/202	McDonald's	3.73
6/22/2012	McDonald's	3.73
7/9/2012	Pilot	5.71
5/24/2012	Pizza Hut	15.04
6/21/2012	Wendy's	8.68
5/24/2012	A & W	14.46
6/25/2012	TA	4.64
6/24/2012	Berkot's	7.61
4/10/2013	Taco Bell	3.37
4/10/2013	A & W	9.93
4/17/2013	HMS Host	9.85
4/12/2013	Chick-a-Dee	7.39
4/12/2013	McDonald's	3.21
4/11/2013	Burger King	3.38
4/13/2013	McDonald's	2.14
4/11/2013	Berkot's	19.18
4/14/2013	Subway	6.36
4/14/2013	McDonald's	2.14
4/13/2013	Chick-a-Dee	14.75
4/24/2013	McDonald's	3.09
5/23/2013	McDonald's	5.54
5/23/2013	McDonald's	2.14

5/25/2013	McDonald's	4.91
?/?/2013	Pizza Delivery	14.75
5/24/2013	Burger King	3.84
6/9/2013	McDonald's	3.63
5/26/2013	McDonald's	6.30
5/26/2013	McDonald's	2.14
6/8/2013	Chick-a-Dee	15.99
6/9/2013	McDonald's	3.49
6/10/2013	McDonald's	6.09
TOTAL FOOD		419.20

Date	Vendor	Address	Cost
MATERIALS / SUPPLIES (Lab Assay Consumables)			
11/5/2012	UltiDent Scientific	ultident.com/scientific	294.14
11/5/2012	Qiagen Inc.	181 Bay St., Toronto, Ontario	887.36
3/26/2013	Invitrogen / SCMS	invitrogen.com	624.78
4/2/2013	Sigma Aldrich	sigmaaldrich.com	1,221.99
TOTAL MATERIALS / SUPPLIES			3,028.27

PERSONNEL

Work performed by Amy Chabot during the grant period of September 5, 2011 to June 30, 2013.

See following page for invoice from Amy Chabot to Midewin Tallgrass Prairie Alliance. Also included is proof of payment from the Midewin Alliance in the form of a $9,000 cashier's check from Charter One Bank.

Appendix 4. Copies of receipts for expenditures.

Amy Chabot
2395 Harlowe Road, RR 1
Arden, Ontario K0H 1B0
Phone: (613) 336-1702
Email: Amy@ChabotCuddy.ca

June 30, 2013

Invoice 1 of 1

Expenses incurred related to research on Loggerhead Shrike in the Midewin National Tallgrass Prairie from September 5, 2011 to June 30, 2013.

Professional services ($500 US/day for 18 days):	$9,000
Total:	$9,000 USD

Please remit to: Amy Chabot (SSN: 002 54 0803). Thank you.

Amy Chabot

June 30, 2013
Date (June 30, 2013)

OFFICIAL CHECK

Charter One

057-0012 / 0115 531143405-3

July 27, 2013

$9,000.00 DOLLARS

*AMY CHABOT *

NON-NEGOTIABLE

MEMO:

PAYMENT OF WPF GRANT #12-611W

Amanda Espaza IL# 355

CUSTOMER'S RECORD

SAVE THIS RECORD

This Official Check may not be replaced for 90 days after the issue date if lost or stolen.

WE CANNOT GIVE INFORMATION OR SEARCH RECORDS UNLESS THIS COPY IS PRESENTED

Appendix 5: Promotion

July - August, 2013

Midewin
National Tallgrass Prairie

Prairie Telegraph

A Newsletter of the Midewin Tallgrass Prairie Alliance for its Members and Midewin Volunteers

Shrike Survey Nearing Completion

From Connie Heinrich, Midewin Alliance Treasurer

Some of our readers may have attended the lecture, "A Grassland Bird in Crisis: Loggerhead Shrike Research at Midewin" that was presented in April by Dr. Amy Chabot. Those who attended the lecture may recall that the Loggerhead Shrike is an example of a grassland bird species that has seen a serious population decline. It is now listed as an endangered species in Illinois. Midewin is one of the few areas in northern Illinois that still sustains a small breeding population of Loggerhead Shrike. Dr. Chabot's survey will assess the nesting success of this bird at Midewin and she will try to identify the factors that contribute to nest failures and the decline of the population.

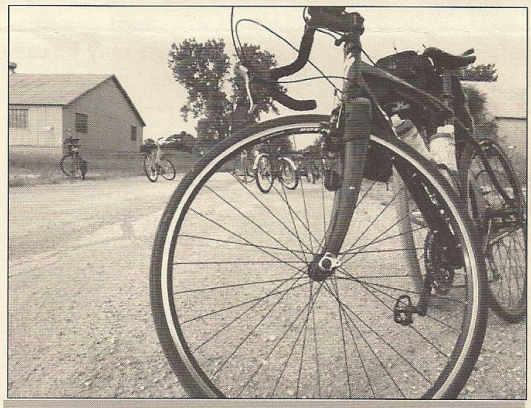
Dr. Chabot's research since September of 2011 until the end of June this year is being funded by the Illinois Department of Natural Resources (IDNR) through a Wildlife Preservation Fund grant to the Midewin Tallgrass Prairie Alliance. The source of money for the Fund is from donations made on the Illinois income tax Form 1040 charitable check-off list that allows for part of individual state tax refunds to be directed to certain specified charitable causes. The Midewin Alliance and The Nature Conservancy of Illinois also contributed funding for Amy's work in the spring of 2011 before the grant was awarded.

We look forward to seeing the results of Dr. Chabot's research. She is a very diligent and committed researcher who has grown very attached to her feathered subjects. She has also contributed her own time and money to this project. Hopefully, her findings will lead to the increased survival of this unique grassland bird.

Who Likes to Hike? Who Likes to Bike?

By Jerry Heinrich, President, Midewin Alliance

In an unofficial, unscientific "poll" conducted on Saturday, June 8, 2013, the results of the "poll" were rather surprising - or maybe not so surprising. Two separate guided tours of Midewin were offered that day. At 10:00 am, visitors were offered the opportunity to tour Prairie Creek Woods Loop Trail on foot; later in the day, visitors could tour the east side of Midewin on bicycle.



Bicyclists' Tour of Midewin's Backroads. Photo by Carol Malnar.

Interestingly, 30 visitors ranging in age from 7 to 70 years opted to bicycle, and only one hearty visitor, an octogenarian, chose to hike. Both tours were 2¼ hours in length and both tours were conducted under ideal conditions. The day was sunny, temperatures in the 70's with a pleasant breeze, and there were no biting bugs. Well, I guess it really doesn't matter how you choose to experience Midewin as long as you get out and enjoy the outdoors.

If you are interested in taking a scheduled guided tour of Midewin, either on foot, on bicycle, on horseback, or by car caravan, visit Midewin's website at www.fs.usda.gov/midewin or see the tour schedule provided elsewhere in this issue of the *Prairie Telegraph.*

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Grassland bird in crisis

Loggerhead shrike research at Midewin Prairie

Editor's note: Submitted by Jerry Heinrich, Midewin Tallgrass Prairie Alliace

The Loggerhead Shrike is an example of a grassland bird species that has seen a serious decline in population — primarily due to nest predation and loss of grassland habitat. It is now listed as a endangered species in Illinois.

The U.S. Forest Service Midewin National Tallgrass Prairie is one of the few areas in northern Illinois large enough to sustain a small breeding population of Loggerhead Shrikes.

Over the past two years, Dr. Amy Chabot, a biologist and biological consultant, conducted a study at Midewin National Tallgrass Prairie in an attempt to identify and better understand the factors that have led to the decline in population of the Loggerhead Shrike. Results of the study will be made available upon request once published.

Funding for this two year research project was provided in large part through an Illinois Wildlife Preservation Fund Grant from the Illinois Department of Natural Resources in cooperation with the Midewin Tallgrass Prairie Alliance as grantee.

The Midewin Tallgrass Prairie Alliance is a 501(c)(3) not-for-profit organization that serves as a "Friend of Midewin National Tallgrass Prairie." The source of funding for the Wildlife Preservation Fund is from donations made on the IL-1040 charitable check-off list that allows for part of individual state tax returns to be directed to certain charitable causes. The Midewin Alliance and The Nature Conservancy of Illinois also contributed funding for this special research prior to grant being awarded.

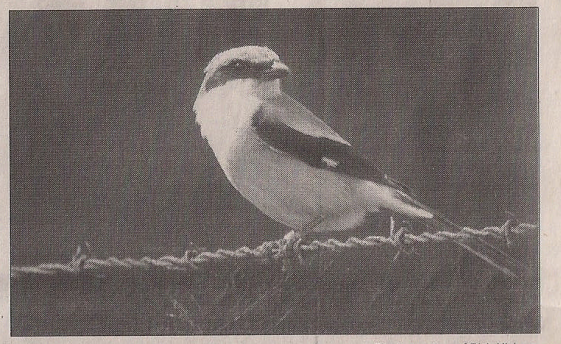

Photo courtesy of Rich Hickson

A grant-funded study of the Loggerhead shrike at the Midewin has been completed. Results will be published soon, and will be available upon request.