

**PENNSYLVANIA GAME COMMISSION  
BUREAU OF WILDLIFE MANAGEMENT  
PROJECT ANNUAL JOB REPORT**

**PROJECT CODE NO.:** 06798

**TITLE:** Barn Owl Conservation Initiative

**JOB CODE:** 79801

**PERIOD COVERED:** 1 January 2014 to 31 December 2014

**WORK LOCATION(S):** Statewide

**PREPARED BY:** Dan Mummert, Southeast Regional Wildlife Diversity Biologist; Mario Giazzon, Northcentral Regional Wildlife Diversity Biologist; Tammy Colt, Southwest Regional Wildlife Diversity Biologist; Richard Fritsky, Northeast Regional Wildlife Diversity Biologist; Clayton Lutz, Southcentral Regional Wildlife Diversity Biologist; Stacy Wolbert, Northwest Regional Wildlife Diversity Biologist

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**ABSTRACT:** Regional wildlife diversity biologists (RWDBs) began a barn owl conservation initiative (BOCI) in spring 2005 with the goal of securing this species' future in the Commonwealth. The barn owl is considered a species of greatest conservation need (SGCN), classified as Near Threatened, and comparisons between the First and Second Pennsylvania Breeding Bird Atlases suggest that barn owls have declined by approximately 50 percent since the mid-1980s in the state. In support of the BOCI, RWDBs monitored known nest sites to determine barn owl nesting activity, searched for new nest sites, conducted outreach to engage and inform landowners, and distributed and/or installed barn owl boxes to promote long term security of nest sites. Where feasible, barn owl nestlings were banded to gather information on longevity, causes of mortality, and dispersal. RWDBs confirmed 57 active barn owl nests, of which 9 were new sites, bringing the total number of unique, confirmed nest sites to 195 since nest searches began in 2005. RWDBs banded 177 barn owls at 47 sites in 18 counties in 2014. To date, 87 banded barn owls have been recovered. Dispersal distance has ranged from 0 to 926 miles with a median of 20 miles. Of 84 recovered owls that had known ages at time of banding, 73 were recovered dead and 11 were found living. The median age of recovered owls was 14 months and ranged from birds found dead at the natal site within one month after banding to an 8-year old that was recovered still alive and sitting on her nest incubating eggs. In 2014, RWDBs and volunteers provided, and in most cases installed, 57 barn owl nest boxes. In addition, 82% (47 of 57) of confirmed nest sites were in barn owl nest boxes.

**OBJECTIVES**

1. Annually evaluate the abundance and distribution of barn owls.
2. Periodically evaluate barn owl habitat use and prey use.

3. Annually evaluate threats to survival and dispersal of barn owls.
4. Improve nesting and foraging habitat to promote barn owl recovery.
5. Promote conservation of barn owls to landowners and general public.

## **METHODS**

### **Annually evaluate the Abundance and Distribution of Barn Owls**

Sites with potential barn owl habitat were surveyed by Regional Wildlife Diversity Biologists (RWDB). During site visits, RWDBs determined presence or absence by searching for barn owls and fresh sign (e.g., pellets and “whitewash”). Locations of breeding activity were determined by the confirmation of eggs, nestlings, or recently fledged young. Global positioning system (GPS) devices were used to record location of active sites. Data related to site location, reproductive status, nest site characteristics, and adjacent land use were recorded for new active nests. Data were submitted to the Pennsylvania Natural Heritage Program database.

### **Periodically evaluate Barn Owl Habitat Use and Prey Use**

Pellets collected in 2014 were provided to Keystone College for diet analysis. Results are not yet available. Another research project to conduct small mammal trapping in 2015 concurrent with pellet analyses near active nest sites was coordinated with Susquehanna University.

### **Annually evaluate Threats to Survival and Dispersal of Barn Owls**

Barn owls were banded following standard protocol of the Patuxent Wildlife Research Center Breeding Bird Lab (BBL) to provide information on longevity, dispersal, and causes of mortality. We plotted locations of all bands that were reported to the BBL as either bands recovered from dead owls or bands observed on live owls that were captured or observed in Pennsylvania.

### **Improve Nesting and Foraging Habitat to Promote Barn Owl Recovery**

To provide additional nesting sites safe from predators and hazardous ledges, RWDBs and cooperating volunteers installed barn owl nest boxes at appropriate locations with the permission and cooperation of landowners. Nest boxes were monitored by RWDBs, volunteers, or landowners to determine use and nesting success.

Promote conservation of barn owls to landowners and general public Landowners with active nest sites or potential habitat that may be occupied by barn owls were given information on barn owl conservation status, habitat requirements, threats, causes of decline, habitat management recommendations, and proper nest box placement. RWDBs delivered presentations and organized a symposium on barn owl conservation and research.

## **RESULTS**

### **Annually evaluate the Abundance and Distribution of Barn Owls**

In 2014, RWDBs confirmed 57 active barn owl nests in 18 different counties. There were 9 new locations where nesting was confirmed. Since the Barn Owl Conservation Initiative (BOCI) was initiated in 2005, nesting has been confirmed at 195 unique locations (Fig. 1).

Confirmed nests continue to be concentrated in agriculturally dominated valleys of the central and southeastern parts of the Commonwealth. Data from new nesting locations will be submitted to Pennsylvania Natural Diversity Inventory (PNDI).

### **Periodically evaluate Barn Owl Habitat Use and Prey Use**

No reportable data were obtained towards this objective in 2014.

### **Annually evaluate Threats to Survival and Dispersal of Barn Owls**

RWDBs banded 177 barn owls at 47 different locations in 2014 (Table 1). Average clutch size at time of banding was 3.7 nestlings (Fig. 2). The majority of the nests were banded in June ( $n = 16$ ) and July ( $n = 27$ ) (Fig. 3) with most young likely to have fledged from these nests by August. The earliest banding occurred on 26 May. The eggs from this nest would likely have been laid between the third week in March and first week of April. The latest banding occurred on 19 September indicating that eggs were laid in mid-July and young were likely fledging in early October. There were no known second clutches in 2014. Because most nest sites were not monitored beyond the first clutch, second clutches may have been produced without our knowledge.

Since the inception of the BOCI, 87 banded barn owls have been recovered (Table 2). Seven recoveries were of birds banded in other states and later recovered in Pennsylvania. Eleven recoveries were of barn owls banded within Pennsylvania and recovered outside of the state. The remaining 69 recoveries were of owls banded and recovered within Pennsylvania. Dispersal distance is not necessarily accurate because the U.S. Geological Survey (USGS) Bird Banding Lab provides recovery data precise only to the 10-minute block; this can cause error of up to approximately 10 miles. Using these data, we estimate that banded barn owls were recovered between 0 and 926 miles from their natal site, with a median recovery distance of 20 miles for the 73 birds recaptured at least 3 months after being banded. The furthest recovery to date was a bird recovered in the Bahamas; 926 miles from the banding site at State Game Lands 145 in Lebanon County (Fig. 4).

Of 84 recovered owls that had known ages at time of banding and approximate date of recapture, 73 were recovered dead and 11 were found living. The median age of recovered owls was 14 months and ranged from birds found dead at the natal site within 1 month after banding to an 8-year old that was recovered still alive and sitting on her nest incubating eggs.

In addition to the proposed small mammal trapping and pellet analyses research project, we are continuing to collaborate with Susquehanna University in hopes of successfully conducting satellite telemetry on barn owls. Obtaining the required permits for the capture and attachment of transmitters has been difficult and locating existing researchers currently permitted to conduct such work has been met with limited success.

### **Improve Nesting and Foraging Habitat of Barn Owls**

In 2014, RWDBs and volunteers provided, and in most cases installed, 57 barn owl nest boxes. In addition, 82% (47 of 57) of confirmed nest sites were in nest boxes installed specifically for barn owls.

### **Promote conservation of barn owls to landowners and general public**

RWDBs, lead by Dan Mummert, successfully proposed, organized, and facilitated a barn owl symposium entitled, “Barn Owl Conservation, Research and Management” at The Wildlife Society twenty-first Annual Conference in Pittsburgh. The symposium was moderated by Clayton Lutz. A presentation entitled, “A Brief Synopsis of Barn Owls in North America” was given by Richard Fritsky and a presentation entitled, “Pennsylvania’s Barn Owl Conservation Initiative” was given by Dan Mummert and Mario Giazzon. The symposium was attended by a minimum of 75 wildlife professionals, though this estimation only takes into account the highest number of audience members observed at any 1 time and is not a tally of all unique audience members as they fluctuated in and out of the room between presentations throughout the event.

In addition to the symposium, RWDBs delivered 13 presentations to approximately 545 people and 2 radio interviews where they provided information about barn owls and their conservation.

## **RECOMMENDATIONS**

RWDBs should continue to check barn owl nest sites to determine breeding activity, search for new active sites and confirm breeding when found, conduct outreach, distribute barn owl boxes to suitable locations and install barn owl boxes. Because a relatively small amount of information important for the conservation of barn owls is generated from labor intensive banding activities, it is recommended that less priority be given toward this activity in the future.

Recommendations for expanding the project, based on the barn owl species account in the PGC's WAP, are to 1) determine if a nest box program in landscapes where nesting habitat is likely a limiting factor; reclaimed strip mines, for example; has a significant effect on expanding the state’s population and distribution, 2) use satellite telemetry technology to increase knowledge of partial migration patterns and habitat usage throughout the winter months when mortality is highest, and 3) increase knowledge about use of natural tree cavities for nesting which would help us better estimate the current population size and distribution which may be underestimated. A study in New Jersey, for example, found that 50% of a population nested in tree cavities and 31% in nest boxes (Colvin 1984). Volunteers, academia, and students should continue to be sourced when available.

## **LITERATURE CITED**

Colvin, B. A. 1984. Barn owl foraging behavior and secondary poisoning hazard from rodenticide use on Farms. Dissertation, Bowling Green State University, Bowling Green, Ohio, USA.

Table 1. Summary of statewide Barn Owl Conservation Initiative activities conducted by Pennsylvania Game Commission Regional Wildlife Diversity Biologists, 2014.

<b>Region</b>	<b>Active Nests</b>	<b>New Nests</b>	<b>Nests Banded</b>	<b>Owls Banded</b>	<b>Box Installs*</b>
NW	0	0	0	0	0
SW	0	0	0	0	0
NC	5	0	5	17	8
SC	15	3	14	57	11
NE	6	1	6	15	1
SE	31	5	22	88	37
<i>Statewide</i>	<i>57</i>	<i>9</i>	<i>47</i>	<i>177</i>	<i>57</i>

\* Number of nest boxes installed by RWDB and/or volunteers

Table 2. Summary of barn owl band recoveries, 2005-2014.

<b>ID</b>	<b>Band Location</b>	<b>Recovery Location</b>	<b>Band Date</b>	<b>Age (months)</b>	<b>Distance (miles)</b>	<b>Dir</b>
1	Brentsville, VA	South Mountain, PA	6/24/2001	5	81	N
2	Bristersburg, VA	East Berlin, PA	5/29/2002	49	104	N
3	Marlboro, NJ	Malta, PA	5/26/2001	70	140	NW
4	Lewisburg, PA	New Berlin, PA	6/30/2006	9	8	S
5	McConnellsburg, PA	McConnellsburg, PA	6/14/2006	9	7	N
6	Kleinfeltersville, PA	Douglassville, PA	7/10/2006	11	27	E
7	East Berlin, PA	Knotts Island, NC	6/7/2006	17	250	S
8	Elizabethville, PA	Dalmatia, PA	7/24/2007	9	6	NW
9	Thompsonsontown, PA	Thompsonsontown, PA	6/12/2007	1	0	natal site
10	Turbotville, PA	Turbotville, PA	10/6/2009	4	3	SW
11	Turbotville, PA	Turbotville, PA	12/8/2009	3	0	natal site
12	Fairfield, PA	Fairfield, PA	6/27/2007	2	4	W
13	Berrysburg, PA	Greenwich, NJ	6/20/2007	13	115	SE
14	Lewisburg, PA	Mifflinburg, PA	7/3/2007	20	9	SW
15	Elizabethville, PA	Freeburg, PA	7/24/2007	21	11	NW
16	Hartleton, PA	Watsontown, PA	6/11/2008	10	21	NE
17	Thomasville, PA	Cedarville, NJ	7/5/2006	35 (alive)	99	SE
18	Newburg, PA	New Berlin, PA	8/13/2008	12	57	NE
19	Mercersburg, PA	Chambersburg, PA	6/12/2009	5	20	NE
20	East Berlin, PA	East Berlin, PA	6/28/2008	19	1	N
21	Rehrersburg, PA	Ephrata, PA	6/29/2009	4	14	S
22	Franklintown, PA	York Springs, PA	5/26/2009	10	5	SW
23	Fairfield, PA	Rocky Ridge, MD	6/6/2008	21	20	SE
24	Birdsboro, PA	New Britain, PA	9/14/2009	6	33	E
25	Bloserville, PA	Gettysburg, PA	6/17/2009	9	42	SE
26	Turbotville, PA	McEwensville, PA	5/12/2009	12	5	SW
27	Kidron, OH	Mifflintown, PA	6/19/2007	48 (alive)	236	E
28	Weavertown, PA	Laurel Hill, PA	7/6/2009	2	5	NE
29	Grantville, PA	Temple, PA	9/29/2010	5	38	E
30	Berrysburg, PA	Mowry, PA	6/8/2009	22	24	NE
31	Lewisburg, PA	Turbotville, PA	7/17/2009	15	12	NE
32	Manassas, VA	Indiantown, PA	6/27/2009	18	130	NE
33	Matterstown, PA	Matterstown, PA	4/19/2010	4	1	S
34	Prescott, PA	Freeport Mills, PA	7/16/2010	2	5	NW
35	Bridgeton, NJ	Philiadelphia, PA	5/21/2008	5	32	N
36	Killinger, PA	Thompsonsontown, PA	5/21/2009	12	19	W
37	Milton, PA	Newtown, PA	7/29/2009	7	111	SE
38	Thomasville, PA	Warrington Twp., PA	5/26/2009	13	11	N
39	Matterstown, PA	Laurel Hill, PA	7/6/2007	34	52	SE
40	Mt. Holly Springs, PA	Mt. Holly Springs, PA	6/8/2011	2	5	E
41	Southampton Twp. PA	Falling Spring, PA	6/11/2009	4	6	SW
42	Thompsonsontown, PA	Indiantown, PA	6/9/2009	22	38	SE
43	Fredricksburg, PA	East Buffalo Twp, PA	6/11/2010	10	43	NW
44	Watsontown, PA	Acton, NJ	6/3/2010	12 (alive)	129	SE

Table 2. cont.

<b>ID</b>	<b>Band Location</b>	<b>Recovery Location</b>	<b>Band Date</b>	<b>Age (months)</b>	<b>Distance (miles)</b>	<b>Dir</b>
45	Northeastern Ohio	Washington, PA	unknown	Unk (alive)	unknown	SE
46	Exchange, PA	Antes Fort, PA	12/8/2009	28 (alive)	30	W
47	Upper Lawn, PA	Shirksville, PA	6/18/2008	48	15	NE
48	Watsontown, PA	Turbotville, PA	6/3/2010	20	5	E
49	Pillow, PA	Bernville, PA	5/25/2010	24	42	SE
50	Upper Lawn, PA	Bahama Islands	7/7/2011	4	926	S
51	Shoemakersville, PA	Maytown, PA	8/7/2011	10	45	SW
52	Fairfield, PA	Lake Meade, PA	6/29/2011	14 (alive)	21	NE
53	Hartleton, PA	Hartleton, PA	8/15/2011	Unk (alive)	0	band site
54	Turbotville, PA	Turbotville, PA	7/26/2011	4	2	S
55	Weavertown, PA	Portsmouth, RI	7/1/2011	12	278	NE
56	Matterstown, PA	Matterstown, PA	4/19/2010	36	3	E
57	Lewisburg, PA	Hartleton, PA	5/26/2011	22	12	SW
58	Grantville, PA	Bordnersville, PA	8/24/2011	20	9	NE
59	Hartleton, PA	Hartleton, PA	6/4/2009	25	1	N
60	Lewisburg, PA	Antes Fort, PA	5/3/2012	14 (alive)	21	NW
61	Elimsport, PA	Mifflinburg, PA	6/1/2012	10 (alive)	17	S
62	Pillow, PA	Franklin, WV	5/22/2012	7	195	SW
63	Watsontown, PA	Washingtonville, PA	5/22/2012	9	9	SE
64	Lancaster, PA	Else Island, PA	7/20/2012	4	14	SW
65	Weavertown, PA	Brownstown, PA	7/6/2009	50	6	NW
66	Exchange, PA	Exchange, PA	12/19/2012	2	0	natal site
67	Albany, PA	Hancocks Bridge, NJ	6/13/2012	18 (alive)	81	S
68	Pillow, PA	Rockville, PA	5/28/2009	56	64	SE
69	Heilmandale, PA	Freeport Mills, PA	5/11/2012	15	5	NE
70	Lewisburg, PA	Millmont, PA	5/26/2011	34	13	SE
71	Turbotville, PA	Lewisburg, PA	7/7/2011	33	14	SE
72	Schultzville, PA	Schultzville, PA	7/17/2012	unknown	1	NE
73	Bally, PA	Moselem, PA	8/14/2006	95 (alive)	18	NW
74	Plainfield, PA	Plainfield, PA	7/9/2013	2	2	S
75	Rehersburg, PA	Millardsville, PA	6/2/2011	34	5	S
76	Exchange, PA	Exchange, PA	12/19/2012	2	1	natal site
77	Frystown, PA	Greenwich, NJ	6/12/2012	24 (alive)	91	SE
78	Schultzville, PA	Heidelberg, PA	7/17/2012	24 (alive)	26	W
79	Lancaster, PA	Strausstown, PA	7/20/2012	24	30	N
80	East Berlin, PA	Walnut Bottom, PA	6/15/2012	23	23	NW
81	East Berlin, PA	Urbana, MD	6/24/2013	9	46	N
82	Lake Meade, PA	Lake Meade, PA	7/10/2013	2	0	natal site
83	Winfield, PA	Winfield, PA	8/2/2013	2	0	natal site
84	Exchange, PA	Exchange, PA	7/29/2013	2	0	natal site
85	Exchange, PA	Exchange, PA	7/29/2013	4	0	natal site
86	Newville, PA	Newville, PA	8/8/2012	25	3	NE
87	Turbotville, PA	Turbotville, PA	5/22/2012	27	3	S

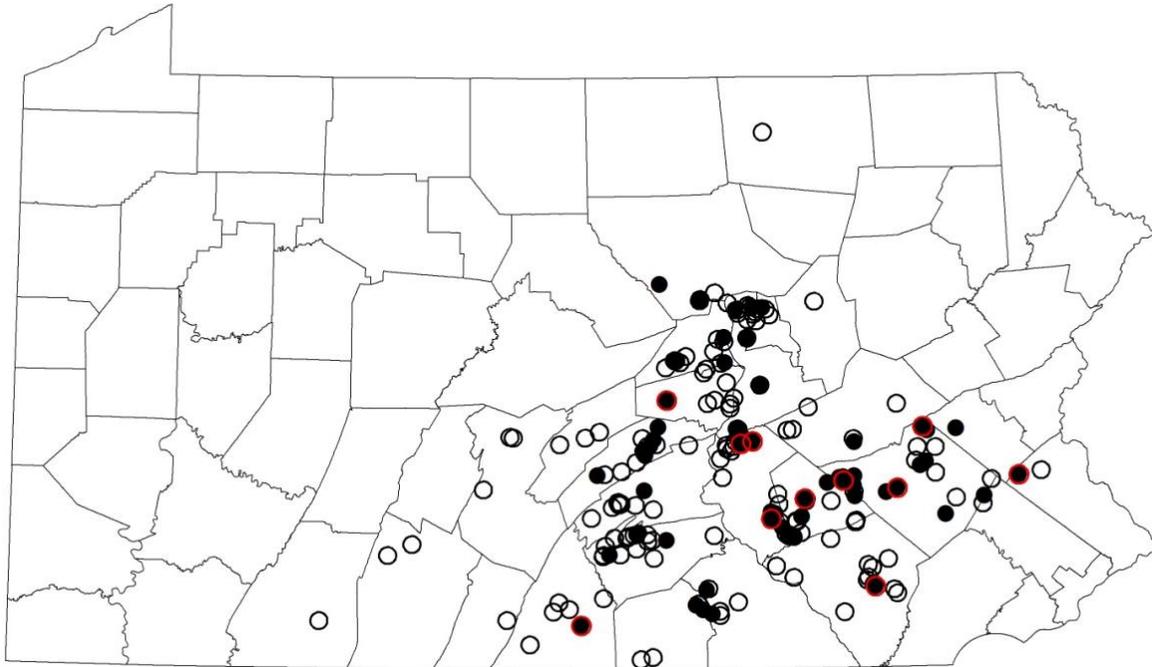


Figure 1. Barn owl nest sites, 2005-2014. Open black rings indicate a nest that was last confirmed active between 2005 and 2013 ( $n=138$ ). Solid black circles indicate a nest that was confirmed active in 2014 which was also active in previous years ( $n = 48$ ). Nests newly discovered in 2014 are identified as red ringed circles ( $n = 9$ ).

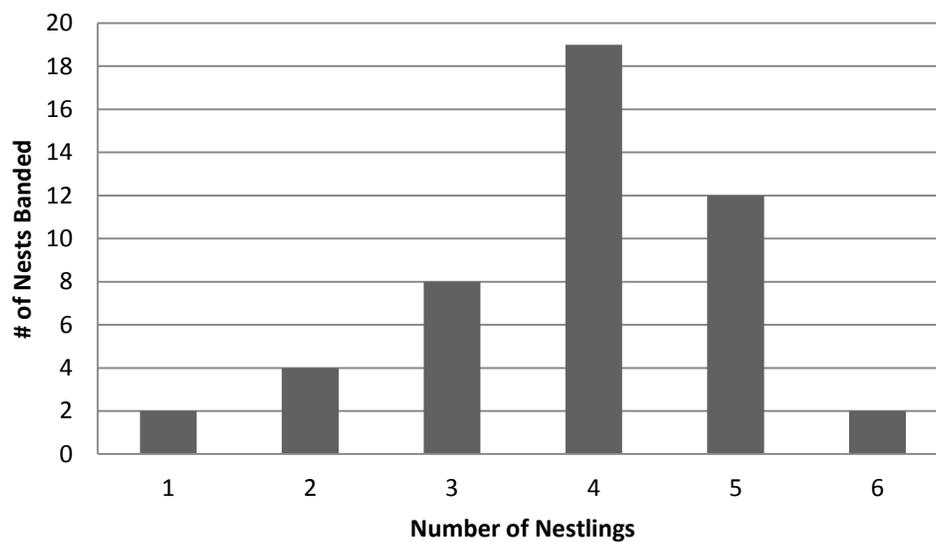


Figure 2. Clutch size at time of banding ( $n = 47$  clutches).

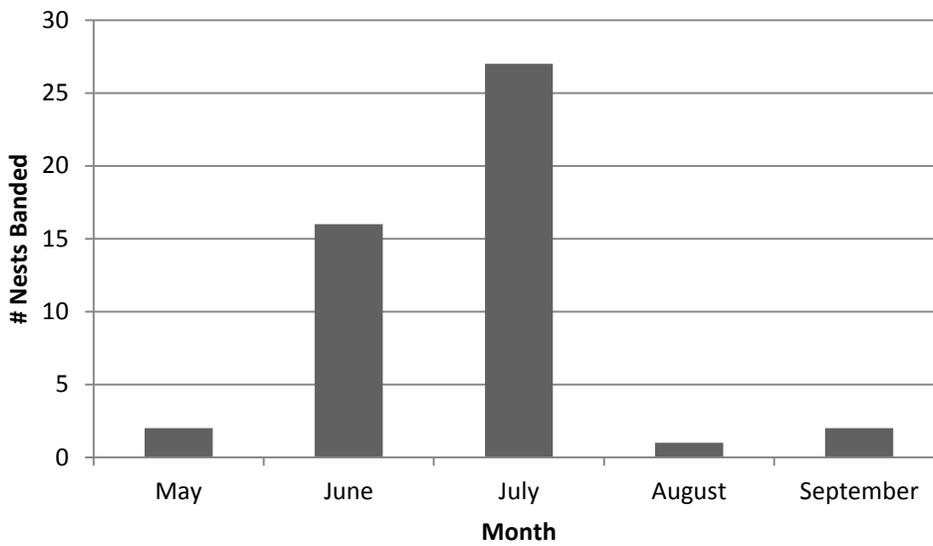


Figure 3. Number of barn owl nests banded per month ( $n = 47$  clutches).

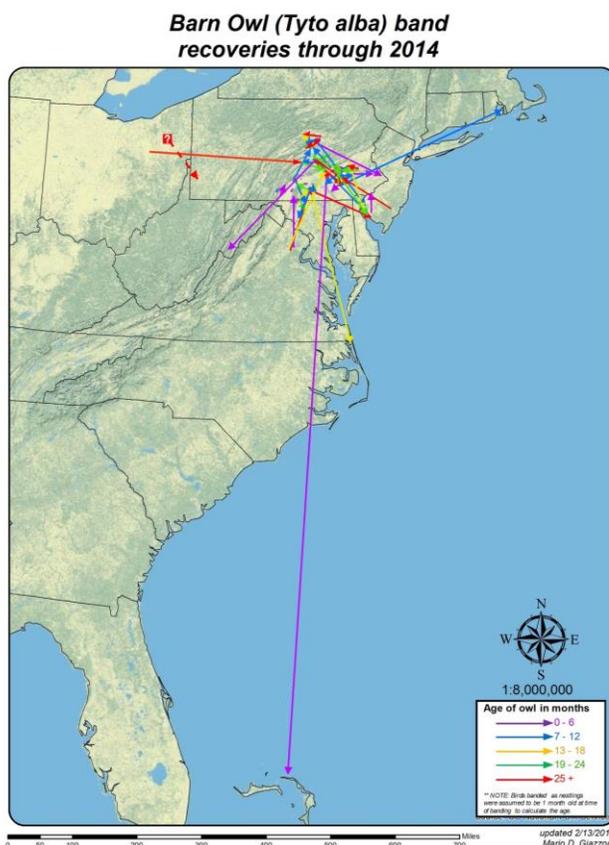


Figure 4. Summary of barn owl dispersals, 2005-2014. Line begins at banding location and end of arrow point indicates location of band recovery.