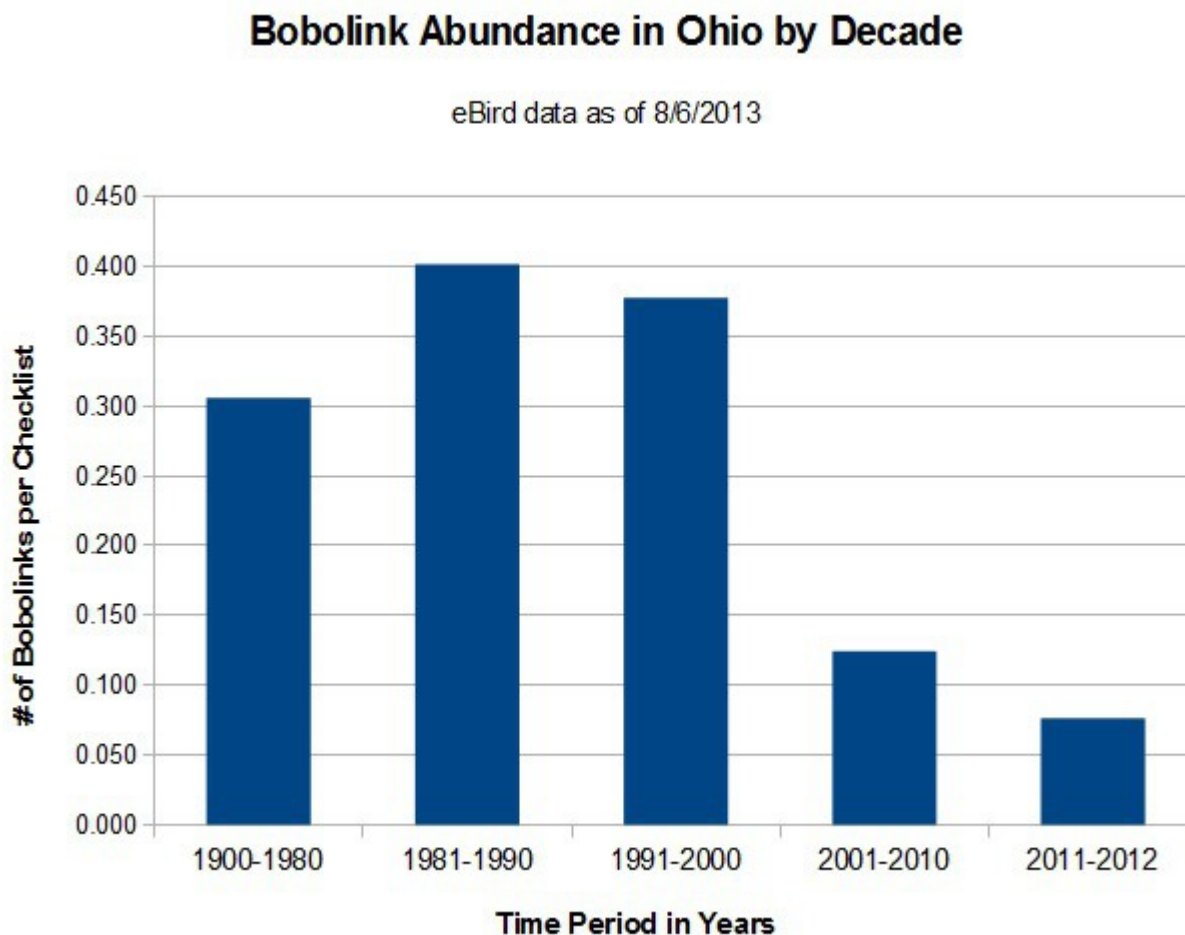


Is the Bobolink in Trouble in Ohio?



This chart shows an 80% decline in bobolinks in Ohio from the 1980s to 2012. The data comes from eBird, an online Citizen Science database of over 100 million bird sightings worldwide, as of 8/6/2013. All the sightings for each time period were totaled and then divided by the total number of checklists. The result is the total number of bobolinks per checklist by decade.

Why bobolinks per checklist? In baseball, one batter might have 800 hits and another batter has 160 hits. Who is the best batter? The raw numbers don't really help us. Enter the batting average. It is a ratio showing the number of hits per at bat. So if the batter with 800 hits accomplished that number in 3200 at bats, his batting average would be .250. If the batter with 160 hits did it in just 480 hits his batting average would be .333. The better batter would be the batter with the .333 batting average. Even though he had only 160 hits, his batting average indicated a much more efficient batter.

In much the same way I am using a ratio here. Is it better than just the raw number of sightings of bobolink? I think so. For instance, take the black-tailed gull in Ohio. During one week a total of 28 sightings were entered into eBird. And that represents the total in eBird. It is not the total number of individuals—it is the number of *sightings*. In that case 28 different people entered sightings of just *one* black-tailed gull. But if the total sightings were divided by the total number of checklists, one would

end up with 1.0—just one bird per checklist. It is still not a perfect number, but does, I believe, give a better representation of true abundance. It can give us an inkling of larger trends.

But an 80% drop? That seems rather drastic. I thought back to my own childhood home in Holmes County, Ohio. Bobolinks were common then in the 1960s and 1970s. It was not unusual to see half a dozen bobolinks from my backyard on any given day from the second week of May through the first week of July. In the last decade bobolinks have been much harder to find. I occasionally hear a single bird from the same backyard. Some years I do not hear them at all. The fields have changed. There is now corn on one side, a house on another, and lightly-grazed pasture that gets mowed a several times a year.

The chart above shows an 80% drop since the 1980s...statewide. Really? What could have happened? The first thing I look at when crunching numbers is if something doesn't make sense in reality, look again at the numbers. Are they really giving a true picture. The number I am using is what eBird terms "Abundance". It is actually the number of sightings per checklist. To get a dramatically smaller Abundance number one could decrease the number of sightings—the numerator (top number in division). Or one could increase the number of checklists—the denominator (the bottom number).

The number of bobolink sightings increased from the 1980s to 2011-2012 (from 1,909 to 4,227). That is more than double the number in the 1980s! So much for the numerator being smaller. How about the number of checklists? Yes. That shows a gigantic change from 4,756 checklists submitted for Ohio during the 1980s to 55,353 checklists submitted in Ohio in just two years, 2011-2012. Bam! That's it. That change is H-U-G-E. That would make the number of bobolinks per checklist number quite small. I was ready to drop this whole bobolink project thinking that the data was just too skewed.

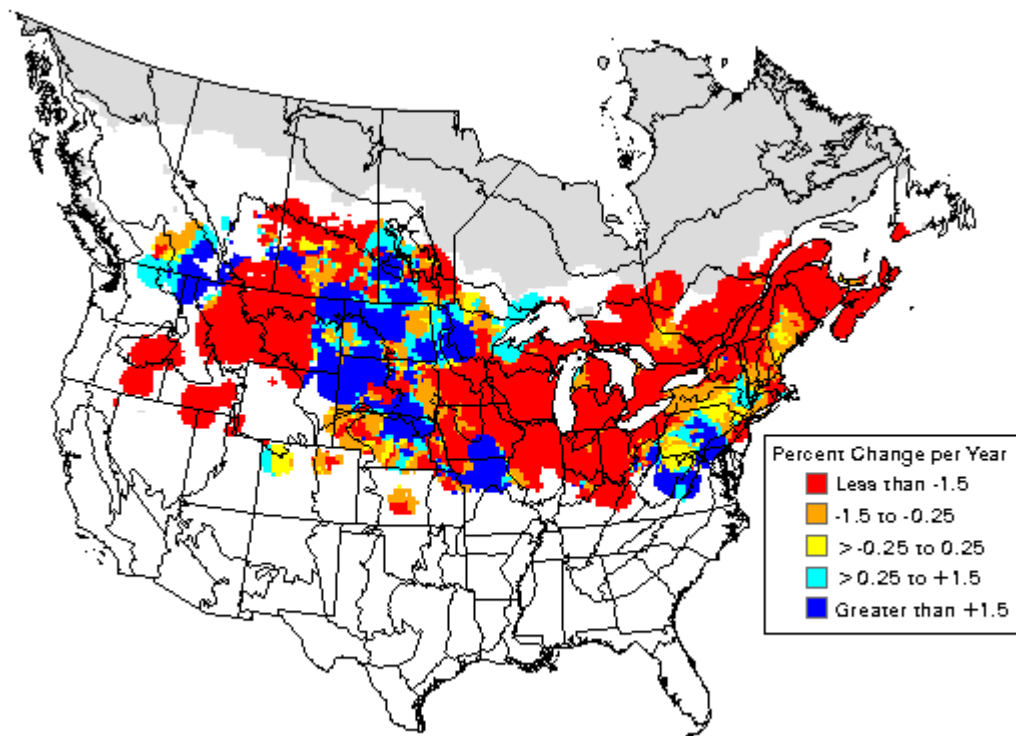
But I had a small nagging voice on the inside. I felt that bobolinks had declined enough that I could tell just from my own gut feel. But how much was the decline? I didn't know. How would I measure it? One of the things that can affect the sightings of bobolinks per checklist is the location of the checklists where folks are birding. Much that is entered into eBird comes from feeder watches, especially in the winter months for Ohio. And a great number of bird sightings in eBird come from urban birding. The coverage in much of the countryside in the U.S. is still sparse. Are these both factors in Ohio? Yes. They are.

In Ohio, fully one third of all bird sightings come from three of Ohio's 88 counties—Cuyahoga (City=Cleveland), Franklin (City=Columbus), and Hamilton (City=Cincinnati). That is certainly going to affect my ratio. Bobolinks like grassy fields, not cities or soccer fields, or even most city parks. And bobolinks are only here in Ohio in the warmer months. Additional winter checklists would not have bobolinks on them. In our early data through the 1990s, most all of the data submitted to eBird occurred in spring and summer into early fall. Now, the weeks of the year that checklists are submitted are much more evenly distributed even though spring and summer still get the most action. Combining the facts of urban sprawl and a higher reporting ratio from cities and more winter checklists being submitted in the modern era makes even more a case for dismissing my initial chart as invalid.

One of the faults of using just the pure sightings data is that the sightings are unevenly distributed geographically. This is quite true in Ohio, too. Most all of the checklists in eBird are submitted from glaciated Ohio—North and West part of the state. The Southeast gets very little coverage at all. This was even more pronounced 30 years ago in the 1980s. Ohio has much better coverage today than it did 30 years ago. But part of this is still troubling to me. There is greater coverage and more bobolinks reported, but the ratio of bobolinks to checklists is far less than in the 1980s.

And then it struck me. I could hunt for BBS (Breeding Bird Survey) data. They should have accurate scientific numbers measured from *the same locations today as historically*. But what would the data show?

I went to the USGS Patuxent Wildlife Area website to look for data on bobolink population trends (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* [USGS Patuxent Wildlife Research Center](http://www.pwrc.usgs.gov), (<http://www.pwrc.usgs.gov>) Laurel, MD). Thanks to the pioneering work of Chandler Robbins for his efforts with the BBS in North America. What a treasure trove of valuable data! Information for over 400 species can now be found online. Here is a BBS trend map for bobolinks in North America from 1966-2011. The red and orange areas show a decline. The blue areas show an increase.



I see a lot of red on this map. This shows a decline of -1.5% per year, or worse. Unfortunately, my hunches on this grassland species decline appear to be correct. On this, I would not mind if I had been wrong. Sadly, a pretty steep decline overall is evident over much of the bobolink's range.

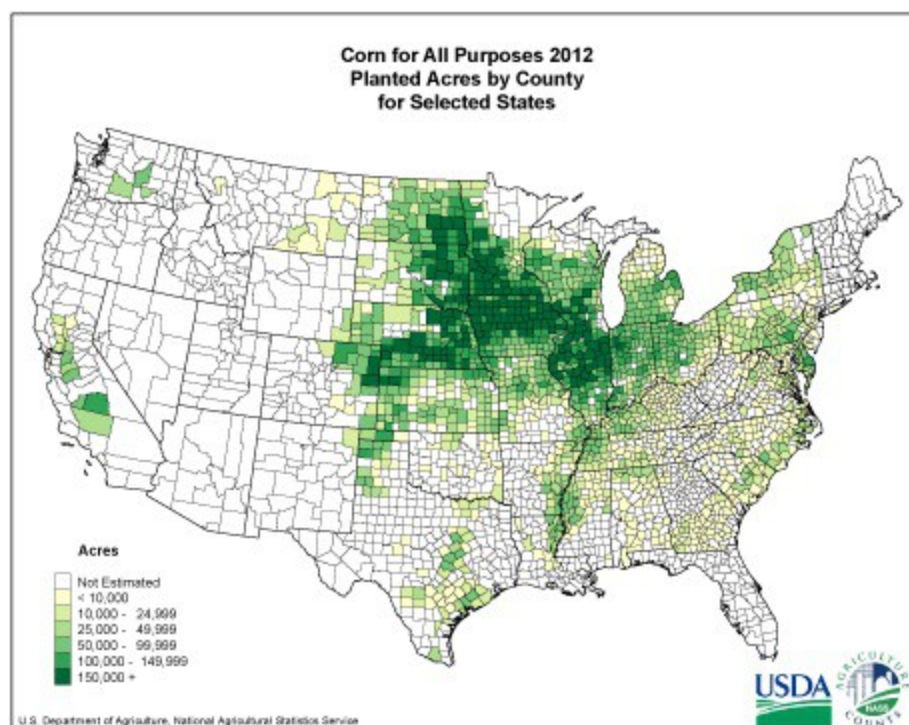
But that is only -1.5% or more. That doesn't sound horrible. How bad is -1.5% per year? Think of it as compound interest...*in reverse*. So for the period of 1966 through 2011 a -1.5% per year decline would reduce the population by about 50%—*one half*. If only the decline was only -1.5% per year for Ohio. How bad is it? Bad. Very bad. The data for Ohio BBS trends show bobolinks declined at the rate of -4.5%...per year. That represents an 87% decline for 1966 through 2011. Yikes! That is not too far off from our original number—80%. Hmm.

The hardest part is trying to figure out why. Let us say that both my eBird data and the BBS data do not really represent the true abundance of bobolink in Ohio. Let us imagine for a moment that we have only witnessed half of that—say a 40-45% decline in numbers. That is still a large number. Could the data only be 1/4th as bad as the original numbers? 20%. That is still only 4/5ths of the original population 30+ years ago. What has happened? What changed?

As a boy growing up in the 1960s I remember far more small farms. Now there are fewer small farms and more large farms. More land has been cleared and houses developed. More pesticides are used now and special fertilizers and genetically modified crops are bringing higher yields. Many farms now use the huge round bales for hay instead of the old square ones. Most hay fields are now alfalfa instead of timothy hay. And mowing occurs up to 3 times per year in Ohio. Corn seems to be *everywhere*. And farm land is being sold now in small parcels instead of as a farm. The times they are a changin'.

Ohio is not the only place seeing declines in bobolinks. As part of a green initiative in New England, re-forestation projects are reducing the area where bobolinks breed. Here is an instance where man's initial presence actually benefited the bobolink for decades. New England was heavily forested and pioneers came and removed the timber and converted the land to agriculture. Bobolinks took advantage of new nesting areas and began nesting there in greater numbers. Now, to reduce man's initial impact many areas of New England having tree planting projects. This will do what folks intended in restoring some of the forested land. But unintentionally this will harm current bobolink populations there. Such are the difficult decisions that face us today.

In the Cornbelt bobolinks face a similar challenge, but from a different source. Reduced breeding here comes in the form of the ever-increasing acreage needed for corn.



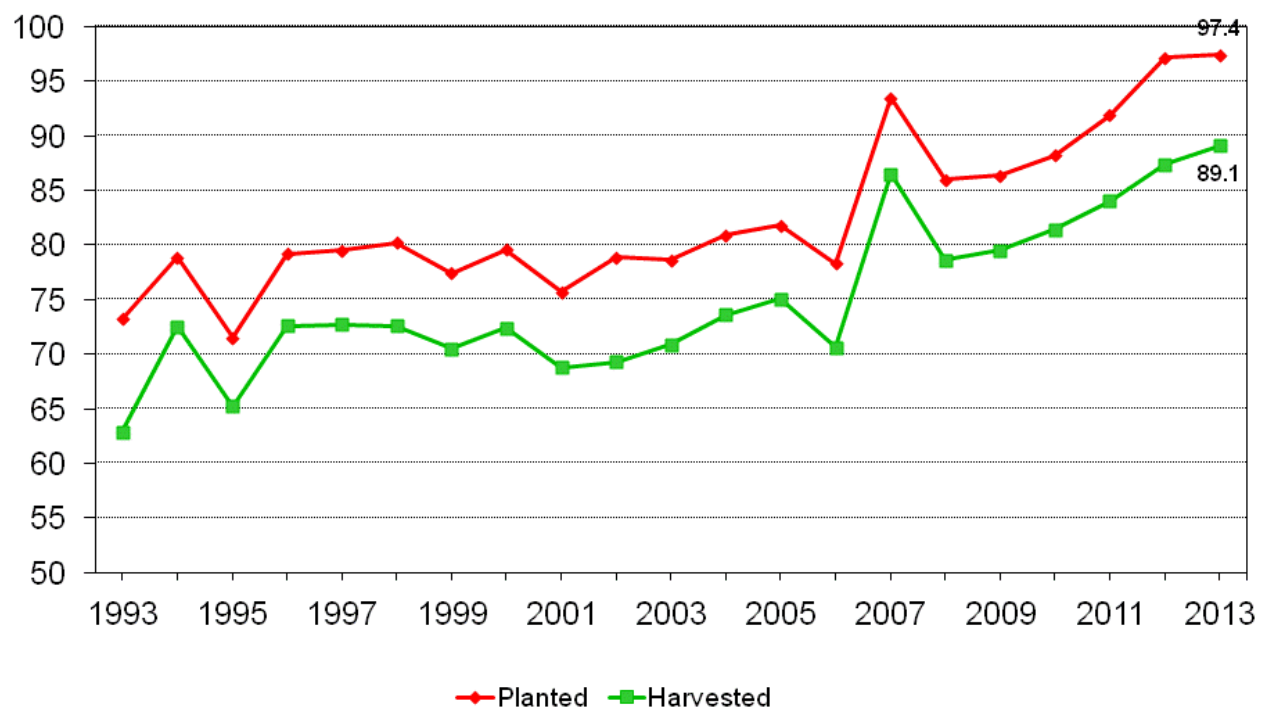
According to the National Corn Growers Association's 2013 World of Corn report, yield on corn has increased over 600% over the last 100 years. Yield in 2012 was 20 bushels/acre. Today the yield is 123.4 bushels/acre. Studies in genetically modified crops have helped increase yield dramatically. Even so, it is not enough to meet the current demand. In just six years from 2006-2012 there has been an increase of 20 million acres used to plant corn. Current land use for corn crops in the U.S. is nearly 100 million acres. So say the folks at the USDA. For those of you wondering how much 100 million acres is—well, about 4 times the size of the State of Ohio. Wow! That is a lot of corn!



U.S. Corn Acres



Million acres



USDA-NASS
6-28-13

In the United States many pesticides are used for our crops. But we have many regulations in an attempt to protect us as well as wildlife. But bobolinks don't stay here during the colder months. They migrate South—waaaaaaay South. South America South. Many bobolinks make the 6,000 mile, one way journey to Bolivia, Paraguay, southern Brazil, and northern Argentina. It's a region of grasslands and rice fields in an area about 1,000 miles from north to south.

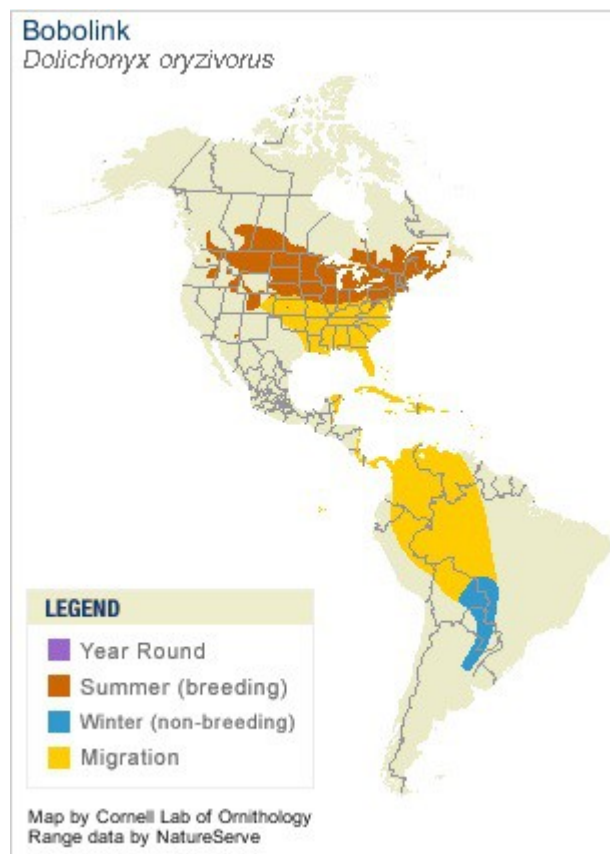
Some of the countries in South America still use potent pesticides for their crops. Rosalind Renfrow, a biologist from Vermont has studied bobolinks in South America on their wintering grounds. Pesticides there pose a grave danger to bobolinks, especially since they gather in such large concentrations..

"Blood from 40% of Bobolinks captured in Bolivian rice fields exhibited exposure to organophosphates at lethal and sublethal levels. The culprit was monocrotophos, a pesticide that, like other organophosphates, interferes with the nervous system."

-Vermont Center for Ecostudies: Bobolink Wintering Ecology

Much harm could make a real impact in the total population of birds. Many of the bobolinks there congregate into huge flocks and can wreak havoc on local rice fields. The birds are viewed as pests to many of the rice farmers. The damage they can inflict to a field can be monumental. Renfrow documented one flock estimated to be 150,000. (-"Vermont biologist discovers Bobolinks" by Bryan Pfeiffer in the Vermont Guardian. July 7, 2006)

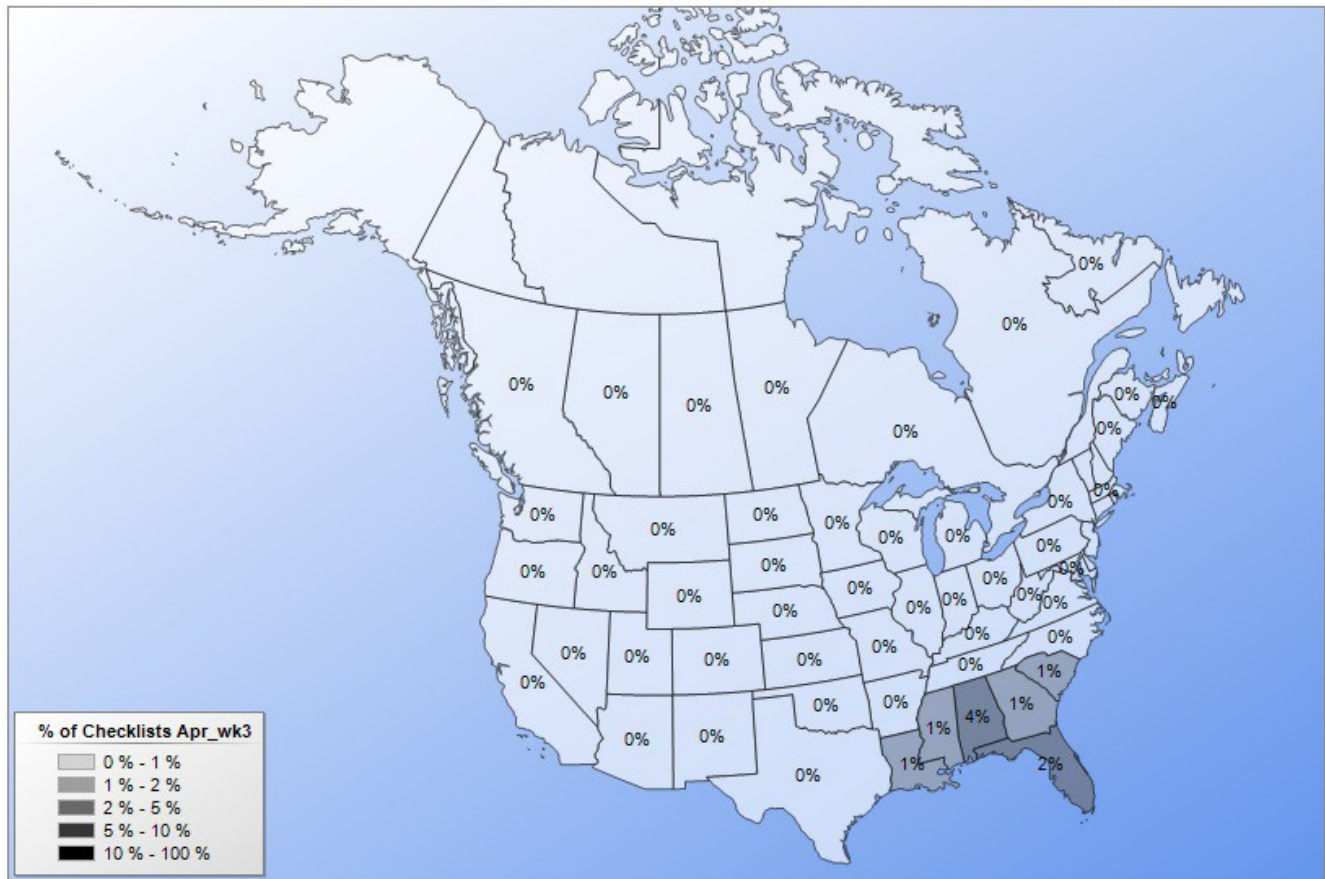
Renfrow has also studied the incredible flights that bobolinks make. One bird (with a good tailwind) was document to fly over 1,100 miles in 24 hours! Most birds do not make that large a flight all at once. And our birds that nest here in Ohio do not make a 6,000 mile journey either. Ours "only" fly between 4,200-5,000 miles by my estimates from eBird maps and global distance calculators. By looking at different dates and areas in eBird I estimate a normal bobolink will cover 70-100 miles per day on its epic 6,000-mile journey (which may take up to two months to complete). That is pretty amazing for the little yellow, white, and black bird that weighs little more than three Oreo Cookies. Here is a range map from the Cornell Laboratory of Ornithology:



It appears they fly north through Columbia, into Central America, making their way northward up into the Yucatan and cross the Gulf of Mexico as far west as Texas. Most bobolinks, however, hit Florida first and move westward into Arkansas and then north into the Northern Great Plains. Bobolinks can be found along much of the Canada-U.S. Border all the way east into Newfoundland. North Dakota is the current center of population for bobolinks in North America. In fall the bobolinks follow wind patterns to the East Coast where they gather in large flocks before flying south through the Caribbean into South America and back to their wintering areas.

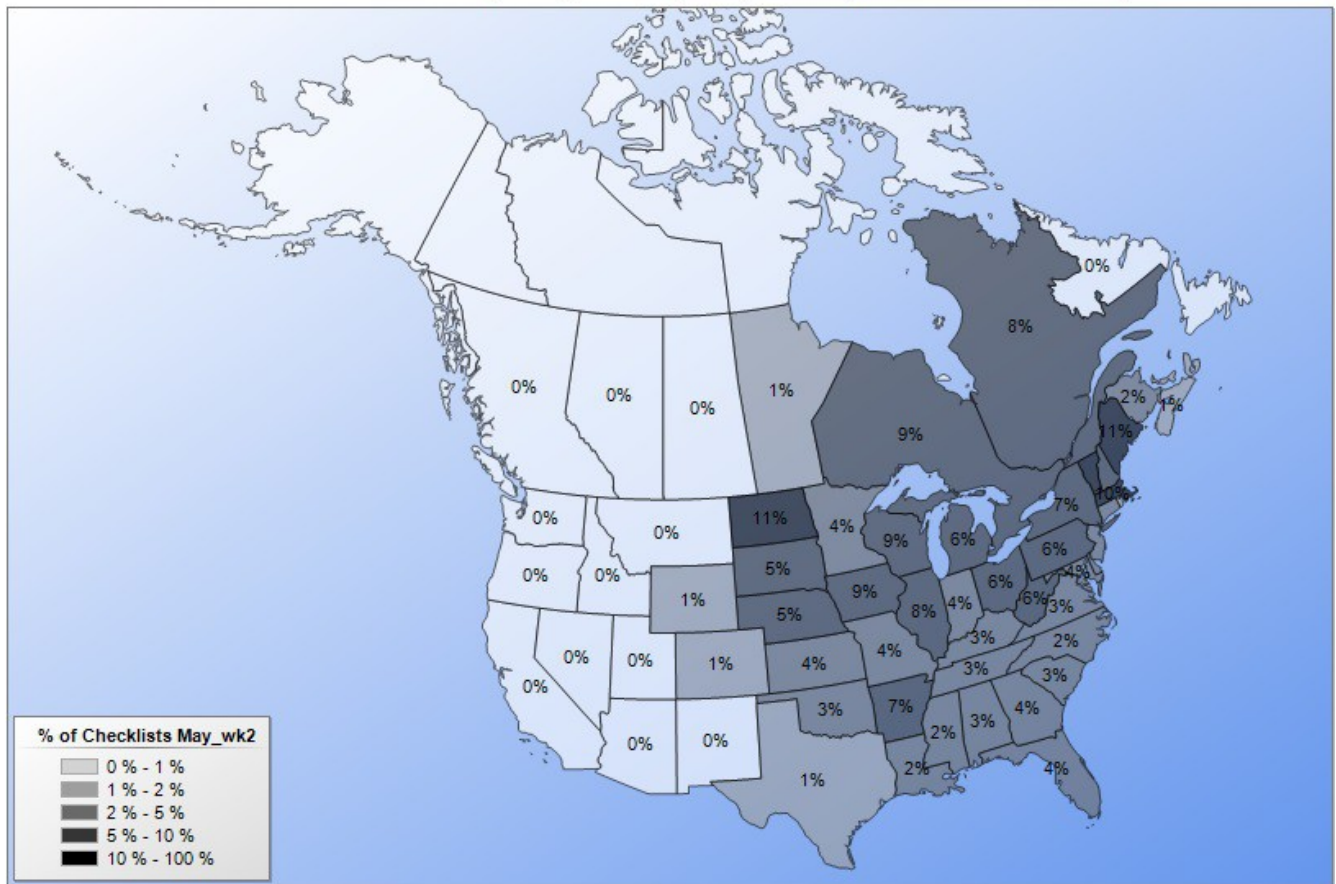
Spring migration in the U.S. starts out like this during the 3rd week of April:

Bobolink % of Checklists by State_Prov - April 15-21 (eBird all yrs/months as of 2/22/2013)



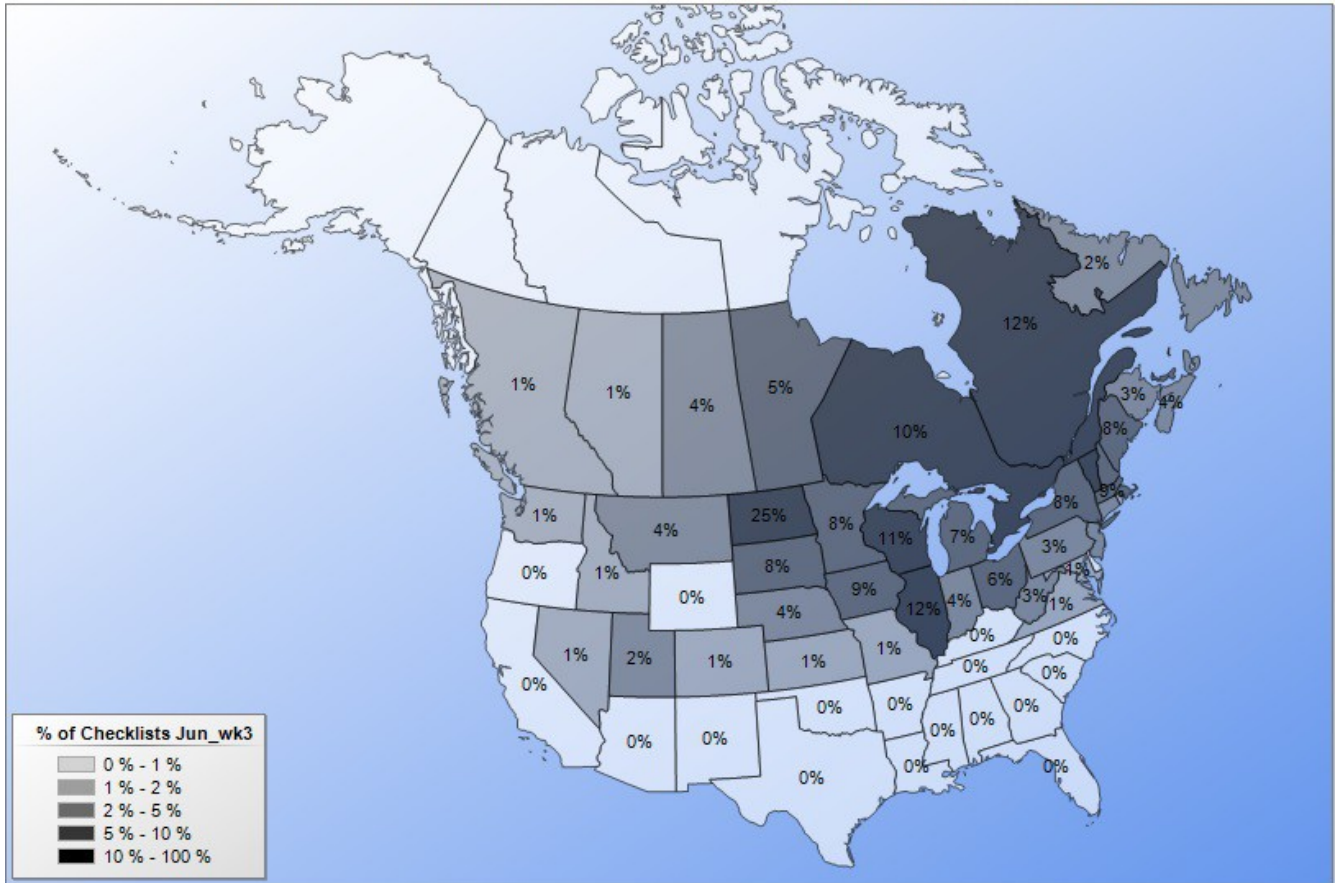
According to eBird, bobolinks peak in abundance during May 8-14:

Bobolink % of Checklists by State_Prov - May 8-14 (eBird all yrs/months as of 2/22/2013)



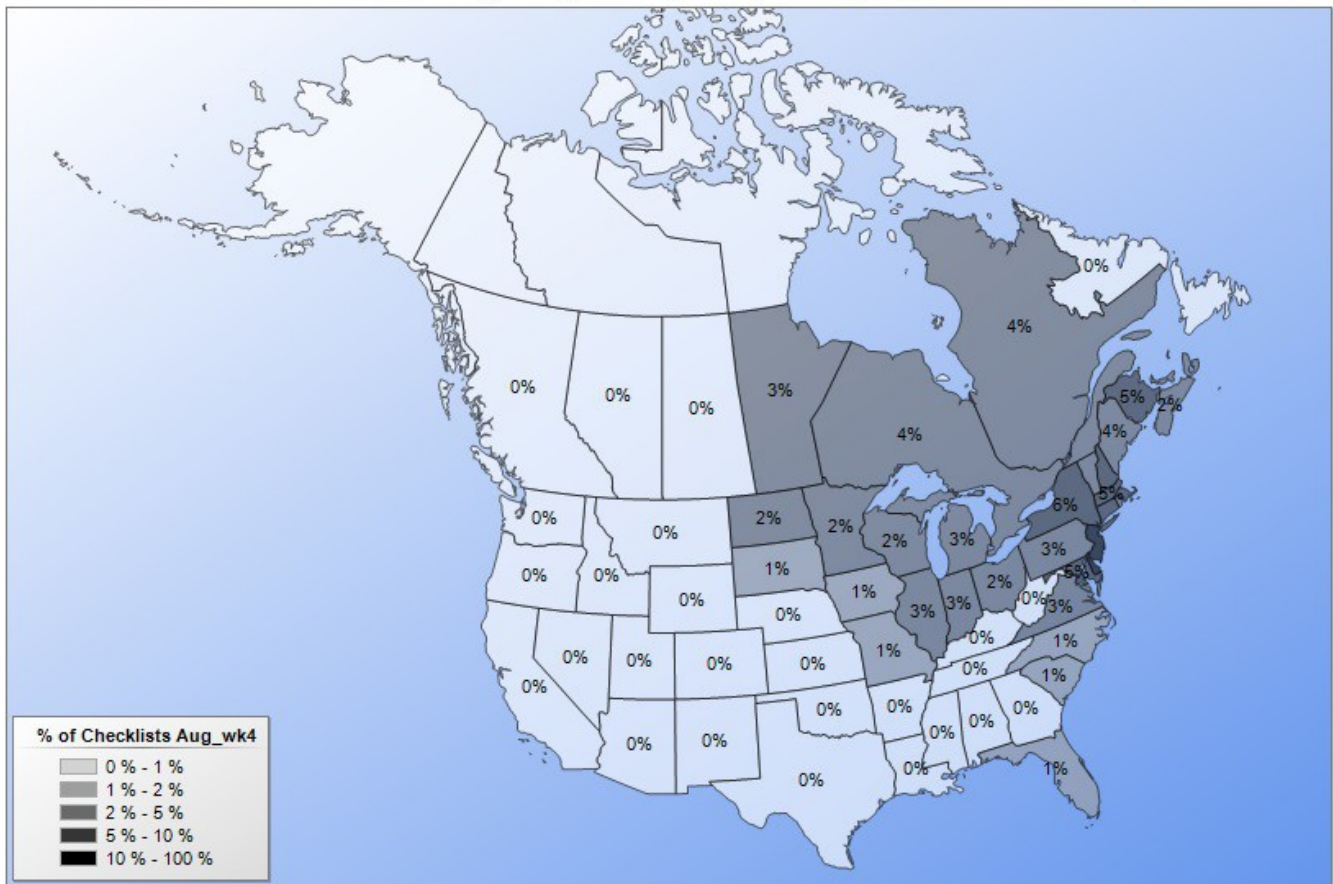
By mid-June bobolinks are in full breeding mode:

Bobolink % of Checklists by State_Prov - Jun 15-21 (eBird all yrs/months as of 2/22/2013)



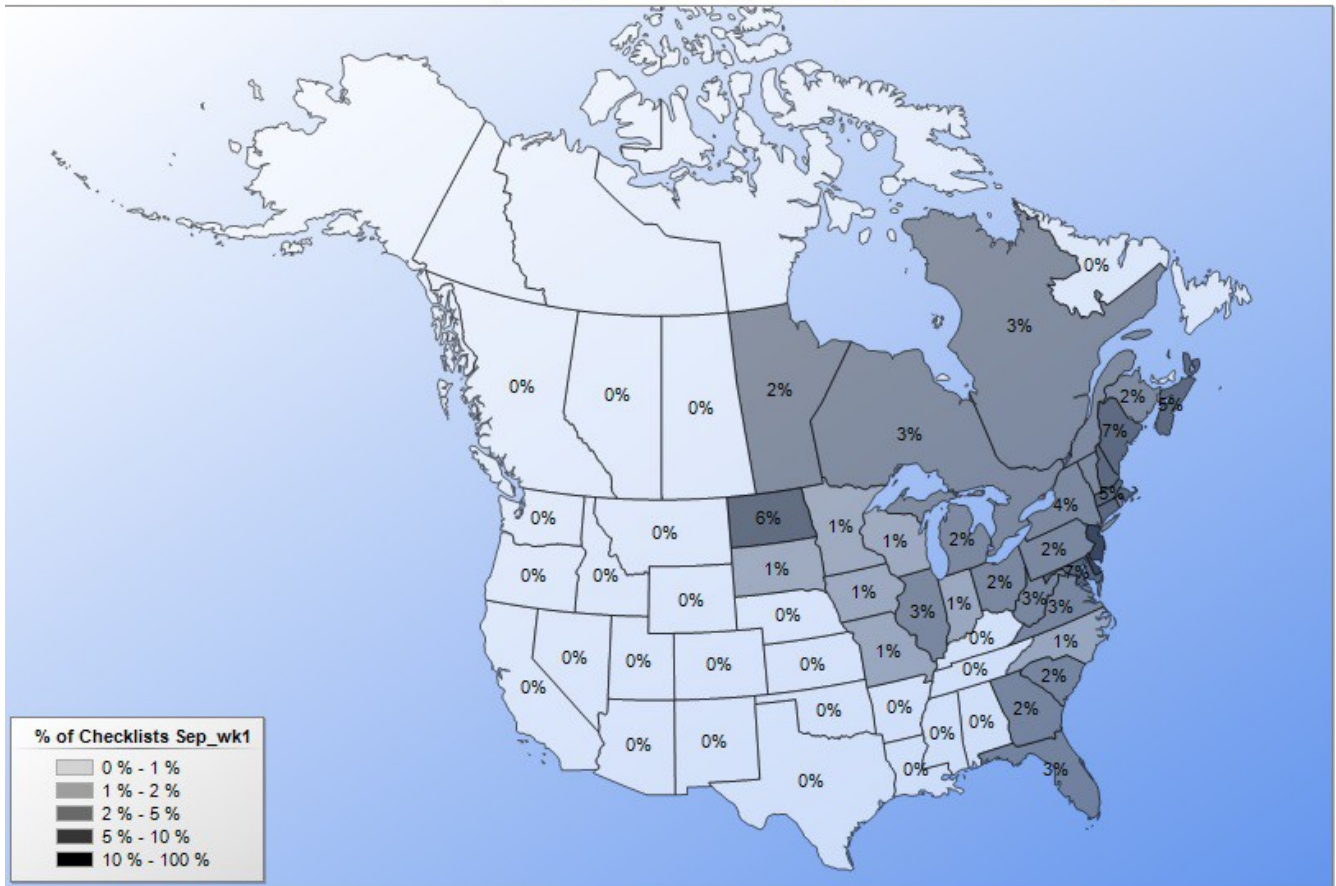
Fall migration begins rather early. Bobolinks peak the last week of August in Ohio:

Bobolink % of Checklists by State_Prov - Aug 22-31 (eBird all yrs/months as of 2/22/2013)



Only a week later bobolinks arrive in larger numbers in the mid Atlantic (1st week of September):

Bobolink % of Checklists by State_Prov - Sep 1-7 (eBird all yrs/months as of 2/22/2013)



By the end of October most bobolinks have left North America:

Bobolink % of Checklists by State_Prov - Oct 22-31 (eBird all yrs/months as of 2/22/2013)



Note that I am using a different eBird metric here called Frequency of Checklists. This is just an indication whether or not one or more bobolinks occur on a checklist submitted to eBird (% of checklists recording one or more bobolinks). I created these maps from eBird data. And I am using the Frequency of Checklists because I haven't had the time to get at the actual numbers for a project of this magnitude. You may have also noted that it appears that bobolinks breed all the way north to the Hudson Bay. This is not true. I have merely rolled up data by State and Province. So a large Province like Quebec which has bobolinks nesting in the southern third will appear on this map as if the bobolink is evenly distributed when it is not. I have used these maps here to demonstrate the movement of bobolinks here in the U.S. and Canada.

Bobolinks probably had their heyday in the late 1800s and early 1900s when they were still considered pests and hunted. Occasionally, bounties were even offered. This quote from the early 1900s is very telling:

"The small flocks unite; all those that breed in the northeastern part of the country concentrate along the marshes and inlets of the seashore, and the whole body, constantly growing by accessions from other parts of the range, moves steadily southward toward the rice fields--an army vaster than that of Xerxes. The birds begin to arrive upon the rice fields about August 20, and from that time until the last of them wing their way to their winter home, nearly two months later, there is no rest for the unfortunate rice grower. They swarm upon fields by millions, and when frightened off at one place at once settle upon another a short distance away."
-Food of the Bobolink, Blackbirds, and Grackles by F.E.L. Beal, B.S. Bulletin 13. U.S. Department of Agriculture. Division of Biological Survey. 1900.

I had no idea the birds were ever so common. *Millions*. Plural. And they were compared in numbers to the red-winged blackbird. Their numbers were felt quite strongly by the damage they could inflict on crops. Some folks went to great lengths to protect their land.

In 1912, a South Carolina game warden reported that in a single year, over 720,000 rice-birds had been killed and then shipped from the port of Georgetown to market, where they were sold as food. Known as reed-birds in the northeastern U.S., bobolinks also were slaughtered there to be served in restaurants. Bobolinks are still collected as food in Jamaica, where they are called butter birds—a commentary on how fat they are as they pass through on migration.

-Smithsonian National Zoological Park: Migratory Bird Center: Bird of the Month, Feb 1997

This is amazing to me that the bobolink was so prevalent as to have gained the reputation as a major pest. I can only imagine the scenario of swarms of bobolinks in the fall—like other blackbirds. And eating bobolinks just seems like a horrifying proposition to me. How could they do that? For one thing, when they migrate in the fall they no longer have their pristine black, yellow, and white plumage. They are in non breeding, or basic plumage—bright buffy colored and brown-streaked. They look more like sparrows in this plumage than blackbirds. In their breeding grounds in the North the bobolinks have always been adored. There are even some famous poems about bobolinks. Not so in the Southeast where these birds decimated fields of rice and the early rice farmers were vexed with their presence.

But those numbers of bobolinks are certainly no longer present. There are still millions of birds left but probably not the magnitude of years gone by. In 2009 Audubon Magazine cites the world population of bobolinks to be 11 million birds:

The species is by no means endangered. Partners in Flight has estimated the continental population at 11 million, including 1.5 million in North Dakota, where the bobolink is doing very well indeed on more than 3 million acres of grasslands enrolled in the U.S. Department of Agriculture's Conservation Reserve Program.

"Buying Time". Les Line. Audubon Magazine. November-December 2009.

Wow. That is still a lot of birds. 11,000,000. And 1,500,000 in North Dakota alone! That number seemed high to me after all the research I have done. The citation above references Partners in Flight. So I went to the website myself to find out if that 11,000,000 was still the number of bobolinks in the world. I accessed the database on bird population estimates this morning, August 10, 2013. The world population of bobolinks? Yeah. It's a lower number. The estimate has dropped to 8,000,000 birds. The data from Partners in Flight further split out the bobolink numbers. The current estimate for the United States is 5,800,000 and 2,200,000 for Canada. --*Partners in Flight Science Committee 2013. Population Estimates Database, version 2013. Available at <http://rmbo.org/pifpopestimates>. Accessed on 8/10/2013.*

Ok. This leaves us with some simple number crunching. The Audubon article appeared at the end of 2009. A little more than ½ of 2013 is gone. Let's see. End of 2010 is one year. End of 2011 is two years. End of 2012 is three years. So about 3.5 years. Now the heavy math. Division. Oh, dear. 3,000,000 divided by 11,000,000 gives us 27%. There. The world population of bobolinks dropped 27% in just over 3 years. Yikes! That sounds scary.

I am wondering, "What is the total number of bobolink sightings in eBird for the whole year, 2012 for all of North America?" Here is where I *love* all the new data available in eBird. I navigated to eBird.org this morning, August 10, 2013. I clicked on Explore Data, select line charts, searched for Bobolink. I changed the date to the full year 2012. A total of 141,018 sightings of bobolinks were recorded in eBird for the whole year, 2012, for the entire continent of North America. All the birders reporting sightings to eBird only recorded about 1.8% of the world population of bobolinks. Well, probably less than that since this number assumes that each one of those 141,018 bobolink sightings was of a unique bird. I am quite certain that is not the case. What happens (at least here in Ohio) is folks go out and find fields that have bobolinks and other birders go there to see those bobolinks. So the same individuals get counted again. I can't blame the follow up birders. I do the same thing. It saves time and effort to find your own birds. Finding OPB—Other People's Birds is far more efficient for time-starved folks.

We can see that eBird certainly does not give us a complete picture...yet. But with nearly 1.4 million checklists submitted to eBird in just one year, 2012, it is far more data than we have ever had available. Kudos to the team of folks who envisioned eBird and coordinate and maintain it. It is already a valuable resource and will only get better.

Now about that 27% decline in world population. Did that really happen? Maybe. I cannot say whether it is true or not. It is only an estimate. But if I had to guess, I would say we have better data available now than we did in 2009. I am guessing that part of this may be a downward revision of the estimate to give a truer picture of what is thought to be the total population of bobolinks. But that is just my opinion. I could be wrong. Unfortunately, even a drop of 10% in 3 ½ years is pretty staggering.

To find out more about bobolinks let us look at some nesting data:

Clutch Size: 4-7

Length of Incubation: 10-13 days

Days to Fledge: 10-14

Number of Broods: 1

- Ehrlich, P., Dobkin, D., and Wheye, D. (1988). The Birders Handbook: A Field Guide to the Natural History of North American Birds. New York: Simon and Schuster Inc.

Note that from the time of egg-laying to the time that the birds actually fledge is 20-27 days, or about 3-4 weeks. And this does not take into account how long it takes to set up a territory, how long it takes to mate, length of time before egg-laying, and don't forget how long it must take to construct a nest.

According to Dr. Noah Perlut of the University of New England, the whole process takes about 65 days. Dr. Perlut has been studying bobolinks for over 15 years.

Bobolinks need 65 days to mate, lay eggs in the grass and raise their hatchlings until they can fly away. The farmers' cut-after-cut schedule conflicts with the birds' routine.

-"Experiment tests whether bobolink payment plan will fly". Burlington (Vermont) Free Press. April 13, 2013. Candace Page.

Let's use 13 days for incubation (from above) plus 14 days to fledge (above) for a total of 27 days. Now subtract the 27 days from 65 days needed for the whole process. That leaves 38 days for a

bobolink to set up territory, build a nest, and mate. Basically it's a process that takes two months and a week. So how does this fit into a schedule for Ohio?

- *Normal arrival in Ohio: Apr 22-30*
- *Peak in Ohio: May 5-10*
- *Northward movement stops: May 20-23 (interior counties); May 27-30 (along Lake Erie)*
- *Nests with eggs: May 25-Jul 4*
- *Fall peak in Ohio: Aug 10-Sep 10*
- *Fall migrants are normally last reported Oct 5-12*
- *Largest flight of Bobolinks in Ohio: 7,500 recorded on Aug 8, 1936 in Toledo*

-Bruce G. Peterjohn. 2001. The Birds of Ohio. pp. 530-532. The Wooster Book Company.

The earliest normal arrival date is April 22. So when would first egg-laying begin for bobolinks in Ohio? Add 38 days to April 22 and the result is May 30. Cool. That coincides well with Peterjohn's nest with eggs dates as May 25-Jul 4. Peterjohn's last date for northward movement stopping in spring (inland counties) is May 23. Add 38 days to those late-arriving bobolinks and their nest with eggs estimated date would be June 30. That's pretty close to end of the nest with eggs date from Peterjohn. So what would be the estimated date that the latest-arriving bobolinks have fledgelings—those birds ready to actually take flight? If we use June 30 as last date with nest with eggs and we use the fastest incubation (10 days) and fastest to fledge (10 days) that would make July 20th the earliest date that bobolinks would finish nesting to the point of fledging young. If we use the later nest with eggs date of Peterjohn and use the longer incubation and longer to fledge times that would make the date July 4 plus 27 days, or July 31.

Wow. That is later than I imagined that young birds were just fledging. Hmm. Did we estimate when the first-arriving bobolinks should fledge? Nope. We didn't do that yet. Here we go. Above we figured those first arrivals might have eggs by May 30. Adding 27 days would put us at June 26 on the calendar. More importantly, we should try to figure out a fledge date from the peak of our spring migrants. Peterjohn uses May 5-10 as peak. Ebird data indicates a peak from May 8-14. Let's use May 8 as an arbitrary number knowing that it could vary year-to-year by a week or so. Ok. May 8 plus 65 days from start to finish gives us a date of July 12. That is the date that the majority of our bobolinks are just emptying the nest of new fledgelings.

What about our normal hay fields in Ohio? Research from New England's bobolink expert Dr. Perlut indicates that our mowing practices are not great for bobolinks.

"A bobolink that nests in a field that is cut twice or three times a summer faces zero chance of raising any young. Small wonder that surveys for the Vermont Breeding Bird Atlas found that bobolink numbers had plummeted 75 percent from 1966-2007."

-"Experiment tests whether bobolink payment plan will fly". Burlington (Vermont) Free Press. April 13, 2013. Candace Page.

But all hope is not lost. According to University of Vermont ornithologist Allan Strong and the aforementioned Noah Perlut bobolinks may attempt to mate again during the same summer:

"If a farmer delays the next cut 65 days, bobolinks will make the most of that second chance and successfully raise a new set of nestlings."

"Experiment tests whether bobolink payment plan will fly". Burlington (Vermont) Free Press. April 13, 2013. Candace Page.

I don't know if this would work in Ohio or not. I am neither an expert on bobolinks or a hay farmer. But it is an interesting concept.

The people in New England have taken this nugget of information a step further and formed it into a plan of action called "The Bobolink Project":

"Researchers from the University of Connecticut are conducting a new research project to determine whether people are willing to pledge money to reimburse farmers for allowing the bobolinks the time needed for successful nesting."

... "Farmers, dairy farmers in particular, need to cut their hay several times a summer, when its protein content is highest. That typically means a harvest in late May or early June, another in July and a third in late summer."

Trouble is, delaying that second cut reduces the value of the hay and might make a third hay harvest impossible. Most farmers can't afford to take the loss."

... "In essence, The Bobolink Project is asking people to share the cost of renting farmers' fields for 65 days in June and July."

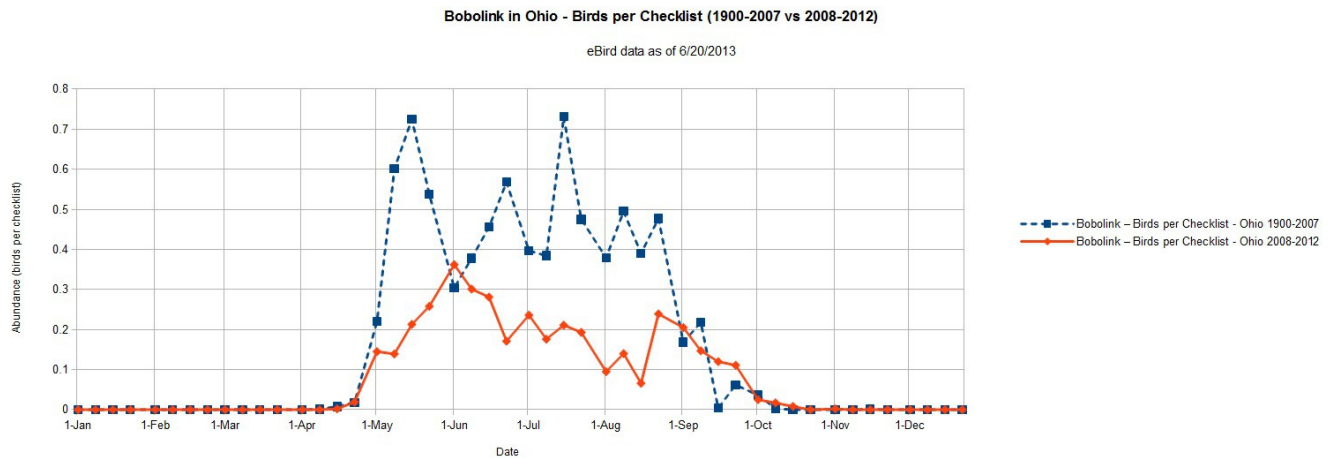
"Experiment tests whether bobolink payment plan will fly". Burlington (Vermont) Free Press. April 13, 2013. Candace Page.

More information on this fascinating project can be found here:

<http://www.bobolinkproject.com>
University of Connecticut
<http://www.facebook.com/TheBobolinkProject>
<http://twitter.com/BobolinkProject>
contact:
Stephen Swallow, Professor
University of Connecticut
W.B. Young Bldg, Room 320
1376 Storrs Road, Unit 4021
Storrs, CT 06269
stephen.swallow@uconn.edu
(860) 486-1917

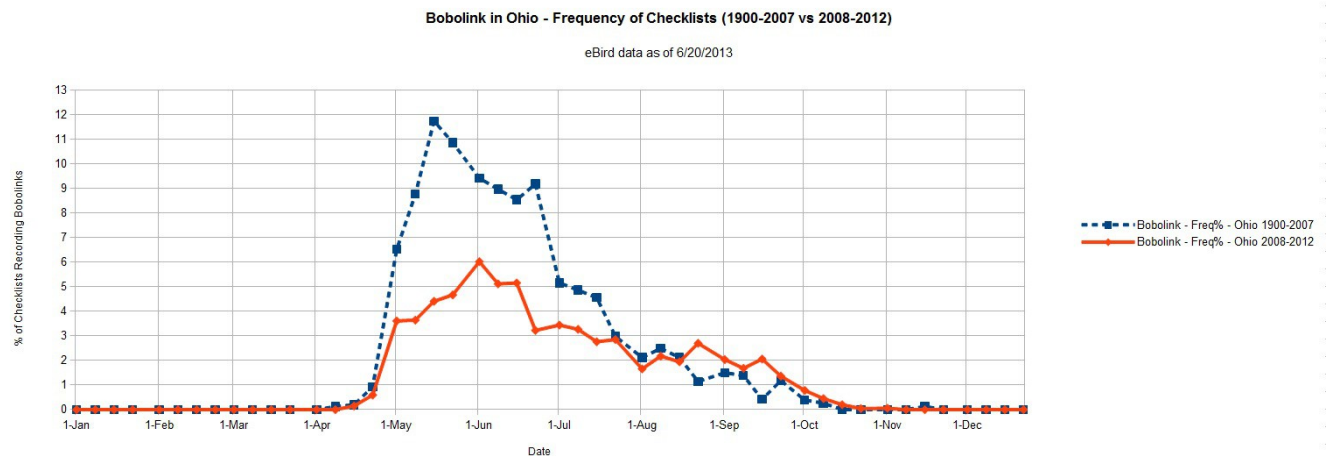
Finally, my initial research was probably not as valid as I had hoped. There were just too few bird sightings to provide adequate coverage for the 40,000 square mile area of the State of Ohio. Observations from before about 10 years ago in the early 2000s are about all we can hope for historically for research for Ohio. If you are still reading this you are more patient than I am. I took a long time to finally put this all this data together. But there is more. Really. In light of the fact that data for Ohio older than the early 2000s probably is insufficient for long term trends I did a little more

research. I am including 3 more charts here. They document more recent data which I consider to have enough data available to provide better trends (albeit over a much shorter period of time). The charts below document two time periods 1) 1900-2007 and 2) 2008-2012.

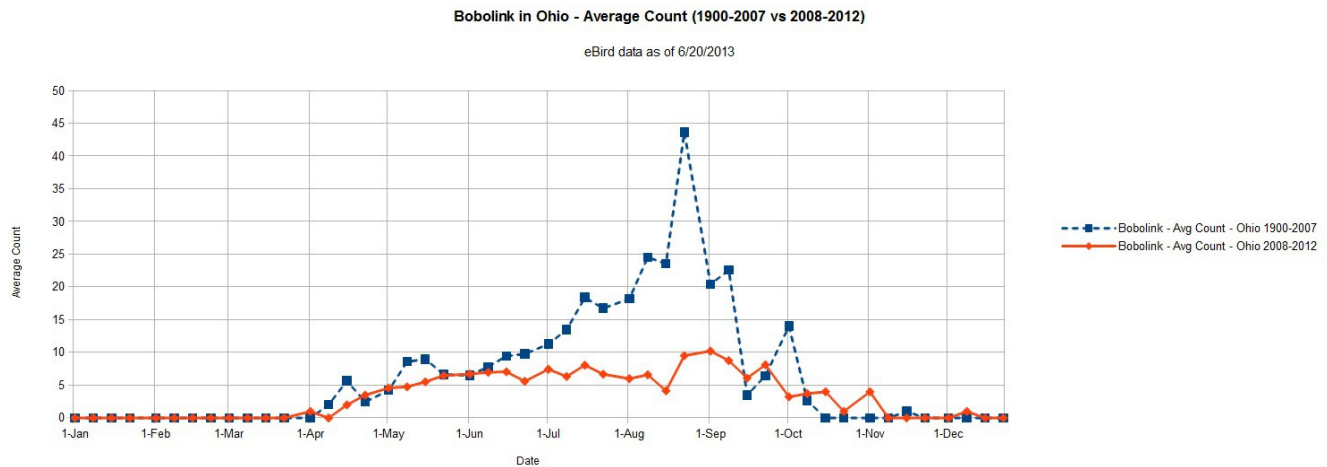


This chart shows the Abundance of bobolinks in Ohio with the number of bobolinks reported divided by the number of checklists submit by week for each time period. The blue dashed lines are for 1900-2007 and the solid orange line represents data for 2008-2012. This chart uses eBird data retrieved on 6/20/2013.

What stands out about this chart? Two things: 1) Yes. Bobolinks were more abundant in the early period 1900-2007 (heavily weighted toward 2007) and 2) The peak of abundance in spring is later in more recent years than in the past (spring peak in mid May in 1900-2007 and spring peak at end of May in 2008-2012). Very curious. I'm still thinking about this chart.



This chart shows the Frequency of Checklists for Bobolinks in Ohio. Ebird's Frequency of Checklists is just the percent of checklists showing whether or not a bobolink was seen. It is not a great indication of true abundance. The calculation is just the number of checklists with bobolink checked on them divided by the total number of checklists submitted for the time period. It is not as much as measure of abundance so much as a measure of how widespread a species is over time. Here again I will emphasize the curious feature of the change in time of the spring peaks. Ok. The percentage of checklists is almost double (proportionately) in 1900-2007 as it is in 2008-2012. That's pretty amazing, too.



On this last chart (really...I am stopping here. You are probably leaping for joy.) is the comparison of Average Counts of bobolinks comparing 1900-2007 with 2008-2012. Average Count is the total number of bobolinks divided by the total number of checklists reporting bobolinks. So when you run across a field of bobolinks and you stop to look there, this should be the number of bobolinks you see. The whole year is pretty similar between the two time periods except late summer and early fall. Wow. What has happened to change this? Does this just represent fewer bobolinks per site? Or does it represent a trend in nesting failure (given the timing of the disparity)? The latter part of August and early September could also represent a decline in numbers of bobolinks passing southward that originated in Canada, too. Could it maybe represent a change in migration patterns? Are there more bobolinks showing up during early fall elsewhere that might have once passed through Ohio? Ah. Those questions are for another paper sometime. For now they are food for much thought and consternation.