

Ecostewards and fellow naturalists,

Thank you for your careful reporting this year. As of 13 January, I had received 19 reports, with just a couple outstanding. So I thought I'd go ahead and begin summarizing the breeding bird data for the past 15 years.

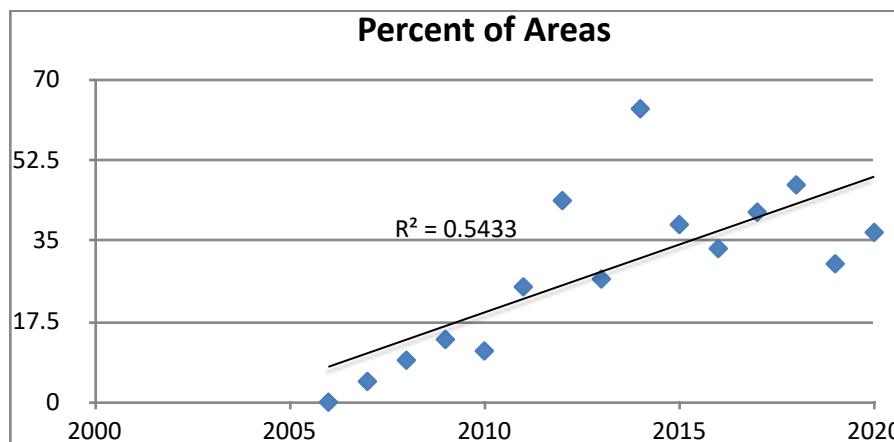
So far, I've entered the highest breeding code within each area and during each year for 70 easily detectable species listed as "rather common," "uncommon," or "rare" on the Boulder County Audubon 2010 Birds of Boulder County checklist. Then I created scatter plots (attached) showing the percentage of adopted areas where each species was seen within documented breeding habitat each year. (I'm proud to say I did all of this without ever touching the keyboard or mouse; if anyone would like a demonstration some time, it's easy and exhilarating).

Obviously, this is a pretty subjective exercise, since the number of areas actually surveyed each year varies from 9 to 22. To try to address this, I've created two categories:

1. All areas sampled during a given year.
2. Only those 12 areas that were sampled during at least 10 of the 15 years of the survey.

So here is what a sample graph looks like:

Eurasian Collared-Dove



Note the R^2 value assigned by Excel. I think we can assume that any value above .4 indicates a strong relationship, and any value above .3 suggests at least a weak

relationship. Click on the "graphs" attachment, above, and check all these out for yourself. Some will surprise you!

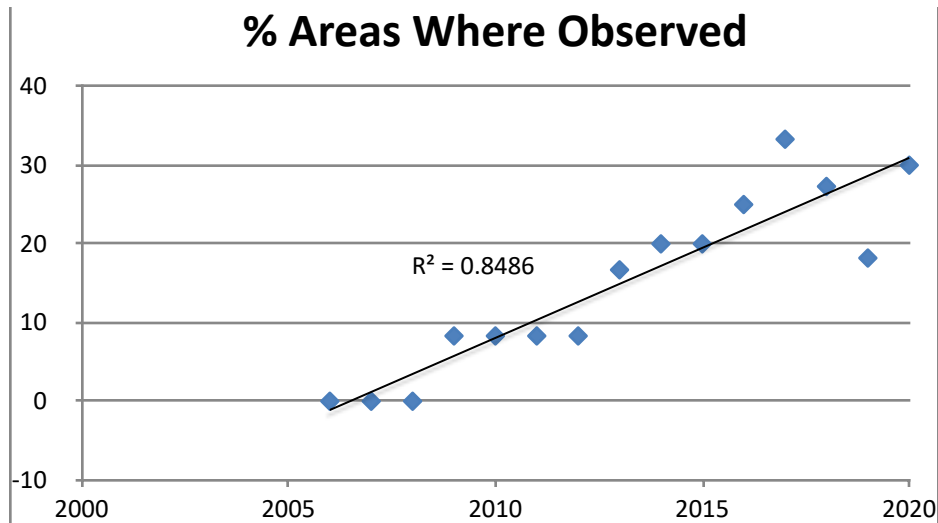
The preponderance of "increasers" didn't surprise me, since in addition to urbanization, the primary environmental change driving breeding bird distribution in Boulder County over the past couple of decades appears to have been deciduous tree and shrub expansion throughout the plains and foothills. Many studies have shown that total volume of vegetation is a strong predictor of breeding bird abundance and diversity. You'll see that most of the species on the "expanding" list nest either in deciduous woodlands or shrub lands.

Another factor probably driving range expansions has been ecological succession in and around gravel ponds and reservoirs, which may favor some nesting duck species, along with Bald Eagles, Ospreys, Northern Harriers, and American Bitterns. [Note: I've entered these more rare species on the spreadsheets, but I created scatter plots only for those species that were documented during at least 6 of our 15 years of surveys and that also showed some kind of change over time].

I know, you're wondering about climate change. That's progressing, but 15 years of these kinds of surveys aren't likely to show dramatic changes. For example, I expected to see a decline in the distribution of nesting Dusky Grouse and Red-naped Sapsuckers as a result of aspen die off, one symptom of global warming. But such a trend just didn't show up on the spreadsheets. It will require more focused observations of these reclusive and uncommon birds over more years to document this anticipated decline.

It's true that some breeding species, including Eastern Phoebe, Black Phoebe, Black-chinned Hummingbird, and Bushtit, have colonized Boulder County from the south during the past two decades. Scholarly articles about these range expansions tend to conclude that while warming temperatures may contribute, the main driving factors are proliferation of shrubs and deciduous trees in urban and rural areas; and adaptation of cliff-nesting species such as the phoebes to nesting on bridges and underpasses.

Here's my favorite scatter plot of all, showing changes in Ovenbird distribution within areas sampled during at least 10 of 15 years:



When I look at this image, I think of an exotic flower bursting open. Knowing that Ovenbirds have recently expanded their nesting distribution northward from the scrub-oak woodlands of southern Colorado into the northern Front Range, we might jump to the conclusion that global warming is causing this range expansion. But I think it's useful first to look at the habitats where Ovenbirds are apparently nesting (dense and vegetatively diverse riparian areas in foothills canyons) and ask how those habitats have changed and why.

To my mind, the answer appears straightforward. The shrub and deciduous tree vegetation in these areas is much denser than it was 20 or 30 years ago. That's particularly important for ovenbirds because they need the deciduous leaf litter to build their oven-shaped ground nests. Try building a roofed nest out of pine needles!

So why has this change occurred? Those of you who are relatively new to Boulder County may not know that prior to the 1980s most of our foothills canyons were grazed by cattle. The removal of these cattle and protection of these areas through open space programs helped stimulate growth and expansion of foothills shrub and riparian woodlands. In a 1998-2013 study of bird populations within the Coal Creek riparian area upstream from Superior that several of us completed in cooperation with Boulder Open Space and Mountain Parks, we documented a doubling of numbers of shrub-nesting and cavity-nesting birds after cattle were fenced out.

It also helped that the 1990s was Boulder's wettest decade on record and this past decade the second wettest. So now we have all these ovenbirds chanting away in these lush canyons, a minor miracle that occurred as a result of a land-use change that

many of us hardly took notice of. If you look at the graphs for Black-chinned Hummingbird, Bushtit, Gray Catbird, Yellow-breasted Chat, and Lazuli Bunting, all shrub-nesters, you'll see similar expansions in distribution.

I think we're certain to see climate change playing a stronger role as we continue our observations. This is why I'd hoped that we could carry out this project for at least 30 years. That's about how long it's likely to take before we see these profound long-term changes kicking in. I'll try to complete 5-year compilations from here on out. And if you have to give up your adopted area for any reason, please try hard to find someone to replace you.

I suspect you're also wondering about the rare nesting species that seem to be declining or disappearing locally--including Northern Goshawk, Burrowing Owl, Lewis's Woodpecker, Evening Grosbeak, and Lark Bunting--but that don't show up on the table, below. The problem here is we don't have enough observations in our ecosystem stewardship database to suggest trends. But other databases do. For example, the Indian Peaks Four-Season Bird Counts indicate a steep decline in numbers of Evening Grosbeaks (not to mention cowbirds!). Observations of Lark Buntings by the various local agencies show that while present in Boulder County during the late spring and early summer, these once-abundant grassland-nesters rarely breed successfully here anymore.

So please take these data for what they're worth: one way of looking at changes in Boulder County's diverse breeding bird population. I think our work these past 15 years has been particularly useful in demonstrating how changes in breeding habitats are influencing breeding bird distribution. We're not tracking absolute numbers for sure, but we are tracking distribution, just as the Colorado Breeding Bird Atlas I and II did for the state as a whole.

A preliminary look at the 2021 reports indicates a general decline in numbers of breeding birds throughout much of Boulder County during that year. We also have now had two consecutive years with lower than average numbers in the Indian Peaks Breeding Bird Count. It may be that this is the beginning of a long-term trend related to drought in the southwestern United States and Mexico. This year's low numbers were probably also driven by our wet, cool spring, which appears to have delayed insect hatches and subsequent arrival of nesting songbirds from the South. It's likely complicated and thus irresponsible to try to pin short-term changes on one or two observed causes, but it is our tendency as humans to do that. The advantage of having

long-term data streams is that they often permit more accurate correlations between cause and effect.

If we can somehow get in another 15 years of equivalent effort, I think the results will become truly astonishing.

Thanks for your dedication and patience, Steve

2006-20 Changes in Breeding Season Distribution of Boulder County Audubon Society "Fairly Common," "Uncommon," and "Rare" Species¹

Source: 2006-20 Ecosystem Stewardship Surveys. curlewsj@comcast.net

Annual distribution is defined as percent of sampled areas where a given species was seen or heard within suitable nesting habitat during its documented nesting season.

All areas: Areas surveyed for at least two consecutive years and for at least 8 hours each year.

Selected areas: Twelve areas that were surveyed during at least 10 of 15 years.

Species listed in the tables are those with r^2 values exceeding 0.300 within either of these two groups.

Increasing Distribution

Species	2010 status¹	R² all areas	R² selected areas	Nesting Habitat
Wood Duck	Fairly common	.4979	.4025	Tree cavities near water
Blue-winged Teal	Fairly common	.3235	.1626	Shorelines
Green-winged Teal	Uncommon	.4731	.3803	Shorelines
Cinnamon Teal	Fairly common	.4639	.447	Shorelines
Wild Turkey	Uncommon	.5393	.4381	Ponderosa pine woodlands and shrublands

Black-chinned Hummingbird	Rare	.6418	.561	Pinyon-juniper woodlands and shrublands
Eurasian Collared-Dove	Fairly common	.5821	.6073	Riparian woodlands and urban areas
Say's Phoebe	Fairly common	.6513	.7417	Grasslands and cliffs
Western Interior Scrub-Jay	Fairly common	.3229	.1387	Shrublands
Bushtit	Uncommon	.4227	.3247	Shrublands
Gray Catbird	Fairly common	.4662	.3146	Shrublands
Cedar Waxwing	Uncommon	.2767	.3407	Riparian woodlands and shrublands
Yellow-breasted Chat	Fairly common	.6534	.2034	Shrublands
Ovenbird	Rare	.7628	.8486	Foothills riparian woodlands
Lazuli Bunting	Fairly common	.3945	.1684	Foothills riparian woodlands and shrublands

Decreasing Distribution

Species	2010 status	R ² all areas	R ² selected areas	Nesting Habitat
Sharp-shinned Hawk	Uncommon	.2291	.3579	Conifer forests, aspen, riparian woodlands

¹ Boulder County Audubon Society. 2010. Checklist of Birds of Boulder County. Relative abundance of each species was characterized using results from 1978-2015 Boulder County Audubon Monthly Wildlife Inventories. www.boulderaudubon.org.

² Wickersham, Lynn. 2016. Second Colorado breeding bird atlas. Colorado Breeding Bird Atlas Partnership, Denver.

Thanks everyone!