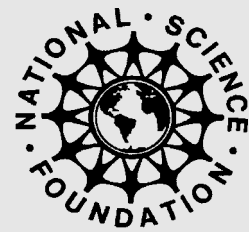


**Citizen Science  
Toolkit Conference**

June 20 - 23, 2007

**audubon's christmas bird count**  
from 19<sup>th</sup> century conservation action  
to 21<sup>st</sup> century citizen science

Geoff LeBaron  
Director, Christmas Bird Count  
National Audubon Society



**CORNELL LAB OF ORNITHOLOGY**

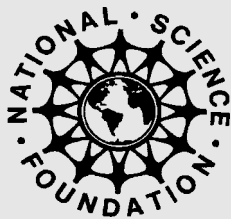
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This presentation took place at the Citizen Science Toolkit Conference at the Cornell Lab of Ornithology in Ithaca, New York on June 20-23, 2007.

Note that this document did not originate as a formal paper. Rather, it combines an oral presentation with accompanying PowerPoint slides and reflects the more informal, idiosyncratic nature of a delivery prepared specifically for this live event.

Documentation of the conference is meant to serve as a resource for those who attended and for others in the field. It does not necessarily reflect the views of the Cornell Lab of Ornithology or individual symposium participants.



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The following is one of three focus point presentations delivered on day three of the Citizen Science Toolkit Conference as part of the session titled "Community Building for Citizen Science."

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For complete documentation of conference proceedings and to learn more about citizen science and the Citizen Science Toolkit, or to join the ongoing citizen science community, go to:

**<http://www.citizenscience.org>**

# Audubon's Christmas Bird Count

## From 19<sup>th</sup> Century Conservation Action to 21<sup>st</sup> Century Citizen Science

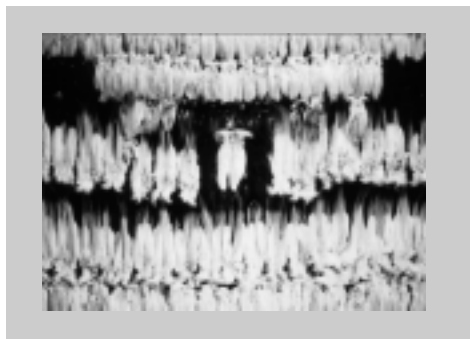
### Overview and Background

I have been constantly involved here in the presentations and case studies over the past few days and it has been fascinating to talk to everybody and learn what others are doing. It has been a wonderful experience, and I find that this presentation refers back to things that others have said about their own programs and citizen science.

I'm going to talk about the Christmas Bird Count, and it has been interesting being in charge of it for twenty years. I want to give you a brief overview of the program itself and its history and the way that it is used. What I want to focus on is what I think a program like the Christmas Bird Count brings to a conference like this on citizen science, the challenges of rewarding and maintaining your audience, your participants, and your diverse users.

Long, long ago there was a fascinating, wonderful gentleman named Frank Chapman, who was an ornithologist at the American Museum of Natural History and editor of what was basically his own magazine, *Bird-Lore*. At the turn of the nineteenth century into the twentieth, he realized there was over-hunting, really excess hunting of resources, especially birds, and he thought it would be a great idea to propose an alternative activity to over-hunting during the holiday season and rather than going out and shooting birds during the holiday season, to actually go out and count them. That was how the Christmas Bird Census came about.

The millinery trade was thriving and birds were being harvested all over the place by literally tens of thousands at a time. This is the way that a lot of colonial waterbirds ended up in people's hats. Budding conservationists



Geoff LeBaron,  
Director,  
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[www.audubon.org/bird/cbc/](http://www.audubon.org/bird/cbc/)



Frank Chapman



Feather Hats Were the Rage



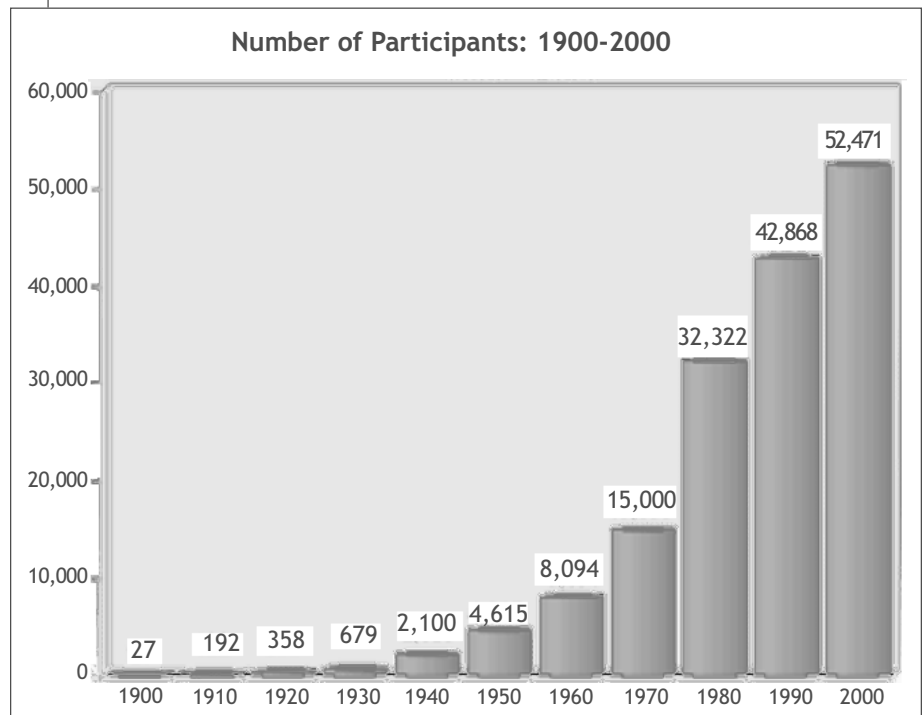
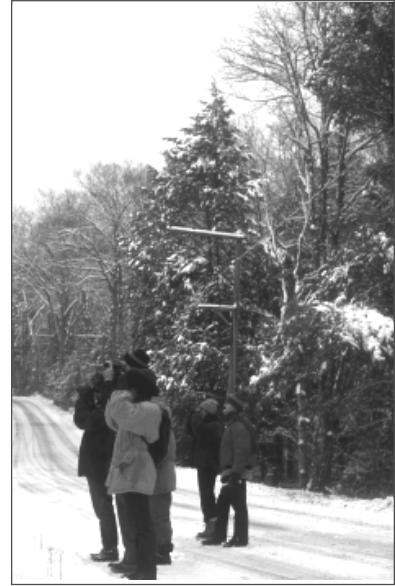
A Christmas Bird - Census



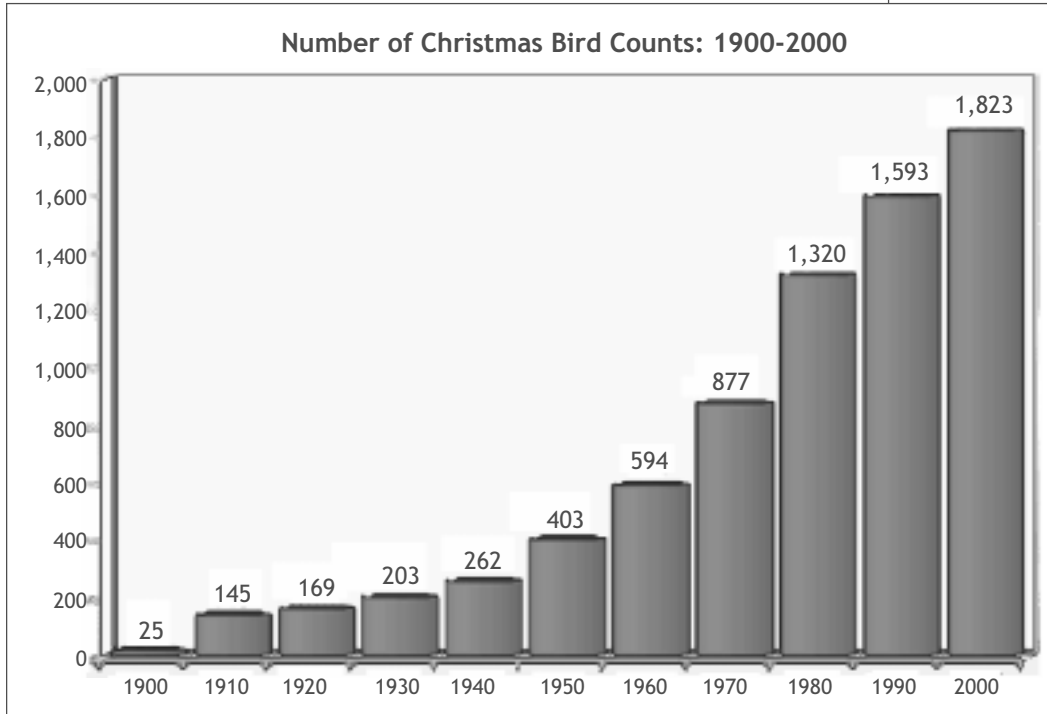
during this time were realizing that there were real problems and birds were in decline. This is what begat the various different Audubon societies that took the name from John James Audubon, who really began the way we perceive bird artwork and natural history artwork now.

In the fall issue of *Bird-Lore* in 1900, Frank Chapman proposed what was then called a Christmas Bird Census rather than a Christmas Bird Count. Literally every year now for a hundred and seven years during the holidays people have been out counting birds during the Christmas Count season.

The methodology has evolved a little bit, but basically the number of participants has skyrocketed as you might guess. There were twenty-seven people for the first season. All of those counts were done on Christmas Day, by the way, with good representation all the way across the continent, including in Canada, during that first season. That was twenty-seven people then and the 106<sup>th</sup> count from two years ago had just over fifty-seven thousand observers involved.



The number of counts, obviously, has gone up also. There were twenty-five the first year, and we have 2,041 right now completed this season online. Last season we had 2,060.



The Christmas Bird Count is fun, it's social, traditional, educational, and finally, even the scientific community is realizing that it is valuable. Even in its first year, as I've said, it was an international program. Of those first twenty-five counts, I think two were in Canada. Now of the roughly 2,000 counts that are submitted every year, the vast majority are in the United States and Canada. Of the 2,060, we will get roughly 1,700 in the U.S., 300 or 400 in Canada, and another fifty or sixty throughout Latin America, the Caribbean, and the Pacific Islands.

**The Christmas Bird Count is:**

- Fun
- Social
- Traditional
- Educational
- Valuable

We have been talking about partnerships at this conference, and what has been happening recently is that we are increasingly involving partners in the Christmas Bird Count. For the first fifteen years or so that I was in charge of the program I was the one person communicating with the organizers of the individual counts, which tends to be quite a job. It helps with the growth in other countries to have partners on a local level involved.

**The Christmas Bird Count is International:**

• Canada (BSC as partner)	• Colombia (partners)
• United States	• Ecuador
• Bermuda	• Chile
• Mexico (partners)	• Peru
• Belize	• Brazil
• Costa Rica	• Trinidad
• Panama	• West Indies
	• Pacific Islands

I would say that the conservation value of the Christmas Bird Count has really come to the forefront in the last ten years. Scientists are finally embracing citizen science and what they view as popular science kinds of data. Scientists like to be able to design and take care of every

### Conservation Value of CBC Data

- Audubon's State of the Birds
- Population trends and dynamics
- Population effects of West Nile virus
- Boreal Songbird Initiative
- Winter range changes due to global warming
- Recent WatchLists based partially on analysis of data from the Breeding Bird Survey
- Christmas Bird Count analysis now being combined with Breeding Bird Survey trend data for new State of the Birds report
- CBC analysis also important on state and local levels



little bit of variation in the data that they are analyzing and be able to give you that 100% or at least 99.5% certainty that what they are saying is true based on their study. You can't do that when you've got thirty or forty thousand people out there and two thousand different locations, each counting in slightly different ways in each count circle during a count period that runs for three weeks, which is also very much affected not only by the weather on count day, but during the count season as well as the preseason early in the fall. All of those factors affect where the birds are on a given day at a given time.

What we are learning is what we can do to account for this variation. Even if there is an intercount variability in the way that the count is specifically run, each individual count is run the same way over time. It is usually the same people doing it, sometimes for fifty or seventy years, doing the same count the same way every season. So even if there is a little bit of difference from count to count, they are each individually done the same way over time and you get good trend data.

Sam Droege, who is at this conference, is one of the first people who started playing with the Christmas Bird Count data, as well as a group down at Patuxent. They have led the charge in embracing the Christmas Bird Count as well as the Breeding Bird Survey and other citizen science data that they assess.

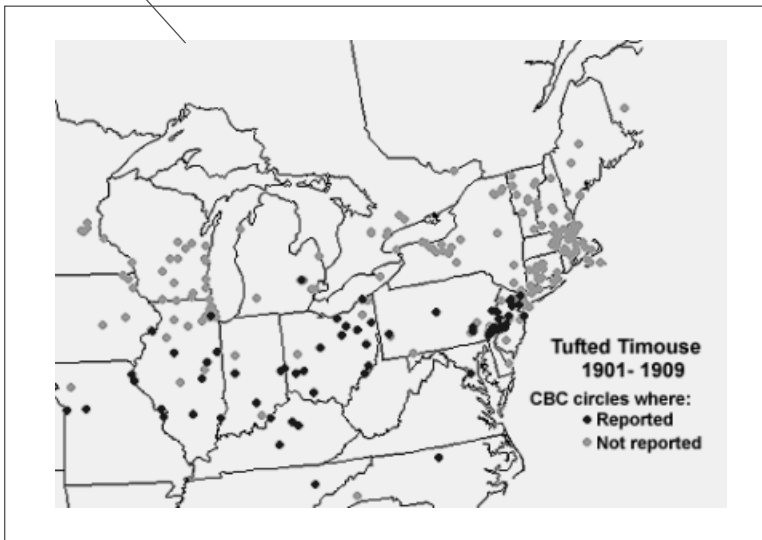
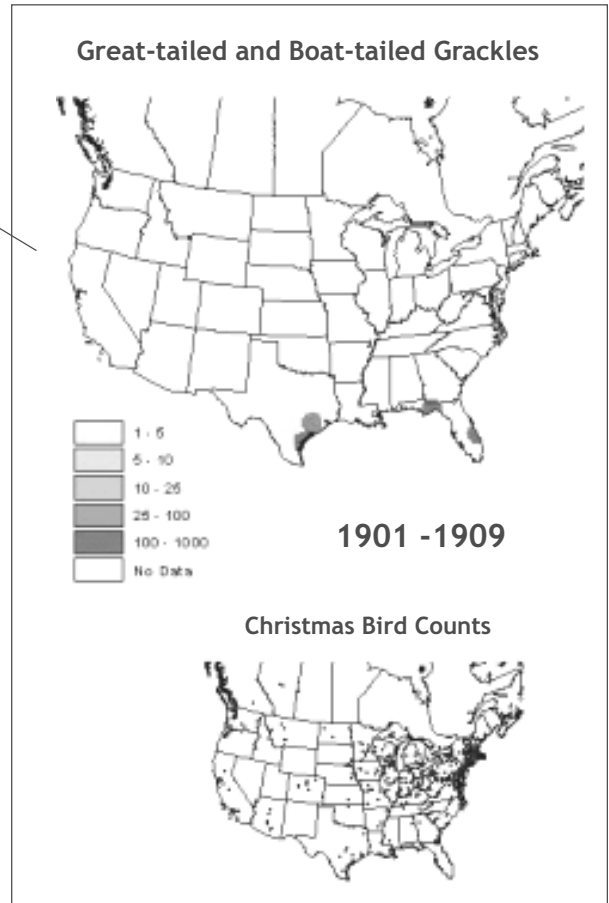
What we have recently been able to look at is what has happened on a population level at national and regional levels and the effects of West Nile virus, for example. You can see the evidence as well as the numbers on a continental basis and track the spread of diseases and how birds are reacting to those diseases. We've also partnered with the Boreal Songbird Initiative to try to get a handle on what is happening to birds in the boreal forests. More recently, with the big hullabaloo about global climate change, the Christmas Bird Count kit and kaboodle is right there, ready for analysis to see how we can track range shifting in bird species during the early winter period and correlate that with what is happening with global climate change.

Right now we are about to finish up the first large-scale analysis that is combining Christmas Bird Count and Breeding Bird Survey trend data to come up with uniform trend data for all species that are well sampled both by the Breeding Bird Survey and the Christmas Bird Count. Once that is complete, which we hope will be done by the end of this year or early next year, we are going to move into something people here at the Lab have been interested in for a while: tracking how these birds are changing or shifting their range during the Christmas Bird Count period, which runs from December 14 to January 5 each year now, and if they are range shifting in response to global climate change.

Here are just a few examples of range shifting and how you can track what is going on. The Christmas Bird Count was really brought into the

online world by a collaboration between the Cornell Lab of Ornithology and Audubon. The first ninety-eight years of the Christmas Bird count it was strictly paper-run. Since then it has basically been an online project. These are animated pieces that are on the Web site, developed for BirdSource. This shows you the spread of two different species, Boat-tailed Grackles along the eastern Gulf Coast and along the East Coast, and Great-tailed Grackles in the west. You can really see how these birds are expanding northward, at least during the Christmas Bird Count period. It is a real expansion of both of these and not only can you see that Great-tailed Grackles are continuing to expand up the west, but Boat-tailed Grackles seem to have reached an impasse as they're coming up the East Coast, right about at Long Island.

The other is a sort of classic example that shows the way it all works. And with both of these examples we are not only showing where the birds are, but where the counts were that did not find the birds. So in the graphic below the light gray dots show where birds were not seen, and the dark gray dots show where birds were seen.



This is the Tufted Titmouse, one of the classic southern birds expanding northward during the winter season, or in this case year-round. Tufted Titmice are taking over the East Coast, and many of you who feed the birds know that.

Christmas Bird Count data doesn't necessarily tell you why birds are moving. What it does is document if and in what measure birds are responding to different catalysts. Birds really are one of the best

### Forging the Future with the Past

- CBC—the great-granddaddy of citizen science programs—has evolved into the largest database in ornithology
- Traditional and social aspects are key components to CBC's continuation
- Without buy-in of existing constituency, program could falter—or fail

indicators of the quality of the environment and whether things are changing environmentally.

So the Christmas Bird Count is sort of the great-granddaddy of citizen science, though during this conference I now have learned that it is not the oldest citizen science project. And I suspect, based on the numbers that I'm hearing, that we're not going to be the biggest for long, if we still are, in terms of numbers in the database. We have millions and millions of records, but at the rate that eBird is growing right now I think it will soon, if it hasn't already, surpass the total number of records in our database. However, if you compare the Christmas Bird Count on a hemispheric basis as well as the amount of time that data has been collected, it is still a wonderful tool to track what is happening with bird populations.

## The Challenge: Rewarding and Maintaining Participants

But if we don't have the buy-in of the people who are actually doing the program, we could falter or fail. The scientific user community has really embraced the Christmas Bird Count in increasing numbers, almost exponentially in terms of the number of data requests that we get for CBC data for people to do analyses of all sort of different things on a regional, continental or local basis.

What is also great is that the observers and compilers often do their own analyses of their own CBC data on a local basis. If they're interested in protecting a wetlands, they might look at the CBC data to see if wetland species have been declining or not, or if wetland species in their area have been declining when others around it have not. You get an idea of how the habitat quality within the count circle is doing compared to other counts on a regional basis.

However, in order to keep them engaged we really have to start giving something back other than just the ability to use the data and some entertaining output on the Web site, which we are doing, and we know we need to improve that. You can go to the Christmas Bird Count Web site and download anything into your computer that you can view on the screen.

The buy-in of the constituency is the important thing. There are two critical aspects to the Christmas Bird Count. It's not only the data that we are generating for scientific and conservation use, it is the traditional and social aspect. And I don't know if you've noticed, but bird watchers are a little competitive, and field people don't like to be questioned when they say they've seen something. With the Christmas Bird Count data you've got thirty or forty thousand people out there and the real meat and potatoes of the Christmas Bird Count, the true value, is about counting the common birds and finding out about how the common birds are doing, how the birds that are supposed to be there are increasing or decreasing in number or changing their range.



So everybody going out on the count will be counting Starlings and Robins and Titmice, but the key that really gets them out there is, what am I going to find this year that we've never had in our count circle before? For example, are we going to get a Cape May Warbler in Ithaca this year, which is really supposed to be down in Latin America or the Caribbean? It's the rarity that sort of provides the catalyst and the thrill (or the potential for a thrill) of something new and different on the Christmas Bird Count. It is also a feature or one of the key things that compilers report every year, the total number of species that were recorded for that year on their count in addition to the total number of birds and numbers of each type of bird. That species total is one of the important benchmarks that people going on Christmas Bird Counts are really interested in. It is a competitive and social thing that really is important to them.

We need to keep their interest, to keep buy-in of our volunteers. We need to keep them engaged in the program and we need to keep them caring about our programs for the programs to continue. One of the great challenges that Audubon faces right now is developing new ways of maintaining that buy-in. We used to publish in print every single bird and species and the complete results of all counts that were submitted to Audubon and give those to compilers. Those are now only available online after the hundredth count.

We have a results report on the CBC Web site so that basically in real time people can see the results, but not a lot of people want to look at their results on the Web including a vocal group of people comprised mostly of compilers. These are the ladies and gentlemen out there who are doing the individual work for each Christmas Bird Count, the ones that we are tasking with going out and organizing the volunteers, getting everyone to do what they're supposed to do, giving on-the-ground training if necessary, submitting the data, compiling it for us at that level, and submitting it to us online, hopefully in an expeditious manner.

One of the things about the Christmas Count that might be a little bit different than many of your programs is that they actually pay to do the Christmas Bird Count. It is a five dollar participation fee. That fee really is the biggest impediment to the growth of the Christmas Bird Count program at this point. Some people don't feel that Audubon should be charging them to do a volunteer activity when they're already out there spending their money on gas to participate in the Christmas Bird Counts. The average CBC observer goes on two CBCs. Many people will go out on ten or fifteen. There is one guy in Iowa

### Finding New Ways to Reward Compilers and Participants

- Formerly, 700-page *American Birds* publication with complete results of all CBCs was given to compilers
- Complete CBC data now available online, and sales of *American Bird* issues plummeted
- Compilers, who do all the organizational work on local level and collect CBC fees for Audubon, now receive little for their efforts other than waiving of CBC participant fee
- Participants who pay their fees receive CBC summary publication of *American Birds*, as do all compilers
- Can't afford to publish old style results, but need to pursue new ways of giving something back to compilers
- Customized printable output to mimic old results?
- Online tools only available to compilers?

### Balancing Needs of CBC Community with those of Scientific Researchers

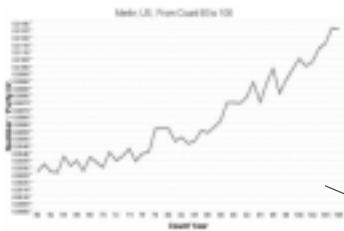
- Audubon must walk the fine line between fulfilling the social and birding needs of CBC participants and providing a rigorous and accurate database for conservation biologists
- We need to keep the birding community engaged for years to come, while enhancing the value of CBC data for scientific investigations

### Funding the Christmas Bird Count

- Current funding method— participation fee
- Participant fees provide ~ 75% of annual program costs (exclusive of IS needs)
- Fee is biggest impediment for growth of CBC
- Some counts, especially in certain regions, conducted but not submitted as a protest
- Reduction—or elimination—of fee critical to future expansion
- Most viable source of funding: endowment

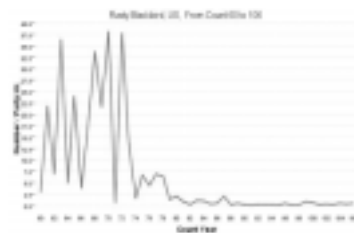
### The Future of the Christmas Bird Count

We hope for this...



Merlins on CBC's, 1960-2006

...not this...



Rusty Blackbirds on CBC's, 1960-2006

who tries to go on twenty-three counts in twenty-three days. So we need to fund the Christmas Bird Count, ideally by endowment. That is a dream, and that is really at the forefront of what Audubon is trying to do for the CBC right now. We also need to find something to give back to compilers to reward them for all their work.

Part of the exciting business about the acceptance of the CBC recently is that we had a scientific peer review, as was done with the Breeding Bird Survey a few years back. Basically it was embraced by its scientific users, and the 104<sup>th</sup> CBC issue of *American Birds* contains a whole list of recommendations of what we're doing right, what we could do better, and how to embellish the database within the CBC to make it more useful for these types of long-term studies. Mostly it involves tweaking the methodology because we don't want to radically change what has been going on and create something new and lose the continuity.

So these are the two challenges that we are facing right now. The first is developing new ways of rewarding the compilers. We used to be able to give them that 700-page booklet that was the printed results of everything. And they not only want to be able to track the birds, but also the people who are participating, and we also have a complete participant list. We have all of that now on the Web site but as traditionalists say, "You can't curl up with a computer in bed." Well maybe you can, but it's not the same going through individual screen pages as it is thumbing through a book.

We really do hope the future of the CBC is like the Merlins shown here, not the Rusty Blackbirds, in terms of its popularity and increase. And finally, this is a representation of where we have CBCs,



which as I said is mostly in North America, but it correlates very nicely to the human centers of population.

### CBC Scientific Peer Review

- Completed in November 2003
- Final report published in 104<sup>th</sup> CBC issue of *American Birds*
- Recommends tweaks to methodology to improve value to research
- Recommends embellishment of weather and effort in CBC historical database