



# These Maps Are For The Birds

*Students will study New York State Breeding Bird Atlas maps to learn where different bird species nest and how their distributions have changed over time.*

**Objectives:** Students will understand:

- how maps serve as representations of a geographic region;
- how the distribution of animals varies geographically based on habitat requirements;
- how the distribution of animals changes over time as environmental conditions change, often in response to human activities.

**Grade level:** Elementary/Middle School (Grades 4-7)

**Subject Area:** Science, Social Studies

**Standards:** Social Studies Standard 3  
Mathematics, Science, & Technology Standard 4

**Skills:**

- Interpret data presented geographically on a map.
- Observe, identify, and communicate patterns in data.
- Analyze document-based information presented in scientific figures.

**Duration:** Preparation time: 10 minutes  
Activity time: 50 minutes

**Materials:** Each student should have:

- Worksheet: These Maps Are For The Birds
- Relief Map of New York State with county boundaries
- Pencil or pen

## Background:

Maps usually show terrain, political regions, roads, towns, and similar features of the natural and built landscape, but can also show other information linked to geography. This lesson explores maps from the New York State Breeding Bird Atlas. The Atlas was created using data on nesting birds collected by more than 1,200 volunteers in 5,332 blocks—sections of U.S. Geological Survey maps—that together formed a mosaic covering all of New York.

The distribution of breeding birds is tied to the availability of suitable habitat. Their distribution can change as habitat is altered. Examples include the disappearance of grasslands due to urbanization, an increase in forest cover as farm fields are abandoned, and milder winters due to climate change. Other factors influencing bird distribution include application of toxic pesticides, shooting, and introduction of non-native species.

Students will view actual Breeding Bird Atlas maps to learn how such factors play roles in bird distribution. By comparing data collected over two decades, they will see how this distribution can vary over time. They will answer document-based questions about information in these scientific figures. The maps are unaltered except for being reduced in size and—most likely—converted to black and white in photocopying.

On each map, blocks in which a species occurred are colored to show the bird's breeding distribution. The color of the block shows how likely it was that the species did nest. Finding a nest in use or babies would confirm breeding, indicated by a blue block. Possible breeding means only that the bird was seen in the right nesting habitat, indicated by a yellow block. Because color distinctions may be lost in copying to black and white, the worksheet for this lesson does not address this feature of the maps.

## Activity:

1. Review vocabulary and point out that the lesson will look at where birds nest in New York. The maps do not show where birds migrate, nor do they include non-breeding species.
2. Compare an Atlas map to the state relief map showing counties. Point out the location of major topographic features such as the Adirondacks, Catskills, Atlantic Ocean, Great Lakes, and Hudson River. On the Atlas map, find the county in which your school is located.
3. Go through the "These Maps Are For The Birds" worksheet in class.
4. See **Resources** for links to more information about birds included in this lesson.

## Assessment:

- Have students share answers to worksheet questions, or collect and grade sheets.
- Select other Atlas maps for students to analyze. Suggestions: double-crested cormorant, golden-winged warbler, peregrine falcon, ring-necked pheasant, ruffed grouse, upland sandpiper, and whip-poor-will. Fact sheets on the web (see **Resources**) explain increases or declines in these species.

## Vocabulary:

**atlas:** a book of maps

**breeding:** producing young by hatching or live birth

**data:** factual information (plural of datum)

**habitat:** the particular sort of place where a given plant or animal lives

**landscape:** a region's set of landforms, viewed as a whole

**native:** belonging in a particular place by birth; not brought in from another region

**pesticide:** a substance used to kill creatures or plants considered to be pests

**population:** a group of individuals of one species living in a particular region

**relief map:** a map that shows the topography of an area

**scientist:** a person skilled in science

**species:** a class of living things of the same kind and same name

## Resources:

All Breeding Bird Atlas maps are on the Department of Environmental Conservation website at [www.dec.ny.gov/cfm/xtapps/bba/](http://www.dec.ny.gov/cfm/xtapps/bba/). Scroll down to the table "Breeding Bird Atlas - Maps By Species." In the row labeled "Alphabetic Order" select 1980-1985 or 2000-2005 to see a list of species. (To see maps from both time periods on one page, select "Alphabetic Order" in the row labeled "Compare Maps"). Clicking on a name in the list—duck, for example—opens a table listing one or more species in that category; click on a species name to see its map.

Find a list of breeding birds in your area. Go to [www.dec.ny.gov/imsmaps/bbatlas/viewer.htm](http://www.dec.ny.gov/imsmaps/bbatlas/viewer.htm). A map of New York State will appear, with a search menu on the left. In the search menu, select "Town/City/Village," enter the community's name, and click on "Find." This brings up a map of the locality covered with a grid. Each square in the grid is labeled with a block number - four numerals followed by the letter A, B, C, or D. Choose the block in which your school or home is located and write down its number. Now go to [www.dec.ny.gov/cfm/xtapps/bba/](http://www.dec.ny.gov/cfm/xtapps/bba/), scroll down to the "Species List Inquiry" section, and enter the number in the indicated box. Choose the years for which you want to see the list, and then click "Submit."

Documents on DEC's website explain the reasons for changes in distribution of many birds. While the site's search function can locate such documents, it will be hard for elementary students to sort through the "hits" that the search produces. Here are the URLs for documents covering a number of the species included in the lesson:

bald eagle [www.dec.ny.gov/animals/7068.html](http://www.dec.ny.gov/animals/7068.html)

common tern [www.dec.ny.gov/animals/7100.html](http://www.dec.ny.gov/animals/7100.html)

mute swan [www.dec.ny.gov/animals/7076.html](http://www.dec.ny.gov/animals/7076.html)

wild turkey [www.dec.ny.gov/animals/7062.html](http://www.dec.ny.gov/animals/7062.html)

For additional DEC bird fact sheets and information pages, visit <http://www.dec.ny.gov/animals/271.html>

A broad array of information about birds is available on the Cornell Laboratory of Ornithology's website at [www.birds.cornell.edu/](http://www.birds.cornell.edu/), including photographs of many species and activities for school classrooms.

## These Maps Are For The Birds: ANSWER KEY

### These Maps Are For The Birds

New York State is home to hundreds of kinds of birds. There are many different **habitats** here, each with its own set of bird **species**. Cities have pigeons, starlings, and sometimes peregrine falcons; rivers have ducks and gulls. A city with a river flowing through it might have all these kinds of birds. With the help of volunteers, **scientists** collect **data** on birds nesting in New York. Nesting locations are marked on maps of small sections of the state. A book that collects many maps

together is called an **atlas**. So the collection of all the maps showing where birds nest is called the **Breeding Bird Atlas**.

Tiny squares on a Breeding Bird Atlas map show that a species was found in that small section of New York during nesting season. On the blue jay map, squares cover the entire state; this bird nests all over New York. The gray jay is also called the Canada jay because it nests in northern forests. In New York, it finds this habitat in the Adirondack Mountains.

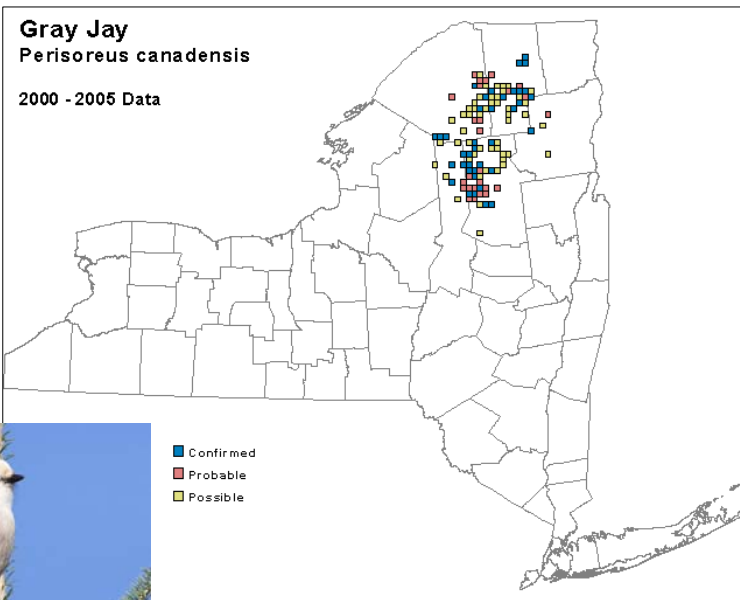


Photo from mdf/Wikipedia

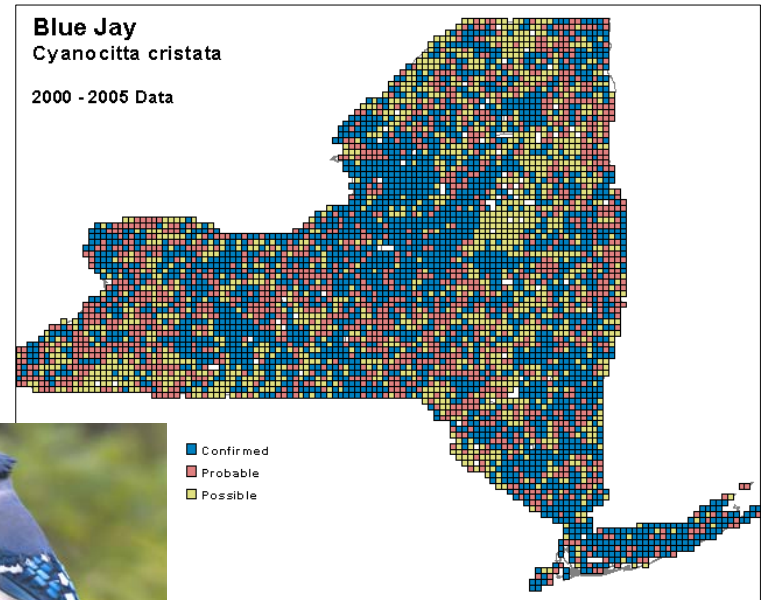


Photo by April King

Breeding Bird Atlas maps do not show rivers, lakes, mountains, or other **landscape** features. To see how such features influence where birds nest, compare the Atlas maps to the **relief map** of New York State. Then answer questions 1-3.

1. Which of these birds nests on mountain tops?

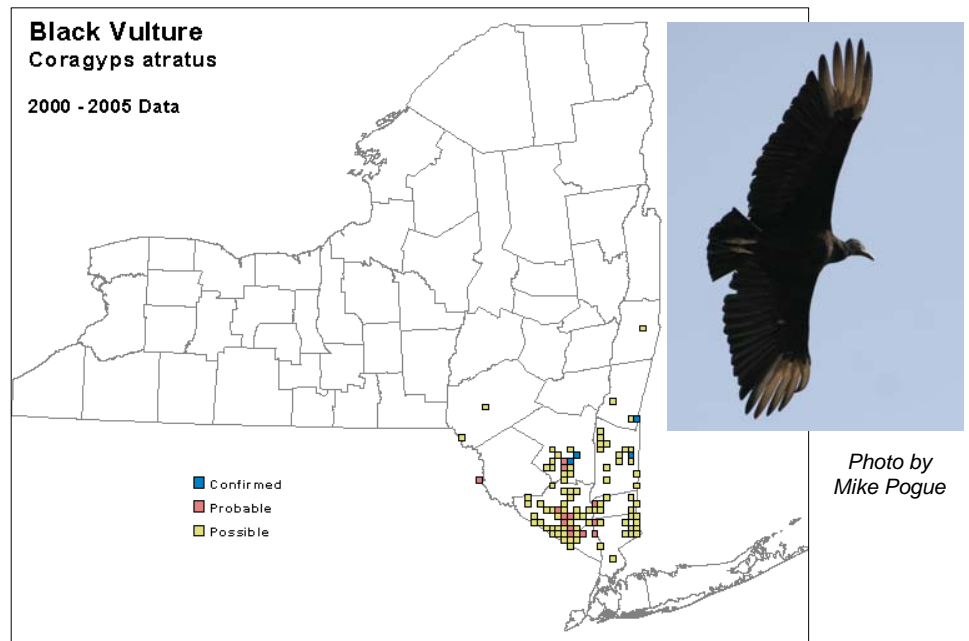
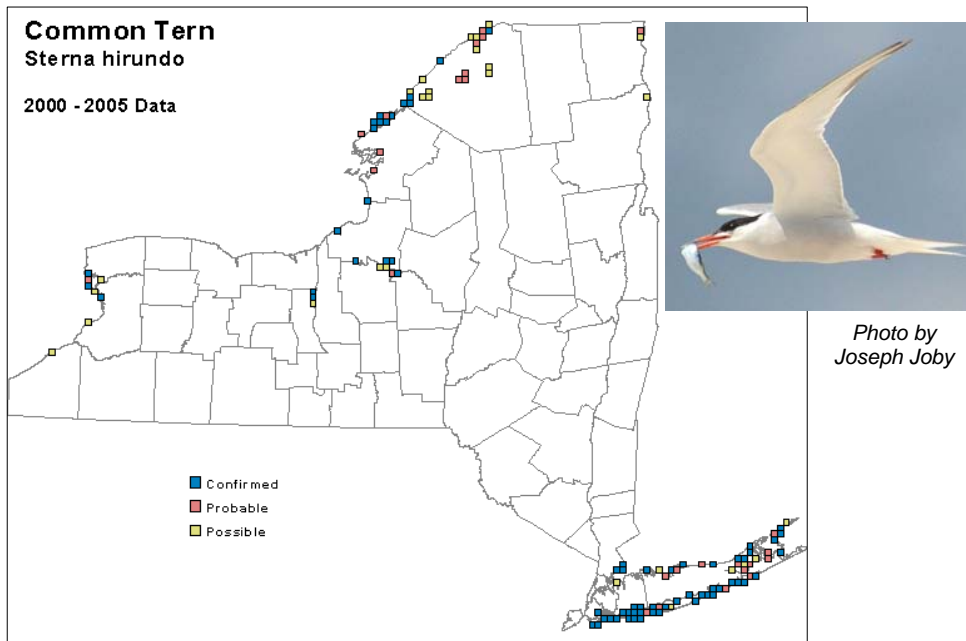
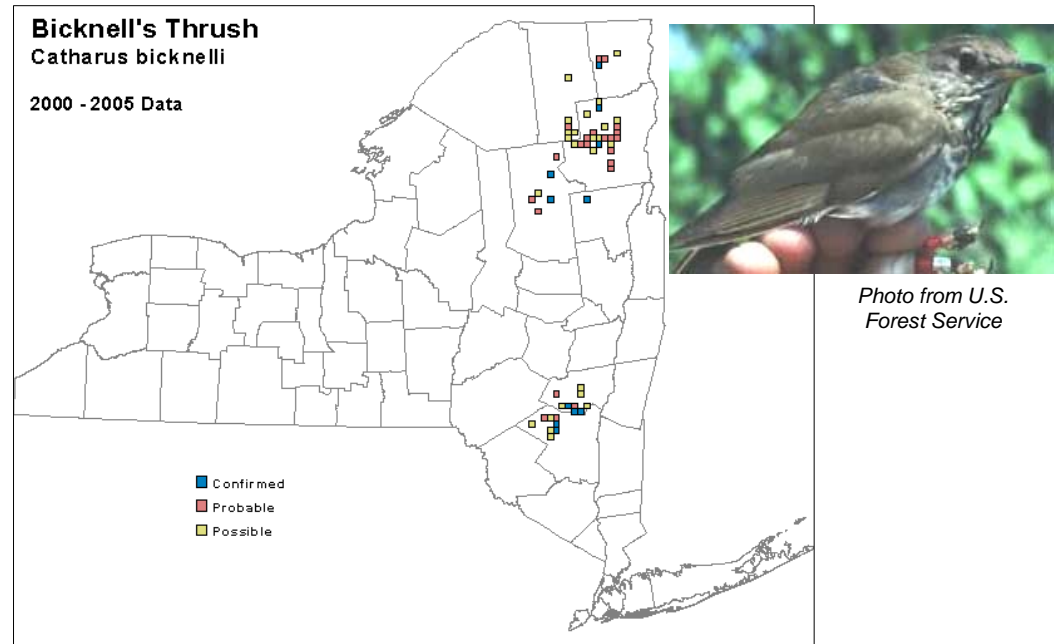
***Bicknell's thrush***

2. Which bird nests near large bodies of water?

***common tern***

3. Which bird nests only in southeastern New York?

***black vulture***



These Maps are for the Birds: Page 2

4. Breeding Bird Atlas data was collected from 1980 to 1985, and again from 2000 to 2005. Scientists compare maps from the two sets of years to look for changes in the **populations** of New York's breeding birds. Look at the six pairs of maps on the next 3 pages. The number of places where each bird was

found might have increased or decreased from 1980-1985 to 2000-2005. The locations where each species was found might have changed, too. Below are six explanations for these changes. Based on evidence in the maps, draw a line matching each explanation to one of the six birds pictured here.

**wild turkey**

**Carolina wren**

**bald eagle**

**mute swan**

**brown thrasher**

**eastern meadowlark**

**A.** This bird eats at the top of food chains. Poisoned by **pesticides** that built up through the chains, it nearly vanished from New York. Now it is coming back, in part because some of those chemicals are no longer used.

**B.** This bird was brought from Europe to Long Island in the late 1800s by people who admired its beauty. Now it is spreading and competing with **native** birds for food and territory.

**C.** This bird nests in fields. In New York, fields are disappearing as farms go out of business. Unused farm fields fill up with trees, or with houses, stores, and other buildings. So this bird is losing its nesting habitat.

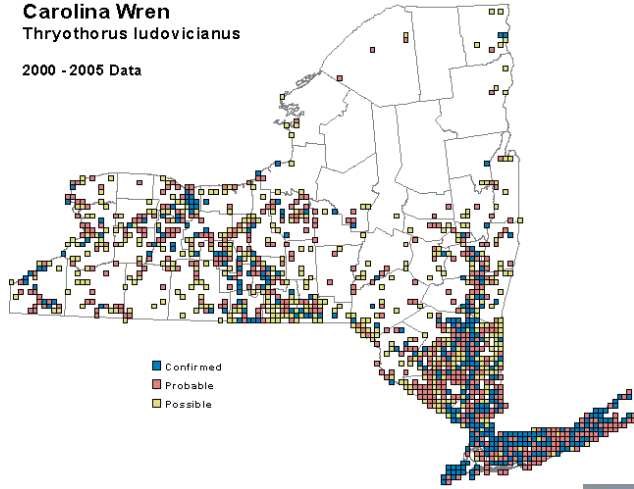
**D.** As climate change makes winters milder, this bird is spreading into New York from states to the south.

**E.** This bird lives in forests. It vanished from New York in the 1800s as forests were cut to make farms. When many farms shut down in the 1900s, forests grew again. This bird returned and is spreading across the state.

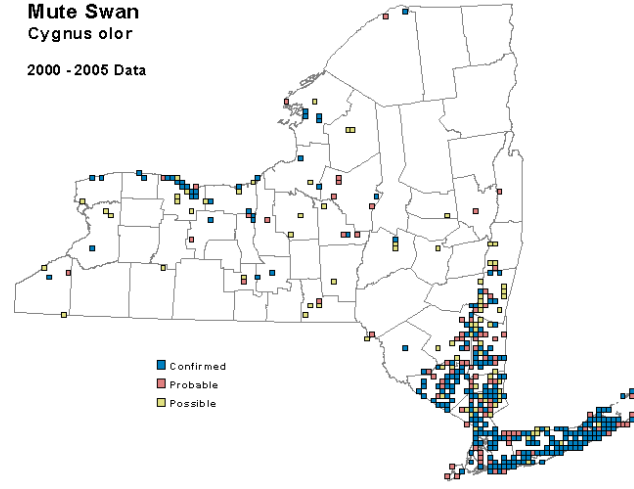
**F.** This bird prefers areas of shrubs and young trees, a habitat found where fields are slowly changing into forests. As New York forests grow older and fields are covered with houses, this bird is losing nesting habitat.

These Maps are for the Birds: Page 3

**Carolina Wren**  
*Thryothorus ludovicianus*  
 2000 - 2005 Data

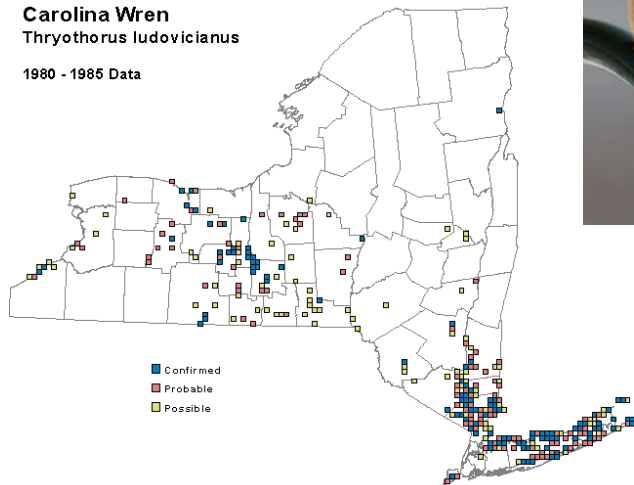


**Mute Swan**  
*Cygnus olor*  
 2000 - 2005 Data

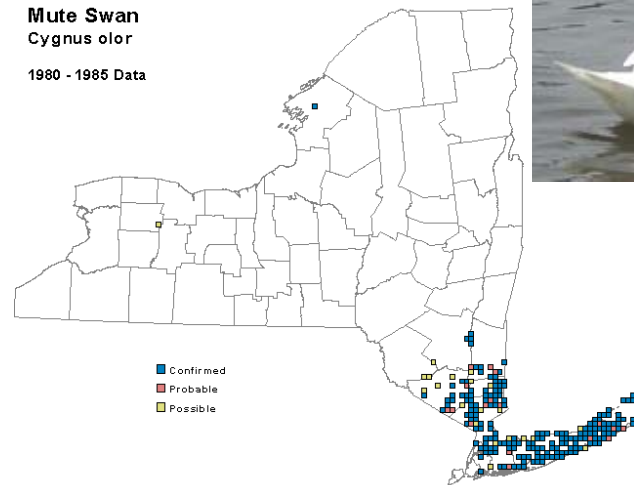


*Photo by Mike Pogue*

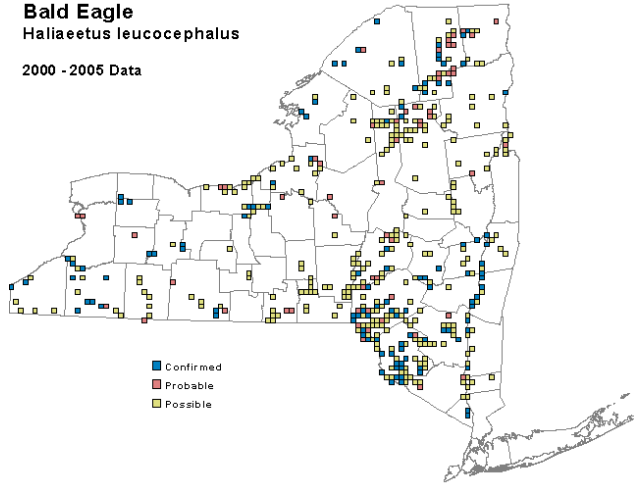
**Carolina Wren**  
*Thryothorus ludovicianus*  
 1980 - 1985 Data



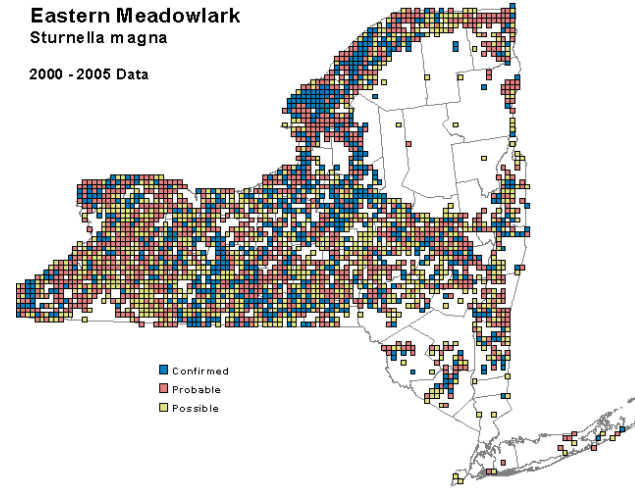
**Mute Swan**  
*Cygnus olor*  
 1980 - 1985 Data



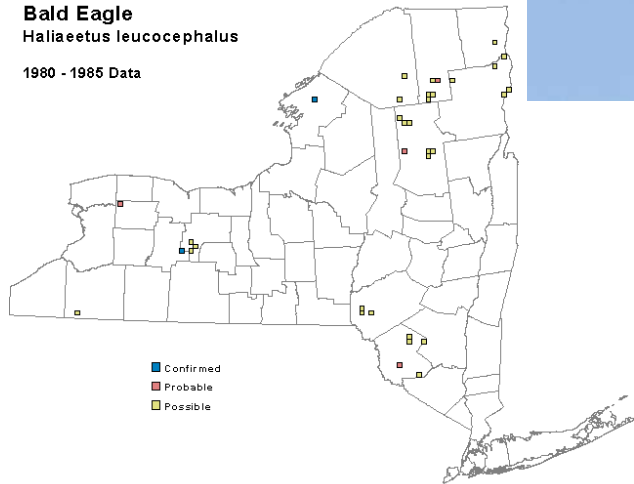
**Bald Eagle**  
*Haliaeetus leucocephalus*  
 2000 - 2005 Data



**Eastern Meadowlark**  
*Sturnella magna*  
 2000 - 2005 Data

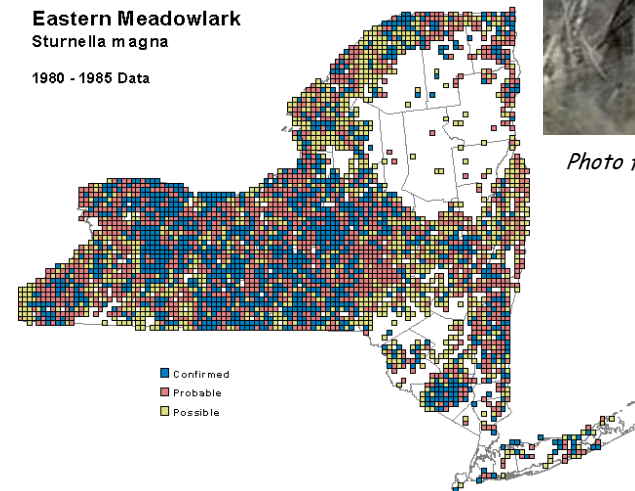


**Bald Eagle**  
*Haliaeetus leucocephalus*  
 1980 - 1985 Data



*Photo by Mike Pogue*

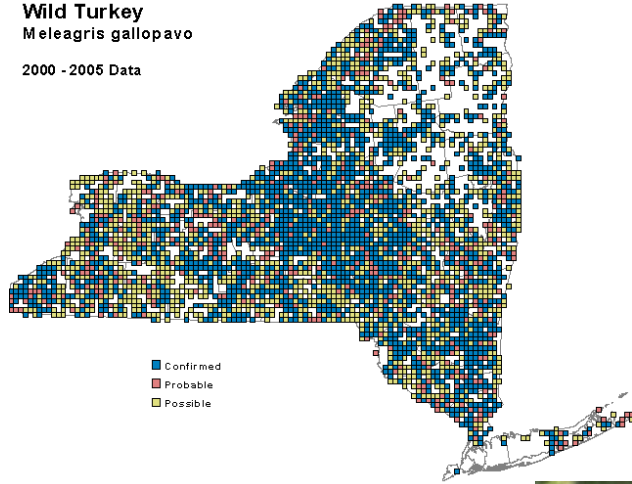
**Eastern Meadowlark**  
*Sturnella magna*  
 1980 - 1985 Data



*Photo from U.S Geological Survey*



**Wild Turkey**  
**Meleagris gallopavo**  
 2000 - 2005 Data

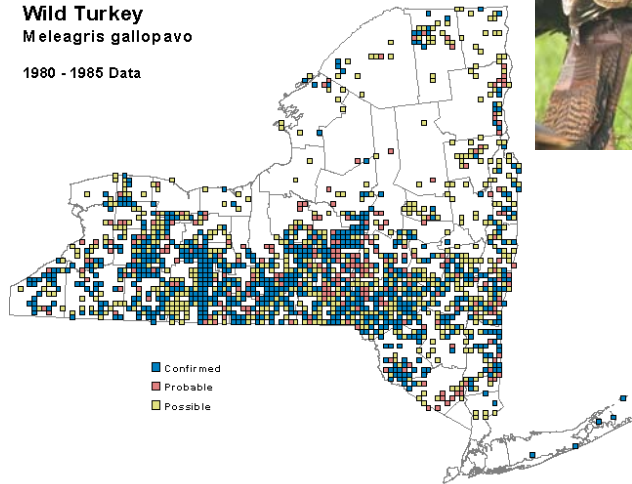


■ Confirmed  
 ■ Probable  
 ■ Possible



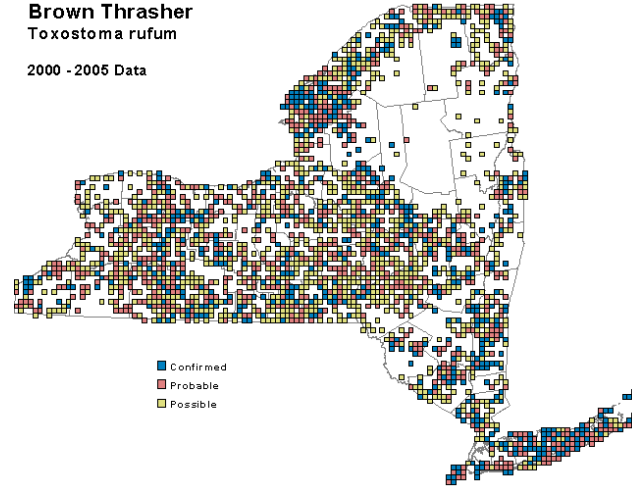
*Photo by Mike Pogue*

**Wild Turkey**  
**Meleagris gallopavo**  
 1980 - 1985 Data

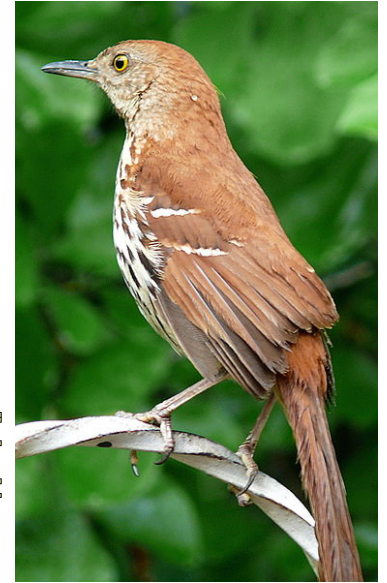


■ Confirmed  
 ■ Probable  
 ■ Possible

**Brown Thrasher**  
**Toxostoma rufum**  
 2000 - 2005 Data

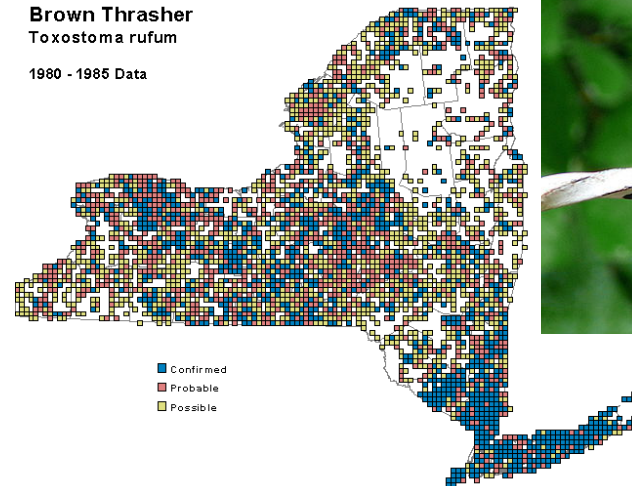


■ Confirmed  
 ■ Probable  
 ■ Possible



*Photo by Ken Thomas*

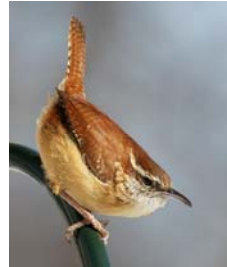
**Brown Thrasher**  
**Toxostoma rufum**  
 1980 - 1985 Data



■ Confirmed  
 ■ Probable  
 ■ Possible

**5. Challenge Question** Imagine how the Hudson Valley would have looked when the *Half Moon* sailed up the river in 1609. What sort of habitats would Henry Hudson and his sailors have seen along the river? Would they have been the same habitats that we see today? Would there have been more of some habitats and less of others (forests or fields, for example)?

In the previous questions you've seen how each bird species requires certain habitats to nest. You've also learned some of the reasons for changes in the numbers of birds and the areas in which they nest. Using this knowledge, give your opinion about whether Henry Hudson might have seen each of these five birds when he explored the Hudson Valley in 1609. Circle YES or NO and explain your reasoning.



a. bald eagle      YES  NO   
 Explain: **No pesticides that could poison eagles were in use then.**

b. eastern meadowlark      YES  NO   
 Explain: **The Hudson Valley was mostly covered with forest. There were few of the large fields these birds need to nest.**

c. Carolina wren      YES  NO   
 Explain: **Climate change due to human action had not begun yet. Winters were harsher; the wren could not survive here.**

d. mute swan      YES  NO   
 Explain: **The swan wasn't imported to New York until the late 1800s.**

e. wild turkey      YES  NO   
 Explain: **The Hudson Valley was mostly covered with forest - good habitat for the turkey.**