

# **FIELD STUDY OF MIGRATORY BEHAVIOR**

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## **INTRODUCTION**

Birds are the best subjects for field observation of migratory behavior. Although many birds migrate at night, many others, especially diurnal raptors, migrate in daylight, and sometimes pass in spectacular numbers. We can best observe migrating birds at places where north-south trending shorelines concentrate land birds that appear to be reluctant to fly over long expanses of water. Consequently, the birds fly along the shoreline over land as far as possible. When they find themselves at a point of land projecting into water in the direction of migration, they may concentrate temporarily, displaying a variety of actions associated with the conflict between an impulse to migrate onward and a tendency to stay over land. Other favorable locations, especially for observing migrating raptors, include north-south trending mountain chains with slopes that produce favorable wind currents, such as at Hawk Mountain Sanctuary, Pennsylvania, and Veracruz.

Bird migration is a complex phenomenon, involving thousands of millions of individual birds flying hundreds or thousands of kilometers, often over inhospitable territory, between their breeding and non-breeding areas. Many birds move from one climatic zone into an entirely different one, and occupy very different habitats and ecological communities in the process. What the proximate and ultimate causes of migration are, how birds find their way, and how they cope with the physiological difficulties of this effort are questions that have long excited biologists.

## **LEARNING OBJECTIVES**

The student will:

- have experience observing and describing migratory behavior
- see migratory movements in relation to geographic features
- gain understanding of the complexity of migratory behavior, as background to:
- further consider hypotheses about the causes of migration, orientation, and navigation

## **MATERIALS**

binoculars

field notebook

magnetic compass, or accurate map of the observation site by which compass direction may be estimated

timepiece to measure minutes and second

## METHODS

The best places to see a variety of migratory birds, as well as migratory insects such as the Monarch Butterfly (*Danaus plexippus*), are those where shorelines of large bodies of water concentrate land migrants, who stay over land as much as they can, crossing open water only when they must do so to continue their migration. Such locations occur along the Atlantic coast, the Gulf coast, and the shores of the Great Lakes. For example, in autumn, southward migrants follow shorelines to concentration points at the tips of peninsulas such as Cape May, NJ, Cape Charles, VA, Point Lookout, MD, Point Pelee, ON; or around the western ends of the Great Lakes near Toronto, ON, Detroit, MI, and Duluth, MN. During spring migration, concentration points occur along the southern shores of the Great Lakes, such as Whitefish Point, MI, Crane Creek, OH, and Derby Hill near the town of Mexico, NY.

Many observers in eastern North America will be close enough to these or other locally-known concentration points to permit class field trips to observe migration.

### The Migrants

The species you can observe migrating vary with locality and date, but the examples described here for Point Lookout, MD in autumn are representative. Autumn migration at Point Lookout begins in late August and continues into November. The earliest migrants are those that go on to the Caribbean Islands, and Central and South America. These include many songbirds such as warblers (Parulidae), vireos (Vireonidae), and tanagers (Thraupidae), which migrate mostly at night and rest and feed during daylight hours. Later migrants are those that go shorter distances, such as from New York to the Carolinas. These include the American Kestrel (*Falco sparverius*), Sharp-shinned Hawk (*Accipiter striatus*), Flicker (*Colaptes auratus*), Tree Swallow (*Tachycineta bicolor*), Blue Jay (*Cyanocitta cristata*), Red-winged Blackbird (*Agelaius phoeniceus*), Brown-headed Cowbird (*Molothrus ater*), European Starling (*Sturnus vulgaris*), and various finches (Fringillidae, Emberizidae, Cardinalidae). Many other birds, including Thrushes (Turdidae) and Tyrant Flycatchers (Tyrannidae) tend to fly mostly at night, so are not often seen passing over.

Besides migrants, permanent residents will be present, such as the Northern Mockingbird (*Mimus polyglottos*) and House Sparrow (*Passer domesticus*). Others that are winter visitors will be arriving and settling for the winter, including Myrtle Warbler (*Dendroica coronata*), and Slate-colored Junco (*Junco hyemalis*).

Spring migration at northward concentration points involves many of the same migrants

### Weather

Weather strongly influences timing and intensity of migration (Pettingill 1985, Kerlinger 1995). Conditions that produce the best migratory activity in autumn are clear, cool weather with westerly or northwesterly winds that accompany the passage of a cold front. Conditions favoring spring migration are southerly winds, with rising temperatures ahead of an approaching low pressure area and front (Haugh 1966, Pettingill 1985, Kerlinger 1995). Therefore, to maximize chances of seeing migration, you should watch the weather reports and visit your observation site when these conditions prevail.

### **Time of Day**

Small land birds that rely on flapping flight tend to fly in the early morning hours near sunrise when the air is least turbulent, whereas the heavier raptors that rely on gliding and soaring flight tend to fly during the middle of the day when turbulence and thermal updrafts provide lift (Kerlinger 1995). Thus the time of day you make your observations will determine the kinds of birds you will most likely see.

### **PROCEDURE**

Observe migrating land birds for at least two hours. Early to mid-morning would be an ideal time to see the greatest variety, as noted above, but migratory activities may be seen at any time of day. Look for compact flocks of land birds, such as Red-winged Blackbird, Brown-headed Cowbird, European Starling, or various finches, and observe how the flock acts as it begins to fly over water. The Flicker (a woodpecker) and Blue Jay fly in looser, straggling groups. Raptors such as American Kestrel and Sharp-shinned Hawk tend to fly alone, but may concentrate where favorable updrafts allow them to gain altitude easily. Select two species that you can identify, and make careful observations of their behavior. Try to answer the following questions. These questions are based on behavior that others have noted:

- What is the compass bearing of their flight path as they pass your observation point?
- Does their flight path relate to the shoreline or other landscape features in a regular way? How so?
- Do the birds fly in a consistent southward (autumn) or northward (spring) direction?
- Do compact flocks waver, disintegrate, or turn back toward land after they fly out over water?
- Do solitary individuals turn back and fly inland some distance after coming to water?
- Do individuals or flocks gain altitude over land before finally heading out over water?
- Do birds continue on the same compass bearing they had over land when over water, or do they angle off in a direction that will carry them the shorter distance to the nearest visible shore?
- To what extent and for how long do birds alight and rest or move about in trees or shrubbery before taking wing and crossing the water?
- Do birds appear to aim their flight so as to compensate for prevailing crosswinds?

As you consider these questions, try to describe the behavior objectively and precisely. Also keep in mind that all your observations are based on an implicit hypothesis, namely that the birds you observe are actually migrating. Try to test this hypothesis by looking for examples of behavior that would be contrary to it, such as flocks of birds flying consistently in the direction opposite to migration. Try to disprove the hypothesis. In fact, some of your subjects might not be migrating! You can then

conclude that the ones that behave consistently as predicted by the migration hypothesis are most likely to be migrating. Another phenomenon that is regularly observed near seacoasts is what is called “reversed migration” in which birds fly in the opposite direction to the migration. They may be doing this because they have encountered unfavorable weather or have depleted their energy, and consequently have turned back to seek suitable feeding and resting sites before making another attempt (Alerstam 1990).

## **REPORT**

Prepare a report of your observations according to your instructor’s directions. A sample report form is appended.

## **REFERENCES**

- Alerstam, T. 1990. Bird Migration (Translated by D. A. Christie). Cambridge University Press, Cambridge, New York, Melbourne.
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- Pettingill, O. S. 1985. Ornithology in Laboratory and Field. Fifth Edition. Academic Press, Inc., Orlando, FL.
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**APPENDIX****REPORT FOR FIELD STUDY OF MIGRATORY BEHAVIOR**

NAME \_\_\_\_\_

DATE \_\_\_\_\_

Date of Observations: \_\_\_\_\_ Times: \_\_\_\_\_

Weather: Cloud Cover, % \_\_\_\_\_ Wind direction and strength \_\_\_\_\_

Temperatures: \_\_\_\_\_

Name the species you chose to report on: \_\_\_\_\_

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For each species, answer the following questions. Use separate paper as needed:

- a) Approximately how many of the species did you observe?
- b) What were these birds doing in general?
- c) Describe the specific behaviors that suggested that each species was migrating.
- d) Describe how the birds' flight patterns differed when over land *versus* water.
- e) Did the birds fly singly or in flocks: how large a flock, and how much coordination of movements did flock members show with each other?
- f) To what extent did it appear that the birds' flight paths were affected by surrounding geographic features such as shorelines, expanses of water, tree lines, ridges and slopes, etc.? Speculate as to why this was so?

## **SUGGESTIONS FOR INSTRUCTORS**

### **General considerations**

This exercise is based on nearly 30 years of experience taking students to Point Lookout in the autumn to watch migratory behavior for college courses in Ornithology and Animal Behavior. The main problem in seeing migrants is being at the observation point when many birds are migrating. The best sites, such as Cape May and Hawk Mountain are most likely to have migrants, provided the weather is reasonable, and you are there during the migration season. Lesser sites such as Point Lookout can be a disappointment if the weather is not optimal or you are not present right around sunrise when the smaller land birds are most likely to be aloft. Therefore, if students can go on their own to the site when conditions are optimal, they are more likely to see impressive displays of migration. The most consistent success depends on having a flexible schedule so the field trip can occur at the best time. It is good to have alternative laboratory exercises when unfavorable field conditions prevail, so time is free later when such conditions do occur.

### **Specific advice**

It is instructive to tie this exercise in with a visit to a banding station, so that even if birds are not flying in large numbers, there will probably be grounded migrants available for close inspection and discussion.

It is interesting, when possible, to be at the site before sunrise. If you are at a coastal location, you may see at first light numerous small birds straggling in out of the sky over the water, as they head for the nearest land to stop and rest. They may then be flying in a direction opposite to migration, as they come down to the nearest available terrestrial habitat. If at an inland raptor migration location, you can have students record the numbers and times of passage of various species as the day progresses, to see to what extent different species fly during different times of day.

Local bird clubs and ornithological societies will know the best observation points in the area, and often schedule field trips specifically to observe migrants.