

Ecology and GIS: Mapping across disciplines

LESSON PLAN

Title of Lesson **Small Forest Patches for Birds in Ohio**
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Time Required 75 minutes

Materials

Compass rose
Map Legend
4 chains
Construction paper (1 color per group) and scissors (1 per team)
Poster board (1 piece per team)
Masking tape one roll for the class to share
10 cones
Laptops (1 per team)

Preparation:

- Prior to this lesson, the instructor and students should read and be familiar with Ohio Department of Natural Research (ODNR's) material regarding small forest patches for birds ([Managing Small Forest Patches for Birds](#))
- Faculty and students will have prior knowledge of landscape ecology as associated with their textbook (Ecology Concepts and Applications, Chapter 21, Molles and Sher, 2016)
- These videos provide some essential background information:
 - [Managing Forests for Birds - Part 1 - Experiences From Ohio's Woodland Owners](#)
 - [Managing Forests for Birds - Part 2 - Creating Early Successional Habitat](#)
 - [Managing Forests for Birds - Part 3 - Thinning and Crop-Tree Release](#)
 - [Managing Forests for Birds - Part 4 - Invasive Species](#)
 - [Managing Forests for Birds - Part 5 - Planning for a Better Timber Harvest](#)

Objectives:

Student will learn the importance of maintaining or creating new forest patches to help improve the quality and increasing the quantity of bird habitats in Ohio by:

- Identifying the bird habitats currently available in regions of OH
- Predicting/suggesting where forest patches and what size/shape of forest patches would be most beneficial to birds and bird populations
- Learning what the ODNR is currently recommending to improve bird habitats

Essential questions:

What can be done to increase the population of birds living in or migrating through Ohio?
And what sites in Ohio have potential to host these populations?

National Geography Standards

- How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information.
- How to apply geography to interpret the present and plan for the future.

Instructional process:

1. Review rules of learning with the Giant Map. No shoes, writing utensils, or sliding on the map.
2. Introduce students to the map.
 - a. Ask how we know which direction is north/south and add the compass rose to the map.
 - b. Ask what the colors and lines indicate on the map and add the legend to the map.
 - c. Discuss how the alpha-numeric grid is used to describe a location. Give a couple of examples: Where is Dayton, Toledo, Columbus etc. located using the grid.
3. Introduce the topic:
 - a. What kind of birds do they notice in their neighborhood? What kind of habitat do they live in? Any hypotheses of why they see birds where they do?
 - b. Discuss decreasing bird populations observed and data from the National Audubon Society using Citizen Scientist counts.
 - c. Discuss landscape ecology and how structure influences process such as the flow of energy, materials, and species across a landscape.
 - d. Discuss the Forest Fragment data of Bowen and Burgess, 1981 in OH, as seen in the textbook figures
 - e. Discuss the importance of patches for birds. Ask about how the shape and distance between patches affect populations previously discussed in class related to landscape ecology.
4. Ask students what they have seen topographically in their travels around the state. Where have they seen farmland? Prairies? Forests? Beaches? Hilly terrain? Ask the students to use the cones provided to map or generally indicate areas matching these descriptions on the map.
5. Ask the students to look at the map provided on page 4 of ***Managing small forest patches for birds: a guide for Ohio landowners (Provided PDF)***. and see if it matches what they have seen in their travels.
6. Use the chains to recreate this map on page 4.
7. Ask the students to use the map key and their laptops to calculate what 50, 100, 500, 1000 acres would like in size on the map. The poster board or construction paper will be used to indicate these sizes later.
8. Ask students where birds are found in Ohio (use springtime as a reference for migratory birds). Why are they found there?
9. Ask students to use their computers to find maps of the forest patches that Bowen and Burgess, 1981 studied. Indicate these patches with cones and the name of the site labeled with tape. Do these patches appear in the map provided on page 4 of the ODNR's report or has the landscape changed since 1981?
10. Refer the students to the ODNR report and choose a type of bird mentioned in the article. What locations within OH would you expect to find that bird? Choose one site and mark it with a piece of the team's construction paper.

11. Refer the students to the ODNR report and ask the students to recommend a site where a patch could be created to host the bird they choose. Mark that site with the team's construction paper/poster board. Cut that construction paper/poster board into a shape that would be recommended (remembering edge to volume ratio). Students may need to tape a few pieces of paper together to create the site of their design.

Further Discussion:

1. Ask each team to explain to the class why they chose the site for a patch to be created and why they chose the size and shape they did. How realistic do they think it is or how likely could it happen?
2. Ask the students what hurdles they would expect in talking to landowners about creating patches.
3. Assign the students the article, Using models of farmer behavior to inform eutrophication policy in the great lakes, *Wilson et al. 2018* (Provided PDF) before leaving class that day. In the following class meeting ask the students again about how landowners might be persuaded to help with creating patches.

References:

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Ohio Bird Conservation Initiative. (2016a, November 1). *Managing Forests for Birds - Part 1 - Experiences From Ohio's Woodland Owners*. YouTube.
https://www.youtube.com/watch?reload=9&v=0C93uksT6xM&list=PLF7G9e991aInhyhfS3-L_NL0kfoQvz4Ro&index=2&t=0s&fbclid=IwAR1AuGeLhcKDHODi5std0XTXgPnEkgOgRwkfsbNAGIdgoxOvPIvFuTPAQ-I

Ohio Bird Conservation Initiative. (2016b, November 1). *Managing Forests for Birds - Part 2 - Creating Early Successional Habitat*. YouTube.
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Ohio Bird Conservation Initiative. (2016e, November 1). *Managing Forests for Birds - Part 5 - Planning for a Better Timber Harvest*. YouTube.

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Wilson, R. S., Schlea, D. A., Boles, C. M. W., & Redder, T. M. (2018). Using models of farmer behavior to inform eutrophication policy in the Great Lakes. *Water Research*, 139, 38–46.

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