

## RESOURCE LIBRARY | UNIT

# Detours and Distractions: How Humans Impact Migration Patterns

This project-based unit will transform your students into animal migration experts. Student groups will research a focal animal and create a multilayered map that features an animal migration pattern, ecosystem-level effects, and human impacts on animal migration. Groups will present their map and an evidence-based argument to convince stakeholders to implement a recommended solution.

**GRADES**

6, 7, 8

**SUBJECTS***Biology, Ecology, Conservation, Engineering, Geography, Geographic Information Systems (GIS)***CONTENTS**

3 Lesson plans

For the complete unit with media resources, visit:

<http://www.nationalgeographic.org/unit/detours-and-distractions/>

## In collaboration with



## UNIT OVERVIEW

Animal migration is an essential component of many ecosystems, and migratory animals contribute to human economies, such as recreation, hunting, and tourism, in addition to having cultural and intrinsic value. Unfortunately, human infrastructure and behavior have altered animal migration patterns.

In this unit, student groups will explore human impacts on animal migration through the lens of a focal animal. Groups will create a multilayered map that shows their focal animal's migration pattern, how their animal's migration interacts with its ecosystem(s), human impacts on their animal's migration, and recommended solutions that could mitigate human impacts. Groups will conclude this unit by presenting their map and an evidence-based argument to convince stakeholders to approve a solution that could mitigate human impacts. Student learning and engagement can be extended through local action to support vulnerable migratory species in your community. With the input of students, classes can decide whether to create a nearby "pit stop" for migrating animals, author a letter to local stakeholders or decision-makers, or conduct field work on local animals and contribute their findings to a citizen science project.

Use this [unit at a glance](#) to explore a brief outline of the materials included in this resource.

**Unit Driving Question: How can we help solve the problems faced by animals on the move?**

## LESSON 1: MAKING SENSE OF MIGRATION | 3 HRS 50 MINS

Students will engage with photographs, videos, handouts, and animations to learn why and how animals migrate, methods used to track and map migrations, and how humans are impacting animal migration. Students use a variety of resources to research a focal animal in order to create a map layer showing its migration pattern, which is part of their unit project. This lesson is part of the [\*Detours and Distractions: How Humans Impact Migration Patterns\*](#) unit.

## LESSON 2: ANIMAL MIGRATIONS AND THEIR ECOSYSTEMS | 3 HRS

Students engage with a variety of resources to learn about ecosystems and the interactions among organisms in ecosystems, with a focus on elk migration in the Greater Yellowstone Ecosystem. Groups create a second map layer for their unit project that shows how their focal

animal's migration impacts its ecosystem. This lesson is part of the Detours and Distractions: How Humans Impact Migration Patterns unit.

## LESSON 3: INTERRUPTED MIGRATIONS: IMPACTS AND SOLUTIONS | 4 HRS 40 MINS

Students investigate different solutions to human impacts on animal migration and identify different stakeholders; this information will be represented in the final map layer for their unit project. Groups develop and present an evidence-based argument that takes a stand on a specific human impact on animal migration and aims to convince stakeholders to implement a recommended solution. This lesson is part of the Detours and Distractions: How Humans Impact Migration Patterns unit.

### BACKGROUND & VOCABULARY

## Vocabulary

Term	Part of Speech	Definition
abiotic	<i>adjective</i>	characterized by the absence of life or living organisms
animal migration	<i>noun</i>	process where a community of animals leaves a habitat for part of the year or part of their lives, and moves to habitats that are more hospitable.
Antarctic	<i>noun</i>	region at Earth's extreme south, encompassed by the Antarctic Circle.
approve	<i>verb</i>	to accept or allow something.
Arctic	<i>noun</i>	region at Earth's extreme north, encompassed by the Arctic Circle.
argument	<i>noun</i>	reason or set of reasons given with the aim of persuading others that an action or idea is right or wrong.
average	<i>noun</i>	ordinary.
biotic	<i>adjective</i>	having to do with living or once-living organisms.
cascading effect	<i>noun</i>	series of secondary changes that are triggered by the primary changes to a key species in an ecosystem.
claim	<i>verb</i>	to state as the truth.
competition	<i>noun</i>	contest between organisms for resources, recognition, or group or social status.
component	<i>noun</i>	part.

<b>Term</b>	<b>Part of Speech</b>	<b>Definition</b>
<b>condition</b>	<i>noun</i>	an environmental state that must be present or exist in order for something else to exist or function.
<b>curiosity</b>	<i>noun</i>	desire to know more about a subject.
<b>detour</b>	<i>noun</i>	unplanned or temporary path.
<b>distract</b>	<i>verb</i>	to divert or draw attention away from something.
<b>ecosystem</b>	<i>noun</i>	community and interactions of living and nonliving things in an area.
<b>effect</b>	<i>noun</i>	result or impact produced by an action.
<b>empirical</b>	<i>adjective</i>	able to be proved with evidence or experience.
<b>environment</b>	<i>noun</i>	conditions that surround and influence an organism or community.
<b>evidence</b>	<i>noun</i>	data that can be measured, observed, examined, and analyzed to support a conclusion.
<b>external</b>	<i>adjective</i>	outside of something.
<b>feasible</b>	<i>adjective</i>	possible.
<b>feeding ground</b>	<i>noun</i>	region where organisms go to eat.
<b>focal</b>	<i>adjective</i>	central and important.
<b>growth rate</b>	<i>noun</i>	measurement of how fast something increases in size during a particular period of time.
<b>hazardous</b>	<i>noun</i>	involving the possibility of risk, loss, or harm
<b>impact</b>	<i>verb</i>	to influence or have an effect on something.
<b>implement</b>	<i>verb</i>	to carry out plans.
<b>internal</b>	<i>adjective</i>	inside, or having to do with the inner part of something.
<b>interrupt</b>	<i>verb</i>	to break the uniformity or continuity of something.
<b>key</b>	<i>noun</i>	an explanation of symbols and abbreviations used on a map, also known as a legend.
<b>map</b>	<i>noun</i>	symbolic representation of selected characteristics of a place, usually drawn on a flat surface.
<b>map layer</b>	<i>noun</i>	part of a map representing specific features of a place.
<b>measure</b>	<i>verb</i>	to determine the numeric value of something, often in comparison with something else, such as a determined standard value.
<b>method</b>	<i>noun</i>	way of doing something.
<b>migration cue</b>	<i>noun</i>	natural signal, such as a change in temperature, to which animals respond by migrating to more hospitable habitats.
<b>migration pattern</b>	<i>noun</i>	predictable movements, in time and space, of a group of animals or people.

<b>Term</b>	<b>Part of Speech</b>	<b>Definition</b>
<b>migration route</b>	<i>noun</i>	path followed by birds or other animals that migrate regularly.
<b>model</b>	<i>noun</i>	image or impression of an object used to represent the object or system.
<b>overcrowd</b>	<i>verb</i>	to fill an area with too many objects or organisms.
<b>pelagic</b>	<i>adjective</i>	having to do with the open ocean.
<b>perilous</b>	<i>adjective</i>	dangerous.
<b>perspective</b>	<i>noun</i>	point of view or way of looking at a situation.
<b>pole</b>	<i>noun</i>	extreme north or south point of the Earth's axis.
<b>population</b>	<i>noun</i>	total number of people or organisms in a particular area.
<b>predator</b>	<i>noun</i>	animal that hunts other animals for food.
<b>prey</b>	<i>noun</i>	animal that is hunted and eaten by other animals.
<b>reasoning</b>	<i>noun</i>	process of using evidence to make inferences or conclusions using logic.
<b>reproduce</b>	<i>verb</i>	to create offspring, by sexual or asexual means.
<b>resource</b>	<i>noun</i>	substances such as water, air, shelter, and food sources which are valuable in supporting life.
<b>revise</b>	<i>verb</i>	to correct or improve an existing material, often a written document.
<b>scale</b>	<i>noun</i>	distinctive relative size, extent, or degree.
<b>solution</b>	<i>noun</i>	an answer to a problem.
<b>species</b>	<i>noun</i>	group of similar organisms that can reproduce with each other.
<b>species range</b>	<i>noun</i>	native, geographic area in which an organism can be found. Range also refers to the geographic distribution of a particular species.
<b>stakeholder</b>	<i>noun</i>	person or organization that has an interest or investment in a place, situation, or company.
<b>surveillance</b>	<i>noun</i>	observation of a person, community, or situation.
<b>survival</b>	<i>noun</i>	ability to live.
<b>symbol</b>	<i>noun</i>	something used to represent something else.
<b>temperature</b>	<i>noun</i>	degree of hotness or coldness measured by a thermometer with a numerical scale.
<b>tracking</b>	<i>noun</i>	process in which scientists and resource managers use technology to tag animals and map their movements.
<b>trigger</b>	<i>verb</i>	to cause or begin a chain of events.
<b>wind turbine</b>	<i>noun</i>	machine that produces power using the motion of wind to turn blades.

<b>Term</b>	<b>Part of Speech</b>	<b>Definition</b>
<b>Yellowstone National Park</b>	<i>noun</i>	large national park in the U.S. states of Wyoming, Idaho, and Montana.



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