



Grade Level: 7  
Subject: SCI

# Blacktail Deer Monitoring

## ESSENTIAL UNDERSTANDINGS

- Lifeways
- Identity
- Since Time Immemorial
- History

## LEARNING OUTCOMES

- Students will be able to explain why monitoring and minimizing human impact on the environment is important.
- Students will be able to design a method to monitor human impact on the environment.

## CULTURALLY RESPONSIVE PRACTICES

- Connecting to the lives of students
- Proximity
- Preserving and honoring cultural history
- Student talk, working together and individually

## ASSESSMENT

Students will be assessed for understanding through observations, participation in group conversations and activities, and proficient completion of the lesson worksheet.

## VOCABULARY

- **Reservation:** an area of land set aside for occupation by North American Indian.
- **Human Impact:** changes in the environment caused directly or indirectly by humans.
- **Hunting Tag:** a permit to hunt a specific type of animal.

## Overview

In this lesson, students will learn about the Blacktail Deer population on the Confederated Tribes of Grand Ronde Reservation and design an alternative method to track deer population to monitor and minimize human impact on the species. Animal population monitoring and control is an important aspect of Native land management.

## MATERIALS

- Whiteboard/Poster Paper for Mind Map
- [Grand Ronde Reservation Map](#)
- [Blacktail Deer Video Part 1](#)
- [Blacktail Deer Video Part 2](#)
- [Blacktail Deer Video Worksheet](#)
- [Blacktail Deer Activity Worksheet](#)

## LOGISTICS

- Where does this activity take place?  
**Classroom**
- How are the students organized?

**Whole Class    Teams: 3-5**

Pairs                      Individually

## TIME REQUIRED

**45-60 minutes**

## STANDARDS

### Next Generation Science Standards

**MS-ESS3-3.** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

**MS-LS2-1.** Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

**MS-LS2-2.** Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

**MS-LS2-3.** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.

**MS-LS2-4.** Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

**MS-LS2-5.** Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

## Background for Teachers

The Confederated Tribes of Grand Ronde has been working towards regaining and retaining hunting and fishing rights for tribal members since 1983 when the tribe was restored with federal recognition. Today, the tribe has a Natural Resources Department (NRD) that “serves the Grand Ronde tribal membership through responsible stewardship of all-natural resources important to the cultural identity, self-sufficiency, and **sovereignty** (inherent authority of indigenous tribes to govern themselves within the borders of the United States) of current and future generations.” Hunting and fishing rights are important to the tribe because it helps promote land management, land conservation and also allows the tribe to continue to practice cultural ceremonies and activities.

The purpose of this study is to obtain reliable blacktail deer population estimates to help the tribe determine how many additional hunting tags should be distributed to tribal members. Currently, the tribe nor the Oregon Department of Fish and Wildlife have an estimate on the deer population in Oregon. The Trask hunting unit is on reservation land and is open to the public. Over distributing hunting tags in the Trask unit could potentially have a negative effect on the habitat on the reservation.

A panel of seven microsatellites and two sexing markers were used to screen all 269 samples. Of the 269 samples, 89 (33%) produced data at five or more loci in Panel 1. Forty samples (15%) failed at all loci, and the remaining 140 samples (52%) amplified at 1-5 loci. The 89 samples that amplified at  $\geq 5$  loci were identified as 56 unique deer, of which 40 were female and 16 were male (1 male: 2.5 females). In addition to the 19 deer that were recaptured within the 2017 data set, several deer sampled in 2017 were previously sampled in 2015 and/or 2016. For the sake of this lesson, we will be using table 2, which gives information on 89 samples that were collected.

A team from NRD was assembled to go out on the reservation to collect fresh deer pellets. The surveyed area consisted of habitats that were freshly logged or the trees were only 0-5 years old. The team covered 403 acres of land. The attached excel sheet labeled 2017 Node Locations. The map shows where each node plot is and how many pellets were collected from that node.

In addition to microsatellite loci, each panel contained 2 markers for sex identification. The markers are repeated twice because you get two genes on the allele, one from each parent. The sample ID's (example BT17.001) represent the fecal samples that were collected. BT stands for blacktail deer, while the number 17 stands for the year the data was collected, i.e. 2017. The last three digits indicate the sample number. You will notice that there are some missing samples. That is because not all of the samples that were collected were blacktail deer or the quality of the sample wasn't complete enough to determine its species. The data on table 2 represents all complete locus, which was only 33% of that data.

The data in the body of the excel sheet show the specific alleles the microsatellite primers target. Meaning if that allele shows up, we know it's a blacktail deer and that the number is unique to that individual. For example, BT17.001 matches BT17.005 which shows us that it's the same deer because their alleles are the same. The alleles also show us which deer are male and which ones are females. This helps us identify the ratio of female to male deer on the reservation.

## Opening

- Write the word “Human Impact” on the board.
- Ask students what they know about this phrase.
- Add what students are saying to the word creating a mind map.
- Guide students to the idea that human impact can both help and hurt animal populations. From animal extension to animal revitalization movements humans play an important role in both.

## Activity

1. Show students the map of the Grand Ronde Reservation. Have students locate the reservation on the map.
2. Let students know that the Confederated Tribes of Grand Ronde is very concerned with monitoring the health and wellbeing of animal populations on the reservation. This is due to the significance that hunting has to the tribal people.
3. Inform students that they will be learning about the Blacktail Deer that lives on the Tribe’s reservation. They will be learning how the tribe monitors the deer population to make sure that the group is healthy. Then, they will be designing their own monitoring technique for the deer.
4. As the students are watching the video, have them complete the accompanying video worksheet. This worksheet will serve as a model for the activity to come.
5. Watch the Blacktail Deer Video Part 1 & 2.
6. Give students time to complete the video worksheet.
7. Go over the video worksheet as a whole group. Guide students to the idea that the researchers were monitoring the deer population by tracking the number of individual deer living on the reservation. This allows the tribe to know how many hunting tags to give out.
8. Introduce the next step of the activity. Students are given the task of designing a method to find where Blacktail Deer are living because the tribe needs to build a lab somewhere on the reservation. As a team they must come up with a plan to locate the deer, decide what other things need to be considered for the development and determine why it is important to locate the deer prior to building.
9. Have students get into small groups.
10. Pass out the activity worksheet to the students.
11. Give students time to work together to complete the activity worksheet.
12. Once the groups have started to complete the worksheet have the students gather back as a whole group. Allow groups to share their method for monitoring the deer location on the reservation and what they will do to protect their habitat from development.
13. If needed, students can go back to their small groups and add new ideas to their plan.

## Closure

End the lesson by bringing the students back to the “Human Impact” Mind Map. Ask students what they learned about the importance of minimizing the human impact on animals during this lesson. Take a few answers from the students.

## Differentiation

- Be intentional about the groups that you put students in so they can benefit from working with each other. Students can decide upon groups ahead of time if needed.
- Use vocabulary cards for the lesson and refer to them when using the specific vocabulary to offer students a visual.
- Do check-ins with groups and individuals to ensure they are staying on task and understanding the content of the lesson.

## Extension

- Integrate Technology: Allow students to use technology and research different methods for tracking animals.
- Class Visit: Take a trip to Grand Ronde and visit with the Natural Resources Department so they can see some of the locations from the lesson.
- Reflections: Allow students to document in their science journals about what they learned and how they feel about it.

## Notes/Other

Jan Michael Looking Wolf's or Grand Ronde Canoe Family audio tracks can be played as background music while students are working. These audio tracks can be found on Spotify or Apple Music.

Jan Michael Looking Wolf: [Spotify](#) and [Apple Music](#)  
Grand Ronde Canoe Family: [Spotify](#) and [Apple Music](#)

## Appendix

- Grand Ronde Reservation Map:  
[https://drive.google.com/file/d/1c6Nc\\_DaA1FJckJ\\_6E31imKOe6drQtAOD/view?usp=share\\_link](https://drive.google.com/file/d/1c6Nc_DaA1FJckJ_6E31imKOe6drQtAOD/view?usp=share_link)
- Blacktail Deer Video Part 1: <https://youtu.be/LEeMrIVpYGI>
- Blacktail Deer Video Part 2: <https://youtu.be/Q0FF9-s1hpg>
- Blacktail Deer Video Worksheet:  
[https://drive.google.com/file/d/1E-6e5IFXsYYZOsR4xEQeZgoWrWW3OnrX/view?usp=share\\_link](https://drive.google.com/file/d/1E-6e5IFXsYYZOsR4xEQeZgoWrWW3OnrX/view?usp=share_link)
- Blacktail Deer Activity Worksheet:  
[https://drive.google.com/file/d/1nMwLVPMdTWyg5TMV99dFqpmfOsdwtmD6/view?usp=share\\_link](https://drive.google.com/file/d/1nMwLVPMdTWyg5TMV99dFqpmfOsdwtmD6/view?usp=share_link)