WOOD BISON CURRICULUM

Lesson 1 (STEM lesson)

Where Will the Wood Bison Roam?


Photo by Doug Lindstrand

Synopsis:

Students work individually, in small groups, and as a class to answer a real-world question as they use scientific data to identify "where the wood bison will roam" in Alaska. After watching Part I of a slide show that provides background information about a scientific study done to determine which sites are suitable for wood bison restoration, students are divided into six groups and each group is assigned one habitat factor (data category) that is critical to the successful restoration of wood bison in Alaska. In small groups, students graph and rank real-world data and present findings to their peers. Working as a class, students develop management recommendations based on the combined scientific findings from all six groups. Real-world results are included as Part II of the slide show, so students can compare their findings with those of real wood bison biologists. All data and results used in this exercise stem from a real-world study on wood bison restoration completed by biologists at the Alaska Department of Fish and Game.

To help solidify some key concepts associated with habitat and wood bison forage, students can participate in **two extension lessons**:

1) Creature Feature! Working in groups, students create a new species (creature) and then collect data along transect lines in the school yard to

Grade Level: 7-8

Subjects: Science and Math

Duration: Approximately 3 class periods

Materials for lesson:
-PART I Slide show "Where Will the Wood Bison Roam?"
- PART II Slide show "Where Will the Wood Bison Roam?" (results)
-Teacher Instructions
-Student Pages

Vocabulary: captive herd, data, extirpate, forage, generalist herbivore, graminoids, habitat, hybridization, key grazing animal, mesic, restoration, sedge

Lesson authors:
Dr. Melissa Reynolds-Hogland and Allison DePuy

determine if the school yard provides suitable habitat for their creature. Students can share creature features with others worldwide by posting on our "virtual creature feature" page.

2) Calculate It! Now that students know WHAT wood bison eat, they can calculate HOW MUCH wood bison eat daily and annually (at the individual and herd levels).

Objectives:

1. Students will actively participate in the process of discovery, using real-world data from a scientific study on wood bison

2. Students will be able to define habitat and what it means for wood bison in Alaska

3. Students will understand the reciprocal relationship between wood bison and habitat: habitat affects wood bison AND wood bison affect habitat

4. Students will understand that wood bison are listed as a threatened species and that the Alaska Department of Fish and Game, the US Fish and Wildlife Service, and the Alaska Wildlife Conservation Center are partnering to restore a captive wood bison herd back into the Alaska wild

5. Students will graph and rank real-world data, and interpret/analyze results

6. Student will understand that restoring wood bison onto the wild landscape requires consideration of biological factors, political factors, and cultural factors

7. Students will work individually and cooperatively as they problem solve, construct explanations, hone critical thinking skills, and participate in designing solutions

8. Students will hone skills in communication as they engage in a range of collaborative discussions (in groups and teacher-led)

9. Students will actively participate in the process of scientific discovery, using real-world data and six case studies on wild bighorn sheep

10. Students will present findings, emphasizing important facts with relevant evidence

Background Information for Teachers

In 1973, the wood bison was federally listed as an endangered species under the Endangered Species Act (ESA). In June 2012, the US Fish and Wildlife Service lowered the wood bison status to "threatened". Wood bison once roamed many parts of Alaska prior to the 1900's, but changes in the distribution of wood bison habitat and ***unregulated*** hunting (which differs significantly from legal hunting) resulted in the extirpation of wood bison in Alaska. Around 1900, there were only about 400 wood bison left in North America; these wood bison were in Canada. Owing to conservation efforts in Canada, there are currently over 4,000 wood bison in healthy free-ranging herds. However, there are still no wild wood bison in the US.

The Alaska Department of Fish and Game and the Alaska Wildlife Conservation Center are currently working with the US Fish and Wildlife Service to restore wood bison populations to portions of their

historic range within Alaska. Why? Restoring wood bison in Alaska would increase the number of wood bison worldwide and help ensure their long-term survival. It would also enhance Alaska's wildlife resources by restoring a **key grazing animal** to the northern ecosystem, which would affect natural processes and increase biological and habitat diversity. Restoring wood bison to Alaska would also benefit Alaska's people by increasing hunting opportunities, and by providing economic opportunities for local communities and the tourism industry.

In 2008, the Alaska Department of Fish and Game obtained 53 wood bison from a disease-free herd in Elk Island National Park in Alberta Canada. These wood bison were taken to the Alaska Wildlife Conservation Center (AWCC) in Portage, Alaska where they are currently residing as a captive herd awaiting release into the Alaska wild. As of June 2013, there are currently 133 wood bison residing at AWCC.

Before this captive herd can be released into the Alaska wild, wood bison biologists must locate suitable areas for the wood bison to live. To this aim, Alaskan biologists conducted a field study to **identify suitable sites** for wood bison restoration. Results from their study were compiled into the paper: *Habitat Assessment of Potential Wood Bison Relocation Sites in Alaska*, written by Gardner et al. 2006.

In this paper, the authors wrote, "before restoring the wood bison to the wild in Alaska, certain biological and social criteria need to be met. There must be sufficient habitat with suitable forage to support a viable population and there must be a minimal chance that wood bison will conflict with people, existing plains bison, and other wildlife."

After identifying six potential restoration sites in the interior of Alaska, the biologists then collected data in each of the six sites to determine which of these sites would be suitable for wood bison restoration. The biologists collected the following types of data:

1. Amount of meadow habitat in the site
2. Availability of wood bison forage in the site's meadows
3. Accessibility of wood bison forage in the site
4. Size of site
5. Proximity of the site to existing plains bison herds
6. Landownership in and near the site

As part of this lesson, students will use data collected from this real-world study as they work individually and in groups to identify which of the six potential sites are suitable for wood bison restoration.

Please note: all data that the students use came directly from the study *Habitat Assessment of Potential Wood Bison Relocation Sites in Alaska*, written by Gardner et al. 2006, with the notable exception for data on "Landownership patterns in and near the site". For this dataset, we have included updated information about mineral development possibilities that have occurred since 2006 (when the scientific paper was published). For example, there is currently the possibility of mineral development in two of the potential wood bison release sites, which has implications for whether or not these potential release sites would be suitable for wood bison restoration.

Materials Needed

- *Where Will the Wood Bison Roam?* power point slide show presentation, Part I and Part II (results)
- Student Pages: Where Will the Wood Bison Roam? (at the end of this lesson)
  There are six sets of Student Pages, one set for members of each group

Procedure

1. Show your students Part I of the power point slide show: "Where Will the Wood Bison Roam?"

2. At the conclusion of Part I, divide your students evenly into six groups. Assign each group one of the six data categories :

1. Amount of meadow habitat in the site
2. Availability of wood bison forage in the meadows
3. Accessibility of wood bison forage
4. Size of site
5. Proximity of site to existing plains bison herds
6. Landownership in and near the site

3. Hand out the appropriate "Student Pages" to members of each group (Group 1, Group 2, Group 3, Group 4, Group 5, Group 6) and allow students enough time to read the instructions and create their graphs or rankings using data provided in their Student Pages. As part of this exercise, students will work together to identify a research question that can be answered using the data in their Student Pages, so you might need to help groups identify and formulate their research questions.

4. Tell each group that they will be presenting their findings to the classroom. As part of their presentation, each group should provide: 1) brief background information about why their data category is important when determining which of the six sites are suitable for wood bison restoration, 2) the research question their groups is answering, 3) the graph or ranking that the group created, and, 4) the group's management recommendation for which site/s are suitable for wood bison restoration, based on the data provided in their Student Pages. (The presentation can be done by one member of the group, or by several members).

5. After all six groups have given their presentations, post graphs and rankings from all six groups in an area where students can view them.

6. As a class, use information from all six groups to discuss and determine which of the six sites they think would be suitable for wood bison restoration.

7. To compare the class' findings with findings from the biologists who worked on the real-world study to determine which sites are suitable for wood bison restoration, show your students Part II of the power point slide show: "Where Will the Wood Bison Roam?"

Student Pages: Where Will the Wood Bison Roam?

Group 1 **Amount of Meadow Habitat in the Site**

Instructions for this Activity

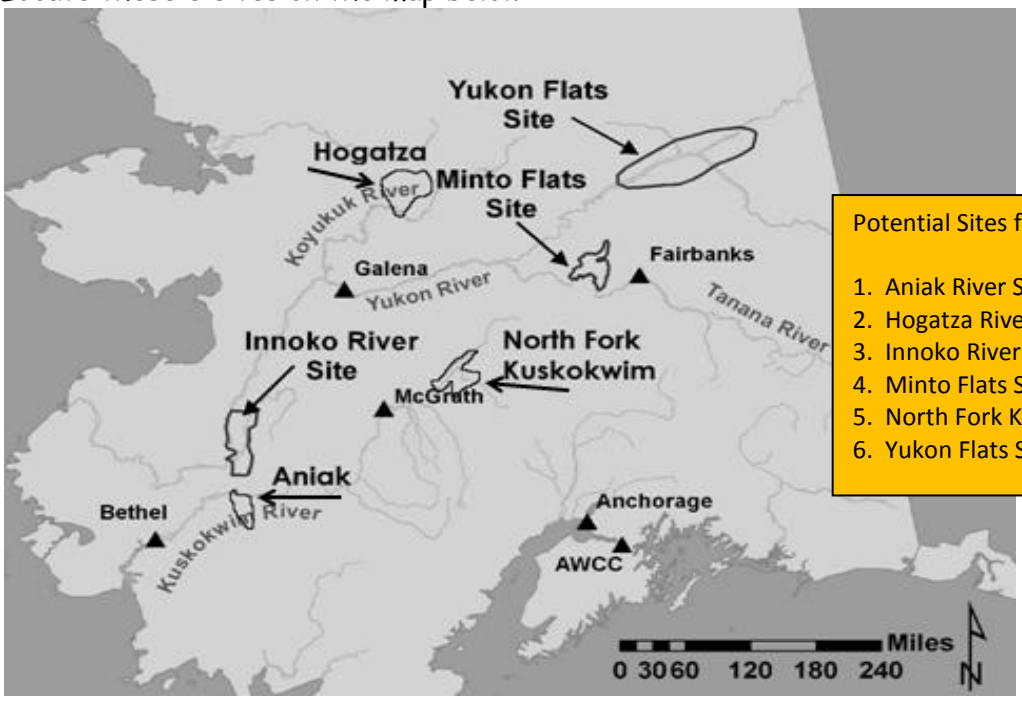
You should be in one of 6 groups. Individually, read through this page of background information thoroughly before examining and graphing the data. After you have graphed the data individually, work as a group to determine which of the 6 sites are suitable for wood bison restoration, based on the amount of meadow habitat.

Then, as a group create a presentation that you will give to your other class mates. Your presentation should include the following: 1) brief background information about why amount of meadow habitat is important when determining which of the 6 sites are suitable for wood bison restoration, 2) the research question your groups is answering, 3) the graph you created, and, 4) your recommendation for which site/s are suitable for wood bison restoration, based on the amount of meadow habitat.

Background Information

There are currently no wood bison in the wild in the United States. In efforts to help conserve wild populations of wood bison in Alaska, wood bison biologists at the Alaska Department of Fish and Game are working to reintroduce a wood bison herd somewhere in the historic wood bison range in Alaska. Where exactly? Aha! Let's find out.

The wood bison biologists identified LOTS of potential sites for wood bison restoration, but they narrowed the possibilities down to 6 sites.
Locate these 6 sites on the map below:



Potential Sites for Wood Bison Restoration

1. Aniak River Site
2. Hogatza River Site
3. Innoko River Site
4. Minto Flats Site
5. North Fork Kuskokwim River Site
6. Yukon Flats Site

All 6 potential sites are flat plains at low elevations that are adjacent to major rivers. The types of vegetation are similar among all 6 sites and include some grass/sedge meadows interspersed with riparian areas (with willow, dwarf birch, alder, and cottonwood trees) and conifer-deciduous forests.

After the wood bison biologists identified these 6 potential sites for wood bison restoration, they visited each site to collect data. The biologists collected the following data at each of the 6 sites:

1. Amount of meadow habitat in the site
2. Availability of wood bison forage in the site's meadows
3. Accessibility of wood bison forage in the site
4. Size of site
5. Proximity to existing plains bison herds
6. Landownership in and near the site

Your group will be working on data category #1:Amount of meadow habitat in the site

Information about meadow habitat

Wood bison use a variety of habitats throughout the year, but wood bison prefer wet and mesic sedge-grass meadows. In fact, wood bison do not occupy areas where sedge-grass meadows are absent. So, we need to identify how much meadow habitat is available in each of the 6 sites.

Use the table below to create a bar graph that depicts how much meadow habitat is available in each of the 6 sites.

Potential Wood Bison Restoration Site	**Amount of Meadow Habitat (miles^2)**
Aniak River Site	Not determined
Hogatza River Site	170
Innoko River Site	103
Minto Flats Site	210
North Fork Kuskokwim River Site	205
Yukon Flats Site	318

1. Which sites have the most meadow habitat?
2. Which sites have the least meadow habitat?
3. Why do you think the availability of meadow habitat was "not determined" for the Aniak River Site?

After you have created your graph and answered the questions individually, work as a group on the following tasks:

A. Come up with a research question that you can answer using the data you have graphed

B. As a group, answer your research question

C. As a group, develop a presentation that you will give to the other groups. Remember to include the following information in your presentation:

1) brief background about your data category: why is the amount of meadow habitat important to consider when determining which of the 6 sites are suitable for wood bison restoration? 2) the research question your groups is answering, 3) the graph you created, and, 4) your management recommendation for which site/s are suitable for wood bison restoration, based on scientific data about the amount of meadow habitat.

Student Pages: Where Will the Wood Bison Roam?

Group 2 **Availability of Wood Bison Forage in the Site**

Instructions for this Activity

You should be in one of 6 groups. Individually, read through this page of background information thoroughly before examining and graphing the data. After you have graphed the data individually, work as a group to determine which of the 6 sites are suitable for wood bison restoration, based on the availability of wood bison forage.

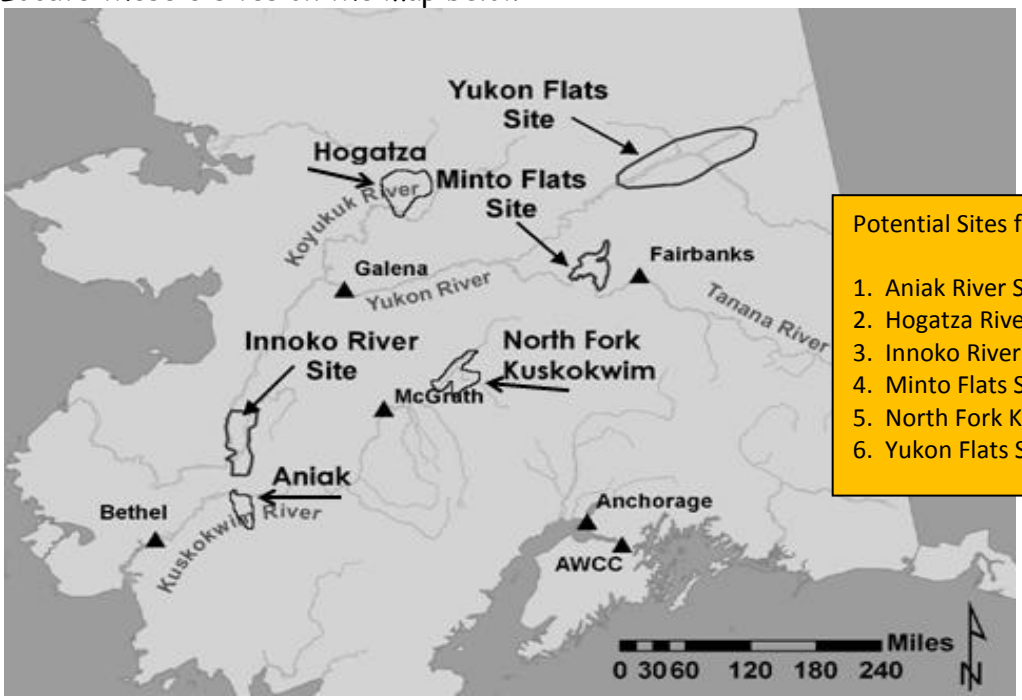
Then, as a group create a presentation that you will give to your other class mates. Your presentation should include the following: 1) brief background information about why availability of wood bison forage is important when determining which of the 6 sites are suitable for wood bison restoration, 2) the research question your groups is answering, 3) the graph you created, and, 4) your recommendation for which site/s are suitable for wood bison restoration, based on the availability of wood bison forage.

Background Information

There are currently no wood bison in the wild in the United States. In efforts to help conserve wild populations of wood bison in Alaska, wood bison biologists at the Alaska Department of Fish and Game are working to reintroduce a wood bison herd somewhere in the historic wood bison range in Alaska. Where exactly? Aha! Let's find out.

The wood bison biologists identified LOTS of potential sites for wood bison restoration, but they narrowed the possibilities down to 6 sites.

Locate these 6 sites on the map below:



Potential Sites for Wood Bison Restoration

1. Aniak River Site
2. Hogatza River Site
3. Innoko River Site
4. Minto Flats Site
5. North Fork Kuskokwim River Site
6. Yukon Flats Site

All 6 potential sites are flat plains at low elevations that are adjacent to major rivers. The types of vegetation are similar among all 6 sites and include some grass/sedge meadows interspersed with riparian areas (with willow, dwarf birch, alder, and cottonwood trees) and conifer-deciduous forests.

After the wood bison biologists identified these 6 potential sites for wood bison restoration, they visited each site to collect data. The biologists collected the following data at each of the 6 sites:

1. Amount of meadow habitat in the site
2. Availability of wood bison forage in the site's meadows
3. Accessibility of wood bison forage in the site
4. Size of site
5. Proximity to existing plains bison herds
6. Landownership in and near the site

Your group will be working on data category #2: Availability of wood bison forage

Information about wood bison forage

Wood Bison are bulk feeders that eat primarily graminoids, which are sedges and grasses. The most nutritious sedge for wood bison throughout the year is slough sedge, but wood bison also eat beaked sedge, reed grass, water sedge, willow bark and leaves, lichen, and even some flowers.

To estimate the availability of wood bison forage in each of the 6 sites, biologists randomly selected small and large meadows in each site and then collected data along transects in each meadow. Along these transects, biologists collected information about the percent cover of wood bison forage. Then, they estimated the availability of wood bison forage by multiplying the percent cover of wood bison forage by the amount of area. The **estimates of wood bison forage** are presented in the table below. Use these estimates to create a bar graph depicting the amount of wood bison forage in each of the 6 sites.

Potential Wood Bison Restoration Site	**Amount of wood bison forage (miles^2)**
Aniak River Site	Not determined
Hogatza River Site	Not determined
Innoko River Site	50
Minto Flats Site	98
North Fork Kuskokwim River Site	92
Yukon Flats Site	198

1. Which site has the most availability of wood bison forage?
2. Which site has the least availability of wood bison forage?
3. Why do you think the availability of wood bison forage was "not determined" for the Aniak River Site and the Hogatza River Site?

After you have created your graph and answered the questions individually, work as a group on the following tasks:

A. Come up with a research question that you can answer using the data you have graphed.

B. As a group, answer your research question

C. As a group, develop a presentation that you will give to the other groups. Remember to include the following information in your presentation:

1) brief background about your data category: why is the availability of wood bison forage important to consider when determining which of the 6 sites are suitable for wood bison restoration? 2) the research question your groups is answering, 3) the graph you created, and, 4) your management recommendation for which site/s are suitable for wood bison restoration, based on scientific data about the availability of wood bison forage.

Student Pages: Where Will the Wood Bison Roam?

Group 3 **Accessibility of Wood Bison Forage in the Site**

Instructions for this Activity

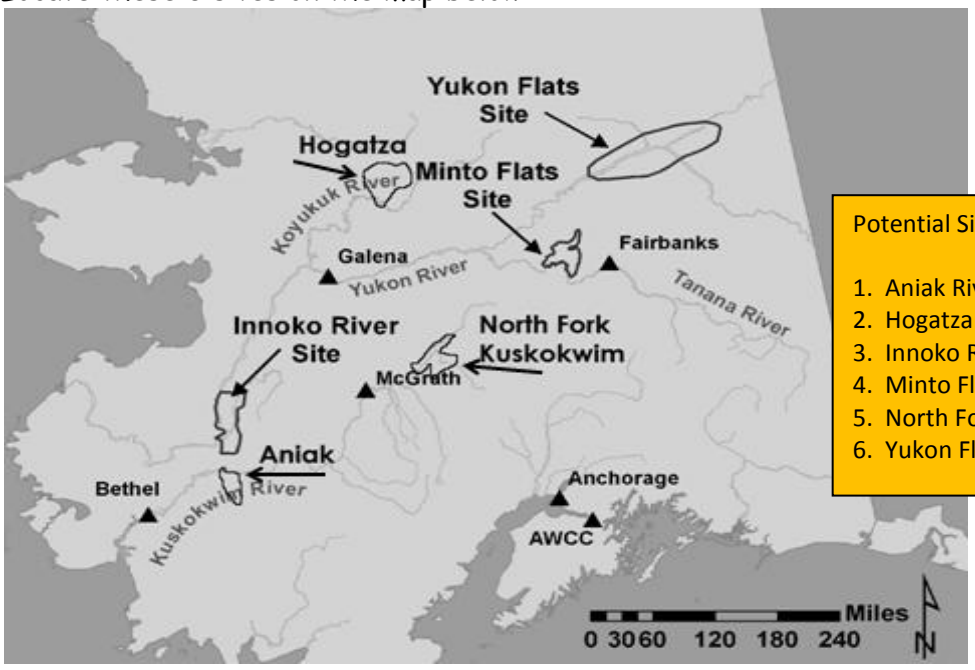
You should be in one of 6 groups. Individually, read through this page of background information thoroughly before examining and ranking the data. After you have ranked the data individually, work as a group to determine which of the 6 sites are suitable for wood bison restoration, based on accessibility of wood bison forage.

Then, as a group create a presentation that you will give to your other class mates. Your presentation should include the following: 1) brief background information about why access to wood bison food is important when determining which of the 6 sites are suitable for wood bison restoration, 2) the research question your groups is answering, 3) the list of 6 sites, ranked in order of suitability based on accessibility of wood bison forage, and, 4) your recommendation for which site/s are suitable for wood bison restoration, based on accessibility of wood bison forage.

Background Information

There are currently no wood bison in the wild in the United States. In efforts to help conserve wild populations of wood bison in Alaska, wood bison biologists at the Alaska Department of Fish and Game are working to reintroduce a wood bison herd somewhere in the historic wood bison range in Alaska. Where exactly? Aha! Let's find out.

The wood bison biologists identified LOTS of potential sites for wood bison restoration, but they narrowed the possibilities down to 6 sites.
Locate these 6 sites on the map below:



Potential Sites for Wood Bison Restoration

1. Aniak River Site
2. Hogatza River Site
3. Innoko River Site
4. Minto Flats Site
5. North Fork Kuskokwim River Site
6. Yukon Flats Site

All 6 potential sites are flat plains at low elevations that are adjacent to major rivers. The types of vegetation are similar among all 6 sites and include some grass/sedge meadows interspersed with riparian areas (with willow, dwarf birch, alder, and cottonwood trees) and conifer-deciduous forests.

After the wood bison biologists identified these 6 potential sites for wood bison restoration, they visited each site to collect data. The biologists collected the following data at each site:

1. Amount of meadow habitat in the site
2. Availability of wood bison forage in the site's meadows
3. Accessibility of wood bison forage in the site
4. Size of site
5. Proximity to existing plains bison herds
6. Landownership in and near the site

Your group will be working on data category #3: *Accessibility of wood bison forage*

Information about accessibility of wood bison forage: Wood Bison have some special habitat needs. They are heavy mammals with relatively short legs. Wood Bison have difficulty walking in areas that are too boggy or wet—they sink! In the winter, Wood Bison use their heads to push snow out of the way so they can forage on the grasses and sedges under the snow. If there is too much snow (more than 35 inches) or if the snow becomes icy and hard they cannot forage for food.

To understand which of the 6 potential sites might inhibit access to wood bison forage, biologists visited each of the 6 sites and collected data on meadow wetness/bogginess during spring and summer, as well as data on snow depths and ice layers during winter. This information is summarized in the table below. Use these estimates to rank the sites in terms of suitability, based on access to wood bison food. Consider a rank of 1 to be the highest suitability. Sites with higher numbers (2, 3, 4, etc.) represent lower suitability. (HINT: some sites may have the same rank. For example, more than one site can be ranked #1).

Potential Wood Bison Restoration Site	Access Concerns
Aniak River Site	None
Hogatza River Site	Snow depth average is 40 inches with hard and crusty layers
Innoko River Site	Spring flooding around rivers, but available access to hills with good forage
Minto Flats Site	Wet/boggy conditions in 25% of range during spring and summer
North Fork Kuskokwim River Site	Wet/boggy conditions in 50% of range during spring and summer
Yukon Flats Site	None

1. Which sites appear to be most suitable for wood bison, based on accessibility of wood bison forage?
2. Which sites appear to be least suitable for wood bison, based on accessibility of wood bison forage?

After you have ranked your sites and answered the questions individually, work as a group on the following tasks:

A. Come up with a research question that you can answer using the data you have graphed

B. As a group, answer your research question

C. As a group, develop a presentation that you will give to the other groups. Remember to include the following information in your presentation:

1) brief background about your data category: why is accessibility of wood bison forage important to consider when determining which of the 6 sites are suitable for wood bison restoration? 2) the research question your groups is answering, 3) the list of 6 sites ranked in order of suitability based on accessibility of wood bison forage, and, 4) your management recommendation for which site/s are suitable for wood bison restoration, based on accessibility of wood bison forage.

Student Pages: Where Will the Wood Bison Roam?

Group 4 **Size of the Site**

Instructions for this Activity

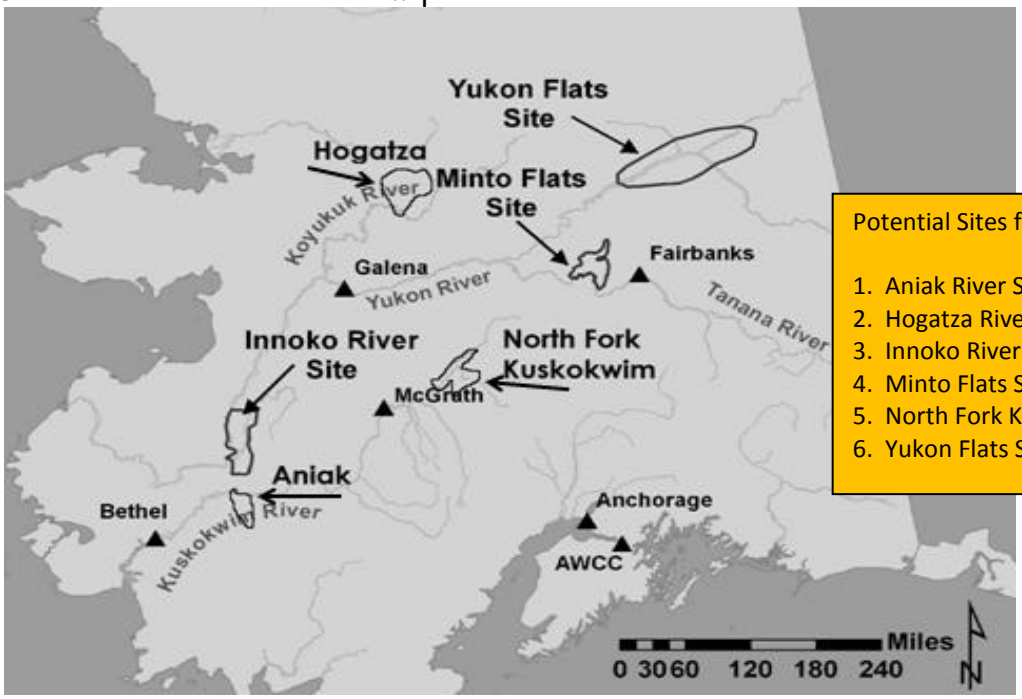
You should be in one of 6 groups. Individually, read through this page of background information thoroughly before examining and graphing the data. After you have graphed the data individually, work as a group to determine which of the 6 sites are suitable for wood bison restoration, based on the size of the sites.

Then, as a group create a presentation that you will give to your other class mates. Your presentation should include the following: 1) brief background information about why availability of food is important when determining which of the 6 sites are suitable for wood bison restoration, 2) the research question your groups is answering, 3) the graph you created, and, 4) your recommendation for which site/s are suitable for wood bison restoration, based on the size of the sites.

Background Information

There are currently no wood bison in the wild in the United States. In efforts to help conserve wild populations of wood bison in Alaska, wood bison biologists at the Alaska Department of Fish and Game are working to reintroduce a wood bison herd somewhere in the historic wood bison range in Alaska. Where exactly? Aha! Let's find out.

The wood bison biologists identified LOTS of potential sites for wood bison restoration, but they narrowed the possibilities down to 6 sites.
Locate these 6 sites on the map below:



Potential Sites for Wood Bison Restoration

1. Aniak River Site
2. Hogatza River Site
3. Innoko River Site
4. Minto Flats Site
5. North Fork Kuskokwim River Site
6. Yukon Flats Site

All 6 potential sites are flat plains at low elevations that are adjacent to major rivers. The types of vegetation are similar among all 6 sites and include some grass/sedge meadows interspersed with riparian areas (with willow, dwarf birch, alder, and cottonwood trees) and conifer-deciduous forests.

After the wood bison biologists identified these 6 potential sites for wood bison restoration, they visited each site to collect data. The biologists collected the following data at each of the 6 sites:

1. Amount of meadow habitat in the site
2. Availability of wood bison forage in the site's meadows
3. Accessibility of wood bison forage in the site
4. Size of the site
5. Proximity to existing plains bison herds
6. Landownership in and near the site

Your group will be working on data category #4: Size of the Site

Information about the size of the site

It is important for Wood bison to have room to roam and room to grow. The objective is to identify suitable wood bison habitat that is large enough to sustain a population of at least 400 animals. To meet help meet this objective, biologists determined that the size of the site should be > 600 mi^2. For this study, biologists estimated the size of each of the 6 potential sites using aerial surveys. The **estimates of site size** are presented in the table below. Use these estimates to create a bar graph depicting the size of the 6 sites.

Potential Wood Bison Restoration Site	Size of Site (mi^2)
Aniak River Site	280
Hogatza River Site	811
Innoko River Site	1,348
Minto Flats Site	812
North Fork Kuskokwim River Site	964
Yukon Flats Site	3,800

1. Which sites are largest?
2. Which sites are smallest?
3. Based on this information alone, can you make a good recommendation for which site is best for restoring wood bison? Why or why not? If no, then what other information do you need?

After you have created your graph and answered the questions individually, work as a group on the following tasks:

A. Come up with a research question that you can answer using the data you have graphed

B. As a group, answer your research question

C. As a group, develop a presentation that you will give to the other groups. Remember to include the following information in your presentation:

1) brief background about your data category: why is the size of the site important to consider when determining which of the 6 sites are suitable for wood bison restoration? 2) the research question your groups is answering, 3) the graph you created, 4) your management recommendation for which site/s are suitable for wood bison restoration, based on scientific data about the size of the sites.

Student Pages: Where Will the Wood Bison Roam?

Group 5 **Proximity of the Site to Existing Plains Bison Herds**

Instructions for this Activity

You should be in one of 6 groups. Individually, read through this page of background information thoroughly before examining and graphing the data. After you have graphed the data individually, work as a group to determine which of the 6 sites are suitable for wood bison restoration, based on proximity of sites to existing plains bison herds.

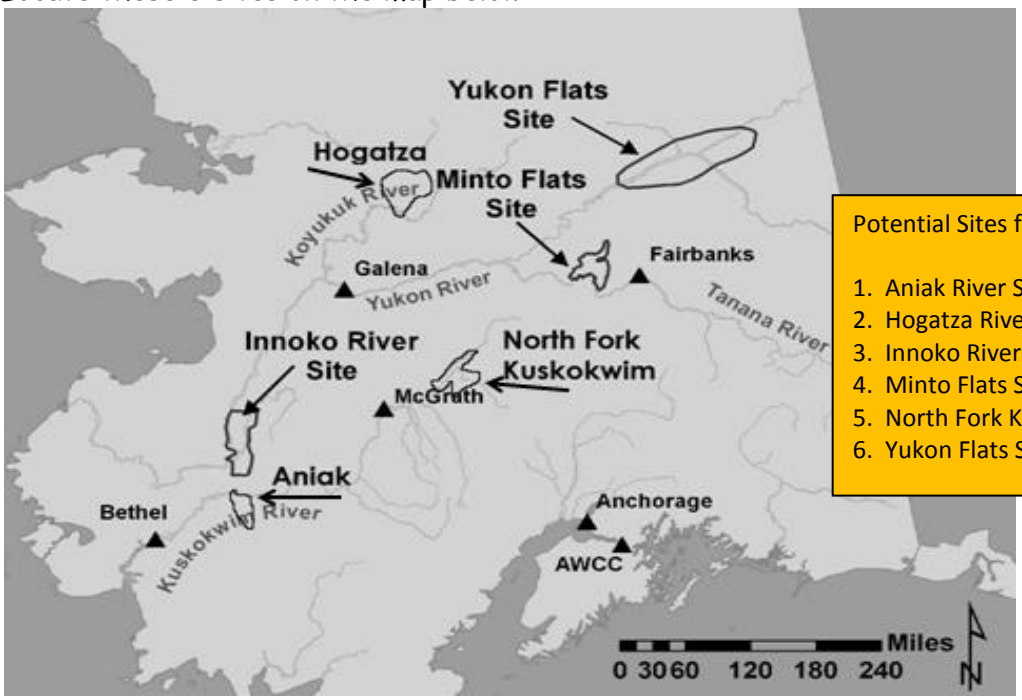
Then, as a group create a presentation that you will give to your other class mates. Your presentation should include the following: 1) brief background information about why the proximity to existing plains bison herds is important when determining which of the 6 sites are suitable for wood bison restoration, 2) the research question your groups is answering, 3) the graph you created, and, 4) your recommendation for which site/s are suitable for wood bison restoration, based on the proximity of sites to existing plains bison herds.

Background Information

There are currently no wood bison in the wild in the United States. In efforts to help conserve wild populations of wood bison in Alaska, wood bison biologists at the Alaska Department of Fish and Game are working to reintroduce a wood bison herd somewhere in the historic wood bison range in Alaska. Where exactly? Aha! Let's find out.

The wood bison biologists identified LOTS of potential sites for wood bison restoration, but they narrowed the possibilities down to 6 sites.

Locate these 6 sites on the map below:



Potential Sites for Wood Bison Restoration

1. Aniak River Site
2. Hogatza River Site
3. Innoko River Site
4. Minto Flats Site
5. North Fork Kuskokwim River Site
6. Yukon Flats Site

All 6 potential sites are flat plains at low elevations that are adjacent to major rivers. The types of vegetation are similar among all 6 sites and include some grass/sedge meadows interspersed with riparian areas (with willow, dwarf birch, alder, and cottonwood trees) and conifer-deciduous forests.

After the wood bison biologists identified these 6 potential sites for wood bison restoration, they visited each site to collect data. The biologists collected the following data at each of the 6 sites:

1. Amount of meadow habitat in the site
2. Availability of wood bison forage in the site's meadows
3. Accessibility of wood bison forage in the site
4. Size of the site
5. Proximity of site to existing plains bison herds
6. Landownership in and near the site

Your group will be working on data category #5: Proximity of Site to Existing Plains Bison Herds

Information about proximity to existing plains bison herds

It is important to separate wood bison from plains bison because of possible hybridization. There are two subspecies of bison: 1) wood bison (*Bison bison athabascae*) and plains bison (*Bison bison bison*). Wood bison and plains bison are genetically distinct. To ensure the long-term conservation of wood bison, therefore, it is important to separate wood bison herds from plains bison herds.

The biologists estimated the distance from each of the 6 potential sites to existing plains bison herds, which are presented in the table below. Use these estimates to create a bar graph depicting the distance between the sites and existing plains bison herds.

Potential Wood Bison Restoration Site	Distance to Existing Plains Bison Herd (miles)
Aniak River Site	150
Hogatza River Site	220
Innoko River Site	150
Minto Flats Site	130
North Fork Kuskokwim River Site	70
Yukon Flats Site	170

1. Which sites are closest to existing plains bison herds?
2. Which sites are furthest away from existing plains bison herds?

After you have created your graph and answered the questions individually, work as a group on the following tasks:

A. Come up with a research question that you can answer using the data you have graphed

B. As a group, answer your research question

C. As a group, develop a presentation that you will give to the other groups. Remember to include the following information in your presentation:

1) brief background about your data category: why is the proximity to existing plains bison herds important to consider when determining which of the 6 sites are suitable for wood bison restoration? 2) the research question your groups is answering, 3) the graph you created, 4) your management recommendation for which site/s are suitable for wood bison restoration, based on your scientific data about the proximity to existing plains bison herds.

Student Pages: Where Will the Wood Bison Roam?

Group 6 **Landownership in and Near the Site**

Instructions for this Activity

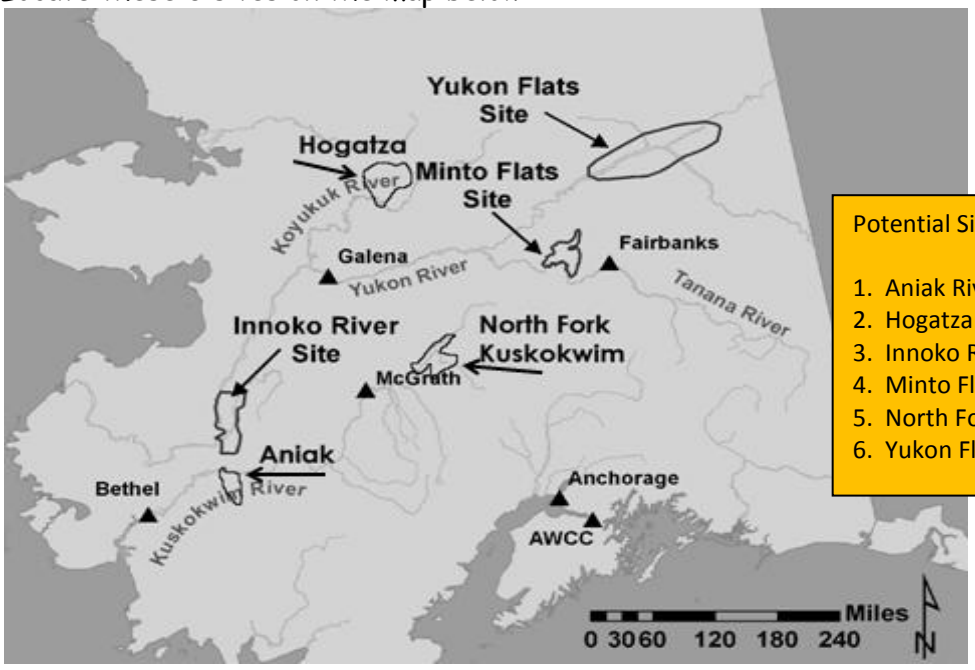
You should be in one of 6 groups. Individually, read through this page of background information thoroughly before examining and ranking the data. After you have ranked the data individually, work as a group to determine which of the 6 sites are suitable for wood bison restoration, based on landownership patterns.

Then, as a group create a presentation that you will give to your other class mates. Your presentation should include the following: 1) brief background information about why landownership patterns are important when determining which of the 6 sites are suitable for wood bison restoration, 2) the research question your groups is answering, 3) the list of 6 sites, ranked in order of suitability based landownership patterns, and, 4) your recommendation for which site/s are suitable for wood bison restoration, based on landownership patterns.

Background Information

There are currently no wood bison in the wild in the United States. In efforts to help conserve wild populations of wood bison in Alaska, wood bison biologists at the Alaska Department of Fish and Game are working to reintroduce a wood bison herd somewhere in the historic wood bison range in Alaska. Where exactly? Aha! Let's find out.

The wood bison biologists identified LOTS of potential sites for wood bison restoration, but they narrowed the possibilities down to 6 sites.
Locate these 6 sites on the map below:



Potential Sites for Wood Bison Restoration

1. Aniak River Site
2. Hogatza River Site
3. Innoko River Site
4. Minto Flats Site
5. North Fork Kuskokwim River Site
6. Yukon Flats Site

All 6 potential sites are flat plains at low elevations that are adjacent to major rivers. The types of vegetation are similar among all 6 sites and include some grass/sedge meadows interspersed with riparian areas (with willow, dwarf birch, alder, and cottonwood trees) and conifer-deciduous forests.

After the wood bison biologists identified these 6 potential sites for wood bison restoration, they visited each site to collect data. The biologists collected the following data at each site:

1. Amount of meadow habitat in the site
2. Availability of wood bison forage in the site's meadows
3. Accessibility of wood bison forage in the site
4. Size of the site
5. Proximity to existing plains bison herds
6. Landownership in and near the site

Your group will be working on data category #6: Landownership in and near the site

<u>Information about landownership patterns</u>

Who owns the land in and near the potential restoration sites? Why do we care? Because when restoring wood bison into the wild in Alaska, it is important to think about who might be affected by the wood bison. Farmers who own land near the site might be concerned that the wood bison will eat or trample their crops. Land and home owners who own land near the site might be concerned that wood bison might trample their yards or gardens. Local residents who live near the site might be concerned that wood bison might cause conflict on roads. People and organizations who have mineral rights on areas where wood bison could be restored might think that wood bison might affect their ability to extract minerals. It is also important to make sure animals already existing in an area will not be in conflict with the wood bison and require additional management.

The biologists collected information about landownership patterns and potential conflicts for each site. This information is summarized in the table on the next page. Use this information to rank the 6 sites in terms of suitability for wood bison, based on landownership in and near the sites. Consider a rank of 1 to be the highest suitability. Sites with higher numbers (2, 3, 4, etc.) represent lower suitability. (HINT: some sites may have the same rank. For example, more than one site can be ranked #1).

Potential Wood Bison Restoration Site	Landownership Concerns
Yukon Flats Site	Major issue: this site is currently being considered for mineral development by Doyon Inc (the for profit part of the Native Corporation) and they think that even if wood bison were given the status of "non-essential, experimental"
Hogatza River Site	No landownership issues at present
Innoko River Site	Minor issue: This site borders a wildlife refuge so landownership policies would need to be put in place before restoring wood bison here to minimize conflict with other wildlife species
Aniak River Site	No landownership issues at present
North Fork Kuskokwim River Site	Major issue: this site is close to Denali National Park, which could increase potential conflicts with recreation users
Minto Flats Site	Major issue: this site is currently being considered for mineral development by Doyon Inc (the for profit part of the Native Corporation) and they think that even if wood bison were given the status of "non-essential, experimental" that resource development might be difficult

1. Which sites appear to be most suitable for wood bison, based on landownership patterns?
2. Which sites appear to be least suitable for wood bison, based on landownership patterns?

After you have ranked your sites and answered the questions individually, work as a group on the following tasks:

A. Come up with a research question that you can answer using the data you have ranked

B. As a group, answer your research question

C. As a group, develop a presentation that you will give to the other groups. Remember to include the following information in your presentation:

1) brief background about your data category: why is landownership patterns important to consider when determining which of the 6 sites are suitable for wood bison restoration? 2) the research question your groups is answering, 3) the list of 6 sites ranked in order of suitability based on landownership pattern, and, 4) your management recommendation for which site/s are suitable for wood bison restoration, based on landownership patterns.