

“Past, Present, and Future”



Photo courtesy of Cape Lookout National Seashore

Prepared by: Nancy A. Hoffmann, M.C.S.
Noble Middle School

Updated by: Chase Sinnett, Animal and
Poultry Science, Class of 2019, Virginia Tech

Content Areas: Science and Social Studies

NC Essential Standards Science: 8.L.3, 8.L.3.1,

Social Studies: 6.H.1.1, 6.H.2.2, 7.H.1.1, 7.H.1.3,
8.H.1.1, 8.H.1.2, 8.H.1.3, 8.H.1.4, 8.G.1.3, 8.C&G.2.2

NGSS: ESS3-3, MS-ESS3-2, MS-LS2-1, L.S2.A, 3- LS4-3,
3-LS4-4

Materials:

- Computer
- Overhead projector
- Whiteboard
- Printed copies of Shackleford Island Horse History (Appendix A)
- Dry erase markers (3, any color)
- 8 ½ x 11 blank white paper for each student (1 piece per student)
- Copies of Harem Data
- 26 magnets or 4 different colored markers
- Copy of article from Carolina Shore: Exploring Coastal Carolina. Minding the Herd (p. 38-41). See Appendix B for link to article.
- Spiral Notebook (1 per student)

Activity Time: The suggested time per day/per lesson is 60 minutes. However, the activities could be broken into smaller segments or carried over into additional days depending on the needs of your students and available class time each day.

Setting: Classroom

Goals and Objectives:

Content Area: Social Studies

The overarching goals are to understand the cultural and historical significance of Shackleford Banks' horses; to develop awareness of current day issues facing the management of the herd; and to build stewardship for the ongoing protection of the horses.

Anticipated Outcomes

Students will use knowledge gained to create educational awareness posters, videos, and/or brochures to aid in the management and protection of the Shackleford Banks Island horses.

Theme

This curricular unit will view the history of the horses through three lenses: The past, the present, and the future. Using these vantage points as references, students will be able to understand the unique importance of the wild horses to North Carolina's history and how they are significant to the cultural heritage of the state, specifically the southeastern portion of the Outer Banks. Historical events or issues can be understood through the use of data.

The student will be able to:

- Use different sources of information from multiple perspectives to understand a particular event or issue.
- Distinguish between primary and secondary sources of information.
- Understand how charts, graphs and historical narratives can be used to explain historical events.
- Create charts, graphs, and historical narratives to explain events or issues.

The student will know:

- How maps, charts, graphs, geographic data and available technology tools are used to organize information about geographic phenomena.
- How organisms interact and respond to their environment

Background

Fundamental Resource or Value: Shackleford Banks horse herd

Importance

- Shackleford Banks, the southwestern-most barrier island within seashore boundaries, is one of the few places in the eastern United States where visitors can see a herd of free-roaming wild horses. The origin of the horses is the subject of several tales and a remnant of the practice of using the islands as open range. The Shackleford horses are protected by federal legislation as a cultural resource.

Condition

- Maintain horse population as mandated by federal legislation
- Population is disease-free
- Population range is consistent with legislative limits

- Each horse is individually identified

Trends

- Stable population with ongoing management
- Genetically viable population is maintained through selective removals and contraception

Threats

- Storm events
- Visitor interaction
- Disease
- Erosion
- Climate change and the associated influences (sea level rise, increase in annual mean temperature)

Opportunities

- Overall visitor education and interpretation opportunities
- Utilizing best management practices to foster a genetic pool for Shackleford horses

Existing information (e.g., data, plans) that provides knowledge base for planning and management

- Genetic information and behavioral studies about horses (e.g., matrilineage)
- Horse management plan
- Social structure
- Annual census

Procedure:

DAY 1: Building Background on Wild Horses of Shackleford

Elicit: KWNL Chart

Create a “KWNL Chart” to determine what students already KNOW (K) about the Shackleford Banks horses; what they WANT (W) to learn; what they NEED (N) to learn according to the State Standards for Social Studies; and once the unit has been completed, what they have LEARNED (L) about the topic. This serves as a pre- and post-assessment of the unit.

- List the “I can” statements/objectives on chart paper or white board for what they NEED (N) to learn according to the NC 7th grade curricular standards. Students should copy this list in their spiral notebook under the (N) part of the KWNL Chart.
- Have students individually list what they already KNOW (K) about the wild horses found in NC, specifically those that live on Shackleford Banks, in their Social Studies spiral notebook.
- Share out ideas and list them on a wall chart or white board.

Explore: Building Background on Wild Horses of Shackleford

- **PowerPoint Presentation**, ‘Wild Horses of Shackleford.’ Students will participate in an “Interactive PowerPoint” by taking notes in their spiral of main ideas from the PPT.

Evaluate: Students will create an exit ticket listing 5 important facts learned from the

PowerPoint presentation.

DAY 2: Vocabulary Development

Engage:

- Prior to lesson, write the vocabulary words and definitions on the white board or chart paper.
- Have students fold an 8 ½ x 11 sheet of paper into 8 parts.
- Demonstrate by folding a piece of paper in half lengthwise (so that it is long and narrow like a hotdog). Then, fold the paper in half again (hamburger-style). Finally, fold the paper one more time (hamburger-style), then open to show eight-fold divisions/sections.
- In each section, students should write one term, the definition, and create an illustration or add a mnemonic device to aid in recall. One box will be left over for the title of the activity, student name, and date.

Explore: Vocabulary Development:

Students will make a foldable for the following key terminology:

- Environmental condition
- Geographic phenomenon
- Historical narrative
- Historical perspective
- Literal meaning
- Primary sources
- Secondary sources

ANSWER KEY FOR VOCABULARY DEFINITIONS

- Environmental condition is the state of the natural environment of a place at a given time, such as: pollution, erosion, deforestation, depopulation, climate, glaciation, and desertification.
- Environmental issues are matters relating to the natural world and the safeguards of Earth, its people, plants, animals and natural systems.
- Geographic phenomena are the features of the Earth's surface as well as the activities that take place on the Earth's surface.
- Historical narrative is an account, report or story of events or experiences that is based on factual evidence from the past.
- Historical perspective is the ability to describe the past from the point of view of those who lived during the particular time period under study.
- Literal meaning refers to the meaning of a passage, text, etc. as the original author would have intended and what the original hearers/readers would have understood.
- Primary sources provide a first-hand account or direct evidence concerning a topic under investigation. They are created by witnesses or recorders who actually experienced the events or conditions being documented. While these sources are

created at the time when the events or conditions are occurring, primary sources may also include autobiographies, memoirs, and oral histories recorded later.

- Secondary sources provide interpretations of primary sources.

Evaluate: The teacher should collect the students' foldables at the end of class and review, checking for students' understanding.

DAY 3: Puzzling Out the Past: "Historical Narratives: How important are primary sources?"

Engage:

- **SCRIPT:** Today, you will be doing an experiment that will help you understand the difference between a primary source and a secondary source. Record your answers in your social studies spiral notebook.
- **Part 1-Your job:** Think of an important moment in your life. It can be something *little* (example: a time you scraped your knee) or something *large* (example: the first time you were able to ride your bike on your own). What is important is that *this memory stands out*. You remember many details around what happened, both the *physical details* (5 senses/memories) and the *emotional details* (how you felt while it was happening).
- Write your memory now and be sure to use specific physical and emotional details.

Explore:

- **Part 2-Share your story:** Find a person in the room whom you do not know very well. This person may know you, but wouldn't know the memory you wrote in Part 1. For Part 2, you will tell your memory, in detail, to the partner you have chosen. Please read your memory directly from what you wrote, but **DO NOT** show the written portion during or after sharing the memory. The partner is to listen, but is **NOT** to write down what you told him or her—yet.
- **Part 3-Listen to your partner's memory:** After telling your story, it is your turn to listen. As in Part 2, listen closely to your partner's memory, but do not look at their written version of the story. You may **NOT** take notes while they are telling the story.
- **Part 4-Recall your partner's story:** *On the separate sheet of paper provided,* write down **AS MUCH** of your partner's memory as you can remember. You should include both physical and emotional details you remember your partner sharing with you.
- **Part 5-Compare your story with your partner's retelling:** Now that you both have finished writing down your recollection of your partner's story, it's time to see how accurately they wrote it down.

Explain:

- Collect their written retelling of your story. Read the retelling.
 - *Circle* everything they remembered correctly.
 - Put a *box* around any information that has changed in their version, but is still somewhat correct.
 - Finally, *underline* anything that is all together wrong.

Evaluate:

- **Part 6-Process what you've learned:**
- Student directions: Write the question and answer in your spiral notebook.
 - How can the telling of stories (such as oral histories) have an impact on historical data?
 - Look at your written story, and then your partner's retelling of your story. Which story is more reliable? Why?
 - Final questions: Do you think it is reliable to understand a historical event by only studying primary sources? Secondary sources? How would you go about finding the most reliable understanding of an event?

Execute:

- Distribute the "History of Horses" article by Carolyn Mason and related historical excerpts (pdf) to each student.
 - Students should read and highlight historically significant information that is from a primary source in blue and highlight the historically significant information from a secondary source in yellow.

DAY 4: TIMELINE OF EVENTS

Engage: Generate Dates for Timeline

- Have students popcorn read *History on hooves: The Wild Horses of Shackleford Island* (See Appendix A)
- List dates identified as significant on whiteboard.
- Discuss the benefits/disadvantages of primary/secondary sources of information.

Explore: Create a Timeline

- Prior to starting timeline, discuss the usefulness of timelines for organizing and understanding chronological events.
- Using the identified dates from the article. Students will create a timeline of events as evidenced in the article.
 - For each date, students should add a visual cue to help recall the significance of each date.
 - Students should hang their timeline on the wall in the classroom for others to view via the Gallery Walk.

DAY 5: Managing the Herd Today: Herd Census

- How Shackleford Banks horses interact and respond to their environment

Explore:

- **Part 1:** Use an overhead projector to display the Shackleford Banks Map (Provided in small and large copies below). Pass out copies of Harem Data. Have each student go up to the whiteboard, and plot a harem on the map, using a magnet or marker. If you're using markers use a different color for each section of the island. Once all 26 harems have been plotted discuss with the students why the harems may be distributed this way.
- **Part 2:** Then using the overhead projector display the Shackleford Banks Satellite Images (Provided in small and large copies below). Have students find and list reasons why horses are or are not in a section of the island. Prompt them to locate fresh-water sources and marsh areas, or lack of these areas.
 - Important to notice for each island section
 - West- One fresh-water source, No marshes,
 - Midwest- No fresh-water source, No marshes
 - Mideast- Multiple fresh-water sources, Some marshes
 - East- Multiple fresh-water sources, Many marshes
 - Dark green in Satellite Images is a thick Maritime Forest
 - Discuss why the horse's home ranges are centered on some parts of the island and not others, and why they are not evenly distributed across the island
 - Students should notice that the harems gravitate towards fresh-water sources and marshes.
 - Teacher Note: The horse gravitate to marshes because that is the preferred grazing area.
- **Part 3:** Using the same Harem Data have the students create a Bar Graph showing the distribution of the harems in the four sections of the island. (Key provided below)
- **Part 4:** Using the Harem Data have the students create a Pie Chart showing the distribution of the harems in percentages. (Key provided below)
- Compare the different methods they used to plot the data, see which method the students preferred, and discuss why it is important to be able to plot data multiple ways.

Evaluate:

- Participation in Shackleford Banks Map
- Participation in Shackleford Banks Satellite Images
- Bar Graph
- Pie Chart

DAY 6: MANAGING THE HERD TODAY: Population Control

Explore:

- Read aloud the article from Carolina Shore: Exploring Coastal Carolina and Minding the Herd (p. 38-41). See Appendix B for link.
 - Discuss the role of the NPS and the wild horses herd manager, Dr. Sue Stuska; the challenges that are faced when managing a wild herd of horses; and the technology/tools that assist in their oversight.
 - Discuss the reasons for darting the mares with contraceptives and the difficulty of finding the horses on a primitive barrier island with various geographic features.

Extend: “Dart the Mare” Game

- The objective of the game is to better understand the challenges of locating a horse, specifically a mare on the island when trying to contracept her. The NPS uses GPS devices to locate specific coordinate’s horses have been seen or to locate watering holes where horses may visit throughout the day. This game simulates this process through the use of graphing coordinates (similar to latitude and longitude) to locate your opponent’s mares.
- Discussion that follows the game should be geared toward understanding this objective.
- Game instructions: Have the student’s pair up for this game. Each student will need a sheet of graphing paper or notebook paper where they can draw a graph. Each student will draw a graph with both axes (x,y) going from -5 to 5 (Negative five through positive five). Once this is done each student will secretly place five Mares (dots) on their own graph, at any coordinates. Then the pair will try to “dart” their opponents mares by guessing coordinates. The student to “dart” all of their opponents mares wins the game.

Evaluate:

- Reflection: Write 5-7 sentences in your Social Studies spiral/journal to complete this reflection assessment.
 - If you were working on the island as the NPS Ranger, what challenges might you face as you try to complete the search for mares?
 - Consider the geography of the island. Will you be able to walk through the marshes as well as a horse? How will you get through the Maritime Forest?

DAY 7: The Future of the Horses and How YOU can help the National Park Service!

Engage: Write on white board, “The National Park Service needs YOU!”

Explore:

- Share the “Managing wildlife” article from the NPS newspaper.



Preserve & Protect

FREE

Cape Lookout National Seashore

2008-2009 Edition

Managing Wildlife for a Changing Ecosystem

Most wildlife – like loggerhead turtles and piping plovers – have to handle their own population to adapt to changing habitats. But the horses on Shackleford Banks have some help.

Because the population is on a limited space – 2990 acres – and can't roam like turtles or birds, it needs some help keeping the numbers at a sustainable level. The herd is kept between 10 and 130 animals. Selected mares (adult females) are contracepted (given a birth control injection by dart which falls out after injecting the contents) each year. Selected young horses are sedated, also by darting, and removed each year to go to adoptive homes on the mainland.

If the horses weren't managed, natural selection would determine which animals reproduced. Females who were fertile and who were good mothers would have offspring.



Management strategy allows mares of under-represented lines the chance to reproduce.

Strong offspring would survive. Males who were good strong fighters would become alpha stallions and hold large harems of mares.

Since the horses need to be managed for population size, the managers (the park and the Foundation for Shackleford Horses, Inc.) have to make choices. Which mares to contracept? Which youngsters to remove?

One model is the "random" system. Females whose numbers were chosen out of a hat would receive birth control that year and youngsters who were similarly chosen would be removed.

But herd managers have information about the herd that

suggests we should manage differently. We have up to four generations of records on these horses. The Shackleford herd members trace their ancestry back to 47 "founders." A founder is an individual whose parents are not known, and he or she is treated as the originator of that line.

Our primary genetics advisor, Dr. Gus Cothran of Texas A&M University, has determined that the herd is comfortably diverse "as is." There is no danger from herd members being too closely related at this time.

Of the founders, one mare "#36 Daphne" has 28 living representatives – daughters, sons, granddaughters, etc. – on the island. This is far and away the largest line. Seven lines have only one representative on the island, five have only two, and nine have three representatives.

Since we don't know the relationship of the lines any further back than 4 generations, we treat the lines as if they are unrelated. Though, of course, all the horses on the island are likely to be somehow related to each other. They are related enough to be given a breed name: Banker Horses.

If you were managing a barrier island population for the future, and wanted to be sure it had the best chance to adapt to changing conditions, what attributes would you choose? Perhaps the ability to make do with less water? Or the instinct to avoid hurricane force winds and rising water? Or the ability to survive in temperature extremes? All of these are assets. The problem is that we don't know what lines have these abilities to a greater or lesser degree.

The best way to manage a population like this is to preserve its diverse gene pool. That way, whatever adaptive abilities are needed in the population, some animals should have them.

Management decisions of contraception and removal are made on the basis of number of representatives, mean kinship, and some individual factors. For example, a mare with one "uncle" and no offspring would not be contracepted so she has the chance to produce offspring for her line. A stallion with no offspring and no known relatives would – if he could win and keep a mare – have the chance to increase his line by having any foals stay on the island – even if their



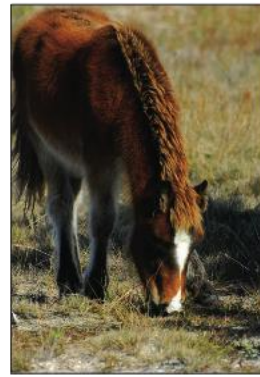
Strength and agility are required of a successful harem stallion.

mother was from a very well represented line.

Mean kinship is a number derived from a complex formula that shows the relative relatedness of all members of the herd. An offspring from two well represented parents would have a higher mean kinship number than one with two less well represented parents. Mean kinship is valuable when a decision needs to be made between two individuals and the relationship is more complicated than can be determined by just comparing the number of representatives.

Individual factors include situations like the reproductive capacity of the members. A line with three representatives where all three are breeding age females is not so "thin" as one with one aging mare and two young unproven stallions.

By making the best possible decisions, this wild but remotely managed population will have the genetic diversity to adapt to its changing barrier island ecosystem



Young horses need thick winter coats and enough grasses left over from the growing season to survive the cold months.

- Share these images with students and discuss their observations from this image.



Guided tour group at Shackleford Island.



Many people do not obey the law of keeping dogs on a 6-foot leash when visiting the island, which is dangerous to the dogs, horses, and people.

- Script: Although guidelines are in place to secure the inherent wild nature of the horses and safety of people, it is clear that the public needs to be better educated!
- Script: However, the NPS has found that with so many visitors to the island, some people do not treat the animals as WILD creatures and stand/walk closer than 50 feet from the animals (HINT: Think 1+ school bus lengths).

Extend:

- Script: Through educational posters placed strategically where visitors can see them when taking the ferry to the island, and possibly at local launch sites, the NPS is hopeful that YOUR signs can make a difference. Help maintain the wildness of the horses and ensure the safety of visitors by making colorful posters with facts and images.

- **Directions:** Using information gathered in this unit about wild horses, create a poster using 11 x 14 inch paper, markers, colored pencils, and/or crayons. Be accurate with your facts! Make sure the poster is neatly composed, spatially organized, and unique!

DAY 8: Wrap Up

- Gallery Walk: Students share their posters via a Gallery Walk. Students should leave a sticky note comment on each poster giving specific feedback.
- KWNL Wrap Up: As a class, review the KWNL Chart and add to the (L) LEARNED section. Each student should add 7-10 things they learned to their individual KWNL Chart in their spiral notebook.
- Revisions and Voting: Students have 1 day to consider the suggestions and comments from their peers and make any changes to their poster. The following day, the students vote for the top 5 posters to be sent to/used by the National Park Service.
- Note: Contact Dr. Sue Stuska to coordinate having the posters displayed at the park
 - sue_stuska@nps.gov

Evaluate:

1. Reflection
2. Exit Ticket
3. Gallery Walk Notes
4. Educational Poster
5. KWNL Chart

Readings:

Mason, C.S. (2004). *History on hooves: The Wild Horses of Shackleford Island*. International Society for the Protection of Mustangs and Burros.

DeVan, E. (2017). *Carolina Shore: Exploring Coastal Carolina*. Minding the Herd (p. 38-41).

2008-Managing-Wildlife-for-a-Changing-Ecosystem.pdf

Optional Reading: National Park Service (October, 2012). *Foundation Document, US Department of the Interior, Cape Lookout National Seashore*.

EXTENSION ACTIVITY: SPEAK UP/BE HERD!

When you see an opportunity to comment about wild horses online or in person, do it! For short Facebook or Twitter comments, use only Step One. For letters to editors, blogs, or letters to government representatives, use all 4 steps.

STEP ONE Make a statement and use BECAUSE to back it up.

“Wild horses deserve freedom because laws have given them the right to roam public lands.” “Wild horses belong to all Americans and because most Americans don’t believe in eating horsemeat, mustangs shouldn’t go to slaughter.”

STEP TWO Describe your personal connection to the issue in 2 - 3 sentences
STEP THREE Give 3 facts about the issue in 1 - 3 sentences
STEP FOUR WHAT ACTION do you want people to take? 1 sentence

That's it! In 3 - 6 sentences, you will have explained why you want to live in a world with wild horses. You can keep that short document, but whenever you can, put your opinion out there and help save our beautiful wild horses on Shackleford Island! You don't have to be brilliant or a really great writer; you just have to speak up for those who can't speak for themselves.

Together we CAN make a difference in the world!

Appendix A

Mason, C.S. (2004). History on hooves: The Wild Horses of Shackleford Island. *International Society for the Protection of Mustangs and Burros*.

<http://www.shacklefordhorses.org/timeline.htm>

Appendix B

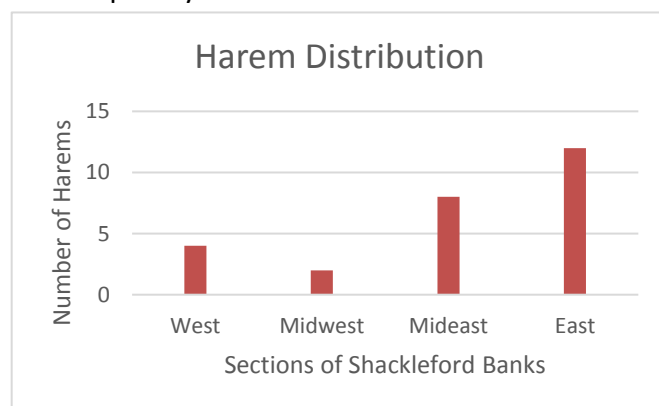
Carolina Shore: Exploring Coastal Carolina. Minding the Herd (p. 38-41).

https://issuu.com/nccoast/docs/car_shore

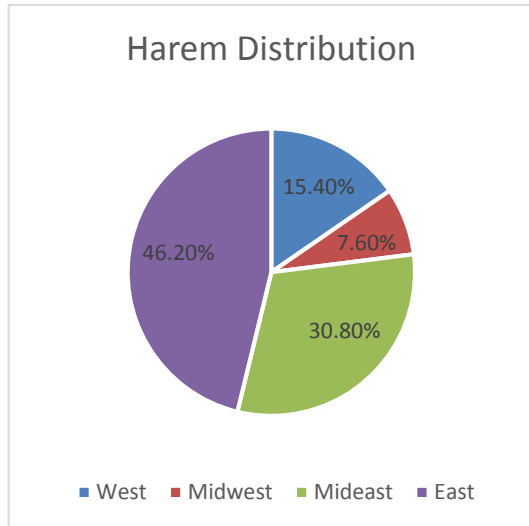
Templates and Keys:

KWL Chart: www.facinghistory.org/resource-library/teaching-strategies/k-w-l-charts

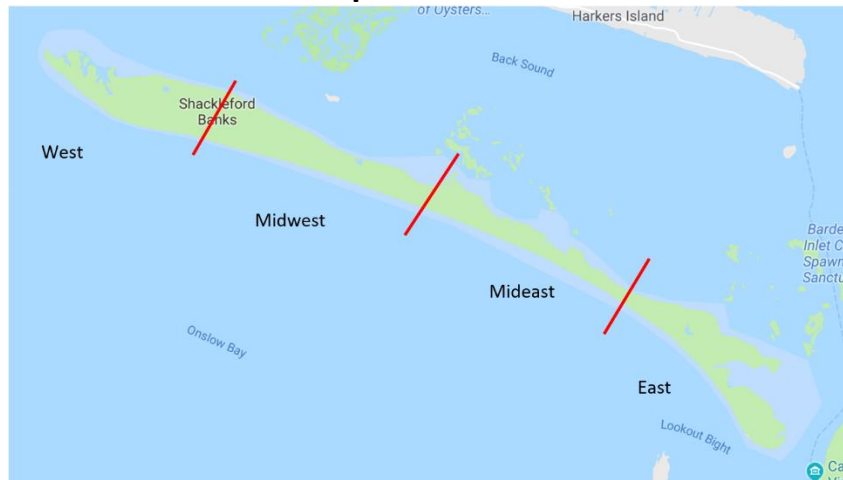
Bar Graph Key:



Pie Chart Key:



Shackleford Banks Map:



Shackleford Banks Satellite Images:





For teacher reference, what the students should notice.



Provided below are enlarged copies of the Shackleford Banks Map, and Satellite Images

Harem Data

| Harem | Island Section |
|-------|----------------|
| A. | West |
| B. | Mideast |
| C. | East |
| D. | Mideast |
| E. | West |
| F. | East |
| G. | Mideast |
| H. | East |
| I. | Midwest |
| J. | East |
| K. | Mideast |
| L. | West |
| M. | East |
| N. | Mideast |
| O. | East |
| P. | East |
| Q. | Midwest |
| R. | Mideast |
| S. | East |
| T. | Mideast |
| U. | East |
| V. | West |
| W. | East |
| X. | East |
| Y. | Mideast |
| Z. | East |

Additional Resources:

- Music
 - Wild Horses <https://www.youtube.com/watch?v=SQTHB4jM-KQ>
 - Born to be Wild <https://www.youtube.com/watch?v=5UWRypqz5-o>

- Videos
 - <https://www.commonsemmedia.org/lists/horse-movies-for-kids#>

- Children's Books
 - <http://www.scholastic.com/parents/resources/book-list/animals/horse-books-children>
 - <https://www.barnesandnoble.com/blog/kids/11-books-for-the-horse-obsessed/>

- Coloring pages
 - <https://goo.gl/images/qyMMBX>
 - <https://goo.gl/images/5vsmaJ>
 - <https://goo.gl/images/GXDJtN>
 - <https://goo.gl/images/L4r2gF>

Works Cited

DeVan, E. (2017). *Minding the Herd*. Carolina Shore: Exploring Coastal Carolina (pp. 38-41).

Mason, C.S. (2004). *History on hooves: The Wild Horses of Shackleford Island*. International Society for the Protection of Mustangs and Burros.

US National Park Service (2007-2008). *Preserve and Protect*.

US National Park Service (2008). *Managing Wildlife for a Changing Ecosystem*

Shackleford Banks Map:



Shackleford Banks Satellite Image; Whole Island



Shackleford Banks Satellite Image; West



Shackleford Banks Satellite Image; Midwest



Shackleford Banks Satellite Image; Mideast



Shackleford Banks Satellite Image; East

