Advanced Jr. Wildlife Ranger

Name:_____

Hello and welcome to Hagerman National Wildlife Refuge! Your duty on this expedition is to identify the habitats that are in this refuge, as well as the ecological systems that are at work. Be on the lookout for rare species and try your best to figure out some conservation strategies to help our local habitats. At the end of your journey report back to the Visitor Center for your merit of completion. Good luck out there!

COMPLETE at least 4 out of the **8** activities

Mission: Habitat Identification (1)

This refuge contains a variety of habitats. Survey the landscape and list the types of habitats that could be found. Explore the Visitor Center tables to find the five habitats on the refuge and review before you head out to the refuge.

1. _____
2. _____
3. _____
4. _____
5. _____

Ready for your Expedition? Don't forget to stay hydrated.
Look at your map and trek towards Harris Creek Trail. What habitats can you identify here?

_____
_____
_____

Mission: Understanding the System (2)

Select the habitat for study. What kind of plant makes up most of that habitat? Identify the subject to the best of your ability. Sketch or describe the primary producer.

We need to know what organism eats those plants. Intel suggest that they could be low to the ground or in the water. Draw or describe the primary consumer.

There are predators in this habitat. Can you identify a predator from this habitat? Because there are many organisms in this area, it could range from small to large, in the sky or under the water. Draw or describe the secondary / tertiary consumer.

Now that you have found the primary producer, the primary consumer, and the secondary/tertiary consumer of this habitat let's link and find the ecological relationship they have. Fill in the food web, link together your findings, and add some extra species you have seen in this ecosystem on **Page 6**. Remember every plant and animal supplies nutrients to the decomposers eventually.

Primary producer

Primary consumer

Secondary+ Consumer

Decomposers

Look deeper. Why is this habitat important, and what purpose does it serve? Briefly explain why we should support this habitat.

_____

_____

What can you can do to improve this habitat? There are several methods that we use to restore these lands, such as physical, biological, and chemical control.

_____

_____

_____

Mission: Another Habitat to Investigate (3)

We need to further study an additional habitat. Pick a habitat of your choice, from **page 2**.
Can you identify a major producer for this habitat?
Identify the subject to the best of your ability. Sketch or describe subject.

Identify the primary consumer. Draw or describe that specimen.

Identify the predator in this ecosystem. Draw or describe this specimen.

Now that you have found the primary producer, the primary consumer, and the secondary/tertiary consumer of this habitat let's link and find the ecological relationship they have. Fill in the food web, link together your findings, and add some extra species you have seen in this ecosystem on **Page 9**.

Primary producer

Primary consumer

Secondary+ Consumer

Decomposers

Why is this habitat important, and what purpose does it serve? Briefly explain why we should support this habitat.

_____

_____

What are some ways you can improve this habitat?

_____

_____

_____

Excellent work scout! Now that we have some data on several systems in this area, we can review what we have discovered.

Refuge

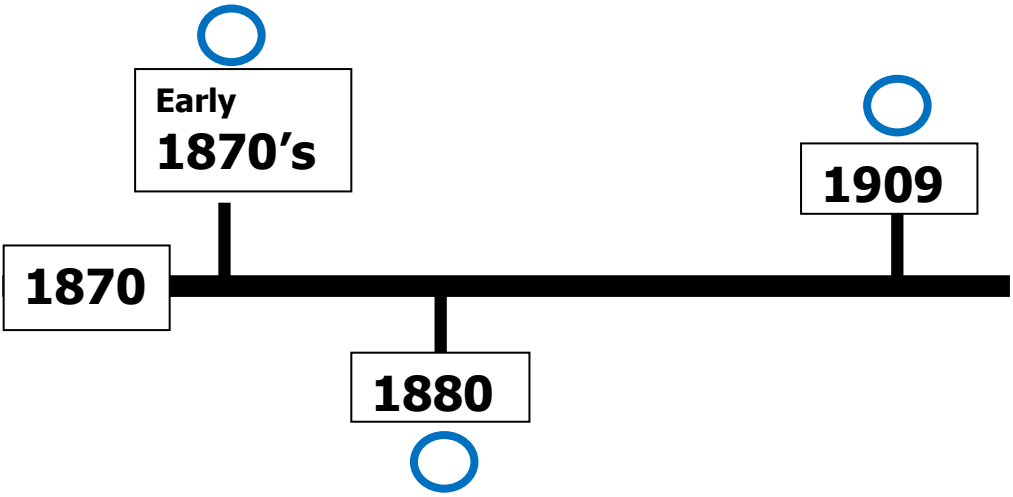


Figure out the correct order for the Hagerman refuge history. Match the statement to the appropriate year.

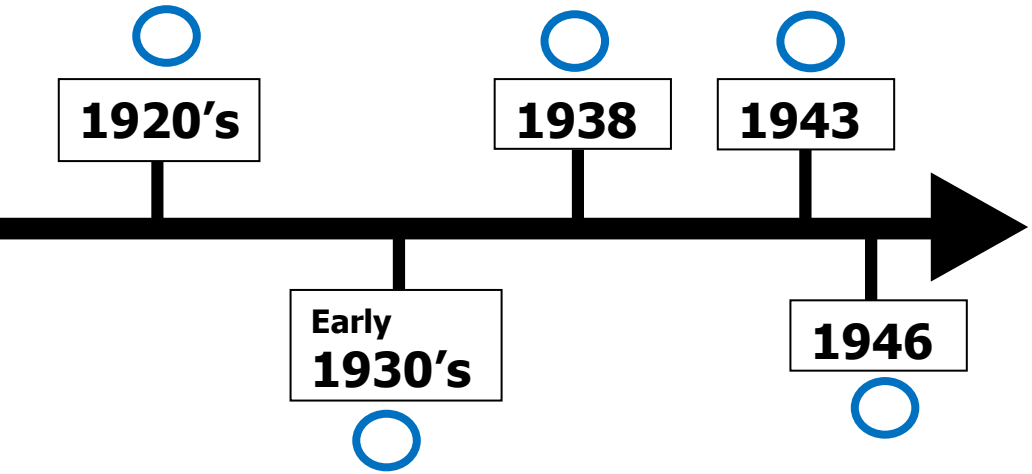
1. The Missouri, Kansas, Texas railroad arrived to the area, and town was named Hagerman after a railroad attorney.

2. Town Post office closed. Citizens began to abandon the town.

3. Hagerman National Wildlife Refuge was established.

4. Denison Dam was in the process to be constructed.

History(4)



5. Construction of Denison Dam was completed. Lake Texoma began to form and soon the town was submerged.

6. The town of Steedman was established, and town post office was opened.

7. People began to abandon the town when they heard news of the Denison Dam project.

8. Farmers and ranchers arrived in the area from more established settlements and began to colonize the lands.

Dates could be found in the visitor center history section and historical sign

BRIEFING (5)

We are here to engage with the information that you have uncovered and combine information from research on other similar habitats. In habitats such as a lake or pond a primary producer in that ecosystem could be algae. Algae is an **autotroph**, meaning that it produces its own nutrients with sources such as carbon dioxide and sunlight.

As the algae expands **primary consumers** may increase their consumption and population due to a larger supply of food resources. A typical consumer of algae may be a Mussel.

Freshwater mussel

In Lake Texoma it has been known that an invasive species of **bivalves** called zebra mussels now reside in the area. Zebra Mussels are known for reproducing until they are out of control due to them being introduced into a foreign habitat. They have no natural predators to control their population and this can ruin the balance of an ecosystem. Because they are so resilient, the only method we have to combat them is prevention. Prevent them from moving from one water source to another by removing water from equipment, washing, and drying equipment before moving to another body of water.

Zebra Mussels suffocating another mussel

A **secondary consumer** to a mussel in its natural environment may be an otter. Otters do reside within Hagerman although they are difficult to observe. Predators such as the Otter provide a balance to an ecosystem by controlling the populations of its prey, this is known as **Top-Down Pressure**. A balanced ecosystem has good diversity.

Why would diversity be a benefit to an ecosystem? Look back to your food webs. What happens if you remove some species?

_____

_____

At Hagerman National Wildlife refuge, we focus on improving habitats. There are several methods that we utilize here. Because we reside on the last remaining fragments of the Blackland Prairie, we attempt to reestablish that habitat to a higher status. Some methods to restore the prairie involve prescribed

burnings, disking, and species control. Each one of these methods benefit the habitat.

Disking is the disruption of soil and cutting of large brushes with machinery in order for grasses to outgrow larger and slower plants, such as Honey Locust and Red Cedar.

Prescribed fires are another method for grassland restoration. While burning grasses seems like the opposite of helping, it is one of the most effective strategies for maintaining a prairie. Prairie fires occur naturally during dry and hot conditions. Conducting prescribed fires allows us to control when and how they burn instead of having a raging wildfire. Fires also burn invading plants and return nutrients back to the soil. Grasses are pioneer species, so they are some of the first plants to sprout from the soil.

Species control is incorporated into refuge conservation practice by methods such as hunts. Hunting allows us to limit the population of deer, or other animals, that could easily overtake grassland ecosystems. Controlling the invasive wild hog is also a responsibility we must endure. Wild hogs tear up the habitat and compete for resources with of other species. In addition, herbicide use will assist in control of invasive plants and weeds.

What conservation practices would be beneficial to a grassland ecosystem?

_____

_____

_____

_____

Now then, let's review some of your skills!

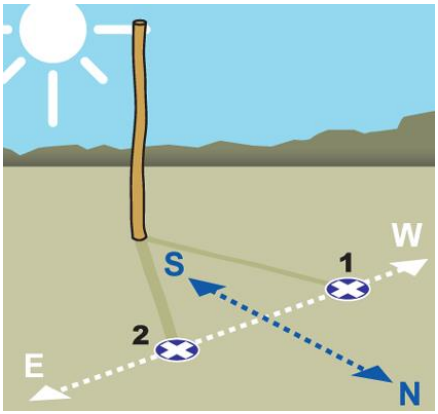
Skill Checks

Navigation (6)

You could practice this navigation method anywhere in the world. Even though it's no GPS, it will help you get around.

Shadow Tip Navigation

1. Find a level surface with a visible shadow.
2. Place a stick in the ground about 3 feet in length. Place a stone or marking on the tip of the shadow. This first mark is always West.
3. Wait about 15 min until the tip of the shadow has moved. Place a stone or mark on the tip of the new shadow location.
4. Stand over your markings. With the first mark on your left and the second mark on your right, you are facing north



Bird Identification Extended (7)

Determine the type of bird based on silhouette.

1.

2.

3.

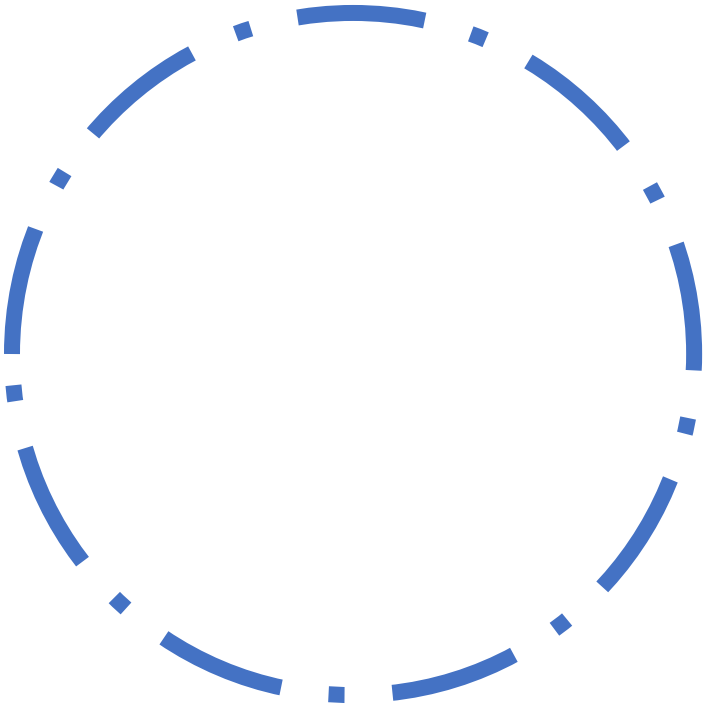
4.

5.

Wading bird, Waterfowl, Songbird, Raptor, Shorebird

Congratulations and thank you for your work and dedication to the Hagerman Jr. Ranger program!

You will now receive the Hagerman National Wildlife Refuge Stamp and Jr Ranger Identification. We look forward to seeing you again Ranger.



Ranger Pledge

As a Junior Ranger, I promise to protect wildlife and plants.

To Keep the water, land, and air clean.

I will share what I have learned with my friends and family so they can protect our planet too!

ANSWER KEY

Activity 1, 2, & 3

12 **Agricultural land**= food for migrating birds & humans

Improve: Grow variety of crops for greater diversity during times of migration, allow grasses to grow during non-production periods to provide habitat for local species, etc

Grassland= shelter/breeding ground/food sources for a variety of land species. Important for pollinators.

Improve: Invasive species removal, protect/plant native plants, prescribed fire, disking, etc

Lake= shelter/breeding ground/food sources for aquatic species. Food and recreation for humans. Resting location and food for migratory birds.

Improve: Invasive species removal, algae control, regulated fishing, etc

Wetland= Flood prevention/water filtration/erosion prevention. Shelter/food sources for land and aquatic species Important for migratory birds.

Improve: Invasive species removal, protect/plant native plants, irrigation to prevent drying during hot conditions

Forest= Many shelter/food sources for variety of species. Wood/food supply for humans. Generate clean air/ help create rainfall through respiration.

Improve: Invasive species removal, protect/plant native plants, allowing dead timber to remain (shelter), prescribed fire depending on region, etc

Activity 4

Diversity benefits an ecosystem by allowing more food resources and shelter to be available. Diversity allows more pathways for energy and nutrients to travel though the ecosystem.

Disking, prescribed fire, species control, invasive species removal.

Activity 5

1. 1909	2. Early 1930s	3. 1946	4. 1938
5. 1943	6. 1880	7. 1920's	8. 1870's

Activity 7

1. Raptor
2. Waterfowl
3. Wading Bird
4. Songbird
5. Shorebird

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