



# Whoopers on the Rise

Grade Level: 5-8

Subject Areas: math, biology, ecology.

Duration:

- Preparation - 20 minutes
- Activity (Parts 1 & 2) - 50 minutes
- Activity (Part 2) - 20 minutes

Setting:

Classroom

Group Size:

unlimited

Materials:

- graph paper
- pencils, markers
- copies of “Whooping Crane Historical Numbers” sheet; one per student.
- copies of “Predicting the Future” sheet; one per student.

Skills:

graphing, interpreting, analyzing.

Vocabulary:

extinct, threatened, endangered, population dynamics, migration, re-introduced.

Project BEAK Links:

[Birds & People - Science](#)

## OBJECTIVES

- Students study the population dynamics of the Whooping Crane (*Grus americana*) by exploring and graphing historic population numbers.
- Students explore reasons for population decline of Whooping Cranes and what is currently being done to help both natural and re-introduced populations thrive.
- Students estimate future population numbers based on the natural history of Whooping Cranes and hypothetical situations.

## Nebraska State Social Studies Standards

- 5.4.1

## Nebraska State Math Standards

5.3.1, 5.3.2, 5.4.1, 5.4.2, 6.3.2, 6.4.1, 7.4.1, 8.4.2

## Nebraska State Science Standards

- 8.4.3, 8.4.4, 8.4.5

## BACKGROUND

There are a wide variety of reasons why an animal may become threatened or endangered. Habitat loss, habitat degradation, and historically unregulated hunting are the most common (see inset box). Often before a species is listed as threatened or endangered, it is first listed as an “At-Risk Species.” This means that although the species is not threatened or endangered, it is headed in that direction. If the species’ population continues to decline, it is then listed as threatened. Following careful analysis and much research, the species is listed as endangered if the population drops to a point where it would be extremely difficult for the population to recover without help.

There are nearly 9,000 species in the U.S. listed on the Fish and Wildlife Service’s Federally Endangered Species list. Seventeen of these species are in Nebraska.

In addition to the federally listed species, there are also Nebraska state listed species. All federally listed species are on the

Nebraska State Endangered Species List. However, all Nebraska listed species are not on the Federal list. For example, Saltwort (*Salicornia rubra*) is on the Nebraska State

## **Causes of species becoming threatened or endangered:**

- habitat loss – both natural destruction like tornados or hurricanes, and human-made loss like urban development or converting native lands to agricultural crops.
- habitat degradation – habitat degradation is caused by many things. Pollution such as pesticides, chemicals, and fertilizers is one major cause of degradation. It can also be caused by non-native or invasive plant and animal species, diversion of water, and soil erosion.
- Historically Unregulated Hunting – depending on the species, some hunting may be fine, but too much hunting may cause the population size to become too small making it harder for the species to reproduce and survive.

Endangered Species List due to its limited range within the state. Saltwort is not on the Federal list and is in fact common on the East Coast.

One species which is on both the Federal Endangered Species List and the Nebraska State Endangered Species List is the Whooping Crane (*Grus americana*). This large bird is extremely rare; in 2006, there were only 336 individuals left in the wild.

The decline of Whooping Cranes has been caused primarily by habitat loss and secondarily by historically unregulated hunting. As prairie marshes in the Northern Great Plains were converted to agricultural crops, much of the breeding habitat for Whooping Cranes was destroyed. In addition, the wintering grounds along the southern Texas coast have been altered due to intercoastal waterways and development.

From 1870 to 1920, over-hunting was a large cause of population decline for Whooping Cranes. The species was officially listed as a Federal Endangered Species in 1967.

To learn more about Whooping Cranes, check-out the Rare Ones chapter on the Project BEAK Website ([www.projectBEAK.org/rare/atrisk\\_whooping.htm](http://www.projectBEAK.org/rare/atrisk_whooping.htm)).

### ACTIVITY, PART 1

Start the activity by asking students to define the terms “threatened” and “endangered.” Ask students what cause species to become threatened, endangered or extinct. Spend some time having a class discussion about the causes of animals becoming endangered or extinct (habitat loss, pollution, natural disasters, unregulated hunting).

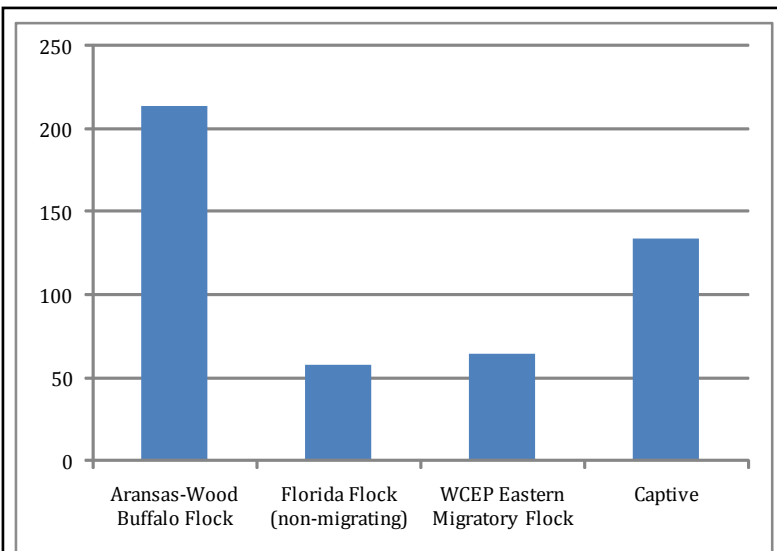
Ask students if they can name any threatened or endangered species. You may have students point out that there are federally listed threatened and endangered species and state listed species. Species which are listed at the state level may or may not be listed at the federal level. All federally listed species, however, are on state lists. For a complete list of Nebraska’s threatened and endangered species, visit [www.ngpc.state.ne.us/wildlife/programs/nongame](http://www.ngpc.state.ne.us/wildlife/programs/nongame).

### ACTIVITY, PART 2

Give each students a piece of graph paper and a copy of the “Whooping Crane Historical Numbers” sheet. Ask students to create a line graph of Whooping Crane populations. Each of the six populations – Aransas-Wood Buffalo, Louisiana, Rocky Mountain, Florida, WCEP Eastern Migratory, and captive – should have their own line.

Ask students to create several other types of graphs using the Whooping Crane population data. Examples of graph could include a bar graph representing the populations in 2005-06. Or, a pie chart depicting the percentage of each population of the total in 2001-02. Let students be creative in their analysis of the population data.

You may also want to have students go to the computer lab to create graphs using graphing software.



Example bar graph of Whooping Crane populations in the winter of 2005-06.

### ACTIVITY, PART 3

Give each student a copy of the “Predicting the Future” student page. Ask students to complete the worksheet using the information provided.

Once students are finished with the worksheet, have a classroom discussion about population dynamics, why so many chicks die (predation, disease, competition, difficult migration), and why crane populations are so slow to increase.

**EXTENSIONS**

- Invite a local resource professional to come in to talk about threatened and endangered species in Nebraska and what is being done to protect the species.
- Have students collect current newspaper articles about threatened and endangered species.
- Assign students, or groups of students, an endangered species to research. Have students prepare reports and PowerPoint presentations to present to the class.

**ASSESSMENT**

- Evaluate graphs made by students.
- Gauge participation in class discussions.

**ADDITIONAL RESOURCES: WEBSITES**

- International Crane Foundation  
[www.savingcranes.org](http://www.savingcranes.org)
- U.S. Fish and Wildlife Service Endangered Species Program  
[www.fws.gov/endangered](http://www.fws.gov/endangered)
- Platte River Whooping Crane Maintenance Trust, Inc.  
[www.whoopingcrane.org](http://www.whoopingcrane.org)
- USGS Patuxent Wildlife Research Center for Whooping Cranes  
<http://whoopers.usgs.gov>
- Journey North: A Global Study of Wildlife Migration and Seasonal Change  
[www.learner.org/jnorth](http://www.learner.org/jnorth)
- Whooping Crane Eastern Partnership  
[www.bringbackthecranes.org](http://www.bringbackthecranes.org)

**ADDITIONAL RESOURCES: BOOKS**

- Song for the Whooping Crane  
by Eileen Spinelli and Elsa Warnick  
Publisher: Eerdmans Books for Young Readers, © 2000  
ISBN-10: 080285172X  
ISBN-13: 978-0802851727
- The Untamed World: Whooping Cranes  
by Janice Parker and Karen Dudley  
Publisher: Raintree, © 1997

ISBN-10: 0817245642

ISBN-13: 978-0817245641

- Cranes: A Natural History of a Bird in Crisis  
by Janice M. Hughes  
Publisher: Firefly Books, © 2008  
ISBN-10: 155407343X  
ISBN-13: 978-1554073436

**PERMISSIONS & CREDITS**

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# Whooping Crane Historical Numbers

YEAR	Natural Flocks		Re-introduced Flocks			Totals		
	Aransas-Wood Buffalo Flock	Louisiana Flock	Rocky Mountain Flock	Florida Flock (non-migrating)	WCEP Eastern Migratory Flock	Total in the Wild	Total in Captivity	Total
1938-39	18	11				29		29
1939-40	22	13				35		35
1940-41	26	6				32		32
1941-42	16	6				22		22
1942-43	19	5				24		24
1943-44	21	4				25		25
1944-45	18	3				21		21
1945-46	22	2				24		24
1946-47	25	2				27		27
1947-48	31	1				32		32
1948-49	30	1				31		31
1949-50	34	1				35		35
1950-51	31					31		31
1951-52	25					25		25
1952-53	21					21		21
1953-54	24					24		24
1954-55	21					21		21
1955-56	28					28		28
1956-57	24					24		24
1957-58	26					26		26
1958-59	32					32		32
1959-60	33					33		33
1960-61	36					36		36
1961-62	39					39		39
1962-63	32					32		32
1963-64	33					33		33
1964-65	42					42		42
1965-66	44					44		44
1966-67	43					43	1	44
1967-68	48					48	6	54
1968-69	50					50	12	62
1969-70	56					56	17	73
1970-71	57					57	14	71
1971-72	59					59	17	76

## Whooping Crane Historical Numbers, continued

Winter of	Aransas-Wood Buffalo Flock	Louisiana Flock	Rocky Mountain Flock	Florida Flock (non-migrating)	WCEP Eastern Migratory Flock	Total in the Wild	Total in Captivity	Total
1972-73	51					51	17	68
1973-74	49					49	17	66
1974-75	49					49	21	70
1975-76	57		4			61	20	81
1976-77	69		6			75	19	94
1977-78	72		8			80	21	101
1978-79	75		9			84	22	106
1979-80	76		15			91	20	111
1980-81	78		20			98	20	118
1981-82	73		13			86	25	111
1982-83	73		14			87	34	121
1983-84	75		30			105	33	138
1984-85	86		33			119	38	157
1985-86	97		31			128	40	168
1986-87	110		21			131	41	172
1987-88	134		16			150	42	192
1988-89	138		14			152	48	200
1989-90	146		13			159	55	214
1990-91	146		13			159	66	225
1991-92	132		12			144	70	214
1992-93	136		9			145	79	224
1993-94	143		9	8		160	89	249
1994-95	133		4	16		153	89	242
1995-96	158		3	25		186	94	280
1996-97	160		3	56		219	102	321
1997-98	182		6	60		248	100	348
1998-99	183		4	57		244	106	350
1999-00	188		2	65		255	108	363
2000-01	180		2	74		256	120	376
2001-02	176		1	87	6	270	111	381
2002-03	185			86	21	292	118	410
2003-04	194			82	36	312	119	431
2004-05	215			66	45	326	127	453
2005-06	214			58	64	336	134	470

# Predicting the Future

Scientists often try to estimate future population numbers based on current population numbers and the life history of the species. Use the information below to predict the future population numbers for Whooping Cranes in the United States.

## Whooping Crane Natural History (Aransas-Wood Buffalo Flock)

Migrating Whooping Cranes begin their year at Aransas National Wildlife Refuge along the southern coast of Texas. In early spring, they begin their migration through the Central Flyway to their summer breeding grounds at Wood Buffalo National Park in Canada. Once at their breeding grounds, mating pairs begin constructing a nest typically in the same general area as the year before. Nests are built using bullrush and other vegetation over shallow water.

In late April or early May, Whooping Cranes lay 1 - 3 eggs (typically 2). Both males and females incubate the eggs. After about 30 days, the chicks hatch. They are cared for by both parents. Chicks fledge (take their first flight) at about 80-90 days – typically only one chick survives.

In mid-September, Whooping Cranes begin their migration back to their wintering grounds at Aransas NWR. Here, mating pairs will remain together while juveniles form groups near their parent's territory. The Cranes will again migrate north to Wood Buffalo National Park in the spring. Only one in four chicks which hatched the previous year will survive to the breeding grounds in the north. Whooping Cranes do not begin breeding until they are 4 years old.

In their breeding range, Whooping Cranes eat mollusks and crustaceans, insects, minnows, frogs, and snakes. When in their wintering ground, Whooping Cranes eat blue crabs, clams, fiddler crabs, shrimp, aquatic invertebrates, and plants.

## Population Prediction Questions

1. If there are 231 Whooping Cranes at Wood Buffalo National Park, how many mating pairs could there be?
2. If each of these mating pairs builds a nest and lays 2 eggs, how many eggs will there be?
3. If only 1 in 4 chicks survive hatching, migrating south, and then migrating back north again, how many Whooping Cranes will there be at the start of breeding season the next year?
4. If the original 231 Whooping Cranes continue laying 2 eggs for the next 5 years, how many chicks will they have produced which survived?
5. What are three things that can be done to help the Whooping Crane population recover?

# Predicting the Future - ANSWERS

Scientists often try to estimate future population numbers based on current population numbers and the life history of the species. Use the information below to predict the future population numbers for Whooping Cranes in the United States.

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## Population Prediction Questions

1. If there are 231 Whooping Cranes at Wood Buffalo National Park, how many mating pairs could there be?

$$231 \div 2 = 115.5 \rightarrow 115$$

2. If each of these mating pairs builds a nest and lays 2 eggs, how many eggs will there be?

$$115 \text{ mating pairs} \times 2 = 230 \text{ eggs}$$

3. If only 1 in 4 chicks survive hatching, migrating south, and then migrating back north again, how many Whooping Cranes will there be at the start of breeding season the next year?

$$230 \text{ eggs} \div 4 = 57.5 \rightarrow 58 \text{ surviving chicks} + 231 \text{ adult cranes} = 289 \text{ total cranes}$$

4. If the original 231 Whooping Cranes continue laying 2 eggs for the next 5 years, how many chicks will they have produced which survived?

$$231 \div 2 = 115.5 \rightarrow 115 \text{ pairs} \times 2 = 230 \text{ eggs} \div 4 = 57.5 \rightarrow 58 \text{ surviving chicks} \times 5 \text{ years} = 290 \text{ chicks}$$

5. What are three things that can be done to help the Whooping Crane population recover?

- protecting wintering grounds in southern Texas
- protecting breeding grounds in Canada
- continue to raise captive flocks of Whooping Cranes
- continue to protect Whooping Cranes from hunting