

Whoopers on the Rise

Nebraska
Rare Species
Educator Packet
grades 5-12

OBJECTIVES

Students will (1) learn the reasons some wildlife species populations become threatened or endangered, (2) explore reasons for population decline of Whooping Cranes and what is being currently done to help both natural and re-introduced populations thrive, and (3) estimate future population numbers based on the natural history of Whooping Cranes and hypothetical situations.

METHOD

Students study the population dynamics of the Whooping Crane (*Grus americana*) by exploring and graphing historic population numbers.

MATERIALS

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

Subject Areas: Science, Environmental Education, Ecology, Geography, Math.

Duration: Activity (Parts 1 & 2) - 50 minutes; Activity (Part 2) - 20 minutes

Group Size: any

Setting: indoors

Vocabulary: population dynamics, threatened, endangered, extinct, re-introduction, migration

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. Fourteen 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 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



Causes of species becoming threatened or endangered:

- 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.
- 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.

primarily by historically unregulated hunting and secondarily by habitat loss. 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.

PROCEDURE, PART I

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).

2. 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.

PROCEDURE, PART II

3. Give each students a piece of graph paper and a copy of the “Whooping Crane Population 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.

4. Ask students to create several other types of graphs using the Whooping Crane population data. Examples could include bar graphs. 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 create graphs using graphing software.

PROCEDURE, PART III

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

6. 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

1. 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.



2. Have students collect current newspaper articles about threatened and endangered species.

3. Assign students, or groups of students, an endangered species to research. Have students prepare reports and PowerPoint presentations to present to the class.

4. Help students organize a bird festival celebrating all birds - including Whooping Cranes. The festival could take place at a local elementary school, library, nature center, or park.

EVALUATIONS

1. Evaluate graphs made by students.

2. Gage participation in class discussions.

3. Have students write a letter to a state or national senator suggesting legislation that would help Whooping Crane populations to grow. Letters should include information about Whooping Cranes, why they are listed as endangered, what is currently being done to help Whooping Crane populations, and what they feel would further help Whooping Crane populations.

RELATED WEBSITES

Nebraska Game & Parks Commission, Wildlife Watching

<http://outdoornebraska.ne.gov/conservation/wildlife-viewing/SandhillCranes/whooping.asp>
General information about Sandhill and Whooping Cranes including opportunities for wildlife watching.

Crane Trust

www.cranetrust.org
A non-profit organization dedicated to habitat conservation for whooping cranes, sandhill cranes, and migratory birds along the Platte River.

International Crane Foundation

www.savingcranes.org
A site devoted to all cranes - including Whooping

Cranes. Great information including education resources and student information.

U.S. Fish & Wildlife Service, Nebraska Field Office
www.fws.gov/nebraskaes

A great Nebraska-specific site for all federally listed threatened and endangered species.

BOOKS & PRINTED MATERIAL

Whooping Crane: Images from the Wild by Klaus Nigge and Krista Schlyer. 2010. ISBN-13: 978-1603442091

The Man Who Saved the Whooping Crane: The Robert Porter Allen Story by Kathleen Kaska. 2012. ISBN-13: 978-0813040240

A Whooper Named Frank by David M. Torres. 2000. ISBN-13: 978-1571683298

Saving the Whooping Crane (On My Own Science) by Susan E. Goodman. ISBN-13: 978-0822567516

Song for the Whooping Crane by Eileen Spinelli
ISBN-13: 978-0802851727

Crane Music: A Natural History of American Cranes by Paul A. Johnsgard. 1998. ISBN-13: 978-0803275935

Will We Miss Them? Endangered Species (Nature's Treasures) by Alexandra Wright
ISBN-13: 978-0881064889

Can We Save Them? Endangered Species of North America by David Dobson. ISBN-13: 978-0881068221

The Atlas of Endangered Species: Revised & Updated by Richard Mackay. ISBN-13: 978-0520258624

PERMISSIONS & CREDITS

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Whooping Crane Populations Historical Numbers, page 1

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
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



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Whooping Crane Populations Historical Numbers, page 2

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
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
2006-07	236			45	59	340	145	485
2007-08	266			30	91	387	151	538
2008-09	247			29	106	382	152	534
2009-10	263			25	119	407	167	574
2010-11	278	24		20	115	437	162	599

Source: Information contained in this chart is © 2011 by the International Crane Foundation, www.savingcranes.org. Information compiled by B. Didreckson.



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 build 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 may 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 may 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?

- **continue to raise captive flocks of Whooping Cranes (for use in re-introductin efforts)**
- **continue to protect Whooping Cranes from illegal shooting, collisions with power lines, etc.**
- **protect habitat including wintering grounds in southern Texas and breeding grounds in Canada**
- **protect migration routes and stopover sites**

