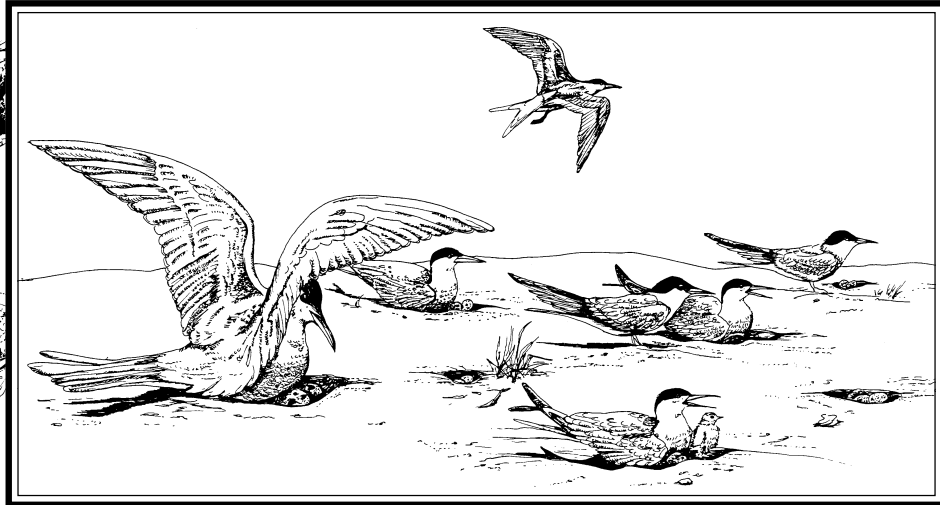


The page is framed by a border of numerous small, detailed illustrations of bird nests, each containing a single speckled egg. The nests are scattered across the page, primarily around the perimeter and between the main text blocks.

LAND OF A



THOUSAND
NESTS

Fort Fisher State Recreation Area
An Environmental Education Learning Experience
Designed for Grades K-5

*“A dense mass of birds had risen
at our approach and spread out over the
island like a cloud . . . And the rush
and roar of the flapping wings
was tremendous, there were hundreds
of birds – perhaps a thousand.”*

– Robert H. Lawrence
The Auk, 1891

Funding for this publication was generously provided by



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This Environmental Education Learning Experience
was developed by
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N.C. Division of Parks and Recreation
Department of Environment, Health and Natural Resources



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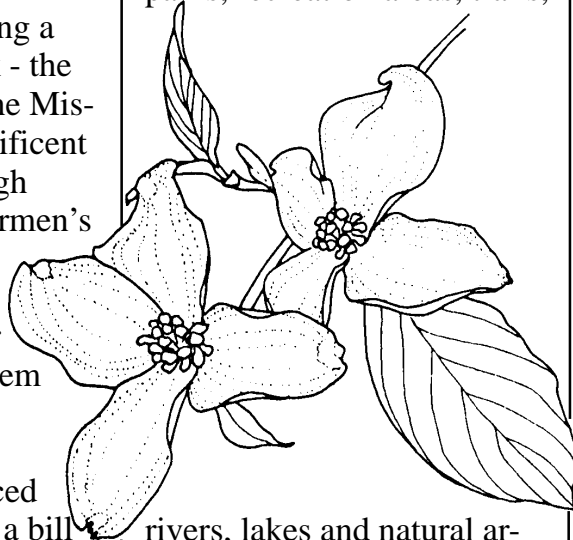
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Introduction to the North Carolina State Parks System

Preserving and protecting North Carolina's natural resources is actually a relatively new idea. The seeds of the conservation movement were planted early in the 20th century when citizens were alerted to the devastation of Mount Mitchell. Logging was destroying a well-known landmark - the highest peak east of the Mississippi. As the magnificent forests of this mile-high peak fell to the lumbermen's axe, alarmed citizens began to voice their opposition. Governor Locke Craig joined them in their efforts to save Mount Mitchell. Together they convinced the legislature to pass a bill establishing Mount Mitchell as the first state park. That was in 1915.

The North Carolina State Parks System has now been established for more than threequarters of a century. What started out as one small plot of public land has grown into 61 properties across the state, including parks, recreation areas, trails,



rivers, lakes and natural areas. This vast network of land boasts some of the most beautiful scenery in the world and offers endless recreation opportunities. But our state parks system offers much more than scenery and recreation. Our lands and waters contain unique and valuable archaeological, geological and biological resources that are important parts of our natural heritage.

As one of North Carolina's principal conservation agencies, the Division of Parks and Recreation is responsible for the more than 168,000 acres that make up our state parks system. The Division manages these resources for the safe enjoyment of the public and protects and preserves them as a part of the heritage we will pass on to generations to come.

An important component of our stewardship of these lands is education. Through our interpretation and environmental education services, the Division of Parks and Recreation strives to offer enlightening programs that lead to an understanding and appreciation of our natural resources. The goal of our environmental education program is to generate an awareness in all individuals which cultivates responsible stewardship of the earth.

For more information contact:

**NC Division of Parks
and Recreation
1615 Mail Service Center
Raleigh, NC 27699-1615
919/ 733-4181
www.ncsparks.net**

Introduction to Fort Fisher State Recreation Area

Located five miles south of Carolina Beach off US 421, Fort Fisher State Recreation Area is on the southern tip of Pleasure Island. Fort Fisher tapers to a point with the Atlantic Ocean on the east and the Cape Fear River on the west. The park became a part of the North Carolina State Parks System on March 5, 1986.

The area provides visitors access to more than three miles of undeveloped beach, shallow creeks, bays and salt marshes. Visitors can enjoy a variety of recreational activities including beachcombing, swimming, surf fishing, hiking and bird watching. Fort Fisher State Recreation Area provides important habitat for a host of animals and plants. The salt marsh provides an area for wildflowers such as sea-oxeye, sea lavender and salt-marsh mallow. Protected portions of the open beach provide a nesting sanctuary for three species of colonial nesting waterbirds: common tern, least tern and black skimmer.

Civil War History of Fort Fisher

The city of Wilmington on the Cape Fear River was an important port of entry for the Confederacy during the Civil War and by late 1864, it was the last southern port open to trade. Fort Fisher, built in 1861, served to protect this valuable port from Union ships. In 1864, the first of two Union attacks on Fort Fisher took place. The fort held strong and Union forces withdrew but the Confederacy was not so fortunate the next time. In early 1865, a fleet of 56 ships bombarded the fort prior to a land assault by a force of more than 3,300 infantry. It was the largest naval bombardment and land-sea battle fought in any war to that time. Its outcome contributed significantly to the end of the long and bitter struggle of the Civil War. Fort Fisher was captured and the Confederate supply line broken. Approximately three months after the fall of Fort Fisher, the Civil War came to an end.

Learn more about the history of Fort Fisher at the state historic site.

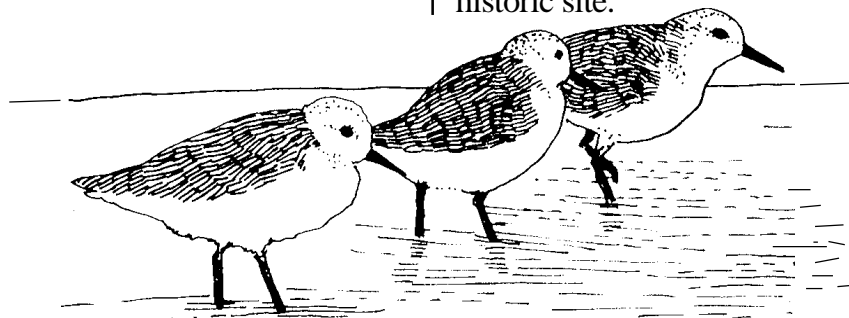
Natural History of Fort Fisher

It would be difficult to find an area on the North Carolina coast with a greater variety of maritime habitats than Fort Fisher.

The Sea: The ocean teems with life — from microscopic plankton to such fisherman's favorites as king and Spanish mackerel, striped and channel bass and the great blue marlin. Spot an Atlantic bottle-nosed dolphin just beyond the breakers or follow the flight of the brown pelican closer to shore.

One of the most interesting animals found at Fort Fisher is the loggerhead sea turtle. The loggerhead uses the isolated beach as a nesting habitat, coming ashore to deposit eggs in the warm sands. The loggerhead turtle is included on the federal list of endangered and threatened species. Those who disturb or harm turtles, nests or hatchlings are subject to penalty.

The sand bars and intertidal pools found in the narrow zone between land and sea are a diverse and productive arena for living things. Low-tide brings tidal pools which delight shell-seekers of all ages with such treasures as starfish and sea urchins. Throughout the year, brown pelicans and sea gulls, including the great black-backed gull, soar above



the dunes, while double-crested cormorants flock to the area in winter.

The Land: The northern portion of the peninsula is occupied by maritime forests of live oak, yaupon and loblolly pine. On the ocean-front, salt-tolerant trees are shaped by wind and sea spray and grow no more than 20 to 30 feet in height. Farther south, an evergreen shrub thicket runs along the main road. Yaupon, wax myrtle, sweet bay and greenbrier populate the area. These natural hedgerows provide ideal hiding places for raccoons, opossums and rabbits.

Sand dunes cover the southern end of the peninsula where sea oats and other plants, tolerant of the constant wind and salt spray, help to stabilize the dunes. The barren grassy area behind the dunes is a nesting habitat for colonial waterbirds, such as black skimmers and terns, who deposit their eggs in shallow depressions in the sand. In order to protect their exposed nests, these birds seek safety in colonies ranging in size from a few pairs to several thousand pairs. Nesting areas at Fort Fisher are posted to provide sanctuary from the intrusions of man.

The Sound: The estuary's tidal creeks attract seafood lovers as well as fish-eating birds. Herons, osprey and diving ducks frequent the creeks in search of flounder, spot, crabs, scallops and clams.

Other birds, including the willet, oystercatcher and whimbrel, enjoy nearby sandbars. Mud flats at the mouth of the estuary are also great for bird-watching, especially at low tide when plovers, dowitchers and sandpipers swarm the area in search of food.

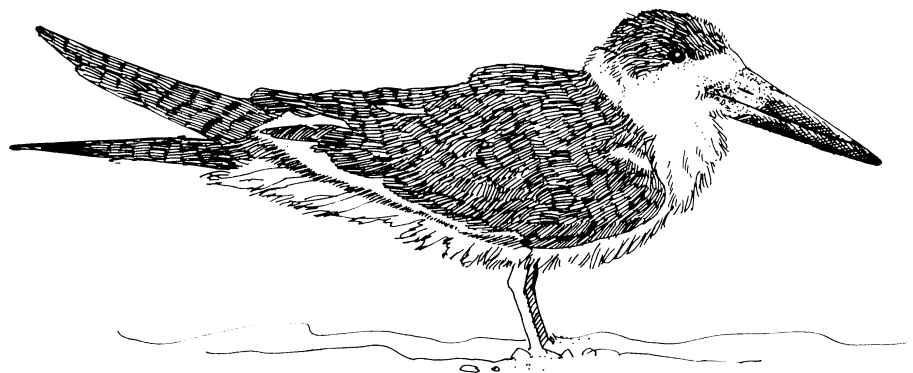
Extensive salt-marshes border the west side of the peninsula. These habitats are among the most productive on earth and supply vital nutrients to the ecosystems of nearby creeks, bays and ocean waters. Near the water, cordgrass shelters the larvae of fish and shellfish, while closer to land black needlerush provides cover. Wildflowers in the marsh include sea-oxeye, sea lavender and salt-marsh mallow. Northern harriers and other raptors take advantage of these open spaces to feed upon small rodents.

Fort Fisher State Recreation Area holds the key to many of nature's best-kept secrets. Unlock the door to nature's classroom and watch the mysteries begin to unfold.

Program Options:

Abounding with natural history, Fort Fisher State Recreation Area is an excellent place to teach ecology, environmental issues, biology, conservation and earth science, as well as to enjoy recreation. The area is rich with cultural resources and provides a wonderful outdoor classroom for learning about the maritime environment.

Groups are encouraged to visit the park during all seasons of the year for hikes, exploration, nature study and other activities. Leaders may choose to design and conduct their own activities or to use the Environmental Education Learning Experience activity packet. Park staff will be happy to assist you with your programming needs. Please contact the park office at least two weeks in advance for arrangements.



Black Skimmer

Scheduling a Trip:

1. To make a reservation, contact the park at least two weeks in advance. Please provide the following information:

- Name of group (school).
- Name, address, work and home telephone numbers of the group contact person.
- Requested date, time of arrival and meeting place at the park.
- Departure time from the park.
- Number of participants and adult leaders. *A maximum of 30 participants is recommended. Please have one adult leader per 10 students. Adult leaders are responsible for maintaining control of the group.*
- Age range and/or special needs of participants.
- Desired activities; assistance needed from park staff.

2. Research activity permits may be required for sampling activities. If your group plans to collect any plant, animal or mineral within the park, please contact the park office at least 30 days in advance to obtain a permit application.

3. *If you will be late or need to cancel your trip, please notify the park as far ahead as possible.*

Before You Make the Trip:

1. Complete the pre-visit activity in the Environmental Education Learning Experience packet.

2. Visit the park without the participants prior to the group trip. This will allow you to become familiar with facilities and park staff and to identify any potential problems.

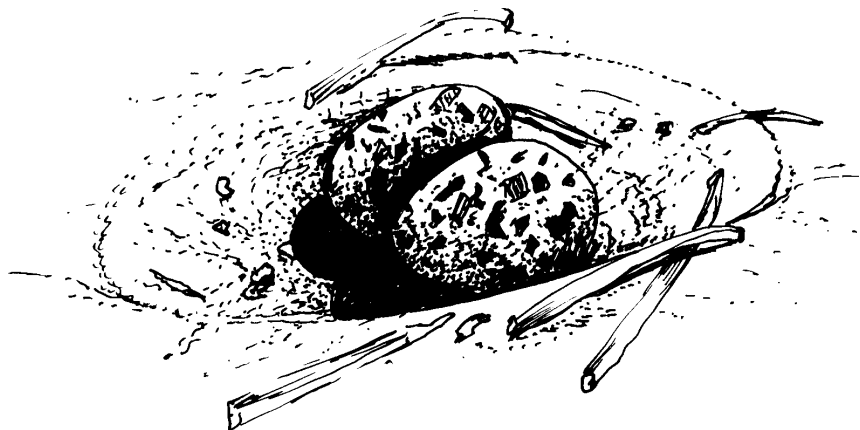
3. Group coordinators should discuss park rules and behavior expectations with adult leaders and participants. Safety should be stressed.

4. Activities that take place outdoors will possibly expose students to harsh sun and insects. Be prepared by bringing drinking water and using sunscreen and insect repellent, if necessary.

5. Everyone should wear a name tag and a buddy system should be established.

6. Encourage everyone to wear appropriate, comfortable clothing and walking shoes.

7. *Group leaders are responsible for obtaining a consent form from each participant including a listing of any health considerations and medical needs.* These forms are available in the activity packet.



Common tern's nest

While at the Park:

Please obey the following rules:

1. To help you get the most out of the experience and increase the chance of observing wildlife, be as quiet as possible while in the park.
2. On hikes, walk behind the leader at all times.
3. All plants and animals within the park are protected. Breaking plants and harming animals is prohibited in all state parks. This allows future visitors the same opportunity to enjoy our natural resources.
4. Picnic in designated picnic areas only. Help keep the park clean and natural; do not litter.
5. In case of accident or emergency, contact park staff immediately.

Following the Trip:

1. Complete the post-visit activity in the Environmental Education Learning Experience packet.
2. Build upon the field experience and encourage participants to seek answers to questions and problems encountered at the park.
3. Relate the experience to classroom activities and curriculum through reports, projects, demonstrations, displays and presentations.
4. Give tests or evaluations, if appropriate, to determine if students have gained the desired information from the experience.
5. File a written evaluation of the experience with the park. Evaluation forms are available in the activity packet.

Park Information:

Fort Fisher State Recreation Area
PO Box 243
Kure Beach, NC 28449
Telephone:
(910) 458-5798 (office)
(910) 458-3722 (fax)

Hours of Operation:

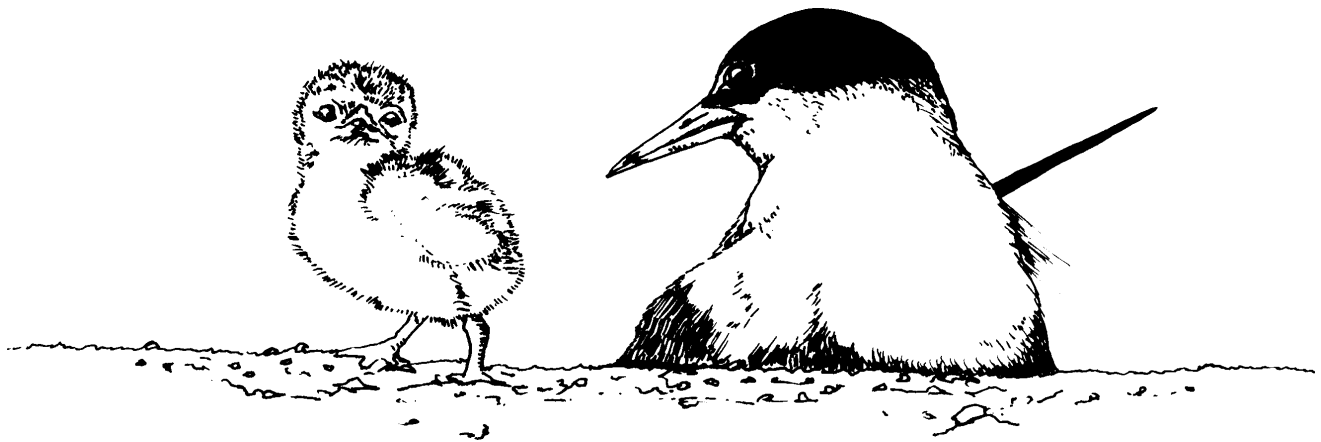
Nov - Feb	8:00 - 6:00 p.m.
Mar, Oct	8:00 - 7:00 p.m.
Apr, May, Sept	8:00 - 8:00 p.m.
Jun - Aug	8:00 - 9:00 p.m.

Other facilities in the area:

NC Aquarium at Fort Fisher
PO Box 130
Kure Beach, NC 28449-0130
(910) 458-8257

Fort Fisher State Historic Site
PO Box 68
Kure Beach, NC 28449-0068
(910) 458-5538

Underwater Archaeology Unit
PO Box 58
Kure Beach, NC 28449-0058
(910) 458-9042



Least tern with chick

Introduction to the Activity Packet for Fort Fisher State Recreation Area

The Environmental Education Learning Experience, "Land of a Thousand Nests," was developed to provide environmental education through a series of hands-on activities geared to Fort Fisher State Recreation Area. This activity packet is designed to introduce the student to colonial nesting waterbirds. It is targeted for the 5th and 6th grades and meets established curriculum objectives of the North Carolina Department of Public Instruction.

There are three types of activities in this packet; pre-visit, on-site and post-visit. The on-site activity will be conducted at the park, while the pre-visit and post-visit activities are designed for the classroom environment. The pre-visit activity should be introduced prior to the park visit so the students will have the necessary background and vocabulary for

the on-site activity. We encourage you to use the post-visit activity to reinforce concepts, skills and vocabulary learned in the pre-visit and on-site activities. These activities may be performed independently or in a series to build upon the students' newly gained knowledge and experiences.

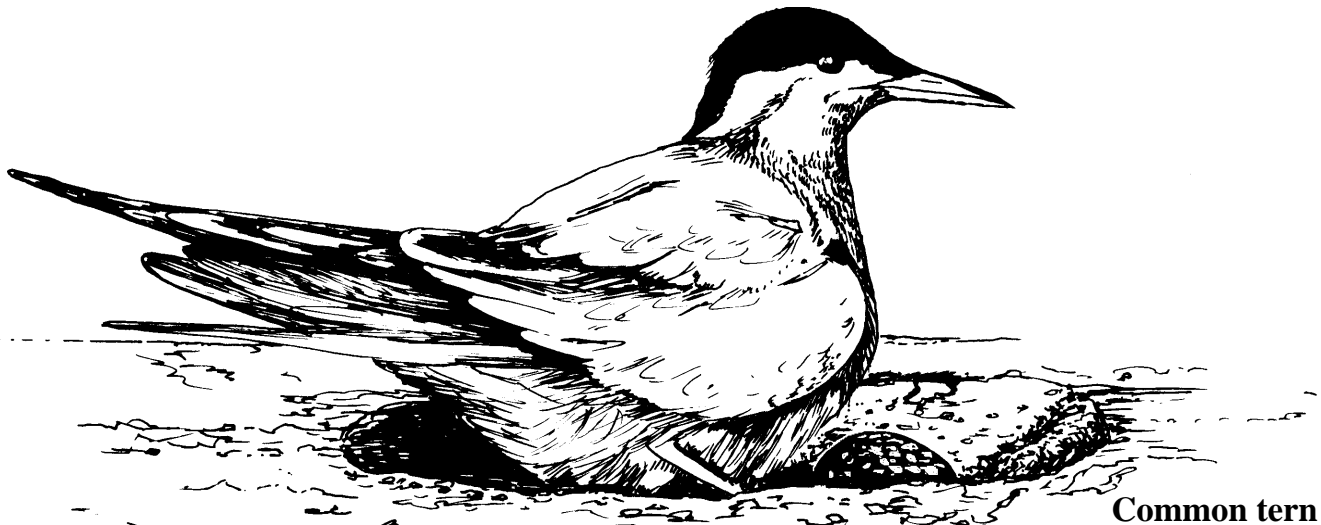
The Environmental Education Learning Experience, "Land of a Thousand Nests," will expose students to the following major concepts:

- **Ecology**
- **Endangered, threatened & special concern species**
- **Predator & prey relationships**
- **Adaptation**
- **Map & graph reading**
- **Natural resource management**
- **Impacts on wildlife**

Vocabulary words used throughout this Environmental Education Learning Experience appear in **bold type** the first time they are used in an activity. Their definitions are listed in the back of the activity packet. A list of reference materials used in developing the activities follows the vocabulary list. A set of fact sheets on coastal area birds is also located at the end of this activity packet.

To make these learning experiences on coastal area birds more effective, we encourage the students to create a notebook of all their activities, drawings and worksheets.

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Common tern

Activity Summary

The following outline provides a brief summary of each activity, the major concepts introduced and the objectives met by completion of the activity.

I. Pre-Visit Activity

Crack The Code (page 3.1)

Through word games, students will learn the basic vocabulary relating to colonial nesting waterbirds.

Major Concepts:

- Ecology
- Endangered, threatened and special concern species

Objectives:

- Define endangered, threatened and special concern species.
- Define colonial nesting waterbirds.
- Identify five colonial nesting waterbirds.
- List the colonial nesting waterbirds that are either endangered, threatened or of special concern.
- Use basic terminology related to the colonial nesting waterbirds.

II. On-Site Activity

“Honey, I Lost The Eggs” (page 4.1)

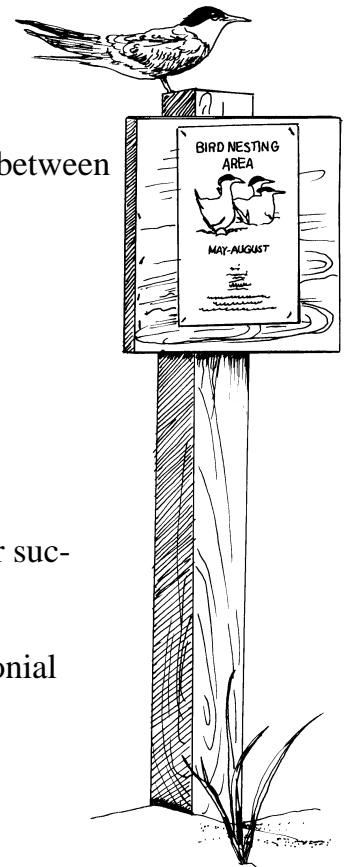
Through a role-playing game, students will learn the relationship between predators and prey.

Major Concepts:

- Predator and prey relationships
- Ecology
- Adaptation

Objectives:

- Identify six predators of colonial nesting waterbirds.
- Describe two adaptations colonial nesting waterbirds have for successful nesting.
- Define a predator/prey relationship, using one example.
- Describe a resource management practice used to protect colonial nesting waterbirds.



III. Post-Visit Activity

A Tern for the Worse (page 5.1)

Through this map and graph reading activity, students will learn the major breeding sites of North Carolina's colonial nesting waterbirds. They will be asked to consider the potential impacts (natural and human-made) on some of these nesting sites.

Major Concepts:

- Geography skills (map and graph reading)
- Impacts on wildlife

Objectives:

- Use of longitude and latitude to locate points of interest on a map of North Carolina.
- Locate and map known colonial nesting waterbird sites with a grid overlay.
- Speculate about the impacts on the nesting sites using three different scenarios.

Curriculum Objectives:**Grade 5**

- Communication Skills: vocabulary comprehension, study skills
- Library/Media Skills: work independently and creatively in preparing assignments
- Science: environment

Grade 6

- Communication Skills: vocabulary comprehension, study skills
- Library/Media Skills: work independently and creatively in preparing assignments
- Science: ecology

Location: Classroom

Group Size: 30 students

Estimated Time: 40 minutes

Appropriate Season: Any

Materials:

Provided by educator:

Per student: Student's Information, vocabulary sheets, waterbird fact sheets, "Alphabet Code" worksheet, "Crossword" puzzle, "Word Search" puzzle, "Crack the Code" worksheet.

Major Concepts:

- Ecology
- Endangered, threatened, and special concern species

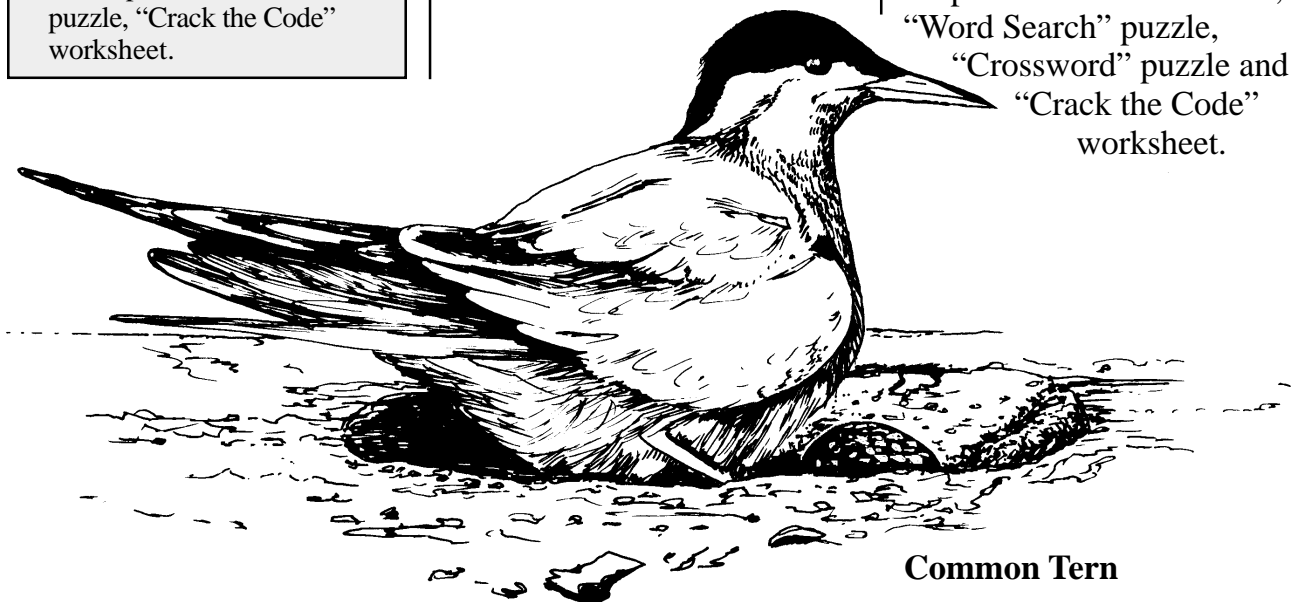
Objectives:

- Define endangered, threatened and special concern species.
- Define colonial nesting waterbirds.
- Identify five colonial nesting waterbirds.
- List the colonial nesting waterbirds that are endangered, threatened or of special concern.
- Use basic terminology related to the colonial nesting waterbirds.

Educator's Information:

In an entertaining and challenging way, the students will learn about colonial nesting waterbirds found at Fort Fisher State Recreation Area. Students will be introduced to the Endangered Species Act and concepts of the birds' ecology. The purpose of this activity is for students to become familiar with vocabulary words used throughout the package.

Provide the students with the Student's Information, the waterbird fact sheets in the appendices and vocabulary prior to beginning the activity. Lead a discussion asking students how animals (or plants) can become endangered, threatened or special concern. Examples are the loss of habitat, the selling of plants and animals and pollution. The activity includes four parts: "Alphabet Code" worksheet, "Word Search" puzzle, "Crossword" puzzle and "Crack the Code" worksheet.



Common Tern

Student's Information

Three **species** of **colonial nesting waterbirds** nest at Fort Fisher State Recreation Area. Others nest on adjacent **spoil islands** in the Cape Fear River. These low, small islands are man-made islands, created where sediments are deposited when shipping channels are dredged. Some of these islands are managed as **sanctuaries** for colonial nesting waterbirds. Fort Fisher State Recreation Area is vital to the **preservation** of these birds because it provides a natural, undeveloped and protected nesting site.

The number of colonial nesting waterbirds has greatly decreased through the years. In 1973, the Federal Endangered Species Act was created to help slow the loss of species. The Endangered Species Act provides for identifying and listing **endangered** or **threatened** species of plants and animals, monitoring the status of their populations and protecting these species with laws that

regulate threats to their **survival**. There are other federal and state laws which include provisions for species protection as well. Plants and animals may be added or removed from the list as their populations decrease or increase.

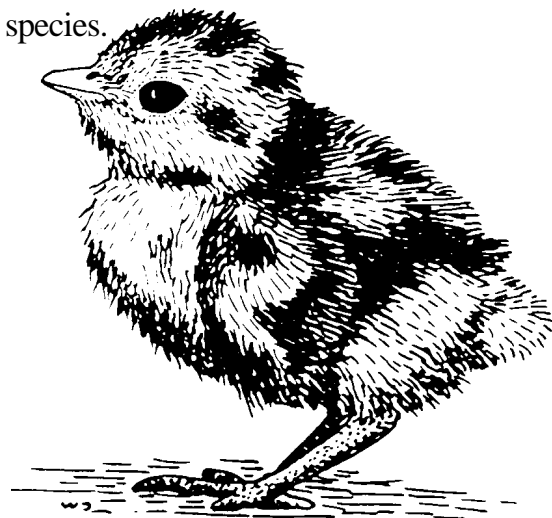
In 1980, the brown pelican was listed as federally endangered. The reduction of pelicans was mainly due to **pesticide** residues causing eggshell thinning and breakage. Increasing beach development, which meant a loss of nesting **habitat**, also contributed to their decline. By banning the harmful pesticides and protecting the nesting colonies, the population of brown pelicans has increased in recent years. In 1992, the brown pelican was removed from the federal list, but North Carolina still lists the species as **special concern** because either loss of nesting habitat or a **catastrophe** such as an oil spill could harm the species.

At Fort Fisher State Recreation Area least terns, common terns and black skimmers receive **protection** through **resource management** practices such as posting signs and roping off nesting areas.

Plants and animals have also developed natural means of protection through **adaptation**. Some adaptations for survival of colonial nesting waterbirds include advanced development at birth and **camouflage**. The majority of colonial nesting waterbirds are **precocial** (pre-ko-shal), meaning when hatched, they are fully covered with downy feathers, can see, run around and, to some degree, take care of themselves. **Songbirds**, such as the American robin, are **altricial** (al-treish'el). Upon hatching they are very weak, cannot see, are featherless and totally dependent upon their parents.



Altricial chick



Precocial chick

Alphabet Code Worksheet

Look at the alphabet code. Place the correct letter in the space above its matching number to decipher the code.

A) Birds that nest in colonies of a few pair to thousands of pairs.

 3 15 12 15 14 9 1 12 14 5 19 20 9 14 7 23 1 20 5 18 2 9 18 4 19

B) My top side is black, while my underside is white. I have a large orange bill with a black tip and my legs are red.

 2 12 1 3 11 19 11 9 13 13 5 18

C) I am white with a black cap and pale grey back and wings. I have a bright red-orange bill with a black tip and a deeply forked tail.

 3 15 13 13 15 14 20 5 18 14

D) I am a large, heavy bird with pink legs and a red spot on my lower beak. My chest and head are white. My wings' tips are black and my upper wing surfaces are gray.

 8 5 18 18 9 14 7 7 21 12 12

E) I have a broad forked tail, a straight yellow bill and yellow legs. My forehead is white, with a black cap.

 12 5 1 19 20 20 5 18 14

F) My body is gray-brown, and my feet are large and webbed. My beak is long and is hooked at the tip.

 2 18 15 23 14 16 5 12 9 3 1 14

G) A term describing species whose population levels, though not threatened or endangered, require study by biologists.

 19 16 5 3 9 1 12 3 15 14 3 5 18 14

H) A species that is in danger of extinction throughout a given area.

 5 14 4 1 14 7 5 18 5 4 19 16 5 3 9 5 19

I) A species that is not yet endangered, but might become so in the future.

 20 8 18 5 1 20 5 14 5 4 19 16 5 3 9 5 19

J) Colonial nesting waterbirds can be found in this protected area.

 6 15 18 20 6 9 19 8 5 18 19 20 1 20 5

 18 5 3 18 5 1 20 9 15 14 1 18 5 1

Alphabet code

A	B	C	D	E	F
1	2	3	4	5	6
G	H	I	J	K	L
7	8	9	10	11	
M	N	O	P	Q	
12	13	14	15	16	17
R	S	T	U	V	
18	19	20	21	22	
W	X	Y	Z		
23	24	25	26		

Alphabet Code Answer Sheet

Look at the alphabet code. Place the correct letter in the space above its matching number to decipher the code.

A) Birds that nest in colonies of a few pair to thousands of pairs.

C O L O N I A L N E S T I N G W A T E R B I R D S
 3 15 12 15 14 9 1 12 14 5 19 20 9 14 7 23 1 20 5 18 2 9 18 4
 19

B) My top side is black, while my underside is white. I have a large orange bill with a black tip and my legs are red.

B L A C K S K I M M E R
 2 12 1 3 11 19 11 9 13 13 5 18

C) I am white with a black cap and pale grey back and wings. I have a bright red-orange bill with a black tip and a deeply forked tail.

C O M M O N T E R N
 3 15 13 13 15 14 20 5 18 14

D) I am a large, heavy bird with pink legs and a red spot on my lower beak. My chest and head are white. My wings' tips are black and my upper wing surfaces are gray.

H E R R I N G G U L L
 8 5 18 18 9 14 7 7 21 12 12

E) I have a broad forked tail, a straight yellow bill and yellow legs. My forehead is white, with a black cap.

L E A S T T E R N
 12 5 1 19 20 20 5 18 14

F) My body is gray-brown, and my feet are large and webbed. My beak is long and is hooked at the tip.

B R O W N P E L I C A N
 2 18 15 23 14 16 5 12 9 3 1 14

G) A term describing species whose population levels, though not threatened or endangered, require study by biologists.

S P E C I A L C O N C E R N
 19 16 5 3 9 1 12 3 15 14 3 5 18 14

H) A species that is in danger of extinction throughout a given area.

E N D A N G E R E D S P E C I E S
 5 14 4 1 14 7 5 18 5 4 19 16 5 3 9 5 19

I) A species that is not yet endangered but might become so in the future.

T H R E A T E N E D S P E C I E S
 20 8 18 5 1 20 5 14 5 4 19 16 5 3 9 5 19

J) Colonial nesting waterbirds can be found in this protected area.

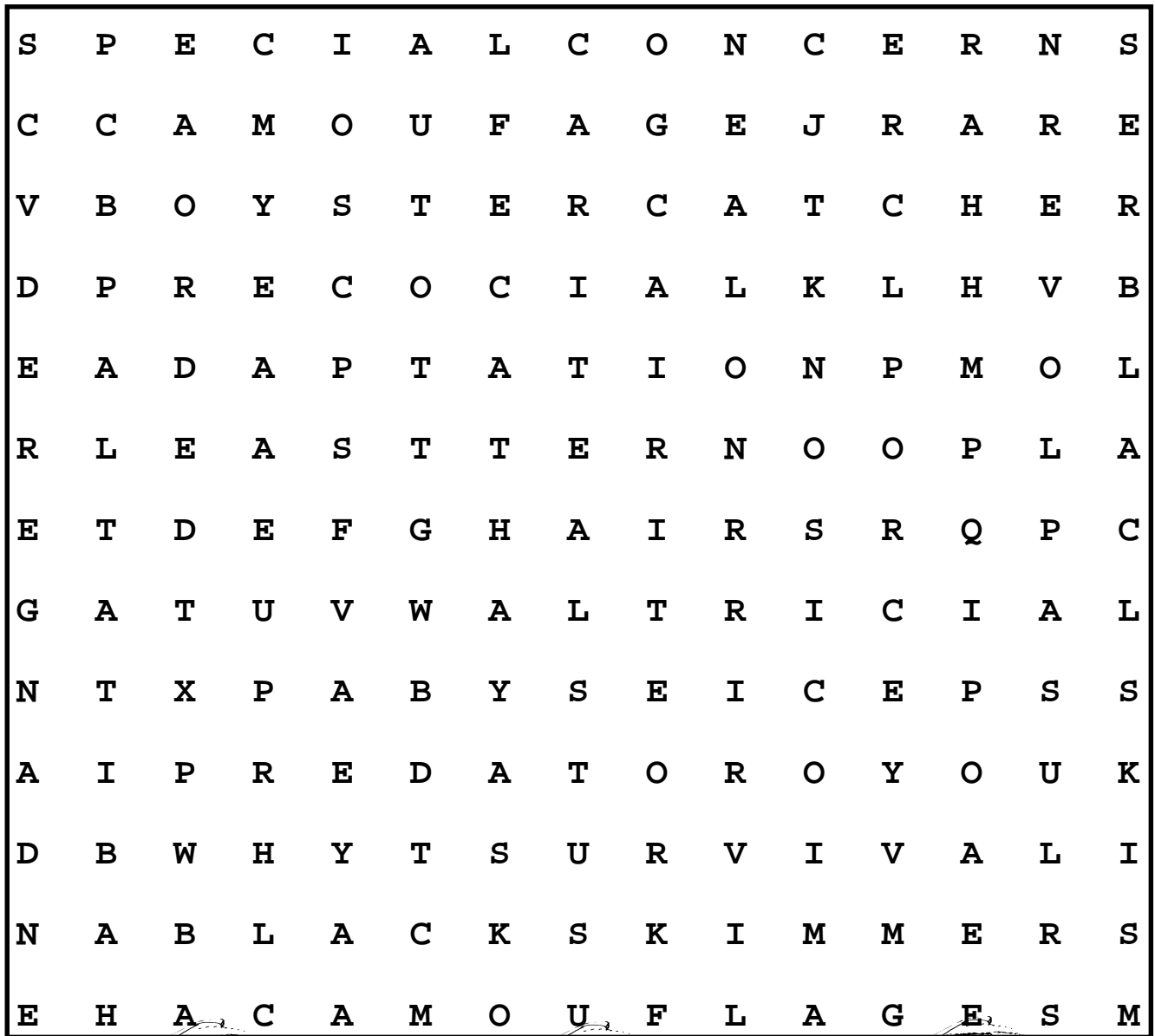
F O R T F I S H E R S T A T E
 6 15 18 20 6 9 19 8 5 18 19 20 1 20 5
R E C R E A T I O N A R E A
 18 5 3 18 5 1 20 9 15 14 1 18 5 1

Alphabet code

A	B	C	D	E	F
1	2	3	4	5	6
G	H	I	J	K	L
7	8	9	10	11	
M	N	O	P	Q	
12	13	14	15	16	17
R	S	T	U	V	
18	19	20	21	22	
W	X	Y	Z		
23	24	25	26		

Colonial Nesting Waterbirds Word Search

In this puzzle, find 14 of the 20 terms or words listed below that are hidden and circle them. The words may appear horizontally, vertically or backwards.




Altricial	Least tern	Preservation	Songbird
Oystercatcher	Precocial	Special concern	Rare
Endangered	Adaptation	Camouflage	Species
Habitat	Predator	Survival	Threatened
Brown pelican	Common tern	Resource management	Black skimmers

Colonial Nesting Waterbirds Word Search Answer

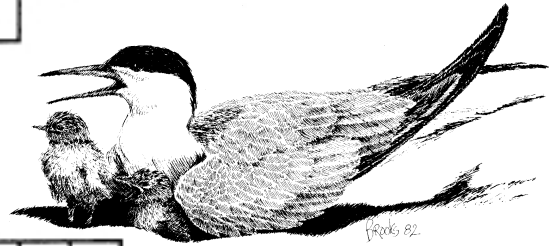
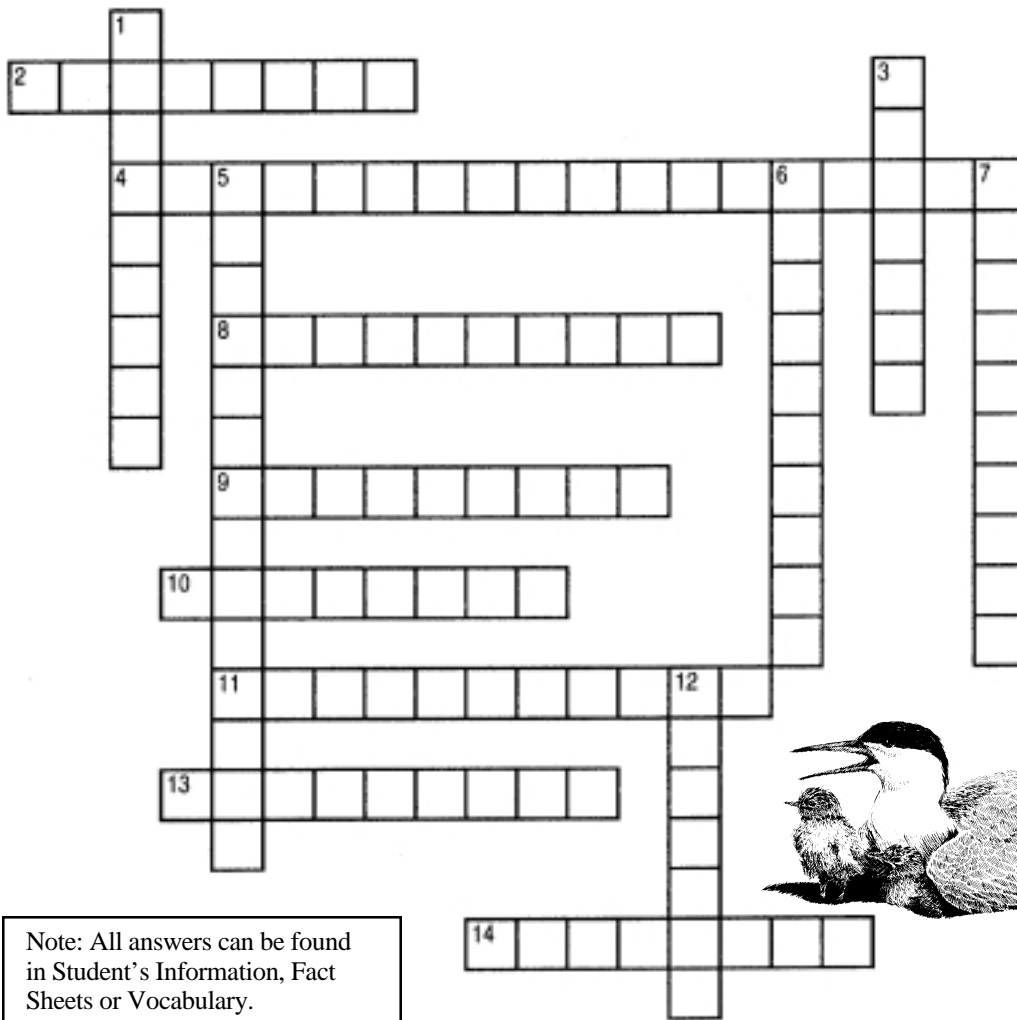
In this puzzle, find 14 of the 20 terms or words listed below that are hidden and circle them. The words may appear horizontally, vertically or backwards.

S	P	E	C	I	A	L	C	O	N	C	E	R	N	S
C	C	A	M	O	U	F	A	G	E	J	R	A	R	E
V	B	O	Y	S	T	E	R	C	A	T	C	H	E	R
D	P	R	E	C	O	C	I	A	L	K	L	H	V	B
E	A	D	A	P	T	A	T	I	O	N	P	M	O	L
R	L	E	A	S	T	T	E	R	N	O	O	P	L	A
E	T	D	E	F	G	H	A	I	R	S	R	Q	P	C
G	A	T	U	V	W	A	L	T	R	I	C	I	A	L
N	T	X	P	A	B	Y	S	E	I	C	E	P	S	S
A	I	P	R	E	D	A	T	O	R	O	Y	O	U	K
D	B	W	H	Y	T	S	U	R	V	I	V	A	L	I
N	A	B	L	A	C	K	S	K	I	M	M	E	R	S
E	H	A	C	A	M	O	U	F	L	A	G	E	S	M



<u>Altricial</u>	<u>Least tern</u>	<u>Preservation</u>	<u>Songbird</u>
<u>Oystercatcher</u>	<u>Precocial</u>	<u>Special concern</u>	<u>Rare</u>
<u>Endangered</u>	<u>Adaptation</u>	<u>Camouflage</u>	<u>Species</u>
<u>Habitat</u>	<u>Predator</u>	<u>Survival</u>	<u>Threatened</u>
<u>Brown pelican</u>	<u>Common tern</u>	<u>Resource management</u>	<u>Black skimmers</u>

Crossword Puzzle



Note: All answers can be found in Student's Information, Fact Sheets or Vocabulary.

ACROSS

2. _____ nesting waterbirds nest in a colony from a few pairs to thousands of pairs.
4. _____ is protection of a habitat through such practices as posting signs and roping off nesting areas.
8. Chicks and eggs blend into surroundings for protection. This is called _____.
9. I have a forked tail and a straight yellow bill. I am a _____.
10. A _____ is an altricial bird having a melodious song or call.

11. A sudden disaster is a _____.

13. I hatch with my eyes open, and I am not totally dependent upon my parents. I am a _____ chick.

14. A _____ is an animal that hunts another animal to eat, which is called its prey.

DOWN

1. I hatch with my eyes closed, and I am totally dependent upon my parents. I am an _____ chick.

3. _____ are organisms that can mate and produce fertile offspring.

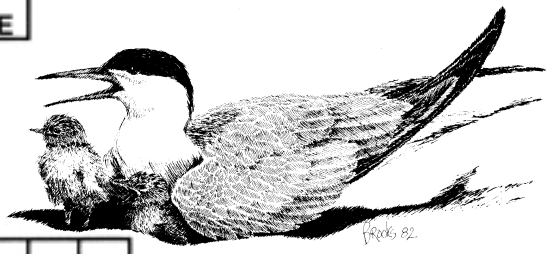
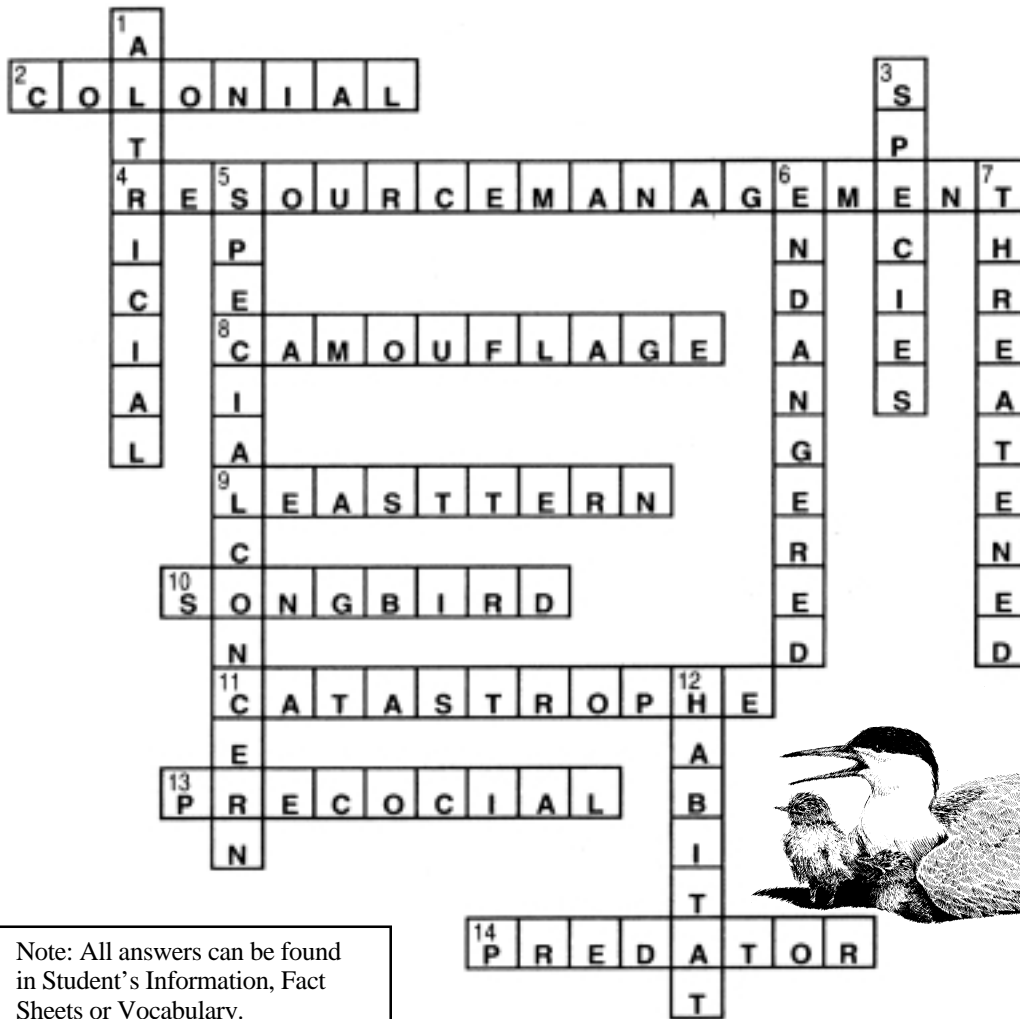
5. _____ is a term describing species whose population levels, though not threatened or endangered, require study by biologists.

6. A species that is in danger of extinction throughout a given area is known as _____.

7. _____ is a species that is not yet endangered but might become so in the foreseeable future.

12. _____ is where an animal or plant lives and finds its food, water, shelter and space.

Crossword Puzzle Answer Sheet



Note: All answers can be found in Student's Information, Fact Sheets or Vocabulary.

ACROSS

- 2. _____ nesting waterbirds nest in a colony from a few pairs to thousands of pairs.
- 4. _____ is protection of a habitat through such practices as posting signs and roping off nesting areas.
- 8. Chicks and eggs blend into surroundings for protection. This is called _____.
- 9. I have a forked tail and a straight yellow bill. I am a _____.
- 10. A _____ is an altricial bird having a melodious song or call.

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- 14. A _____ is an animal that hunts another animal to eat, which is called its prey.

DOWN

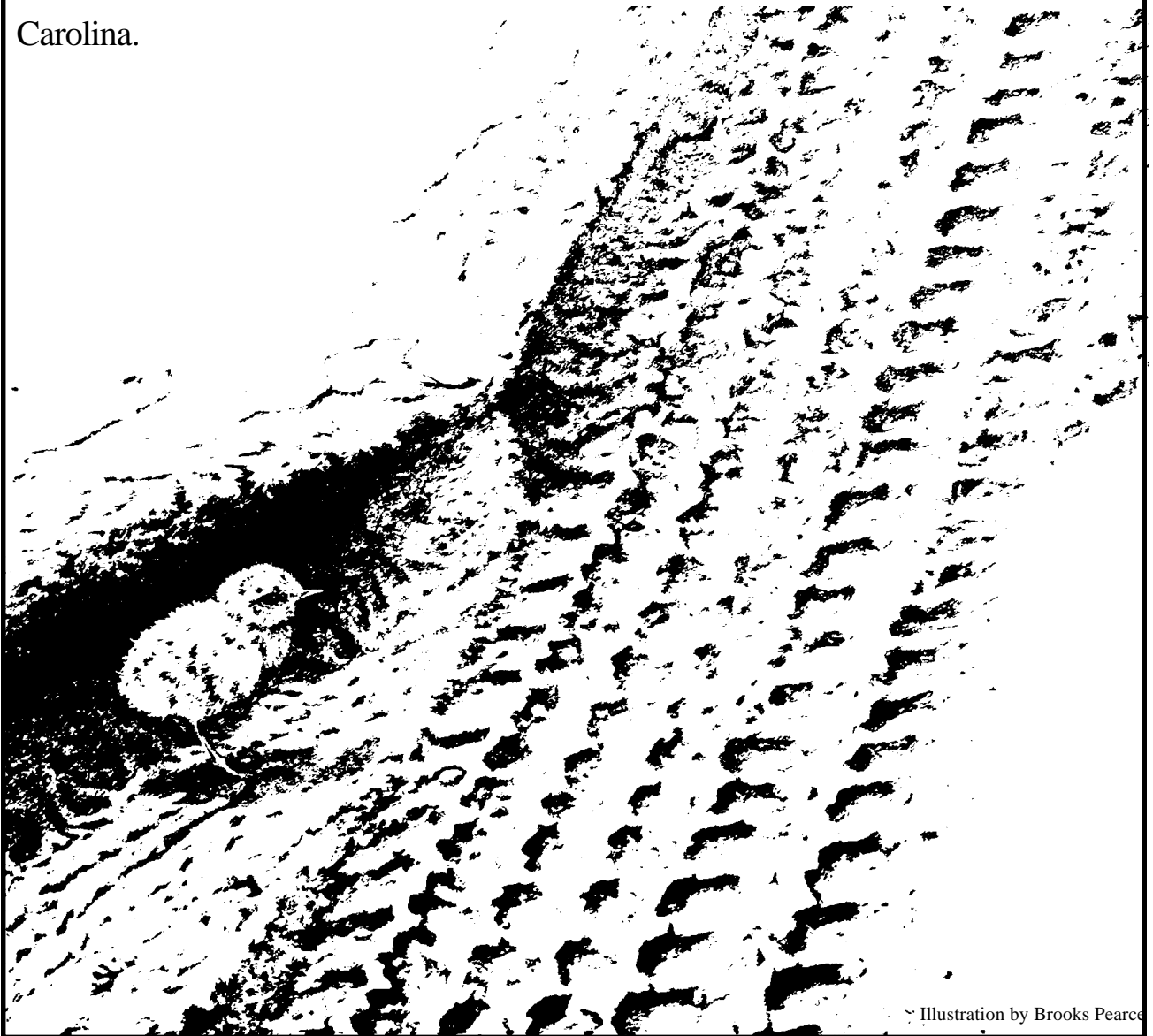
- 1. I hatch with my eyes closed, and I am totally dependent upon my parents. I am an _____ chick.
- 3. _____ are organisms that can mate and produce fertile offspring.

- 5. _____ is a term describing species whose population levels, though not threatened or endangered, require study by biologists.
- 6. A species that is in danger of extinction throughout a given area is known as _____.
- 7. _____ is a species that is not yet endangered but might become so in the foreseeable future.
- 12. _____ is where an animal or plant lives and finds its food, water, shelter and space.

Crack The Code

Crack the following code to complete the message. Find the words that fit the spaces. Information to crack the code is found within the three worksheets, (Alphabet Code, Word Search, Crossword Puzzle). The first three items are names of birds, the fourth item describes the type of birds and the fifth item is a place where the birds nest.

_____s, _____s
and _____s are _____
_____ needing your help
for protection at _____
_____ and elsewhere in North
Carolina.



Crack the Code Answer Sheet

Crack the following code to complete the message. Find the words that fit the spaces. Information to crack the code is found within the three worksheets, (Alphabet Code, Word Search, Crossword Puzzle). The first three items are names of birds, the fourth item describes the type of birds and the fifth item is a place where the birds nest.

#1 # 2 #3 #4
Common Terns, Least Terns and Black Skimmers, are colonial nesting waterbirds
needing your help for protection at Fort Fisher State Recreation Area and elsewhere
in North Carolina.

Answer Key

#1 is found in item **C** of alphabet code

#2 is **9** across of crossword puzzle

#3 is item **20** of word search

#4 is item **A** of alphabet code

#5 is item **J** of alphabet code

Curriculum Objectives:

Grade 5

- Arts Education: participate in creative dramas
- Guidance: competency for interacting with others
- Science: environment
- Social Science: draw conclusions, participate effectively in groups

Grade 6

- Arts Education: participate effectively in creative drama activities
- Guidance: competency and skill for interacting with others
- Science: ecology
- Social Science: draw conclusions

Location: Beach

Group Size:

30 students, class size

Estimated Time:

One hour

Appropriate Season:

Beach access is weather dependent.

Materials:

Provided by the park: Six bells, thirty bags, 120 “fish,” boundary signs, 100 colored eggs, whistle, easel with markers, large graph pad, stopwatch, bird pictures, rope

Special Considerations:

Check playing field for sharp objects. Students should wear appropriate clothing and footwear. Students may be exposed to harsh sun and insects. Be prepared by bringing drinking water and using sunscreen and insect repellent, if necessary.

Major Concepts:

- Predator/prey relationships
- Ecology
- Adaptation

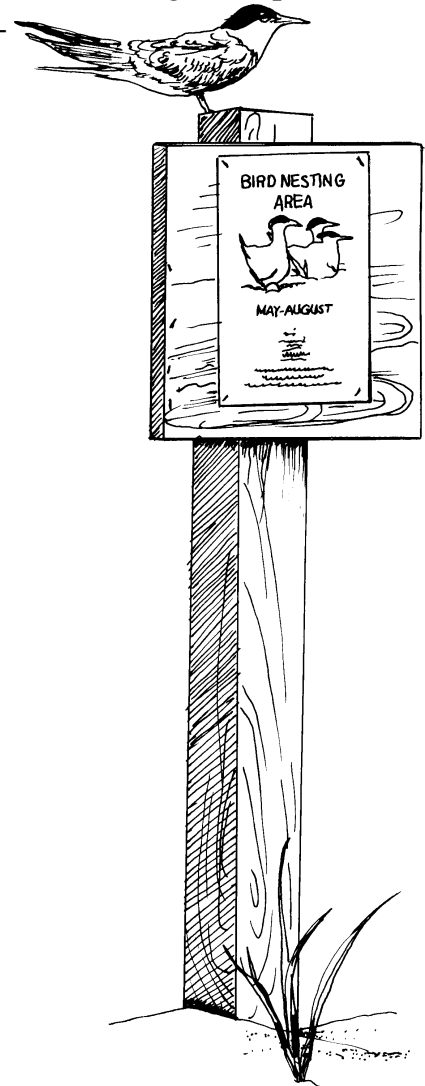
Objectives:

- Identify six predators of colonial nesting waterbirds.
- Describe two adaptations that colonial nesting waterbirds have for successful nesting.
- Define a predator/prey relationship, using one example.
- Describe a resource management practice used to protect colonial nesting waterbirds.

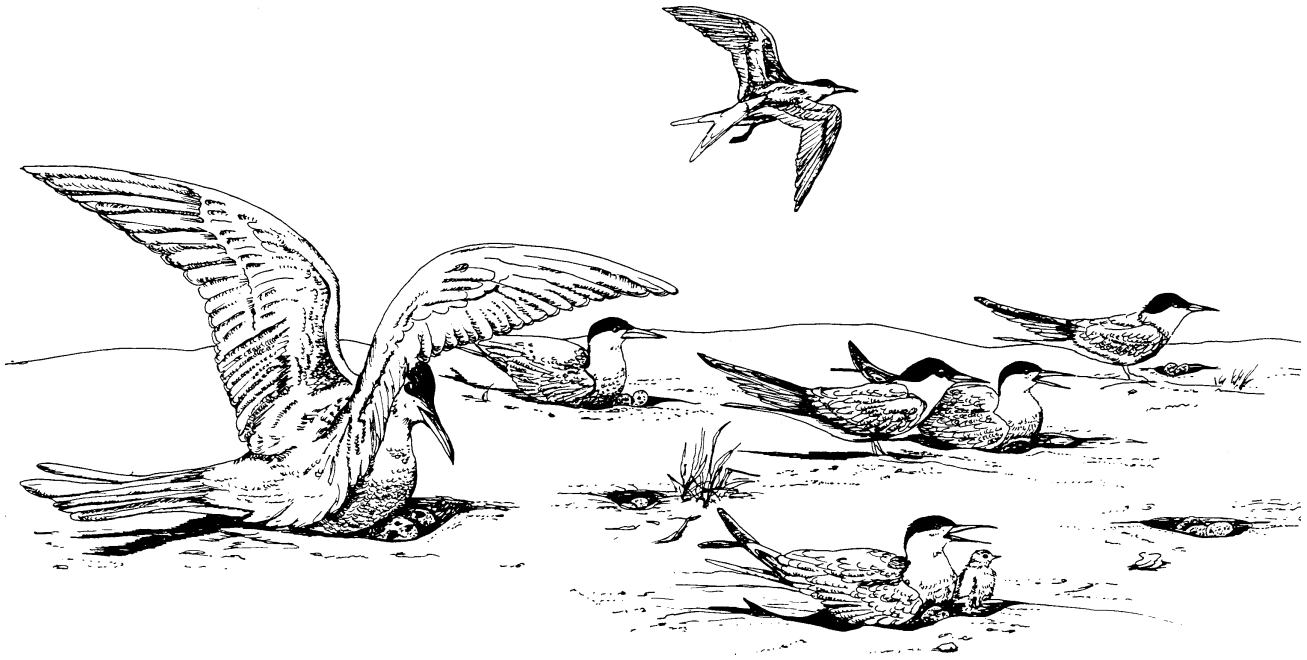
Educator’s Information:

The purpose of this activity is to have students role play the predator/prey relationships of a colonial nesting waterbird colony. Students will develop an understanding of predation within a nesting area and observe how large numbers of birds forming colonies helps insure successful nesting.

Have the students read the Student’s Information prior to coming to the park.



Student's Information



Colonial nesting waterbirds at Fort Fisher State Recreation Area nest in large, flat, sandy, open areas near where food is readily available. The birds nest together as a form of **protection** from **predators**. At Fort Fisher State Recreation Area staff and volunteers pro-

tect the nesting colonies by posting signs and roping off the nesting area to keep people out. Since the number of nesting sites for colonial nesting waterbirds has decreased nationwide, this **resource management** practice is very important for continued **sur-**

vival of the nesting colonies at Fort Fisher.

All animals must eat to survive. Some animals are **predators** – animals that feed on other animals. Some are **prey** – animals that are eaten by other animals. In this game you will role play the relationship of predators and prey.

Instructions:

1. Provide each student with a bag which identifies them as a parent colonial nesting waterbird or a predator. The bag represents their stomach.

Predators are: fox, raccoon, ghost crab, **feral** cat, feral dog and gull.

2. Give each parent bird a clutch of four eggs with which to establish a nest. Have them locate a nest within the area posted as the waterbird colony.

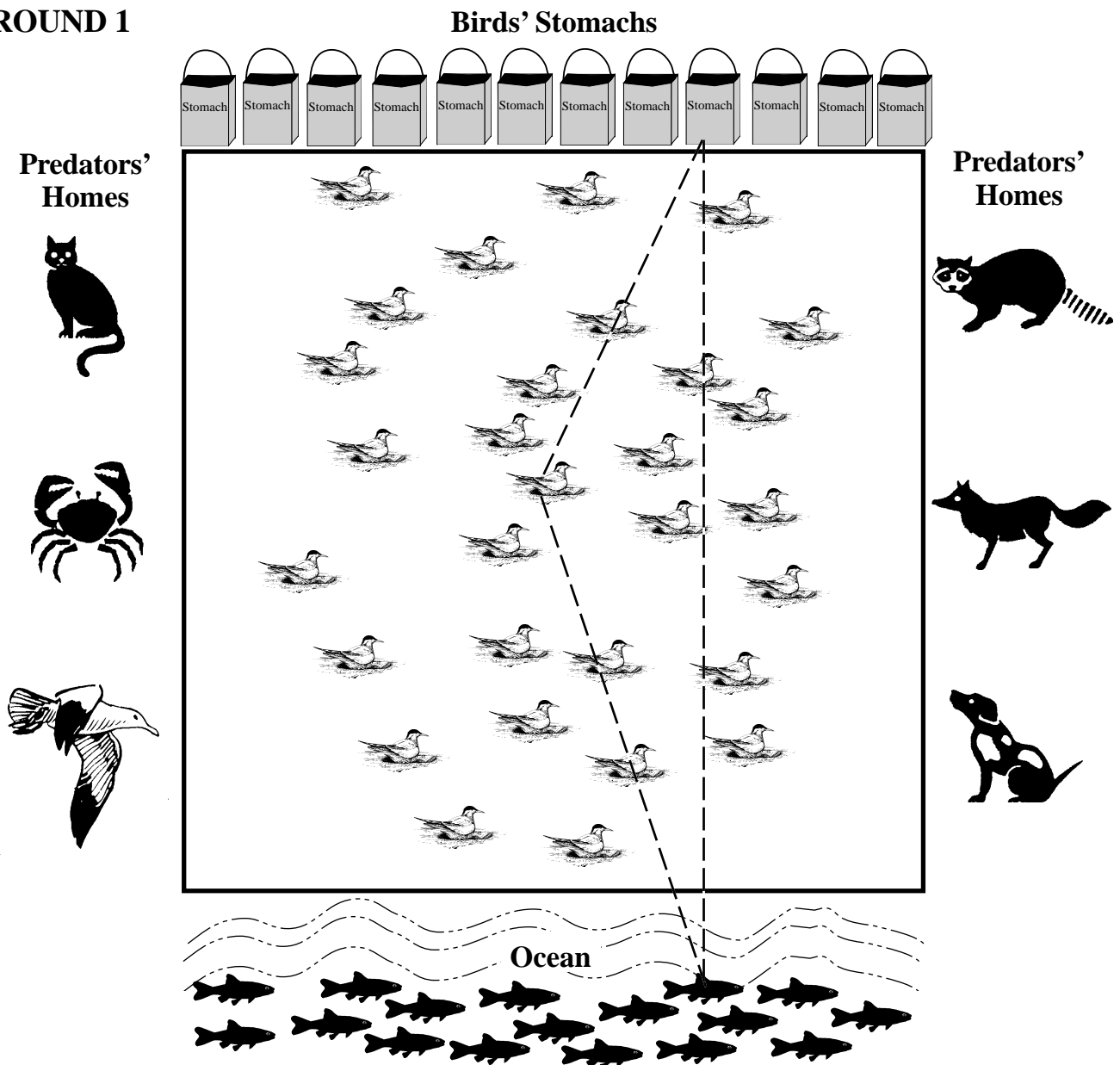
Parents will put their eggs in the nests and stand over or near them. Eggs must be in plain view and not covered with sand or grass. All four eggs must be together in one nest. Parent birds cannot carry eggs around with them after the eggs have been "laid." The parent birds' goal is to protect their nests.

3. In order for the colonial nesting waterbirds to survive they must find food. Each parent bird must leave their nest

and fly to the area designated as the ocean, pick up a fish and fly back to deposit it in their bag. Only one fish can be picked up per flight to the ocean. Each parent bird must get at least three fish to survive.

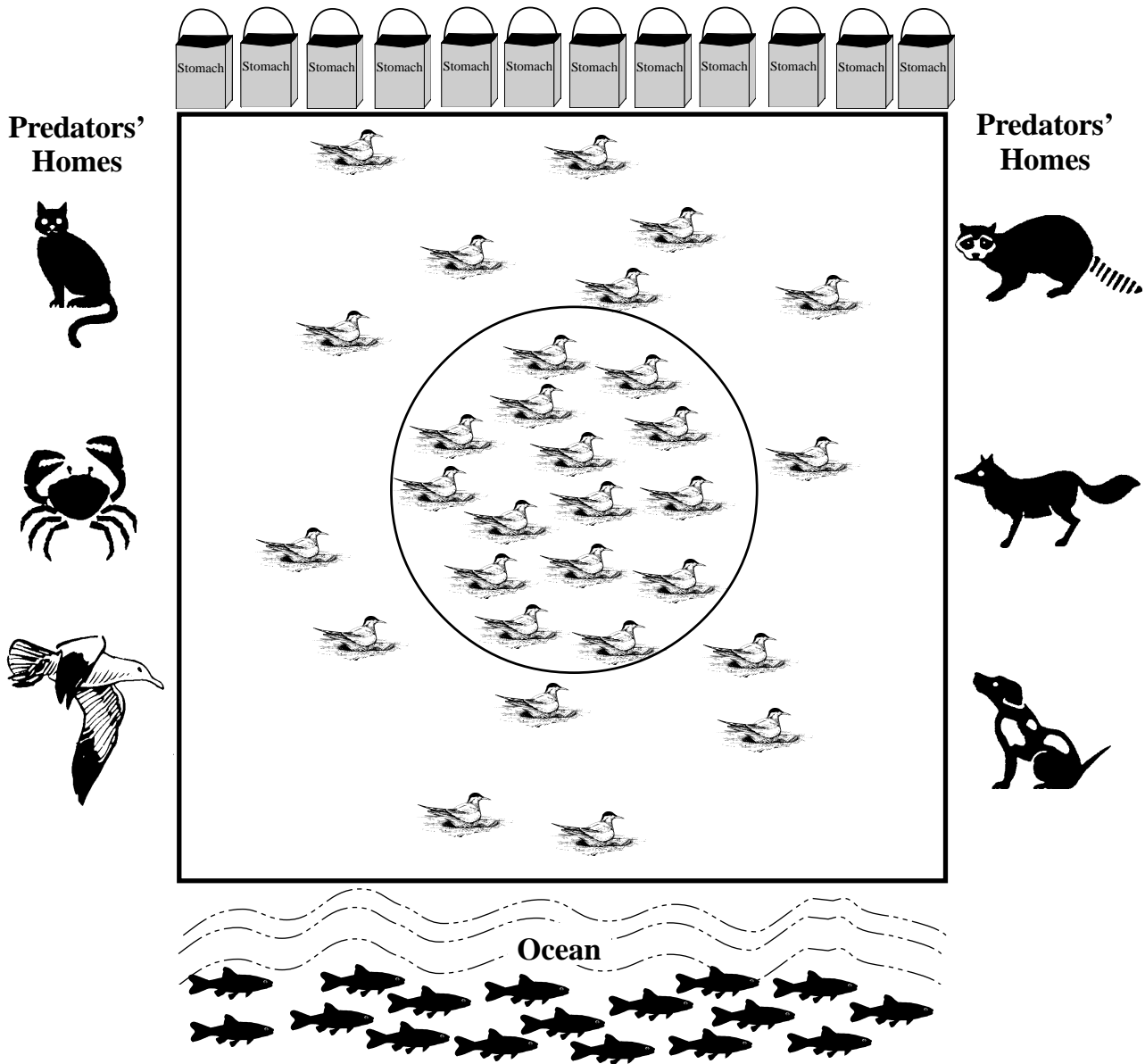
4. The predators' goal is to steal as many eggs as possible. The predators' homes are designated areas on either side of the colony (see illustration). Each predator must place its bag in its home area. The

ROUND 1



ROUND 2

Birds' Stomachs



predators leave their home area and go into the colony to steal eggs from the unguarded nests. Each predator must wear a bell and not allow it to ring while sneaking into the colony. If their bell rings they must return home and try to enter again — predators need to be sneaky. The bell can ring while returning home. Predators can steal only one egg per trip into the colony. The predators must take the stolen eggs back to

their home areas and put them in their paper bags. This represents the time it would take for the predators to eat or destroy the eggs. Each predator must get at least six eggs to survive. The predator cannot take an egg while a parent bird is near the nest.

5. If a parent bird loses all the eggs in its nest, it can continue to fly back and forth to the ocean to get more fish; or it can fly and squawk at the

predators that have invaded the colony to try and distract them. The nesting birds and predators cannot touch, hit or push each other, nor can they talk. But the nesting birds can warn each other by making bird noises such as a squawk.

6. Blow the whistle to start round 1 of the game. Give the students 2 1/2 minutes to play. The educator will then blow the whistle to stop the action.

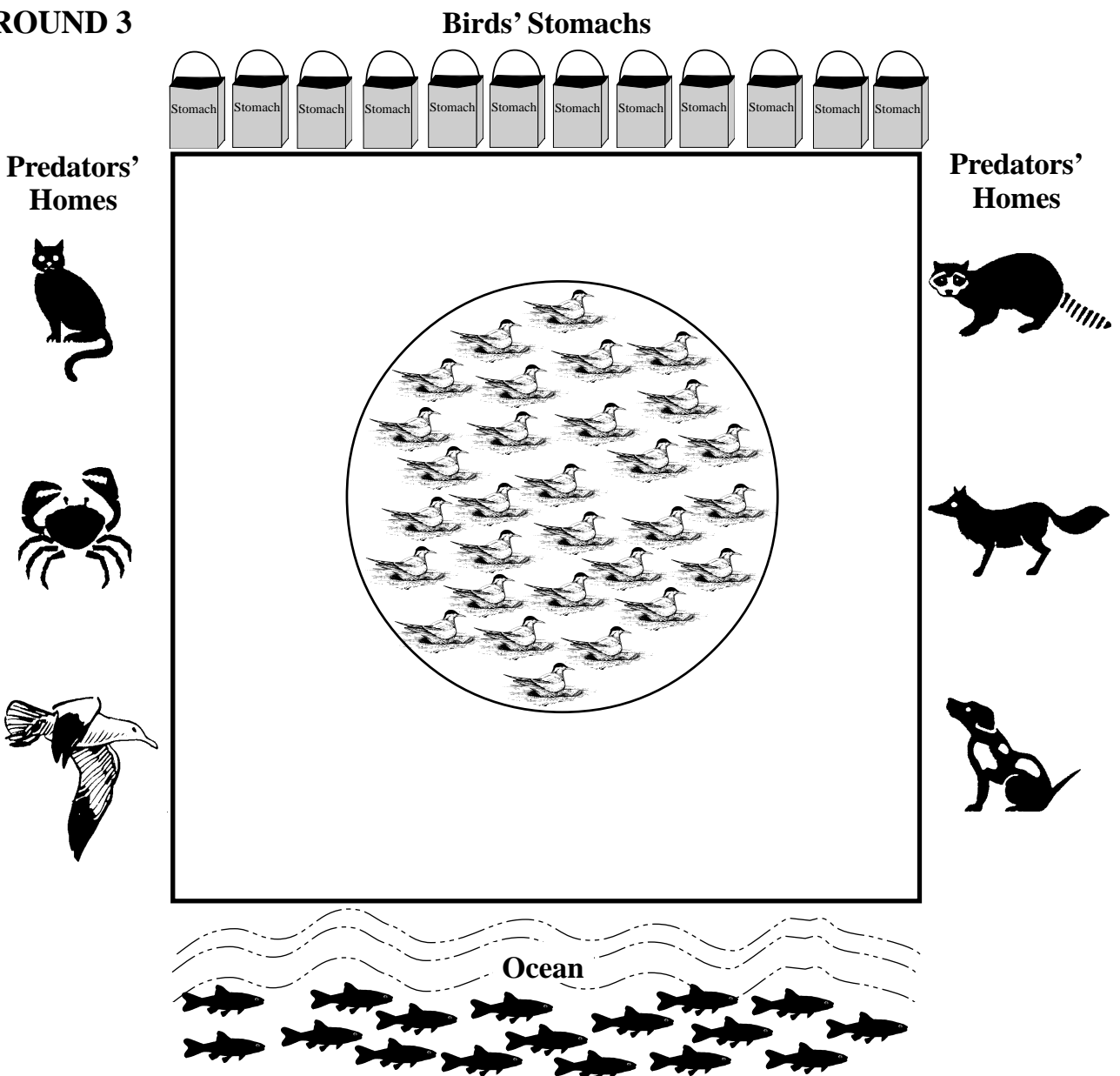
7. At the end of the round, count the number of eggs remaining in the colony. Successful nesters are parent birds with at least three fish and at least one egg in their nest. Successful predators have collected six or more eggs. At the end of the round, record on the large graph pad the number of successful nesting birds.

8. For round 2, create a nesting area within the colony. Divide the nesting birds into two groups. Group A will build their nests inside the designated nesting area. Group B will build their nests randomly outside the designated nesting area but still within the posted colony area. Follow instructions for steps 2 through 7.

9. For round 3, have all nesting birds build their nests inside the designated nesting area. Follow steps 2 through 7.

10. Discuss the results and emphasize the increased number of successful nesting birds resulting from the birds nesting closer together. "Safety in numbers" is one of the **adaptations** of colonial nesting waterbirds which increases their breeding success.

ROUND 3



Be sure to ask the following questions:

- Which seabird had the most eggs left and at least three fish?
- Where was its nest located?
- Which seabird had the most fish and at least one egg left?
- Who was the best seabird parent? Why?
- What problems did you face as a mother or father seabird?
- What did you do to out-smart the predators?

- Which predator had the most eggs at the end of the game?
- What strategies did the predators use to steal the eggs? Did any of the predators work in groups? Did any birds work together to protect the colony?
- Which strategies worked best?
- What was realistic about this game? What was not?
- If the eggs were camouflaged would predators have a more difficult time finding them? Why?

Modifications:

1. Change the number of predators and see the effect on predation — record and graph the result.
2. Replace the colored eggs with **camouflaged** eggs.



Curriculum Objectives:

Grade 5

- Communication Skills: viewing comprehension
- Guidance: competency for interacting with others
- Mathematics: solve problems in measurement
- Science: environment
- Social Science: gather, organize and analyze information, draw conclusions, use maps, participate effectively in groups

Grade 6

- Communication Skills: viewing comprehension, study skills using environmental sources
- Guidance: competency and skill for interacting with others
- Healthful Living: environmental health, how people affect the environment
- Mathematics: solve problems in measurement
- Social Science: gather, organize and analyze information, draw conclusions, use maps

Location: Classroom

Group Size:

30 students, class size

Estimated Time: 50 minutes

Appropriate Season: Any

Materials:

Provided by the educator:
Per group - NC Transportation Map, photocopy of map grid on overhead transparency, copy of "Nesting Sites" data sheet and "Mapping" worksheet, ruler, water soluble pen

Major Concepts:

- Geography skills (map and graph reading)
- Impacts on wildlife

Objectives:

- Use of longitude and latitude to locate points of interest on a map of North Carolina.
- Locate and map known colonial nesting waterbird sites with a grid overlay.
- Speculate about the impacts on the nesting sites using three different scenarios.

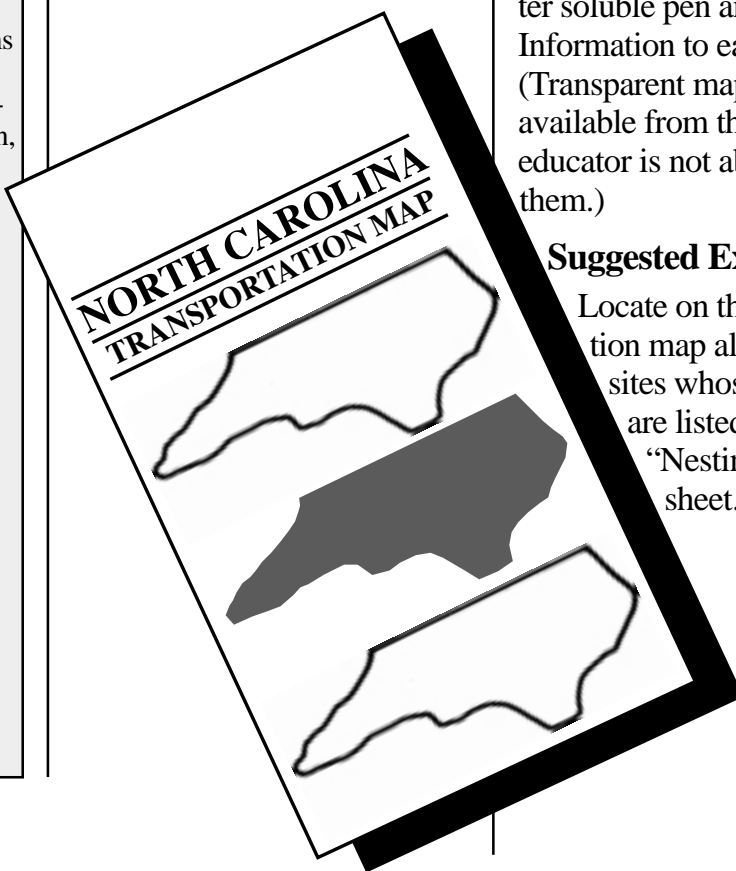
Educator's Information:

In North Carolina there are over 220 colonial nesting waterbird sites. Students will use the geographic coordinate system to locate various colonial nesting waterbird nesting sites in North Carolina. By using maps, students will determine which nesting sites could be affected by catastrophes such as hurricanes and oil spills. In North Carolina, development is the largest destroyer of nesting habitat.

Have the students work in groups of two to four students. Provide the "Nesting Sites" data sheet, N.C. Transportation Map, map grid, ruler, water soluble pen and Student's Information to each group. (Transparent map grids are available from the park if the educator is not able to produce them.)

Suggested Extension:

Locate on the transportation map all 10 nesting sites whose coordinates are listed on the "Nesting Sites" data sheet.



Student's Information

Most maps have vertical lines called **longitudes** and horizontal lines called **latitudes** forming a network of reference lines. Any point on the earth's surface can be located using the lines of longitude and latitude as a guide. This method of location is known as the **geographic coordinate system**.

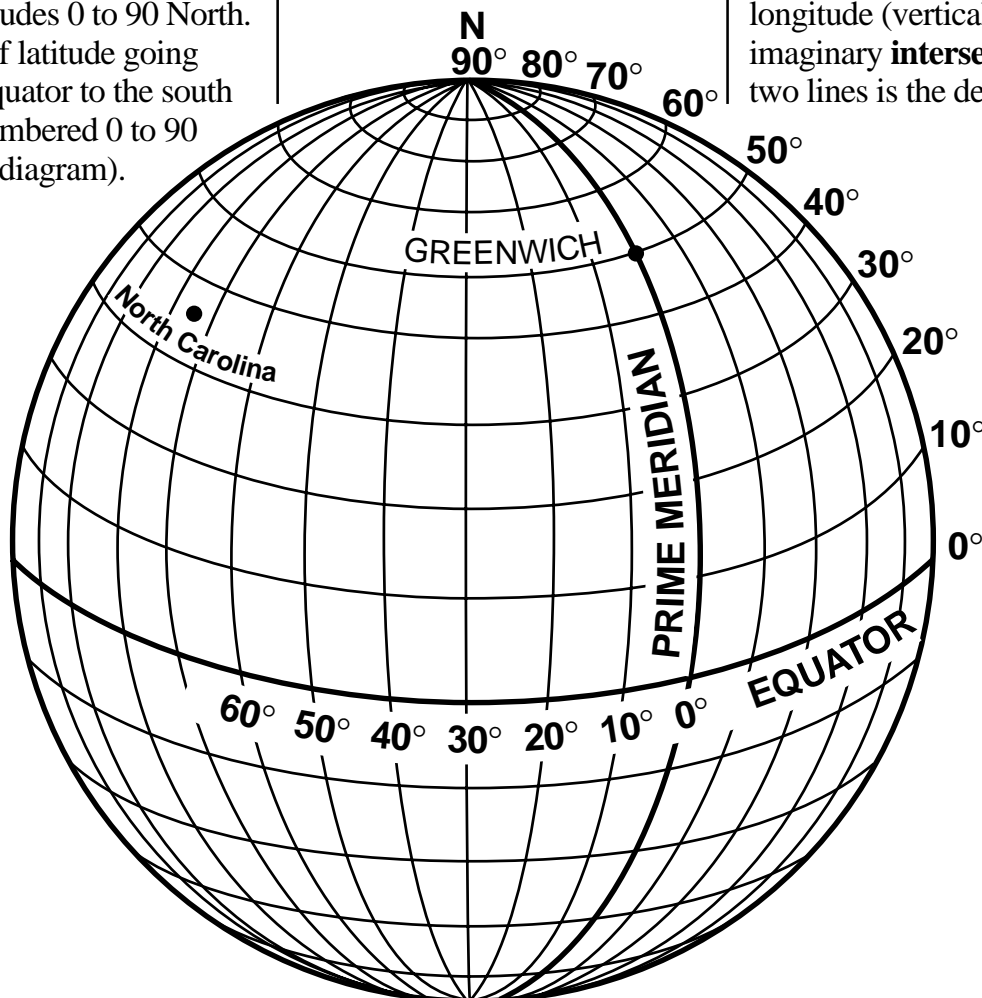
The horizontal line around the middle of the earth is called the **equator**. Latitudes run east to west, parallel to the equator. The equator is **0 degrees** latitude. The North Pole is 90 degrees latitude North. From the equator to the north pole are the latitudes 0 to 90 North. The lines of latitude going from the equator to the south pole are numbered 0 to 90 South (see diagram).

The vertical lines are divided into east and west longitudes. Zero degrees longitude is an imaginary line running north and south through Greenwich, England. This line is known as the Greenwich or **prime meridian**. As in the degrees of latitude, it is important to know the direction of the degrees of longitude - east or west of the prime meridian at 0 degrees longitude (see diagram).

Each degree of latitude or longitude represents, at the equator, about 111 kilometers, (69 miles). Degrees are divided into 60 parts called

minutes, (expressed '). Each minute at the equator represents about 1.85 kilometers (1.15 miles) or a nautical mile. Minutes are divided in 60 **seconds**, (expressed "). Each second at the equator, represents about 30 meters (100 feet). Seconds will not be used in this activity because the curvature of the earth makes using a rectangular grid inaccurate for such precision.

Using the geographic coordinate system, any location in the world can be found using an appropriate map. To locate a point on a map, find the latitude (horizontal line), and longitude (vertical line). The imaginary **intersection** of the two lines is the desired point.



Instructions:

1. Starting in the lower right hand corner of the transportation map, find the red numbers around the edge of the map that represent the latitude and longitude. Move up (north) the map for latitude and left (west) along the bottom for longitude.
2. As an example of a coordinate point, find where 35 degrees N latitude intersects with 76 degrees W longitude. (You will be just east of Portsmouth Island.)
3. Here is an example of how

to use the transparent map grid to locate coordinates.

a. Determine the desired coordinate location, e.g., 34 degrees 37 minutes N and 76 degrees 31 minutes W.

b. Round off the minutes upward, adding 1 to the 34 degrees, to make it 35 degrees N. Do the same, adding 1 to the 76 degrees, to make it 77 degrees W.

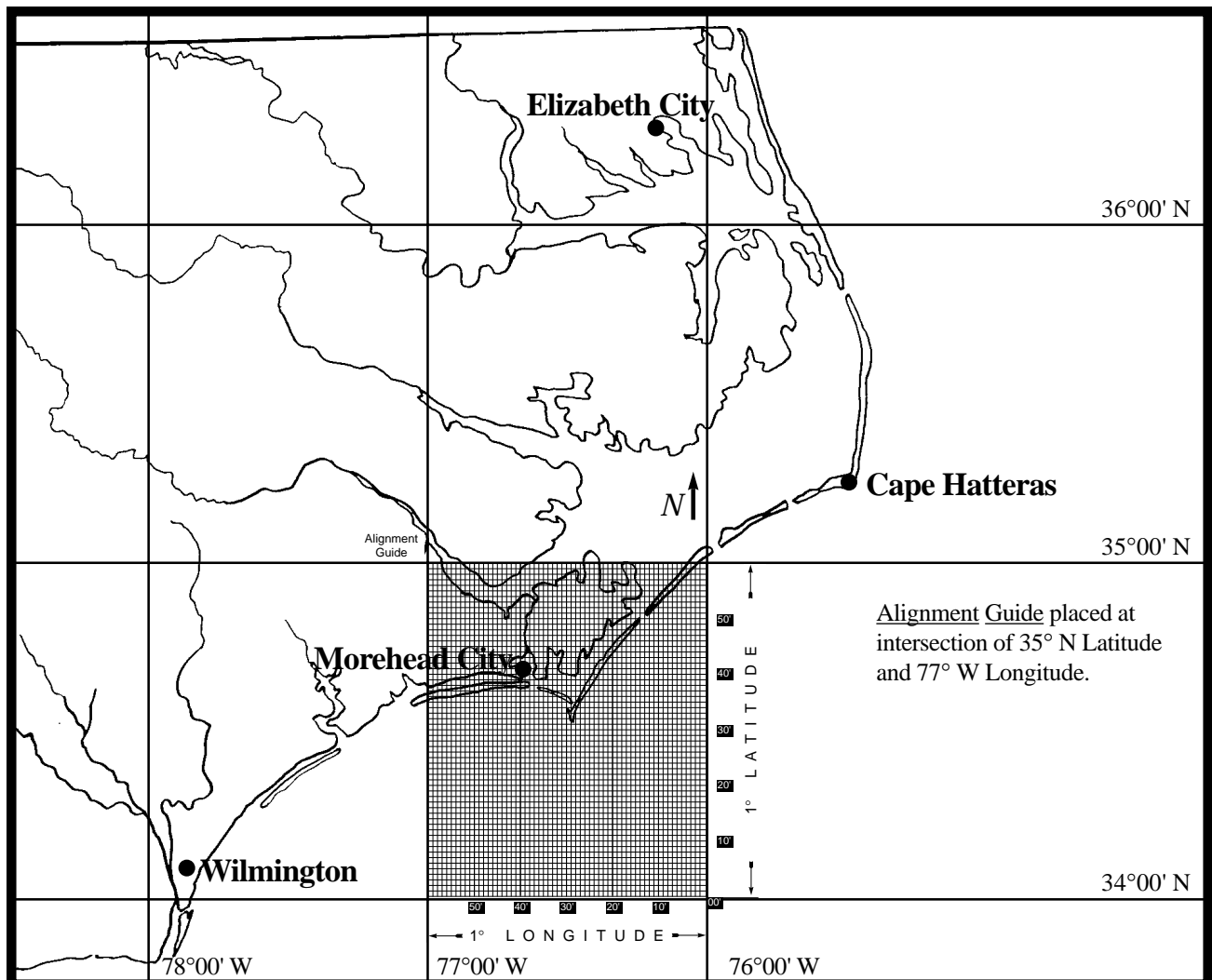
c. Now place the alignment guide of the transparent grid at the intersection point of 35 degrees N and 77 degrees W. (The alignment guide is the upper left corner of the trans-

parent grid.)

d. To determine latitude, start at the lower right corner (00 minutes) of the grid and count up (north) the grid to line 37 minutes N. Mark it with a water soluble pen.

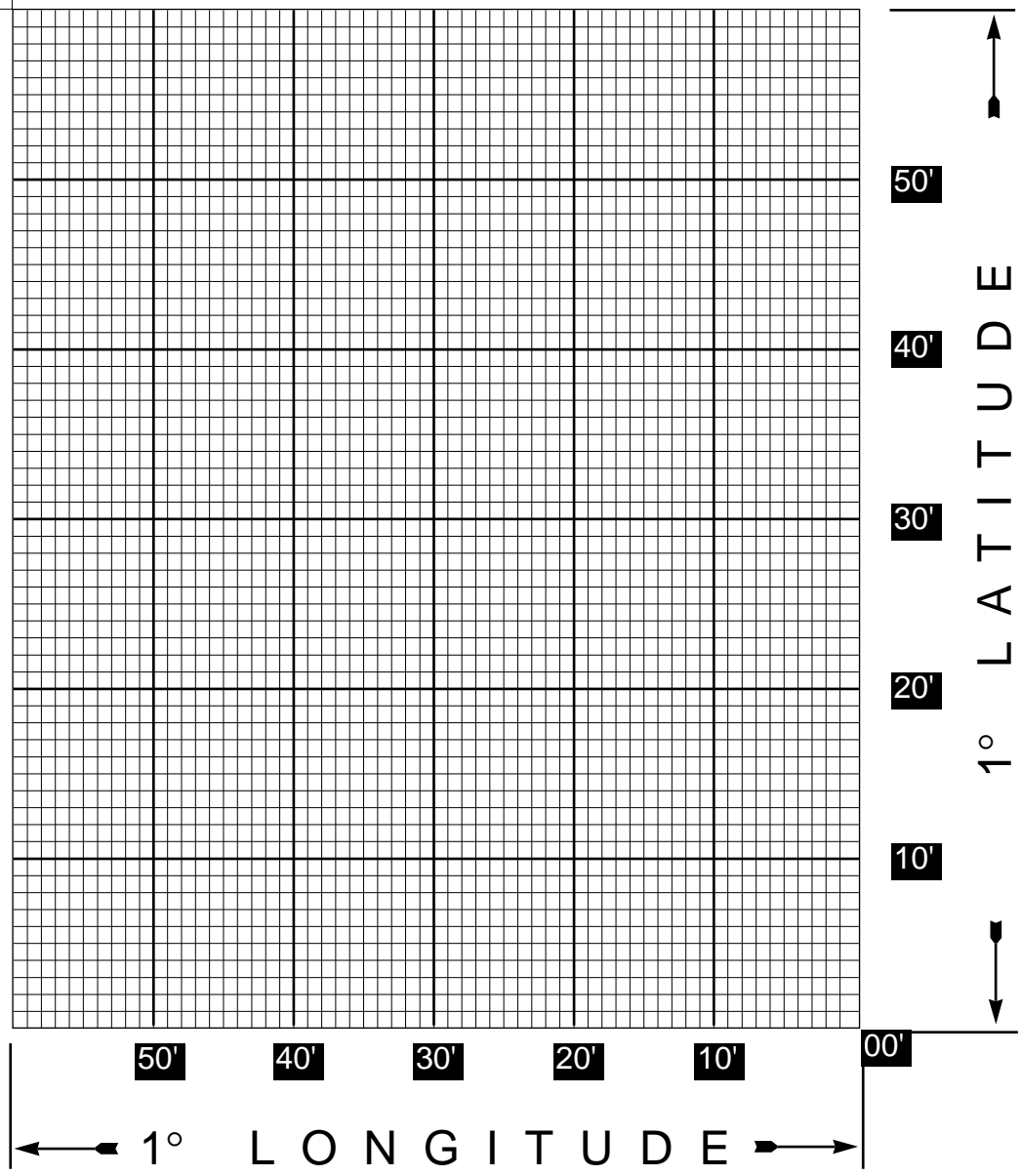
e. To determine longitude, move from the lower right corner (00 minutes) of the grid along the bottom to line 31 minutes W. Mark it with a water soluble pen.

f. Draw lines to create an intersection point at 34 degrees 37 minutes N and 76 degrees 31 minutes W on the transparent grid. You should be near Cape Lookout lighthouse.





Alignment
Guide



Nesting Sites Data Sheet

10 selected from over 220 identified
by Parnell & Shields in *Management of North Carolina's Colonial Waterbirds*.

NESTING AREAS	COORDINATES		SPECIES	NESTS
	Latitude	Longitude		
Fort Fisher – Natural Barrier Island	33° 57' N	77° 55' W	Common tern	22
			Least tern	400+
			Black skimmer	91
Battery Island – Natural Island	33° 55' N	78° 00' W	Little blue heron	65
			Cattle egret	137
			Great egret	10
			Snowy egret	97
			Tricolored heron	87
			Black-crowned night heron	42
			Glossy ibis	3
			White ibis	5442
Sand Bag Island – Man-made Spoil Island	34° 40' N	76° 31' W	Brown pelican	44
			Herring gull	10
			Laughing gull	8000+
			Royal tern	1877
			Sandwich tern	1145
Brant Island – Man-made Spoil Island	34° 42' N	76° 41' W	Gull-billed tern	64
			Common tern	576
			Least tern	58
			Black skimmer	157
Core Banks North of Drum Inlet – Natural Barrier Island	34° 53' N	76° 16' W	Least tern	100+
Swan Island – Natural Estuarine Island	35° 05' N	76° 25' W	Brown pelican	163
			Herring gull	2
			Laughing gull	2000+
			Little blue heron	2
			Great egret	4
			Snowy egret	45
			Tricolored heron	44
			Glossy ibis	2
Old House Channel – Man-made Spoil Island	35° 46' N	75° 35' W	Royal tern	441
			Sandwich tern	124
			Caspian tern	30
Gull Island – Natural Estuarine Island	35° 28' N	75° 31' W	Great black-backed gull	300+
			Herring gull	200+
			Laughing gull	500+
			Forster's tern	100
			Great egret	25
			Snowy egret	45
Bodie Island – Natural Barrier Island	35° 48' N	75° 33' W	Common tern	50
			Least tern	100+
			Black skimmer	58
Bear Island – Natural Barrier Island	34° 38' N	77° 10' W	Least tern	85

Mapping Worksheet

Answer the following questions using the NC Transportation Map and the "Nesting Sites" data sheet:

1. A ship carrying crude oil runs aground on an uncharted sandbar in May at 34° 36' N 76° 26' W. Off of what National Seashore does it wreck?

The ship spills 10,000,000 gallons of crude oil. The wind is blowing from the southwest. The oil floats north to Swash inlet. Nesting areas located on Core Banks, north of Drum Inlet are affected.

a. What species is affected at this site?

b. How many nests are affected?

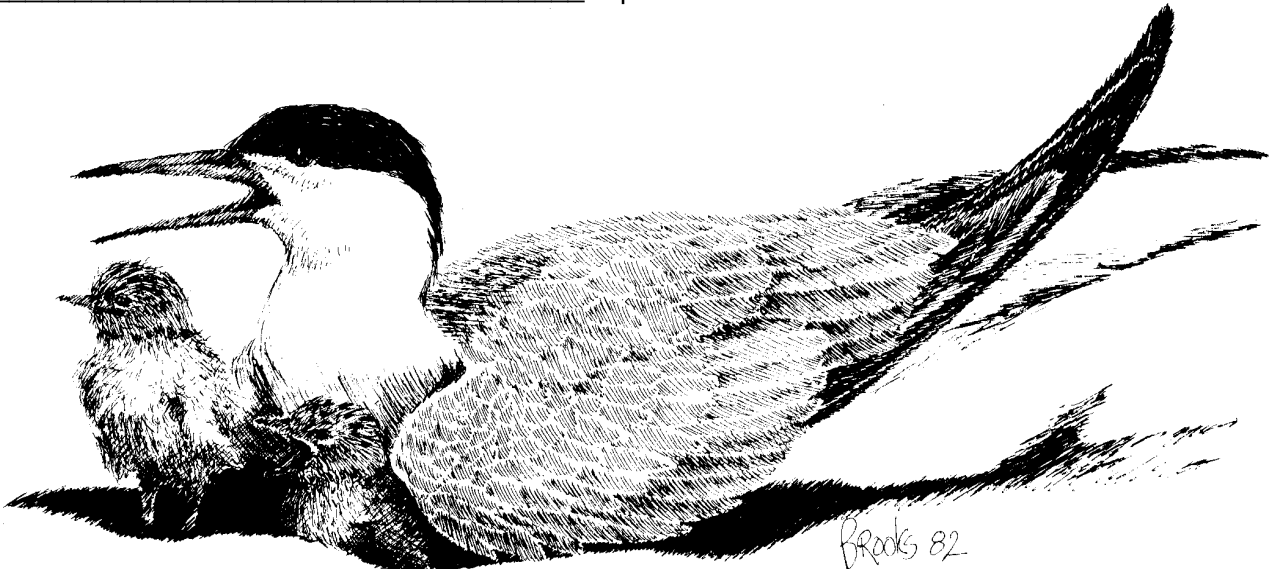
2. Hurricane Dillard makes landfall on June 15. The eye of the storm passes over Southport. What are the coordinates of the Bald Head Island lighthouse?

The storm creates extremely high tides which flood low lying areas north to Carolina Beach. A number of colonial nesting waterbird nesting sites are within the area of the storm. Sites at Battery Island and Fort Fisher were destroyed.

How many nests were destroyed at the two sites?

3. The town of Whalebone, near Nags Head, is permitting off-road-vehicles (ORV) on the beaches south of town. Nesting sites are affected at Bodie Island. How many nests are affected?

Which resource management methods should be used to protect the site?



Mapping Worksheet Answer Sheet

Answer the following questions using the NC Transportation Map and the “Nesting Sites” data sheet:

1. A ship carrying crude oil runs aground on an uncharted sandbar in May at 34° 36' N 76° 26' W. Off of what National Seashore does it wreck?

Cape Lookout

The ship spills 10,000,000 gallons of crude oil. The wind is blowing from the southwest. The oil floats north to Swash inlet. Nesting areas located on Core Banks, north of Drum Inlet are affected.

a. What species is affected at this site?

Least Tern

b. How many nests are affected?

100+

2. Hurricane Dillard makes landfall on June 15. The eye of the storm passes over Southport. What are the coordinates of the Bald Head Island lighthouse?

33 degrees 52 minutes N and 78 degrees

0 minutes W

The storm creates extremely high tides which flood low lying areas north to Carolina Beach. A number of colonial nesting waterbird nesting sites are within the area of the storm. Sites at Battery Island and Fort Fisher were destroyed.

How many nests were destroyed at the two sites?

6,396

3. The town of Whalebone, near Nags Head, is permitting off-road-vehicles (ORV) on the beaches south of town. Nesting sites are affected at Bodie Island. How many nests are affected?

208

Which resource management methods should be used to protect the site?

Posting signs around the nesting sites and roping them off.

NOTE: If you ask your students to locate each of the islands on page 5.1.5, here is where they should find each island:

1. Fort Fisher - marked in red on the DOT map just below Kure Beach.
2. Battery Island - located above Bald Head Island near Corncake Inlet.
3. Sand Bag Island* - located south of Harkers Island.
4. Brant Island* - located north of Fort Macon State Park.
5. Core Banks North of Drum Inlet - due east of the town of Atlantic.
6. Swan Island - this small island can be found on the map northeast of Rattan Bay in the Pamlico Sound.
7. Old House Channel* - located west of Oregon Inlet and east of Stumpy Point in the Pamlico Sound.
8. Gull Island* - located west of Hatteras Island between Salvo and Avon.
9. Bodie Island - southern end of Bodie Island near lighthouse (near Oregon Inlet).
10. Bear Island - Hammocks Beach State Park near Bogue Inlet (western end of Bogue Sound).

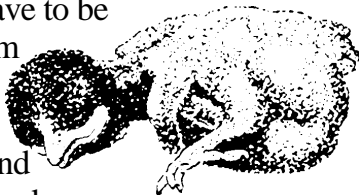
* The smaller islands, especially the manmade spoil islands, will not appear on the DOT map. You are finding general locations only.

VOCABULARY

Adaptation – A change in the structure or function of an animal that allows it to better adjust to its environment.

Altricial (al-TRISH-el) – Chicks that are very weak and have to be fed and kept warm by their parents.

At hatching they have no feathers and their eyes are closed.



Camouflage – Blending in with the environment for protection.

Catastrophe – A sudden disaster, such as a hurricane, that can destroy a nesting colony.

Colonial nesting waterbirds – Birds that nest in colonies of a few pair to thousands of pairs.

Degree – A unit of latitude or longitude representing about 111 kilometers or 69 miles at the equator. Because the earth is round, a degree of longitude is shorter as you move north or south from the equator.

Endangered – A species that is threatened with extinction throughout all or a significant portion of its range.

Equator – The imaginary line running east to west around the middle of the globe. The equator is also known as 0 degrees latitude.

Feral – Untamed, wild.

Geographic Coordinate System – A network of horizontal (latitudes) and vertical (longitudes) reference lines used to locate points on the earth's surface.

Habitat – Where an animal or plant lives and finds its food, water, shelter and space.

Intersection – A place where two or more lines cross.

Latitude – Horizontal line running east to west on a map or globe. 0 degrees at the equator to 90 degrees at the poles.

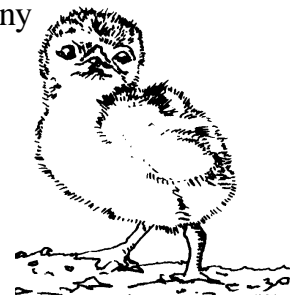
Longitude – Vertical line running north to south on a map or globe (see Prime Meridian).

Minute – A unit of longitude or latitude. A degree is divided into 60 parts called minutes, representing about 1.85 kilometers or 1.15 miles at the equator.

Pesticide – Any chemical used for killing insects and/or weeds. The chemicals can also affect animals and plants other than the ones considered pests.

Plume – A feather, especially one that is large and showy. At one time, feathers from the colonial nesting waterbirds were used as decorations on ladies' hats. Hunters killed many birds for their valuable plumes.

Precocial (pree-KOH-shal) – Chicks that are fully covered with downy feathers. Soon after hatching their eyes are open, they can run around, find food and to some degree take care of themselves.



Predator – An animal that feeds on another animal.

Preservation – To maintain and protect a natural area for plants and animals.

Prey – Animals that are eaten by other animals.

Prime Meridian – The imaginary vertical line running north to south through Greenwich, England. The prime meridian is also known as 0 degrees longitude.

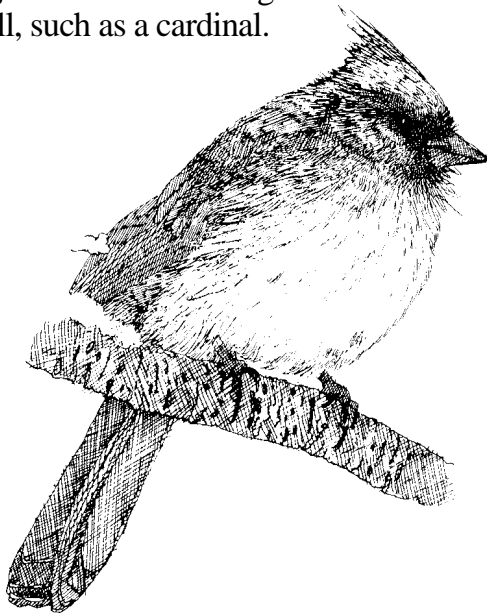
Protection – To protect from harm; to keep safe.

Resource management – Practices, such as posting signs and roping off nesting areas, which are designed to protect plant or animal habitat.

Sanctuary – An area in which animals are protected from hunting and other disturbances. Education, law enforcement and resource management are three ways plants and animals can be protected in a sanctuary.

Second – A unit of longitude or latitude. A minute is divided into 60 parts called seconds representing about 30 meters or 100 feet at the equator.

Songbird – A bird having a melodious song or call, such as a cardinal.



Special concern – A term describing species whose population levels, though not threatened or endangered, require study by biologists.

Species – Organisms that can mate and produce fertile offspring.

Spoil islands – Low lying islands created by the dredging of shipping channels. Channels are deepened by the dredge scooping or sucking up sand. The sand is deposited in areas to create spoil islands.

Survival – The act of surviving; to continue life and activity.

Threatened – A species that could become endangered in the foreseeable future.

Vulnerable – Something that can be easily destroyed or injured.

Wildlife population – The total number of animals living in a particular area.

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Black Skimmer Fact Sheet

Common Name: Black Skimmer

Scientific Name: *Rynchops niger* (RING-kops NYE-ger) – Genus name from German, referring to beak and face. Species name from Latin, meaning black

Distribution: Summer range in the U.S. is along the Atlantic Coast from Massachusetts, south to Florida and along Gulf Coast to Texas. Winter range is the Gulf Coast, south along both coasts in South America. Black skimmers are common on the Carolina coast in summer.

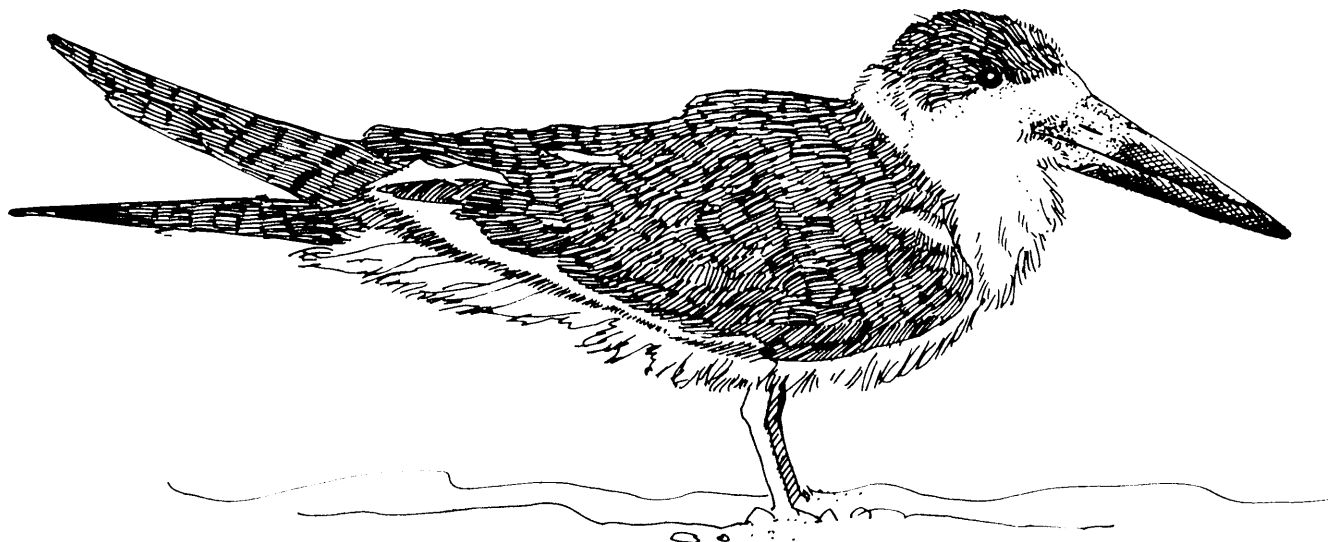
Description: The adult black skimmer is crow sized. It is black above and white below, and the bill is red with a black tip. Skimmers are the only birds in which the lower bill is longer than the upper. The bill is scissor-like with the lower bill about 1/3 longer than the upper.

Habitat: Black skimmers live along the sea coast.

Food Habits: Black skimmers feed by flying just above the water with the tip of the long lower bill cutting through the water. When a shrimp or small fish strikes the bill, the upper bill snaps shut. They feed mostly in the early evening and at night when the water is calm and their prey is near the surface.

Behavior and Adaptations: Black skimmers nest on remote coastal islands or beaches. They lay three to five brown-blotched eggs on a bare scrape, usually among shell fragments and scattered grass clumps. The female incubates the eggs for about 21 to 23 days. Adults will feign injury if the nest is disturbed. The buff-colored downy chicks are well camouflaged against the sandy nesting site. To hide themselves, the chicks also dig a shallow depression and kick sand on top of their backs.

Status: Special concern in North Carolina



Brown Pelican Fact Sheet

Common Name: Brown pelican, Alcatraz, Grand gosier

Scientific Name: *Pelecanus occidentalis* (pel-ee-KAY-nus ock-sih-den-TAY-liss)

“A wonderful bird is a pelican, His bill will hold more than his belican.” Dixon L. Merritt

Distribution: Atlantic Coast from North Carolina south to Venezuela; on the Pacific Coast from British Columbia to Chile.

Description: Brown pelicans are very large, stocky birds with dark brown bodies, massive bills and a throat pouch. The wingspan of the brown pelican can range from 6.5 to 8 feet. The head is whitish in adults and dark brown in immature birds.

Habitat: Prime habitats are sounds, beaches and oceans. They often perch on posts and boats. Brown pelicans build their nests in colonies with other pelicans. In North Carolina, the nests are commonly made on the ground.

Food Habits: Brown pelicans feed entirely on marine fish. They either float on the water and lunge at the fish swimming below them, or while flying, spy their food (from as high as 30 feet) and dive head first into the water. As soon as the bill is in the water, it opens, engulfing the fish and up to two gallons of water. The water is drained from the pouch and the pelican then swallows the fish.

Behavior and Adaptations: In the Carolinas all nesting sites are located on small, uninhabited coastal islands. The nests are in colonies. Nests of seaweed, marsh grass and debris are built a foot or more high on the ground. Occasionally they nest in low trees. Both parents incubate three whitish eggs for about four weeks. The adult pelicans feed the chicks regurgitated fish. By 11 to 12 weeks of age, the chicks are fully grown and fledged from the nest.

Status: Pelicans almost became extinct around the turn of the century when they were shot for their feathers. In the 1940's and 50's they were nearly lost again due to the pesticide DDT. The fish eaten by the birds contained DDT. The insecticides built up in the birds' bodies, causing their eggs to be thin-shelled and easily broken. Some breeding colonies failed to produce a single bird. This led to the brown pelican being placed on the Endangered Species List to be protected under federal law. Recently the bird was removed from the federal Endangered Species List for the Atlantic coast.

Presently the brown pelican has special concern status in North Carolina.

Another threat to the brown pelican is discarded fishing line. The birds become entangled in the line, suffering starvation and broken limbs.

Fun Facts:

Pelicans have existed for more than 30 million years (humans have existed less than 1 million years).

10 week old chicks weigh more than their parents.

The tip of a pelican's bill is not curved and pointed for capturing prey, but used in spreading waterproof oil on its feathers.

Chicks unable to fly will regurgitate and snap at predators - hopefully deterring them.

Wing span of 6 1/2 feet - up to 8 feet - taller than your dad or mom (usually) or yourself.

State bird of Louisiana and national bird of Barbados.



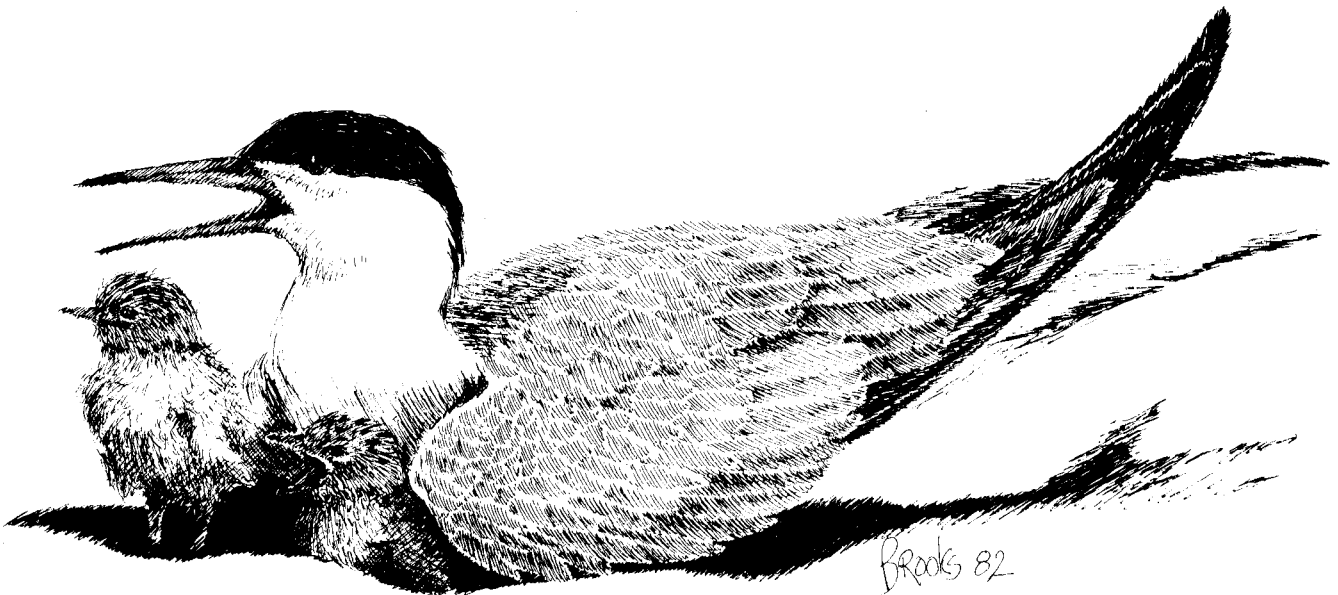
Terns Fact Sheet: General Information

Terns are slender and graceful in flight with a near constant beat of their wings. They have sharply pointed bills, long pointed wings and deeply forked tails. They feed by hovering, then diving head first with a swift, shallow dive to catch small fish, crabs and other crustaceans.

Terns are colonial nesters with both parents incubating the eggs and caring for the precocial young. Tern nests are usually depressions in the sand which may be lined with shells. The parents shelter the eggs and chicks from the hot sun and feed the offspring by poking fish into their throats.

In North Carolina the following terns can be found nesting:

- Gull-billed tern
- Forster's tern
- Common tern
- Least tern
- Royal tern
- Sandwich tern
- Caspian tern



Least Tern Fact Sheet

Common Name: Least tern

Scientific Name: *Sterna albifrons* (STIR-nah AL-bih-fronz) – Genus name of Scandinavian and English origin. Species name from Latin “albus” white and “frons” forehead

Distribution: Maine south to Venezuela; occasionally along rivers in the Mississippi Valley; coastal California. Least terns are fairly common along the Carolina coast from April to October. Winters from the Gulf coast southward.

Description: Size of a large sparrow. Very small tern with a yellow bill with a black tip, white forehead and black cap. Pale gray back and wings with forked tail.

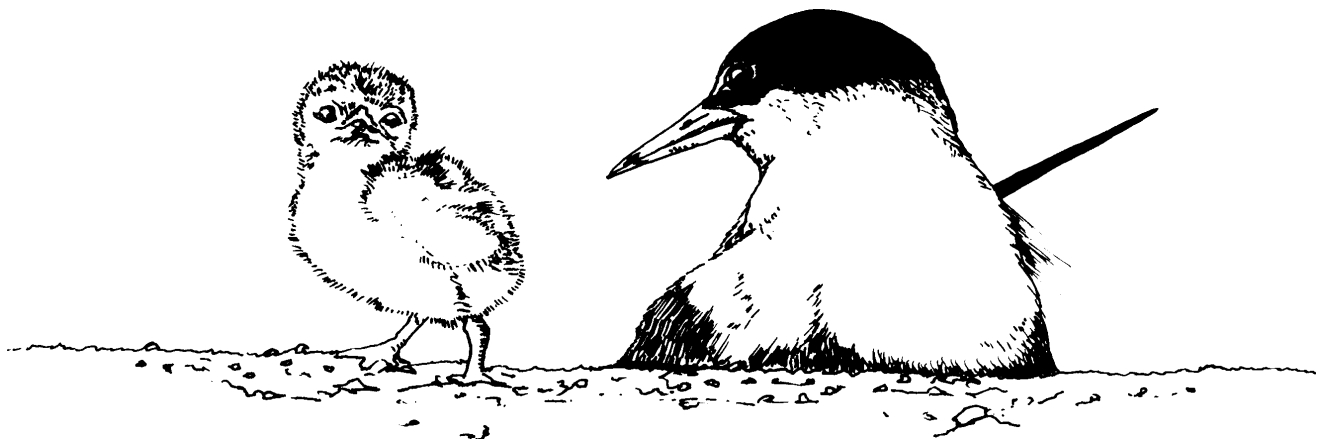
Habitat: Sandy and pebbly beaches along the coast; sandbars in large rivers. Often found at landfills.

Food habits: Least terns feed by diving from the air upon insects and small fish in the water.

Behavior and Adaptations: Least terns usually begin nesting in May. Two or three buff, lightly spotted eggs are laid in an unlined scrape. The eggs are almost invisible among the shells and pebbles on the nesting site. Incubation requires about three weeks and the young can fly when they are 24 days old.

Status: The least tern was once nearly hunted to extinction by plume hunters. Today, the least tern appears to be having difficulty maintaining its population on the east coast. It is especially threatened on the California coast and the Mississippi Valley. The decline is due to the increasing destruction of its nesting habitat by beach development.

The least tern is considered endangered on the west coast of North America.



Common Tern Fact Sheet

Common Name: Common Tern

Scientific Name: *Sterna hirundo* (STIR-nah her-UN-doh) – Genus name of Scandinavian and English origin. Species name is from the Latin for swallow; refers to swallow-like wings and tail.

Distribution: Common terns are found along the Carolina coast throughout the year.

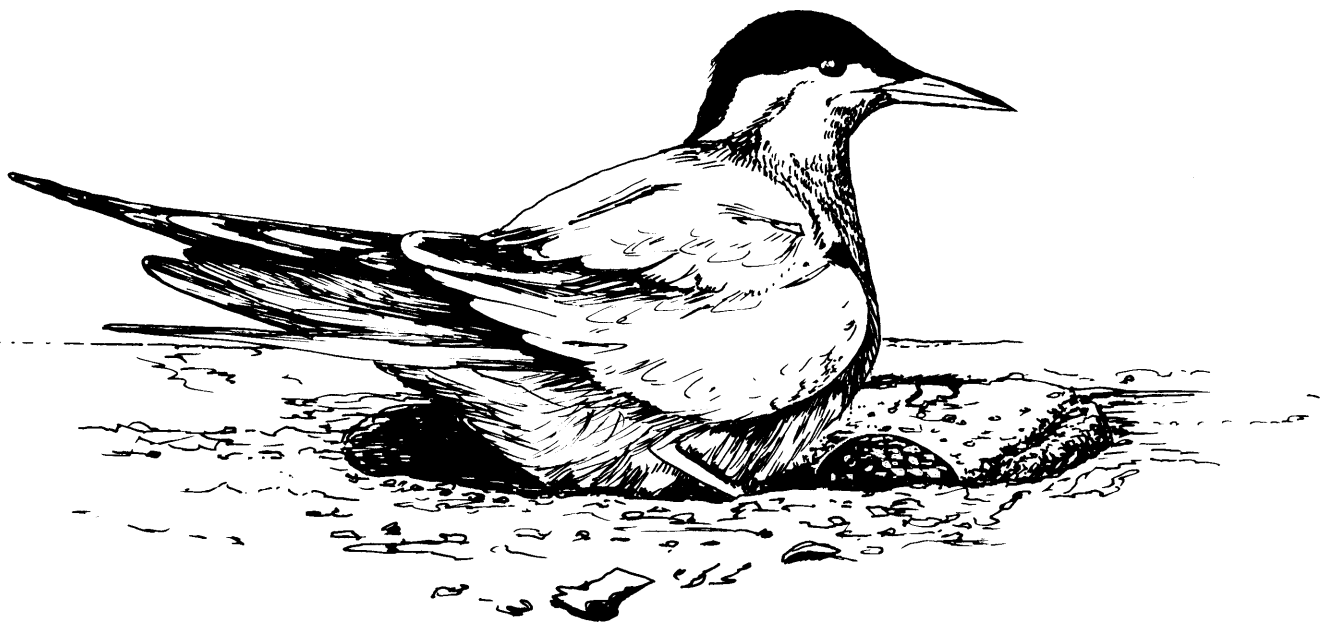
Description: Pigeon-sized. White with black cap and pale gray back and wings. In summer, the common tern has a bright red-orange bill with a black tip. Tail is deeply forked.

Habitat: Lakes, ponds, rivers, coastal beaches and islands.

Food habits: The common tern hovers over a school of fish, then quickly plunges downward, seizing a fish in its bill.

Behavior and Adaptations: Two or three blotched eggs are laid in a depression in the sand that may have a lining of shell fragments or dry grass. Incubation requires about 23 to 26 days. Adult common terns defend eggs and chicks fiercely. They may strike at intruders with their bill or with excrement and cry out loudly and harshly.

Status: The common tern was almost hunted to extinction in the early 1900's, in the height of the plumage trade. The common tern was given full protection in 1913 and had recovered by the 1920's. Today, they are a familiar sight on most bodies of water where protected nesting sites exist.



Herring Gull Fact Sheet

Common Name: Herring Gull

Scientific Name: *Larus argentatus* (LAR-us ar-jen-TAY-tus) – Genus name is Latin for seabird. Species name is Latin for silvery.

Distribution: The herring gull breeds from Alaska and Greenland south to the Carolinas. It is a permanent resident of coastal and tide-water Carolina.

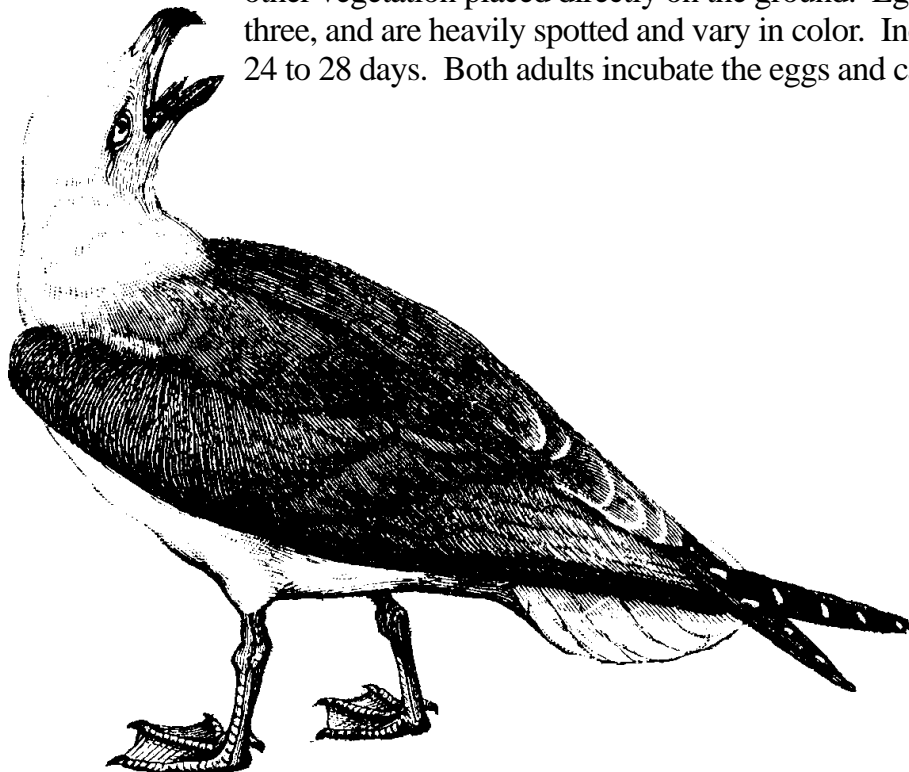
Description: The adult herring gull is white with light gray back and wings. Feet are pink or flesh-colored. The bill is yellow with a red spot near the end. Immature birds are brownish.

Habitat: Lakes, rivers, estuaries and beaches.

Food Habits: The herring gull is a predator of small fish driven to the surface by tuna and other predatory fishes. It forages for wastes and sewage along waterfront towns and cities or at garbage dumps, and follows ships and fishing boats for wastes thrown over-board. The herring gull also feeds on carrion, dead fish, mollusks and crustaceans along mud flats and beaches. The herring gull is known to drop clams and other shell fish on exposed rocks, parking lots or the ground to open them.

Behavior and Adaptations:

In North Carolina, herring gull nests are cup-like mounds of grass and other vegetation placed directly on the ground. Eggs number two or three, and are heavily spotted and vary in color. Incubation lasts from 24 to 28 days. Both adults incubate the eggs and care for the young.



North Carolina's State & Federally Listed Wildlife Species

Coastal Plain Species

	Common Name	Federal Status	State Status	Common Name	Federal Status	State Status
Mammals	Bat, Brazilian free-tailed		SC	Rat, eastern wood		T
	Bat, Rafinesque's big-eared		SC	Shrew, Dismal Swamp southern	T	T
	Cougar, eastern	E	E	Wolf, red	E	E
	Mole, star-nosed		SC			
Birds	Eagle, southeastern bald	E	E	Shrike, loggerhead		SC
	Egret, snowy		SC	Skimmer, black		SC
	Falcon, American eastern peregrine	E	E	Sparrow, Bachman's		SC
	Falcon, Arctic peregrine	T	T	Stork, wood	E	E
	Hawk, Cooper's		SC	Tern, gull-billed		T
	Heron, little blue		SC	Tern, roseate	E	E
	Heron, tricolor		SC	Vulture, black		SC
	Ibis, glossy		SC	Warbler, Kirtland's	E	E
	Pelican, brown		SC	Woodpecker, ivory-billed	E	E
	Plover, piping	T	T	Woodpecker, red-cockaded	E	E
Reptiles	Alligator, American	T	T	Turtle, green (Atlantic)	T	T
	Lizard, mimic glass		SC	Turtle, hawksbill (Atlantic)	E	E
	Snake, Carolina salt marsh		SC	Turtle, Kemp's (Atlantic) ridley	E	E
	Snake, northern pine		SC	Turtle, leatherback	E	E
	Snake, Outer Banks king-		SC	Turtle, loggerhead	T	T
	Terrapin, diamondback		SC			
Amphibians	Frog, Carolina crawfish		SC	Salamander, eastern tiger		T
	Frog, river		SC	Salamander, four-toed		SC
	Salamander, dwarf [silver morph]		SC	Waterdog, Neuse River		SC
Fish	Carpsucker, highfin		SC	Lamprey, least brook		SC
	Chub, Sandhills		S	Madtom, broadtail		SC
	Chub, Thinlip		SC	Madtom, Carolina		SC
	Darter, pinewoods		SC	Shiner, bridle		SC
	Darter, Waccamaw		T	Silverside, Waccamaw	T	T
	Killifish, bluefin		SC	Sturgeon, Atlantic		SC
	Killifish, least		SC	Sturgeon, shortnose	E	E
	Killifish, Waccamaw		SC	Sunfish, Carolina pygmy		T
Mussels	Fatmucket, Waccamaw		T	Lilliput, Savannah		T
	Floater, alewife		SC	Mucket, tidewater		SC
	Floater, barrel		E	Mussel, dwarf wedge	E	E
	Floater, green		E	Mussel, Tar River spiny	E	E
	Floater, triangle		T	Pigtoe, Atlantic		T
	Lampmussel, eastern		SC	Pondmussel, eastern		SC
	Lampmussel, Waccamaw		SC	Slabshell, Roanoke		T
	Lampmussel, yellow		T	Spike, Cape Fear		T
	Lance, pod		SC	Spike, Neuse		E
	Lance, yellow		T	Spike, Waccamaw		T
Snails	Ambersnail, Waccamaw		T	Rams-horn, magnificent		E
	Amnicola, Waccamaw		SC	Siltsnail, Waccamaw		SC
	Ancylid, blackwater		SC	Threetooth, Cape Fear		T
	Rams-horn, Greenfield		SC			

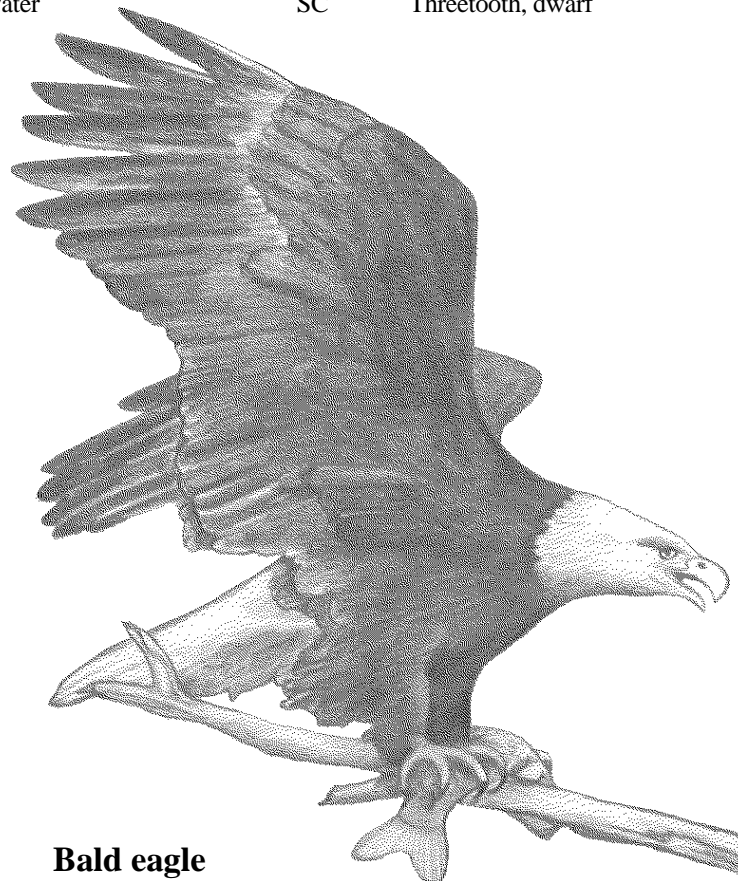
LEGEND

- E** – Listed federally and/or state as endangered
- T** – Listed federally and/or state as threatened
- SC** – State listed as special concern

North Carolina's State & Federally Listed Wildlife Species

Piedmont Species

	Common Name	Federal Status	State Status	Common Name	Federal Status	State Status																																																																																																																																												
Mammals	Bat, Keen's		SC	Cougar, eastern	E	E																																																																																																																																												
	Bat, southeastern		SC				Birds	Eagle, southeastern bald	E	E	Vulture, black		SC	Hawk, Cooper's		SC	Warbler, Bachman's	E	E	Shrike, loggerhead		SC	Warbler, Kirtland's	E	E	Sparrow, Bachman's		SC	Woodpecker, red-cockaded	E	E	Reptiles	Turtle, bog		T				Amphibians	Salamander, four-toed		SC	Salamander, Wehrle's		T	Salamander, mole		SC	Waterdog, Neuse River		SC	Fish	Carp sucker, highfin		SC	Madtom, orangefin		E	Darter, Carolina		SC	Minnow, cutlips		E	Darter, riverweed		SC	Redhorse, river		SC	Jumprock, bigeye		SC	Shiner, Cape Fear	E	E	Lamprey, least brook		SC	Sucker, rustyside		E	Madtom, Carolina		SC				Mollusks	Creekshell, Carolina		SC	Lilliput, Savannah		T	Elktoe, Carolina		SC	Mucket, tidewater		SC	Floater, brook		T	Mussel, dwarf wedge	E	E	Floater, green		E	Mussel, Tar River spiny	E	E	Floater, triangle		T	Pigtoe, Atlantic		T	Heelsplitter, Carolina		E	Slabshell, Roanoke		T	Lampmussel, eastern		SC	Spike, Neuse		E	Lampmussel, yellow		T	Squawfoot		T	Lance, yellow		T				Snails	Ancylid, blackwater	
Birds	Eagle, southeastern bald	E	E	Vulture, black		SC																																																																																																																																												
	Hawk, Cooper's		SC	Warbler, Bachman's	E	E																																																																																																																																												
	Shrike, loggerhead		SC	Warbler, Kirtland's	E	E																																																																																																																																												
	Sparrow, Bachman's		SC	Woodpecker, red-cockaded	E	E																																																																																																																																												
Reptiles	Turtle, bog		T																																																																																																																																															
Amphibians	Salamander, four-toed		SC	Salamander, Wehrle's		T																																																																																																																																												
	Salamander, mole		SC	Waterdog, Neuse River		SC																																																																																																																																												
Fish	Carp sucker, highfin		SC	Madtom, orangefin		E																																																																																																																																												
	Darter, Carolina		SC	Minnow, cutlips		E																																																																																																																																												
	Darter, riverweed		SC	Redhorse, river		SC																																																																																																																																												
	Jumprock, bigeye		SC	Shiner, Cape Fear	E	E																																																																																																																																												
	Lamprey, least brook		SC	Sucker, rustyside		E																																																																																																																																												
	Madtom, Carolina		SC																																																																																																																																															
Mollusks	Creekshell, Carolina		SC	Lilliput, Savannah		T																																																																																																																																												
	Elktoe, Carolina		SC	Mucket, tidewater		SC																																																																																																																																												
	Floater, brook		T	Mussel, dwarf wedge	E	E																																																																																																																																												
	Floater, green		E	Mussel, Tar River spiny	E	E																																																																																																																																												
	Floater, triangle		T	Pigtoe, Atlantic		T																																																																																																																																												
	Heelsplitter, Carolina		E	Slabshell, Roanoke		T																																																																																																																																												
	Lampmussel, eastern		SC	Spike, Neuse		E																																																																																																																																												
	Lampmussel, yellow		T	Squawfoot		T																																																																																																																																												
	Lance, yellow		T																																																																																																																																															
Snails	Ancylid, blackwater		SC	Threetooth, dwarf		SC																																																																																																																																												



Bald eagle

North Carolina's State & Federally Listed Wildlife Species

Mountain Species

	Common Name	Federal Status	State Status	Common Name	Federal Status	State Status
Mammals	Bat, gray	E	E	Mole, star-nosed		SC
	Bat, Indiana	E	E	Rat, eastern wood		SC
	Bat, Keen's		SC	Squirrel, Carolina northern flying	E	E
	Bat, Rafinesque's big-eared		SC	Shrew, long-tailed		SC
	Bat, small-footed		SC	Shrew, pygmy		SC
	Bat, southeastern		SC	Shrew, water		SC
	Bat, Virginia big-eared	E	E	Vole, rock		SC
	Cougar, eastern	E	E			
Birds	Chickadee, black-capped		SC	Kinglet, golden-crowned		SC
	Eagle, southeastern bald	E	E	Owl, northern saw-whet		SC
	Falcon, American eastern peregrine	E	E	Shrike, loggerhead		SC
	Flycatcher, olive-sided		SC	Vulture, black		SC
	Hawk, Cooper's		SC	Wren, Bewick's		E
Reptiles	Snake, eastern smooth green		SC	Turtle, eastern spiny softshell		SC
	Snake, northern pine		SC	Turtle, stripeneck musk		SC
	Turtle, bog		T			
Amphibians	Frog, mountain chorus		SC	Salamander, Junaluska		SC
	Hellbender, eastern		SC	Salamander, longtail		SC
	Mudpuppy		SC	Salamander, mole		SC
	Salamander, crevice		SC	Salamander, Weller's		SC
	Salamander, four-toed		SC	Salamander, zigzag		SC
	Salamander, green		E			
Fish	Carp sucker, river		SC	Drum, freshwater		T
	Chub, rosyface		T	Lamprey, American brook		T
	Chub, spotfin	T	T	Logperch		T
	Dace, rosieside		SC	Logperch, blotchside		E
	Darter, blueside		SC	Madtom, mountain		SC
	Darter, dusky		E	Minnnow, Kanawha		SC
	Darter, longhead		SC	Mooneye		SC
	Darter, olive		SC	Paddlefish		E
	Darter, sharphead		T	Sculpin, banded		T
	Darter, sharpnose		SC	Shiner, striped		T
	Darter, Tennessee snubnose		SC	Shiner, yellowfin		SC
	Darter, turquoise		SC	Stonecat		E
	Darter, wounded		SC	Sturgeon, lake		SC
	Mussels	Creekshell, mountain		T	Mussel, slippershell	
Elktoe, Appalachian			E	Pigtoe, Tennessee		E
Floater, brook			T	Pistolgrip		E
Floater, green			E	Rainbow, Alabama		SC
Heelsplitter, Tennessee			E	Spike		SC
Lampmussel, wavy-rayed			SC	Elimia, knotty		E
Mussel, littlewing pearly		E	E	Mudalia, seep		T
Snails	Coil, fringed		SC	Glyph, fragile		E
	Coil, spiral		SC	Glyph, honey		SC
	Covert, big-tooth		T	Glyph, pink		SC
	Covert, Clingman		T	Lancetooth, blue-foot		SC
	Covert, engraved		T	Mantleslug, black		SC
	Covert, Smoky Mountain		T	Slitmouth, Great Smoky		SC
	Covert, velvet		SC	Supercoil, glossy		SC
	Crater, queen		SC	Supercoil, high mountain		SC
	Disc, saw-tooth		SC	Supercoil, lamellate		SC
	Dome, bidentate		SC	Supercoil, Mirey Ridge		SC
	Globe, dwarf proud		SC	Supercoil, open		SC
	Globe, noonday	T	T	Supercoil, ramp cove		SC
	Gloss, Appalachian		SC	Supercoil, Roan		T
	Glyph, dark		SC	Supercoil, sculpted		T

SCHEDULING WORKSHEET

Date request received _____ Request received by _____

1) Name of group (school) _____

2) Contact person _____
name phone (work) (home)

address

3) Day/date/time of requested program _____

4) Program desired and program length _____

5) Meeting place _____

6) Time of arrival at park _____ Time of departure from park _____

7) Number of students _____ Age range (grade) _____
 (Note: A maximum of 30 participants is recommend.)

8) Number of chaperones _____
 (Note: 1 adult for every 10 students is recommended.)

9) Areas of special emphasis _____

10) Special considerations of group (e.g. allergies, health concerns, physical limitations) _____

11) Have you or your group participated in park programs before? If yes, please indicate previous programs attended: _____

12) Are parental permission forms required? _____ If yes please use the Parental Permission form on page 9.2.?

I, _____, have read the entire Environmental Education Learning Experience and understand and agree to all the conditions within it.

Return to: Fort Fisher State Recreation Area
 P.O. Box 243
 Kure Beach, NC 28449

PARENTAL PERMISSION FORM

Dear Parent:

Your child will soon be involved in an exciting learning adventure – an environmental education experience at _____. Studies have shown that such “hands-on” learning programs improve children’s attitudes and performance in a broad range of school subjects.

In order to make your child’s visit to “nature’s classroom” as safe as possible we ask that you provide the following information and sign at the bottom. Please note that insects, poison ivy and other potential risks are a natural part of any outdoor setting. We advise that children bring appropriate clothing (long pants, rain gear, sturdy shoes) for their planned activities.

Child’s name _____

Does your child:

- Have an allergy to bee stings or insect bites? _____
If so, please have them bring their medication and stress that they, or the group leader, be able to administer it.
- Have other allergies? _____
- Have any other health problems we should be aware of? _____

- In case of an emergency, I give permission for my child to be treated by the attending physician. I understand that I would be notified as soon as possible.

Parent’s signature _____
date

Parent’s name _____ Home phone _____
(please print) Work phone _____

Family Physician’s name _____ phone _____

Alternate Emergency Contact

Name _____ phone _____

**NORTH CAROLINA PARKS & RECREATION
PROGRAM EVALUATION**

Please take a few moments to evaluate the program(s) you received. This will help us improve our service to you in the future.

1. Program title(s) _____ Date _____
Program leader(s) _____

2. What part of the program(s) did you find the most interesting and useful? _____

3. What part(s) did you find the least interesting and useful? _____

4. What can we do to improve the program(s)? _____

5. General comments _____

**LEADERS OF SCHOOL GROUPS AND OTHER ORGANIZED YOUTH GROUPS
PLEASE ANSWER THESE ADDITIONAL QUESTIONS:**

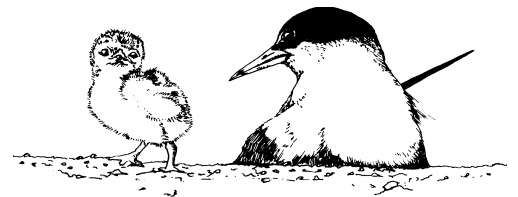
6. Group (school) name _____

7. Did the program(s) meet the stated objectives or curriculum needs? _____
If not, why? _____

Please return the completed form to park staff. Thank you.

Fort Fisher State Recreation Area
P.O. Box 243
Kure Beach, NC 28449

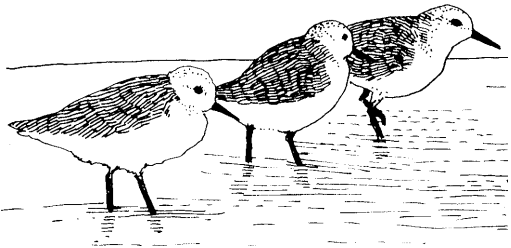
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