

The Nature
Conservancy 
Protecting nature. Preserving life.™

Wings & Water

Field Guide

to the Great Salt Lake Shorelands Preserve

TEACHER'S GUIDE

A Wings & Water Field Guide to the Great Salt Lake Shorelands Preserve: Teacher Guide

Introduction

Thank you for participating in The Nature Conservancy's *Wings & Water* Wetlands Education Program. This tailored, hands-on wetlands experience was designed to meet state core curriculum science standards, and give your 4th-grade students the opportunity to gain a greater appreciation for the Great Salt Lake wetlands and ecosystem.

The *Wings & Water* Student Discovery Guide is a fundamental tool in this program. Your class will love this fun, activity-filled student journal and field guide. Designed by educators, the Discovery Guide contains lesson ideas and exercises, and in combination with this Teacher Guide, will help you assess your students' learning using writing composition, vocabulary, word games and more.

The *Wings & Water* Program also includes a naturalist-guided tour at the Great Salt Lake Shorelands Preserve, pre- and post-tour activities and teacher workshops to help you incorporate core science curriculum standards into your classroom. Visit www.nature.org/wingsandwater or call (801) 531-0999 for more information.

table of contents

Our Visit to the GSL Shorelands Preserve	2
Thinking Ahead	3
Worlds Within Wetlands	4-7
Words for the Wetlands	8-9
Reflections	10-13
Careful Conservation	14
Wetlands Species List	15
Visitor Center Map	16
Composite Poetry	17
I Was There	18-19
Appendix A	20
Appendix B	21



Our **visit** to the Great Salt Lake Shorelands Preserve

My Field Trip Checklist

Check off the things listed below that your teacher says you **need to bring** with you for your field trip to the Great Salt Lake Shorelands Preserve.

- | | | |
|--|--|---|
| <input type="checkbox"/> this Discovery Guide | <input type="checkbox"/> a hat for shade | <input type="checkbox"/> warm jacket or sweater |
| <input type="checkbox"/> 2 sharp pencils | <input type="checkbox"/> sunscreen | <input type="checkbox"/> lunch |
| <input type="checkbox"/> unbreakable bottle of water | <input type="checkbox"/> a raincoat | |
| <input type="checkbox"/> _____ | | |

Wills and Won'ts

Using the lists below, check off things you will and won't do while on your tour at the Preserve. The extra space is for you to add anything else you might think of.

During my time at the Preserve **I WILL:**

- | | |
|---|---|
| <input type="checkbox"/> be polite and pay attention to my tour guide | <input type="checkbox"/> keep my eyes and ears open |
| <input type="checkbox"/> be helpful to my tour group | <input type="checkbox"/> ask thoughtful questions |
| <input type="checkbox"/> _____ | |

During my time at the Preserve **I WILL NOT:**

- | | |
|--|--|
| <input type="checkbox"/> run on the boardwalk | <input type="checkbox"/> throw things |
| <input type="checkbox"/> speak louder than necessary | <input type="checkbox"/> climb on any exhibits |
| <input type="checkbox"/> move ahead of my tour guide | <input type="checkbox"/> pick wetlands plants |

TEACHER'S NOTES ABOUT THIS PAGE

FOR FALL INSTRUCTION

- Part of Pre-Tour Topic #5: Final Preparations.

FOR SPRING INSTRUCTION

- Part of Pre-Tour Topic #5: Final Preparations.

Thinking Ahead



I think I know...

Something I know about the Great Salt Lake is:

(Answers will vary.)

My LFT's

An LFT is something you **Look Forward To** during your tour at the Great Salt Lake Shorelands Preserve. Fill in the spaces below to share a few of your own LFT's.

Things I expect to see or learn about during my visit to the Preserve are:

1. *(Answers will vary.)*

2. *(Answers will vary.)*

Questions about Great Salt Lake wetlands that I hope to have answered:

1. *(Answers will vary.)*

2. *(Answers will vary.)*

TEACHER'S NOTES ABOUT THIS PAGE

FOR FALL INSTRUCTION

- Part of Pre-Tour Topic #5: Final Preparations.

FOR SPRING INSTRUCTION

- Part of Pre-Tour Topic #5: Final Preparations.

Worlds Within Wetlands

Wetlands: What Good Are They?

1. Use your own words to write a definition for wetlands here:

Suggested Answer:

*A wetland is a habitat with **surface water** at least part of the year, **hydric** or special kinds of **soil**, and specially adapted **plants**.*

*(This definition should include three the **bold** elements shown)*

2. Why are most Great Salt Lake wetlands found on the eastern side of the lake?

Some Suggested Answers: Water flows down from nearby mountains.

Wind and waves bring nutrients and sediments. Human industrial development has happened on the western parts of the lake. There has been more conservation on the east side.

3. Imagine someone thinking that wetlands are useless! List three things you could say to someone who asked, “What good are wetlands, anyway?”

a. _____

b. *A list of wetland benefits is provided in the Teacher Background Sections of Topic #1 in the SPRING PRE-TOUR CLASSROOM GUIDE and Fall POST-TOUR CLASSROOM GUIDE.*

c. _____

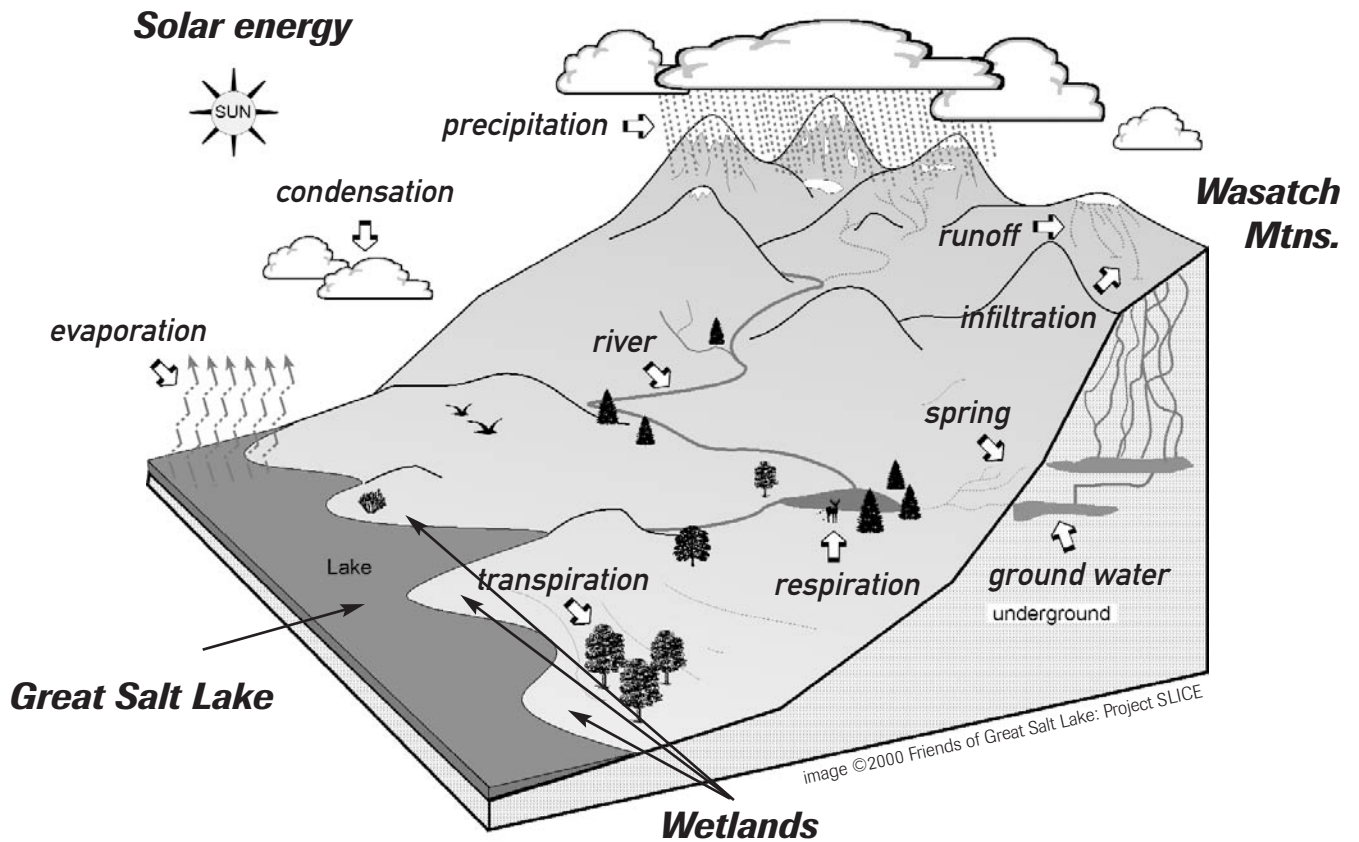
TEACHER’S NOTES ABOUT THIS PAGE

FOR FALL INSTRUCTION

- Correlates to Post-Tour Topic #1: Wetlands.

FOR SPRING INSTRUCTION

- Correlates to Pre-Tour Topic #1: Wetlands.



The Water Cycle: A Never-Ending Tour

1. This drawing shows some important parts of our Great Salt Lake Watershed. Use the following list to label and color the matching parts in the picture: **Solar Energy (yellow)**/ **Great Salt Lake (blue)**/ **Wetlands (green)**/ **Wasatch Mountains (brown or dark green)**
2. Each arrow in the drawing points to something involved in a different part of the water cycle. Label each arrow using the following list: **Condensation/Precipitation/Evaporation/Runoff/Transpiration/Respiration/Infiltration/A Spring/Groundwater/A River**
3. Every second, there are different water molecules in a different place in the water cycle. Imagine you are one of those molecules. Beginning in a raindrop from a cloud, use your pencil to draw a line that connects four or more different places you might go after you leave that cloud in your journey through part of the water cycle. Number each place (1, 2, 3...) in your journey, with the number "1" being in the cloud you started from. Many combinations are possible.

TEACHER'S NOTES ABOUT THIS PAGE

FOR FALL INSTRUCTION

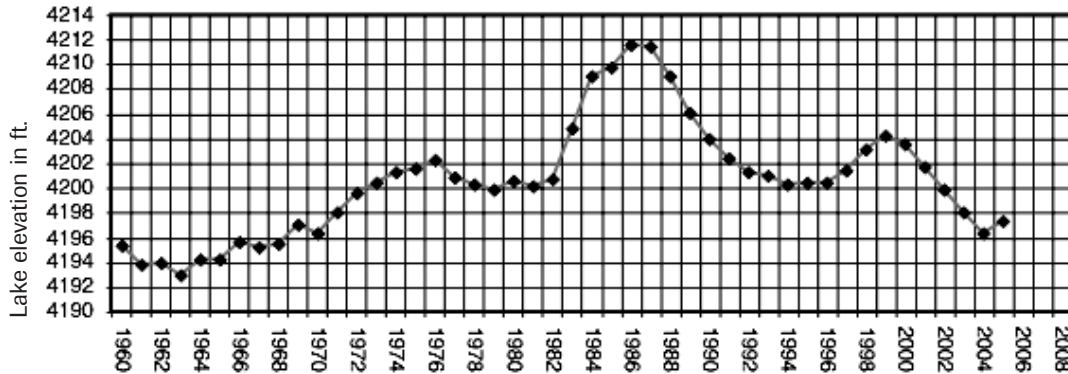
- An optional part of Pre-Tour Topic #2: The Water Cycle.
- An optional part of Post-Tour Topic #2: Watersheds & Wetlands.

FOR SPRING INSTRUCTION

- Part of Pre-Tour Topic #2: The Water Cycle.

Weather & Climate: Patterns of Change

Use this graph of Great Salt Lake levels to answer the first two questions.



1. During which year would Great Salt Lake wetlands have been most filled with water? 1986
2. During which year would Great Salt Lake wetlands have been driest? 1963
3. What two factors cause the Great Salt Lake to change from year to year?

Precipitation

Evaporation

(Other acceptable answers: rainfall, snowfall, temperature, cloud cover.)

4. What is a relationship between the level of the Great Salt Lake and its wetlands?
Some Suggested Answers:
The water level of the lake determines where and how much water is in the wetlands.
The water level of the lake shifts the locations of shorelines, playa and nesting habitat.
The water level of the lake affects how much salt is in the wetlands.
5. Imagine you are a bird who came to the Great Salt Lake last year and found a perfect place for food and shelter. But this year, you return to find that there is too much or not enough water in that same place. What can you do?

Suggested Answer:

Try to find another part of the lake with the habitat you need.

TEACHER'S NOTES ABOUT THIS PAGE

FOR FALL INSTRUCTION

- Part of Post-Tour Topic #6: Weather & Climate Data.

FOR SPRING INSTRUCTION

- Part of Pre-Tour Topic #3: Weather & Climate.

Adaptations: Nature’s Problem-Solvers

- Write your definition for “Adaptation.”

Suggested Answer:

*An **inherited** feature that helps a plant or animal **survive**.*

(This definition should include the two bold elements shown.)

- Use the following chart to name a plant and an animal that you know about, and then give an example of a physical and a behavior adaptation for each.

Species	Physical adaptation	Behavior adaptation
<i>Many Answers Are Possible.</i> <hr/> Plant	<i>Many Answers Are Possible.</i>	<i>Many Answers Are Possible.</i>
<i>Many Answers Are Possible.</i> <hr/> Animal	<i>Many Answers Are Possible.</i>	<i>Many Answers Are Possible.</i>

For a list of suggested answers, see “A Partial List of Adaptations of Utah Wetlands Plants and Animals” at the end of this document.

- How would you explain to a friend why different species of plants or animals have different adaptations?

Suggested Answer:

Different species of plants & animals have different adaptations

because their needs for survival are different.

- Circle the things in the following list that are not really biological adaptations: a seed / a feather / migration / water / waterproof boots / webbed feet / teeth / green leaves.

TEACHER’S NOTES ABOUT THIS PAGE

FOR FALL INSTRUCTION

- An optional part of Pre-Tour Topic #4: Adaptations.
- An optional part of Post-Tour topic #4 Plants & Animals.

FOR SPRING INSTRUCTION

- An optional part of Pre-Tour Topic #4: Adaptations.

Words for the Wetlands



TEACHER'S NOTES ABOUT THIS PAGE

This page and page 9 provide answers to the two word games in the Student Discovery guide. Use these games as opportunities for student free time, field trip travel or other options as desired.

Clue Jumble

Puzzle Solution

Jumble Words

- | | |
|----------------|---------------------------------|
| 1. SWELDTNA | <u>W</u> E T L A N D S |
| 2. AAIDOTPANT | <u>A</u> D A P T A T I O N |
| 3. OTESSMCEY | <u>E</u> C O S Y S <u>T</u> E M |
| 4. NTNOIVERENM | E N V I <u>R</u> O N M E N T |
| 5. AMSHR | M A R <u>S</u> H |
| 6. AABHTTI | <u>H</u> A B I T A T |
| 7. EPEVRSER | P R <u>E</u> S E R V E |
| 8. ESDEIMTSN | S E <u>D</u> I M E N T S |

Jumble Clues

1. Places with water at or near the surface that creates a unique environment with special (hydric) soils and specially adapted plants and animals.
2. How a species looks or behaves that helps it survive in its environment.
3. A community of plants, animals and microorganisms interacting in an environment that supplies them with everything they need to survive.
4. The combination of all living and nonliving things where something lives, including climate, soil, topography, and other plants and animals.
5. A type of wetland near ponds and lakes, with mostly nonwoody plants growing with their roots in water and their tops in the air.
6. The natural home of a plant, animal or microorganism.
7. A place where people try to protect the workings of a community of living things from outside damage or interference.
8. Soil, sand, and minerals that have been transported by wind and water and accumulated in a new area.

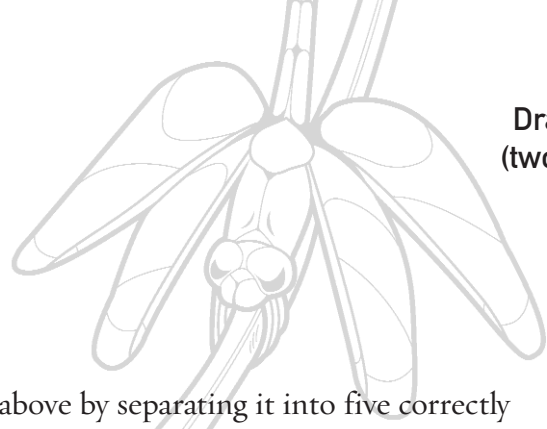
Secret Jumble Clue

All land and water connected by the flow of a river that drains into a particular body of water.

Solution:

W A T E R S H E D

Reflections



Dragonfly
(two wings)

Habitats: *Haftahavahabitat*

1. Make sense of the silly made-up title above by separating it into five correctly spelled and not-so-silly words that finish this sentence:

If you are going to survive, you Have to have a habitat.

2. Write a sentence of your own that explains why habitat is so important to survival.

Sample Answers: Everyone needs somewhere to live. Habitats have food, shelter, water and other things animals need. Other answers are possible.

3. What words would you use to describe the kind of soil sample your group examined during the Preserve tour?

Bulrush soil: wet, full of plant material, soggy, darker, more decomposing plants.
Saltgrass soil: smooth, salty, grainy, light, clay-like.

What plant seemed to grow best in that soil? *depending on the assigned group,*
Bulrush or Saltgrass.

4. Why does it matter what kind of soil there is in a habitat?

Suggested Answer: Soil is food for plants and plants are food and shelter for the animals who use the habitat.

5. Describe something you know about wetlands that you could teach someone else.

Suggested Answer: Answers will vary and could encompass topics such as habitat, plants, animals, conservation, adaptations, water cycle, soil, weather.

TEACHER'S NOTES ABOUT THIS PAGE

FOR FALL INSTRUCTION

- Part of Post-Tour Topic #3: Soils.

FOR SPRING INSTRUCTION

- Part of Post-Tour Topic #2: Soils.

Adaptations: Secrets to Success

Use the spaces below on the left to write the names of a wetland plant and two animals you learned about. Then draw lines connecting each species to any adaptations it has from the list on the right. Use a different color for each species. How many connections can you make?

Species	Adaptations
<p><i>Three square bulrush</i> Wetland Plant</p> <hr/> <p><i>Fox</i> Wetland Animal</p> <hr/> <p><i>Wilson's phalarope</i> Wetland Animal</p>	<ul style="list-style-type: none"> Beak Bright colors Builds nest Camouflage Coughs up pellets Eats insects Eats plants Feathers Floats on water Fur Good eyesight Green leaves Grows in salty soil Grows in soggy soil Hibernation Hunts other animals Lays eggs Lives in groups Long legs Metamorphosis Migration Seeds Sharp teeth Sings Strong sense of hearing Strong sense of smell Strong stems Toes that grip Triangular shape Webbed feet

Shown are just three of many possible plants and animals and associated adaptations. For a list of more possibilities, see "A Partial List of Adaptations of Utah Wetlands Plants & Animals" at the end of this document.

TEACHER'S NOTES ABOUT THIS PAGE

FOR FALL INSTRUCTION

- Part of Post-Tour Topic #4: Plants & Animals.

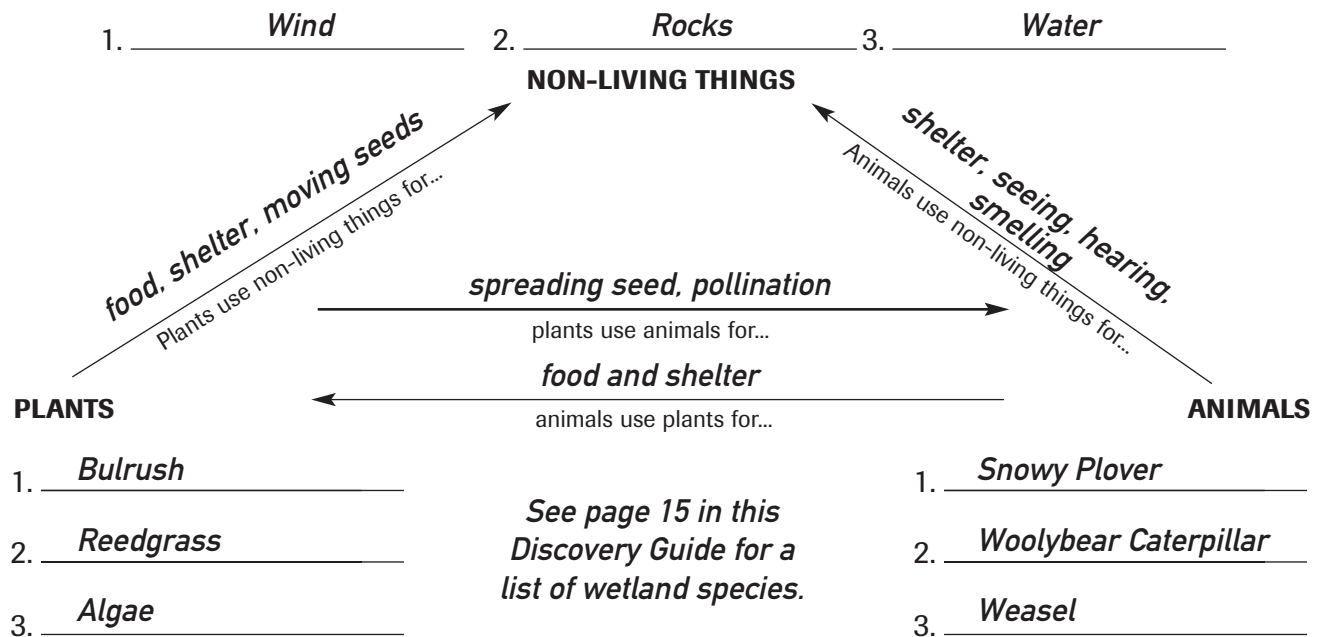
FOR SPRING INSTRUCTION

- Part of Post-Tour Topic #3: Plants & Animals.

For further information about wetland plant and animal adaptations, access the various Fact Sheets at www.nature.org/wingsandwater.

Interrelationships: Nothing Stands Alone

Shown are just three of the several examples of nonliving things. For more ideas, see the "Non-Living Factors" list provided at the end of this document.



1. What plants, animals and non-living things can we find in a wetland? Write three examples for each in the numbered spaces provided in the diagram.
2. Finish the sentences started beneath each of the four arrows in the diagram by writing on the lines of each arrow.
3. Write a sentence that describes how a wetland plant, an animal and a non-living thing are all dependent on each other.

Sample response: Soil comes from dead animals and plants, plants need soil to grow, animals need plants to hide, and for food.

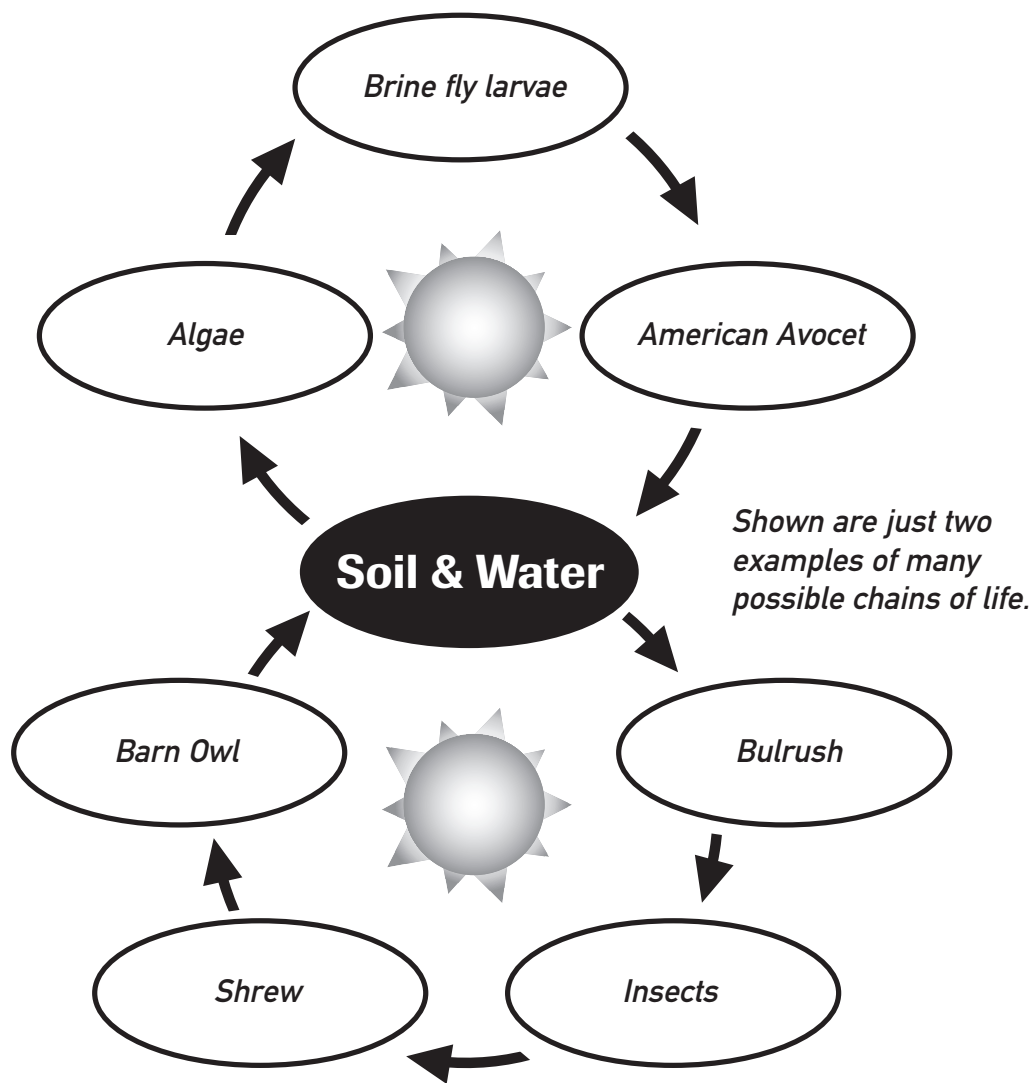
TEACHER'S NOTES ABOUT THIS PAGE

FOR FALL INSTRUCTION

- Part of Post-Tour Topic #5: Interrelationships.

FOR SPRING INSTRUCTION

- Part of Post-Tour Topic #4: Interrelationships.



Life Links

Using the diagram above, write the name of a different species in each oval to correctly show the relationship between plants, animals and soil. For some ideas, look at the illustration in the centerfold of this guide or the species list on page 15.

TEACHER'S NOTES ABOUT THIS PAGE

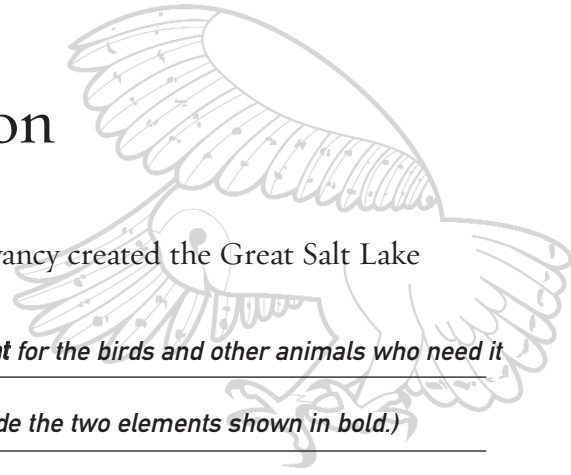
FOR FALL INSTRUCTION

- Part of Post-Tour Topic #5: Interrelationships.

FOR SPRING INSTRUCTION

- Part of Post-Tour Topic #4: Interrelationships.

Careful Conservation



1. Why do you think The Nature Conservancy created the Great Salt Lake Shorelands Preserve?

*Sample Response: To **protect wetland habitat** for the birds and other animals who need it to survive. (Student responses should include the two elements shown in bold.)*

2. Why should people try to protect wetlands at the Great Salt Lake?

Sample Response: To keep them safe for future generations of people and wildlife because they are an important habitat. (answers will vary)

3. Describe two threats to our Great Salt Lake wetlands:

Sample Response: pollution, real estate development, no water, non-native plants.

4. What can The Nature Conservancy do to keep our wetlands safe for wildlife?

Sample Responses: educate people, protect wetlands, restore wetlands.

5. What can you and your classmates do to help protect our Utah wetlands?

Sample Responses: Tell others about wetlands, bring family and friends to the visitor center, conserve water, share knowledge of wetlands with others.

To learn more about how you can help, visit www.nature.org/utah

TEACHER'S NOTES ABOUT THIS PAGE

FOR FALL INSTRUCTION

- Part of Post-Tour Topic #7: Wetlands & You.

FOR SPRING INSTRUCTION

- Part of Post-Tour Topic #5: Wetlands & You.

Wetlands Species List

Here is a list of some of the plants and animals living in our Great Salt Lake wetlands.

Plants

common duckweed
hardstem bulrush
common cattail
common reed
threesquare bulrush
saltgrass
pickleweed
thistle
seepweed

Amphibians, Reptiles and Mammals

northern chorus frog
common garter snake
coyote
deer mouse
long-tailed weasel
meadow vole
muskrat
raccoon
red fox
striped skunk
shrew

Birds We Might Hear or See in the Distance

American avocet*
American white pelican
black-necked stilt*
long-billed curlew*
snowy plover*
white-faced ibis*
Wilson's phalarope*
Canada goose*
great blue heron
sandhill crane
snowy egret
American kestrel*
bald eagle
red-tailed hawk
rough-legged hawk
Swainson's hawk
California gull
Franklin's gull*
Black tern*
Caspian tern
Common tern
Forster's tern*

Birds We Might Hear or See from the Boardwalk

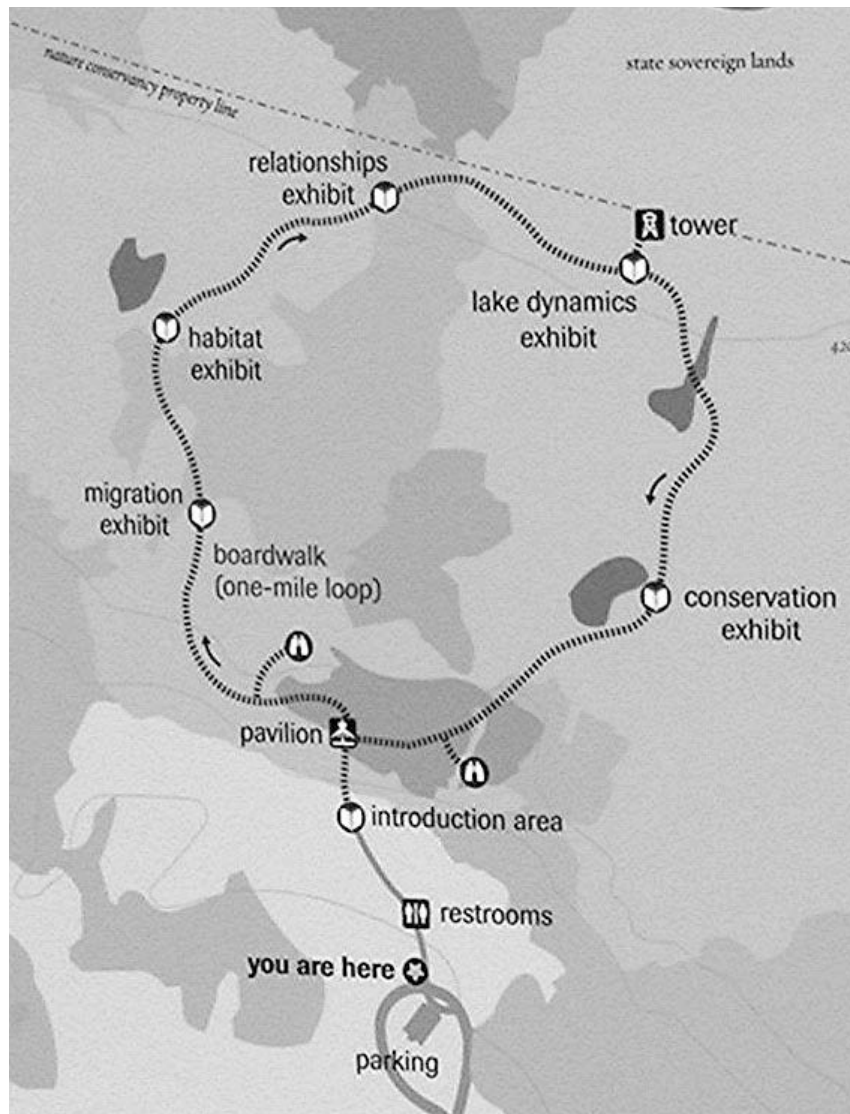
barn owl*
marsh wren*
red-winged blackbird*
sora*
cinnamon teal*
western meadowlark*
black-billed magpie*
American crow
common raven*
yellow-headed blackbird*
northern harrier*

* Birds known to nest at the Preserve.

TEACHER'S NOTES ABOUT THIS PAGE

This page can be a useful reference for completing Discovery Guide pages 7, 11, 12 and 13.

The Great Salt Lake Shorelands Preserve Visitor Center



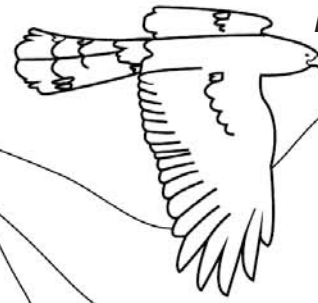
TEACHER'S NOTES ABOUT THIS PAGE

This page can be a useful reference for students reflecting on their tour experience at the Preserve.

Wasatch Mountains

Red-tailed hawk

I Was There



Reedgrass

Midges

Red Fox

Marsh wren

Long-tailed weasel

Water snails

Duckweed

Marsh

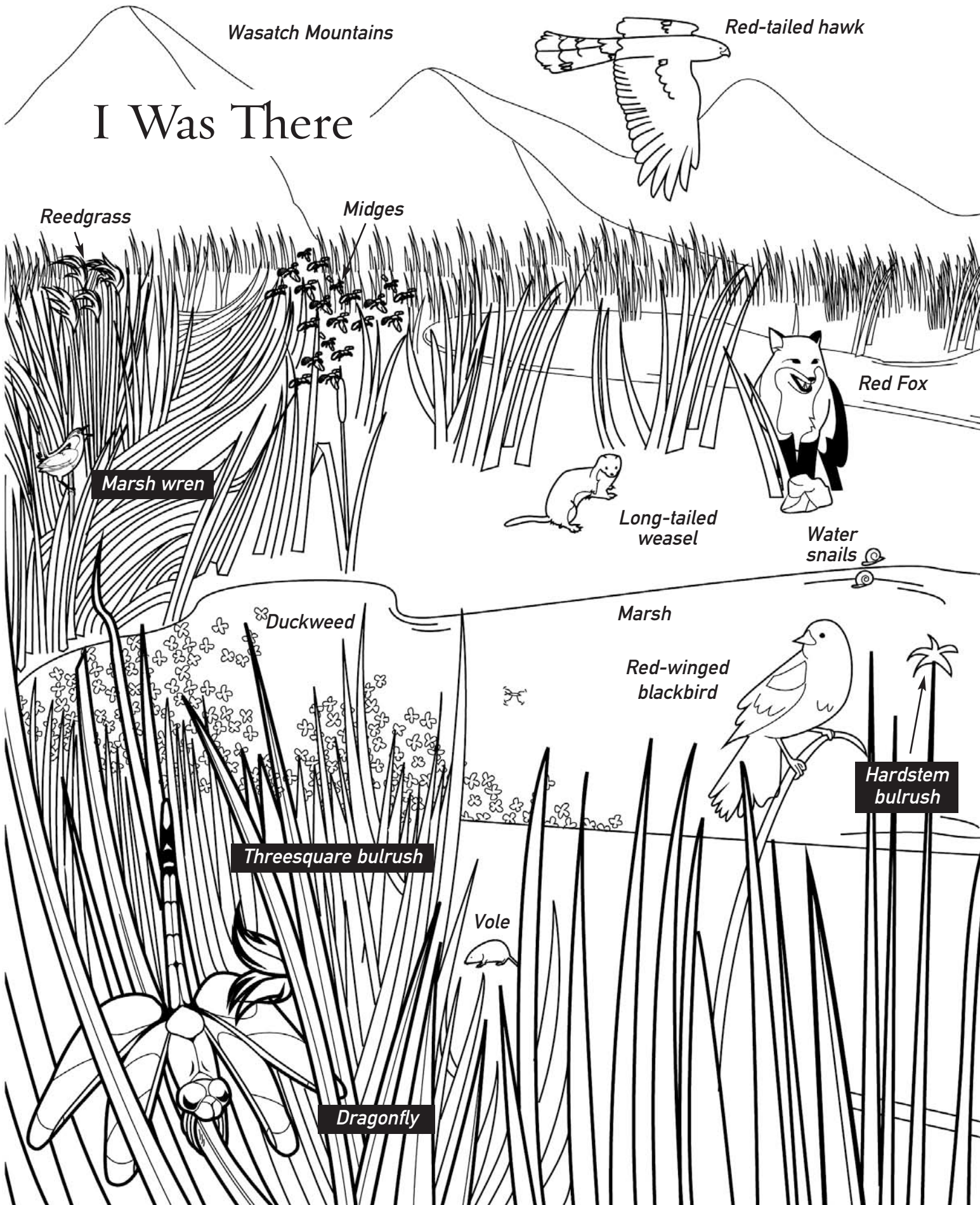
Red-winged blackbird

Hardstem bulrush

Threesquare bulrush

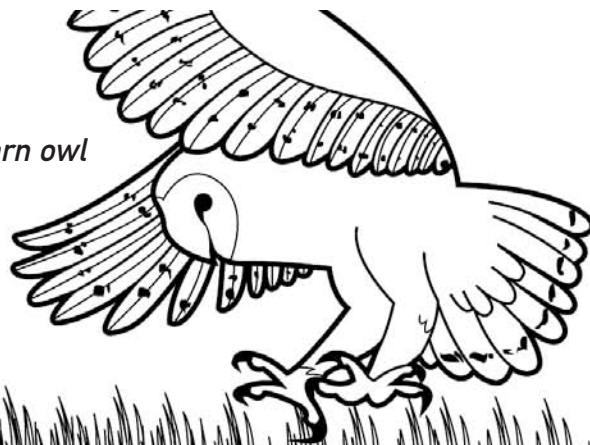
Vole

Dragonfly



Do you recognize this scene? Can you identify some plants and animals you recognize? Use this illustration to show what you now know about the Great Salt Lake wetlands. How? By labeling everything you can.

Barn owl



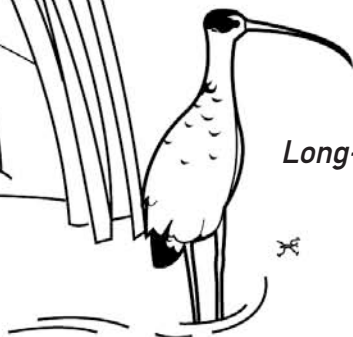
Snowy egret



American white pelican



Long-billed curlew



Water strider



Muskrat



Banded woollybear caterpillar



Striped skunk

Praying mantis



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A Partial List of Adaptations of Utah Wetlands Plants & Animals

There are literally thousands of adaptations possessed by plants and animals of Utah wetlands. This list emphasizes adaptations of species more likely to be seen at the Great Salt Lake Shorelands Preserve.

PLANTS

Float on Water

algae
duckweed

Green Leaves

cattails
duckweed
hardstem bulrush
pickleweed
reedgrass
salt grass
threesquare bulrush

Grow in Salty Soil

pickleweed
saltgrass

Grow in soggy soil

cattails
hardstem bulrush
reedgrass
threesquare bulrush

Produce Seeds

cattails
hardstem bulrush
pickleweed
reedgrass
saltgrass
threesquare bulrush

Produce Spores

duckweed

Roots Under Water

Duckweed
bulrushes
cattails
reeds

Rigid Stems

bulrushes
cattails
reeds

ANIMALS

Beak

all birds, including specific size,
length and shape

Bright Colors

dragonfly
female phalaropes
red-winged blackbird
western meadowlark
yellow-headed blackbird

Builds Nests

all birds
meadow vole
muskrats
shrew
weasel

Camouflage

long-billed curlew
marsh wren
mosquitoes
most mammals
praying mantis
snowy plover

Cough Up Pellets

all raptors
gulls
owls

Eat Insects

dragonflies
most birds
shrews
skunks

Eat Plants

many ducks and geese
praying mantis
voles
wooly bear caterpillar

Feathers

All birds

Feeding

Many birds have very distinctive feeding behaviors. Consult the *Wetlands Birds Fact Sheets* for details.

Fur

all mammals
banded woollybear

Good Eyesight

owls, hawks & eagles
most birds
most predators

Hibernation

chorus frog
garter snake
wooly bear caterpillar

Hunt Other Animals

chorus frog
coyote
fox
garter snake
long-tailed weasel
most birds (insects)
muskrat (crustaceans)
owls, hawks & eagles
praying mantis

Lay Eggs

all birds
chorus frogs
some snakes

Live In Groups

chorus frogs
midge
some birds

Long Legs

American avocet
black-necked stilt
great blue heron
sandhill cranes
water strider
white-faced ibis
Other shorebirds

Metamorphosis

Caterpillars and adults
chorus frog

Migration

most birds

Sharp Teeth

coyote
fox
long-tailed weasel
raccoon
shrews

Sing

frogs
meadowlark
other birds

Good Hearing

coyote
fox
owls
raccoon
weasel

Strong Sense Of Smell

coyote
fox
raccoon
weasel

Toes That Grip

chorus frog
most birds
raccoon
weasel

Webbed Feet

beaver
ducks & geese
pelicans
swans
other water birds

Non-Living (Abiotic) Factors

Important to Wetlands Ecology

Water (clouds, streams, precipitation, snow, ice, etc.)

Air (oxygen, carbon dioxide, etc.)

Temperature

Wind

Rocks

Minerals

Sediments

Odors

Chemistry (salts, acids, bases, etc.)

Landscapes (mountains, slopes, valleys, etc.)

Light (sunlight, moonlight, starlight)

Sound

Gravity

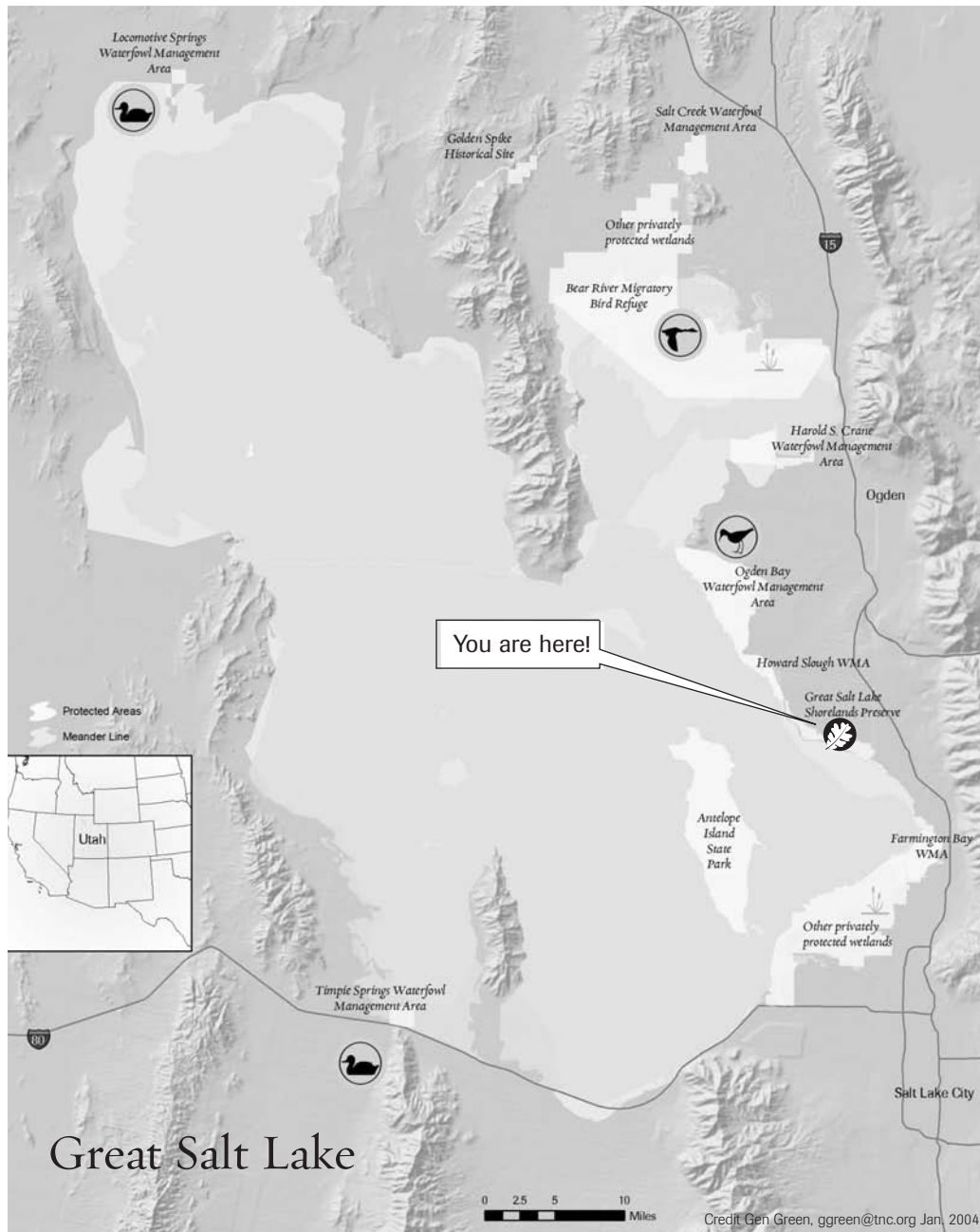
Magnetism

Lightning

Time

Seasons

Weather (storms, floods, draughts, etc.)



About The Nature Conservancy's Great Salt Lake Shorelands Preserve

The Great Salt Lake Shorelands Preserve and Visitor Center is about 4,000 acres of land that is protected by The Nature Conservancy. Millions of birds who visit the Great Salt Lake every year will always be able to find food and shelter here. The Nature Conservancy is an organization that works all over the world to protect lands and waters that plants and animals need to survive. To learn more about The Nature Conservancy, visit our website: www.nature.org/utah or contact us at (801) 531-0999.



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