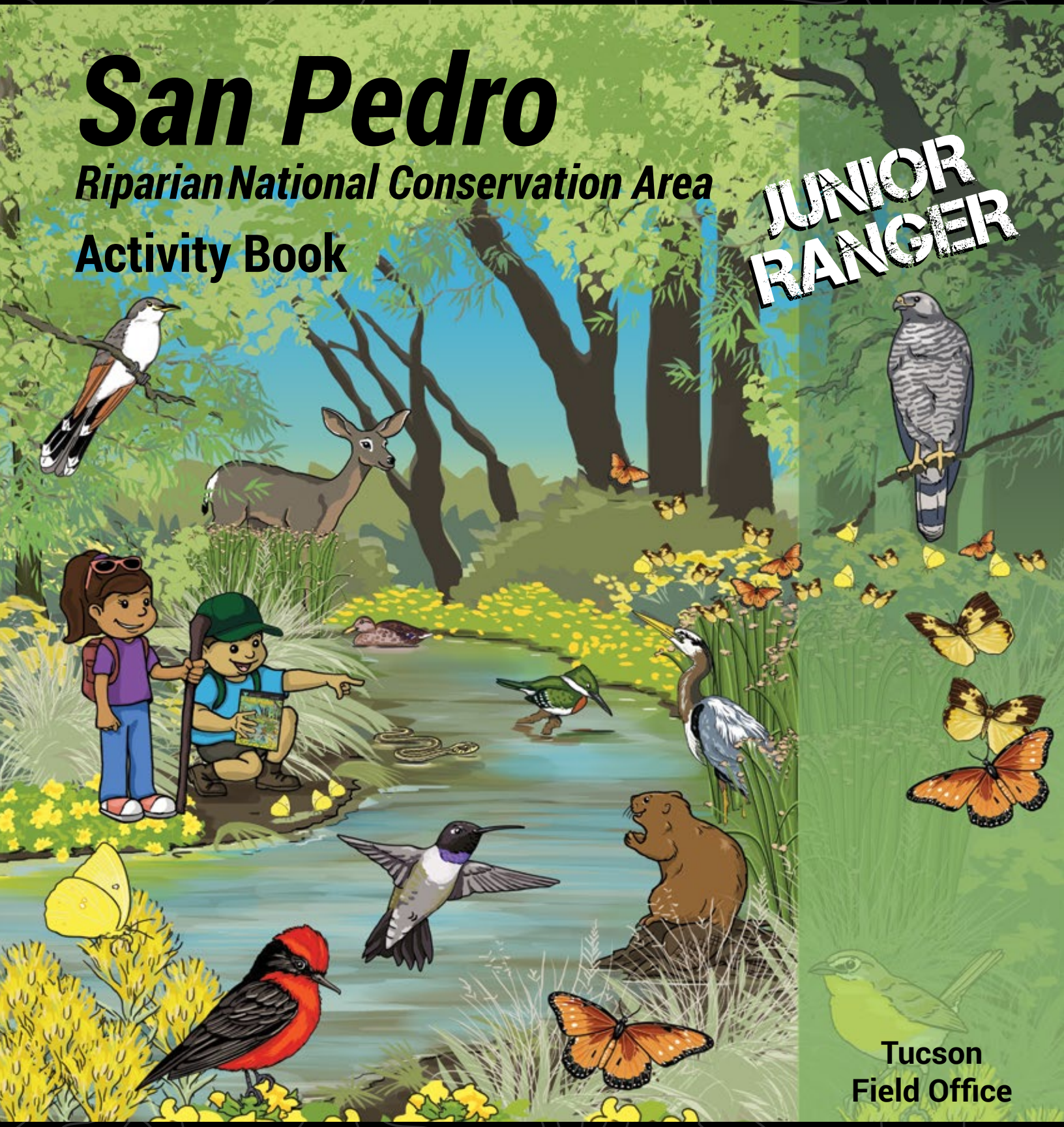
U.S. Department of the Interior
Bureau of Land Management

San Pedro

Riparian National Conservation Area

Activity Book

JUNIOR RANGER



Tucson
Field Office

Contents

Junior Rangers

The Junior Ranger Program introduces young adventurers like you to the lands and resources managed by the BLM. We hope you enjoy the activities in this book and invite you to join the adventure!

How to earn your badge and certificate

Complete six or more activities in this book. To receive your Junior Ranger badge and signed certificate:

Bring your booklet to:

San Pedro House
9800 East Highway 90
Sierra Vista, AZ 85635-9173
(520) 508-4445
OR

Bureau of Land Management
Tucson Field Office
3201 East Universal Way
Tucson, AZ 85756
(520) 258-7200

The Friends of the San Pedro River (FSPR) is a volunteer, non-profit organization that is dedicated to the conservation, protection, and enhancement of the natural and cultural resources of the San Pedro River. They work closely with the Bureau of Land Management (BLM), the federal land manager of the San Pedro Riparian National Conservation Area. They share their love for the river in a variety of activities. Volunteers assist visitors at the San Pedro House and Fairbank Schoolhouse. Docents lead nature and history walks, offer special events, give presentations, and provide educational programs for school children. Further information about FSPR is available at **www.sanpedroriver.org**.

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Illustrations: Rachel Ivanyi, Lori Kovash (page 6)

Species shown on front cover: yellow-billed cuckoo, gray hawk, yellow-breasted chat, black-chinned hummingbird, vermilion flycatcher, Mexican duck, great blue heron, green kingfisher, queen butterfly, southern dogface butterfly, gartersnake, American beaver, mule deer, yellow monkeyflower, rabbitbrush, bulrush, sacaton, Fremont cottonwood, Goodding's willow.

Public Lands Belong to You!

The Bureau of Land Management (BLM) is a federal government agency that cares for more than 245 million acres of public lands. These lands belong to all Americans, including you. Most are in the Western United States. The BLM also manages a number of smaller sites in the Eastern United States.

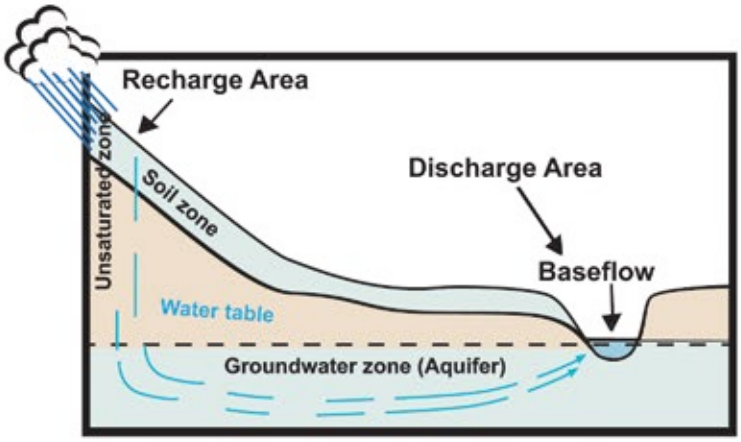
The BLM manages public lands for many uses. These lands provide natural resources, such as coal, oil, and natural gas. They provide habitat for wildlife, food for grazing animals, and timber for people. The lands contain evidence of the past, such as dinosaur bones and plant fossils. Archaeological sites on public lands help us learn about people who lived in North America long ago. Today, people like you enjoy exploring the big open spaces on the lands.

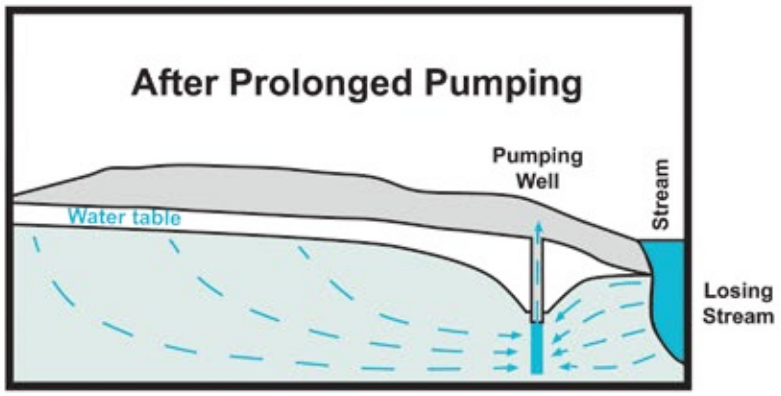
Welcome to San Pedro Riparian National Conservation Area (SPRNCA)

Containing nearly 57,000 acres of public land, the San Pedro Riparian National Conservation Area is between the international border and St. David, Arizona. One of the most important riparian areas in the United States, the San Pedro River's stretch is home to more than 80 species of mammals, two native species and several introduced species of fish, more than 44 species of amphibians and reptiles, and 100 species of breeding birds. It also provides habitat for 250 species of resident birds. The SPRNCA features the intact remains of the Presidio Santa Cruz de Terrenate, a Spanish fortress marking the northern extension of New Spain into the New World. The SPRNCA is home to Murray Springs Clovis Site and National Historic Landmark, a significant archaeological resource, containing evidence of one of the earliest known people to inhabit North America.

NATIONAL CONSERVATION LANDS

Where's that water from? Where's that water going?





Plants, animals, and people need water to survive, but only a small percentage of the water on earth is available for their use at any one time. This water moves from the earth to the sky and back in the Water Cycle.

Clouds form when water vapor (a gas) cools and condenses into liquid water droplets. When the droplets get heavy, they fall from the sky (precipitate) as liquid (rain) or ice (snow, sleet, or hail). Precipitation may flow across the surface in streams or rivers into lakes or oceans, or seep into the ground (infiltrate), where it is stored in soil that can hold water and release it slowly. This water-containing soil is called an aquifer.

Water is returned to the sky by evaporation (turning it into water vapor) from oceans, lakes, and transpiration in plants. Winds may move clouds to bring precipitation to distant places.

In areas with low levels of precipitation, like deserts and grasslands, people get water from an aquifer by digging wells. If they need more water from the aquifer than the Water Cycle can add to it (recharge), they may not be able to keep getting enough water from the aquifer. If the water table (top of the aquifer) drops below the reach of plants that need it, such as in places where streams and rivers dry up, trees that depend on the aquifer may die. Taking too much water from wells dug near rivers or streams might cause the rivers or streams to go dry.

People can help save groundwater by using less, planting xeriscapes (landscapes that require little or no irrigation), collecting rainwater that falls on buildings, and slowing down the surface flow so it can seep back into the aquifer.

Water falling from the sky as rain or snow is called _____ .

Water returns to the sky from the land by _____ .

An _____ is soil underground that can store water.

Water gets stored underground by a process called _____ .

People dig _____ if they want to use underground water.

Name one thing people can do to help keep groundwater from being used up.

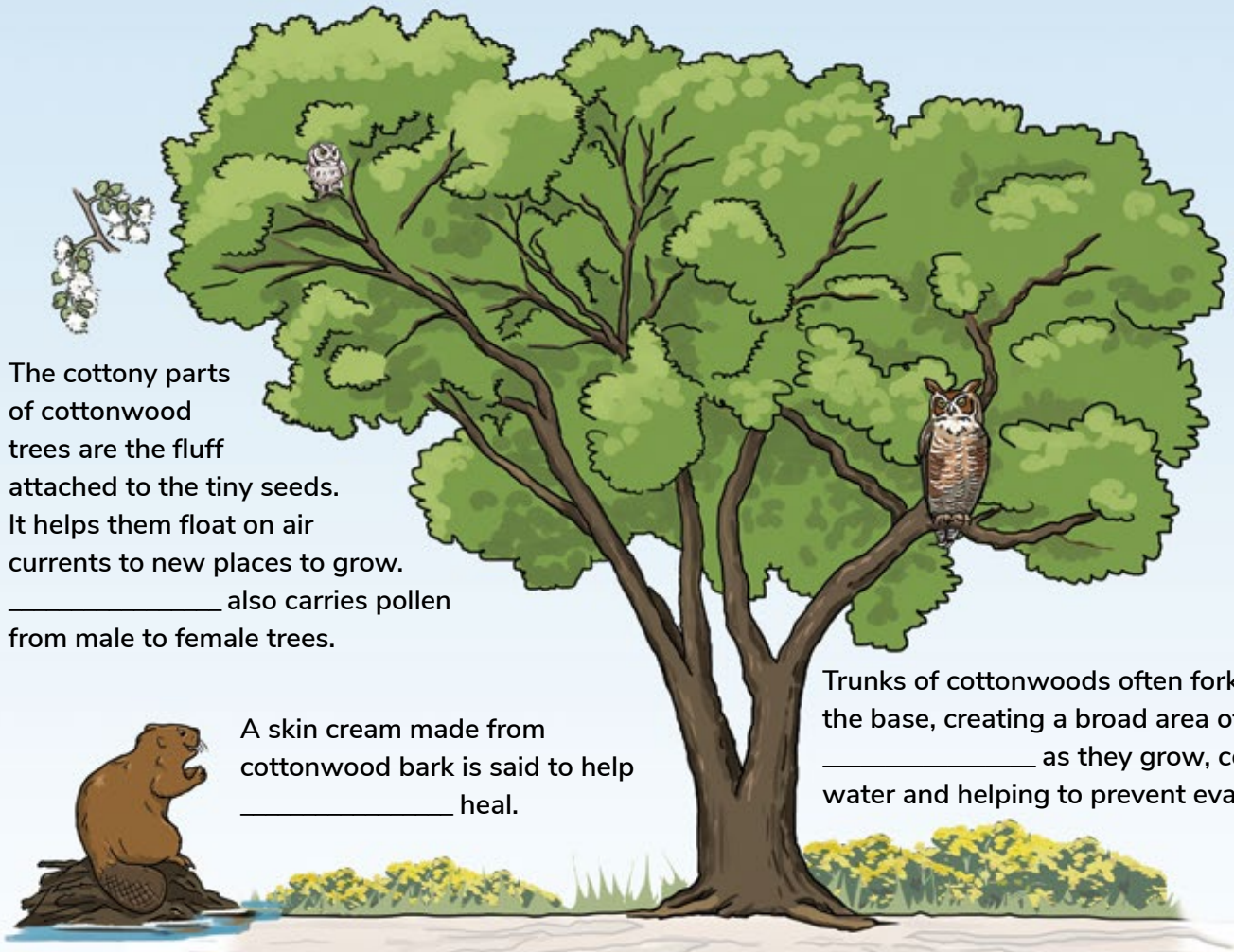
Cottonwood Trees and Water

Fill in the blanks with one of these words:

Shelter	Beavers	Seeds
Insects	Shade	Wounds
Scientist	Root	Wind

Birds like yellow-billed cuckoos, tanagers, nuthatches, and warblers find _____ to eat on the bark, branches and leaves of cottonwoods.

Many birds, including woodpeckers, goldfinches, Cooper's hawks, western screech-owls, and great-horned owls, use cottonwoods for _____ and nest sites.



The cottony parts of cottonwood trees are the fluff attached to the tiny seeds. It helps them float on air currents to new places to grow. _____ also carries pollen from male to female trees.

Trunks of cottonwoods often fork near the base, creating a broad area of _____ as they grow, cooling water and helping to prevent evaporation.

A skin cream made from cottonwood bark is said to help _____ heal.

_____ eat the living part of cottonwood branches just under the bark, and use the branches to make dams, creating ponds that other animals use and slowing water for recharge.

With a shallow _____ system reaching only about 10 feet deep, cottonwoods often signaled the presence of springs and rivers to people passing by.

In order for cottonwood _____ to grow into trees, they must land on wet sand bars after a late spring or early summer flood, then quickly grow roots deep enough to survive floods that follow.

Fremont cottonwoods are named for explorer and _____ John C. Fremont.

SPRNCA Bingo

The San Pedro Riparian National Conservation Area is home to a wide variety of plants and animals. You can observe many of them by walking through the mesquite grassland surrounding the river, and under the trees alongside the river channel. Below is a list of some of the common plants and animals that live near the San Pedro River.

See if you can find four in any row, column or diagonal in the chart below.

 Toad	 Butterfly	 Hawk	 Harvester Ant Nest
 Yucca	 Turtle	 Spider	 Snake
 Fish	 Lizard	 Cottonwood Leaf	 Dragonfly
 Bird	 Mesquite	 Gourd	 Cactus

Animal Adaptations

Adaptations are structures or behaviors that help an organism (a single living thing) survive in its habitat (place where it lives). What are some adaptations of SPRNCA animals and plants that help them survive in the SPRNCA?

Write the plant or animal after its adaptation.

Stays wet when water levels in the river drop during the day by hiding in mats of algae or under logs or stones in the river.

_____

This creature cannot fly, so it sprays an irritating chemical from its rear end at predators.

_____

Has poor eyesight and can't run fast, but it has long, sharp teeth like spears ("javelin" in Spanish) for defense, and scent glands to rub on rocks and trees to signal other members of its species.

_____

Has light-colored hairs on its leaves to reflect sunlight and can grow in soil with high levels of salt.

_____

Tongue is very long and has a sharp tip with hooks that can help it pull soft grubs out of wood.

_____

Can bury itself underground and surround itself in a case that keeps it from drying up between summer rainy seasons.

_____

Has an upturned snout that helps it dig for lizard eggs in sandy soil.

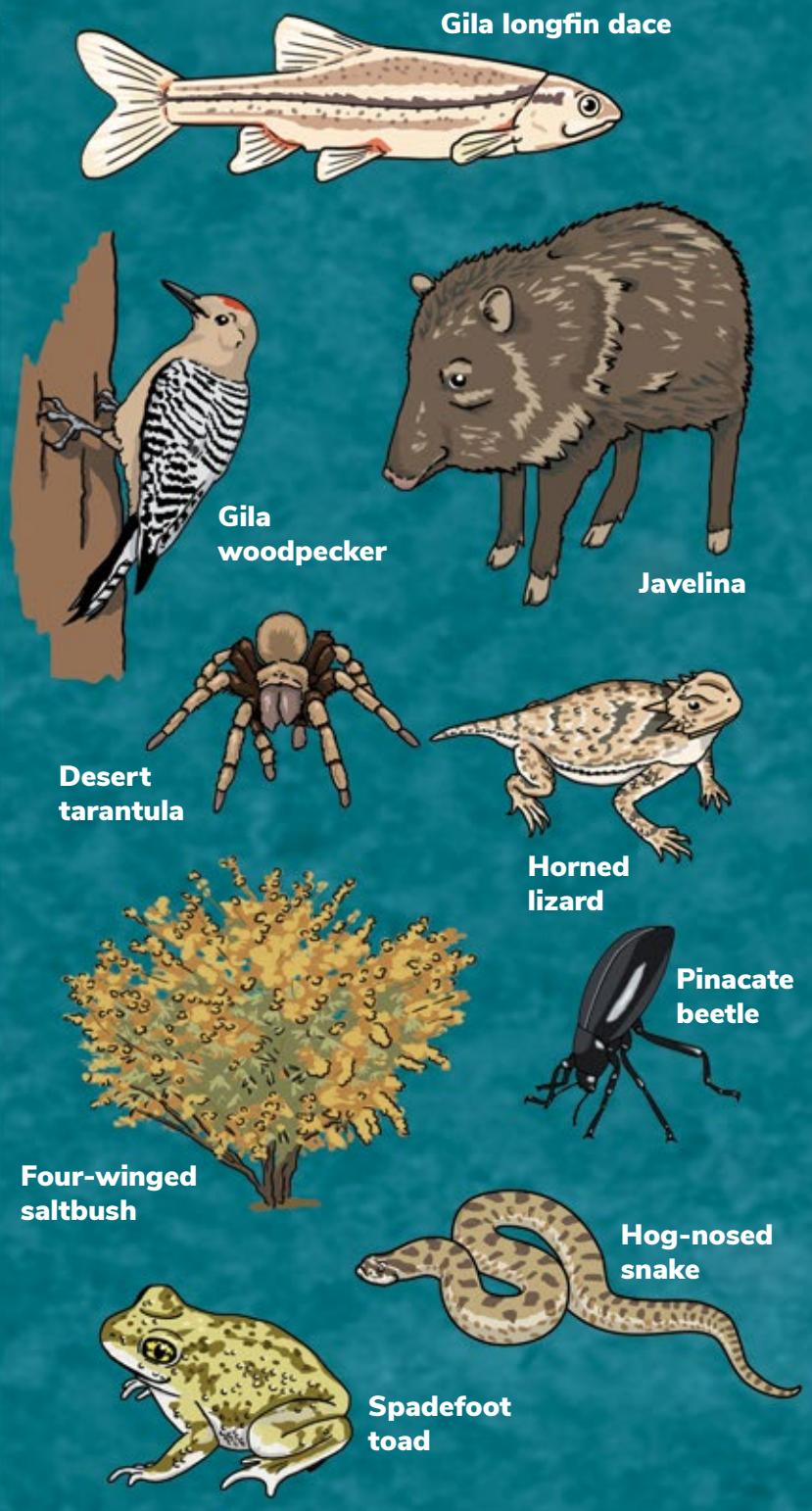
_____

Has barbed hairs that can irritate a predator that gets too close, much like a porcupine's spines.

_____

Can't easily outrun predators, so it puffs up with air, spreading out its horns, and shoots blood from its eye sockets to confuse its foe.

_____



ANSWERS: Gila long-finned dace; Pinacate beetle, javelina; four-winged saltbush; Gila woodpecker; horned lizard; spadefoot toad, hog-nosed snake; desert tarantula.

Tribal Connections to SPRNCA

The ancestors of the Tohono O'odham, Zuni, Hopi, and Apache people lived, traded, traveled, and held sacred the area now known as the San Pedro National Conservation Area. For these Native American tribes, this river is more than just water; it's a vital part of their cultures and traditions and a connection to their ancestors. A connection that is felt not only through the objects and sites left behind, but also stories, songs, and ceremonies passed down over generations.

Another important connection passed down over generations are the names, or place names, given to an area. For Native American people, these names reflect many things like their history, stories, lessons, or describe the land itself! For instance, the Apache refer to the San Pedro as "tulchi" which means "red water." Many of the names are kept private by the tribes and they remind tribal members of how the land looked when their ancestors lived there.

Early American settlers called the San Pedro River the "Beaver River" for all the beaver they found and hunted there.

Huachuca Mountains - The Tohono O'odham name for Huachuca Mountains are "Vav chukadag" which means "moss or lichen that grows on a northerly facing slope."

Now it's your turn to create a placename for where you're at.

Decide on the natural area you want to explore. It could be a forest, a beach, a park, or even your backyard!

Take a walk through the chosen natural area and pay close attention to your surroundings. Notice the unique features, such as trees, rocks, streams, flowers, and wildlife. As you explore, identify specific spots that stand out to you. These could be a particularly beautiful tree, a cozy nook, a bubbling brook, or any other interesting feature.

Now, think of creative names for each of the places you've identified. Consider the characteristics of the spot, its surroundings, and how it makes you feel.

Write it down: Record your chosen names and their locations in your notebook or on your paper and share with others!

Animal Tracks at San Pedro Riparian
National Conservation Area

Draw a line from the track to the animal that makes it.
Below the animal's name, you will find the Native American names too!

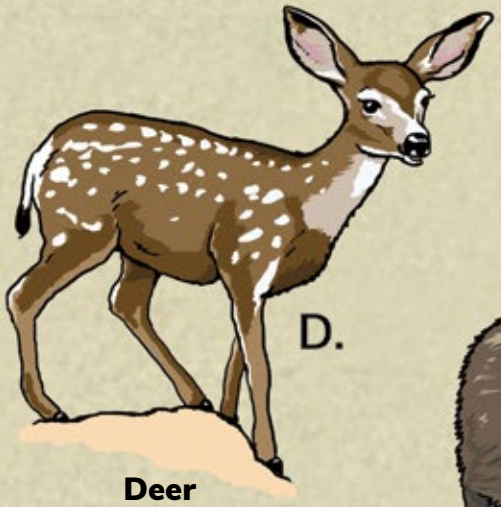
1.

Roadrunner
Tadai
(Tohono O'odham)

Whiptail lizard
Hujud
(Tohono O'odham)

5.

2.



Deer
Tse'é
(Western Apache)

6.

Beaver
Koovi
(Tohono O'odham)

3.

Javelina
Ko:ji
(Tohono O'odham)

4.

Bobcat
Ndóíłbáh
(Western Apache)

Raccoon
Tulį'
(Western Apache)

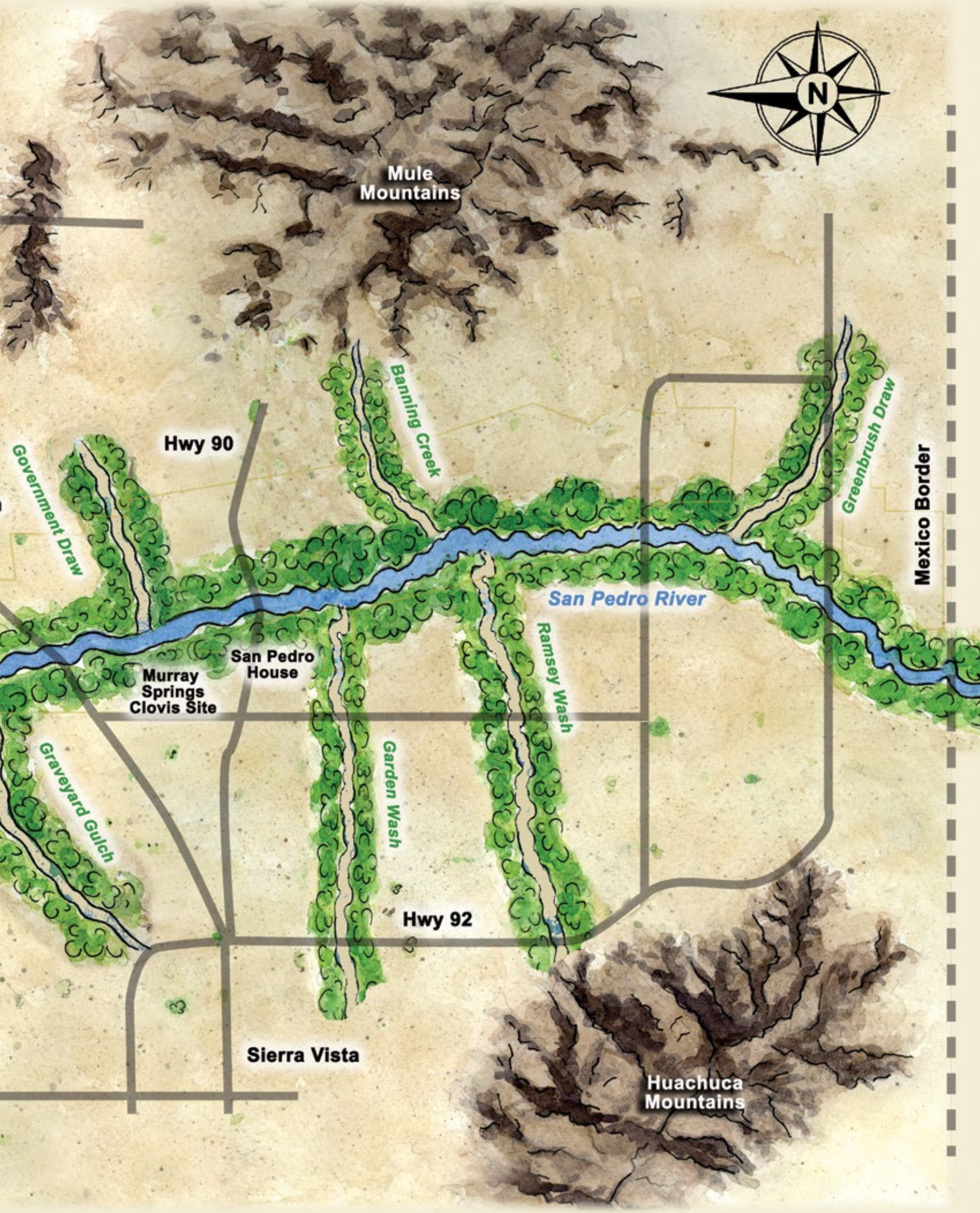
7.

Tracking Tips

1. Walk slowly and quietly - if you are lucky you may see the animal.
2. Tracks are easier to see in the mud.
3. Many animals come out only at night so look for tracks early in the morning.

San Pedro
Riparian National Conservation Area
Map Your Visit

Place stickers on locations you visit while you are here. You can also write notes and do drawings of things you see.

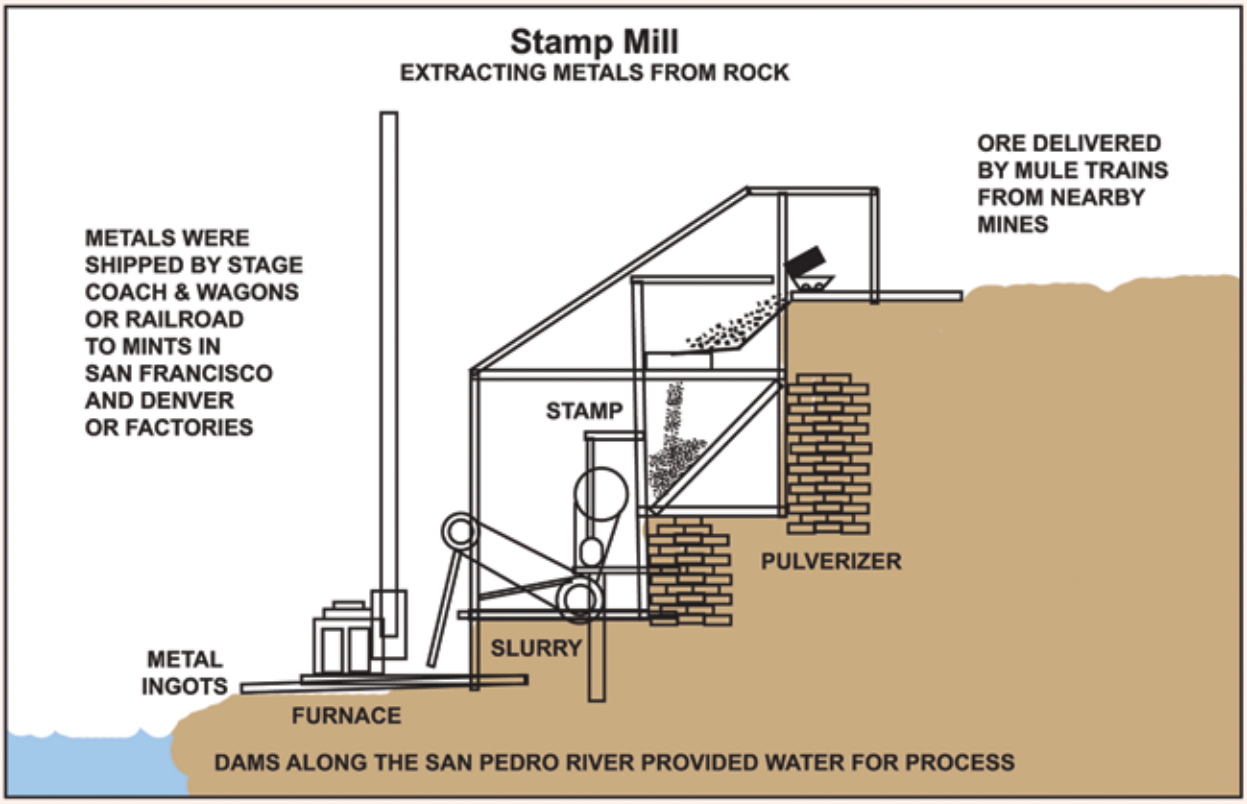

N
Mule Mountains
Hwy 90
Banning Creek
Government Draw
Greenbrush Draw
Mexico Border
San Pedro River
San Pedro House
Murray Springs Clovis Site
Ramsey Wash
Garden Wash
Graveyard Gulch
Hwy 92
Sierra Vista
Huachuca Mountains

Mines to Mills to Mints and Beyond

Rich silver veins were discovered in the hills near modern-day Tombstone in 1877. Miners dug shafts to remove the ore that contained the silver. The ore was taken in wagons to a mill with machinery to process the rock. First, the ore was crushed into pebbles and then powder. It was then mixed with water to make a slurry (paste). Mercury was added to the slurry to make a pulp. Finally, the pulp was heated in a furnace to evaporate the mercury and water to produce ingots of the metal extracted from the ore, mostly silver, but also other metals such as gold, copper, lead and tungsten.

Milling the ore required large quantities of water. Boilers would heat water to form steam to power the machines in the mills. Water was also mixed with the crushed ore in the mill. The only adequate source of water was the San Pedro River and because of that the first mills were located there. Dams were built to pool the river water and then move it through ditches and flumes (wooden troughs) to the mills.

Once the ore was reduced to metal ingots at the mill, the ingots were loaded onto wagons and then trains for shipment. Millions of dollars in metal passed through Fairbank on the railroads. The first stop for the ingots was a smelter, where they were melted and separated into pure metals. Some of the metal ended up in factories at places like Chicago or New York, where it was used to create products sold all over the world. Most of the silver was sent to Federal mints in San Francisco and Denver to be made into coins.



Activity:

Can you name the coins that contain silver?

_____

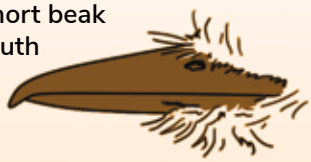
Can you name something you have used made of lead or copper?

_____

SPRNCA Bird Beak Adaptations

Gila Woodpecker – Sharp, narrow beak pairs with powerful neck muscles to make nest holes and probe for insects in wood.

Black Phoebe - Wide mouth with short beak and sensory feathers at edges of mouth help it catch insects in flight.



Pyrrhuloxia – Cone-shaped beak with broad base has power to crack seeds open.

Mexican Mallard – Bill edges have tiny, toothlike structures to strain small plants and animals from water.

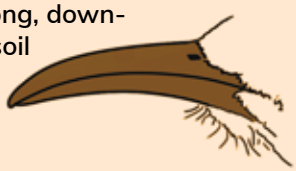
Red-tailed Hawk – Upper jaw overhangs lower with sharp, hooked tip for tearing meat from reptiles, birds, and mammals.

Yellow Warbler – Narrow, short beak can fit into cracks in tree bark for insects.

Great Blue Heron – Long beak with sharp tip works with long, flexible neck to spear fish, frogs and crayfish from ponds.

Black-chinned Hummingbird – Long, narrow beak fits into tubular flowers to reach nectar, and is also good for snatching small insects from the air.

Curve-billed Thrasher – Long, down-curved beak for digging in soil and leaf litter for insects.



Turkey Vulture – Hooked beak, like a hawk has, but featherless head to prevent contamination with decaying flesh from its food source of dead animals.

Find the names of the birds in the word search. Names may be forward, backward, up, down, or sideways.

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

The Food Web

The sun is the source of energy for life on earth.

1 What kind of living thing gets its energy from the sun? (Hint: yellow arrows) _____

2 Name an animal that eats more than one kind of food.

_____

3 What would happen to the food web if all the grass died?

_____

4 What do plants make that animals need?

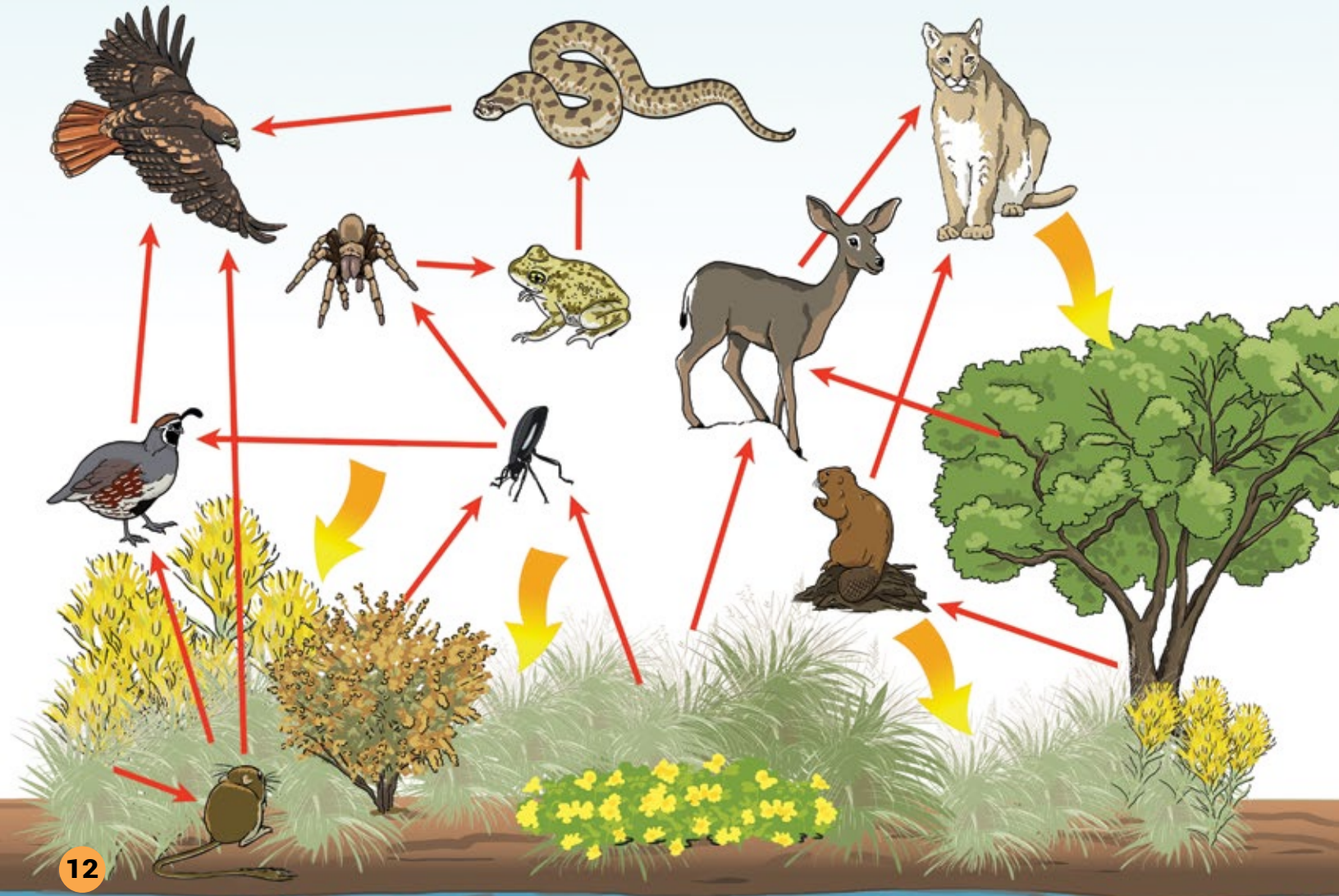
_____

5 Name a type of living thing that can return nutrients to soil or water for plants to use. _____

Living things with a green pigment called chlorophyll (klor-e-phil) (plants, algae and phytoplankton (fy-toe-plank-ten) can convert the sun's light energy to chemical energy in the form of sugars and starches that other living things can eat.

This energy passes from one organism to another through a network of food chains that make up a web of energy flow relationships (food web), ending with decomposers such as bacteria and fungi, which return nutrients to soil and water where green organisms can recycle them.

eater = consumer of chemical energy ← **food**



ANSWERS: 1. plants; 2. hawks; 3. many animals would die; 4. sugars and starches; 5. bacteria and fungi

Precious Water – Xeriscapes

How can we save **water** and plan a beautiful yard that attracts wildlife? We can plant a **xeriscape (zeer-e-scape)**, a landscape designed to use plants that don't need much water. We can store water that falls on building roofs using raingutters, downspouts and barrels.

We can choose plants that don't need a lot of water. Many of these have flowers that hummingbirds and butterflies like.

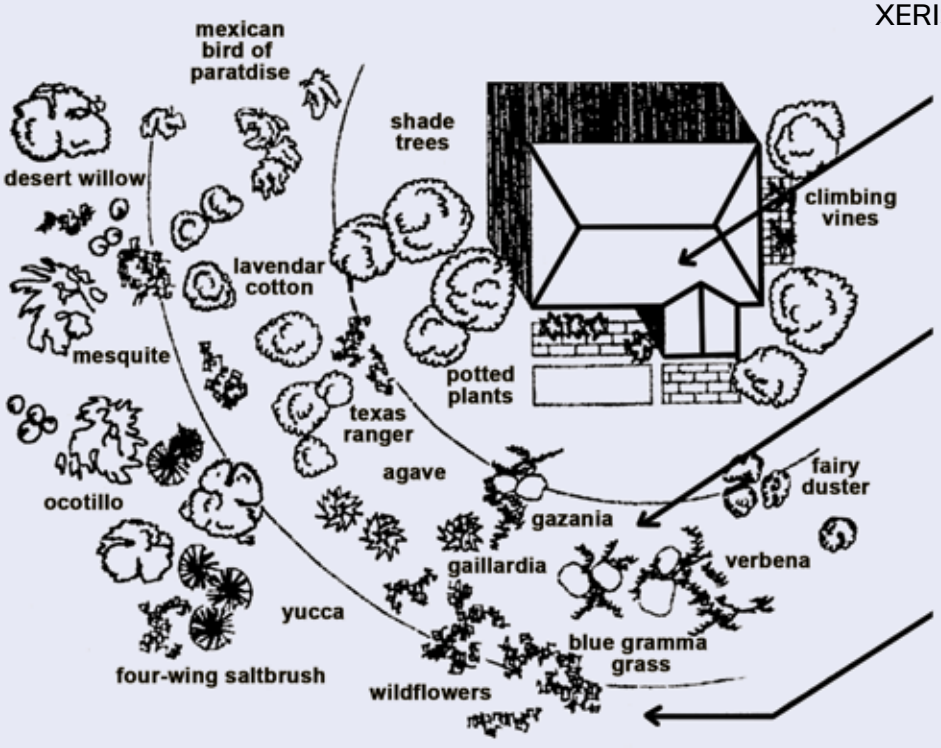
To slow down **evaporation**, we can cover the ground with landscape cloth underneath crushed rock or bark.

Deciduous trees can shade windows in summer and allow warmth in during the cooler months.

Irrigation tubes can be connected to the water storage barrels to take small amounts of water further from the house to smaller plants that need help during dry times.

SAVING WATER

Draw a xeriscape design for your yard at home.



XERISCAPE LANDSCAPING TECHNIQUES

Zone 1–Mini oasis

Patio with **potted** plants

Deciduous trees outside south-facing windows

Water storage tanks attached to downspouts

Zone 2

Lower water use plants

Rain **gutters** with berms or

French drains to channel or detain water

Contoured yard, drip **irrigation**

Landscape fabric to retard weed growth

Zone 3

Low water use plants, native plants when possible

Fairbank Townsite

Starting in 1882, Fairbank grew up around a train depot just east of the San Pedro River. The people of Fairbank worked for the railroads, in stores, for the Chinese farmers, and as cowboys. As the town grew, a school was built that taught first grade through eighth grade. The first school burned down in 1920 and was replaced with this building that is still standing. Up to 50 students went here, divided into two classes by age, taught by two teachers. When you visit the school today, it looks much like it did in historical times, with desks and chalkboards.

Compare your school with the Fairbank school in the pictures. What differences do you see? Write them below.

My school today:

_____

_____

_____

_____

_____

_____

Fairbank School:

_____

_____

_____

_____

_____

_____

Bats of the SPRNCA

Mammals that Fly

The SPRNCA is home to about 25 bat species that use a variety of food sources.

There are more than 1,000 species of bats worldwide. The only mammals that can fly, bats are seldom seen because they are nocturnal (active at night) and shelter out of sight by day.

Bats' wings are made of a thin membrane of skin stretched between extra-long finger bones.

They use their short thumb bones to climb to a good height for taking off.

Bats are important members of many different ecosystems (areas where living things interact with each other and their non-living surroundings). Some bats control populations of arthropods (animals with jointed legs and exoskeletons, like insects and spiders), and others pollinate flowers and/or spread seeds of the plants whose fruits they eat.

See if you can match the bat with what it eats. Each bat's head has adaptations (structures that help it survive where it lives) that make it easier to find and eat its food.

1. Which bat flies with its mouth open to send out sounds that bounce off the flying insects it hunts? This is called echolocation. It also has a structure in front of its ear opening to direct sound into the ear canal.

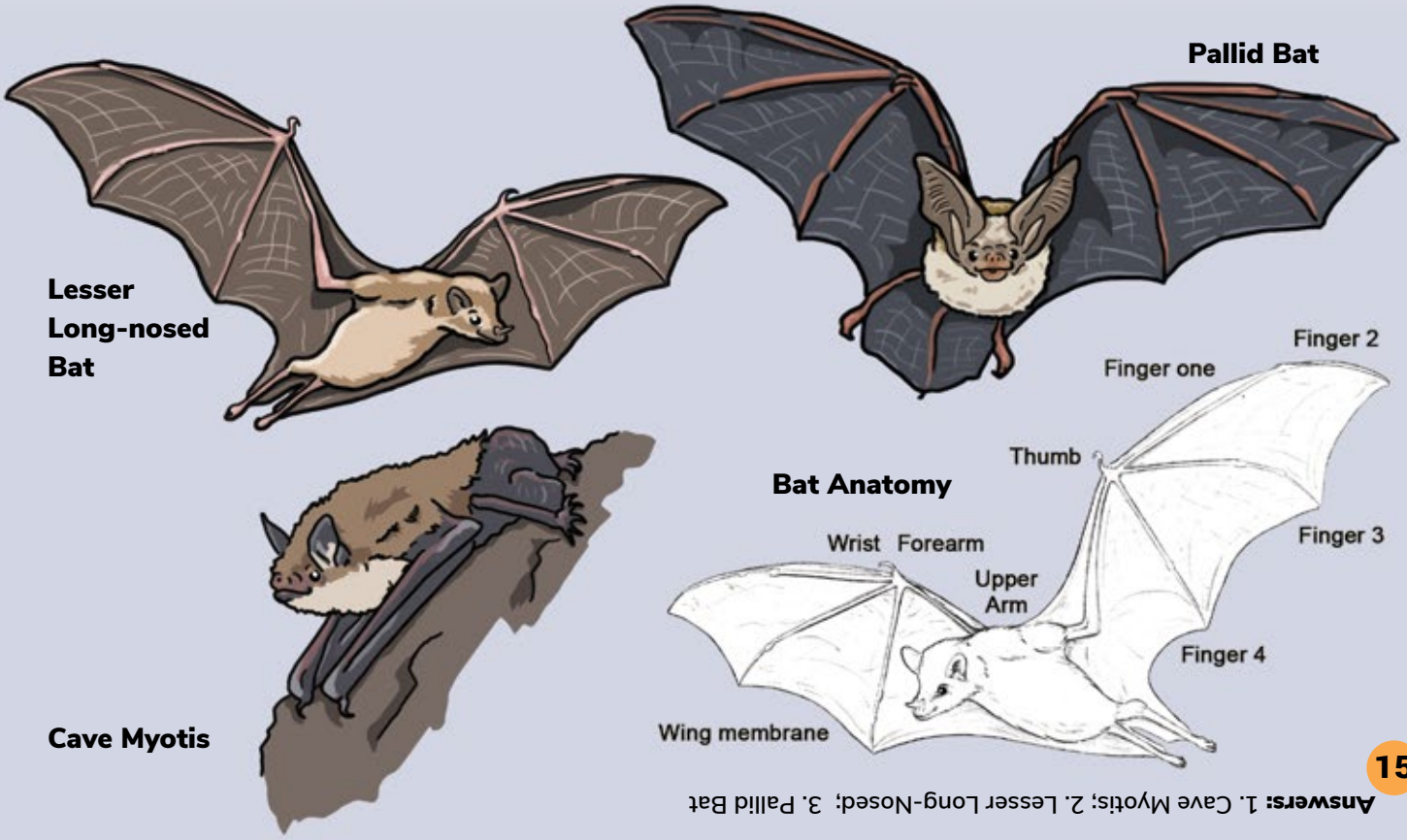
_____

2. Which bat has small ears, large eyes and a long nose with a leaf at the tip to see and smell cactus and agave flowers and cactus fruits?

_____

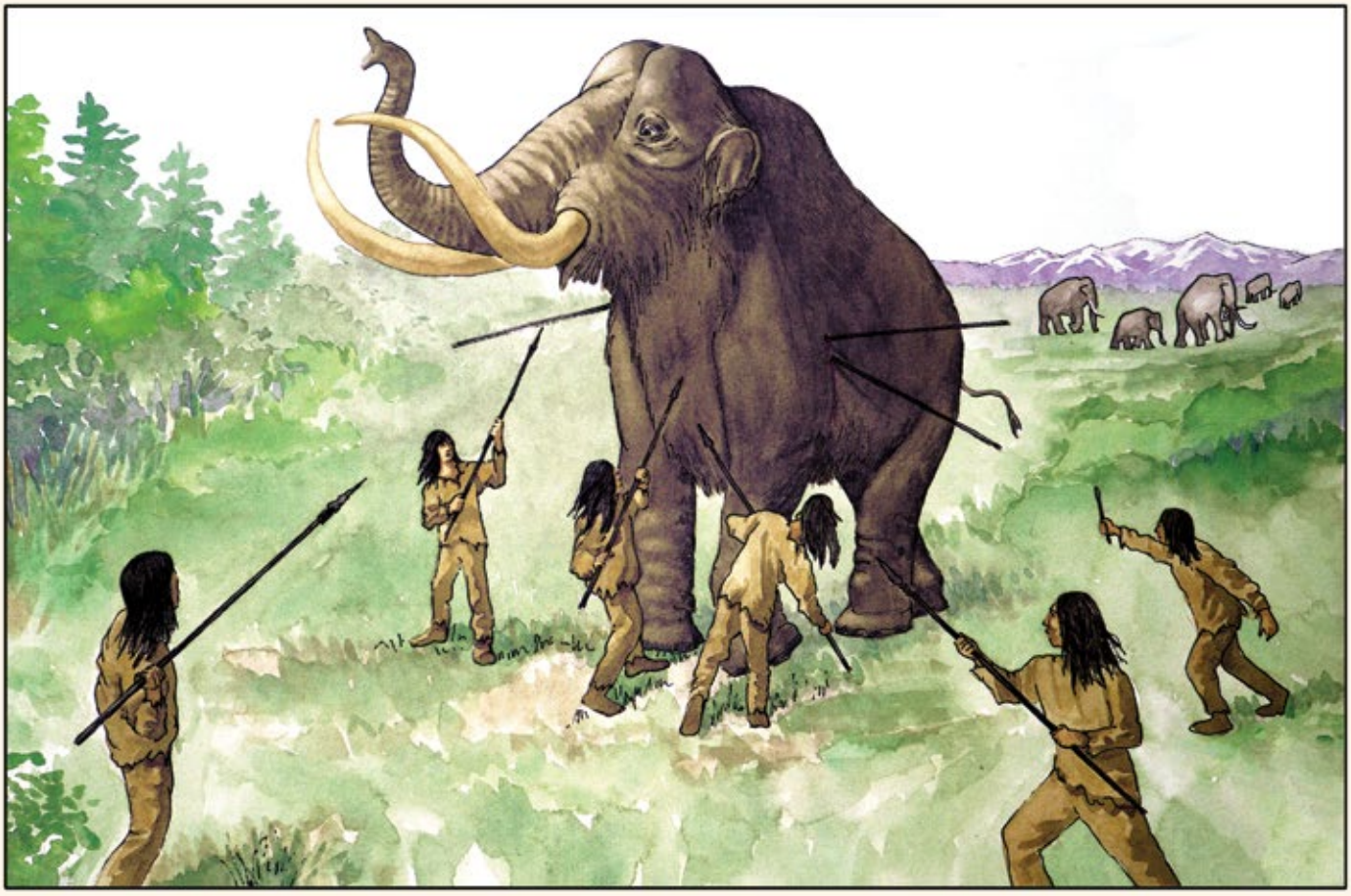
3. Which bat has long, wide ears and a short nose for hunting and eating insects, scorpions, and centipedes on the ground?

_____



Answers: 1. Cave Myotis; 2. Lesser Long-Nosed; 3. Pallid Bat

Murray Springs – Ancient Hunting Site



Picture: Clovis hunters throwing atlatl spears at a mammoth.

The Clovis were the first people known to have lived along the San Pedro River, 13,000 years ago. These ancestral Native Americans were wandering hunters looking for large game animals like mammoth (related to elephants) and bison (similar to buffalo). The Clovis hunters used an atlatl (AT-LAT-TIL), a throwing stick that propelled a spear a great distance. One large animal could provide enough food for their group for many days.

At the time of the Clovis, Murray Springs was a marshy area that attracted animals. It was a good spot for Clovis hunters to hunt, since animals in the marsh couldn't move as quickly to escape. Archaeologists have found bones from mammoths and bison the Clovis killed at this site. A camp was found nearby where the Clovis butchered and cooked animals, and made stone tools, including distinctive spear points.

Activity:

What people in our area ate changed over time. At first, they mainly ate meat from animals they hunted. Later, they added wild foods like mesquite beans. Finally, they mostly ate the corn, beans, and squash they grew.

What do you eat?

Write a list of at least 5 things you eat almost every day. Did the Clovis people eat some of the same things? Choose yes or no.

Things I eat every day:	**Yes**	**No**

NATIONAL CONSERVATION LANDS

More Places to Play and Learn

on the National Conservation Lands

Bureau of Land Management

Junior Ranger

As a Bureau of Land Management Junior Ranger, I promise to:

- Do all I can to help preserve and protect the natural and cultural resources on our public lands.
- Be aware of how my actions can affect other living things and the evidence of our past.
- Keep learning about our important heritage.
- Share what I have learned with others.

Ranger Signature _____

Date _____