

2008

Finicky Fish Finish... Last! On-Site Programming -- Support Materials (Grade 5)

Discover Mojave: Forever Earth

Follow this and additional works at: https://digitalscholarship.unlv.edu/pli_forever_earth_curriculum_materials



Part of the [Curriculum and Instruction Commons](#), [Curriculum and Social Inquiry Commons](#), [Environmental Indicators and Impact Assessment Commons](#), [Natural Resources and Conservation Commons](#), and the [Science and Mathematics Education Commons](#)

Repository Citation

Discover Mojave: Forever Earth (2008). Finicky Fish Finish... Last! On-Site Programming -- Support Materials (Grade 5). 1-20.

Available at: https://digitalscholarship.unlv.edu/pli_forever_earth_curriculum_materials/5

This Curriculum Material is protected by copyright and/or related rights. It has been brought to you by Digital Scholarship@UNLV with permission from the rights-holder(s). You are free to use this Curriculum Material in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you need to obtain permission from the rights-holder(s) directly, unless additional rights are indicated by a Creative Commons license in the record and/or on the work itself.

This Curriculum Material has been accepted for inclusion in Curriculum materials (FE) by an authorized administrator of Digital Scholarship@UNLV. For more information, please contact digitalscholarship@unlv.edu.

GRADE 5

FINICKY FISH FINISH...LAST!

ON-SITE PROGRAMMING • SUPPORT MATERIALS

Student Reference:
LAKE MEAD FISH IDENTIFICATION SHEET



common carp

- stout, high-backed, deep body
- two pairs of barbels on either side of mouth
- top of body is brassy-colored



channel catfish

- small eyes
- eight barbels around mouth
- gray to slate-blue colored



striped bass

- slightly arched back
- lower jaw slightly longer than upper jaw
- dark, continuous stripes on body



bluegill

- large eye
- large mouth
- side is blue or blue-green with a purple luster

Demonstration:
LAKE MEAD FISH FACT OR FICTION POWERPOINT

Finicky Fish Finish...Last Fact or Fiction is a PowerPoint presentation that is delivered with a lot of energy. It functions to introduce some of the native and non-native fish that live in the Colorado River system today. This presentation both sets the tone for the rest of the program and leads into further discussion about the razorback sucker as an endangered species adapted for life as a Colorado River native.

FACT or
FICTION?

finicky fish finish...Last!

A minnow lives in the Colorado River that can grow to 6-feet long and weigh 100 pounds.

FACT



Colorado Pikeminnow

To catch this fish, you could use a small rabbit as bait.

FACT




Colorado Pikeminnow

Voracious meat-eating Piranhas living in Lake Mead have eaten native fish populations.

FICTION

There's a fish in the Colorado River that can live to be 50 years old.


FACT



Razorback Sucker

It's possible for the razorback sucker to survive on food that's smaller than a hair.

FACT




Razorback Sucker eats PLANKTON

Like a camel, the razorback sucker uses its hump to store fat.

FICTION

There is an amazing fish that lives not only in Lake Mead, but also Japan and many other places in the world!

FACT



Common Carp

Photo/Illustration credits: Razorback sucker and Colorado pikeminnow illustrations © Joseph R. Tomelleri; Photo, Charles and Pat Mantle display a Colorado pikeminnow caught in the Colorado river around 1935, courtesy Sue Mantle; Common carp illustration from the Duane Raver Art: Fresh Water Fish Collection, U.S. Fish and Wildlife Service.

Facilitator Reference: RAZORBACK SUCKER FAST FACTS



Razorback Sucker

Illustration © Joseph R. Tomelleri

DISTINGUISHING PHYSICAL FEATURES

- brownish-green upper body with a yellow- to white-colored belly;
- abrupt, sharp edged hump on back behind head;
- fleshy lips used for sucking up food; and
- generally 16 to 28 inches long, weighing less than seven pounds but have been known to reach 36 inches and 18 pounds.

LIFE HISTORY SPECIFICS

- currently limited to 25% of historic range;
- have been known to live 40 to 50 years;
- capable of spawning at an age of 3 to 4 years and spawning occurs in spring;
- feed primarily on insects, plankton, and plant matter;
- natural habitat is in the Colorado River Basin;
- once valued as food by early settlers and miners of the Colorado River Basin; and
- hump is believed to provide stability in turbulent flow or to provide protection against being eaten by the Colorado pikeminnow (actual purpose of hump is unknown).

STATUS

- currently given full protection under the Endangered Species Act;
- federally listed as "Endangered" in 1991;
- became endangered under Colorado law as of 1979;
- was listed as protected under Utah law as of 1973;
- existing population is made up primarily of adult fish because non-native fish prey upon young;
- populations raised in hatcheries are being reintroduced in the Colorado, Gunnison, Green and San Juan rivers; and
- less than 500 razorback suckers currently live in Lake Mead.

POTENTIAL THREATS

- habitat alteration and destruction (primarily due to flow regulation);
- decline in water quality; and
- direct competition and predation by non-native fishes: carp, bluegill, green sunfish, largemouth bass, striped bass, tilapia, and crayfish are species that typically prey upon or compete with razorbacks.

Fast facts retrieved (May 26, 2006) from the following Internet sites:

<http://mountain-prairie.fws.gov/coloradoriver/Crrzb.htm> and www.azgfd.gov/w_c/research_razorback.shtml

Facilitator Reference: RAZORBACK SUCKER SURVIVOR

1. The objective of this activity is for students to learn about the effects of damming the Colorado River and how the introduction of non-native fish species impacted razorback suckers. The object is for students representing razorback suckers to avoid becoming threatened, endangered, or extinct. Students will see how interactions with introduced fish and a changing ecosystem affect the razorback sucker's ability to find food, reproduce, and survive.
2. Show the students the three things that the razorback suckers in this activity will need to survive and maintain their population: food, correct water temperature (thermal preference = 22.9 -24.8 °C), and fingerling. Each of these three survival components will be represented on different colored Frisbees. If there is not sufficient food, fewer razorback suckers will be able to survive. If the water temperature is too high or too low, razorback suckers are less likely to thrive in their environment (e.g., in low temperatures, fish move more slowly and juveniles are less likely to escape predators, and reproduction rates are reduced in lower temperatures). If there aren't enough fingerlings, then there will be fewer razorback suckers in the habitat. "Threatened" is the term used to mean there are fewer razorback suckers than there were; "Endangered" means that there are so few that they are in danger of becoming extinct; "extinct" means that there are no more razorback suckers anywhere in the world (not even in a zoo).
3. Clear an area and place each Frisbee on the ground randomly to resemble a river. Tell students that the activity area represents the Colorado River. The river water is a certain temperature; there are places called "nurseries" where razorback sucker eggs hatch and grow up; and there are other places where insects, plankton, and other plant material provide food for razorback suckers. Next divide the class into five equal teams. Explain to Teams 1-4 that they represent a predatory fish called a striped bass. Each team represents 100 striped bass.
4. Inform Team 5 that they are razorback suckers – show them a picture. Provide each member of the Razorback Sucker Team with an identifying nametag.
5. Have the Razorback Sucker Team members come forward. Explain to them that each razorback sucker needs to collect one temperature Frisbee, one fingerling Frisbee, and one food Frisbee to survive the round. Tell them that they have to collect these in an orderly fashion – no pushing, shoving, etc., and that they have to wait for your word to go. Say: "Go!"
6. Each Razorback Sucker Team member should have no trouble finding the three Frisbees they need to



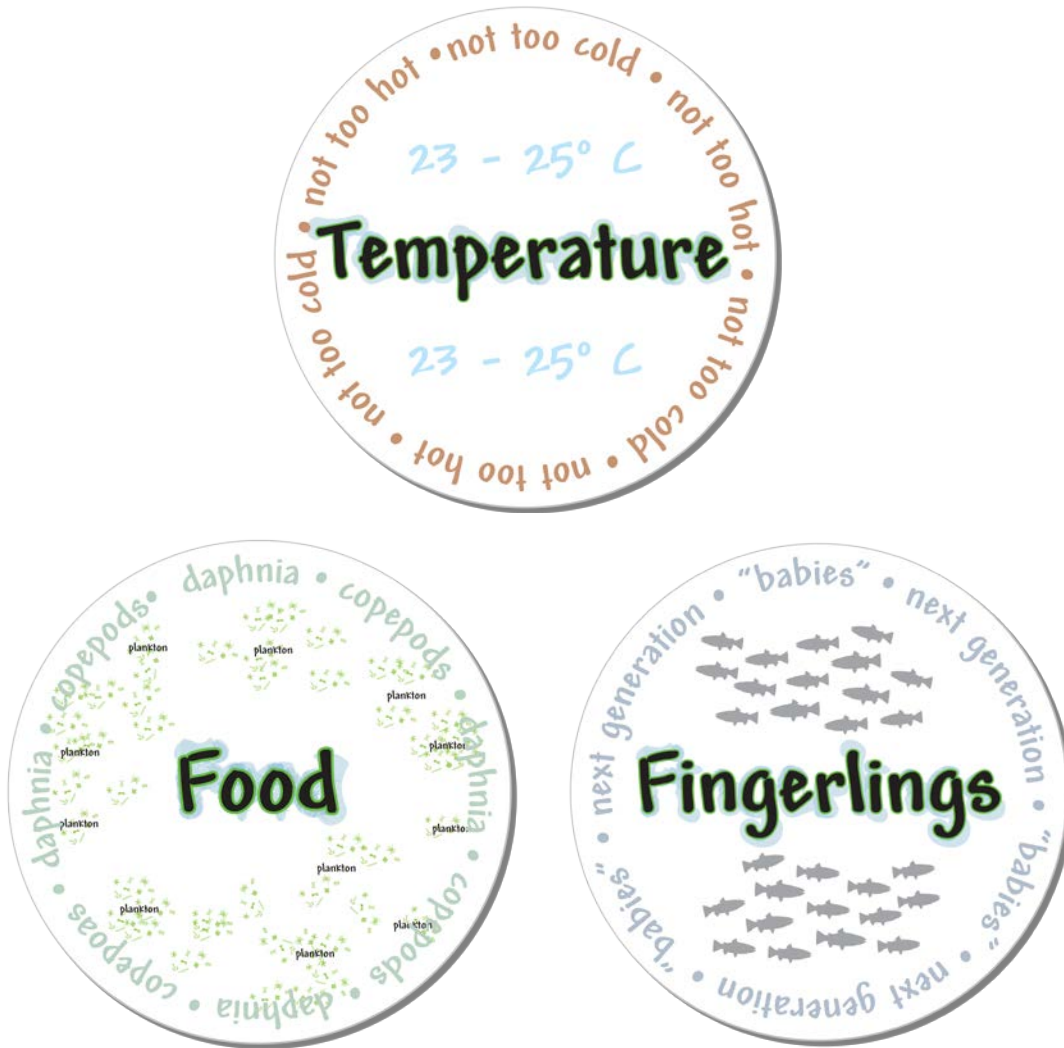
Students participate in a field-test version of Razorback Sucker Survivor aboard Forever Earth

survive. Congratulate them on their survival skills, and replace the Frisbees in the “river.” The razorback sucker population is doing fine!

7. Round 2: Ask the members of Striped Bass Team 1 to step forward. Each of these striped bass is hungry and will “take” either one food Frisbee or one fingerling razorback sucker. Have them go into the river and stand on a food Frisbee or a fingerling razorback sucker Frisbee (student's choice). These Frisbees are no longer available to our Razorback Sucker Team members. Have the Razorback Sucker Team step forward and, on your prompt, find the three Frisbees they need to survive.
8. Each Razorback Sucker Team member should be able to find the three Frisbees they need. Congratulate them again on their clever survival skills, and ask them: *Was it more difficult to find what you needed to survive? Why?* Replace the Frisbees into the river, telling Striped Bass Team 1 to remain where they are. Although there is now danger for their young and competition for food, 100 striped bass and the razorback suckers can survive together.
9. Round 3: It's 1935, and the construction of the Hoover Dam is complete. The dam was built to control the wildly unpredictable levels of the Colorado River, which ranged from periods of extreme flooding to periods where it was nearly dried up. The Hoover Dam created Lake Mead and provided a means to generate electricity, but, of course, it also changed the Colorado River forever. Of special significance to the razorback sucker: as Lake Mead is formed, the water becomes much deeper, and because sunlight can't penetrate beyond a certain depth to warm it, the water becomes much colder (especially the deeper you go). If you have enough students, create a Hoover Dam Team. These students stand and link arms at one end of the “river channel” of Frisbees. Once the students are in place, shift the Frisbees into a more circular layout to represent the filling in of Lake Mead. In the lake, striped bass can survive easily, but razorback suckers have a narrow range of tolerance – it has to find suitable places to live where the temperature is warmer, usually near the surface. Turn over several temperature Frisbees to represent colder temperatures. Make sure to let students know that these Frisbees are now unavailable. Because Lake Mead is a great habitat for striped bass, have Striped Bass Team 2 step forward, representing 100 more striped bass, and find a Frisbee (either food or fingerling) to stand on. Have the Razorback Sucker Team step forward and, on your prompt, find the three Frisbees they need to survive.
10. One or more razorback suckers won't find all three Frisbees they need to survive. If they are missing one or more Frisbees, their population shrinks because fewer razorback suckers have survived. Hand a life jacket to each of the Razorback Sucker Team members that did not get all three Frisbees – the life jacket represents that the population has become threatened. Ask the students: *How many striped bass are in the lake this time? Was it more difficult to find what you needed to survive? Why?*
11. Round 4 and 5: Repeat, adding Teams 3 and 4 for each round. A Razorback Sucker Team member holding a life jacket that can't collect all three Frisbees must now wear the life jacket to signify that their population has become endangered. A Razorback Sucker Team member wearing

a life jacket that can't collect all three Frisbees is asked to step out because they are now extinct. After each round, ask: *How many striped bass are in the lake this time? Was it more difficult to find what you needed to survive? Why?*

12. To conclude, ask the students what was real and not real about the activity. The activity presents a simplified but conceptually accurate view of what has happened to the razorback sucker's habitat and population over the years. The introduced striped bass and other non-native fish compete for food and are predators of young razorback suckers.
13. Next students will determine whether the conditions of Lake Mead provide habitat components within the range of tolerance of razorback suckers.



Scaled-down images of the Frisbee covers

**Student Worksheet:
DATA COLLECTION SHEET (SIDE 1)**

Finicky Fish Finish...Last!

Investigation:

Is Lake Mead a good place for razorback suckers to live?

1) Temperature ⇨ FACTS: razorback sucker survival: 16°C to 32°C Best: 23°C to 25°C

Temperature Measurement	Data	
At the surface	°F	°C
2 meters below surface	°F	°C
5 meters below surface	°F	°C

- a. Can razorback suckers live in the **temperatures** you found? YES NO
- b. Are these the BEST **temperatures** for razorback suckers? YES NO

2) pH ⇨ FACTS: razorback sucker survival: pH = 7.5 to 10 Best: pH is 8 to 9

pH Measurement	Data	
At the surface		
2 meters below surface		
5 meters below surface		

- a. Can razorback suckers live at the **pH** you found? YES NO
- b. Is the BEST **pH** found here? YES NO

3) Water clarity ⇨ FACTS: razorback suckers like muddy water best.

Survival: .1 m to .43 m Best: less than .5 m

Secchi disc depth today: _____

- a. Can razorback suckers live at the **water clarity** you found? YES NO
- b. Is the BEST **water clarity** found here? YES NO

**Student Worksheet:
DATA COLLECTION SHEET (SIDE 2)**

4) Food ⇨ **FACT:** razorback suckers eat plankton, especially Daphnia and copepods.

- a. Is there **food** for razorback suckers here? YES NO
- b. What kind of **food** did you find? Sketch it in the box.

5) Razorback suckers are adapted to live in flowing water. Before the dam, the Colorado River used to go through cycles of drought and raging floods.

Describe how the water is flowing in Lake Mead. Circle your answer

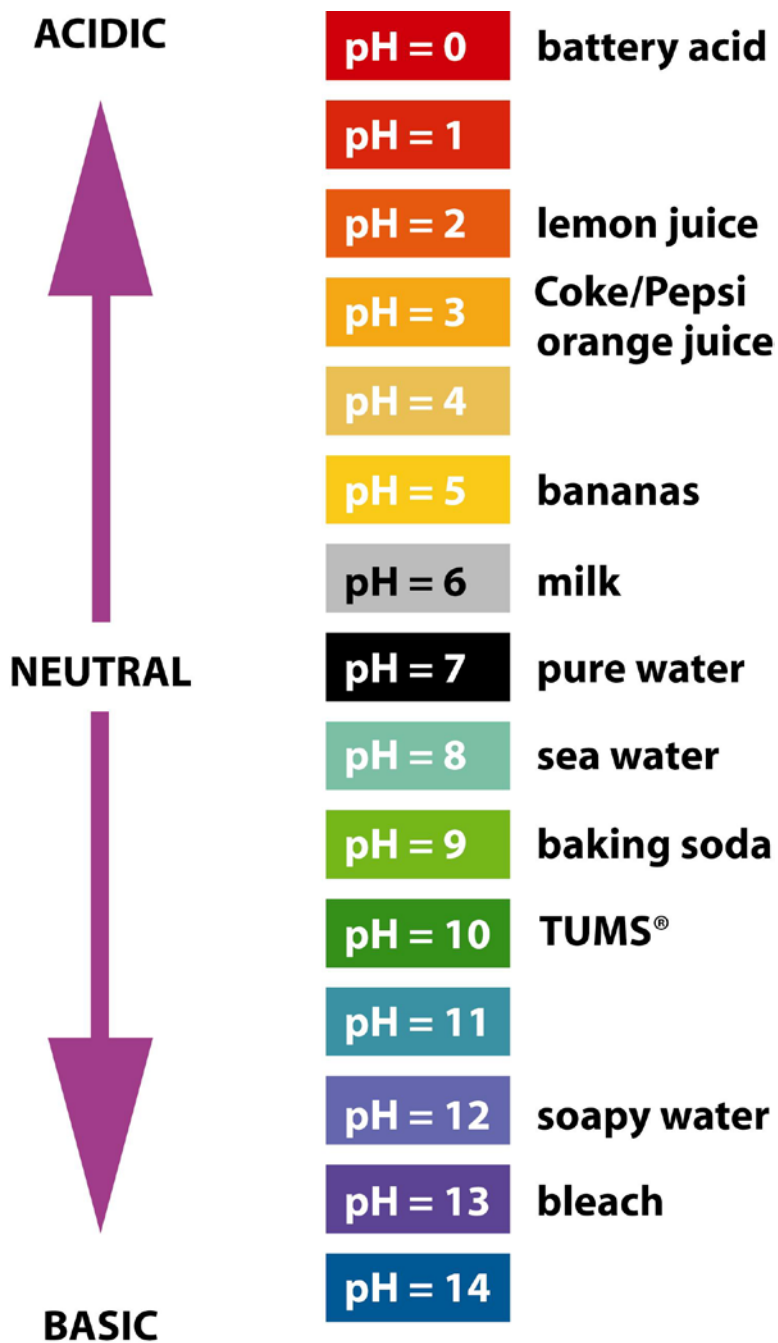
FAST SLOW NOT AT ALL

6) Razorback suckers are adapted to live in areas that flood. Floods provide backwaters (large puddles) that serve as nurseries for young razorbacks.

Do you see large puddles along the shore? YES NO

7) Is Lake Mead an ideal place for razorback suckers to live? YES NO

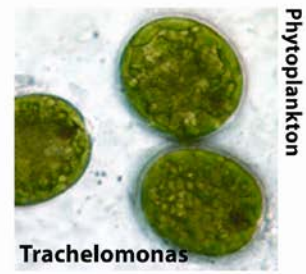
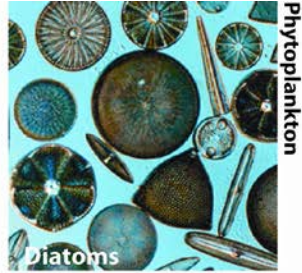
Student Reference
PH SCALE AND EXAMPLES



Student Reference: PLANKTON IDENTIFICATION SHEET

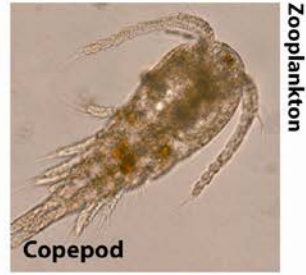
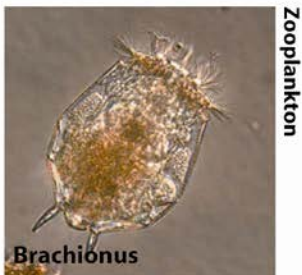
phytoplankton

- microscopic **plants** that live in water
- first in the food chain
- use chlorophyll to make sugars out of energy from the sun, chemicals (like nitrogen), and dissolved carbon dioxide gas.

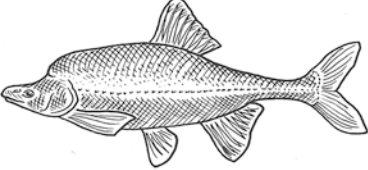
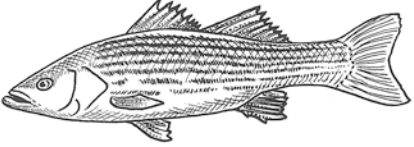
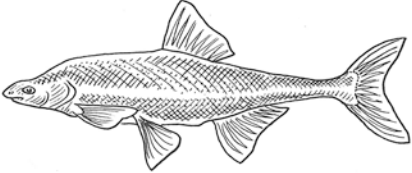
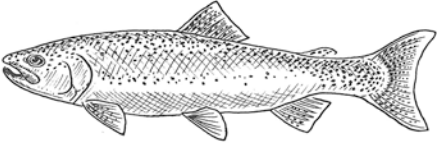
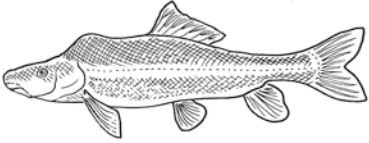
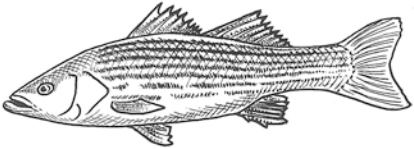


zooplankton

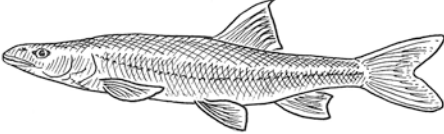
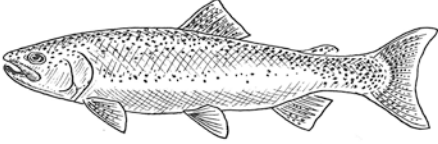
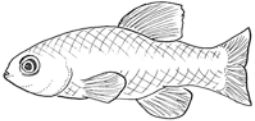
- microscopic **animals** and single-celled organisms that live in water
- eat other plankton



Student Activity:
CHILLIN' WITH THE CHUBS FACT CARDS (SHEET 1)

<p>Humpback chub (<i>Gila cypha</i>)</p> <ul style="list-style-type: none"> • Hump behind its head and large fins help it to maneuver in strong currents and whitewater. • Evolved 3–5 million years ago. • Lifespan: up to 30 years. • Length: up to 18 inches.  <p style="text-align: center;">© Claire Emery and Project WET International</p>	F O L D H E R E	<p>Striped bass (<i>Morone saxatilis</i>)</p> <ul style="list-style-type: none"> • Introduced to reservoirs in the Colorado River system; native to the Atlantic coast. • Popular game fish because it is good to eat. • Lifespan: up to 31 years. • Length: 24 inches or more (up to 60 pounds!).  <p style="text-align: center;">© Claire Emery and Project WET International</p>
CUT HERE - - - - -		
<p>Bonytail chub (<i>Gila elegans</i>)</p> <ul style="list-style-type: none"> • Large fins and streamlined body. • Rarest endangered fish species in the Colorado Basin. • Evolved 3–5 million years ago. • Lifespan: up to 50 years. • Length: 22 inches or more.  <p style="text-align: center;">© Claire Emery and Project WET International</p>	F O L D H E R E	<p>Rainbow trout (<i>Oncorhynchus mykiss</i>)</p> <ul style="list-style-type: none"> • Named for its rosy lateral stripe. • Popular game fish native to western North America. • Lifespan: up to 11 years. • Length: 16 inches or more.  <p style="text-align: center;">© Claire Emery and Project WET International</p>
CUT HERE - - - - -		
<p>Razorback sucker (<i>Xyrauchen texanus</i>)</p> <ul style="list-style-type: none"> • Large, bony ridge behind head. • Fleshy lips used for feeding on river bottom. • Evolved: 4 million years ago. • Lifespan: 40 years or more. • Length: 36 inches or more.  <p style="text-align: center;">© Claire Emery and Project WET International</p>	F O L D H E R E	<p>Striped bass (<i>Morone saxatilis</i>)</p> <ul style="list-style-type: none"> • Introduced to reservoirs in the Colorado River system; native to the Atlantic coast. • Popular game fish because it is good to eat. • Lifespan: up to 31 years. • Length: 24 inches or more (up to 60 pounds!).  <p style="text-align: center;">© Claire Emery and Project WET International</p>

Student Activity:
CHILLIN' WITH THE CHUBS FACT CARDS (SHEET 2)

<p>Colorado pikeminnow (<i>Ptychocheilus lucius</i>)</p> <ul style="list-style-type: none"> • Torpedo-shaped body and large mouth. • Largest native minnow in North America. • Evolved: 3–4 million years ago. • Lifespan: 50 years or more. • Length: up to 60 inches. <div style="text-align: center;">  </div> <p style="text-align: center; font-size: small;">© Claire Emery and Project WET International</p>	<p>F O L D</p> <p>H E R E</p>	<p>Rainbow trout (<i>Oncorhynchus mykiss</i>)</p> <ul style="list-style-type: none"> • Named for its rosy lateral stripe. • Popular game fish native to western North America. • Lifespan: up to 11 years. • Length: 16 inches or more. <div style="text-align: center;">  </div> <p style="text-align: center; font-size: small;">© Claire Emery and Project WET International</p>
CUT HERE		CUT HERE
<p>Desert pupfish (<i>Cyprinodon macularius</i>)</p> <ul style="list-style-type: none"> • Is adapted to tolerate rapid changes in water temperature and salinity that occur when desert pools shrink due to evaporation. • Large scales vary in color from brilliant blue to metallic gray. • Length: 5 inches or less. <div style="text-align: center;">  </div> <p style="text-align: center; font-size: small;">© Claire Emery and Project WET International</p>	<p>F O L D</p> <p>H E R E</p>	<p style="font-size: 2em; font-weight: bold; letter-spacing: 0.5em;">ENVIRONMENTAL STRESSOR</p>
CUT HERE		CUT HERE

Student Activity:
PLUMBING THE COLORADO

<p style="text-align: center;">1</p> <p>The Colorado River begins in the mountains with lots of rain and melting snow!</p> <p style="text-align: right;">OVER</p>	<p style="text-align: center;">1</p> <p>Lots of rain and melting snow means ... you</p> <p style="text-align: center;">ADD 4 1/3 CUPS of water.</p>
<p style="text-align: center;">2</p> <p>People in Denver need water! They take water from the Colorado River.</p> <p style="text-align: right;">OVER</p>	<p style="text-align: center;">2</p> <p style="text-align: center;">REMOVE 1 CUP of water from your river.</p>
<p style="text-align: center;">3</p> <p>Two rivers add more water into the Colorado River.</p> <p style="text-align: right;">OVER</p>	<p style="text-align: center;">3</p> <p>More water!</p> <p style="text-align: center;">ADD 2 CUPS of water to your river.</p>
<p style="text-align: center;">4</p> <p>A BIG river called the Green River adds a lot of water to the Colorado River.</p> <p style="text-align: right;">OVER</p>	<p style="text-align: center;">4</p> <p>More water!</p> <p style="text-align: center;">ADD 5 2/3 CUPS of water to your river.</p>

<p>5 Lake Powell loses a lot of water because of EVAPORATION.</p> <p>OVER</p>	<p>5 Evaporation means... you REMOVE 1 CUP of water from your river.</p>
<p>6 Lake Mead loses a lot of water because of EVAPORATION.</p> <p>OVER</p>	<p>6 Evaporation means... you REMOVE 1 1/4 CUPS of water from your river.</p>

<p>7 People in Las Vegas need water! They take water from Lake Mead.</p> <p>OVER</p>	<p>7 REMOVE 2/3 CUP of water from your river.</p>
<p>8 Lake Havasu loses a lot of water because of EVAPORATION.</p> <p>OVER</p>	<p>8 Evaporation means... you REMOVE 1 CUP of water from your river.</p>

<p>9</p> <p>People in Arizona need water! They take water from the Colorado River.</p> <p>OVER</p>	<p>9</p> <p>REMOVE</p> <p>1 1/3 CUP</p> <p>of water from your river.</p>
<p>10</p> <p>Water is needed for growing food! Water from the Colorado River is used for farming.</p> <p>OVER</p>	<p>10</p> <p>Using water to grow food means ... you</p> <p>REMOVE</p> <p>3 3/4 CUPS</p> <p>of water from your river.</p>
<p>11</p> <p>Farmers in Mexico need water to grow food. Water from the Colorado River is used.</p> <p>OVER</p>	<p>11</p> <p>Using water to grow food means ... you</p> <p>REMOVE</p> <p>2 CUPS of water from your river.</p>

Lee's Ferry	Lee's Ferry
Gulf of California	Gulf of California

U.S. Mexico Border	U.S. Mexico Border
STOP! Take a look at how much water you have in your river. How much water will be in your river when you reach the Gulf of California? Tell an adult!	STOP! Take a look at how much water you have in your river. How much water will be in your river when you reach the Gulf of California? Tell an adult!

Student Activity:
DAM CONSEQUENCES ROLE-PLAY CARDS

CONSTRUCTION WORKER

There has been little work for construction workers recently, and you're very worried about how you will feed your family and send your children to school. If the dam is built, you'll have a good job for perhaps two years. If the dam is not built, there is no promise of immediate work. You have heard, however, that there are plans to build a bridge within the next year, and you might be able to get a job on that project.

FARMER

Wow! First there was a deadly drought that lasted for two years. Then a huge rainstorm came, and the river overflowed its banks. The water flooded three of your fields, delaying planting. You are wondering how you will be able to grow your crops this year. You are very interested in the dam's potential for protecting crops from floods as well as its ability to provide water for irrigation.

PARK RANGER

As a park ranger, it is your job to save habitats and animals and to teach people to love nature. You have worked in the area for more than 30 years. You know every trail along the river like the back of your hand and have studied the plants and animals that depend on the river.

WHITewater RAFTING COMPANY

You own a whitewater rafting company and use the river for commercial rafting. You employ 30 people during the spring and summer rafting seasons. You are very concerned about losing the rapids on the "best 7 miles of the river!" As well, your company leads hikes into the narrow slot canyons that would be destroyed by the lake.

LOCAL STOREKEEPER

You own the convenience store on the corner of River Junction and Main Street. You would be able to see the dam from your front window. You wonder how the dam will affect your business. Although you would lose the business of the fishermen, rafters, and hikers that come to your store now, you would probably gain the business of the construction workers and, once the dam was built, the boaters that come to the lake.

CITY COUNCIL MEMBER

The people of Rockport voted for you in the last election because you promised to listen to their opinions and make decisions that would benefit them. You know that some people want this dam and some do not. You must listen to what your constituents want and then make the final decision about whether the dam will be built.

As your constituents make their presentations, think how you will decide if their argument is more or less compelling than someone else's. You can use the following to help you evaluate their presentations:

- Is the argument clear? Does it make sense?
- Are you convinced of how people will be affected by the dam—will they be harmed or will they benefit? In what ways? How many people will be affected?
- How will plants and animals be harmed? How will they benefit?
- How much will it cost?