UTAH LAKE JUNE SUCKER

PROCEDURE:

Activity – Game:

UTAH LAKE JUNE SUCKER GAME

Instructions:

1. Hand out one Utah Lake Card per student.
2. Select one area of the gym to be Utah Lake and another to be Provo River spawning grounds.
3. Identify one area (near the teacher) to be the dead zone/new role area.
4. Explain different roles students will play during the activity. The game works somewhat like tag, but each student must hold his/her identifying card in one hand during play.
    A. **June sucker** - These students will swim around eating plankton (move hands like jaws eating). When told by the teacher it's June, they swim to the spawning ground to lay eggs (A card representing the eggs will be placed in a bucket next to the river entrance. The adult June sucker will grab an egg card and place it on the gravel bed), and then go back to the lake area. If tagged by a predatory fish, they must go to the new role area.
    B. **Aquatic Vegetation** - These students stay in the same location in the lake. They are waving their arms as if being moved by water. When a June sucker fry is touching them, the fry are safe and cannot be eaten. Adult June suckers are not safe when touching a plant. If touched by a carp, the carp escorts the aquatic vegetation to the dead zone.
    C. **Fry** - These students come into the game through the Provo River and swim to the lake. In the game, they represent the eggs that will hatch. They cannot leave the river until an adult June sucker has placed eggs on the gravel bed. They enter Utah Lake after they have completed four to ten sit-ups (this represents the 4-10 days it takes for the fry to hatch). Next, they swim to the lake area. They hide from the predatory fish by touching the Aquatic Vegetation. They are safe from the carp. The student must clap their side ten times and move to another plant (representing fry do not just sit, they are constantly in search of food and predator avoidance).
    D. **Predatory fish** - This student hunts and finds a June Sucker adult or fry. They must tag the fish and then bring the fish to the dead zone area where the eaten fish are reassigned roles and the predator immediately re-enters the lake. Utah Lake has several predatory fish including walleye, catfish, carp, and white bass.
    E. **Carp** - This student eats aquatic vegetation by tagging them, and walking the aquatic vegetation to the dead zone (one at a time).

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Game Setup: - Rounds

ROUND ONE - Balanced Lake

1. These numbers represent the amount of students assigned to each role.
   A. **Carp** - zero (fourth round only-one carp will be introduced in round four).
   B. **Fry -** (baby June suckers) - (10%) students in the Provo River area waiting for the spawning season. Half should have a star on the card.
   C. **Aquatic Vegetation** - (50%) of the students are placed in the lake area.
   D. **Predator** - 1 student in the lake area.
   E. **June suckers** - All remaining students. Half should have a star on the card.
2. Each time the whistle blows, students must stop, freeze, and listen to instructions.
3. Announce to begin activity. Allow a couple of minutes to pass while the predator eats a few fish and brings them to the new assignment area.
4. Blow whistle & freeze. Announce the FIRST JUNE SPAWNING SEASON. The Predator can still hunt. Adult June sucker fish head to spawning grounds and place an egg from the bucket to the river, fry fish enter the game at the spawning ground after the grown up fish make it there.
5. While the game is in progress, students who have been eaten by carp or other predators will go to the dead zone and give their card to the teacher. The teacher hands out fry cards to those students. They reenter the game as a fry.
6. Blow whistle for the SECOND SPAWNING SEASON.
7. Allow a few moments of play, then stop the game and discuss.

Additional rounds help teach how each change affected the June sucker fish.

VARIATIONS OF PLAY

(Played the same as round one, with the following additions)

ROUND TWO - Irrigation

1. Play continues as normal except when you get to the spawning season, blow the whistle, and stop play.
2. Some players have a star on their June sucker or fry card. If a player has a star and is in the Provo River, they were trapped in a field or irrigation canal and died.
3. Teacher may instead choose those with no star.

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ROUND THREE - Unregulated Fishing

1. Play continues as normal except when you get to the spawning season, blow the whistle, and stop play.
2. All players with a star on the card (teacher may choose no star to keep the selection random), and are in the river or lake, were caught by fishing nets and used for food by the early settlers of Utah.
3. These fish will need to return to the dead zone.

ROUND FOUR - Introduction of Carp

1. Play continues as ROUND ONE, except add one carp to the play.
2. Additional rounds can be played by varying the amount of carp to demonstrate the affect carp have on June sucker population.
3. The teacher may now hand out additional cards for carp or predatory fish to those in the dead zone.
4. This round stops when there is only one June sucker remaining.

DISCUSSION

1. Return to class and discuss the June sucker and Utah Lake.
    A. Ask students to think back on the activity.
    B. What things can be done to save the June sucker from becoming extinct?
2. Include the following points in the discussion.

Discussion Points:

Only a few problems were addressed during this activity that has actually caused the June sucker to become endangered. There are other reasons that will be discussed in the module of "The Business of Abusing a Beautiful Lake" activity.

- The problem – Dams and fishing nets prevent fish from spawning.
    - Solution – Laws passed to prevent fishing nets from blocking the Provo River during spawning season and fishways by dams so fish can move past the dam to spawn.
- The problem – Irrigation water, and thus fish in the water, is taken out of streams. When irrigation ends, the fish are trapped in dry channels. They are prevented from returning to the lake an die.
    - Solution – screen the ditches so water can get through to the farms, but fish cannot.

- The problem – Introduction of bottom-feeding carp uprooted the aquatic vegetation. This contributed to the murky (turbid) water as well as eliminated places for young June sucker fish to hide from predators.
    - Solution – remove 75% of the carp population to allow plants to become reestablished, one of the goals of the June Sucker Recovery Implementation Program.
- The problem – June sucker fish are fewer and fewer. The young are unable to get to Utah Lake and when they can, do not survive in the lake.
    - Solution – Rear more June sucker in a fish hatchery such as the ones in Springville and Logan. After the suckers grow to 8", they are released into the lake to help build the population.
    - Solution – Restore stream habitat so that fish can successfully spawn and create habitat for protecting the fry.
    - Solution – Ensure that flows of streams and rivers are adequate to allow the fish to return to the lake.

Following the discussion, show the video about carp removal efforts (*YouTube Link*).

ASSESSMENT AND/OR EXTENSIONS:

Optional Home/Class Work: have students create their own "round" using Utah Lake's history.

ADDITIONAL REFERENCES:

None

INTERNET RESOURCES:

- Additional information about June sucker
- Additional information about Common Carp

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STANDARDS ADDRESSED:

Science

Standard 5: Students will understand the physical characteristics of Utah's wetlands, forests, and deserts and identify common organisms for each environment.

Objective 2: Describe the common plants and animals found in Utah environments and how these organisms have adapted to the environment in which they live.

Indicators:

c. Describe some interactions between animals and plants of a given environment.

e. Find examples of endangered Utah plants and animals and describe steps being taken to protect them.

Objective 4: Observe and record the behavior of Utah animals.

Indicators:

c. Research or report on the behavior of a species of Utah fish (e.g. feeding on the bottom or surface, time of year and movement of fish to spawn, types of food and how it is obtained).

Social Studies

Standard 1: Students will understand the relationship between the physical geography in Utah and human life.

Objective 3: Analyze how human actions modify the physical environment.

Standard 2: Students will understand how Utah's history has been shaped by many diverse people, events, and ideas.

Objective 3: Explain the development of the economy in Utah.

Indicators:

a. Explain the relationship between supply and demand.

c. Explore cultural influences from various groups found in Utah.

JUNE SUCKER ACTIVITY CARDS

June Sucker
Adult

June Sucker
Adult

June Sucker
Adult

June Sucker
Adult

JUNE SUCKER ACTIVITY CARDS

June Sucker

Fry

June Sucker

Fry

June Sucker

Fry

June Sucker

Fry

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Aquatic Vegetation

Aquatic Vegetation

Aquatic Vegetation

Aquatic Vegetation

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Carp

Carp

Predatory Fish

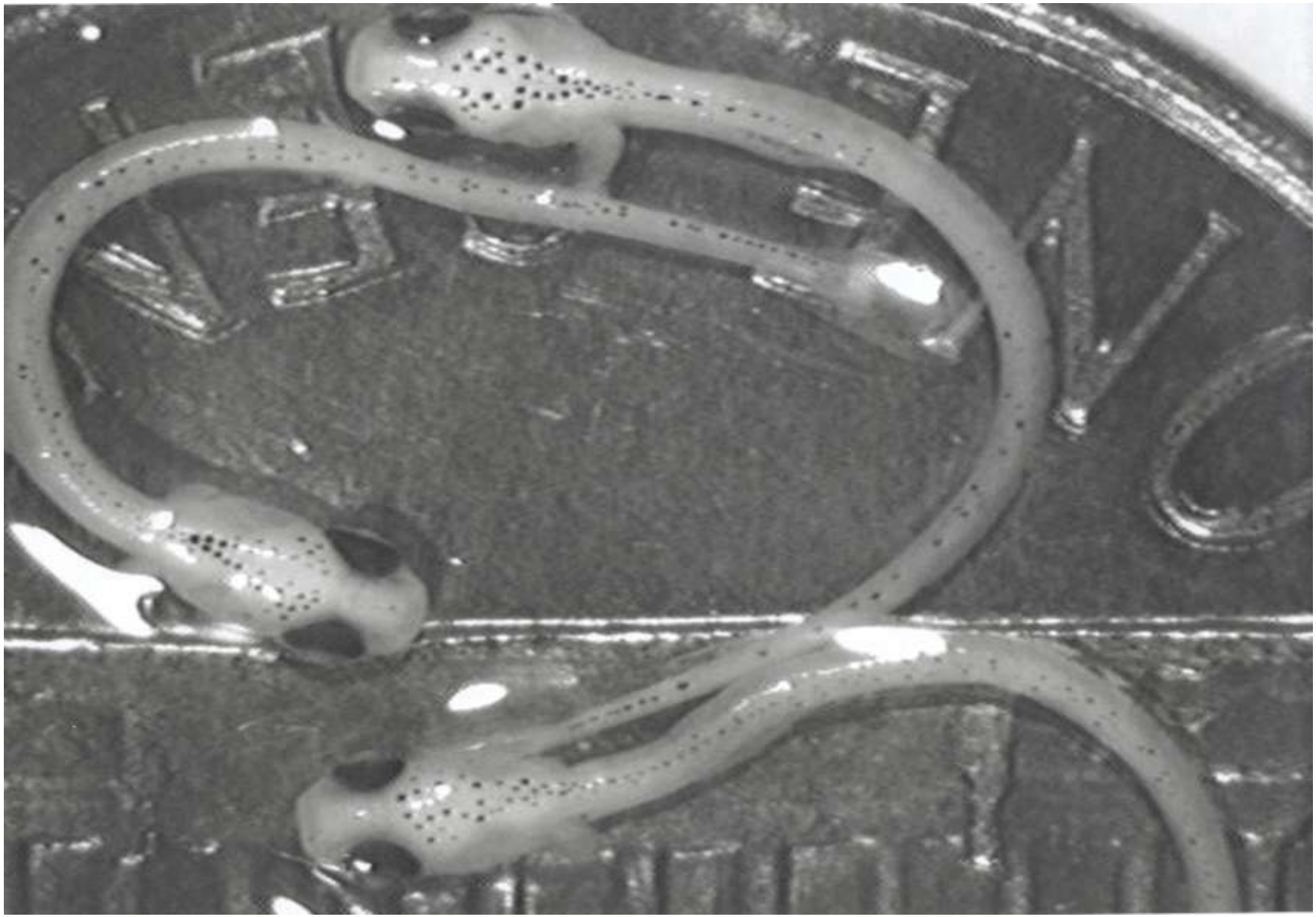
Predatory Fish

JUNE SUCKER ACTIVITY CARDS

JUNE SUCKER PICTURES

Experimental cages that exclude carp allow scientists to examine the potential to restore aquatic vegetation. (Photo by Chris Keleher)

JUNE SUCKER PICTURES



Tiny June sucker (as seen here on a penny) are usually less than three weeks old when they drift down river from spawning beds, and are easy prey for nonnative fish (Photo by Craig Ellsworth).

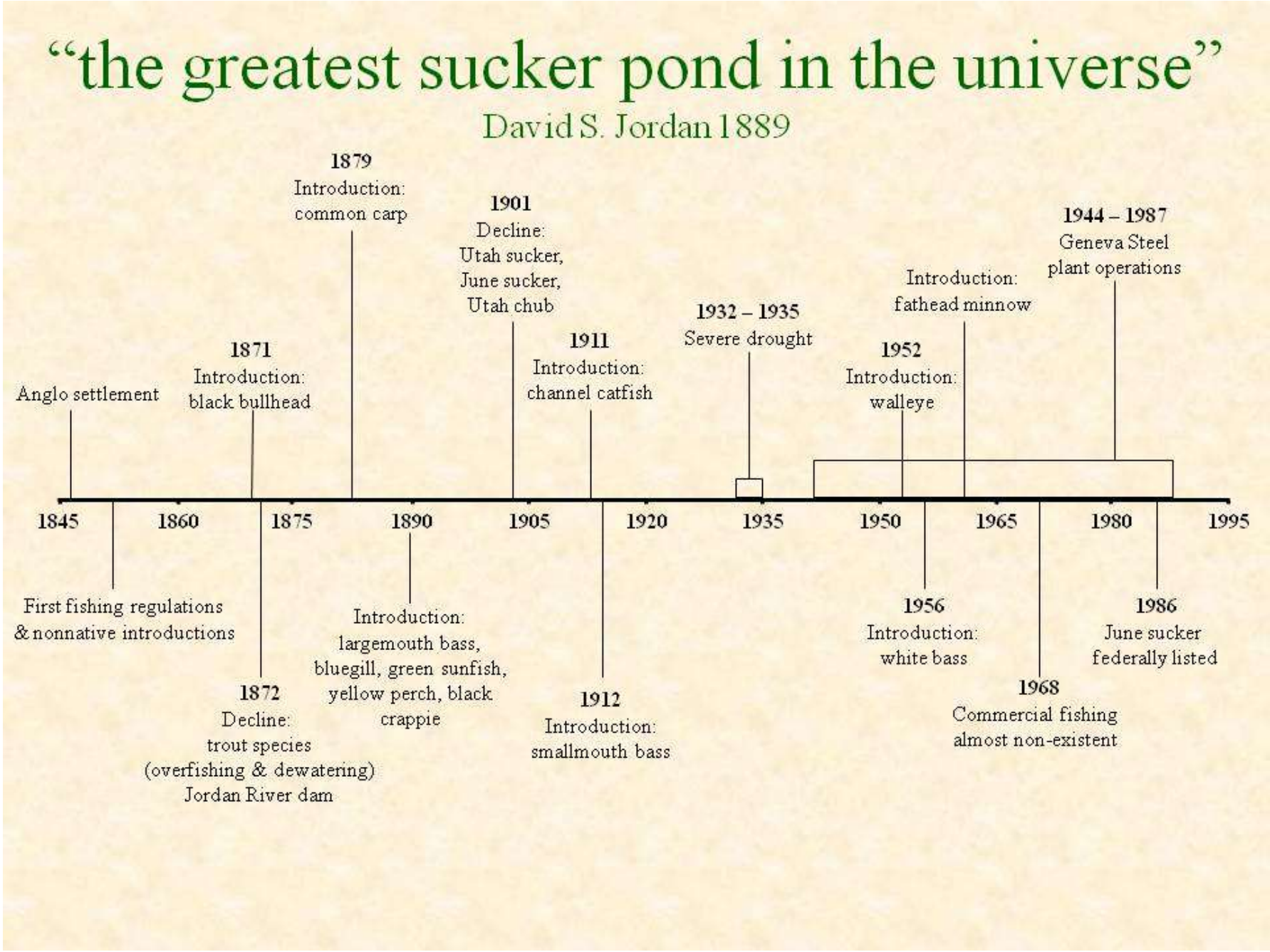
JUNE SUCKER PICTURES

A carp

JUNE SUCKER PICTURES

A June sucker

GREATEST JUNE SUCKER POND



Utah Lake Native Fishes


1


2

3 Extinct


4


5


6


7


8


9


10


11


12


13

1 June Sucker
2 Utah Sucker
3 Utah Lake Sculpin
4 Bonneville Cutthroat Trout
5 Least Chub
6 Bonneville Redside Shiner
7 Mottled Sculpin
8 Leatherside Chub
9 Utah Chub
10 Speckled Dace
11 Long Nosed Dace
12 Mountain Whitefish
13 Mountain Sucker

Courtesy of Joe Tomelleri

JUNE SUCKER ARTICLE

UTAH'S WILD NOTEBOOK

Utah Lake's endangered fish and you. What's the connection?

June sucker

By Diana Vos
Project WILD Coordinator

A LOOK BACK in time:

The story of Utah Lake and its June suckers begins about 15,000 years ago. That's when Lake Bonneville, which covered nearly half of what is now the state of Utah, began to drain and dry up.

When the lake disappeared about 10,000 years ago, it left behind several large lakes. One of these lakes became known as Utah Lake, the largest freshwater lake west of the Mississippi River.

One of the fish that swam in Lake Bonneville was the June sucker. As the lake retreated, the June sucker and 12 other fish species, including the Bonneville cutthroat trout and the Utah sucker, became isolated within Utah Lake. These native fish thrived in their new environment, and millions of June suckers filled the shallow lake.

The situation is much different today, however. Fewer than 1,000 adult June suckers live in Utah Lake, and the fish is now federally listed as an endangered species.

What changed 150 years ago?

This is where the ancestors of many of us come into the story. For the state's early residents—Native Americans, Spanish explorers in the 1700s, fur trappers and traders in the early 1800s, the Mormon pioneers who arrived in 1847 and the stream of settlers who followed—Utah Lake was a treasured resource that provided needed water and food. Its fish played a significant role in the area's settlement and literally fostered the growth of civilization in Utah.

In 1848, an early frost killed most of the Mormon pioneer's crops. Swarms of grasshoppers destroyed what was left. The residents in the valley were faced with starvation. To find food, the pioneers organized fishing companies and turned to Utah Lake.

Using large nets (seines) made of cotton, flax or yarn, the pioneers caught thousands of pounds of cutthroat trout, June suckers, Utah suckers and other fish. Driven by hunger, more people fished even more frequently over time. Records from 1855 hunger relief efforts show that 2,301 pounds of fish were dispensed through Salt Lake City's public works department. During the summer of 1856, fishing companies organized by Mormon wards caught tons of fish, including one ward that reported catching about eight tons.

In those early days, the number of fish in Utah Lake seemed infinite. The

Invasive plant species are causing a change in Utah Lake's habitat.

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Found only in Utah Lake and once numbering in the millions, the June sucker is now threated with extinction.

abundance of fish is reflected in an 1854 recollection of George Washington Bean, one of Provo's first settlers, "So great was the number of suckers and mullets passing continuously upstream that often the river would be full from bank to bank, as thick as they could swim for hours and sometimes days together."

Because the number of fish in the lake seemed to be infinite, little thought was given to their long-term survival. People seined night and day and even placed stationary gill nets across the mouth of the Provo River where the fish were attempting to spawn. Utah Lake's fish became a valuable commodity, and laws that regulated fishing methods and the number of fish that could be taken from the lake were often disregarded.

A variety of other events also threatened the health of Utah Lake's fish. During the 1850s, numerous canals and diversion dams were built for irrigation. These dams presented barriers that did not allow the fish to move up the rivers and streams to spawn. Unscreened ditches also carried thousands of adult and newly hatched fish onto farmers' fields, instead of back to the lake. Rivers and streams that led to and from the lake were straightened, channeled and dredged to divert water, expedite the delivery of water and provide flood control. These changes caused water levels to fluctuate and damaged habitat.

Fish populations also suffered greatly in the1880s when a portion of the Provo River was de-watered for irrigation, killing close to one million spawning suckers. In the 1880s, sugar beet processing waste and sawdust from sawmills was also dumped into streams that feed the lake. Sewage dumping followed in the 1890s.

All of these factors led to a serious decline in Utah Lake's native fish populations. But instead of instituting regulations to protect the native fish, non-native fish were introduced into Utah Lake. It was hoped that these non-native fish would allow the lake to continue to provide a food source and a commercial fishery.

Carp and the June sucker:

The decision to introduce non-native fish, especially carp, resulted in a series of events that changed Utah Lake forever.

Introduced into Utah Lake in 1881, carp now comprise more than 90 percent of the fish biomass in the lake. Carp are a hardy fish that are very popular in other parts of the world, but their aggressive foraging habits have destroyed Utah Lake's aquatic vegetation. The loss of vegetation makes it easier for waves to stir up sediments, which causes the water in the lake to be more turbid, or muddy, in appearance. High levels of nutrients from runoff and waste water treatment plants also fuel algae growth. This algae growth can deplete oxygen levels and kill fish.

The lack of aquatic vegetation leaves young June suckers without cover in which to hide. This lack of cover makes them vulnerable to predation by white bass and walleye, two of the more than 20 non-native fish species that have been introduced to the lake.

What's special about June suckers?

Of the 13 native fish that once lived in Utah Lake, the June sucker is one of only two fish that are still found there.

The June sucker is a member of the

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lakesucker family, Castostomidae. Their peak spawning time occurs during the month of June, and that's how the June sucker got its name. A large steel-gray fish with a white belly, June suckers grow to 17 to 24 inches long and weigh about five pounds. Their head is wide and rounded, with a distinct hump on their snout.

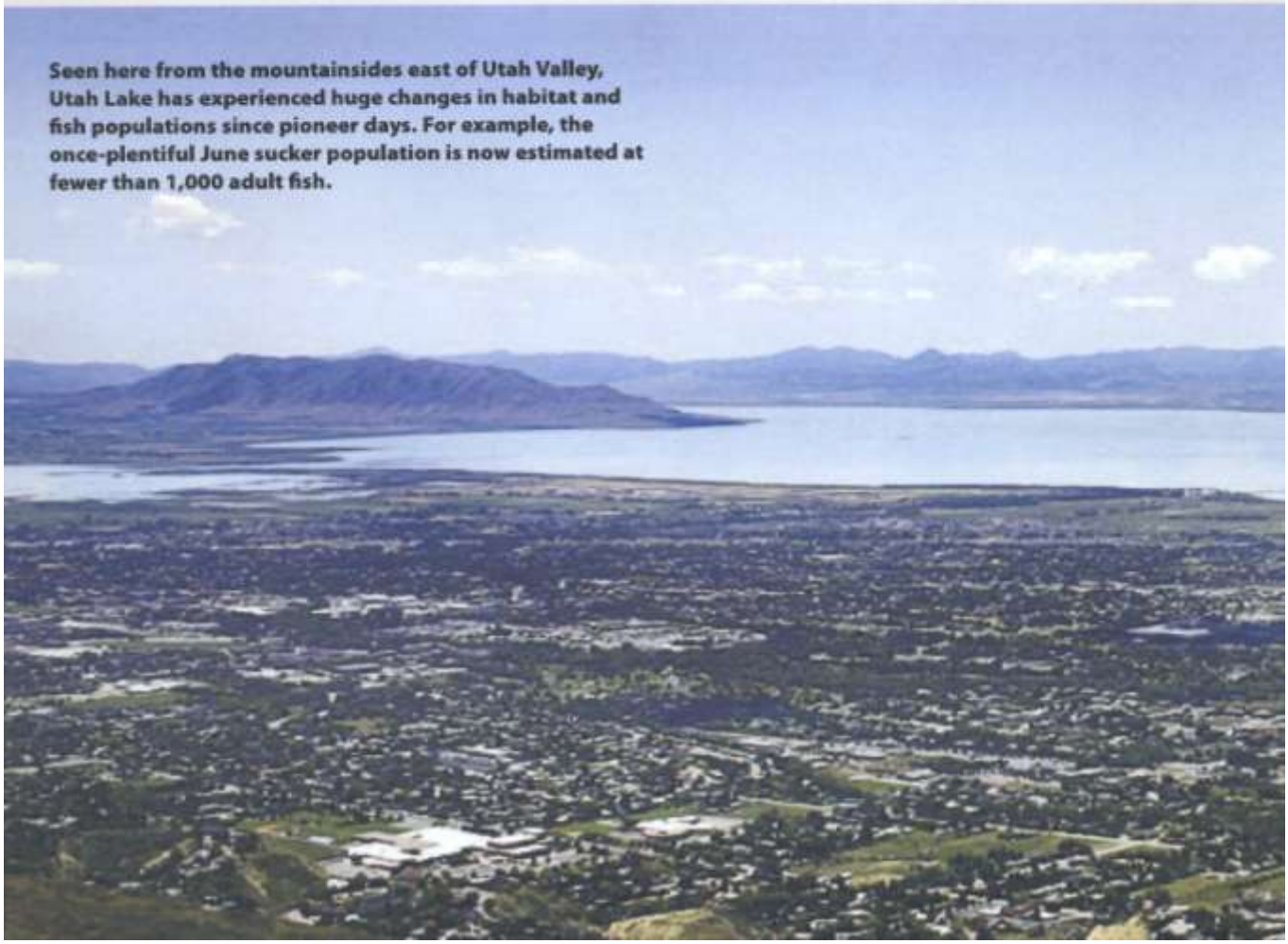
Pelagic planktivores, June suckers feed on single-celled zooplankton in the middle water column. They swim in groups and feed by opening their mouths, filtering out plankton with special structures called gill rakers.

June suckers are endemic to Utah Lake, which means they're found naturally only in Utah Lake and nowhere else in the world. A few refuge populations have been established elsewhere as part of a recovery program that was developed after the U.S. Fish and Wildlife Service listed the species as endangered on April 30, 1986.

Historically, June suckers were very abundant in Utah Lake. David S. Jordan, visiting the lake in 1889, reported millions of suckers in the lake and proclaimed Utah Lake, "...the greatest sucker pond in the universe." Commercial anglers reported large annual catches of suckers through the early 1900s. Between 1901 and 1905, an average of about 178 tons of suckers were harvested each year. In the early 1950s, the catch of suckers was still relatively high, with reports of as many as 1,250 suckers caught in a single day of commercial seining.

By the late 1970s, however, June sucker numbers had plummeted. The decline corresponds closely with the introduction of white bass and walleye to the lake in the mid-1950s. When they were listed as endangered in 1986, the wild June sucker population was thought to be less than 1,000 fish. A 1998 report indicated the wild adult spawning population was closer to 300 individuals.

The life cycle of the June sucker begins in the lower Provo River. Each spring, between April and June, adult June suckers enter the river from Utah Lake to spawn. In most years, the area where the fish can spawn is limited to the lower three miles of the river because an irrigation diversion doesn't allow the fish to pass farther upstream. In very wet years, they can migrate far-



Seen here from the mountainsides east of Utah Valley, Utah Lake has experienced huge changes in habitat and fish populations since pioneer days. For example, the once-plentiful June sucker population is now estimated at fewer than 1,000 adult fish.

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ther and can access an additional 1.9 miles of spawning habitat before they reach another irrigation diversion that's impossible for them to pass.

Soon after spawning, the adult suckers return to Utah Lake.

Depending on the temperature of the water, June sucker eggs hatch in four to 10 days. After they hatch, larvae emerge from the gravel bed where the eggs were laid and begin drifting downstream. Unfortunately, little is known about the early years of a June sucker's life because researchers haven't been able to capture any. It's believed the drifting larvae are either eaten by non-native fish in the Provo River, or they die because the altered habitat in the lake does not provide the food or temperatures the fish need to survive.

June suckers raised by the Division of Wildlife Resources in a hatchery are placed into Utah Lake when they're about 8 inches long, which is large enough to avoid predation. These fish have survived and have matured to the point that they've been able to spawn in the wild themselves. The ability of hatchery fish to survive, grow and reach sexual maturity shows that the bottleneck that's limiting the natural recruitment of June suckers is in the early stages of a fish's life.

June suckers reach reproductive maturity at age five or six and live to be about 40 years old.

To date, more than 8,500 juvenile June suckers have been released into Utah Lake. The total number that have survived to adulthood is not known,

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however. Total recovery of the fish will only be achieved after they're able to complete their entire life cycle in their native habitat.

Utah Lake and the June sucker:

Despite the significant role June suckers have played in Utah's history, a recent survey found that more than 83 percent of Utahns have never heard of them. And many of the people who have heard of the June sucker see the federally protected fish as a nuisance.

What many people don't realize is that recreating a healthy habitat for June suckers will benefit the entire Utah Lake ecosystem, the people who live around the lake and the area's economy. June suckers are considered an indicator species—a species whose health reflects the health of the ecosystem of which it is a part.

In April 2002, the June Sucker Recovery Implementation Program (JSRIP) was formed. The JSRIP has two intertwined goals: recover the June sucker so it no longer requires protection under the Endangered Species Act while allowing people to continue to develop and use water resources along the Wasatch Front.

The JSRIP is a broad coalition of federal, state and local groups, including the U.S. Fish and Wildlife Service, the Utah Department of Natural Resources, water resource agencies, and environmental and outdoor groups.

To help people understand more about June suckers and Utah Lake, the JSRIP has produced a book titled *Utah Lake: Legacy* that chronicles the history of the June sucker and its long-neglected home. An exceptionally well-done documentary based on the book aired on KBYU Channel 11 in spring 2006. A DVD of the program is available by request (see resources below).

Changing public attitudes about Utah Lake is an important step to cleaning up the lake. Other steps include ensuring good water quality by limiting the amount of pollutants that enter the lake; reducing the lake's carp population; reestablishing historic river and stream flows; and restoring spawning and nursery habitat.

Human use of Utah Lake has often been at odds with the June sucker .

Cleaning up Utah Lake and recovering the June sucker is a challenging, long-term project, and much of its success will depend on public support. This restored lake will be a jewel that future generations can enjoy, just like our ancestors did.

Resources:

- *Utah Lake: Legacy* by D. Robert Carter, Vanguard Media Group, 2003.(Check your local or school library, or order for $15)
- *Free Utah Lake: Legacy* DVD and Educator Study Guide. Request by e-mailing *BrendaLandureth@utah.gov.*
- June Sucker Recovery Implementation Program Web site: *www.JuneSuckerRecovery.org*
- June Sucker Recovery Implementation Program—Program Director's Office. (801) 538-5273.

project WILD

More information: Getting WILD! Utah's WILD Notebook is produced by Utah's Project WILD program. WILD workshops, offered by the Utah Division of Wildlife Resources, provide teachers and other educators with opportunities for professional development and a wealth of wildlife education activities and materials for helping students learn about wildlife and its conservation. For a current listing of Project WILD educator workshops, visit the Project WILD Web site at *www.wildlife.utah.gov/projectwild* or send an e-mail to *DianaVos@utah.gov.*