

KIDDER CREEK ENVIRONMENTAL SCHOOL  
FISH FIELD STUDY PROGRAM

FINAL REPORT

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ABSTRACT

The Kidder Creek Aquatic Field Study is based on the "Klamath River Studies" (KRS) curriculum for fourth through sixth grade students. The major objectives are to educate students concerning the life cycle, habitat requirements and the importance of salmonids. Also emphasized are the human impacts that are harmful to our fish populations and what we can do to improve this situation. The curriculum also allows the students to observe, collect data and appreciate the wonders of the riparian habitat.

The curriculum is intended to assist teachers and resource specialists in leading the aquatic field study at Kidder Creek Outdoor School. It is divided into specific sites which include background information, specific activities, discussion questions and optional activities. A cross sectional and an overview map is provided for the students to record data and observations during the field study. Field study kits, providing the necessary materials and equipment, will be at each field study station. Student field study data, observations, ideas and concerns will be displayed at Decker Hall at our salmonid information area.

This field study curriculum was developed with the assistance of a core group of interested resource specialist who are familiar with the logistical problems that arise when teaching in the outdoors. It is highly recommended that all teachers and resource specialist involved in this field study participate in the training given at the teacher orientation prior to the spring and fall sessions of Kidder Creek Outdoor School. It would also be very helpful if each teacher would receive a copy of the Klamath River Studies.

## INTRODUCTION

Kidder Creek is a major tributary to the Scott River which is experiencing habitat degradation related to agricultural diversion of stream flows, removal of riparian vegetation due to over grazing and water quality problems related to runoff from recent intensive logging practices. Recent information provided by the Department of Fish and Game and the American Fisheries Society indicated that the coho salmon population in the Scott River is at a high risk of loss. There has been a strong run of coho salmon in the Scott River including its tributaries until recently. Kidder Creek Environmental School (KCES) is Siskiyou County's residential school for fifth and sixth grade students. We have the unique opportunity to educate many students concerning the survival requirements and the importance of salmon to our region.

## DESCRIPTION OF STUDY AREA

Kidder Creek Environmental School is located on Kidder Creek approximately 6 miles from the confluence with the Scott River. The location for the student field studies is located on Kidder Creek which is a major drainage on the east side of the Marble Mountains. The site offers a variety of creek habitats allowing the students to explore and study the components of the riparian area. Also a major agricultural water diversion is present which provides many monitoring opportunities for the students.

## METHODS AND MATERIALS

As was stated earlier the field study curriculum was developed with the assistance of a core group of interested resource specialist who are familiar with this subject and teaching in the outdoors. I also consulted with Diane Higgins, Klamath River Education Program coordinator, and used existing curriculum whenever possible. We will train the teachers and resource specialist, from the local agencies, in using the activities, equipment and teaching techniques involved in this program.

## RESULTS AND DISCUSSION OF RESULTS OBTAINED FROM THE YEAR'S WORK

See Appendice A - The field study curriculum

## SUMMARY AND CONCLUSION

The developed curriculum incorporated the project tasks with some modifications to task 4.

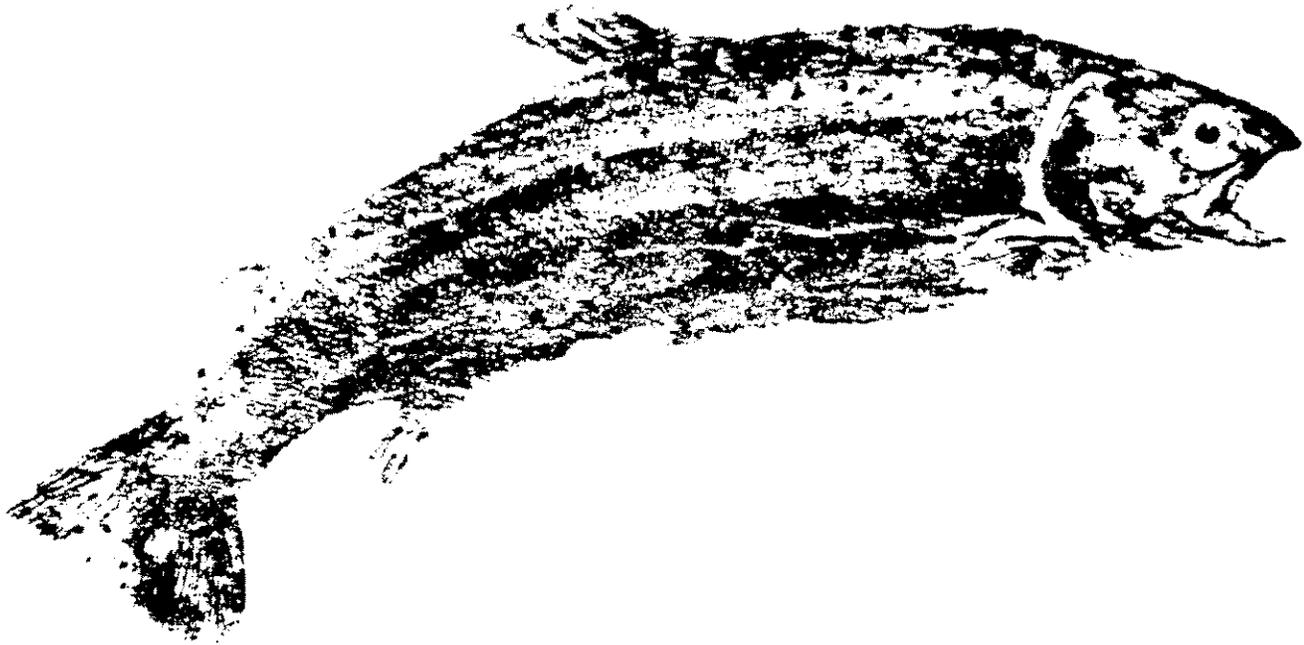
The following are the modifications to task 4, pertaining to the site specific riparian restoration activity at Kidder Creek Outdoor School. As the curriculum for the aquatic field study was developed it became apparent that planting trees in the riparian area by the students would not fit into the time allowed for the field study. All of the basic ground work was done but it was decided to provide the tree planting activity as an optional activity. Teachers and resource specialist have the option to implement this activity in place of another station. Also it can be utilized as a demonstration involving a few students in the planting. The teachers and resource specialist will be trained in riparian restoration and the importance of a healthy riparian zone.

Subtask 4.1-- It was decided to use the over head map that the students will be utilizing during the field study. The areas that are in need are indicated on the enclosed map.

Subtask 4.2-- Permission to plant trees was obtained from the owners of Kidder Creek Orchard Camp and the adjoining property owners. Realizing that time would be a limitation in completing all of the stations of the field study it was decided to keep our planting on or near the school.

Subtask 4.3-- On site willows are intended to be the main tree to be planted. Students will be involved in cutting willow sprigs will plant them in designated areas under the direction of a teacher or resource specialist. Conifers will be obtained from the U.S. Forest Service, Salmon River District, (Dave Knight)---Scott River District (Rich Svilich), U.S. Soil Conservation Service (Ann Parry). Also these agencies will provide the necessary tools. Presently a field study box is available with the needed tools to demonstrate willow cutting and planting.

# KIDDER CREEK



# OUTDOOR SCHOOL

June 1992

## STATION 1 - RIPARIAN OVERVIEW

MATERIALS: Clipboards, Pencils, Maps

### Activity:

1. Introduce the teacher, resource specialist, visiting adults and high school counselors to the students and mention their roles at the field study.
2. Hand out the maps and discuss the format - the movement through the stations, note taking on the maps and the basic objectives of the field study.
3. Orientation - Have the students find their location on the map, both the cross section and the overview. Have them fill in the areas that contain water. Make sure the students know their location on the map before moving to the next station.
4. Introduce the terms: RIPARIAN AREA, WATERSHED, HABITAT

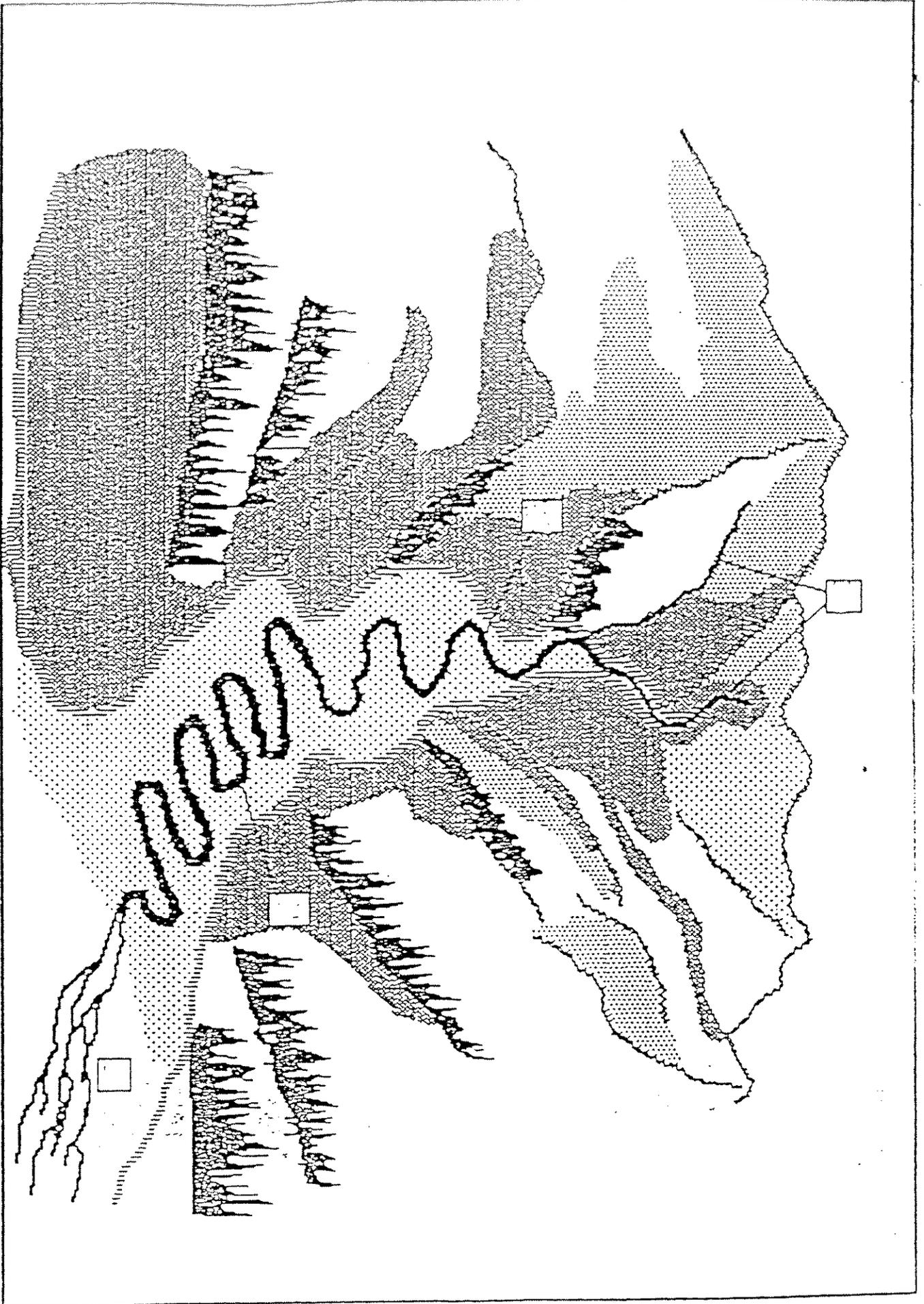
**RIPARIAN AREA:** Riparian areas are the green ribbons of life found on the edges of water courses (streams, lakes, ponds) Conditions there support plant communities that grow best when their root systems are near the level of high ground water. Riparian areas provide space, shelter, and food for the plant and animal communities with which they are associated. For example, leaf litter and terrestrial insects falling from vegetation into the stream provide nourishment for some aquatic life. Vegetation provides shade and shelter for fish and larger land animals and birds. Riparian areas are also transportation corridors or highways for animals that depend on water bodies for food and shelter.

**HABITAT:** The environment in which an animal lives is called habitat. An animal's habitat includes food, water, shelter and adequate space.

**WATERSHED:** A watershed is a place which receives and stores water. The river begins at the top boundaries of the watershed as tributaries, small fast flowing streams which empty into the main stem of the river. Fresh water meets with salt water in the estuary, where the river flows into the ocean.

5. Have the students locate Kidder Creek Outdoor School on the watershed diagram on their maps and indicate the various parts of the watershed.

\* WATERSHED \*



6. LISTENING ACTIVITY: Have the students close their eyes and listen carefully to the sounds made by the stream for a full minute and write three words that describe the sounds they hear.
7. VISUAL ACTIVITY: Have the students move up to the stream and look up and down stream and at the water. Have them write the first three words that come to their your mind to describe the stream.

\*\*\*\*\* MOVE TO STATION 2 \*\*\*\*\*

## STATION 2 - FLOOD PLAIN

MATERIALS: Maps, Compasses, Thermometers

### ACTIVITY:

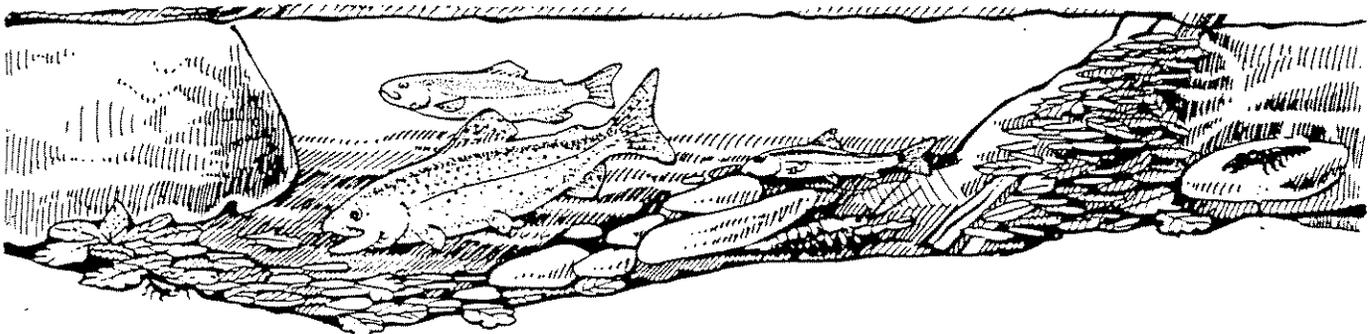
1. SKETCHING OBSERVATION: Have the students sketch what they see in the riparian area on the cross sectional map (water, trees, leaves, plants, animals, human impact etc.)

#### Sketching Guidelines:

1. Quick sketches- 5 to 10 minutes
2. Don't worry about the end product
3. Use a few words to describe if necessary

Discuss the drawings and see if the students can identify the various components of the riparian area. This should include the sucession occurring in the old and new flood plains.

2. COMPASS: Use a compass to determine north,south,east,west. Place the four directions on the map on the space provided.
3. TEMPERATURE: Record the temperature under the trees in the shade and in the open floodplain. Place results on the map.
4. GEOLOGY: Discuss the physical geology of the riparian area. Cutbanks,types and shapes of rocks, prominent land marks, where kidder creek flowed in the past,rocks traveled from the upper areas of the watershed, inclination etc.



5. SOIL COMPONENTS: Have the students pick up a handful of soil or humus from the old floodplain. Have them rub it between their fingers, smell it and look at it closely. See if they can identify the components of soil and discuss how soil is formed. (It takes 1,000 years to form one inch of soil) Mention the fact that we are made up of the same elements that are in the soil.

OPTIONAL ACTIVITY:

1. CALIFORNIA TREE FINDERS: In small groups have the students key out the riparian trees using the California Tree Finders.
2. ROCK IDENTIFICATION: This activity is intended for the teacher and resource specialist who wants to emphasis geology. This lesson can be obtained at the request of the teacher.

\*\*\*\*\*MOVE TO STATION 3\*\*\*\*\*

STATION 3 CREEK (POOL AND RIFFLE)

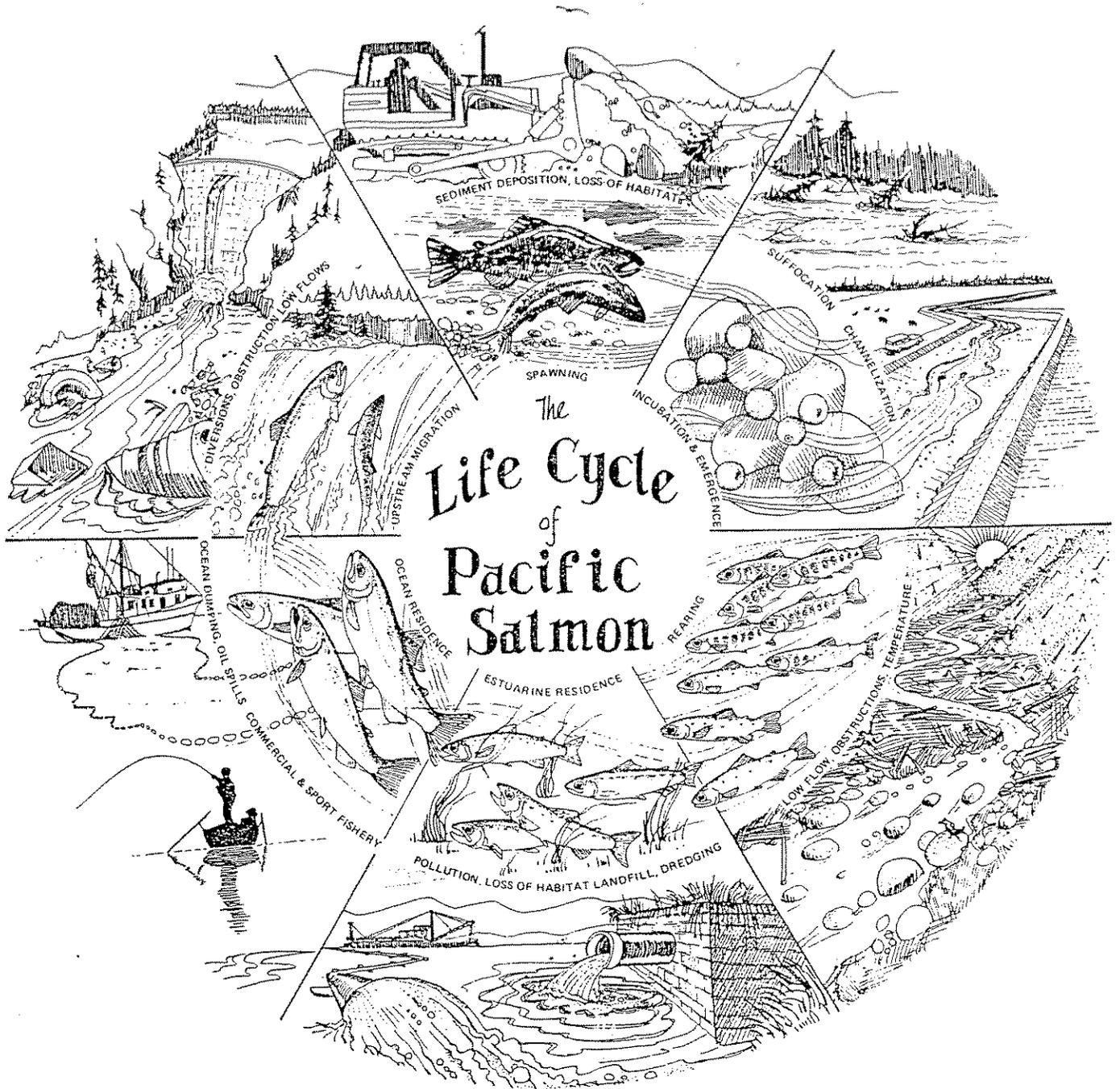
MATERIALS: creek field study kits, aquatic kick nets, diving mask, willow planting kit(optional)

ACTIVITY:

1. OPENING DISCUSSION: Lead a brief discussion before the students become actively involved in collecting data, observing and sketching insects. The topics of the discussing should include: riparian food chain, life cycle of fish and aquatic insects(adult and larvae), habitat requirements of fish, natural survival of wild fish.

Information sheets are included to aid the teacher and the resource specialist in the above topics. Use all or some of the sheets in your discussion.

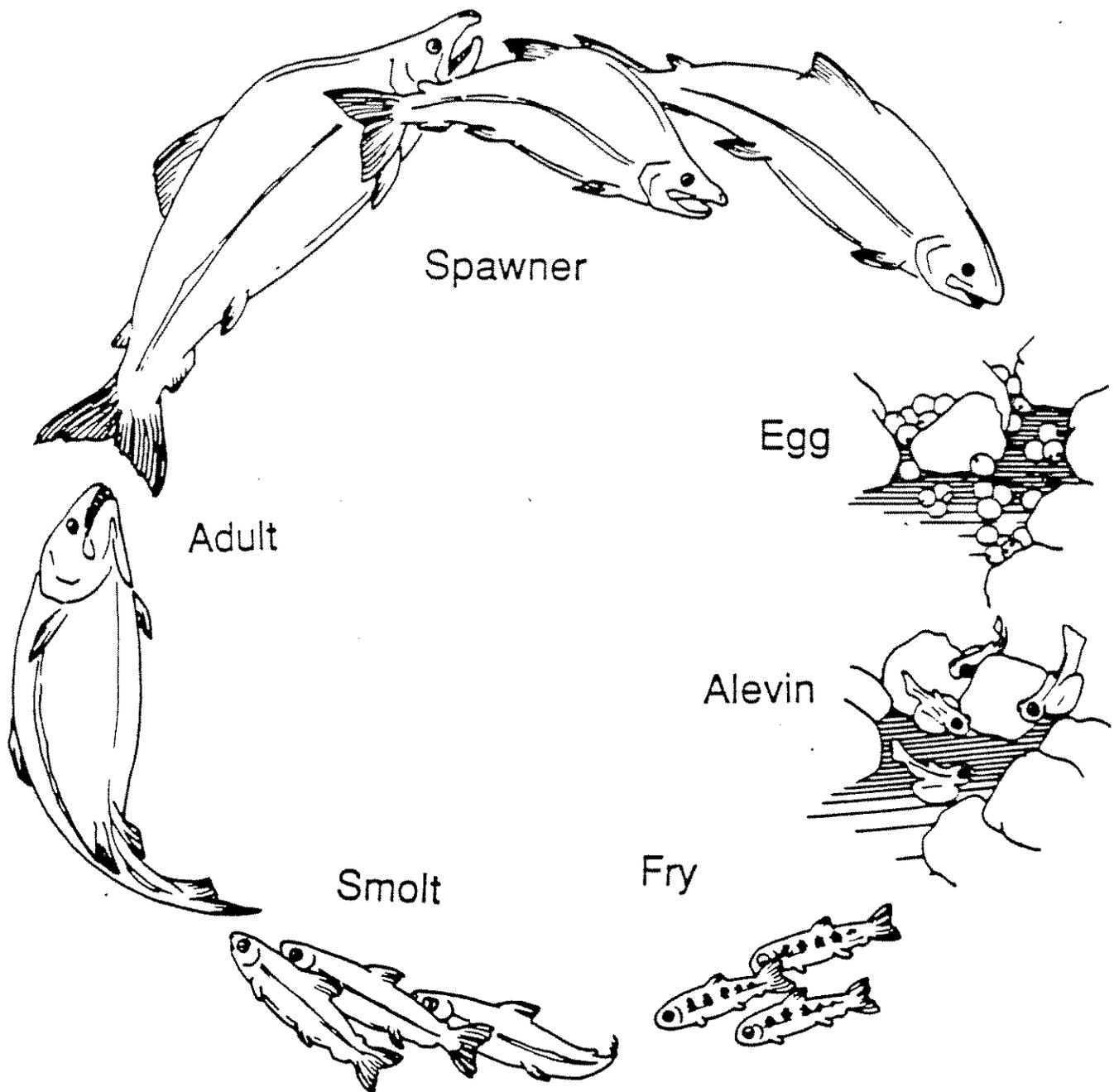
2. DATA COLLECTION: Record water gauge height and water temperature. The data will be posted at Decker Hall and compared to other sessions.
3. RIPARIAN PLANTS: Describe the plants that grow in the water or within 10 feet of the water.
4. RIPARIAN INSECTS: Look for insects within 10 feet of the water but not in the water. Use the two way microscopes to study them. Sketch one insect on the map. Try to identify them using the keys.



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# LIFE CYCLE

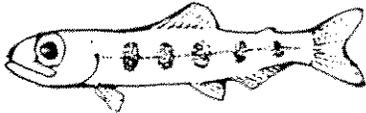


# LIFE CYCLE AND HABITAT USE OF SALMON AND STEELHEAD TROUT



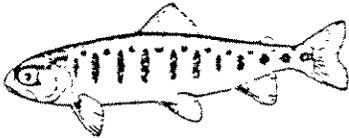
**Alevin**

After the egg hatches, the little alevin stays buried in the gravel. When all the food in its yolk sac has been used up, the alevin becomes a fry and pushes its way up out of the gravel.



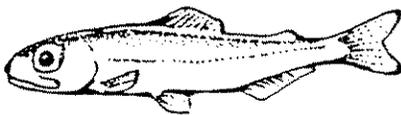
**Fry**

The young fry are small and not strong enough to spend much time in the main current of the stream. Most of the time they stay in backwater pools at the edge of the stream where the current is gentle and there are lots of places to hide.



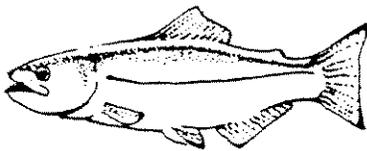
**Fingerling**

As the fry get bigger, they can hold a position in or near riffles. The flowing water carries small insects which the fry snatch out of the water. The white water of the riffle provides cover. The fry are now called fingerlings because they are about the length of a finger.



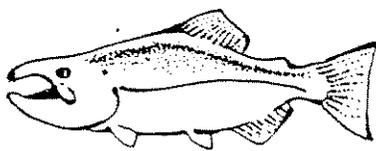
**Smolt**

When the fish begins its journey downstream, or when it reaches the estuary, it goes through changes. It loses its dark spots and turns silver, so it is not easily seen in the ocean environment. Its gills also change so the fish can live in salt water. It is now called a smolt and may spend several months in the estuary.



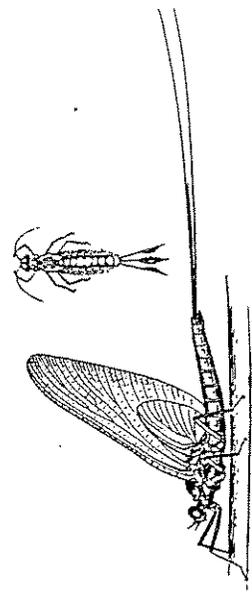
**Adult**

Adult salmon and steelhead trout live in the ocean. There is more food in the ocean than in the stream, so the fish quickly grow big. They may travel thousands of miles in the ocean, following food sources.

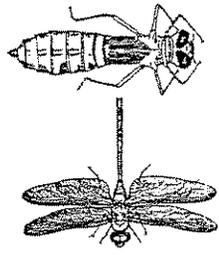


**Spawner**

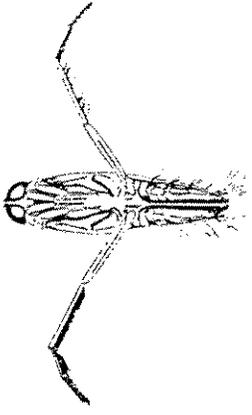
When the fish is mature it returns to the river where it was born to spawn. It usually does not eat once it enters freshwater. It uses up all its energy to battle its way upstream.



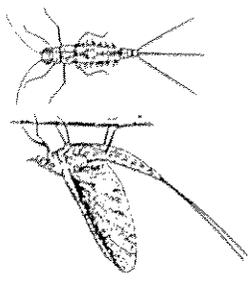
Spring Mayfly and Nymph



Green Darner and Nymph

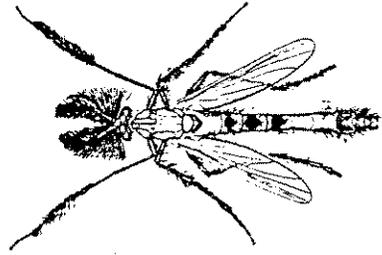


Back-Swimmer

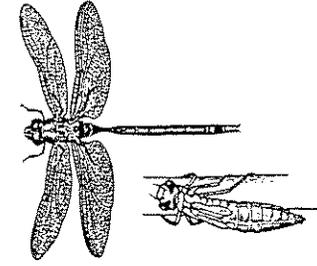


Pale Green Mayfly and Nymph

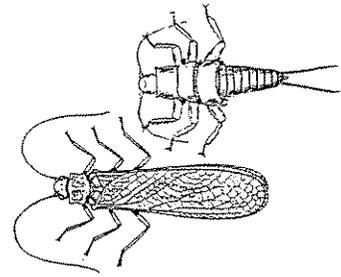
# These Insects Are 'Bread and Butter' in the Diet of California's Trout



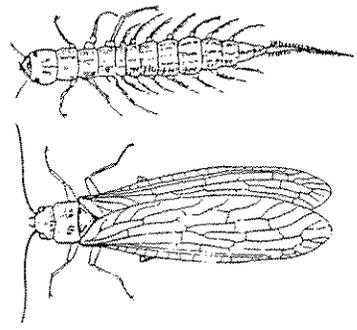
Midge and Larva



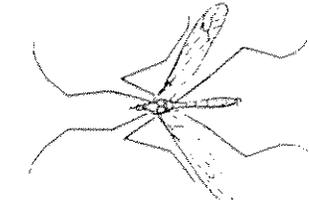
Blue Darner Dragon Fly and Nymph



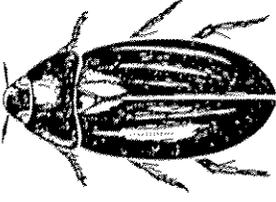
Late Spring Stone Fly and Nymph



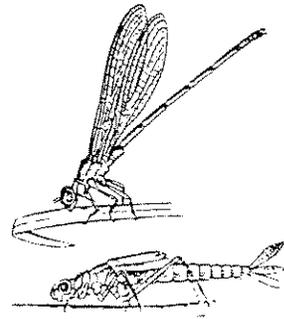
Alder Fly and Larva (Hellgrammite)



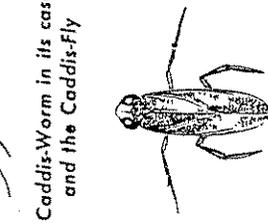
Crane Fly and Larva



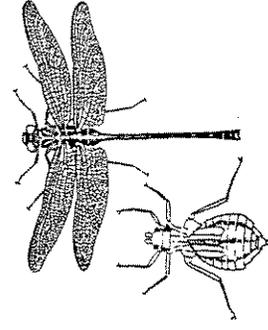
Water Scavenger Beetle and Larva



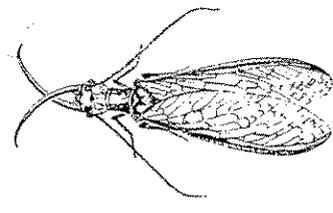
Chromagrion Damselfly and Nymph



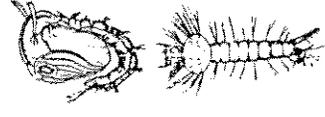
Caddis-Worm in its case and the Caddis-Fly



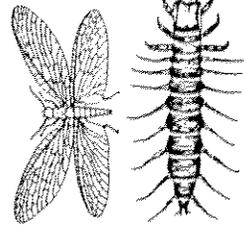
Black Dragon and Nymph



Dobson Fly and Larva (Hellgrammite)



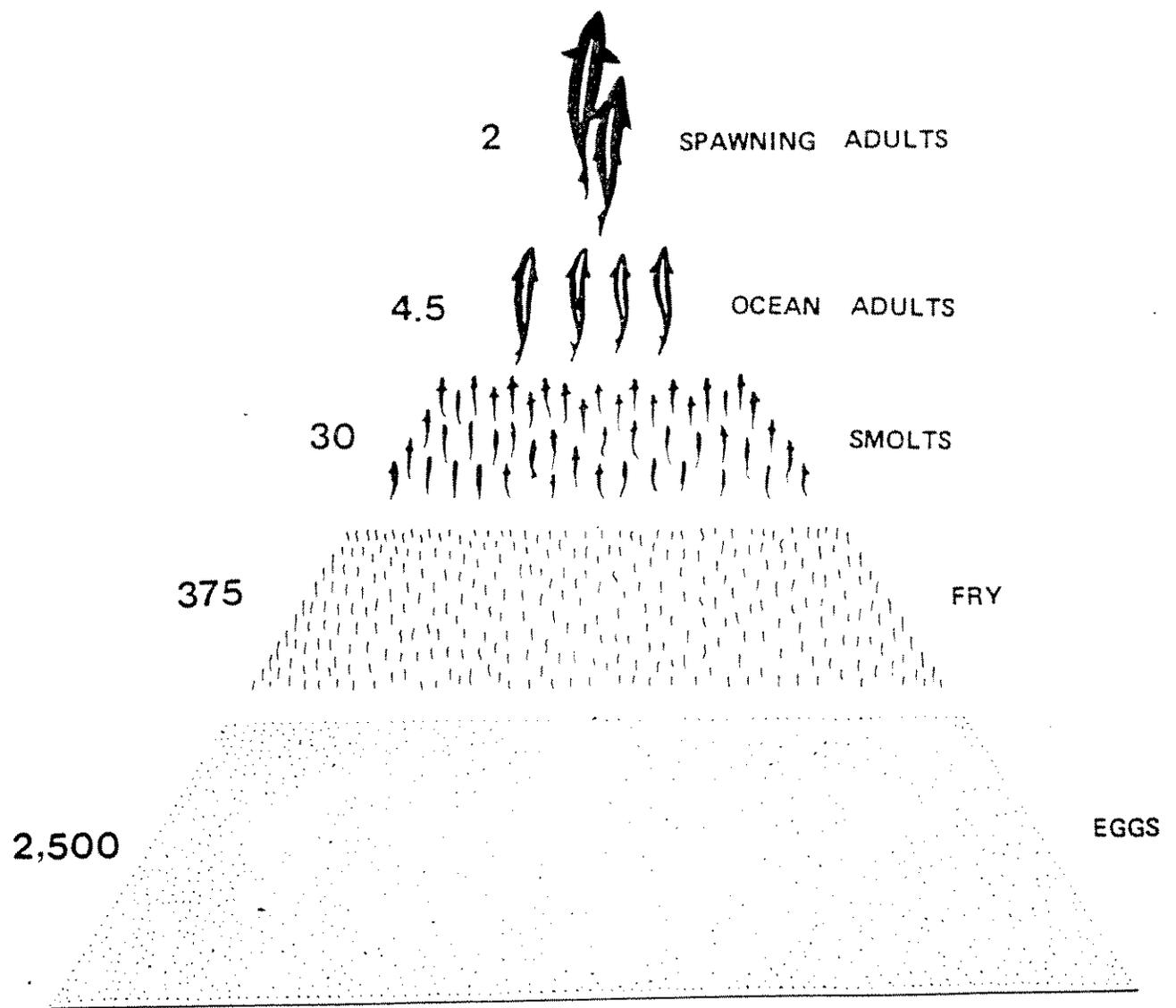
Mosquito and its Larva and pupa



Eel Fly and Nymph

Fish Fly and Larva

# Natural Survival



5. DIVING MASK OBSERVATIONS: Using diving mask, have the students observe aquatic insects without collecting them. Discuss the motion and habitat of the insects.

6. AQUATIC INSECTS: Students will collect and sketch aquatic insects.

1. Brief the students on equipment usage found in the field study kits. Also talk with the students concerning habitat courtesies. Alert them to ways to minimize damaging the habitat and encourage care in collecting techniques. All insects should be returned to their habitat unharmed.

2. Using the collecting equipment have the students collect as many different kinds of insects as possible. Place the insects in the white trays for viewing and sketching. Change the water as often as needed to keep the insects cool.

3. Have the students identify and draw the insects on their maps. They can also sketch the insects while using the two way microscope.

4. Encourage the students to discuss their observations. Emphasize that a healthy creek has a variety of insects.

#### Questions:

1. What are the differences between a riffle and a pool?

2. Is Kidder Creek a healthy creek? Was there a lot of diversity in the insects that were collected?

3. Did you find different kinds of insects in the pool as compared to the riffle? If you did are their bodies built differently? Show the students what the insects will look like in their adult forms.

4. Do you think fish can spawn in this gravel? What shape are the rocks on the stream bottom? Why?

#### OPTIONAL ACTIVITIES:

1. Great Streamboat Race - lesson is included

2. Wohlman Pebble Count - lesson is included

3. Willow Planting - lesson and equipment is included

\*\*\*\*\*MOVE TO STATION 4\*\*\*\*\*

# POOLS AND RIFFLES

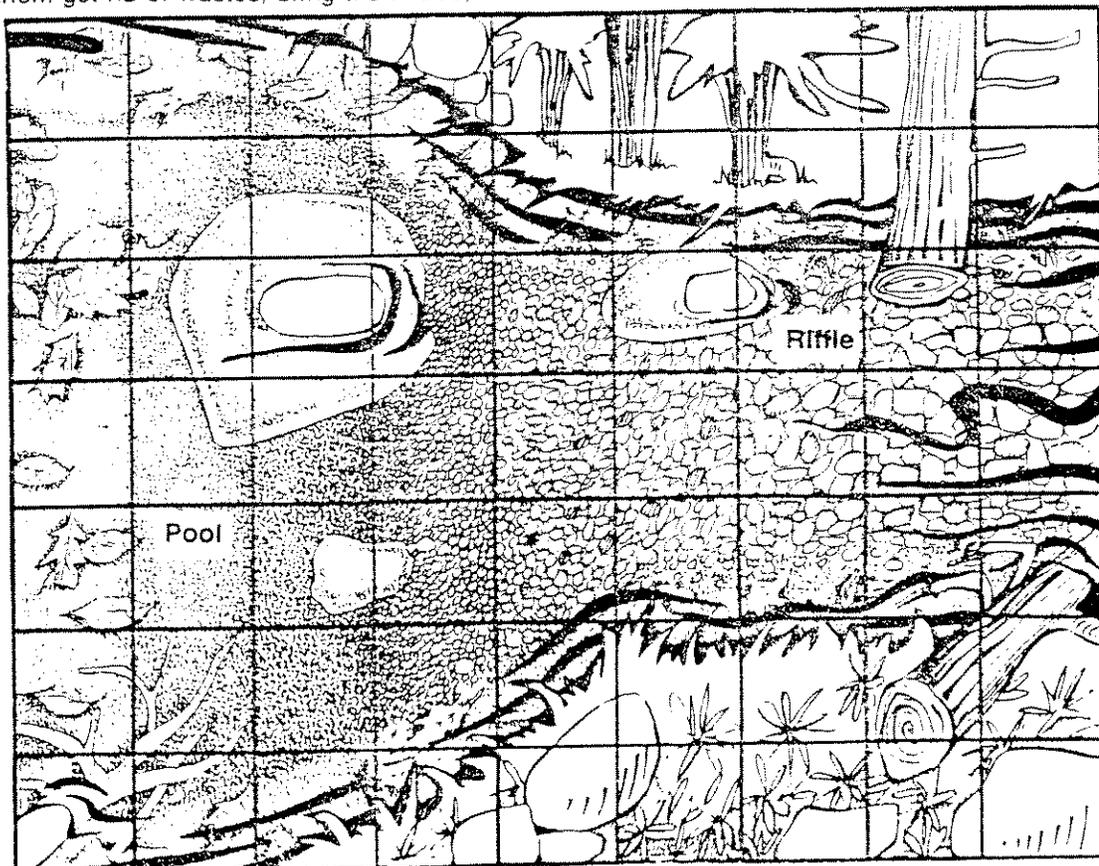
and bring an abundant supply of oxygen. Riffle dwellers like the swimming mayfly are often streamlined so they can move around in areas of high current without being swept away. Others, like the black fly larvae, attach themselves to the bottom. Another strategy is to have flattened bodies and sprawling legs like the stonefly which allows the insect to stay close to the surface of the rocks where the current is slower. The tadpole of the tailed frog has a suction cup beneath it's mouth so it can hold on!

## BACKGROUND

There are several kinds of habitats within a stream. Pools are the deeper, slower moving stream sections; riffles are swift and shallow. The surface of the water in a pool is usually smooth, while riffle areas show ripples and may even have white water. Each of these habitat types supports a different community of animals which are well adapted to the flow conditions. Some animals, like the steelhead or salmon, can move back and forth through either. Often salmonids will feed in riffles and seek shelter in deep pools. An ideal salmon and steelhead stream will be about 50% riffles and 50% pools.

More animals inhabit riffles than pools. Many of the riffle inhabitants live in the cracks between rocks or even under the rocks. The swifter currents in the riffles help them get rid of wastes, bring them food,

Pool residents resemble pond dwellers in some of their adaptations. Dragonfly larvae use the silt that accumulates in the bottom of pools to hide in so they can ambush their prey. They also possess large gills to allow for more efficient removal of oxygen from the water. Case building caddisflies wriggle inside their cases to increase exchange of wastes and to increase oxygen supply to their gills. Dead leaves, which are the largest source of nutrients for most salmon and steelhead streams, accumulate in pools and are eaten by shredders like the caddisfly. Bottom feeding fish, like suckers, live in pools where more detritus settles. The stickleback gathers algae that grows near the edge of pools and builds a golf ball size nest in the slower moving water. Aquatic insect larvae are important food items for salmon and steelhead trout.



#### STATION 4 WATER DIVERSION

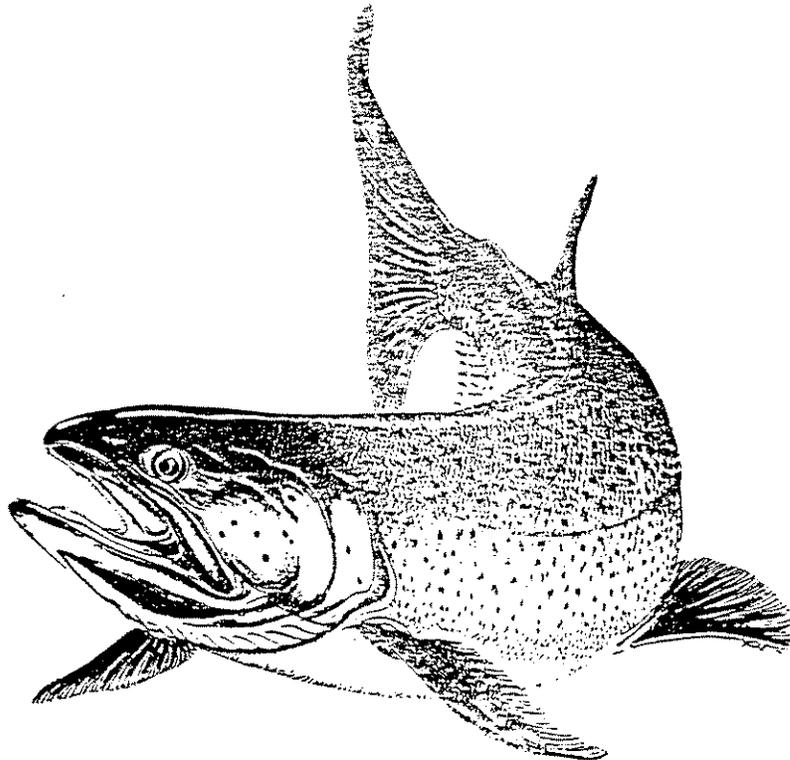
MATERIALS: thermometer, flow gauge

#### ACTIVITY:

1. DATA COLLECTION: Have the students record the water gauge height and the water temperature. The data will be posted at Decker Hall and compared to other sessions.
2. RIVER USES THAT THREATEN WILD FISH: Have the students look at the handout "River Uses that Threaten Wild Fish". Take a few moments to discuss some of the activities that it depicts. How many of these things are going on in our community. What can we do to improve the habitat of the fish and other aquatic animals?
3. How should we share the water of Kidder Creek so there is enough for wildlife and human use?

#### OPTIONAL ACTIVITY:

1. Fish Ladder: Bring your students to the fish ladder and discuss how it works and the importance of it's placement.



# RIVER USES THAT THREATEN WILD FISH

