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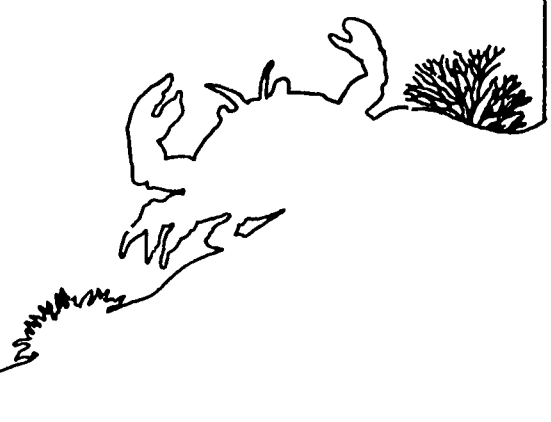
ABSTRACT

The ocean affects all of our lives. Therefore, awareness of and information about the interconnections between humans and oceans are prerequisites to making sound decisions for the future. Project ORCA (Ocean Related Curriculum Activities) has developed interdisciplinary curriculum materials designed to meet the needs of students and teachers living in Washington State. Each activity packet provides the teacher with a set of lessons dealing with a particular topic related to the oceans. Included are student worksheets, lesson plans, and a bibliography. This guide provides teachers of all grade levels with the necessary information to select a beach field trip site in the Puget Sound region. A map and an inventory of facilities is given for each location. Checklists and sample letters are provided as models to aid the teacher in planning the field trip. (TW)

MARINE BIOLOGY FIELD TRIP SITES



ORCA

OCEAN RELATED CURRICULUM ACTIVITIES

PACIFIC SCIENCE CENTER / SEA GRANT
MARINE EDUCATION PROJECT

Andrea Marrett, Manager
John Pauls, Writer
Susan Lundstedt, Illustrator

ORCA PUBLICATIONS

ELEMENTARY

High Tide, Low Tide (4th Grade)
Life Cycle of the Salmon (3rd - 4th Grade)
Waterbirds (4th - 5th Grade)
Whales (4th - 6th Grade)

JUNIOR HIGH

Beaches
Beach Profiles and Transects
Early Fishing Peoples of Puget Sound
Energy from the Sea
Literature and the Sea
Tides
Tools of Oceanography

SENIOR HIGH

American Poetry and the Sea
Marine Biology Activities
Marine Biology Field Trip Sites
Marshes, Estuaries and Wetlands
Squalls on Nisqually: A Simulation Game

PROJECT ORCA

The ocean? It's 2 miles away; it's 200 miles away; it's 2000 miles away. What does it matter to me? For those students who live close to the ocean, a lake or a stream, the effect of water might be more obvious. For the student who lives on a wheat farm in the arid inlands, the word ocean is remote. It may conjure up images of surf, sand and sea gulls, experiences far removed from their daily lives; or it may have no meaning at all. Yet for that same youngster, the reality of the price of oversea wheat shipments or fuel costs for machinery are very real. The understanding of weather and its effects on the success or failure of crops is a basic fact of everyday life. The need for students to associate these daily problems with the influence of the marine environment exists. It requires exposure to ideas, concepts, skills and problem solving methods on the part of the youngsters. It also requires materials and resources on the part of our educators.

The goals of ORCA (Ocean Related Curriculum Activities) are: 1) to develop a basic awareness of ways in which water influences and determines the lives and environments of all living things; and 2) to develop an appreciation of the relationship of water to the study of the natural sciences, social sciences, humanities and the quality of life.

ORCA attempts to reach these goals by: 1) developing interdisciplinary curriculum materials designed to meet the needs of students and teachers living in Washington State, 2) developing a marine resource center, and 3) providing advisory services for marine educators. In conjunction with these efforts, ORCA is coordinating communication among educators throughout the state and the rest of the nation.

The curriculum materials are developed to be used in many areas including the traditional science fields. They consist of activity packets which fit existing curricula and state educational goals and are designed for use as either a unit or as individual activities.

The ocean affects all our lives and we need to be aware and informed of the interconnections if we are to make sound decisions for the future of the earth, the ocean and our own well being. We hope that through Project ORCA, teachers will be encouraged to work together to help students understand and appreciate the ocean and the world of water as a part of our daily existence.

ACKNOWLEDGEMENTS

The senior high series of ORCA (Ocean Related Curriculum Activities) is the product of a cooperative effort between many people and organizations. The primary responsibility for the program belongs to the Pacific Science Center, where the materials were developed. Financial assistance and technical support were provided by the National Oceanic and Atmospheric Administration (N.O.A.A.) Sea Grant, held by the University of Washington.

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Dave Brubaker
Cecilia Moore
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Shirley Pauls
Kathy Sider

CONSULTANTS

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ADVISORY COMMITTEES

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Charles Hardy, Coordinator, Math and Science, Highline School District
David Kennedy, Supervisor of Science, Environmental and Marine Education, Office of the Superintendent of Public Instruction
Roger Olstad, Ph.D., Associate Dean of Graduate Studies, University of Washington, Committee Chairperson
Alice Romero, Teacher, West Seattle High School, Seattle School District
William Stevenson, Superintendent, Shoreline School District
Mark Terry, Associate Director, Environment, The Northwest School of the Arts, Humanities, and the Environment, Seattle

STAFF

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MARINE BIOLOGY FIELD TRIP SITES

ABSTRACT: Beach Field Trip Sites provides teachers with the necessary information to select a beach field trip site in the Puget Sound region. A map and an inventory of facilities is given for each location. Checklists and sample letters are provided as models to aid the teacher in planning the field trip.

GOALS: To increase awareness of beach field trip sites in the Puget Sound region.

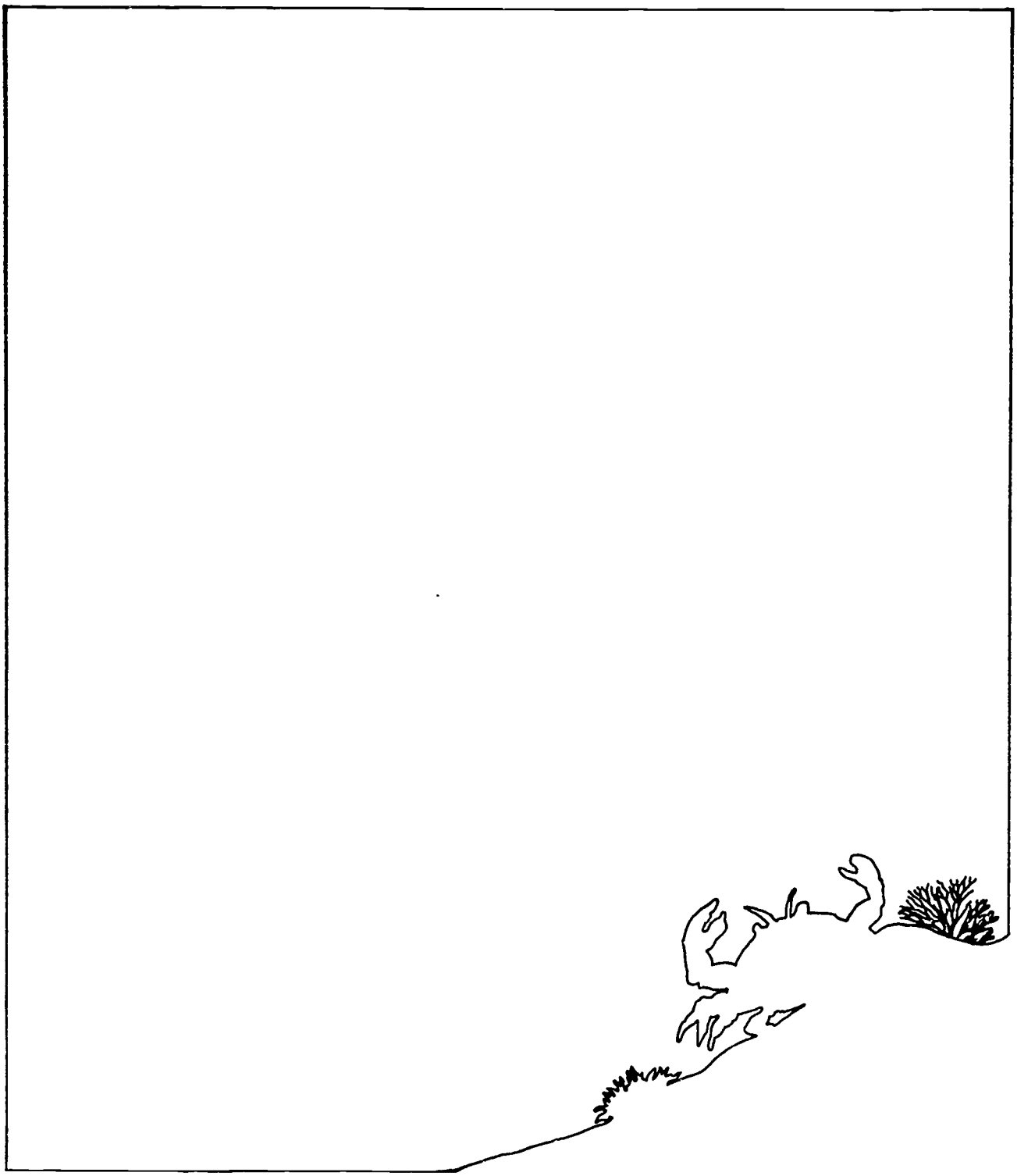
To assist the teacher in planning all details of a day trip or an overnight trip to the beach.

SUBJECTS: Biology, Environmental Education, Outdoor Education, Geology, Earth Science.

GRADE LEVELS: Elementary, junior high, high school, community college.

WRITTEN BY: John Pauls

TABLE OF CONTENTS AND OVERVIEW



PART I:
PLANNING A DAY TRIP

PART I: PLANNING A DAY TRIP

A beach field trip will be as successful as the planning that precedes it. Consider the following when planning a field trip:

1. Write down the goals of the field trip. What do you wish to achieve? Consider the following Pacific Science Center/Sea Grant activity packets.

   1. Beaches
   2. Beach Profiles and Transects
   3. Waterbirds
   4. Tides
   5. Marine Biology Activities
   6. Marshes, Estuaries, and Wetlands
   7. Life Cycle of the Salmon
   8. High Tide, Low Tide
   9. Tools of Oceanography

2. Select the site of the field trip. Take into consideration the transportation costs, field trip goals, and the time available. Suggestions for field trip sites are given in Part III, but many others are available.

3. Visit the site during a low tide. This is necessary to become familiar with the habitats, seasonal variations in populations, facilities, locations for transects, and potential hazards.

4. Select a date for the trip. The most important consideration is that of tides. Select a date with a minus tide. The lower the tide, the better the potential for learning. Minus 0.5 tides have worked out quite well, but minus 2.5 tides are spectacular.

5. Apply for School District approval. Get it in writing.

6. Arrange for transportation. Alternatives include private motor car, school bus, or public transportation. Find out the degree of financial support you can expect from the school district.

7. Put up a bulletin board display. Maps, photographs, and drawings will stimulate interest among your students and among students outside your class. Arrange for stories in the school newspaper and yearbook.

8. Arrange for chaperones. There should be at least two adults. Consider the kinds of students in your class. A ratio of one chaperone for each seven students is about right.

9. Plan Activities. A meaningful field trip is one with a balance between educational activities and free time for students.

10. Gather materials. Make copies of activities (plus extras), and gather supplies listed for each activity.

11. Distribute a list of things students need to bring. Include a list of things not to bring. Allow time for the students to round up their supplies. A suggested checklist follows.

12. Distribute permission slips. Set a due date for their return. There may be a school district approved form, but it is often a good idea to write

one in the form of a letter to parents. This can be an effective communication tool. A sample letter follows.

13. Discuss the schedule of events with the students. If meeting times are established, make certain everyone knows them. It is often wise to give the students a copy of the day's schedule. A sample schedule follows.

14. Discuss the activities that will be performed at the site. This is the appropriate time to give copies of the activities to students. (Some teachers prefer to distribute printed materials at the field trip site.)

15. Discuss the field trip rules. A sample copy of rules is included with these materials. Making the rules very clear before going on the field trip can eliminate many problems on the baech. Emphasize good outdoor manners and respect for marine life. Rules should be few in number and clearly stated.

16. Conduct the field trip.

17. Discuss the results of the field trip. Analysis of the data from the field trip might take several days. It is important not to leave the students' observations unchecked. The students might do oral reports, written reports, or laboratory investigations related to the field trip.

Teacher Information

TEACHER'S FIELD TRIP PLANNING CHECKLIST

[ ] 1. Write down the goals of the field trip.

[ ] 2. Select the field trip site.

[ ] 3. Visit the site during a low tide.

[ ] 4. Select a date for the trip.

[ ] 5. Apply for school district approval.

[ ] 6. Arrange for transportation.

[ ] 7. Put up a bulletin board display.

[ ] 8. Arrange for chaperones.

[ ] 9. Plan activities.

[ ] 10. Gather materials.

[ ] 11. Distribute "Student's List of Things to Bring."

[ ] 12. Distribute permission slips.

[ ] 13. Discuss the schedule of events with the students.

[ ] 14. Discuss the activities that will be performed at the site.

[ ] 15. Discuss the field trip rules.

[ ] 16. Conduct the field trip.

[ ] 17. Discuss the results of the field trip.

NAME _____

STUDENT CHECKLIST OF THINGS TO BRING

Please keep in mind that it is often colder and windier on the beach than it is at your home. The day could be quite miserable if you are caught in the rain or in the direct sun without proper gear. Mark everything with your name.

You must have the following:

___ Hat
___ Raingear
___ Tennis Shoes (salt water ruins leather shoes)
___ Pens or pencils
___ Field Trip Activities Handouts
___ Clipboard
___ Suntan lotion
___ Warm jacket
___ Special medications (for allergies, asthma, etc.; please inform your teacher)
___ Sunglasses
___ Sack lunch

It would be nice to have the following:

___ Goodies
___ A small amount of money
___ Extra shoes, socks
___ camera, film
___ pocket knife

Please leave behind:

___ Expensive watches
___ Large amounts of money
___ Radios, tape recorders
___ Alcohol, drugs, tobacco

SAMPLE LETTER TO PARENTS

Calypso High School
Calypso, W shington

May 10, 1981

Dear Parents:

On Saturday, May 15, the biology class at Calypso High School will take a field trip to Edmonds Beach. The purpose of the trip is to apply what has been learned in the classroom to field studies. Students will be making a transect to discover the distribution of organisms on the beach, studying animals' structural and behavioral adaptations to their environment, and making an in-depth study of one particular kind of organism.

The transportation will be by private car, driven by parent and teacher chaperones. The students will leave the school at 7:30 a.m. and will return at about 1:15 p.m.

If you have questions about the field trip, or about the science program at the school, please do not hesitate to call me at 778-8883. Please sign the permission slip below and return before Thursday, May 13, 1981. Please list below any special health problems (allergies, medications, etc.).

Sincerely,

J.C. Costeau
Science Teacher

I give permission for _____ to go on the biology field trip to Edmonds Beach on May 15.

Special Health Problems: _____

_____

_____
Parent's signature

_____
Telephone

NAME_____

Field Trip Rules

This field trip is a school function. School rules still apply. Smoking, drugs, and alcohol will be dealt with as if you were in school.

1. No swimming. Tides and currents are dangerous. No lifeguards or rescue facilities are available.

2. Be courteous to others. Many people come to this place to have peace and quiet. Respect their privacy.

3. Be careful. One slip could be your last. Soil near cliffs is unstable and can give way unexpectedly. Waves are powerful and may throw you off the rocks or logs. Logs can become killers when rolled in the surf. Sea weed makes the rocks slippery. Watch your step. When climbing steep banks with a group, never dislodge rocks. Should one fall, yell "ROCK" very loudly. The most dangerous animals you will encounter are Beerus canus, Bottlus brokeni, and Americanus clumsianus.

4. Never explore on your own. Always go with a group. Check with a chaperone before leaving the beach area.

5. Minimize your impact on the marine life. Replace all marine life and rocks to their former positions. Avoid injuring any marine life. Do not remove marine life from the beach. Dozens of school groups visit this site each year. If they each remove some animals, it is possible to decimate the population. Therefore, do not take any plants or animals off the beach.

6. Wear shoes. Barnacles and broken bottles will cut bare feet. Leather shoes will be ruined by salt water.

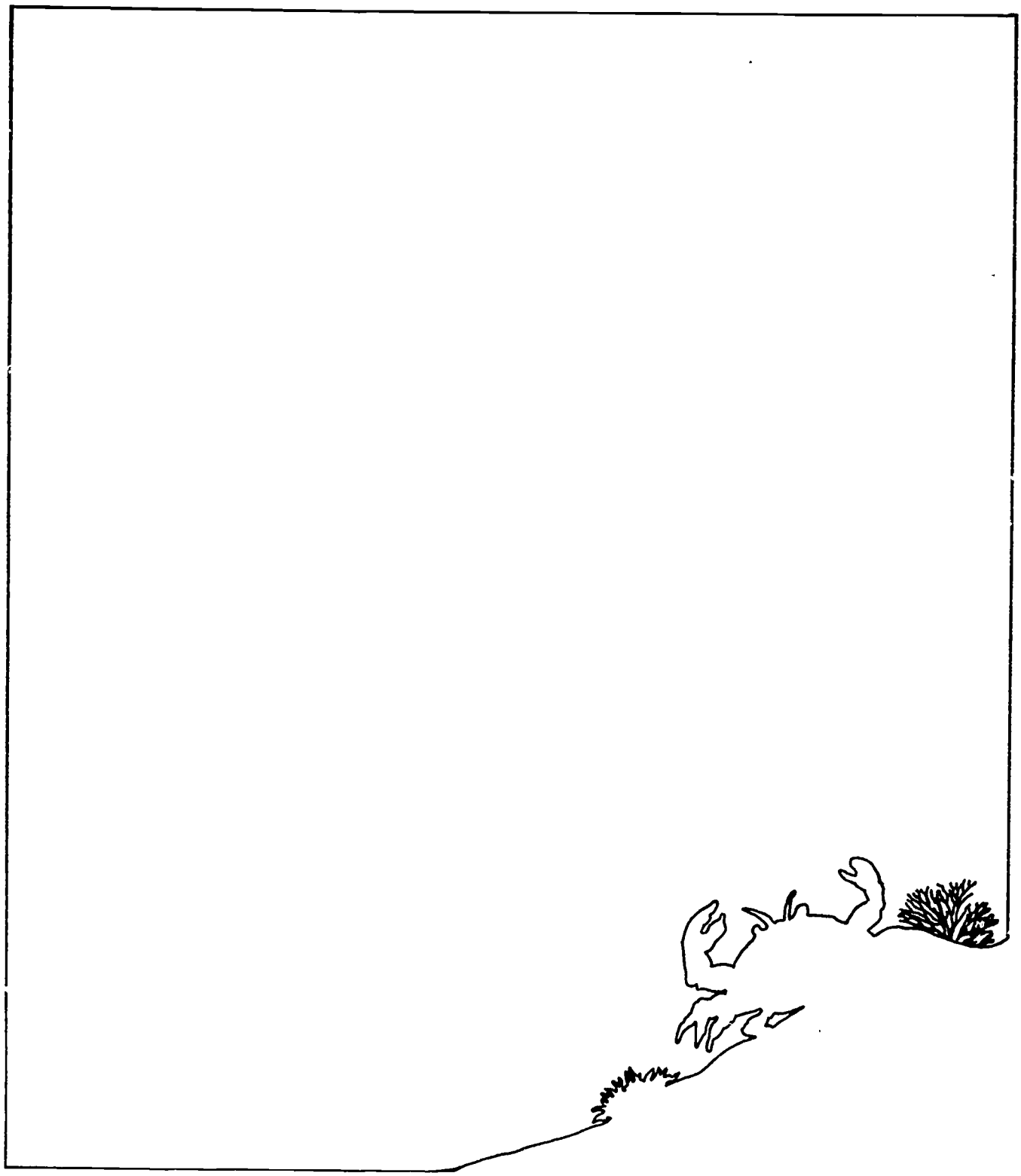
NAME_____

Sample Day's Schedule

Field Trip Schedule

Saturday, May 15

7:30 A.M.	Leave the school
8:15	Arrive at the beach. Introductory comments by the teacher. Begin with Activity 1.
9:07	Low tide (-1.9)
10:00	Meet at the picnic benches for wrap-up.
10:30	Picnic lunch. Volleyball.
1..30	Leave for school.
1:15	Arrive at the school. Please arrange ahead of time for transportation from the school to home.



PART II:
PLANNING AN OVERNIGHT FIELD TRIP

PART II: PLANNING AN OVERNIGHT FIELD TRIP

A camping trip to a beach can be an experience youngsters remember for years to come. It can be a time to remember for the teacher, too--if all details of planning were not attended to.

The intent of this section is to provide teachers with the necessary checklists and planning suggestions that will eliminate problems before they occur.

1. Write down the goals of the field trip. What do you wish to achieve? Consider the following Pacific Science Center/ Sea Grant activity packets.

   1. Beaches
   2. Beach Profiles and Transects
   3. Tools of Oceanography
   4. Tides
   5. Marine Biology
   6. Marshes, Estuaries, and Wetlands
   7. Waterbirds
   8. Life Cycle of a Salmon
   9. High Tide, Low Tide

2. Select the site of the field trip. Take into consideration the transportation costs, the time available, and the objectives of the trip. Suggestions for field trip sites are given in Part III.

3. Visit the site during a low tide. This is necessary to become familiar with the habitats, seasonal variations in populations, facilities, locations for transects, potential hazards, and camping arrangements.

4. Select the date for the trip. The most important consideration is that of tides. Select a date with a minus tide. The lower the tide, the better the potential for learning. Minus 0.5 tides have worked out quite well, but minus 2.9 tides are spectacular.

5. Apply for School District approval. Get it in writing.

6. Contact the camping facility. Be prepared to tell how many students, chaperones, and vehicles you will be bringing. Arrival times and departure times may be asked for.

7. Arrange for transportation. Alternatives include private motor car, school bus, or public transportation. Find out the degree of financial support you can expect from the district. Also find out the district's policy about private cars and/or high school age drivers. Some districts prohibit either or both. Matching funds may be available from the state for environmental education field trips. Make certain that your objectives are oriented toward environmental awareness.

8. Plan financing. Will the school pay expenses? You may have to raise funds or charge students. Many schools have policies on both. If permitted, fund raisers might include candy or candle sales, rummage sales, or "slave auctions." School vice principals often have files of fund raisers.

9. Put up a bulletin board display. Maps, photographs, and drawings will stimulate interest among your students and among students outside your class. Arrange for stories in the school paper and yearbook.

10. Arrange for chaperones. For camping trips, there may be no greater godsend than a parent/chaperone with a motor home. Even if the arrangements are for the class to tent, emergencies do arise. A motor home or camper is a great emergency shelter for a cold, wet student going into hypothermia, a student with an injury, or someone who has developed a cold. Having parents go along on a well organized field trip is excellent public relations for a school. It is also an excellent way to meet parents of students.

11. Plan activities. A meaningful field trip is one that reaches a balance between educational activities and free time for students. A camping field trip needs both. You may wish to plan for competitive games such as softball or soccer. A committee of students can develop a creative schedule of activities.

12. Gather materials. Make copies of activities, checklists for students, rules, and handouts (have extras) and gather supplies for each activity.

13. Arrange for camping supplies. A checklist follows. Plan a menu which is simple in both preparation and clean-up. Students can bring large tents, iceboxes, stoves, large kettles, etc.

14. Distribute a list of things students need to bring. Include a list of things not to bring. Allow time for the students to round up their supplies. A suggested checklist follows.

15. Distribute permission slips. Set a due date for their return. There may be a district approved form, but it is often a good idea to write one in the form of a letter to the parents. This can be an effective comunication tool. A sample letter is included in Part I.

16. Discuss the schedule of events with the students. If meeting times are established, make certain everyone knows them. It is often wise to give the students a copy of the day's schedule. A sample schedule follows.

17. Discuss the activities that will be performed at the site. This is the appropriate time to give copies of the activities to the students. (Some teachers prefer to distribute printed materials at the site.)

18. Discuss the field trip rules. A sample copy of rules is in Part I. Making the rules very clear before going on the field trip can eliminate many problems on the beach. Emphasize good outdoor manners and respect for marine life. Rules should be few in number and clearly stated.

19. Double check the transportation and camping arrangements a couple of days before the trip.

20. Conduct the field trip.

21. Discuss the results of the field trip. Analysis of the data from the field trip might take several days. It is important not to leave the students' observations unchecked. The students might do oral reports, written reports, or laboratory investigations related to the field trip. You might schedule a portion of a period for students to share their photographs as soon as they are processed. This could be combined with an "awards banquet" to memorialize the goofy things that happened.

Teacher Information

TEACHER'S PLANNING CHECKLIST

[ ] 1. Write down the goals of the field trip.

[ ] 2. Select the field trip site.

[ ] 3. Visit the site.

[ ] 4. Select the date.

[ ] 5. Apply for school district approval.

[ ] 6. Contact the camping facility. Make reservations.

[ ] 7. Arrange for transportation. (Can you get state matching funding for environmental field trips?)

[ ] 8. Plan financing.

[ ] 9. Put up a bulletin board display.

[ ] 10. Arrange for chaperones.

[ ] 11. Plan activities.

[ ] 12. Gather materials. (Use separate checklist.)

[ ] 13. Arrange for camping supplies. (Use separate checklist.)

[ ] 14. Distribute list of things to bring.

[ ] 15. Distribute permission slips.

[ ] 16. Discuss the schedule of events with the students.

[ ] 17. Discuss the activities that will be performed at the site.

[ ] 18. Discuss the field trip rules.

[ ] 19. Conduct the field trip.

[ ] 20. Discuss the results of the field trip.

TEACHER'S CHECKLIST OF THINGS TO BRING

[ ] 1. Extra copies of each student handout

[ ] 2. First aid kit

[ ] 3. Transect line

[ ] 4. Quadrat strings, 120 cm long, class set

[ ] 5. Schedule

[ ] 6. Reference books

[ ] 7. Microscopes or hand lenses (optional)

[ ] 8. Microscope slides, cover slips, droppers (optional)

[ ] 9. Plankton net

[ ] 10. Tide table

[ ] 11. Gradient sticks

[ ] 12. Spirit level

[ ] 13. Menu checklist

[ ] 14. Camp supply checklist

[ ] 15. Duty Roster

[ ] 16. Compass

[ ] 17. Maps

[ ] 18. Rock hammer

[ ] 19. Pry

[ ] 20. Other tools

_____

_____

_____

MENU PLANNER

DAY 1

Breakfast | Lunch | Dinner

DAY 2

Breakfast | Lunch | Dinner

DAY 3

Breakfast | Lunch | Dinner

CAMPFIRE SNACKS

Shopping List

Number of people_____

Ice
Stove fuel
Matches

Sample Duty Roster

DUTY ROSTER

Saturday Breakfast			
SERVERS:	Jim A (PIC) David Jeff	CLEAN UP:	Heidi (PIC) David D. Holly DeVar
Saturday Lunch			
SERVERS:	Jill (PIC)	CLEAN UP:	Monica (PIC) Jim J. Tina Lori
Saturday Dinner			
SERVERS:	Pat (PIC) Cindy Karen Tami	CLEAN UP:	Stacy (PIC) Debbie Steve Rochelle
Sunday Breakfast			
SERVERS:	Dawn (PIC) Andy Judy	CLEAN UP:	Kim (PIC) Bret Darrel Doug
Sunday Lunch			
SERVERS:	Kathleen (PIC) Scott Kathy	CLEAN UP:	Right after lunch, all students and chaperones clean camp and pack. Load cars before having the last look around.

PIC is the Person in Charge. Duties include finding out what must be done and seeing that those tasks are completed.

NOTE: Clean up duties refer only to the "community mess." Each person is responsible for washing his/her own dishes.

Teacher's Checklist of Camping Equipment

_____ Number of Students

_____ Number of Chaperones

_____ Total

ITEM	STUDENT WHO WILL BRING
Tent (man)	
Tent (man)	
Tent (man)	
Tent (man)	
Tent (man)	
Tent (man)	
Ice chest (lg, sm)	
Ice chest (lg, sm)	
Ice chest (lg, sm)	
Stove (fuel _____)	
Stove (fuel _____)	
Kettle	
Kettle	
Kettle	
Ladle/Big spoon	
Ladle/Big spoon	
Games (_____)	
Games (_____)	
Games (_____)	

Student's Checklist of Things to Bring

Please keep in mind that it is often colder and windier on the beach than it is at your home when you leave. The trip could be quite miserable if you are caught in the rain or in the direct sun without proper gear. Mark everything with your name.

[ ] Hat
[ ] Raingear
[ ] Tennis shoes (salt water ruins leather shoes)
[ ] Pens or pencils
[ ] Field trip activities handouts
[ ] Clipboard
[ ] Suntan lotion
[ ] Warm jacket
[ ] Special medications (for allergies asthma, etc.; please inform your teacher)
[ ] Sunglasses
[ ] Sack dinner for the first evening
[ ] Personal articles
[ ] Knapsack
[ ] Change of clothes
[ ] Knife, fork, spoon
[ ] Unbreakable, labelled bowl, plate and cup
[ ] Canteen Flashlight
[ ] Soap, towel
[ ] Sleeping bag
[ ]
[ ]
[ ]

[ ] Goodies
[ ] Small amount of money
[ ] Extra shoes, socks
[ ] Camera, film, flash
[ ] Pocket knife
[ ] Chapstick
[ ] Pacs or waders
[ ] Insect Repellent

Please leave behind:

Expensive watches
Large amounts of money
Radios, tape recorders
Alcohol, drugs, tobacco

Sample Schedule

SCHEDULE FOR THE TONGUE POINT
FIELD TRIP

Friday, May 11

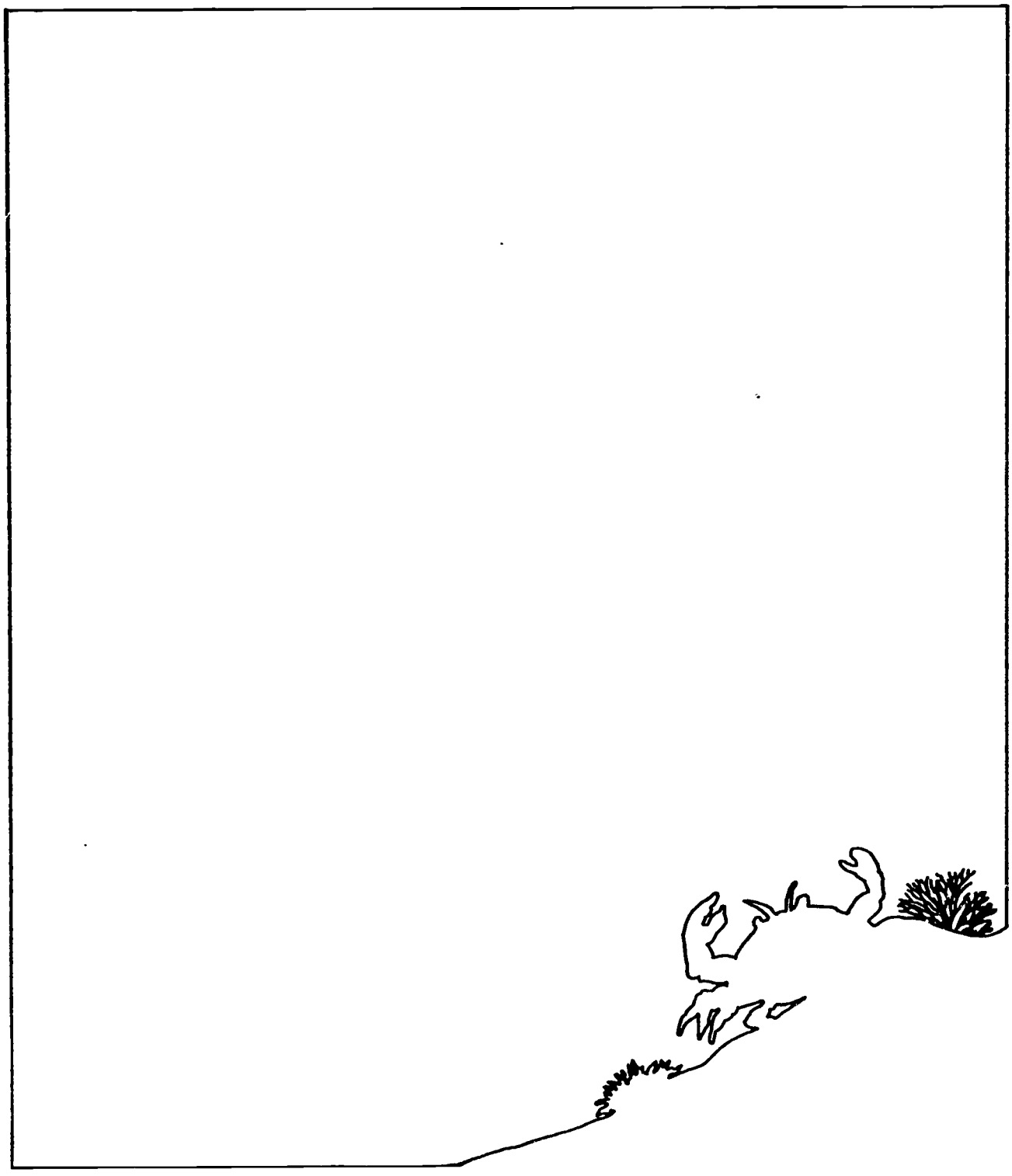
12:0[illegible] Noon	Load the cars in the school parking lot.
1:45 P.M.	Ferry leaves.
5:15	Arrive at campground Set up tents. Eat the sack dinner that you bring. There are no stores nearby.
8:31	Low tide (4.8)
8:35	Sunset.
10:00	Be in camp. Quiet time.
11:45	Be in tents.

Saturday, May 12

5:45 A.M.	Sunrise.
7:15	Last call for breakfast.
8:00	Be on the beach. Do activities 2, 3, and 4.
9:01	Low tide (-1.3)
12:00	Lunch.
1:00 P.M.	Leave on "easy tennis shoe walk" to the top of Striped Peak. Wear st[illegible]dy shoes and long pants.
4:48	High tide (7.9)
5:00	Dinner.
8:35	Sunset.
10:00	Students in camp. Quiet time
11:45	Students in their tents.

Sunday, May 13

5:45 A.M.	Sunrise.
7:30	Last call for breakfast.
8:30	Cars leave for Freshwater Bay.
9:00	Arrive at Freshwater Bay. All students begin activity 1. After finishing activity 1, go on to finish activities 2, 3 and 4.
9:38	Low tide (-1.8)
10:00	Cars leave to return to camp.
10:30	Arrive at camp. Pack gear for return trip. Tents should be struck and gear packed before having lunch and a last look around.
11:30	Lunch. As soon as we finish lunch, everybody helps with cleanup.
12:00	Leave for home.
4:00 P.M.	Ferry arrives in Edmonds.
6:00	Arrive back at school. Please have made arrangements to be picked up promptly at 6:00 so the chaperones can leave. Thank you.



PART III:

SELECTED FIELD TRIP SITES

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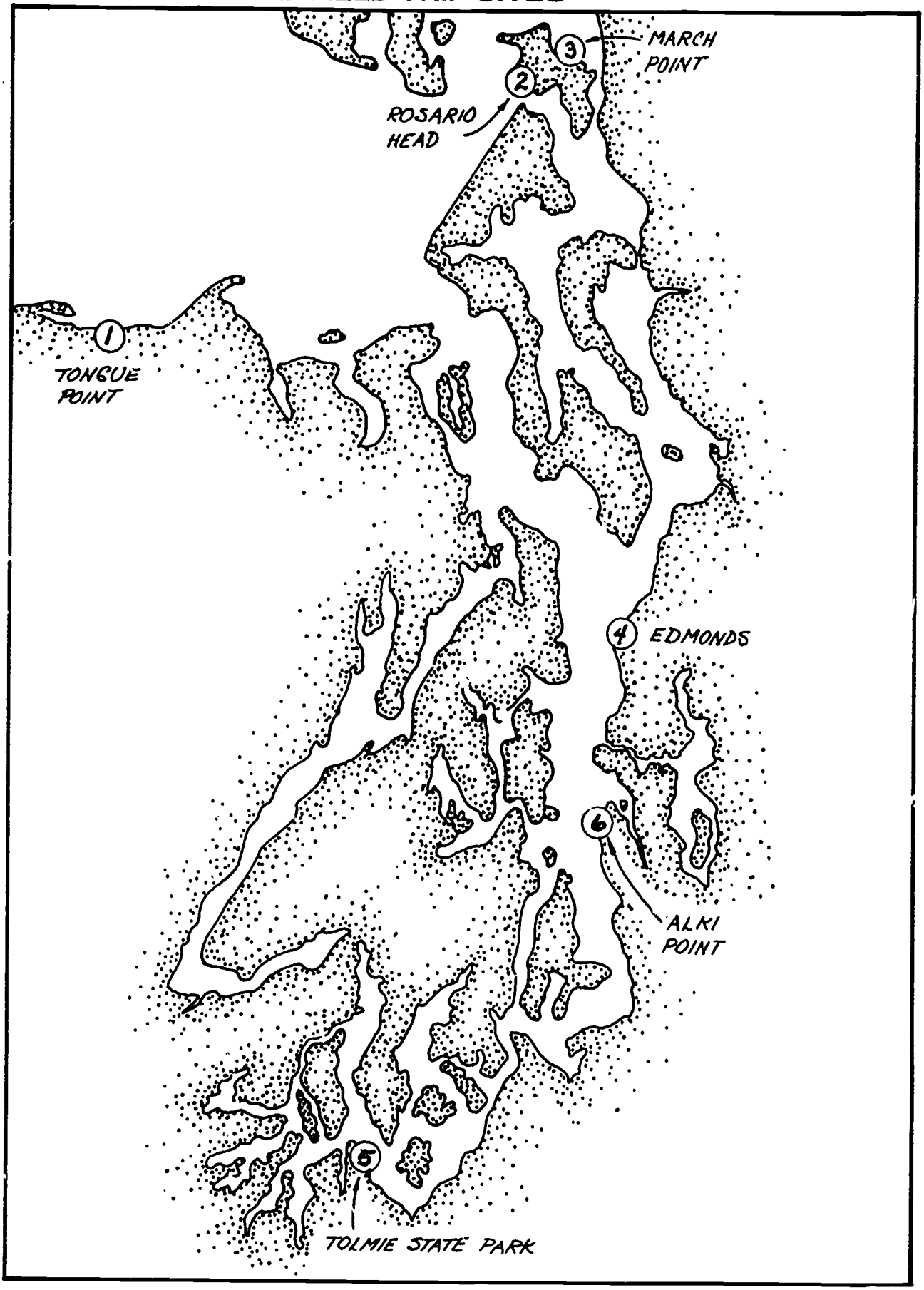


CHOOSING A FIELD TRIP SITE

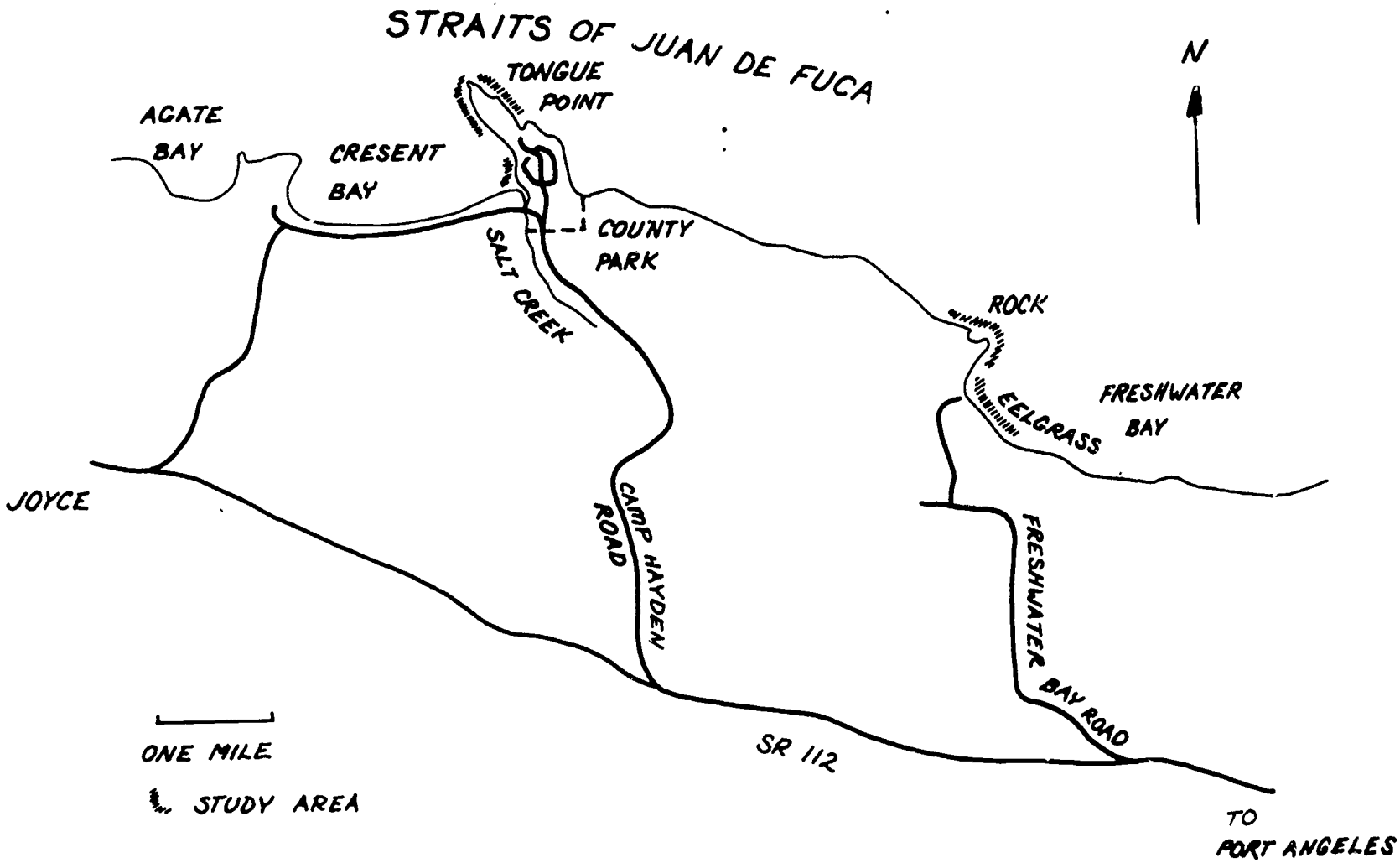
When deciding where to go on the field trip, there are several important decisions to be made. Use the list below to help you make your decision.

1. How far to you wish to travel?
2. Is the field trip to be overnight or just during one day?
3. What habitat(s) are best suited to the biology activities the students will perform? What features or processes are present for earth science students.
4. Which is more important--collecting specimens for classroom study or demonstrating the fragility of the marine environment by not removing anything from the beach?
5. If it is a one-day trip, do you wish to couple the learning with purely recreational activities such as picnicking and games?
6. Is the class mature enough to handle the hazards of cliffs, nettles, and vigorous wave action.

Use the following inventories to select an appropriate site.

BEACH INVENTORY FOR TONGUE POINT

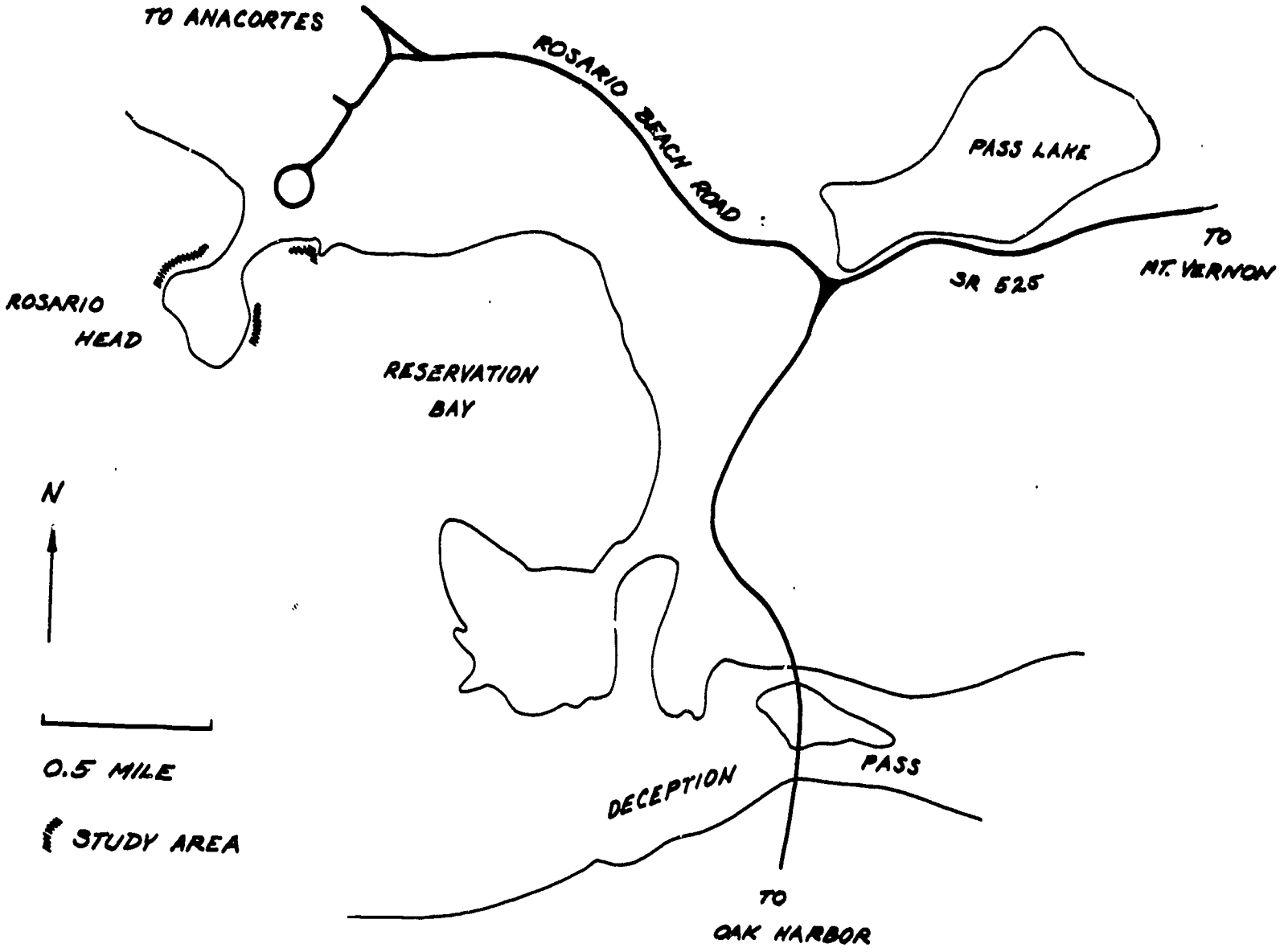
Location:	Salt Creek County Park 17 miles west of Port Angeles on the Straits of Juan de Fuca
Access:	Bus Lines: No Road Access: Travel 5 miles west of Port Angeles on U.S. 101. Go west on SR 112 for 8 miles. Go north on Camp Hayden Road for 4 miles. Enter Salt Creek Recreation Area.
Jurisdiction:	Clallam County Parks Joyce, WA
Collecting Allowed:	No
Low Tide Correction on Port Townsend:	Subtract 2 hours Height: Multiply by 0.81
Habitats Represented:	Solid bedrock, gravel beach, and sandy beach. Mud at nearby Freshwater Bay.
Geological Features:	Glacial erratics, erosion, unconformities, wave terraces, some fossils, sorting, dipping beds, weathering, pillow lava, deposition, headland erosion
Toilets Available:	Flush Toilets
Drinking water available:	Yes
Camping Facilities:	Tent sites: Yes Group sites: No specific area. Large meadows accommodate groups very well. Showers: No Pool: No Playfield: Yes Community Kitchen: Yes Hiking: Yes Swimming: No Stores: No
Special Notes:	The county park was formerly the Camp Hayden Military Reservation. Coast artillery bunkers dot Striped Peak (1166').
	Freshwater Bay (located at the end of Freshwater Bay Road) is an excellent site to visit in conjunction with Tongue Point. Mud, boulders, solid bedrock, and eelgrass beds provide an excellent variety of habitats. There are no facilities other than pit toilets and a boat launch ramp.



TONGUE POINT

BEACH INVENTORY FOR ROSARIO HEAD

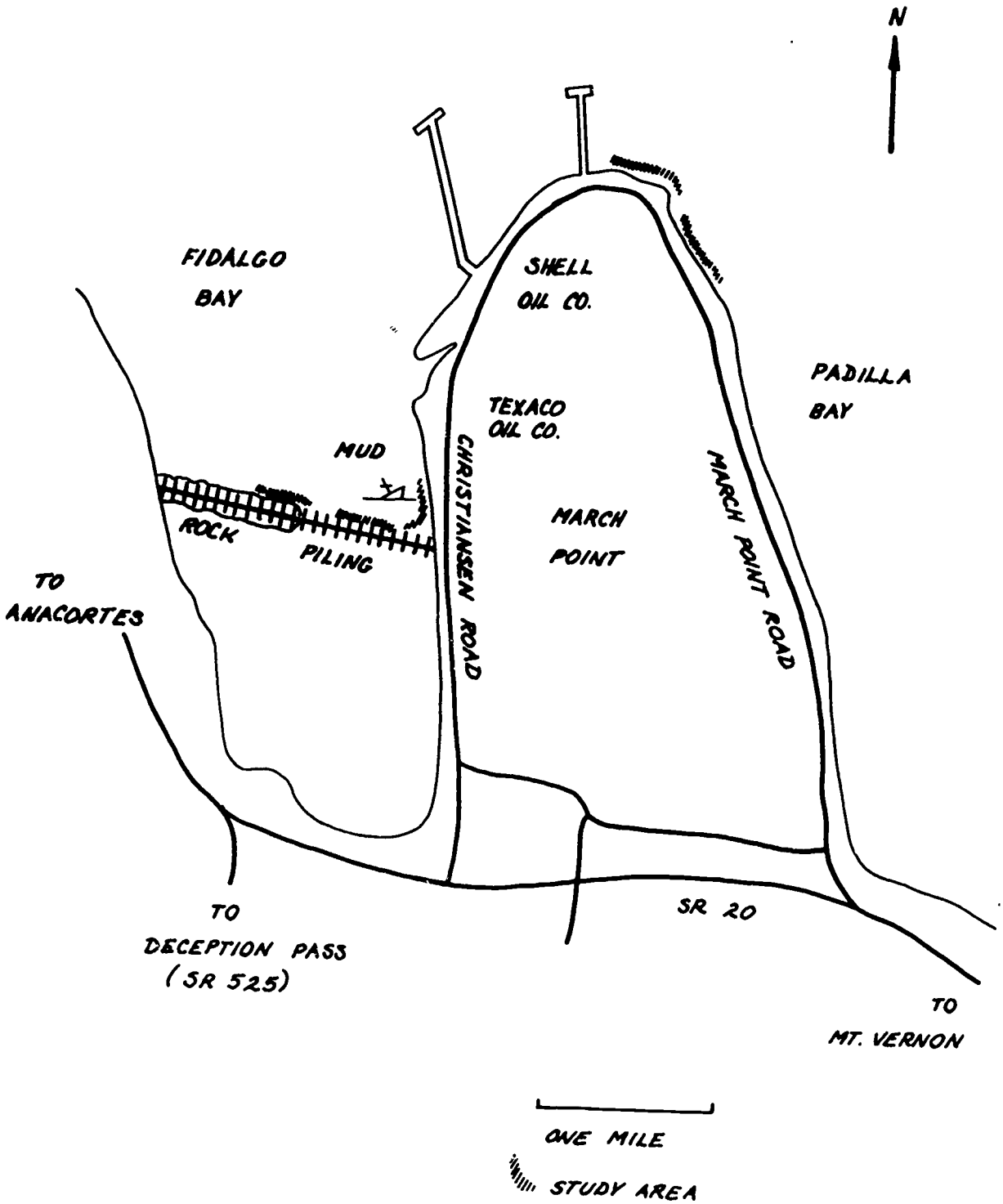
Location:	On Fidalgo Island, south of Anacortes
Access:	Bus lines: No Road access: Take exit 230 from I-5. Go west on SR 20 for 20 miles. Turn left (south) toward Oak Harbor. Go 5.2 miles to park entrance. Turn right and follow signs to Rosario Beach.
Jurisdiction:	Deception Pass State Park Oak Harbor, WA 675-2417
Collecting Allowed:	No
Low Tide Correction on Port Townsend:	Time: subtract 3 times Height: Multiply by 0.92
Habitats Represented:	Solid bedrock, some gravel, some sand south of bridge, mud at Cornet Bay, eelgrass beds on southeast side of Rosario Beach.
Geological Features:	Erosion, weathering, sorting, bedrock
Telephone Available:	Yes
Toilets Available:	Flush Toilets
Drinking water available:	Yes
Picnicking:	Yes
Camping Facilities:	Groups may camp at regular campground sites south of Deception Pass Bridge (no reservations accepted). Maximum of 6 persons per campsite. Group cabins available at Cornet Bay (by reservation only). Cornet Bay is a complete camp facility with kitchen, cabins, and pool.



ROSARIO HEAD

BEACH INVENTORY FOR MARCH POINT

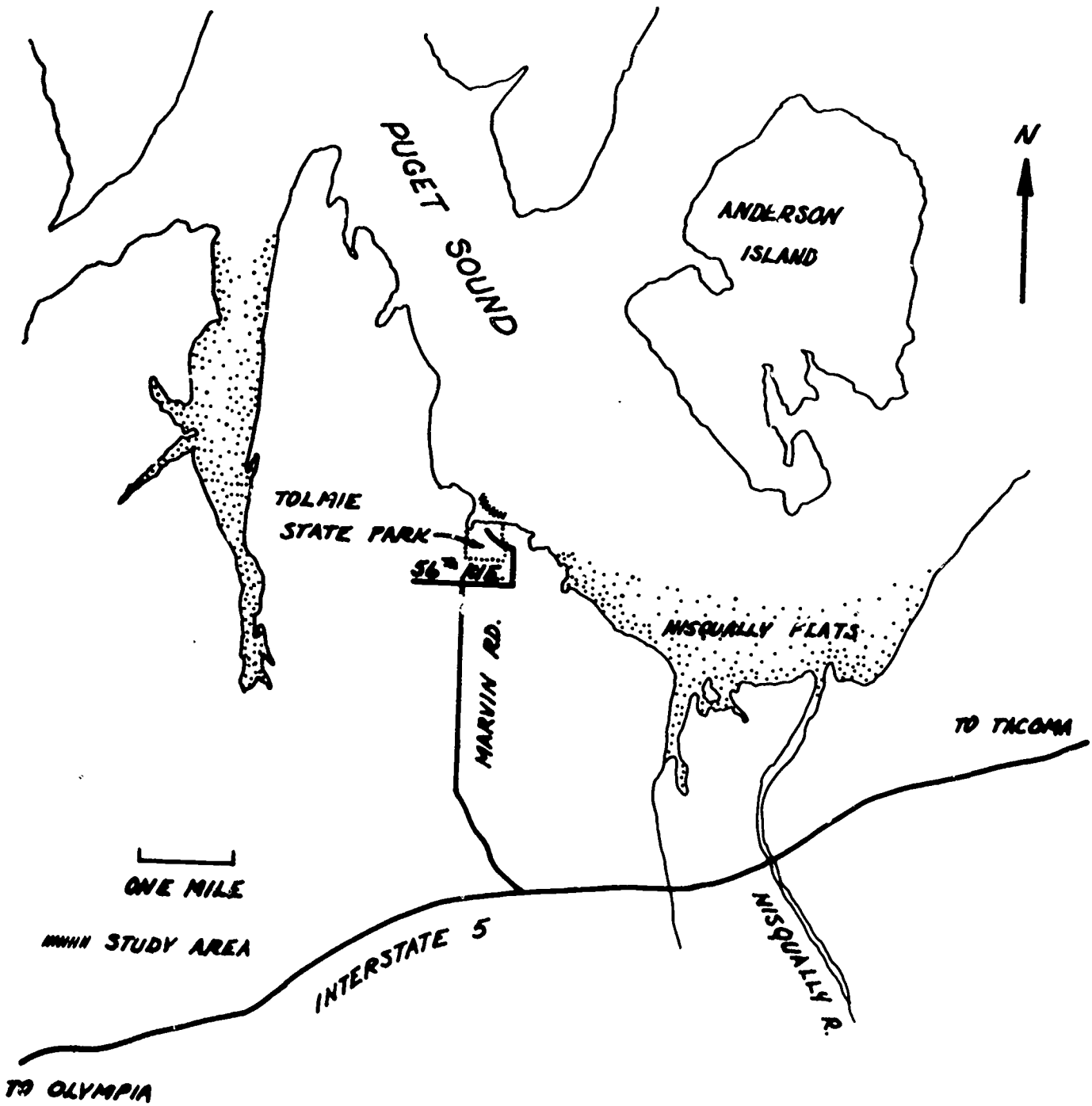
Location:	On Fidalgo Island near Anacortes
Access:	Bus lines: No Road access: Take exit 230 from I-5 to SR 20. Go west on SR 20 for 11.4 miles. Turn right (north) on Christiansen Road. Go 1.1 miles to small parking area just north of the railroad tracks.
Jurisdiction:	Texaco, Inc. P.O. Box 622 Anacortes, WA 98221 293-2131
Collecting Allowed:	Yes
Low Tide Correction on Port Townsend:	Time: Add 35 minutes Height: Multiply by 0.99
Habitats Represented:	Rocky beach, pilings, floats, and some sand
Geological Features:	Erosion, deposition, sorting, wave action, effect of jetty, weathering
Telephone Available:	No
Toilets Available:	No
Drinking water available:	No
Camping facilities:	Recreational vehicle "camping" along road; otherwise, no.
Special Notes:	Refinery tours are available. Write to: P.C. Templeton Texaco, Inc. P.O. Box 622 Anacortes, WA 98221 Use caution on mudflats to avoid becoming stuck.


N
FIDALGO BAY
SHELL OIL CO.
PADILLA BAY
TEXACO OIL CO.
MUD
CHRISTIANSEN ROAD
MARCH POINT ROAD
ROCK
PILING
MARCH POINT
TO ANACORTES
TO DECEPTION PASS (SR 525)
SR 20
TO MT. VERNON
ONE MILE
STUDY AREA

MARCH POINT

BEACH INVENTORY FOR TOLMIE STATE PARK

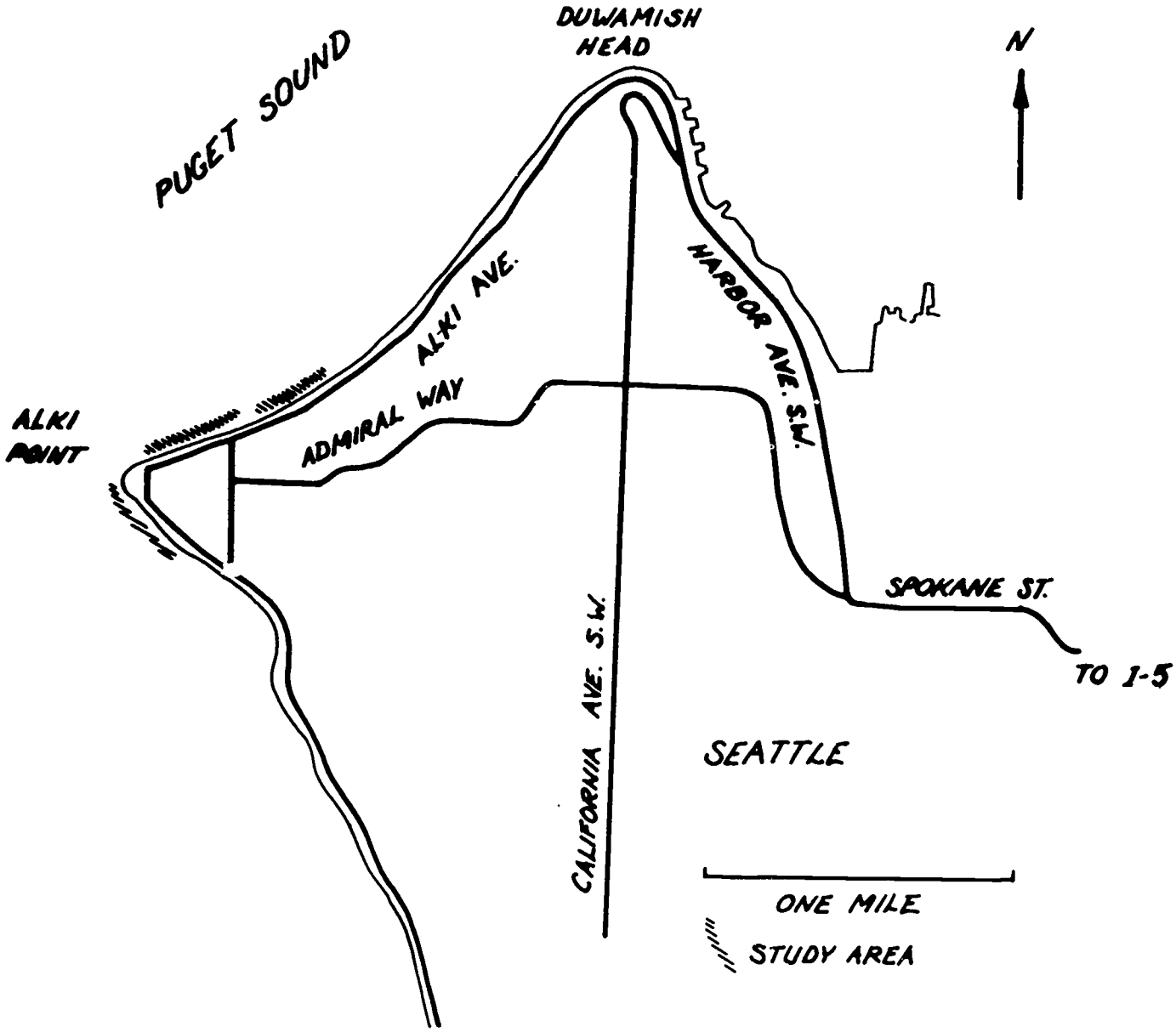
Location:	6 miles north of Olympia
Access:	Bus lines: No Road access: Take exit 111 from I-5. Go north 5 miles to park.
Jurisdiction:	Washington State Parks Olympia, Washington 753-5755 (No local number for Tolmie State Park)
Collecting Allowed:	No
Low Tide Correction on Seattle:	Add 40 minutes
Habitats Represented:	Fine sand
Geological Features:	Embayment, erosion, sorting, deposition
Telephone Available:	No
Toilets Available:	Flush
Drinking Water Available:	Yes
Picnicking Facilities:	Yes
Camping Facilities:	No
Special Notes:	Sand dollars Small stream enters nearly enclosed tidal basin.



TOLMIE STATE PARK

BEACH INVENTORY FOR ALKI POINT

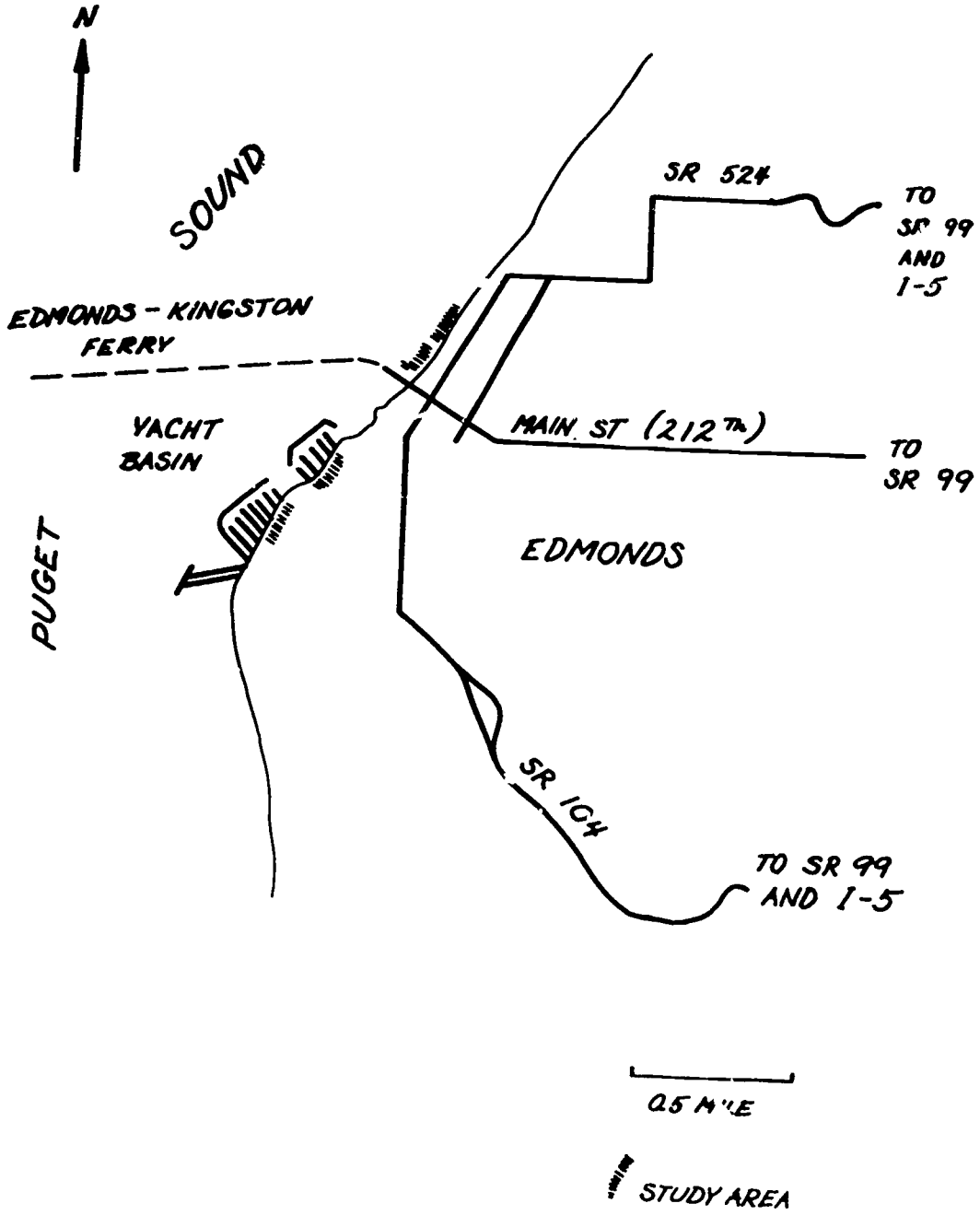
Location:	Alki Point in West Seattle
Access:	Bus Lines: Metro bus #37 Road Access: Take exit 163A from Interstate 5. Go west on Spokane Street 2.5 miles to Harbor Avenue. Follow Harbor Avenue 4.0 miles to Alki.
Jurisdiction:	Seattle Parks and Recreation Department 5201 Greenlake Way North Seattle, WA 625-4671
Collecting Allowed:	No
Low Tide Correction on Seattle:	None
Habitats Represented:	Sandy with some rocks north of Alki Point Rocky south of Alki Point
Geological Features:	Erosion, wave effects, weathering, sorting
Telephone Available:	Yes
Emergency Telephone:	911
Toilets Available:	Flush Toilets
Drinking Water Available:	Yes
Picnic Facilities:	Yes
Camping Facilities:	None
Special Notes:	Good view of city skyline and industry; Bike route follows Alki Avenue; Sand dollar beds are along north shore; United States Coast Guard Light Station Alki 3201 Alki Avenue (visiting weekends and holidays, 1-4 p.m.) 932-5800


PUGET SOUND
DUWAMISH HEAD
N
ALKI AVE.
HARBOR AVE. S.W.
ALKI POINT
ADMIRAL WAY
SPOKANE ST.
TO I-5
CALIFORNIA AVE. S.W.
SEATTLE
ONE MILE
STUDY AREA

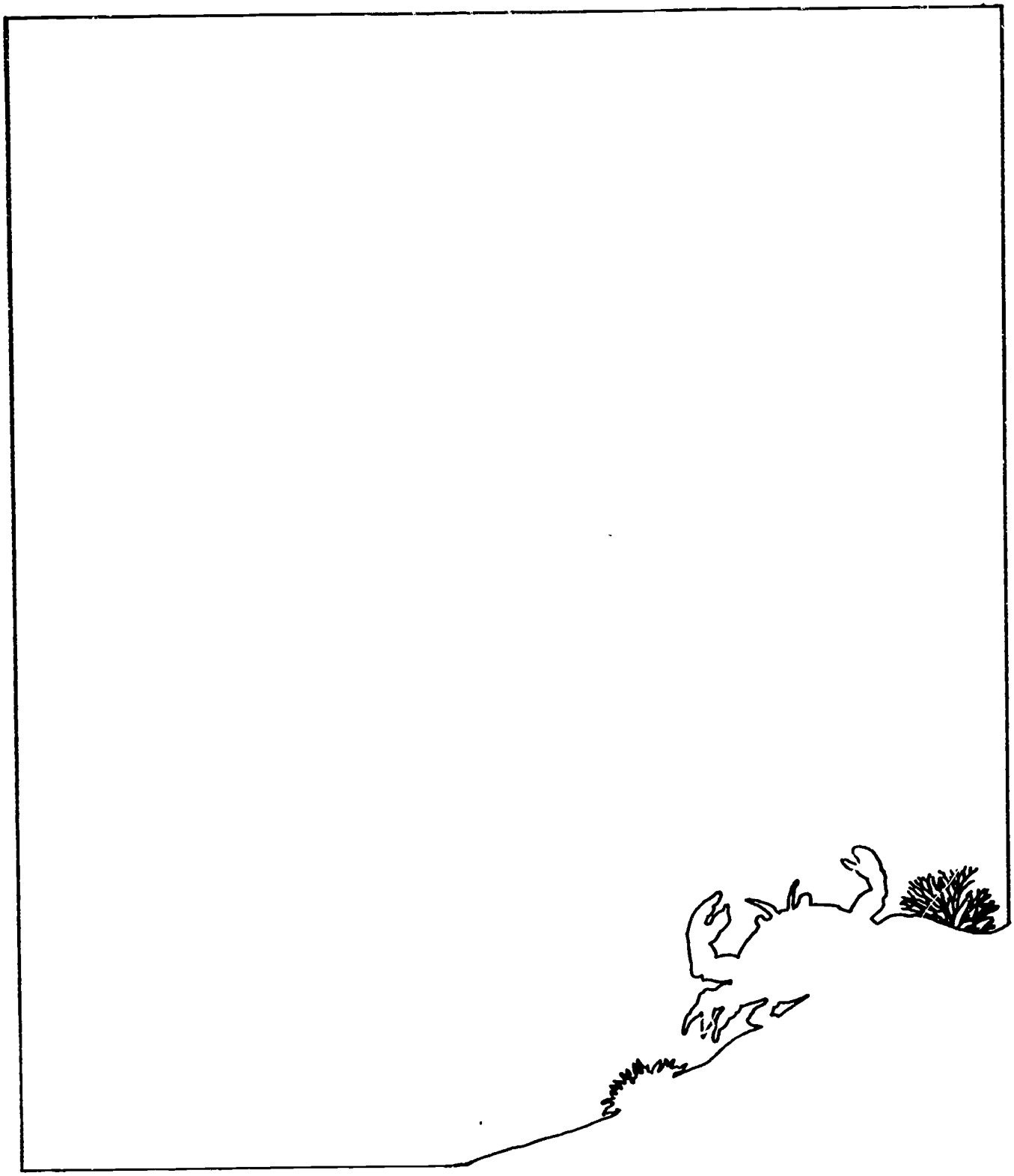
ALKI POINT

BEACH INVENTORY FOR EDMONDS

Location:	Downtown Edmonds, WA
Access:	Bus Lines: Metro #316 from Seattle Community transit S1 from Brier Community transit S3 from Mountlake Terrace Community transit S4 from Lynnwood Community transit R14 from Everett Road Access: Follow SR 104 from Interstate 5 five miles to Brackett's Landing (a city park).
Jurisdiction:	City of Edmonds 250 - 5th North Edmonds, WA 98020 775-2525
Collecting Allowed:	No
Low Tide Correction on Seattle:	Time: Add 2 minutes Height: No change
Habitats Represented:	Rocky beach, pilings, floats, and some sand
Geological Features:	Erosion, deposition, sorting, wave action, effect of jetty, weathering
Telephone Available:	Yes
Emergency Phone:	911
Toilets Available:	Flush toilets
Drinking Water Available:	Yes
Picnicking:	Yes
Camping Facilities	None
Special Notes:	Stores are nearby. The floats at the Edmonds Marina host many feeding tube worms and barnacles. Contact the Port of Edmonds for permission (774-0549). A fishing pier with artificial reef (consisting of tires) is located one-half mile south.


N
SOUND
SR 524
TO SR 99 AND I-5
EDMONDS - KINGSTON FERRY
YACHT BASIN
MAIN ST (212TH)
TO SR 99
PUGET
EDMONDS
SR 104
TO SR 99 AND I-5
0.5 MILE
STUDY AREA

EDMONDS



PART IV:
EXTENDED ACTIVITIES IN MARINE BIOLOGY

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1. Tour the Seattle Aquarium. Telephone: 625-4357 (Seattle).

2. Tour the aquarium at the Point Defiance Park Zoo. Telephone: 759-0121 (Tacoma).

3. Tour the oceanographic ships of the National Oceanic and Atmospheric Administration (NOAA). Reservations are required. Telephone: 442-7657 (Seattle).

4. Tour the University of Washington Fisheries Department. Tours are available during the school year, but September and October are best because the fish are running and being harvested. Telephone: 543-9640 (Seattle).

5. Prepare a bouillabaisse or bake a salmon on the beach.

6. Take a census of organisms in various habitats or microhabitats on a given beach. What changes occur over a decade or more?

7. Give a classroom gourmet celebration. Serve octopus, squid, crab, oysters, sea urchin gonads, sea cucumber muscle strips, etc. See Edible? Incredible! for recipes.

8. Find shells of a particular species of clam that have been drilled by predatory snails. Plot the location of the drill hole on a diagram of clam internal anatomy. Is there a pattern to the holes? What part of the clam does the snail attack?

9. Set up a marine aquarium. See the bibliography for a publication that tells how.

10. Visit the Puget Sound Model at the Pacific Science Center. Telephone: (206) 625-9333

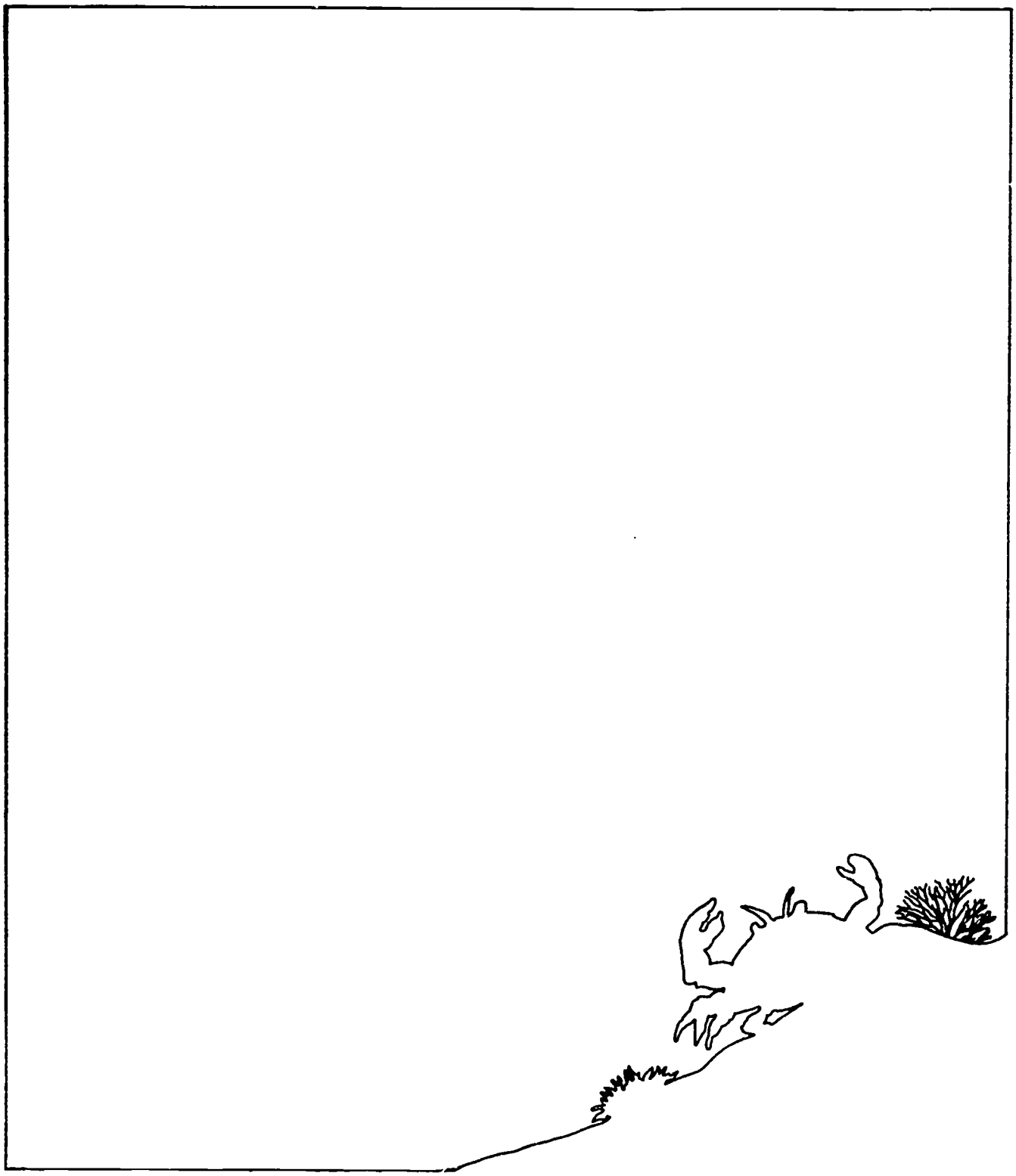
11. Make a survey of limpets to see if shell thickness changes with increased wave shock exposure (such as open coast vs. protected coast.

12. Make a herbarium collection of seaweed.

13. Investigate the Puget Sound Indians' use of marine life as a part of their culture. See Pacific Science Center/Sea Grant publication "Early Fishing Peoples of Puget Sound."

14. Do a plankton tow, either from a boat, in the current passing under a dock or pier, or by a wader.

15. Do a night light field trip. Incredible forms of marine life move toward a bright light on a dock or pier.



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