

IPC to Dale Snow ✓ 3/18-70

FISH COMMISSION
INTRA-DEPARTMENT

MEMORANDUM

DATE: March 10, 1970
TO: Wally Hublou
FROM: Jack Neilsen
SUBJECT: Red Abalone Project

Director _____
Asst. Dir. RNT
Marine Sup _____
Inland Sup _____
A-4

Gene Kruse has asked me to form some long range objectives for the abalone project. I have tried to follow your project proposal plan. There are several headings such as personnel, cooperators and costs which will require discussion with you and Bob Loeffel.

I would like to meet with you and Bob (Gene also if he has the time) to review the work that has been done and to form some official direction for the project. I feel what is accomplished this summer will be extremely important in keeping the project "in house." OSU has had an eye on our abalone program from the start and they would dearly enjoy sharing the public support and enthusiasm the Fish Commission has generated.

Will you pick a date and time we can get together?

cc: Kruse, Loeffel

Fish Commission of Oregon
Research Division

Project Outline
Shellfish Investigations

Project Title: Red Abalone Propagation in Oregon

Purpose: To establish, in Oregon, a coastwide red abalone sport fishery and a limited commercial fishery as stocks dictate.

Objectives:

1. To develop techniques to induce and control adult red abalone spawning in the laboratory.
2. To develop laboratory techniques for mass rearing red abalone larvae.
3. To develop techniques for releasing laboratory reared juvenile red abalone into the marine environment.
4. To evaluate the use of laboratory reared juvenile red abalone to establish new populations in areas where abalone do not exist, and to supplement the natural population in areas where the stocks have been depleted.
5. To evaluate the effect of the red sea urchin Strongylocentrotus franciscanus on survival and distribution of red abalone.
6. To evaluate the contribution of wild stocks of abalone to the fishery.

Duration: Initial groundwork for this project began in July, 1967. The work has been piecemeal and part time. An accelerated program should begin immediately. There is no foreseeable termination date.

Justification: The natural distribution of the red abalone, Haliotis rufescens, in Oregon is from Coos Bay to the California border. A sand beach, devoid of suitable food and habitat for red abalone, extends north of Coos Bay for 53 miles. This barrier has apparently checked the northern advancement of adult

red abalone. Southerly nearshore ocean currents during the summer spawning season further reduces the chance of northern distribution while the abalone larvae are in the planktonic stage.

An attempt to extend the distribution of red abalone into favorable habitat north of Coos Bay was initiated in July 1967, when 5,000 juveniles were introduced into Whale Cove near Newport. These abalone had been reared in a laboratory at a commercial shellfish hatchery at Pigeon Point, California. Periodic observations on these juveniles indicated young abalone will survive and grow on the northern Oregon coast.

Adult abalone from Fort Bragg, California, were transplanted into Whale Cove in January 1968, to provide a stock of adults to use for laboratory spawning. In July 1969, 175 additional adult abalone were transferred from Fort Bragg into three locations along the Oregon Coast. Adults were planted on the Rogue River Reef near Gold Beach and at Harris Beach near Brookings. Whale Cove received 75 new adult abalone.

Several adult abalone from Fort Bragg were induced to spawn in 1968 by using increased water temperature as a stimulus. A number of facts were determined from these efforts.

1. Although spawning can be induced through a stimulus, egg fertilization is not always successful. Eggs and sperm must be physiologically mature before fertilization can take place.
2. Free swimming abalone larvae do not need a source of food. On the contrary, larvae that were fed single-cell algae suffered extensive mortality.
3. Handling abalone larvae by screening and transferring from one holding tank to another causes injury and mortality.

4. Abalone larvae must be reared in clean sea water as even slight contamination will cause extensive mortality.

Several adult abalone were collected from the Cape Ferrelo area north of Brookings, Oregon, in 1969. From the partial spawning of one female and several males in the laboratory, approximately one million larval abalone were reared to setting size. Due to an error in selecting the proper setting cultch and holding container, the entire brood was lost. Despite this failure, a number of questions were answered.

1. Red abalone larvae can be reared to setting size in filtered, sterile sea water. No addition of food is necessary.
2. Setting occurs within five to seven days after egg fertilization depending upon water temperature.
3. Frequent changes of water in which the larvae are reared is unnecessary.
4. A dark colored setting cultch and a light colored holding container is required.
5. Before the swimming organ of the abalone larvae is lost, the animal has the ability to attach with the newly formed foot. This apparently gives the larvae several hours to "choose" a suitable substrate upon which to set.

In April 1969, a survey of the abalone population was started in the Brookings, Gold Beach and Port Orford areas. All of the areas surveyed appeared to have excellent abalone habitat. However, few animals were observed except in the Cape Ferrelo area north of Brookings.

Several factors may contribute to the meager population.

1. Because of the limited number of adult abalone, natural spawning may not be sufficient to build the population. Of the abalone observed, none appeared to be under four years of age.

- 2. Natural spawning may not occur ~~on an annual~~ basis.
- 3. Naturally spawned larvae may be lost during the free swimming stage due to displacement by oceanic currents.
- 4. Competition for food and living space from the red sea urchin, Strongylocentrotus franciscanus, may be eliminating abalone habitat.

Review of previous work: Two publications provide information on abalone propagation with particular reference to laboratory rearing techniques.

Cox, Keith W.
 "Report on a visit to Japanese abalone hatcheries in November 1964."
 California Dept. of Fish and Game.

Ino, Takashi. The abalone Science and its Propagation in Japan. Translation Series No. 1078. Fisheries Research Board of Canada. Nanaimo, B.C. 1968.

Although neither publication deals with Haliotis rufescens, techniques employed in Japan for culturing abalone may well apply for the red.

Methods: The program emphasis for 1970 should be upon laboratory spawning techniques. This should include:

- 1. Conditioning adults for spawning and developing techniques to regulate spawning on a controlled basis.
- 2. Determining optimum larval rearing conditions. Larval density, temperature, salinity, and types of rearing containers should be explored.
- 3. Developing techniques for transferring larval and juvenile abalone to the marine environment.