FAUNA OF YAQUINA BAY SAND-MUD FLATS AND THE ADAPTATIONS EXHIBITED BY THE FAUNA FOR LIFE IN THE HABITAT

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Introduction.

This report is the result of a study of the sand-mud flats of Yaquina Bay conducted on the morning of July 16, 1966, at a -1.2 foot tide. The area studied is south of the Marine Science Center in a part of the bay that is adjacent to an abandoned saw mill. Samples of the sand and mud were screened and the resulting fauna were counted and identified. Additional organisms that were observed in a survey of the area were also collected and identified. These results are shown in the accompanying faunal list.

Adaptations of organisms for life in the sand-mud flats.

Since there is very little primary production of food in the sand-mud flat community, most of the organisms are dependent on an outside source of food. Most of this food is in the form of detritus, the supply of which is constantly being renewed as a result of tidal inflow. Thus, most of the primary consumers exhibit various adaptations for obtaining this detritus--either directly from the water or from the sand and mud.

The primary adaptation of nearly all of the animals living in this community is for burrowing--either in the construction of permanent burrows, such as in Callianassas, or by simply burrowing into the substratum as exhibited by the various species of clams. In order to find their prey which is buried in the sand and mud, predators also must be able to burrow. Thus, we find the various polychaete and nemertean predators equipped with a proboscis and capable of burrowing movements.

Although, as stated earlier, most of the food for the community is brought in with the tide, the alga, Enteromorpha, was found to be abundant. This alga not only serves as a direct source of food to certain amphipods, but, more importantly, is an abundant source of food after it has been decayed to detritus.

Specific Animal Groups.

Annelida

Arenicola pusilla. This burrowing polychaete worm was found in fairly large numbers in the muddier portions of the area studied. It is detected by the presence of a pile of castings outside the burrow. Arenicola burrows by means of an eversible proboscis. The proboscis is supplied with glands that secrete mucus when the worm is feeding; this causes detritus and sand to stick to the proboscis. When the proboscis is inverted, the material is brought into the mouth. The worm constructs a U-shaped burrow and maintains a constant current of water through

the burrow by means of its undulating movements. This not only brings food material into the burrow, but is also important in aerating the external gills and removing waste materials from the burrow.

Arthropoda

Callianassa californiensis. This animal maintains a permanent burrow. It was found abundantly in the higher, more sandy portions of the area studied, but did extend into the muddy regions as well. Callianassa possesses appendages which enable it to construct and maintain a burrow and to feed. It secures its food by eating fine sand and mud and digesting the organic matter contained therein. The coarser particles of sand are separated before ingestion. Accumulations of these coarse particles are periodically gathered up and carried to the surface. (See MacGinitie, pages 284-290 for a more detailed analysis of the natural history of this species.)

Unlike Callianassas, Upogebia is adapted for filtering detritus out of the water that circulates through its burrow. The chelae and first pair of walking legs are thickly covered with long feathery hairs to aid in this process.

Mollusca

The clams which were found in this area are all adapted for burrowing into the sand-mud substratum. The principal factor which seems to determine the depth to which they burrow is the type and length of siphon system they possess.

Macoma nasuta. A deposit feeder, this species is usually found six to eight inches below the surface. It lies on its left side with its incurrent siphon extended to the surface where it "sucks" up the fine material. It is able to blow out the coarse or inedible material through the incurrent siphon. With its long siphon (for its size), it is able to feed over a relatively large area without moving. This clam is able to live in more stagnant water and softer mud than any other species of clam found locally.

Cryptomya californiia. This very small clam is able to live at fairly great depths (up to 20 inches) in spite of its short siphon by projecting its siphons into the burrows of Callianassa and Upogebia. It strains its food from the water circulating through the burrow.

Clinocardium nutalli. This clam is found near the surface of the mud. It is restricted to the near surface because of its extremely short siphons.

Nemertea

Species of nemertea are predatory on small worms living in the sand-mud flat community. Although it is not definitely known, the nemerteans may prey on the small polychaete worms, Maldanidae, which were found in abundance in the area studied. The nemerteans burrow through the substratum by peristaltic movements. Their proboscis is armed with poisonous stylets which are injected into the prey.

Fauna List - Area 3 - Muddy Sand of Yaquina Bay near Marine Science Laboratory

Two mud samples of approximately 0.1 cubic meter each were screened. Animals retained by the screen were counted.

Sample 1

Mollusca
- 22 Tellina salmonea
- 9 Macoma
- 24 Cryptomya

Annelida
- 2 Arenicola cristata
- 1 Arabella iricolor
- ? Maldanidae (abundant; not counted)

Arthropoda
- 1 Callianassa

Nemertea
- 1 Paranemertes peregrina

Sample 2

Mollusca
- 50 Tellina salmonea
- 46 Macoma nasuta
- 6 Macoma secta
- 6 Cryptomya

Annelida
- 9 Arabella iricolor
- 29 Maldanidae
- 3 unidentified species

Arthropoda
- 2 Gammaridea amphipods

Nemertea
- 1 Amphiporus bimaculatus

Other fauna found in the area

Mollusca
- Clinocardium nuttallii
- Schizothaerus nuttallii

Annelida
- Nephtys sp.

Arthropoda
- Upogebia pugettensis
- Cancer magister
- Pinnixa faba

Platyhelminthes
- Large brown worm - disintegrated before it could be classified.