

NON-INDIGENOUS AQUATIC SPECIES OF CONCERN FOR ALASKA

Fact Sheet 4

Softshell Clam

Mya arenaria

BIOLOGY & PHYSIOLOGY

Physical Description: The Softshell Clam has a large shell. The average size ranges between 2.5 to 4 inches; however, these clams can grow to 5.5 inches in length at maturity. The clam's growth rate varies with location and environmental conditions (e.g. sediment type, disturbance, latitude, salinity, and temperature). In Alaska, the Softshell Clam grows about 2 inches every 6-7 years. The growth rate is much faster in warmer climates. Softshell Clams have an ovate-elongate shape, meaning that the front end is rounded, and the back end is slightly pointed. The outside of the shell has a rough surface marked by growth lines. Internally, there is a large, spoon-shaped projection, called the chondrophore, that encases the internal ligament on the left valve at the hinge. The siphons (used to transport water in and out of the clam) are light tan interspersed with dark brown and can be up to three times as long as the shell. The foot is small and muscular. Outside the shell, the color is chalky white with a thin brownish shell coating which tends to be restricted to the edges of the shell. The interior of the shell is typically white.



Photos by: Lane Community College, Eugene, Oregon



Nutrition Requirements: The Softshell Clam is a filter feeder and has a broad food preference. It feeds on phytoplankton, small zooplankton, benthic diatoms, suspended particulates, and dissolved organic matter.

Reproduction: Softshell Clams are typically dioecious (separate sexes) but can sometimes be hermaphroditic (individuals capable of changing gender). Softshell Clams typically live 10-20 years. Reproduction can begin as early as the first year of age; however, clams normally delay reproduction to the fourth year. Softshell Clams will delay reproduction so that they may expend the energy for growth. Larger clams are able to burrow deeper into the sediment which provides them greater protection against predators. The Softshell Clam can spawn once to twice a year, beginning in the spring and continuing until fall (March-November). Since spawning depends on water temperature, its timing varies with latitude. The male clam spawns first by releasing a pheromone in the water that stimulates the female to spawn. The number of eggs released by the female depends on its size; however, females typically release as many as 100,000-1,000,000 eggs. The male clam will then release its sperm. The eggs and sperm can be transported many miles by water currents. Typically, eggs take approximately twelve hours to develop into larvae.

Lifecycle Stages: The Softshell Clam's larval stage typically lasts 2-3 weeks. Larval growth, survival, and the length of the larval stage are dependent on salinity, temperature and food availability. Larvae mortality typically decreases as they approach reproductive age. Fertility of the Softshell Clam increases with increasing female size.

Habitat: Soil type seems to have little influence on the distribution of the Softshell Clam as they are found on muddy, sandy and gravelly bottoms. However, the highest densities of clams are found in muddy sand areas. The Softshell Clam typically inhabits the intertidal and shallow subtidal zones, and is typically found living in water depths up 250 ft; however, some have been observed as deep as 630 ft. This clam can burrow itself up to 20 inches deep in the mud or sand. Young Softshell Clams live in the upper inch of the substrate. With advancing growth,

longer siphons are developed which enable the Softshell Clam to bury itself deeper into the sediment, increasing their ability to escape predation. This clam is considered a hard-winter species and can tolerate water temperatures down to 28°F. The Softshell Clam adapts well to a wide range of salinities and temperatures, and can survive in pristine and disturbed habitats as well as polluted habitats.

DISPERSAL POTENTIAL

Historical and Current Introduction/Spread: The Softshell Clam is a cryptogenic species, meaning that its true origin is unknown. The Softshell Clam was first introduced to the Pacific Coast of North America around 1874, when it was accidentally introduced into San Francisco Bay, California, along with shipments of seed oysters transplanted from the Atlantic Coast. Since that time, they have spread south to the Monterey region of California, and by the 1960's-1970's they spread northward to Alaskan waters. This clam has been widely established for decades in Prince William Sound and Port Valdez, Alaska, and was heavily impacted by benthos upheaval in the 1964 earthquake. The Softshell Clam is found along the Western Pacific coast of Asia from the Kamchatka Peninsula, USSR, to the northern regions of the Japanese islands. It is also found along the U.S. Atlantic Coast from Labrador to South Carolina and is also found more locally in Florida.

Dispersal Methods: The Softshell Clam can invade new habitats by: (1) larval dispersal through passive re-suspension into the water column, (2) plantings by humans, (3) ballast water, and (4) larvae transported in sediment along with oyster transplants. Transport by humans is possible at any stages of its life cycle.

IMPACTS AND CONTROL

General Impacts: The Softshell Clam may compete with native mollusks for space and resources. As a major consumer of phytoplankton and as a food source for various species of birds, decapod crustaceans and fish, the Softshell Clam can greatly influence the marine and terrestrial communities. Also, as a filter feeder, it can affect the nutrient cycling.

Management Information: Predators provide a natural means of controlling the Softshell Clam population. Predators include: filter-feeding organisms (larval predators), crustaceans, gastropods, horseshoe crabs, green crab (*Carcinus maenas*), starfish, nemertea, polychaetes, birds (e.g. oyster catchers and sea ducks), fish, racoons and humans. Considering that the Softshell Clam has already been well established in Alaska waters for many decades, preventing introduction is no longer a viable strategy. There are currently no effective eradication methods in use for the Softshell Clam.

Key Notes: The properties that favor the invasive success of the Softshell Clam are: (1) high fertility, (2) larvae that are easily transported in sediment, (3) a broad spectrum of habitat and food preferences, (4) tolerance of a wide range of environmental conditions such a salinity and temperature, and (5) its relatively large size.