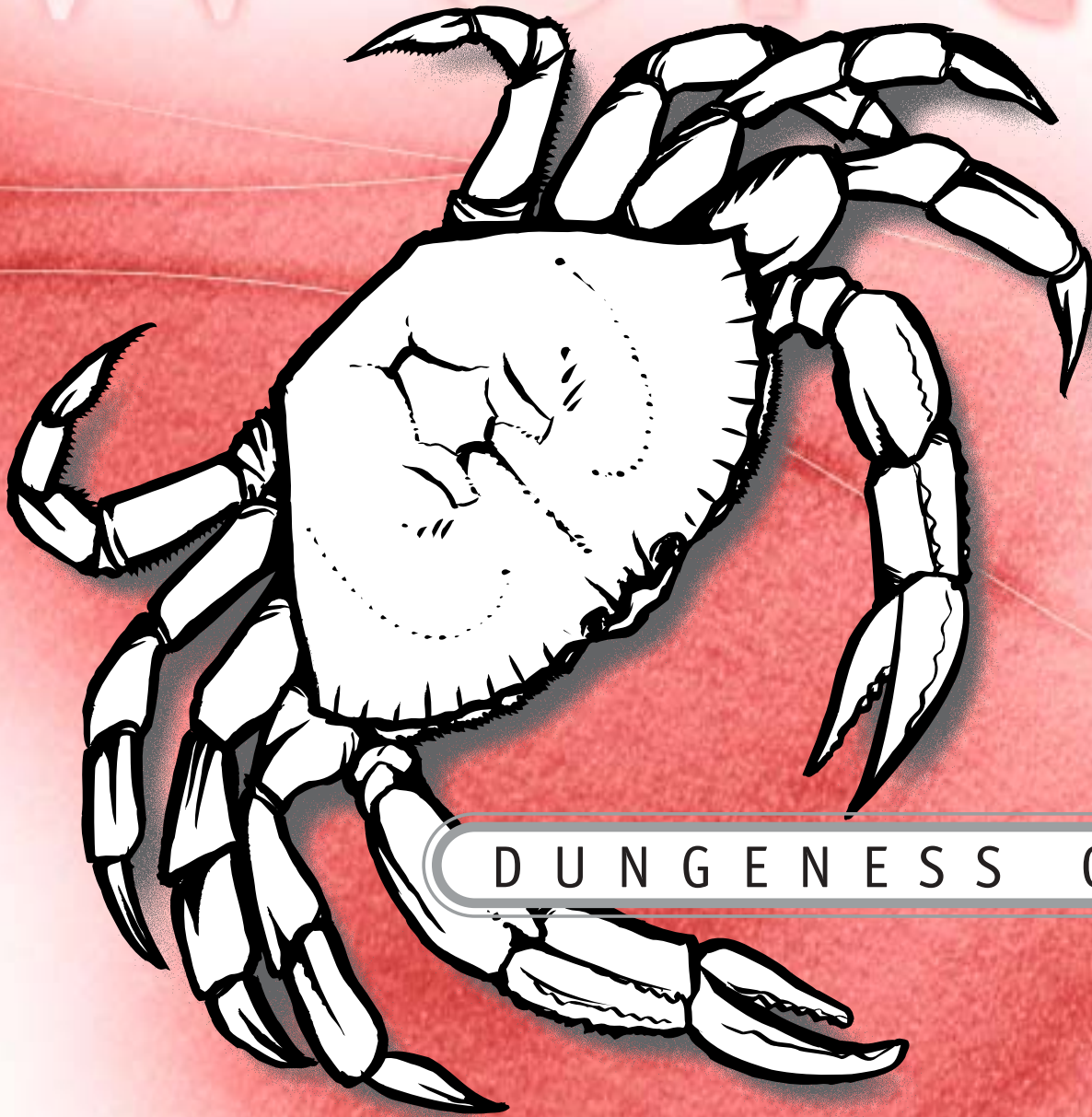
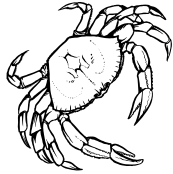




UNDERWATER world



D U N G E N E S S C R A B



Dungeness Crab



Figure 1. Male Dungeness crab — *Cancer magister*

Introduction

People living along North America’s West Coast are familiar with the Dungeness crab as a highly prized sport and commercial shellfish. This crab, one of the 35 true crabs living in Canada’s Pacific waters, has the scientific title of *Cancer magister*. Freely translated, the first word is the Latin name for “crab” and the second means “chief” or “principal”. The common name “Dungeness” is derived from a fishing port near Puget Sound, Washington.

Description

A male Dungeness crab can grow to a maximum carapace or “shell” width of 230 millimetres (spines included), and weigh about two kilograms. In heavily fished areas, however, few crabs wider than 190 millimetres are found. When alive, the main colour of both sexes is a blend of brown and tan. Two similar crabs — the rock crab (*Cancer productus*) and the graceful crab (*Cancer gracilis*) — may cause some identification confusion. Dungeness crab can be distinguished from red rock crab by its slender, light-coloured claw tips (the tips of red rock crabs

are blue-gray or black), and from the graceful crab by its larger size and the absence of a small spine just past the widest point of the shell.

Distribution and Habitat

The Dungeness crab is distributed from the Aleutian Islands, Alaska, to Monterey Bay, California, from the intertidal to a depth of about 180 metres. It lives in bays and inlets, around estuaries, and on the continental shelf. Although it is sometimes found on mud and gravel, this crab is most abundant on sandy bottoms, and in shallow

waters around eelgrass. Newly settled crab has the highest survival rates in shallow waters, including the intertidal zone, presumably to avoid predators. They also require cooler temperature waters, which explains the general absence of this species from the central and northern Strait of Georgia, where summer surface waters are too warm for juvenile Dungeness crab survival.

Reproduction and Growth

Crabs have an outer shell or exoskeleton, and do not grow in the continuous, gradual manner that

animals with internal skeletons — such as fish and mammals — do. Crabs can only grow by periodic shedding of their shell in a process called moulting, and individuals typically increase in size by about 15 to 25 per cent with each moult. Young crabs, which put all their energy reserves into body growth, moult more frequently and to a relatively larger size than adult crabs, which devote more of their energy to reproduction. Prior to and during moulting, crabs absorb water into their body tissues, which expands the body to a larger size causing the shell to split. The soft newly moulted crab then emerges from the old shell and seeks shelter while its new shell hardens. Complete hardening of the new shell takes about six weeks for adult crab and a little longer for the crab to fully replace the absorbed water with new body tissue, such as muscle. Adult males and females in a population tend to moult at different times, so that the males will be hard-shelled and able to mate when the females moult.

The moulted shells of crabs, which are often found along the tide drift line, are often mistaken for dead crabs, as all the hard parts of the crab are shed as one piece. During a moult, the old shell splits at the back and along both sides, and the crab backs out of its shell. The opening in a moulted shell closes up after the crab has exited, but if the shell is held in your hand, the shell can be readily opened again from the back. If the shell is empty of all tissue, it is a moulted shell and not a dead crab.

For a number of hours prior to, during, and after breeding, the male crab clasps the female so that the undersides of each are in close contact. Actual mating occurs in the few hours after a female has

moulted her shell, because only then is her carapace soft enough to allow the male to penetrate and deposit his sperm. The mating itself lasts less than 30 minutes, but a male may transport his partner about for several days before and after her moult to ensure that he alone mates with her. The female can retain viable sperm in her body for years and unused sperm through her next moult. She can also fertilize a number of egg extrusions following a single mating event, although sperm viability will gradually decrease over time. Eggs are fertilized as they are extruded by the female a number of months after she moults and mates, typically in the fall. Fertilized eggs, which may number up to a million in a single extrusion from a large crab, are attached to the female's body under her abdomen, where they are retained for three to five months until they hatch. Egg-bearing females often congregate and bury themselves in areas of suitable substrate, sheltered from winter storms while they incubate their eggs.

After hatching, young crab are planktonic — or free-swimming — in the water column, for about four months, when they pass through five larval stages, known as “zoaea.” These shrimp-like larvae are primarily transported by currents. In the next and last larval stage, termed the “megalops,” the larva becomes more recognizable as a young crab, with claws and legs, but still with a shrimp-like abdomen. Megalopae are relatively strong swimmers, moving at speeds up to 22 centimetres per second, and are typically present in surface waters only at dawn, dusk and night. During the day, they usually move down in the water column to a depth of at least 20 metres.

It takes about 10 or 11 moults — or about two years — for a crab to reach maturity after a megalopa settles to the bottom and moults to a juvenile crab. Females become mature at a shell-width of about 90 millimetres, while males reach maturity at a shell-width of about 150 millimetres. Males reach legal size (165 millimetres, or 6.5 inches, in shell-width) after about 11 to 12 moults. After maturing, females grow slower because most of their accumulated energy is being devoted to egg-production rather than body growth. Relatively few females live long enough to reach a legal size in most heavily fished crab populations.

Habits

Dungeness crab often bury themselves almost completely in sand for protection. Hairs located around the water intakes at the base of their claws keep their gill chambers free of sand grains. When moving about on the sea bottom, crab find and capture their prey — mainly animals living partly or completely buried — by probing into the sand with their legs or claws. While people usually associate sideways movement with crabs, they can actually move in any direction. When necessary, Dungeness crabs can also move quite quickly — fast enough to tire a pursuing scuba diver!

Food and Predators

Live prey such as clams, other crustaceans, and small fish are the crab's preferred food. Crabs use their claws to tear apart large food items and their smaller feeding appendages to pass food to the mouth, where pieces are crushed by two hard mandibles, or “jaws”. In the stomach, there is further cutting and crushing by tooth-like structures, known collectively as a gastric mill.

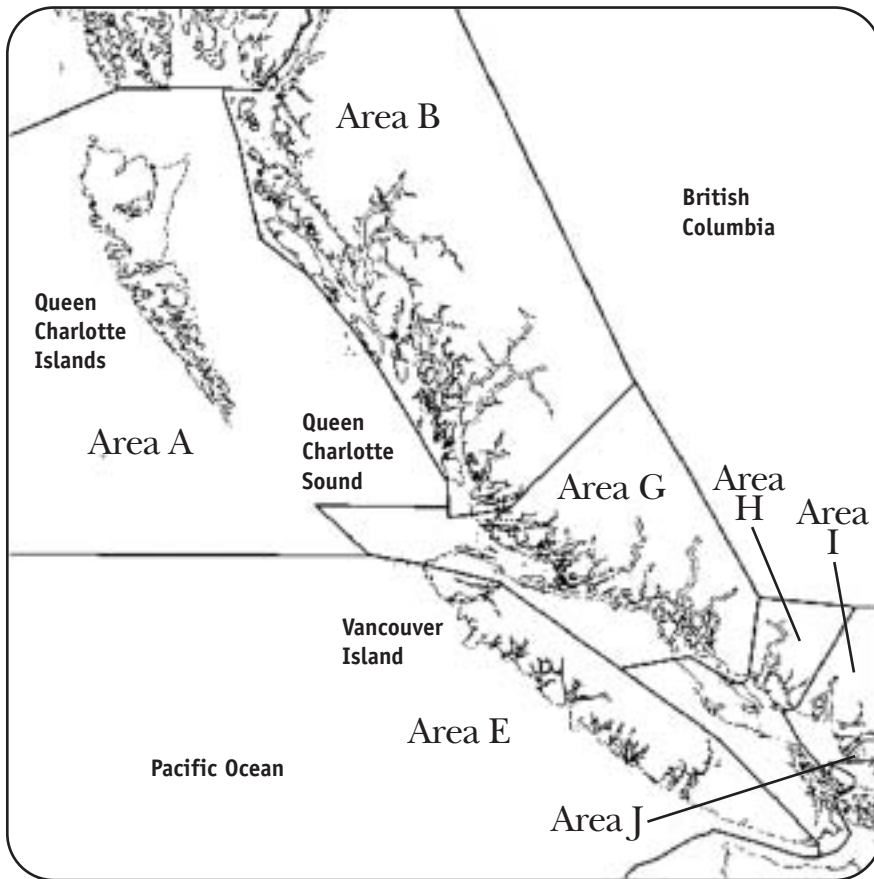


Figure 2. Commercial Crab Fishing Area Map

Crab predators include other crab species, halibut, dogfish, sculpins, octopus and sea otters. Cannibalism may occur, particularly on young crabs during the first weeks after settlement to the bottom, or on newly moulted crabs. Salmon and other fin fish feed on crab larvae when they are available in the plankton.

Fishery

Dungeness crab have been and continue to be an important part of the diet of coastal Aboriginal peoples. Crab fishing remains an

important economic activity for Aboriginals in areas where crab are plentiful, such as the southern Strait of Georgia and off the open outer coasts of Vancouver Island, the Central and North Coasts, and the north and east sides of the Queen Charlotte Islands.

The first record of commercial crab landings in British Columbia was in 1885, in fisheries near Vancouver, Victoria and Nanaimo. Fishing later spread to western Vancouver Island and the Queen Charlotte Islands. In the early 1950s, crab fishermen adopted the stainless-steel circular

trap that is still in use today. In 1991, entry into the commercial fishery became limited and was restricted to 223 licences. As of 2000, crab fishers have had to select one of seven fishing areas (A, B, E, G, H, I or J) to fish in. Area selection is for three years. Each license area is unique and has different management strategies developed in consultation with the local stakeholders.

Major crab fishing locations are Hecate Strait and McIntyre Bay, Long Beach and Clayoquot Sound, Boundary Bay, the Fraser River estuary, Burrard Inlet, the southern Gulf Islands, Queen Charlotte Strait, and Chatham Sound. Although crab in Canada are fished in all months, most landings occur from May to October.

Commercial crab fishers are restricted by the number of traps they are permitted to fish. Trap limits vary by management area and range from 200 traps to 1200 traps per vessel. All traps must be fitted with escape holes for undersized crabs and with biodegradable devices to prevent ghost fishing in case the traps are lost at sea. Depending on the management area, traps are either individually buoyed or attached at intervals along a groundline, which is anchored and buoyed at each end. In all areas, fishers generally haul their traps once every 1 to 10 days, but are required to haul their gear once every 18 days to prevent ghost fishing. Baits used are clams, squid, and fish heads and carcasses.

Smaller traps are sometimes used, along with ring or hoop traps, and recreational fishers can harvest crabs by scuba diving and dip-netting at low tide. The recreational daily possession limit per person in the



Figure 3. Fisherman hauling aboard a crab trap

region east of Vancouver Island is four crabs, while in all other areas, the limit is six. All recreational crab gear must be identified with the fishers name and telephone number.

Crab processing plants are situated at Masset, Prince Rupert, Nanaimo, Vancouver, and Sidney. Products include fresh and frozen whole cooked crabs, frozen unshelled but eviscerated crabs, and fresh and canned crabmeat.

Management

The primary management tools used for this fishery are a minimum size limit (165 millimetres), limited entry, and gear and fishery closure regulations. The rationale for the size limit is to protect crabs until they become sexually mature and to give them an opportunity to

spawn at least once prior to being harvested. However, recent science data suggests that this may not be occurring in all populations and that managers may need to consider alternate management approaches for the fishery. In addition, on the advice of the industry, the fishery is managed to prevent harvest of soft-shell crabs. Annual harvests naturally fluctuate substantially over time because of environmentally induced variable crab settlement and survival. All Canadian Dungeness crab stocks are presently fully exploited.

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