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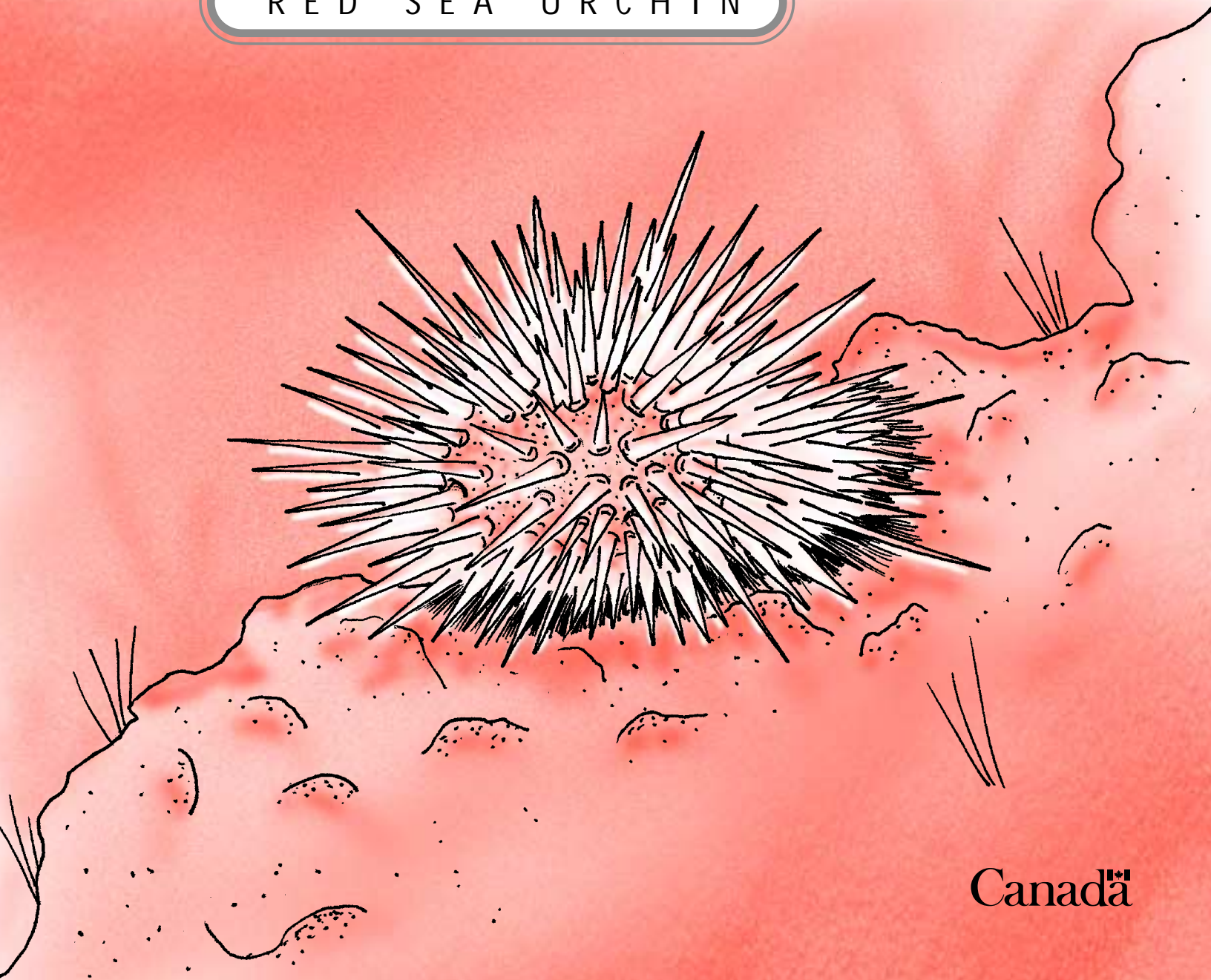
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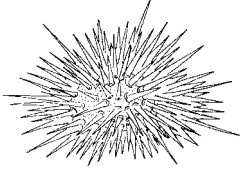
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# UNDERWATER world

RED SEA URCHIN





# Red Sea Urchin

Red sea urchins (*Strongylocentrotus franciscanus*) are colourful creatures, varying between a uniform red and dark burgundy, that crawl slowly over the sea bottom, using their spines as stilts. They scrape off and tear up plant material from the sea floor, aided by a mouth armed with special jaws situated on the bottom surface of the animal.

Sea urchins belong to the marine invertebrate group called echinoderms or “spiny-skinned” animals. Close relatives of sea cucumbers and sea stars, they have spherical bodies, which are encased in a hard shell or “test,” completely covered by many sharp spines. The species is large, with a maximum “test” diameter of over 18 cm and a maximum spine length of 8 cm.

They occur on most rocky subtidal habitats of British Columbia from just below the low tide line to perhaps 90 m. Their preferred habitat is rocky ground with quantities of their food source of seaweeds and kelp. They avoid rocky areas exposed to extreme wave action and areas with sediments such as sand and mud.



Fig. 1 Red sea urchin (*Strongylocentrotus franciscanus*) on a rocky subtidal bottom.

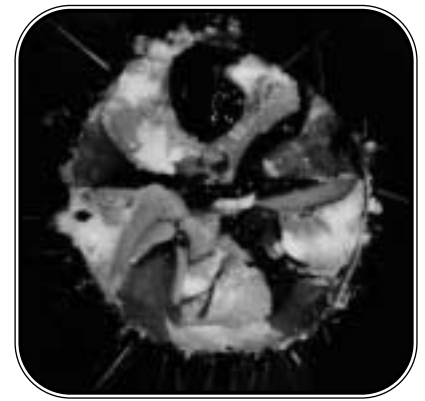


Fig. 2 Cracked open red sea urchin “test,” showing the roe, which appear granular. (Photo: R.M. Harbo)

## Reproduction and Growth

The spawning of red sea urchins peaks between June and September in southern British Columbia. The fertilized eggs develop into planktonic larvae before settling on the bottom where they change into tiny juvenile sea urchins. This replenishment of the population, or “recruitment,” appears to occur annually in local waters. New recruits must hide from potential predators and many seek shelter under the spines of adult sea

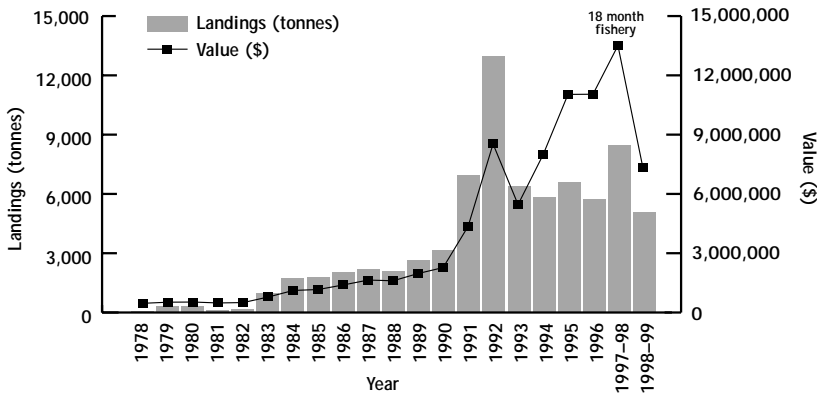


Fig. 3 Commercial red sea urchin landings and value, 1978 to 1999 (1978 to 1993 from fish slips, 1994 to 1999 from harvest logs).

urchins that have a “test” diameter of 9.5 cm or larger. Young sea urchins emerge from shelter when approximately 4 cm in diameter and forage freely over the rocky sea bottom. Adulthood is attained at approximately 7 cm diameter and legal size of 10 cm is reached in five to ten years. Life span sometimes exceeds 30 years.



### Feeding Habits and Predators

Red sea urchins graze on attached or drift seaweed and kelp. They have specialized jaws consisting of five teeth with which they devour plant material. Sea urchins are often found in aggregations whose combined feeding activities can remove all large plant material from the rocks. Such barren patches are usually quite confined and not a widespread occurrence along our coast.

Sea urchins are readily eaten by some sea stars and crabs, although large adults appear to be less susceptible to predation by virtue of their size, and have few predators. Where sea otters occur, however,

even the largest sea urchins are eaten by these voracious marine mammals.



### Fishery

Landings of red sea urchins from British Columbia have been recorded since 1978 and are shown in metric tons in Figure 3. Landings have increased rapidly during the 1980s until landings were reduced and stabilized by quotas in 1993. Fishing occurred exclusively in the south coast of British Columbia until 1983. The north coast of British Columbia was opened to fishing in 1984 and most landings since 1990 have come from the north coast. Fishery statistical areas where most landings have come from are areas 5 and 6 in the North and 12 and 13 in the south (Figure 4). Fishing occurs in less than 18 m depth by divers who use hand rakes to scoop their spiny catch into large mesh bags that are periodically hauled to the surface vessel.

The product from red sea urchins is their reproductive organs, or “roe,” of eggs or sperm. The best roe come from sea urchins taken

between October and May, after which quality decreases as the sea urchins begin to spawn. Processors remove the roe from the animals and place it in shallow trays for export to Japan. The roe must arrive on the Japanese market fresh and in prime condition since it is consumed raw, especially as a garnish for sushi. The domestic market for red sea urchin roe is small.



### Management

Managers have controlled fishing efforts to limit harvesting until more is known about local stocks. Current management approaches include: minimum harvest size of 10 cm test diameter, a coast-wide quota, individual vessel quotas, limited licence entry and area closures. The overall quota is based on a fixed exploitation rate of approximately 2% multiplied by estimates of biomass. Biomass

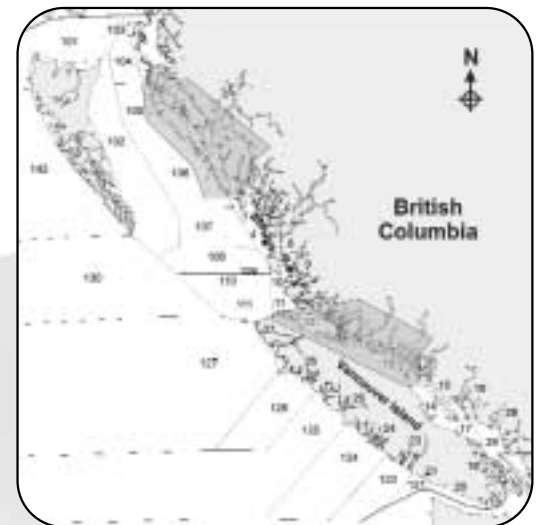


Fig. 4 Fishery management areas of the British Columbia coast. Shaded regions indicate the primary red sea urchin fishing areas.



Fig. 5 Fishermen handling a large mesh bag of red sea urchins.  
(Photo: R.M. Harbo)

estimates are calculated from a combination of field surveys and fishery data. Sea urchin fishermen are required as a condition of their licence to provide fishery-based catch, effort and location information through a mandatory submission to their fishing log-books. A Tidal Water Sport Fishing Licence is required for harvest of red sea urchins by recreational divers for whom the catch limit is 12 red sea urchins per day. Many of these regulations are under review as managers gradually improve their knowledge of local stocks and processors improve understanding of their markets.



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### Further Reading

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