
Fauna and Flora Typically Found on Marine Piling In the Pacific Northwest

Kenneth M. Brooks

In 1995, Environment Canada commissioned a ten-year study to assess the environmental response to the installation of creosote-treated piling in Sooke Basin, a small body of water located on the southern end of Vancouver Island in British Columbia, Canada. Initial surveys in 1995 and 1996 were followed by additional work four, five, and ten years after construction of three, six-piling dolphins. Figures 2-17 document the diverse and abundant epifaunal community that took up residence on both the weathered and BMP-treated piling within

three years of dolphin construction. Nine quantitative samples, each covering 200 cm², were collected from the creosote-treated piling in 2005. Sixty-four different species including sponges, bryozoans, hydroids, and ascidians were identified among the 13,663 animals collected. This inventory was not complete because more mobile fish and crustaceans, like amphipods, escaped during collection. Nearly all of these invertebrates settled on the piling as sensitive larvae that flourished in what became an explosion of colorful life.



Figure P1. Creosote-treated piling supporting the Fort Ward pier and wharf in Washington contained over 60 invertebrate species on the low intertidal and subtidal portions of these piling. Barnacles were highest on the piling, followed by a community dominated by mussels, which transitioned to anemones and plume worms at low intertidal and subtidal elevations.



Figure P2. Creosote piling treated using BMP procedures and exposed for two years in the Sooke Basin. Barnacles dominated at the highest intertidal elevations, but were displaced by mussels, which also would have invaded deeper elevations were it not for starfish and crab predation. Several species of anemones proliferated below the mussel zone.

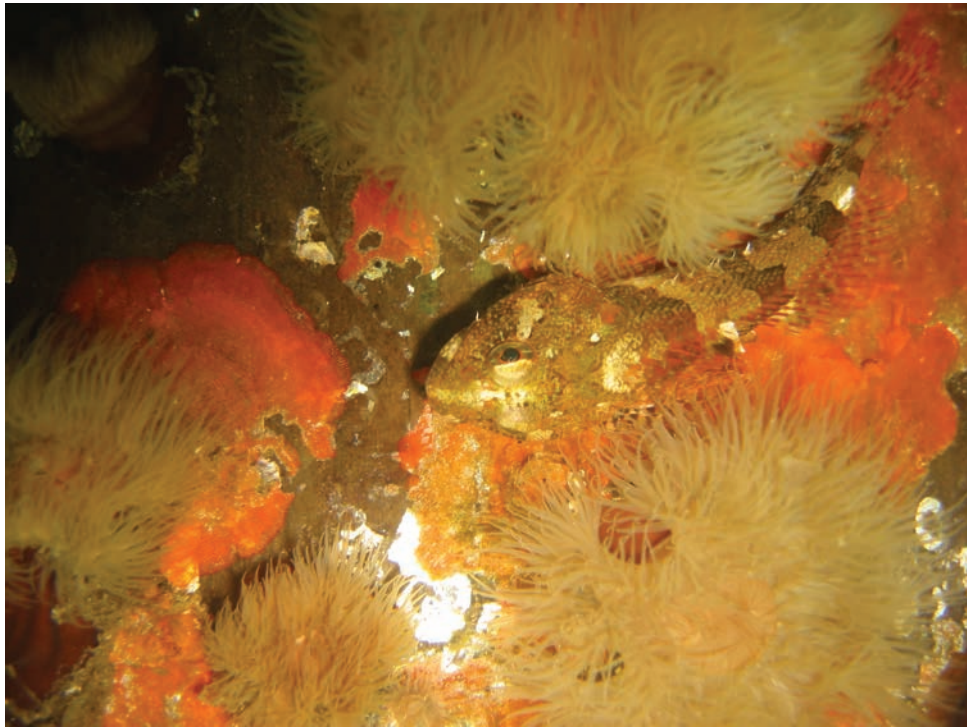


Figure P3. Sculpins are typically found in the intertidal zone associated with rocky pools. This sculpin has made a home within a community of plumose anemones. Schools of pile perch (*Racchochilus vacca*) and shiner perch (*Cymatogaster aggregata*) were more abundant and frequently seen in close proximity to dense clusters of piling.

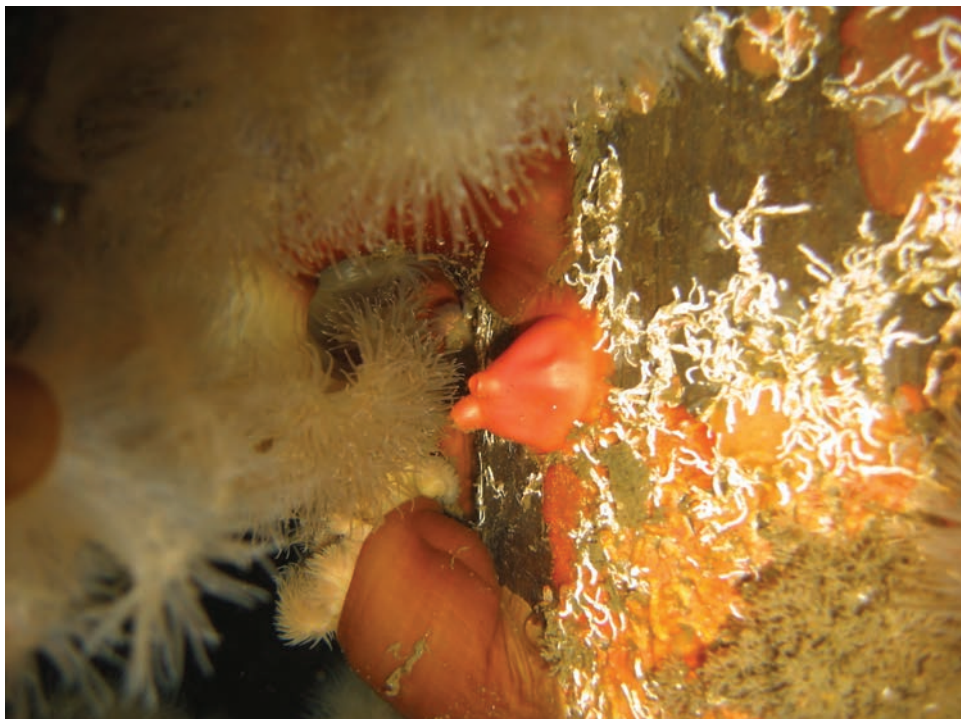


Figure P4. Fifteen cm square (6 inches by 6 inches) samples of the epifaunal community resident on creosote-treated piling revealed dozens of species, including this solitary ascidian (cf. *Cnemidocarpa finmarkiensis*) partially obscured by plumose anemones (*Metridium senile*).



Figure P5. These mussels (*Mytilus edulis trossulus*) grew directly on creosote-treated piling in the Sooke Basin. They did not bioaccumulate polycyclic aromatic hydrocarbons lost from the piling, and their eggs, simply broadcast into the water column and fertilized, developed normally to the trochophore stage in a laboratory study.

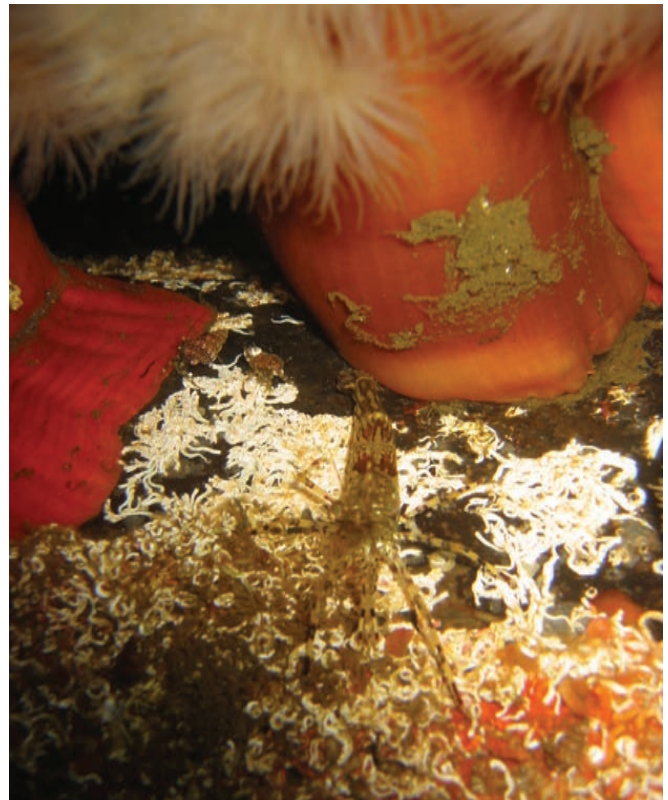


Figure P6. Shrimp are highly mobile predators and were common on the Sooke Basin and Fort Worden creosote-treated piling. However, they escaped capture during the invertebrate inventories, as did many of the more mobile amphipods.



Figure P7. Plume worms (annelids) like *Schizobranchia insignis* were present in the zone dominated by plumose anemones. These invertebrates are filter feeders that use their tentacles to catch detritus and small animals floating by on currents.



Figure P8. Kelp crabs (*Pugettia* sp.) are scavengers commonly found intertidally in the Pacific Northwest and are common on piling and floats such as the creosote-treated piling in the Sooke Basin.



Figure P9. Mussels falling to the base of the piling were quickly consumed by graceful crabs (*Cancer gracilis*). This activity led to significant biological oxygen demand that reduced oxygen tension in the sediments. Hundreds of crabs were present around the Sooke Basin dolphins during all surveys conducted after the first year.



Figure P10. Male and female *Cancer gracilis* in a nuptial embrace on creosote-treated piling in the Sooke Basin. The female will carry the fertilized eggs until the embryos hatch and float away as part of the plankton.



Figure P11. The leather star (*Dermasterias imbricata*) seen here and in Figure P12 feeds primarily on sea anemones and will typically climb the piling to feed.



Figure P12. Starfish are voracious predators attracted to the biological community living on the piling. The sunstar (*Pycnopodia helianthoides*) seen in the lower right side of the photograph preys primarily on mollusks and mussels are a favorite.

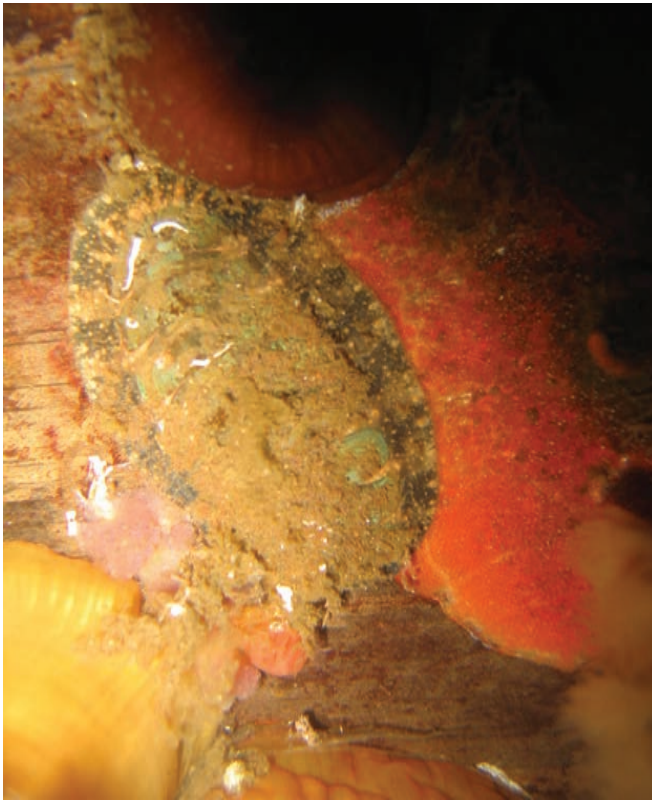


Figure P13. Chitons have been seen on all creosote-treated piling in the Pacific Northwest. Chitons having eight shell segments are mollusks related to gastropods (one or no shell) and bivalves (two shells) like clams and oysters.

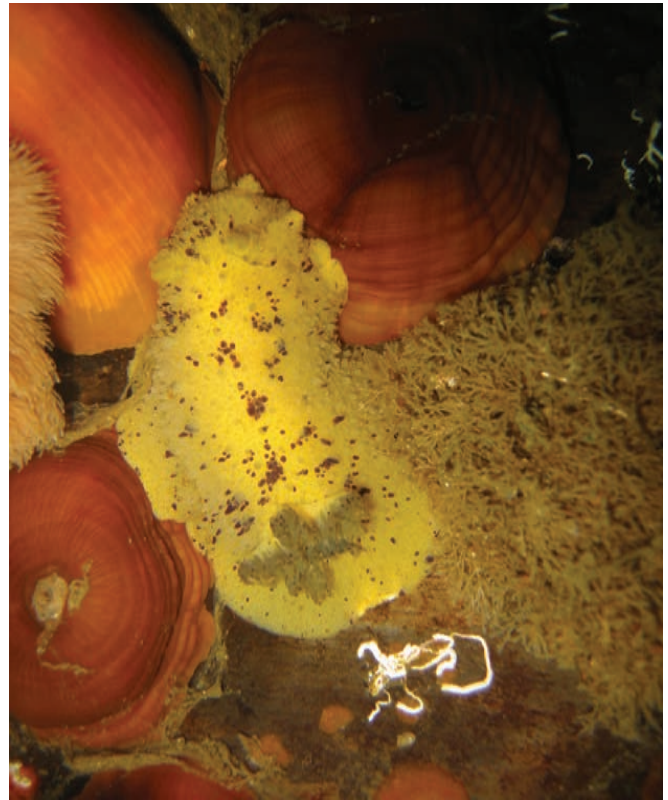


Figure P14. The doris nudibranch (cf. *Artchidoris montereyensis*) feeds on sponges that proliferate on all creosote-treated piling examined in the Pacific Northwest. These sea slugs generally lack shells but are actually mollusks most closely related to gastropods.

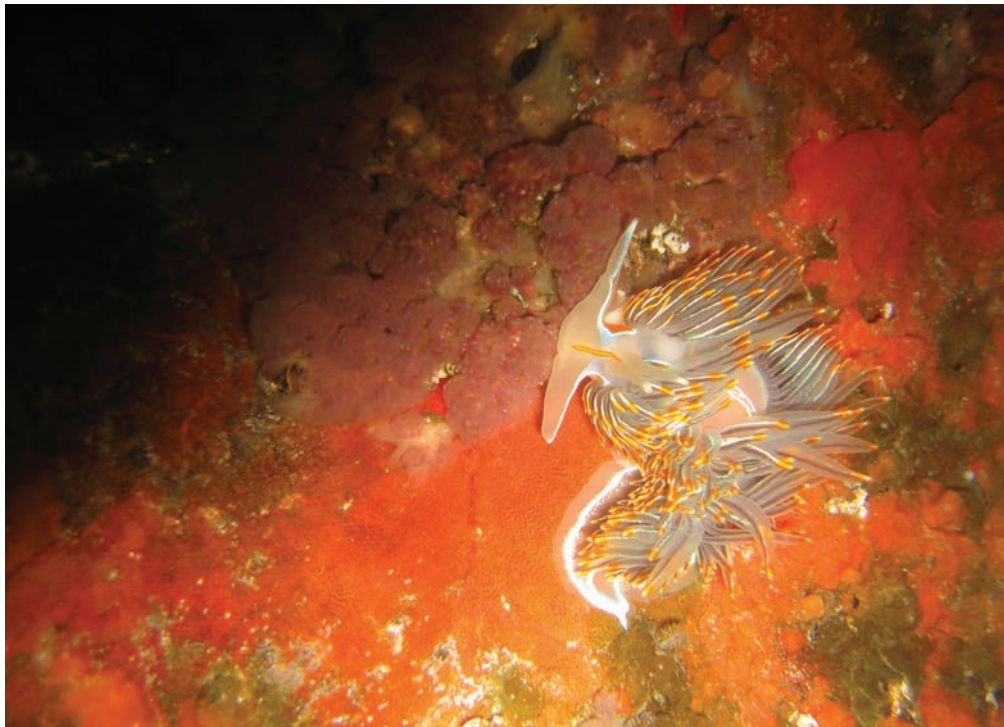


Figure P15. Nudibranchs such as *Phidiana crassicornis* found on creosote-treated piling in the Sooke Basin are grazers, feeding with their radulas on the encrusting coralline algae seen here in bright red.



Figure P16. The sea cucumber (*Parastichopus californicus*) is a commercially harvested echinoderm related to starfish and sea urchins. Sea cucumbers have branched tentacles in their mouth that collect detritus and microscopic animals. They are typically found on the bottom—not on piling.

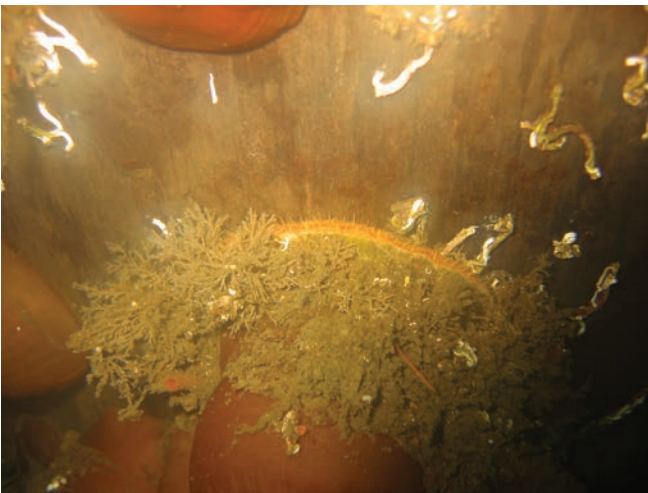


Figure P17. This orange mantle with its tentacles are all that distinguish this bivalve from other masses of Bryozoans common on the piling. The bivalve is likely either a jingle shell (*Pododesmus cepio*) or a rock scallop (*Hinnites giganteus*). Note how clean the subtidal portions of these BMP-treated piling are in this and other photographs.

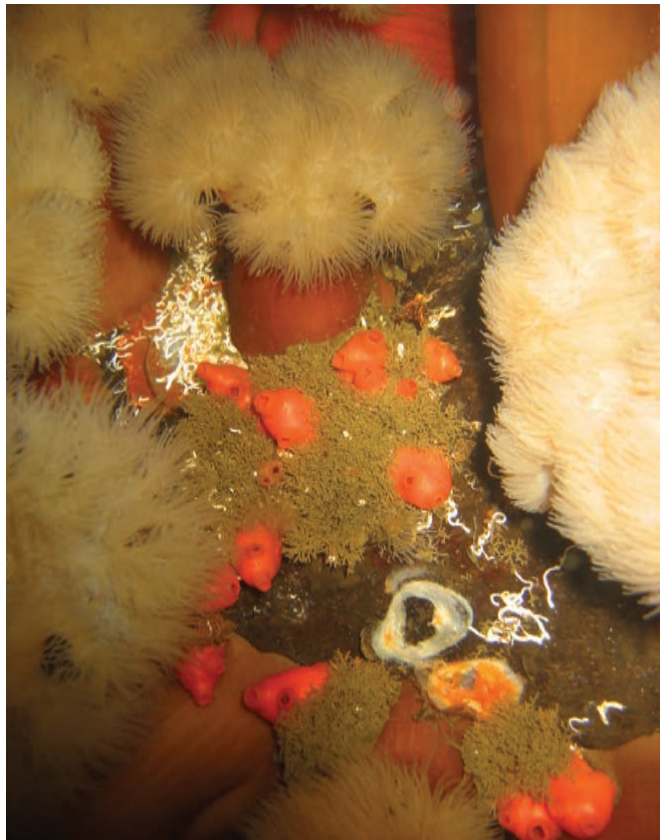


Figure P18. (top) Anemones (*Metridium senile*) come in a variety of colors and were abundant on treated wood; (bottom) *Cnemidocarpa finmarkiensis* were abundant below the area dominated by mussels. The small, coiled, white tubes are those of annelides in the family Spirorbidae.