Our Ocean Backyard — *Santa Cruz Sentinel* columns by Gary Griggs, Director, Institute of Marine Sciences, UC Santa Cruz.

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Algal blooms–good and bad

A large and conspicuous red tide off New Brighton Beach.

The pastures of the sea are the tiny floating plants called phytoplankton. They serve an essential role as the base of the ocean food chain, but they also have a darker side that has come to light in recent years. While most phytoplankton are benign, some produce toxins that can have devastating effects on humans and wildlife.

The Native Americans who originally lived along our shoreline took advantage of the abundant fish and shellfish in the coastal waters, but learned that at certain times of the year the mussels were dangerous to eat. Legend has it that these early inhabitants posted sentries along the shoreline to warn against harvesting contaminated shellfish. Today, health officials closely monitor commercial

shellfish harvests and post signs to warn those who might be looking for dinner on the rocks.

Massive blooms of phytoplankton often occur in Monterey Bay in late spring and summer, sometimes turning the water a reddish color when certain kinds of algae are present. Most of these algal blooms are harmless. Sometimes, however, certain species that produce potent toxins proliferate for reasons we don't completely understand. The result is a "harmful algal bloom," a better term than the misleading "red tide," since many harmful blooms aren't red, and many reddish blooms aren't harmful.

The toxic algae may be filtered out by shellfish or consumed by tiny krill or small fish such as anchovies and sardines. Most fish and shellfish don't seem to suffer any obvious effects from eating the toxic algae. Unfortunately, the toxins get passed up the food chain. The real trouble starts when marine mammals, birds or people eat the contaminated fish or shellfish. Paralytic shellfish poisoning, amnesic shellfish poisoning and diarrheic shellfish poisoning are serious diseases caused by different algal toxins. The toxins affect the nervous system, causing partial paralysis, loss of balance and even death. On the Central Coast, these effects have been seen in seals, sea lions, pelicans and other seabirds.

A famous incident of seabird poisoning occurred in the summer of 1961, when a large flock of sooty shearwaters, fresh from a feast of anchovies, collided with coastal structures from Pleasure Point to Rio del Mar. Residents were awakened in the middle of the night by birds slamming against their homes, and in the morning their yards and streets were littered with dead and confused birds.

Alfred Hitchcock, who had a home in Scotts Valley at that time, read about this event in the Sentinel and used it as the inspiration for his film of avian malice, "The Birds." The reason for this event remained unknown for more than 25 years until it was discovered by researchers at UC Santa Cruz analyzing preserved samples that the birds had been affected by domoic acid, a toxin produced by a particular type of phytoplankton.

Harmful algal blooms are naturally occurring events, but they do appear to be increasing in intensity and frequency. This may be due to natural cycles, but there is growing evidence that human activity may also be causing blooms to occur more frequently, be larger and last longer. One factor may be increased nutrient availability from sewage discharge or fertilizer runoff from agriculture.