

## Green Scene: An Ocean of Slime

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Often more than a meter in diameter, the lions mane jelly is one of the largest that can be seen in Burrard Inlet and Indian Arm. *Ruth Foster photo.*

Being a bookish person with an interest in all things environmental, I have read my fair share of doom and gloom exposés of how things are not going well for the ecosystems of the world. It's an all too familiar theme these days that most people would likely prefer not to think about. However, we can't ignore reality. One book that has really alarmed me is "*Stung! On Jellyfish Blooms and the Future of the Ocean*" by Lisa-ann Gershwin. Gershwin is a biologist who specializes in jellyfish; in fact, she has discovered several species of them. In her book, she outlines why jellyfish are becoming the dominant organisms in many parts of the world's oceans and why we should be worried about this dramatic change.

Jellyfish are true survivors. They have been on the planet for millions of years. For a very primitive animal with no brain or heart, they are extremely adaptable and can survive conditions deleterious to many other species. For example, they can live in waters with lower oxygen content than most other animals. With stinging tentacles that can ensnare large prey, they are very efficient feeders

that also catch a variety of plankton and small larvae. Many of the small larvae or juvenile fish they catch would otherwise have the potential to grow into large marine animals – the kind we like to catch and eat. Jellyfish can grow rapidly to take advantage of periods when there is plenty of food such as during plankton blooms and can consume more than half their weight in food every day. If they do happen to run out of food, they can simply shrink their body size and live on their own tissues for a while.

Acidifying waters apparently pose few problems for them. In the ocean, marine turtles and sunfish are their main predators but both turtles and sunfish appear to be in decline. As for reproduction, they have a number of choices and can reproduce sexually as well as asexually. They live as two forms, the free-floating medusa stage which people are most familiar with, and as a small attached polyp often found underwater on man-made structures and the nets around pens for farmed fish. These polyps can proliferate into large colonies and then, when conditions are right, undergo a process known as strobilation and transform into many small medusas that then float away.

Roughly 1500 species of jellyfish have been identified to date. The largest can be over 2 meters in diameter with tentacles up to 50 meters long and 200 kilograms in weight (most of which is water). As mankind over-harvests fish from the sea, pollutes estuaries and bays with sewage effluent, spews out more carbon dioxide into the atmosphere and thus acidifies the oceans, we are inadvertently creating conditions which favour more jellyfish. Catching too many fish is a particular problem because we distort the food chain by removing so many fish. Jellyfish are always there to fill any gaps created by our over-harvesting.

For example, in the Antarctic, people are now fishing for krill to convert into fish meal...an extremely egregious example of fishing “too far down the food chain”. The krill are being replaced in the ecosystem by copepods, a much smaller type of zooplankton. Unlike krill, the copepods are too small for the penguins to feed on so the penguin populations are declining. However, copepods are the right size (i.e., any size is the right size) for jellyfish, so jellyfish are ominously increasing in abundance as penguins decline. Jellyfish blooms are an increasing problem in many parts of the oceans of the world. The Black Sea, Caspian Sea, Baltic Sea and the Mediterranean are all experiencing increasing problems with massive numbers of jellyfish. Off the waters of China, Japan and Korea, jellyfish blooms are replacing the fish which once sustained the people. In Florida, California, India, Israel and many other places in the world, jellyfish blooms have clogged the cooling water intakes of power plants. Wherever we empty the seas of fish, we are creating advantageous conditions for jellyfish.

What’s to be done? One of the most sensible actions that could be taken to re-balance the food chain in our oceans and protect ecosystems would be to set aside areas where no fishing or other industrial activities are allowed. Just as we need terrestrial parks to serve as biological reservoirs of diversity on land that protect a full community of species, we also need Marine Protected Areas where natural ecosystems can prevail. Where such Marine Protected Areas have been created, the results are usually impressive. Australia, with the largest barrier reef in the world, has wisely already protected 36% of its marine areas. In Canada, we have the longest coastline in the world but only 1% of it is protected. The Canadian Parks and Wilderness Society has identified and recommended a number of Marine Protected Areas along the coast of BC. Now we await some action from the federal government.