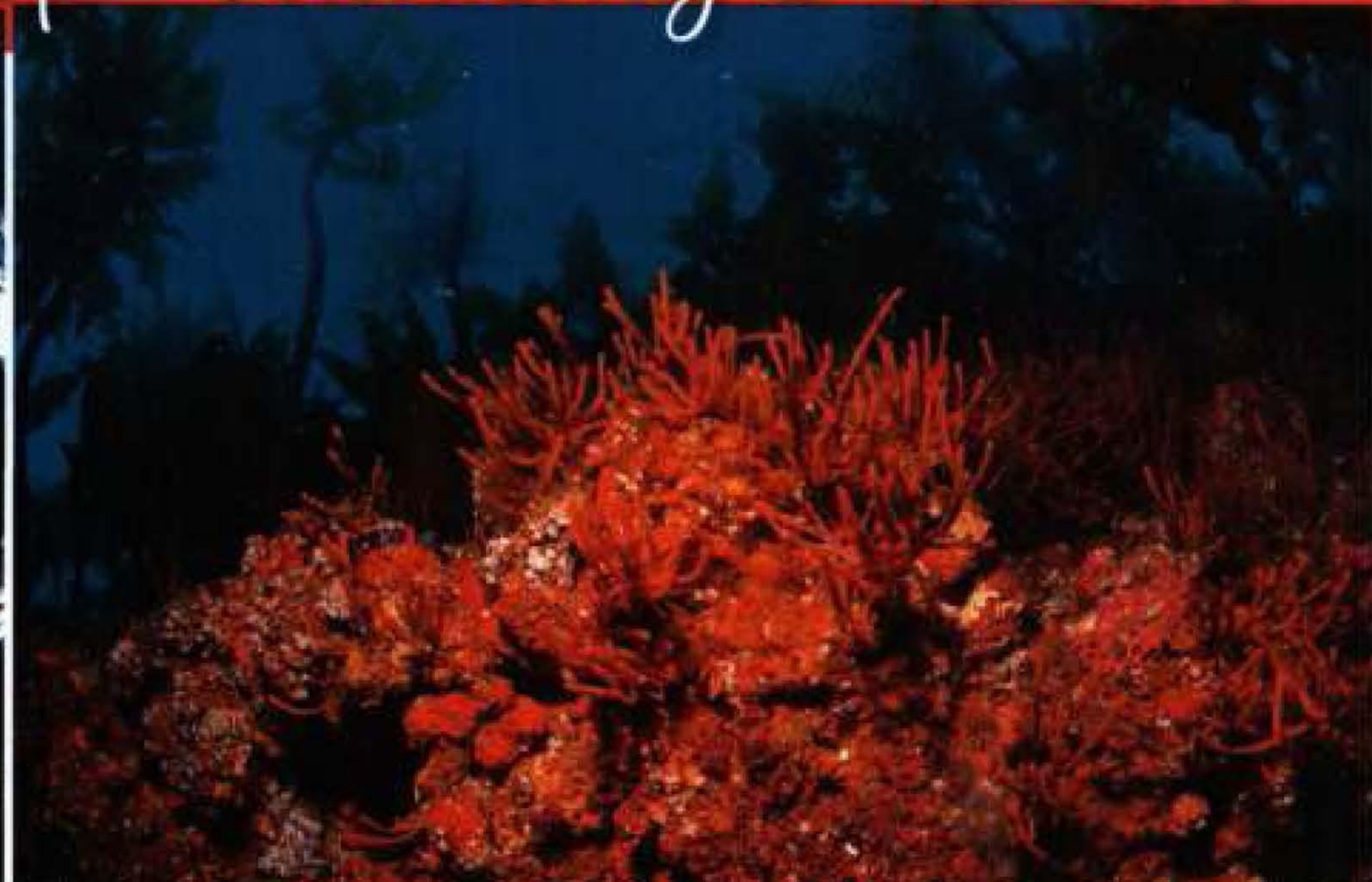


# Don't Stop Thinking About



*above: Abundant fish like this are now a thing of the past on the fished coast. Imagine this photo with 80% of the fish gone, including the big one, and that is how our fish stocks are being maintained.*

*above right: A healthy kelp forest helps maintain abundant diversity of life beneath its sheltering canopy. Lose the kelp, and you lose valuable habitat and biodiversity. A network of Marine Reserves is needed to restore and maintain biodiversity.*



# TOMORROW

By Roger Grace

In New Zealand we live in a land where no-one is far from the sea. For many of us summer fun equals a trip to the beach, time out on the water, or fishing (33% of the New Zealand population are recreational fishers). We are blessed with a beautiful coastline (15,000km of it) with much of it still in a close-to-natural state. Or so it seems from the surface.

Put on a mask and snorkel and look under the water and you will find a new world, so far removed from the hustle and bustle of everyday life that many of us have taken up snorkelling or scuba-diving as a healthy escape from the hassles of the world above.

But unless you are in a marine reserve, what you see is far from natural. Likely you will see a few small fish, wispy bits of seaweed, and large areas of kina or sea urchins. Few of us realize that what we see around our coasts is but a mere shadow of what it was once like, in the days before 'fishing' when the seas were teeming with large fish and dense forests of kelp.

If you go to a long-established marine reserve, like the first to be created (1975)

at Goat Island Bay near Leigh, you will get a glimpse of what it was once like all around our coasts. Lots of large fish, and healthy kelp forests. The contrast with the rest of the coast is staggering.

Why has it changed so much everywhere else? The answer, simply, is because of fishing. We have taken too many fish out of the sea and upset the natural balance. We need to think about tomorrow and leave more fish in the sea.

It is Government fisheries policy to fish our waters to achieve the maximum sustainable yield (MSY) from all our commercial fisheries, and there are something like 130 commercial species for most of which there is a specified Total Allowable Catch (TAC). This is the amount of fish that can be taken legally from each fishery each year. The Quota Management System (QMS) divides up the TAC into a Total Allowable Commercial Catch (TACC), and an allowance for recreational fishers, customary fishers, and for some species poaching.

Fisheries science tells us that to achieve the maximum yield from a fishery on a sustainable basis, for most species we need to remove 80% of the biomass from the fishery and maintain the stock at about 20% of the original population. The

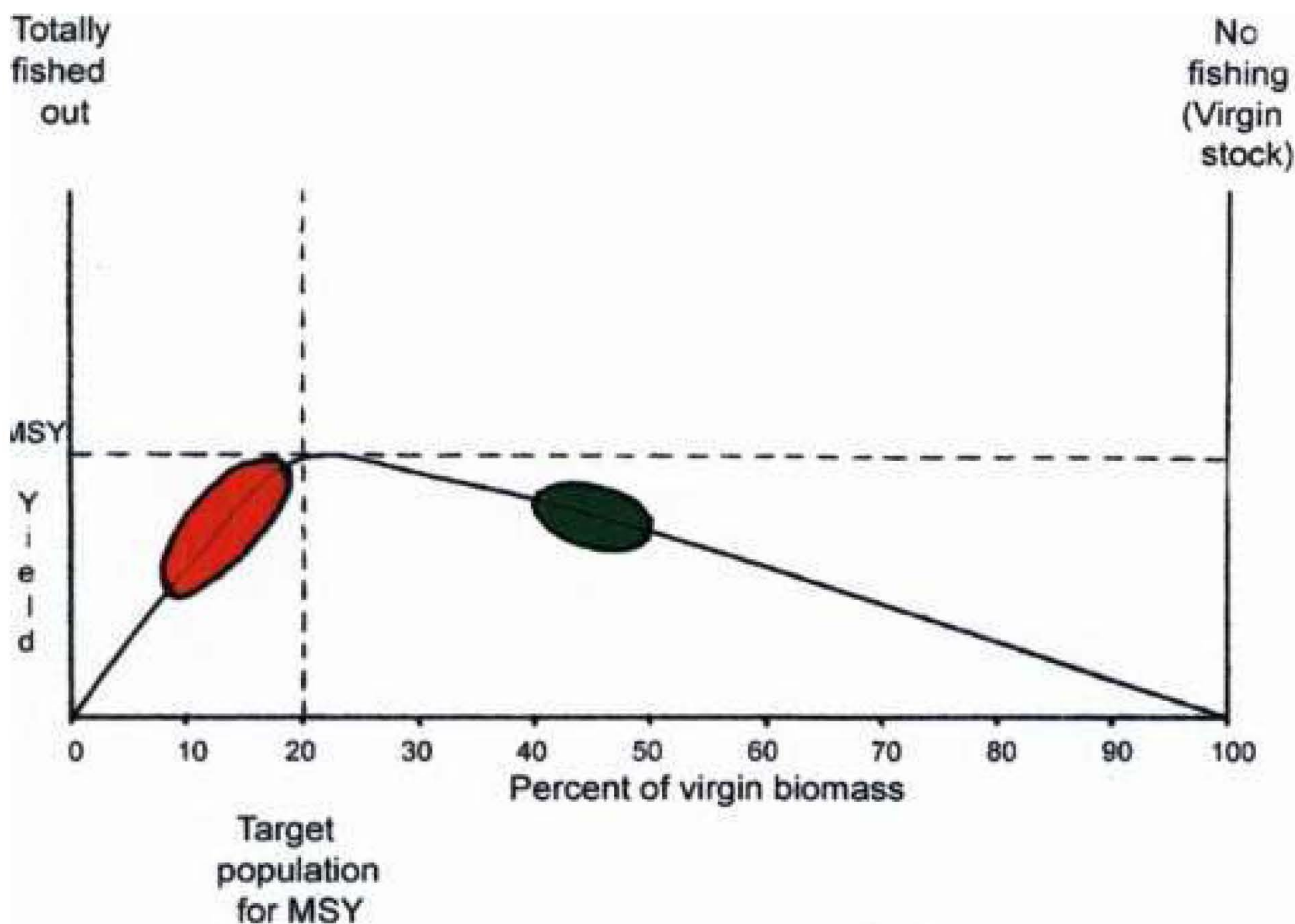
*Most of our shallow rocky reefs are reduced to kina barrens, the kelp having been lost because kina have become abundant as a direct result of too much fishing.*

remaining fish have much less competition for food and space, and grow faster than they would with the original population structure. You end up with most of the remaining harvestable fish just over the legal size limit, and putting on the maximum possible weight each year. Theoretically this annual weight gain is the excess which can be removed by fishing. Most of our fisheries research and management effort is aimed at achieving or maintaining the population at a level at which we can extract MSY.

All sounds very logical, and for single-species management it can be seen to have merit. This might be how you would manage a monoculture of species in a farming situation.

But the sea is not a single-species system. It is a complicated ecosystem with numerous links in a complex of food chains and food webs, many species





*The yield curve shows how most of our fisheries are managed. The target is MSY, but that requires extermination of 80% of the fish. Staying on 20% is costly and difficult, and many fisheries are overfished in the red zone. We should strive for a more modest yield, in the green zone, where there will be more and bigger fish, good safeguards for the fish and the ecology, and healthier seas.*

20 to 30%. But in the meantime at least 10% is a useful start.

In the longer term, clearly our fisheries management needs a big shake-up and a total re-think. It is no longer appropriate to remove 80% of the fish stocks everywhere, and try to maintain only 20% of the populations. There are too many side-effects as well as serious risks to the stocks themselves. The concept of trying to achieve MSY is seriously flawed. Something less will still provide adequate fish for everyone, will leave more fish in the sea, will have far less harmful effect on the rest of the ecology, and the stability and health of our waters and marine life will be restored.

Such a major change in Government fisheries policy will be hard to achieve, and it would need amendment to the Fisheries Act which requires our fish stocks to be maintained at or above a level compatible with achieving MSY. So in the meantime getting a good network of no-take marine reserves is needed, not only to protect the fish stocks, but most importantly to restore the natural biodiversity structure which has been so seriously disrupted by heavy fishing everywhere. Marine reserves are our best insurance against long-term damage to the marine environment by fishing.



interacting in so many ways we cannot begin to understand them all. And if you make an artificial change in one part, that has ramifications throughout the rest of the ecosystem.

Many of our popular edible fish species are predators, most near the top of the food chain. Any thinking schoolkid could tell you that if you take 80% of the population of a top predator out of the system, this will have serious effects further down the food chain. The food species of the predator, for example, is likely to multiply in numbers when predation pressure is reduced. This upsets the natural balance and the effect trickles down the food chain in what is termed a 'trophic cascade'.

The classic example in northern New Zealand is the relationship between snapper (and crayfish), kina, and kelp forests. Both snapper and crayfish are major predators of kina, and so many

snapper and crayfish have been taken out of the sea that kina numbers have skyrocketed. Their major food is seaweed, and hordes of kina have gobbled up large areas of kelp, leaving apparently bare rock covered in dense beds of kina.

In losing the kelp forest, we have also lost vast numbers of encrusting animals – sponges, bryozoans, seasquirts, hydroids to name a few – life which could live on the rock surface only because of the shelter and shade provided by the dense forest of kelp above. The loss to biodiversity, and the loss of fish habitat, has been huge. And it has occurred all around our northern and some southern coasts, wherever there is not a marine reserve!

The short-term remedy is to create an extensive network of marine reserves, representing all habitats, all around our coasts, totalling a sufficient amount to be effective, which will probably be around