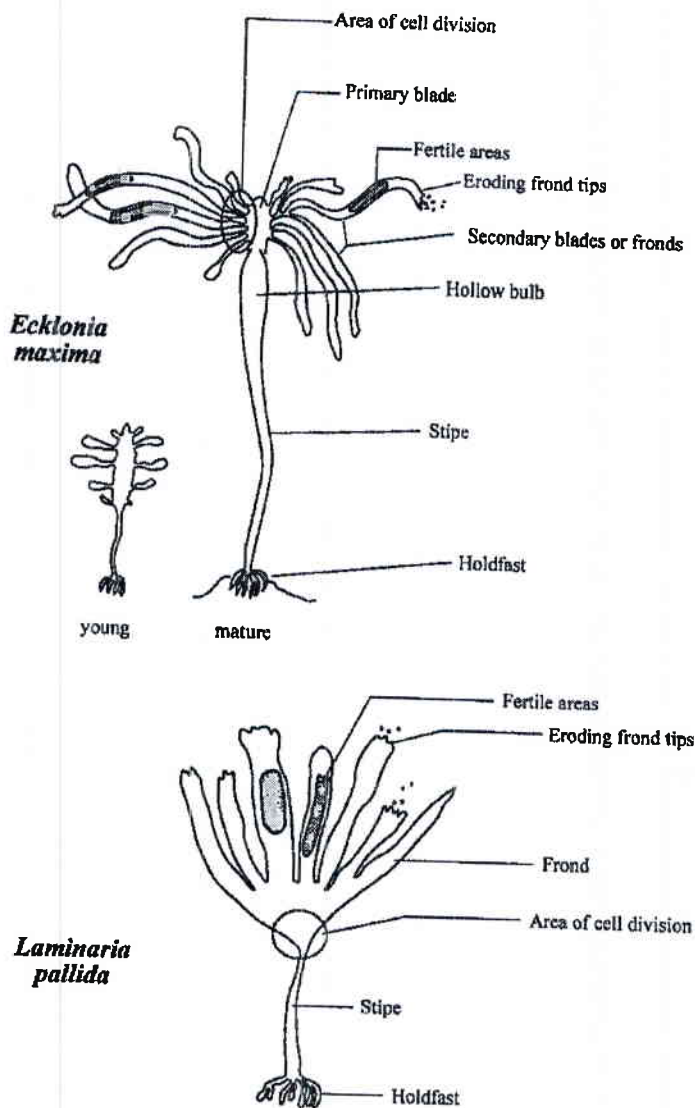


## APPENDIX 2: The Kelp Harvesting Manual

### What is kelp?

Kelp is the name given to certain large brown seaweeds. In South Africa, the two important kelps are *Ecklonia maxima* and *Laminaria pallida* (see diagrams). They grow on the coast, wherever there is suitable rock to attach to, in the cool waters between Cape Agulhas and northern Namibia.

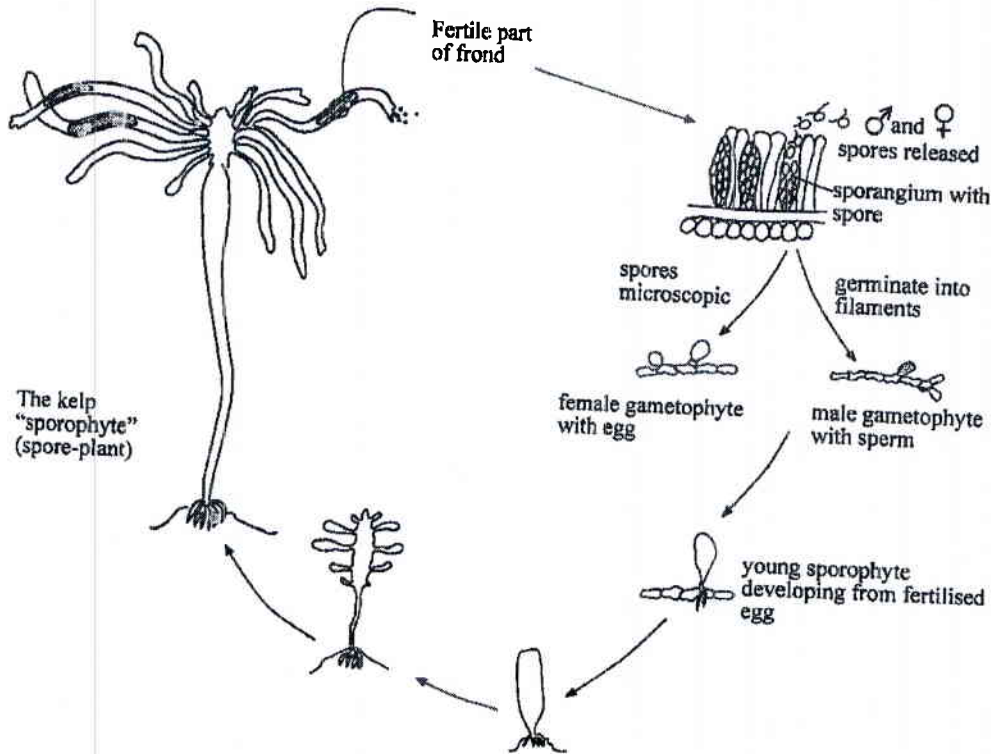
*Ecklonia* is the main kelp in the shallower water from Agulhas around Cape Columbine. Here *Laminaria* grows underneath the *Ecklonia* or in slightly deeper water, down to about 20 m depth. In the Northern Cape, *Laminaria* develops a hollow stipe (stalk) and becomes much more abundant in shallow water, although *Ecklonia* may still be locally common.



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## The kelp life-history

The big kelp plants we see are one stage in a complicated life-history (see Figure 2). We have illustrated the kelp life-history because it makes it easier to understand some of the discussion on the effects of different harvesting methods.



**Figure 2**

Figure 2 shows the stages in a kelp life history. The big kelp (sporophyte or spore-producing stage) releases microscopic spores from fertile areas on the fronds, which are visible as lighter-coloured, slightly raised patches. These spores swim in the water, and soon land on the rock where they attach and germinate. The spores are either male or female, and they grow into separate male or female plants called gametophytes (gamete, or egg and sperm-producing plants). These gametophytes are like tiny tufts of filaments, and they become fertile and produce either eggs or sperm. Once an egg is fertilised, it grows into a tiny sporophyte. The sporophytes start off as small flat blades, then they develop secondary blades or fronds, and later a long stipe that becomes hollow at the top. Above the bulb is the original primary blade, which now often has a spear-shape. The secondary blades (or fronds) grow from the sides of the primary frond. It takes a kelp sporophyte about 2 years to grow to the surface.

*M.*

## Kelp in the ecosystem

Kelp is by far the most abundant seaweed on our west coast shores, but there are also almost 400 other seaweed species and hundreds of species of animals that live in or around the kelp beds and many of these depend on the kelp in some way.

The kelp is eaten directly by many animals (herbivores) such as abalone, sea urchins, snails (e.g. alikreukel), limpets and chitons. A lot of particulate matter enters the water from the constantly eroding tips of the kelp fronds, and this material is an important food for filter-feeders like mussels, sponges and red-bait. Some of these, like mussels, are an important food for rock-lobsters and some fish. Besides providing food to various animals, the kelp beds are a vital habitat for hundreds of species of plants and animals, providing shade, some shelter from wave-action, and homes among the fronds and large, root-like holdfasts.

It is therefore very important that we harvest kelp sustainably – that is, so that we do not damage the kelp beds or reduce our harvests in future.

## Kelp Harvesting

Kelp can be harvested in various ways, depending on what part of the plant is required. The effect on the kelp plant and on the environment depends on how the plant is cut. The main distinction to be made is whether or not the plant is killed by harvesting. If it is killed we call it "whole-plant harvesting", but if only some of the frond material is cut, and the plant is left alive, we call it "frond-only harvesting". The following diagrams explain these two options.

## Whole-plant harvesting

This refers to any type of harvesting that kills the whole kelp plant, such as cutting the stipe near its base (when stipe material is needed), or cutting the whole kelp head, from a boat (when fronds are needed for abalone feed). The holdfast, and the bit of stipe left on it, eventually rot off the rock.

The mature kelps harvested in this way are then replaced by the smaller plants that are usually growing among them, and which take about 2 years to grow to the surface. It is therefore important for the harvester not to damage or cut the small plants (those with stipes of less than 0.5 – 1 m in length), because they will form the next generation of adult plants. Of course new, small sporophytes are continuously being produced from the microscopic gametophytes, but these will take a lot longer to reach the surface.

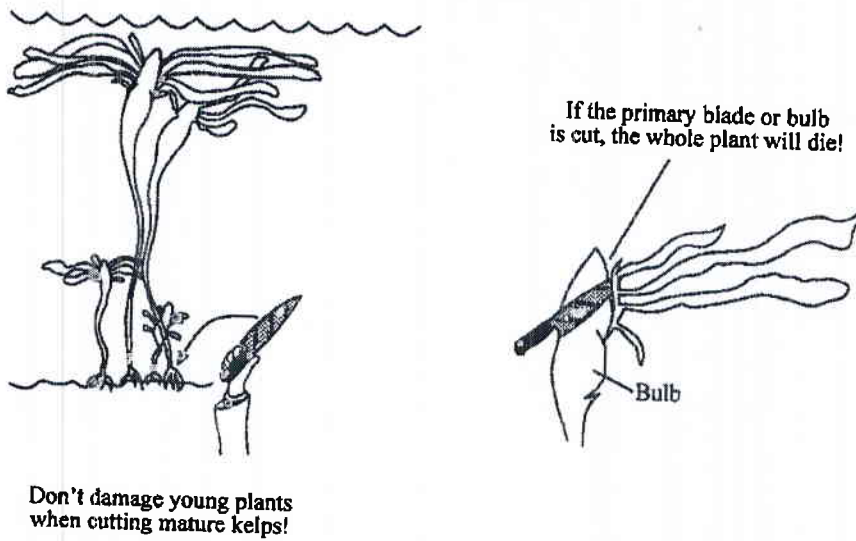
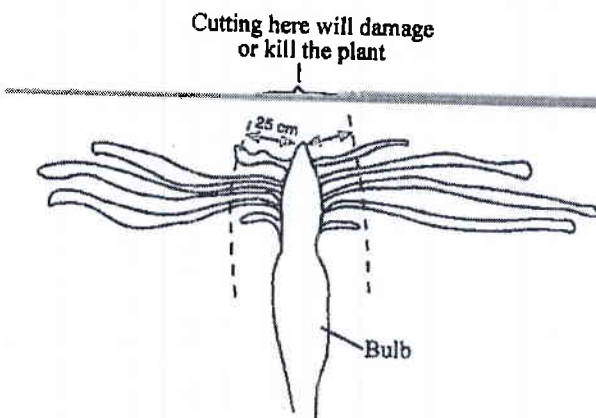


Figure 3

### Harvesting of only fronds

The fronds of kelps grow like belts: the main growth region is near the base of each strap-like frond, and older fronds are continually eroding at their tips. Therefore, by cutting the fronds at least 25 cm from their base, you can obtain most of the frond material without killing the plant. The strap-like fronds continue to grow, and you can come back 6 months later and re-harvest the same plant. In this way you will get much more frond material from a given area of kelp bed, over time. If you kill a kelp plant, it takes at least 2 years for another kelp plant to replace it.

To harvest only frond material (e.g. for abalone feed), a sharp knife or sickle is used, and in the case of *Ecklonia*, the fronds must be cut about 25 centimetres from where they join the primary blade. As long as you do not damage the growing zone at the base of the frond, or the primary blade, bulb or stipe you will not kill the kelp plant. The 25cm-long stumps of the fronds will then continue to grow, and can be cut again 4-6 months later.



**Important:** If the fronds are cut too short, or the primary blade is damaged in any way (or if the bulb or stipe is damaged or cut) the plant will die, and a new kelp plant will have to grow up to replace it!

The harvesting of *Laminaria* fronds is similar, but here 30cm must be left above the point where the frond joins the top of the stipe.

For some kelp concession areas, **ONLY** Frond-Cutting is allowed (see permit

conditions). In others, the harvester may use any method that is practical or convenient, given the sea conditions or end-uses of the kelp. However, in all cases where only fronds are required, we strongly recommend that kelp plants are not killed. This will allow you to get more kelp from easily accessible areas and will minimise the ecological effects of harvesting.

**Table 1: Comparison between whole - plant cutting with frond - only cutting.**

<b>Cutting whole kelp plants</b>	<b>Cutting only fronds (plant left alive)</b>
All fronds and stipe obtained	About 70% of frond mass obtained
Kelp plants are killed (each plant has to be replaced by a new plant).	Kelp is "trimmed" not killed
Kelp bed takes 2 years to recover.	Fronds re-grow within 6 months
Done by diver or from a boat	No diver needed – done from boat.
Yields of fronds lower (per unit area) in the long term	Yields of frond material higher (per unit area) in the long term

For more information, please contact the Seaweed Unit at 061 4669632.



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