EARTH AND MARINE SCIENCE

LUANA, ANA BEATRIZ, LEONIE AND ANNA

Topics we have covered

- Undaria & alginate
- Creek salinity
- Abel Tasman
- Boulder Bank
- Oyster Island
- Cable Bay
- Monaco
- Scallop growth graph
- Tiny beach adventure
- Plankton

Nelson Boulder Bank

GEOGRAPHY (what is it):

The Nelson Boulder Bank, visible off the Nelson coast in this south-facing view, stretches 13 kilometres into Tasman Bay in the northern South Island. It is composed of pebbles and boulders up to 1.2 metres in diameter that have originated from Mackay Bluff at the northern end. During northerly storms the boulders are moved south-west along the bank. Radiocarbon dating shows that the bank has developed in the 6,000 years since the sea rose to its present level.

Maori History:

Local traditions say Kupe was at Chetwode Island in Cook Strait, catching fish and birds and preserving them for the journey home to Hawaiki. Two of his crew, Pani and Kereopa, left the expedition and remained with the tangata whenua. They made small canoes and departed westwards from Chetwode Island towards D'Urville Island, but kidnapped Kupe's daughter as a hostage.

Kupe became angry and gave pursuit; his canoe *Matahourua* soon gained on the absconders, who threw the girl into the maelstrom of French Pass. Kupe was forced to delay the chase to rescue his daughter. By the time the *Matahourua* could again close on Pani and Kereopa, they were well south into Tasman Bay. As the *Matahourua* neared, Pani and Kereopa separated, Pani fleeing north back towards D'Urville Island.

Kupe kept after Kereopa, who chose to hug the coast. Passing Wakapuaka, Kereopa began to utter prayers which caused the rocks at Mackay's Bluff to shift. Kupe's warriors could not get around the bank of boulders, which was named Te Taero-a-Kereopa. The bank grew almost to the sands of Tahunanui, and formed the harbour (Nelson Haven). Kereopa was able to get ashore and flee south to safety.

Kupe then set off after Pani, who passed around the northern side of D'Urville Island and attempted to cross the turbulent passage between it and Stephens Island. Pani's canoe was overwhelmed in the rips and currents now known as Hell's Gate. The petrified canoe remains as a reef in the passage, and two of Pani's daughters are the sentinels as the curious split rock formation. Pani is still paying for his audacity – his spirit is trapped in a cave (Te Ana a Pani) and can be heard wailing as tides and storms surge around his eternal prison.

Descendants of Kereopa are found in Ngāti Kuia and Ngāi Tahu. Their prowess as tohunga karakia (experts with powers through prayer) has been acknowledged. Even Te Rauparaha was in awe of Houa, a priest of Ngāti Kuia, and recruited him to assist his attack on Ngāi Tahu's Kaiapoi pā in 1831.

Europe History

When the European settlers first landed in the north of the South Island, the Boulder Bank was hiding a secret place the indigenous Maori did not want discovered.

Nelson is tucked away from Tasman Bay behind a long finger of coarse gravel and rounded boulders known as The Boulder Bank. This unusual natural reef, or spit, is about 13 kilometers long and behind it, a sheltered harbour. Without the Boulder Bank the port city of Nelson may never have developed in its present location. When English property developer Captain Arthur Wakefield arrived in Tasman Bay in early October 1841 he was looking for somewhere to develop a settlement to be called Nelson. The Motueka Maoris told the men that they would not find a better place for settlement than the land behind the beach called Kaiteriteri near where they were already anchored.

The Wakefield party was not satisfied with the Kaiteriteri area and on the 19th October a group of five set sail across the bay in a small sailing lugger. As a guide they took with them a young Maori man named Pito, who unbeknown to the explorers had been instructed by his chief not to allow these strangers to discover their secret place across the bay.

After a cold, two-day sail and despite protests from Pito that the area was not worthwhile, the men decided to run the lugger through surf and onto the Boulder Banks rocky beach. Two of the men, walked to the top of the bank and to their surprise saw a large estuary with what appeared to be a sheltered harbour at one end.

Pito was, understandably, unhappy and refused to show the explorers the estuary's entrance until he was assured that his Chief would not be told of his failure.

To the Maori of Motueka, the estuarine mud flats behind the Boulder Bank and the deep waters nearby were a valuable source of snapper and other kai moana (seafood). They did not want these pale skinned strangers sharing this bountiful food source.

However, immigration was unstoppable and the harbour proved excellent, although the entrance was difficult at times for sailing ships to negotiate. In the hills and valleys behind this natural harbour, the city of Nelson was born and thrived.

The arrival of European settlers changed Maori forever. The Maori were overwhelmed by the sheer number of settlers who arrived and settled around Tasman Bay. Some Maori moved away and others stayed to make a good living by growing vegetables, sweet potatoes (kumera) and raising pigs to sell to settlers in Nelson and in the new city of Wellington, across Cook Strait.

The Boulder Bank is built from rock that falls into the sea from cliffs along the coast a few kilometres to the north east. These rocks get rounded by rolling along the sea bed, pushed by current and wave action. As the current slows they get dropped in a row that stretches in a 13 kilometre long finger extending south from the cliffs, forming a geologically rare boulder bank.

Rocks are still slowly rolling south along the seabed at about 7.5 meters a year and over the past 6000 years enough rocks accumulated in an irregular row to form the Boulder Bank. Today this Boulder Bank shelters Port Nelson.

The problematic harbour entrance was apparent right from the start so in 1903 the Nelson Harbour Board had a 61 meter wide channel cut through the south end of the Boulder Bank to give ships easier passage into the port. The "cut", as it is known, was later widened to 150 meters and requires regular dredging to keep it from gradually closing in.

After a couple of earlier lights, a kit set cast iron lighthouse was imported from England in 1861 and erected on the Boulder bank. It was first lit on the 4th of August 1862 and remained in use until the 4th of August 1982 when it was replaced with a new light on the mainland.

The cut in the Boulder Bank left its southern tip as Haulashore Island and today the island is a pleasant place for picnics, fishing and swimming. It is possible to walk along the Boulder Bank starting near the cliffs at the Glen but a small ferry boat provides rides across the harbour to the lighthouse and Haulashore Island. The boat ride is considerably easier than the long walk along the uneven surface of the Boulder bank to the old lighthouse and the only way to get onto the island.

Other interesting Stuffs:

The stone is formed under the ground

- He has big crystals
- He came to the surface a collision of the earthquakes

- A stone with small crystals:
- Originated by a volcanic eruption
- Because the rapid cooling of the surface- small crystals form

Planktons

Here is how we catch the we things

Insert at least 3 pictures of different types of plankton that you took looking down the microscope

Try and find out what the plankton is: Phyto or zoo ? Its name?

1

1-baby sea urchin

2- copepod

2

1- Copepod

2- baby crab or baby barnacle

3- plant

3

Baby worm

Oyster Island

Include the following: (four parts to your report)

To help with this my website has lots of pictures and information from previous years…

- (1) **Describe** what oyster Island was like **before the pines were removed** (include an image)
- *Now look at: Oyster Island NCC plan …. the Oyster Island info is from p30)*
- (2) **Explain why** the pines (Americans) were removed
- (3) Now **describe the changes** *(at least 8 photos and a few sentences)* that we have seen since the pines were removed in 2007
  (using data and photos) include why the tree lucerne (Europeans) has been allowed to grow ….
  Lucerne is a legume, find out what that means and why it is important
- (4) also read up on argillite click here it will help you add a bit about the early **Maori occupation** of the island…. our
  evidence for this?

1- Oyster Island before the pine trees were removed

Before the pine trees were cut out, the island was covered with them, no much grass and no much of other natives trees

2- The pine trees were removed

because they use a lot of water, and they want to grow natives plants and trees.

3- Changes

2009

2010

2011

2012

2013

2016

2017 2018

A lot of native plants grow up, and the Lucerne (European plants) were allowed to stay because they make shade on the ground and this keeps the soil moist, they improve the nutrients in the ground so they are good.

Lucerne is today the most **important** fodder crop grown under irrigation in the Karoo and because of the high yields obtained, its palatability and high feeding value, is known as the King of fodder crops.

4- the evidence that we have are the rocks (argillite) that are on the island because they came from far away and the only why that this could happened it's if someone bring them to here.

Argillite is particularly associated with the Nelson-Marlborough region in New Zealand. It is found on Rangitoto (D'Urville Island), along the Whangamoa mineral belt, and in the upper reaches of the Maitai, Wairoa and Motueka Rivers.

Earliest Maori communities recognised its superior qualities of hardness, strength, and ability to hold a sharpened edge, ideal for making tools (especially adzes) and weapons. Another property – conchoidal fracture (like that of obsidian – volcanic glass) provided a source of razor-sharp flakes for filleting fish, preparing roots and vegetables, woodcarving, flax work and net-making.

Maitai Quarry - Argillite [Bruce Campbell, 2007]

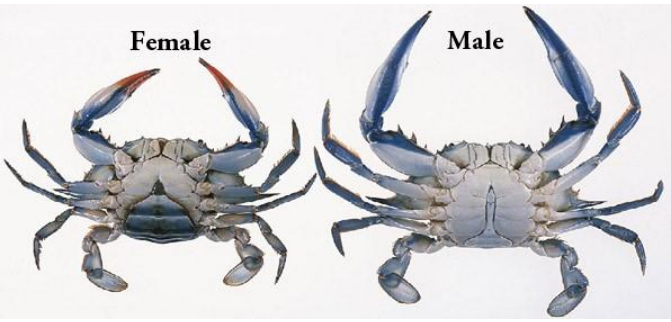
Maori obtained pakohe by quarrying it from lenses in the mountains or by finding boulders which had survived millennia of pounding in mountain streams. Quarries with extensive areas of discarded argillite pieces which have been won from outcrops, but are unworked or only partly worked, can still be seen.

Tiny beach adventure

Find an image of pingao. How is the pingao / marram story like the pine / NZ native plants story. Who cares about pingao?

We care about Pingao because they were used by the Maori people so we like to keep them as a cultural plant.

How do you tell the sex of a crab… find images to support your answer. How do crabs reproduce?



We can tell the sex of a crab by looking the shape of their "apron". If it has a shape like a circle it's female, if it's like a triangle it's male.

When a male and female crab mate, many female decapod crabs can store the male sperm until her eggs are ready to be released. When the eggs are released, the stored sperm flows over them and they become fertilized.

The female crab holds the fertilized eggs in a big spongy mass between its abdominal flap and the body. The eggs are cemented to the pleopods, which are small legs, creating the "berried" appearance.

To keep the eggs healthy, the female crab continually "waves" water over the eggs with the pleopods.

When the eggs hatch into **zoea larvae,** they drift away in the ocean currents as plankton. As the juvenile crab grows in size, it goes through a series of molts, each larval stage changing form and function as it grows in a process called metamorphosis.

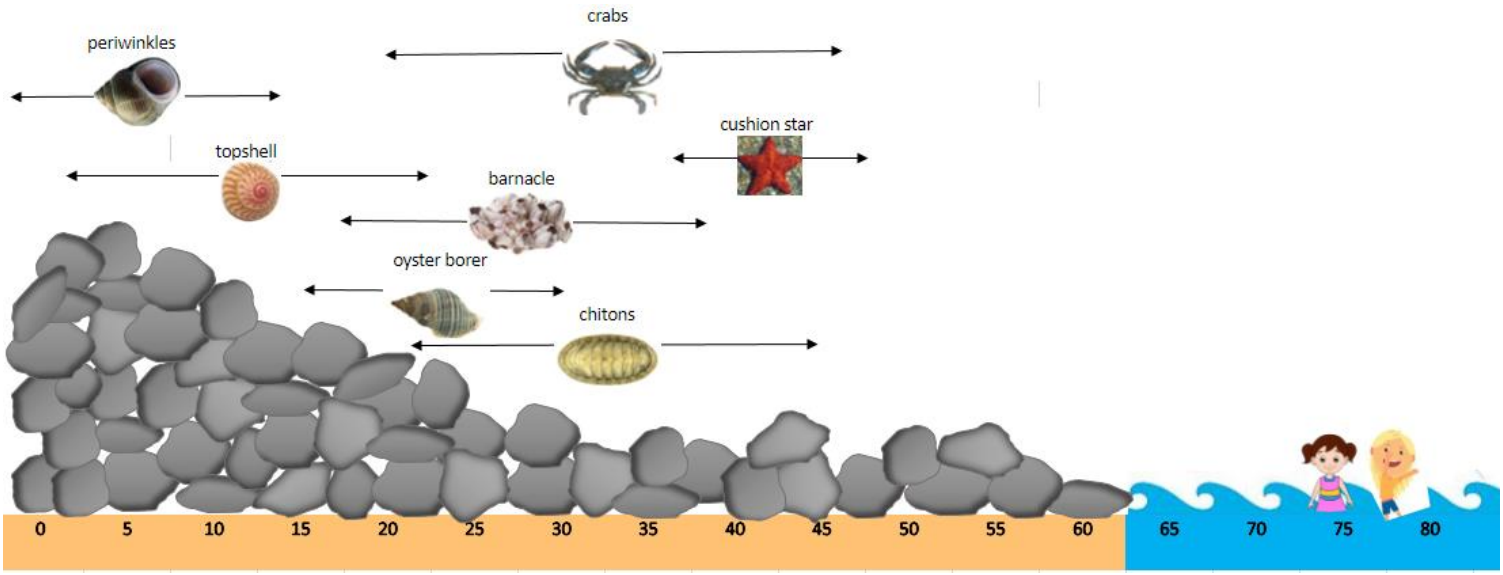
Find an image of a pacific oyster, how did it get here? How are we now making money from it. How do oysters reproduce?

They come here with the big ships, and we make money selling them.

Oysters use external fertilization. External fertilization means that the female oyster releases eggs, and the male oyster releases sperm, and they fuse in the water. The first oyster to begin this process releases pheromones into the water as a signal to other oysters in the area that it is time to reproduce.

Sheels graph - Scallop growth

Cable bay graph



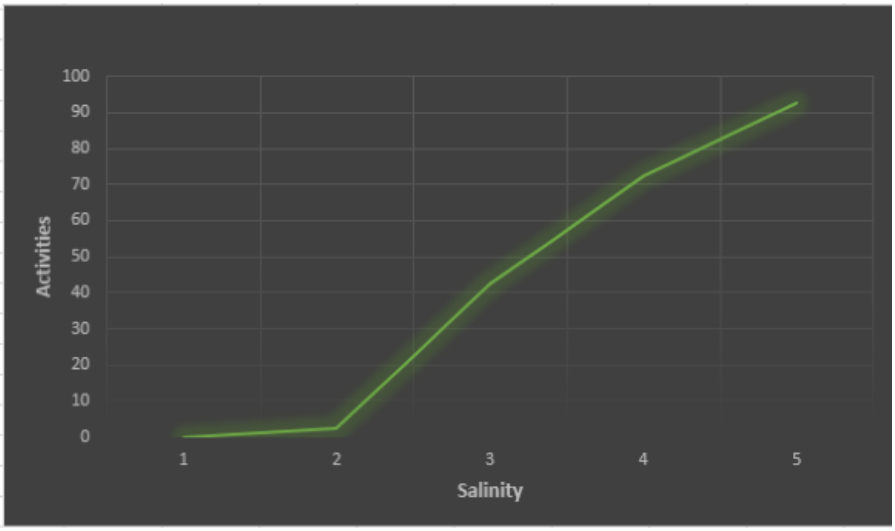
Periwinkles

Describe the **expt** we carried out to see what conditions (salinity) they need to come out and feed (**include a graph**.... the data is in the pic of the board above)

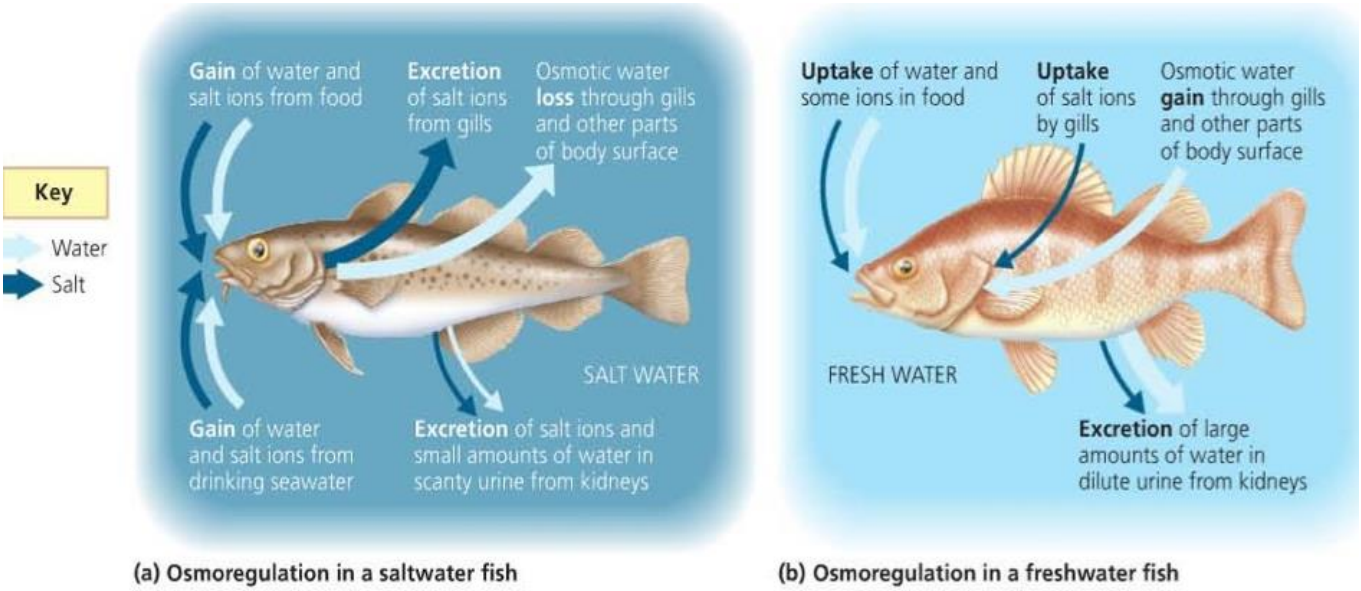
explain their feeding behaviour... what sort of water do they avoid, why?

They avoid the rain water (fresh water), because when they get in contact with this type of water, they will fill with the water and then die. (osmosis) The water molecules will go from the place with high concentration to the low concentration.

sal	0	25	50	75	100
1	0	0	2	8	10
2	0	1	4	5	7
3	0	0	5	7	10
4	0	0	6	9	10
average	0	2.5	42.5	72.5	92.5

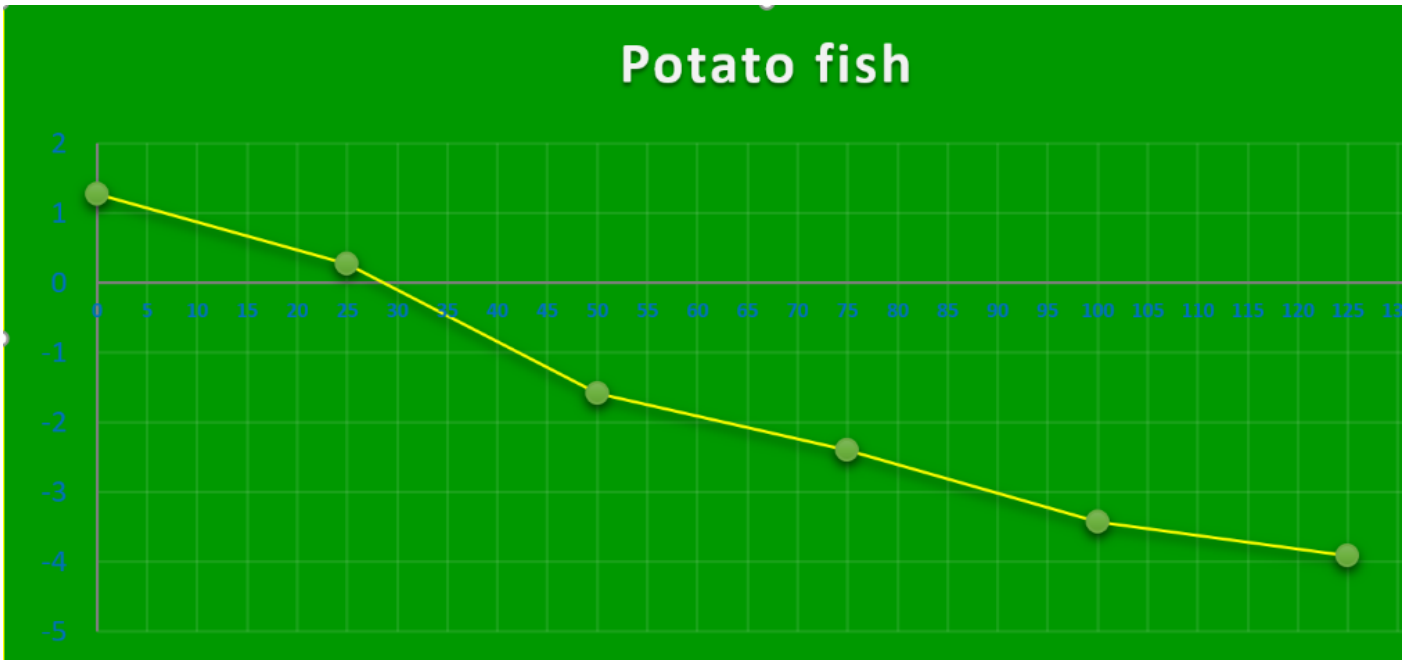


Potato fish graph



(a) Osmoregulation in a saltwater fish

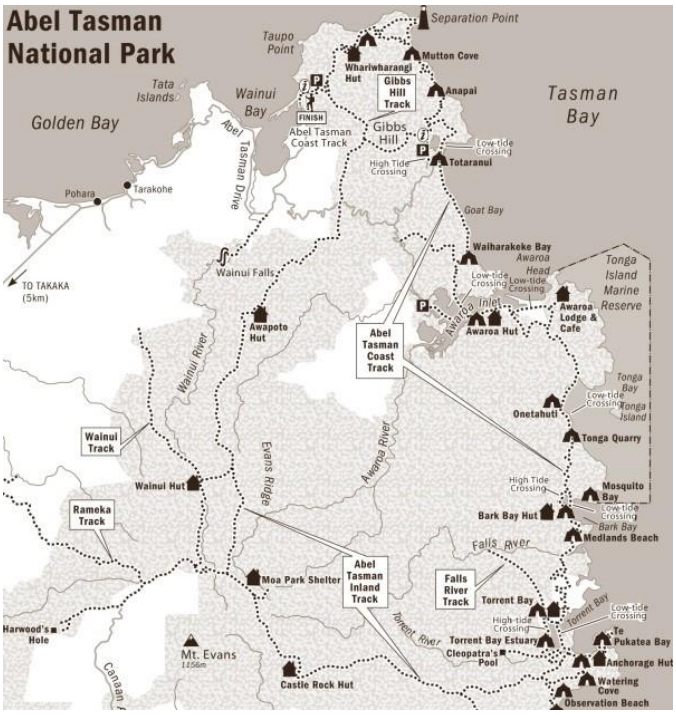
(b) Osmoregulation in a freshwater fish



Able Tasman trip

- **The area we are investigating?** ***(include a map maybe)***

Abel Tasman National Park



What was the area like before people arrived?

A lot of trees and more marine life, like fish.

What have people done that has caused damage?

When the Maori people arrived here they burned half of all the vegetation that we used to have, and a few years later the European burn the other half, so now we have only 28% of native plants. And they used to fish a lot so some species of fish and marine life start disappearing

What is happening now to fix the problems?

The area with native plants it's being protected , so you are not allowed to cut trees or do anything that could cause damage to the plants. And in the marine reserve area you are not allowed to fish too.

- **What evidence can we see *(or hear)* that 'the fix' is working?**

Plus

Some of the things we saw:

- **Spotted shags**

- **Kahawai feeding**

- **Pipis (filter feeders in Frenchman's inlet)**

- 

- Seals and pups
- Dead pine trees
- Old native forest trees (up in Falls River)
- Eagle rays

Undaria and Alginate

- ### what is it

Undaria pinnatifida or wakame is a large brown kelp with a branched holdfast giving rise to a stipe. Just above the holdfast, the stipe has very wavy edges, giving it a corrugated appearance. The stipe gives rise to a blade that is broad, flattened and lanceolate. It has a distinct midrib. The margins of the blade are wavy. Plants can reach an overall length of one to three metres. *Undaria pinnatifida* is an annual species with two separate life stages.

- ### how/when did it get to NZ

Undaria pinnatifida, a brown seaweed, was first found in Wellington Harbour in 1987. It has since spread to Stewart Island and along the east coasts of the South and North islands. It grows rapidly and excludes many native coastal species such as pink kelp, which the native abalone, pāua, depends on. It is native to the north-west Pacific, where it is a food. Also known as Japanese or Asian kelp, it has been described as the gorse of the sea.