

90704R



Level 3 Geography, 2012

90704 Select and apply skills and ideas in a geographic context

9.30 am Friday 23 November 2012
Credits: Four

RESOURCE BOOKLET

Refer to this booklet to answer the questions for Geography 90704.

Check that this booklet has pages 2–11 in the correct order and that none of these pages is blank.

YOU MAY KEEP THIS BOOKLET AT THE END OF THE EXAMINATION.

Resource A: Aquaculture in New Zealand

Aquaculture is the raising of plants or animals in water. It can occur in coastal waters, rivers, lakes, and even on land, in constructed pools or tanks. Marine farming is a type of aquaculture. The main areas for aquaculture in New Zealand are shown in the shaded parts of the map below.



Resource B: Statistics Relating to Aquaculture in New Zealand (2006)

2006 Aquaculture Industry Farm Statistics

TOP THREE SPECIES

SPECIES	NUMBER OF FARMS	TOTAL HA OF MARINE SPACE	TONNES HARVESTED
GREENSHELL™ MUSSELS	645	4 747	97 000
PACIFIC OYSTERS	230	750	2 800
KING SALMON	23	60	7 721

Source: New Zealand Aquaculture Council Annual Report 2006–2007

SALES FIGURE COMPARISON

ALL FIGURES IN NZ \$ MILLION	1986			2006		
	EXPORT	DOMESTIC	TOTAL	EXPORT	DOMESTIC	TOTAL
GREENSHELL™ MUSSELS	12	16	28	181	43	224
KING SALMON	3	6	9	42	59	101
PACIFIC OYSTERS	5	6	11	18	14	32

Source: New Zealand Aquaculture Council Annual Report 2006–2007

Notes:

Domestic sales are industry estimates, ex-factory gate. Export sales are FOB, ex-Department of Statistics.

Resource C: The Importance of Aquaculture

The gap between the supply of seafood from wild fisheries and growing consumer demand is widening. This is due to several factors: the finite natural production, growing affluence and purchase power in countries with traditional high levels of seafood consumption, and increasing consumption in North America and Europe.

Aquaculture offers potential to fill this gap and is the fastest growing food production sector in the world. One of the main reasons for this is that the world wild fish catch has levelled off, or is declining. The most recent global assessment of wild marine fish stocks of the *Food and Agriculture Organisation of the United Nations* (FAO) found that out of the nearly 600 species it monitors, over 75 per cent were being fished to capacity or were over-harvested. With some fish becoming harder to find or more expensive to catch, it is sometimes cheaper and easier to farm some species instead. Over a third of all seafood eaten in the world today has been raised on farms. In New Zealand, all the fresh mussels, salmon, and Pacific oysters we eat, are grown on farms here. Most reach a harvestable size in about half the time it takes in the wild.

At the same time, demand has increased for wholesome, premium quality seafood that has been produced in a socially acceptable and environmentally sustainable manner. All the major seafood markets, especially the US and Europe, are demanding traceability, environmental certification, and quality guarantees.

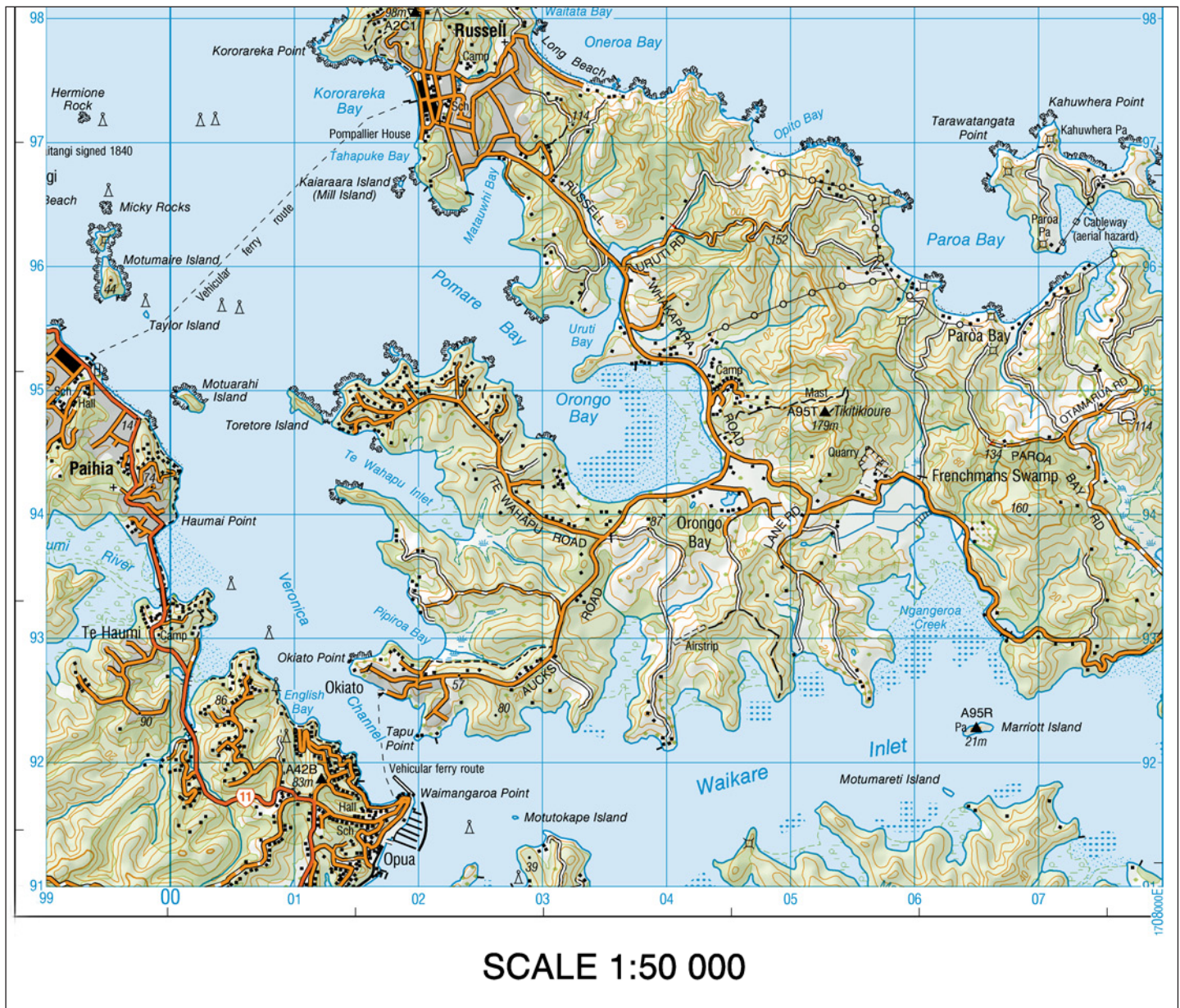
There are now excellent opportunities for premium aquaculture products sourced from locations, such as New Zealand, which can meet these environmental and quality certification standards.

Many people predict that aquaculture development in the 21st century will be similar to how farming on land grew in the 20th century. Some of the reasons people believe aquaculture has potential for growth in New Zealand are that we have over 15 000 kilometres of coastline, enough cool waters to raise a wide range of species, and a clean environment.

Annual Fish Consumption in Kilograms Per Person for Selected Countries in Oceania		
Country	1979–1981	2005–2007
Australia	15.7	24.7
Fiji	36.9	36.6
French Polynesia	43.1	48.3
Kirabati	70.4	75.5
New Caledonia	23.4	21.3
New Zealand	15.7	26.7
Samoa	54.7	47.8
Solomon Islands	56.9	31.0

Resource D: Location Map of Bay of Islands, New Zealand**Resource E: Northland Oyster Farm**

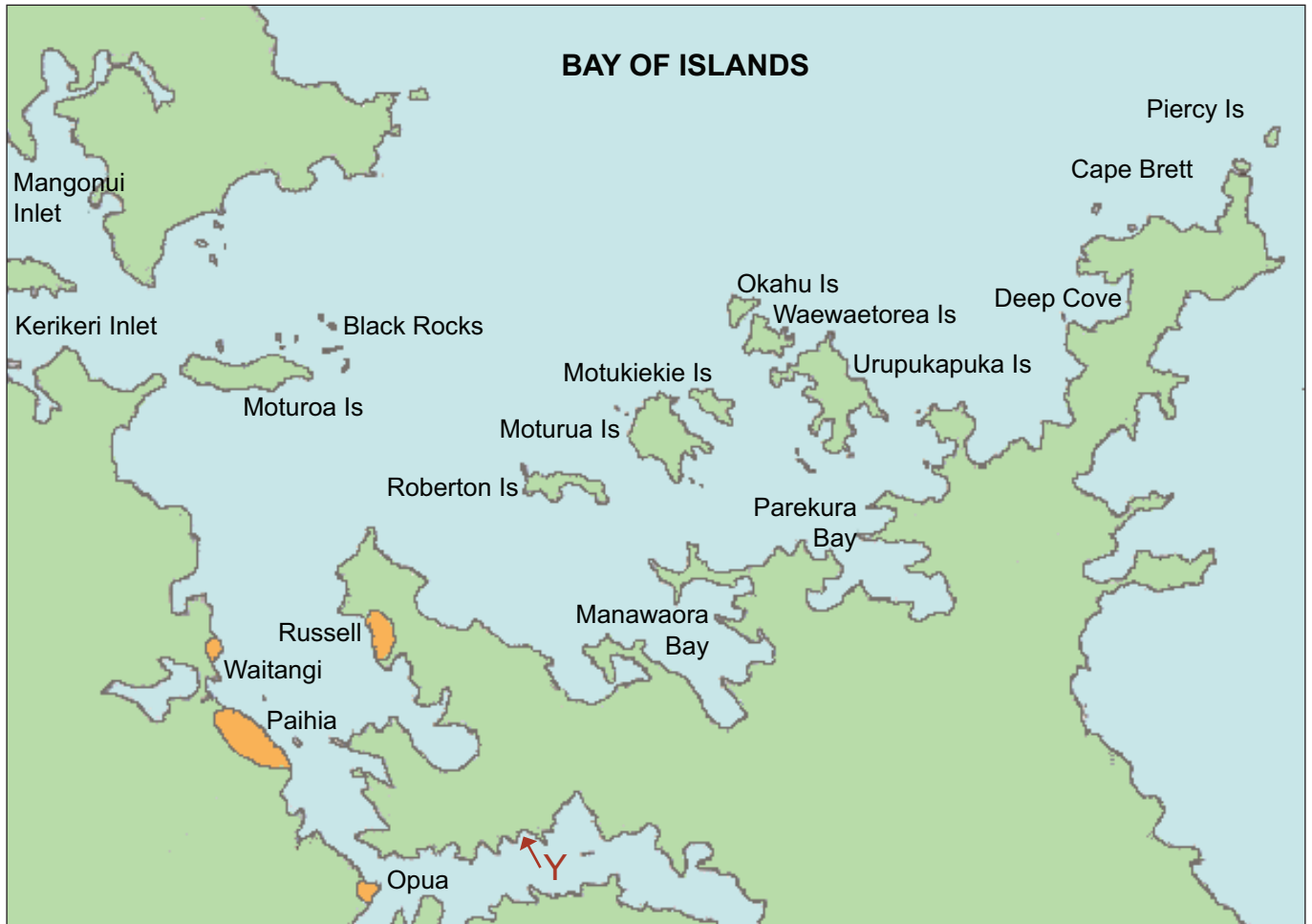
Resource F: Topographical Map



Resource G: Northland Oyster Farm Beds at High Tide and Low Tide



Resource H: Map of the Bay of Islands



Resource I: Okiato–Opuia Car Ferry




Resource J: Potential for Development in Northland for Aquaculture



Location	Available Area (hectares)	Suitable Type
Kaipara Harbour (Northland Region)	400	Oysters
Te Puna Inlet	25	Oysters
North Parengarenga	100	Oysters
Hokianga Harbour	200	Oysters
Whangapae Harbour	20	Oysters
Herekino Harbour	20	Oysters
Mid Hokianga Harbour	20	Finfish
Henry Island	10	Finfish
Te Ngairi	40	Finfish
Kaipara Harbour (Northland Region)	80	Finfish
Stephenson Island	60	Finfish

Resource K: Northland's Aquaculture Industry Compared with Other Primary Industries (2007)

The contribution to Northland's economy of existing primary and associated industries is estimated to be:

	GDP (\$ / Year)	Full Time Equivalent Jobs (FTEs)	
Forestry and wood processing	274 M	2 460	
Horticulture	80 M	1 650	
Fishing (non-aquaculture)	14 M	190	
Aquaculture	19 M	336	
Agriculture (including manufacturing)	310 M	5 900	

Resource L: The Northland Region

Northland is a long narrow peninsula, less than 100 km across at its widest point. No part of the region is more than 40 km from the sea. The coastline is 3 200 km long and has an extensive number of harbours, estuaries, and bays, which vary in size and character.

Most of the people who live in Northland (approximately 156 000 at the last census) are generally concentrated along the region's east coast. The population is growing as a result of a steady stream of new residents drawn by the area's scenic beauty and climate. The increase is also partially attributable to the return of Māori to their ancestral lands, together with trends of retirement to coastal areas, and growth in tourism. Northland is only a few hours' drive from Auckland, New Zealand's largest city. The coast provides a playground for increasing numbers of holidaymakers. Northland enjoys 1.7 million visitor nights annually and there are more than 1 300 tourism operators in Northland. Most visitors come in the summer, to enjoy the attractions of the coastline.



The region's large Māori population has traditionally depended on the sea for kaimoana (food), viewing fisheries and coastal resources as taonga (treasures), and the "food basket" of the people. Increasing numbers of Northland residents have also turned to the coastline as a food source during difficult economic times. In addition, commercial marine farming, principally oyster farming, and the harvesting of crayfish are significant sources of revenue for the region.

The challenge for managing Northland's coast is to balance the demands of settlement and tourism, along with associated development and industry, with the preservation of natural values and the sea's importance as a food resource.

Tourism is Northland's second-biggest income earner. It employs one in nine Northlanders and brings more than \$540 million into the region each year. One of the main attractions for tourists is the coast's natural beauty and associated recreational opportunities.

Aquaculture is a relatively small industry in Northland, but it has significant growth potential. The industry is currently based around the 700 ha of oyster farms, located mainly in the Bay of Islands, Hokianga, Houhora, Kaipara, and Whangaroa harbours. It's estimated that the industry directly contributes about \$19 million to the region per year with the potential to

grow to over \$170 million. The growth is likely to come from more oyster farming and sea cage finfish farming, eg Kingfish.

Central government and the aquaculture industry have a goal for aquaculture to be a \$1 billion industry (in sales) by 2025. If Northland's aquaculture industry developed as per this scenario, it could contribute approximately \$400 million to the central government and the aquaculture industry's goal.



Resource M: Extracts from the Northland Community Research Report (2007)

The “Community Perspectives on Aquaculture Management in Northland” was sponsored by the New Zealand Ministry of Fisheries, and the New Zealand Government Aquaculture Implementation Group.

While some interviewees felt that aquaculture could assist Northland to develop economically, the majority seriously questioned this. Aquaculture potential for development was seen to be relatively small as it was not seen as a labour-intensive industry, hence not creating many jobs. Furthermore, it was thought that much of the profit would go outside Northland because smaller local businesses would be unlikely to start up. Some interviewees thought that aquaculture would have a detrimental impact on the economy because the costs would outweigh the benefits, such as those to the tourism industry, which could be damaged by aquaculture. On the other hand some interviewees thought that aquaculture could enhance tourism – if attitudes were to change and seafood was promoted as an attraction for tourists.

Many interviewees thought that aquaculture was likely to have an adverse impact on the scenery, or visual amenity, ultimately taking away enjoyment and devaluing properties with coastal views. Concerns over visual impacts appeared to be considerable.

Many interviewees were concerned about the environmental impacts of aquaculture, and the potential for other native species’ populations in the area to diminish. Aquaculture farms add excess nutrients into the water as fish feed, as well as chemicals and antibiotics. Fish farm stocks can compromise native gene pools if the fish escape and transfer disease and parasites to wild fish populations.

Population growth and development in Northland were thought to be impacting on water quality, and posing increasing problems for oyster farms in particular, but also for aquaculture in general. Sewage contamination in the past saw some oyster farms having to be abandoned showing their vulnerability. However, some interviewees expressed the view that oyster farms can provide an indicator of water health, and could be a useful environmental monitor, if they remained in the area.

Many interviewees viewed coastal waters as public areas, which should not be locked away for private use as aquaculture, as this precludes other uses of the water. Some interviewees noted that aquaculture infrastructure can also be hazardous to other users of the water (eg a navigation hazard).



Acknowledgements

Resource A:	http://www.mfe.govt.nz/publications/oceans/aquaculture-risk-management/aquaculture-risk-management.pdf (page 70)
Resource B:	http://www.aquaculture.govt.nz/files/pdfs/Aqua_NZ.pdf (page 18)
Resource C:	http://aquaculture.org.nz/wpcontent/uploads/2011/06/AQUACULTURE_FACTSHEETS_WEB.pdf http://www.niwa.co.nz/our-science/aquaculture-and-biotechnology/research-projects/all/high-value-aquaculture-species
Resource D:	http://paihiacentral.co.nz/images/nz_map.jpg
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Resource F:	http://www.linz.govt.nz/topography/topo-maps/map-chooser/singleview.php?xPos=9850&yPos=1913&scale=2&extent=8-AV29
Resource G:	http://thekiwikronicles.blogspot.co.nz/2010/10/day-19-russell-road-drive.html
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