



ROADS Episode **1**

RAIL Episode **2**

POWER Episode **3**

PORTS & SHIPPING Episode **4**



ABOUT THIS STUDY GUIDE	3
COMMON THEMES AND BIG IDEAS	4
ALIGNMENT WITH THE NEW ZEALAND CURRICULUM	5
SOCIAL SCIENCES IN THE NEW ZEALAND CURRICULUM	6
FURTHER CURRICULUM AND NCEA LINKS	7
OTHER SOURCES OF INFORMATION	8
ABOUT eTV's ENHANCED DIGITAL MEDIA CONTENT (eDMC)	9
ABOUT THE TELEVISION SERIES	10
EPISODE BREAKDOWNS AND KEY THEMES	11
CONTRIBUTORS	12
REGIONAL LOCATIONS	14
EPISODE 1. ROADS	16
EPISODE 2. RAIL	21
EPISODE 3. POWER	26
EPISODE 4. PORTS AND SHIPPING	32
RESOURCES – MAPS MASTERS	38
RESOURCES – WORDFINDER MASTERS	39
ACKNOWLEDGEMENTS	44

About this Study Guide

Kia ora and welcome to the *Making New Zealand* television series study guide.

This study guide accompanies the four-part documentary series produced by Top Shelf Productions, first broadcast on Prime Television between May and June 2014, and now available for viewing on eTV.

Making New Zealand covers the development of the nation's infrastructure (roads, railways, power and shipping) much of which we still rely on in many ways today. The series features interviews with some of the people who had hands-on involvement in the work, together with archive footage, historians' commentary, maps and images. Each episode runs approximately 45 minutes and has been produced in five parts. Collectively the series provides a fascinating insight into New Zealand's past, and helps to explain where we are today, and our options for the future.

Starter ideas

The guide has been written for teachers who would like to use *Making New Zealand* as a resource. It suggests possible entry points into parts of the series, offers inquiry-based starter ideas, focusing questions, 'big ideas' themes, and curriculum links, all of which teachers can adapt to support learning opportunities for their students. We strongly recommend that teachers watch the series or episodes of interest first, using the episode information provided to assist them in considering which parts, and themes, may be most relevant for their students and local learning needs.

Level

Making New Zealand is suitable for students in Years 7 and up. However teachers may find that Year 6 and even younger students

could gain value from viewing segments or snippets of the series that teachers might like to pre-select. *Making New Zealand* could also be used effectively as research material for NCEA-related studies. Because of the richness of content, and the length of each episode (approx 45 minutes), we believe that watching pre-selected parts of the series may be the most effective strategy for viewing in class time. Older students (Years 9-13) might like to view full episodes in their study time.

Additional media

As part of its enhanced digital content (eDMC) strategy, eTV has created special libraries of additional media to accompany the series and this guide. The libraries feature content from the series, together with extended interviews with the contributors, and full transcripts of each episode. More information about this extended content is available throughout the guide.

Viewing strategies – 'before', 'during' and 'after' viewing ideas

PRE-VIEWING Teachers might like to consider these pre-viewing activities as a lead-in for students before they watch the series.

DURING VIEWING Teachers might like to encourage students to note some of the key messages of the series while watching the episodes.

POST VIEWING Teachers might like to use the series as a catalyst for further studies and investigations by students, including a local focus.

Common themes and big ideas

As part of their planning, teachers might like to consider the themes and big ideas that are woven throughout the series.

Kiwi can do spirit

Examples of Kiwi Ingenuity

Māori portage of canoes across Auckland Isthmus to save a long trip around Cape Reinga

PORTS AND SHIPPING part 1

Designing and making, in New Zealand, the **Pacific AB Class** steam locomotive which became a model for overseas designs.

RAIL part 3

Creating the **Raurimu Spiral** (to climb 200 metres in 2km). This was considered impossible until Robert Holmes had a stroke of inspiration.

RAIL part 2

Making the **Otira Gorge Viaduct** to replace the perilous zigzag road across the Southern Alps. This was real pioneering engineering.

ROADS part 4

Mountain avalanche control by helicopter bombing. The continuous loss of life due to winter avalanches led to an original New Zealand research and development project.

ROADS part 3

Māori perspectives

Tangata whenua views on the development of New Zealand's infrastructure

A significant amount of the content incorporates a Māori perspective on New Zealand's development. For example:

- The **PORTS AND SHIPPING** episode features the arrival of Māori in New Zealand, and the use of waka in early trading. It explores the development of river and coastal routes around New Zealand.

- The **RAIL** episode traces the effects of railway construction on the rights of traditional Māori living in the King Country.

Contributor **Che Wilson** also explains the benefits of employment to Māori from railway construction and maintenance - and the subsequent challenges that occurred with the later reduction in rail services.

Visual language opportunity

Learning about film-making

The opening minute of each episode features a fast-paced series of images that quickly set the scene for each episode.

Teachers might like to encourage students to unpack one of the opening titles sequences, listing the featured shots and describing their meaning.

Students could then be invited to produce their own presentation or video to convey a complex theme through the use of a visual montage.

This activity could be linked to the Visual Strand of the English in the New Zealand Curriculum learning area for example Achievement Objective Level 4:

Show an increasing understanding of how texts are constructed for a range of purposes.

Alignment with the New Zealand Curriculum

The guide has focused on the *Social Sciences in the New Zealand Curriculum* learning area - including ideas relating to Place and Environment, Continuity and Change, and the Economic World. At upper levels, the content could support in-depth studies in areas such as *History, Social Studies, Geography* and *Economics*.

Teachers will find *Making New Zealand* is also rich in springboards for learning discussions and investigations in a range of other curriculum areas. For example, the series puts the spotlight on an era of 'can do', when our early engineers and pioneers faced and overcame demanding challenges. It was the beginning of our 'number 8 fencing wire' problem-solving ethos, and the emerging technological expertise and scientific knowledge of a new century. Through its historical images and footage, *Making New Zealand* also shows how our language has had to change to accommodate new terms and concepts, how the fashions of the times matched the conditions and traditions of early New Zealand, and how our reliance on technology began to grow.

The regional references in the series also show how New Zealand was becoming accessible to more and more people from all walks of life, and the impact of this on traditional ways of life. Students might find echoes of this in the buildings, developments, monuments, histories and cultures in their own neighbourhood to help them discover how their own corner of the country was influenced.

Teachers might therefore like to consider how the series could be used to support studies in areas such as

- Science
- Mathematics and Statistics
- Technology
- English



Social Sciences in the New Zealand Curriculum

Extract from the New Zealand Curriculum – Social Sciences

<http://nzcurriculum.tki.org.nz/The-New-Zealand-Curriculum/Learning-areas/Social-sciences>

The Social Sciences learning area is about how societies work and how people can participate as critical, active, informed, and responsible citizens. Contexts are drawn from the past, present, and future and from places within and beyond New Zealand.

Place and Environment – Students learn about how people perceive, represent, interpret, and interact with places and environments. They come to understand the relationships that exist between people and the environment.

Continuity and Change – Students learn about past events, experiences, and actions and the changing ways in which these have been interpreted over time. This helps them to understand the past and the present and to imagine possible futures.

The Economic World – Students learn about the ways in which people participate in economic activities and about the consumption, production, and distribution of goods and services. They develop an understanding of their role in the economy and of how economic decisions affect individuals and communities.

Achievement Objectives Level 4

- Understand how exploration and innovation create opportunities and challenges for people, places, and environments.
- Understand that events have causes and effects.

Achievement Objectives Level 5

- Understand how economic decisions impact on people, communities, and nations.
- Understand how people's management of resources impacts

on environmental and social sustainability.

- Understand how the ideas and actions of people in the past have had a significant impact on people's lives.
- Understand how people seek and have sought economic growth through business, enterprise, and innovation.

Achievement Objectives Level 6

- Understand how economic decisions impact on people, communities, and nations.
- Understand how people's management of resources impacts on environmental and social sustainability.
- Understand how the ideas and actions of people in the past have had a significant impact on people's lives.

Level 6

- **History**
Understand how the causes and consequences of past events that are of significance to New Zealanders shape the lives of people and society.
- **Social studies**
Understand how cultures adapt and change and that this has consequences for society.
- **Geography**
Understand how people interact with natural and cultural environments and that this interaction has consequences.
- **Economics**
Understand how the different sectors of the New Zealand economy are inter-dependent.

Further Curriculum and NCEA links

The New Zealand Curriculum

Science in the New Zealand Curriculum

Level 4. Describe everyday examples of sources of energy, forms of energy, and energy transformations

<http://nzcurriculum.tki.org.nz/The-New-Zealand-Curriculum/Learning-areas/Science>

Mathematics and Statistics in the New Zealand Curriculum

Level 4. Evaluate statements made by others about the findings of statistical investigations and probability activities.

<http://www.nzmaths.co.nz/>

English in the New Zealand Curriculum

Level 5. Show an understanding of how texts are shaped for different purposes and audience.

<http://englishonline.tki.org.nz/>

NCEA Achievement Standards

<http://ncea.tki.org.nz/Resources-for-Internally-Assessed-Achievement-Standards>

History. Level 1

91002: Demonstrate understanding of an historical event, or place, of significance to New Zealanders.

91005: Describe the causes and consequences of an historical event.

English. Level 1

90850: Show understanding of specified aspect(s) of studied visual or oral text(s), using supporting evidence.

90856: Show understanding of visual and/or oral text(s) through close viewing and/or listening, using supporting evidence.

Science. Level 1

18977: Demonstrate knowledge of the generation and use of electricity.

Technology. Level 1

91051: Demonstrate understanding of how different disciplines influence a technological development.

Acknowledgment:
The New Zealand Curriculum
and NCEA information is
courtesy of the Ministry of
Education,
New Zealand.

Other sources of information

These links are not intended to be exhaustive, and we recommend teachers check these before viewing with students in case they have been changed. Exploring what is available in the region that relates to the series themes might also provide some interesting learning opportunities. Local council offices, libraries and museums may have resources, or there may be local engineers, builders, quantity surveyors, boaties, parents/whānau/grandparents with memories or expertise to share.

General

Institute of Professional Engineers
New Zealand
www.ipenz.org.nz

New Zealand History Online
www.nzhistory.co.nz

Statistics New Zealand
www.stats.govt.nz

Te Ara the Encyclopedia of
New Zealand
www.TeAra.govt.nz

Te Kete Ipurangi
www.tki.org.nz

The National Library of New Zealand
<http://natlib.govt.nz>

The Science Learning Hub
www.sciencelearn.org.nz

Episodes 1 and 2:

ROADS and RAIL

Heritage New Zealand
www.historic.org.nz

KiwiRail
www.kiwirail.co.nz

New Zealand Railway Bridges
<http://trains.wellington.net.nz/bridges.html>

New Zealand Transport Agency
www.nzta.govt.nz

New Zealand Steam Locomotives
<http://www.trainweb.org/nzsteam/>

Quake Studies
<https://quakestudies.canterbury.ac.nz>

Episode 3:

POWER

Ministry of Business,
Employment and Innovation
www.mbie.govt.nz

New Zealand Geothermal Association
www.nzgeothermal.org.nz

EECA Energywise
www.energywise.govt.nz

Meridian Energy
www.meridianenergy.co.nz

Power Trip
<http://the-power-trip.kiwi/>

Wind Energy New Zealand
www.windenergy.co.nz

Episode 4:

PORTS AND SHIPPING

New Zealand Ship and Marine Society
www.nzshipmarine.com/history

New Zealand Shipping
<http://www.newzealandshipping.co.nz/History/index.htm>

The New Zealand Shipping Association
www.nzshippingcoassoc.org.nz

Voyager Maritime Museum
www.maritimemuseum.co.nz

The Wahine and Captain Robertson
www.thewahine.co.nz

Wellington Museum City and Sea
<http://www.museumswellington.org.nz/index.php/museum-of-wellington-city-and-sea/exhibitions/>

About eTV's enhanced Digital Media Content (eDMC)

eTV has developed a new strategy – the eDMC (enhanced digital media content) strategy – to support its service to schools.

The eDMC approach reflects the fact that television producers gather and produce large amounts of material in the making of a programme. Much of this is used but the producers have collected much more content than can be used within the confines of a broadcast timeslot. By working closely with the producers, eTV can make not only the content that was used in the programme available, but also is able to make the extra content available in digital formats to schools for further use by teachers and students. All these resources are available in the Related Materials section on each of the four episode pages of *Making New Zealand*, thereby creating additional digital libraries to accompany the television recording.

Making New Zealand eDMC

Links to eDMC content can be found on the eTV *Making New Zealand* programme pages. Complete transcripts of each episode are also available for download.

Please note

- access to all eDMC resources is free
- an eTV login is available, at no cost, on request from the login page www.etv.org.nz.
- viewing of the Prime TV Recordings of the *Making New Zealand* series requires a subscription to eTV and that a Screenrights licence is held by your school.



About the television series

Background to *Making New Zealand*

Making New Zealand is a four part documentary series that tells the story of the people and projects that transformed a raw, remote country into a modern-day nation through present-day interviews and visuals, extensive archive footage, photographs and animated graphics.

At its heart, *Making New Zealand* is the compelling story of the blood, guts and glory it has taken to build our country's major infrastructure projects – its massive hydroelectric dams and power schemes, the railways, roads, tunnels, bridges and ports.

This is a series built on the back of tremendous human endeavour. It celebrates those who took on the big challenges and whose vision, ingenuity and hard work transformed the lives of its people to create a modern-day nation.



The episodes

ROADS

Episode 1

This episode traces the development of New Zealand's roads - from past to present.

RAIL

Episode 2

This episode follows the creation and evolution of the New Zealand railway system.

POWER

Episode 3

This episode explains the making of electrical power generation in New Zealand.

PORTS & SHIPPING

Episode 4

This episode describes the growth of New Zealand's ports and our shipping industry.

Episode breakdowns and key themes

ROADS

Episode 1 *total duration: 45mins 15secs*

Part 1 duration: 12mins 50secs
early settlements, gold, tourism, hard labour, extreme climate

Part 2 duration: 10mins 18secs
Homer Tunnel (pick, shovel & dynamite), post World War II road building

Part 3 duration: 11mins 31secs
Auckland Harbour Bridge, avalanche bombing from the air

Part 4 duration: 6mins 41secs
crossing Arthur's Pass (Otira Gorge Viaduct)

Part 5 duration 3mins 46secs
motorway development up to the present day

RAIL

Episode 2 *total duration: 44mins 52secs*

Part 1 duration: 6mins 40secs
linking the main centres, pressure on Māori land

Part 2 duration: 9mins 19secs
Māori land issues, creating the Raurimu Spiral, building the rail viaducts

Part 3 duration: 12mins 46secs
holidays by train, designing the Pacific AB locomotive, Taumaranui

Part 4 duration: 7mins 30secs
an engine driver's world (steam to diesel), Ferrymead in action

Part 5 duration 8mins 33secs
linking North and South Islands (RORO ferries), the economic shift to present day

POWER

Episode 3 *total duration: 44mins 53secs*

Part 1 duration: 9mins 30secs
heroic engineers, first power stations (Lake Coleridge/Karapiro)

Part 2 duration: 9mins 11secs
growing power needs (post World War II), the Roxburgh Dam project

Part 3 duration: 12mins 21secs
New Zealand's power crisis, geothermal power, Benmore Dam, Cook Strait Cable

Part 4 duration: 8mins 17secs
Tongariro Power Scheme, Lake Manapouri, Clyde Dam

Part 5 duration 5mins 30secs
the future, market forces, wind energy, carbon footprint

PORTS & SHIPPING

Episode 4 *total duration: 44mins 44secs*

Part 1 duration: 8mins 23secs
Māori navigation and portage, first European ships, first ports

Part 2 duration: 10mins 25secs
port building/reclaiming, major and minor ports, sandbars and wharfs

Part 3 duration: 9mins 21secs
passenger ferries, Union Steamship Company, waterfront strikes

Part 4 duration: 11mins 36secs
competition, RORO ferries, containerisation

Part 5 duration 4mins 55secs
New Zealand exports, carbon footprint, futures

Contributors

The series introduces us to a remarkable range of people who brought in-depth knowledge and capabilities to their work. Teachers might like to consider how exploring the stories and skills of the contributors themselves could provide starting points for learning conversations.

That's dad's bridge!



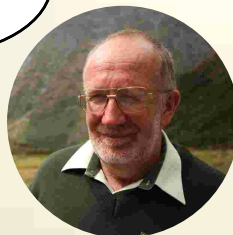
Richard Holyoake was the site engineer for the viaduct over the Otira Gorge. He provides a lively explanation of the enormous engineering challenges in designing the largest viaduct in New Zealand in a valley which has nine major earthquake faults nearby. It is an inspiring case study of Kiwi ingenuity. (ROADS Part 4)

Getting caught out is not an option!



Wayne Carran's job is to drop high explosives from a helicopter to set off avalanches. He describes why this is necessary and how the science of avalanche control has developed in New Zealand. (ROADS Part 4)

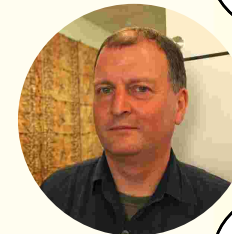
The nearest stores were nearly 80 miles away!



Ken Bradley is a DOC Ranger. He explains what life was like building the Milford Road in the 1930s. (ROADS Part 1)

Matthew Wright is an historian and author who provides much of the historical analysis of the road and railway development and the hard work involved. He explains how the New Zealand road system was built on earlier Māori trading routes. (ROADS Parts 1-4)

They felt they were being treated like convicts!



We took on 60 dozen pies!

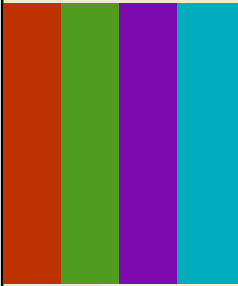


Fay Jones was a refreshment worker at Taumaranui Railway Station during its busiest period. She describes how she dealt with the hundreds of people who wanted food and drink as the main trunk line trains stopped for a short refreshment break. (RAIL Part 3)

The smoke would drift across the main street like fog!



Len Goodwin was a railway worker on the main trunk line. He speaks about the effect of the railways and trains on the town of Taumaranui. (RAIL Part 3)



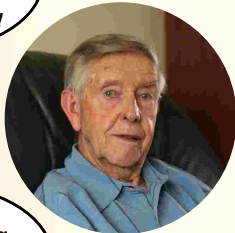
*In these early days,
you need risk-takers!*



John Martin is an historian and author. He discusses the political and economic contexts for the building of power stations in New Zealand.

(POWER Part 1)

*There were bright
Russians, Bulgarians,
Yugoslavs,
Swiss & French!*



Michael Bramley was a London-born quantity surveyor who emigrated with his wife to New Zealand to work on the Roxburgh Dam. He discusses the manpower that was assembled to build this challenging project.

(POWER Part 2)

*Your washing
froze on the line!*



Marion Sheridan and her husband, Eric, moved to Otamatata in the 1960s where Eric had a job helping to build the Benmore Dam. She describes what life was like in the new hydro town.

(POWER Part 3)

Gavin McLean is an historian and author. He traces the history of transport from Māori times through to contemporary ports and shipping.

(PORTS AND SHIPPING Part 2)



*The
Union Steamship
Company was our
first multinational!*

*Conditions up
here were pretty
harsh for the poor
old signal man!*



Emmanuel Makarios is an ex-seaman, historian and author. He describes the lives of the signalmen, way back in the day, who would work up on windy ridges with only a barrel for shelter.

(PORTS AND SHIPPING Part 2)

*(It) was achieved by
the muscle of men
and horses!*



Russell Guise is an historian and author. He explains how the geography of the Auckland region affected early transportation in New Zealand.

(PORTS AND SHIPPING Part 2)

*(Wahine)
got pushed sideways
onto the rocks!*

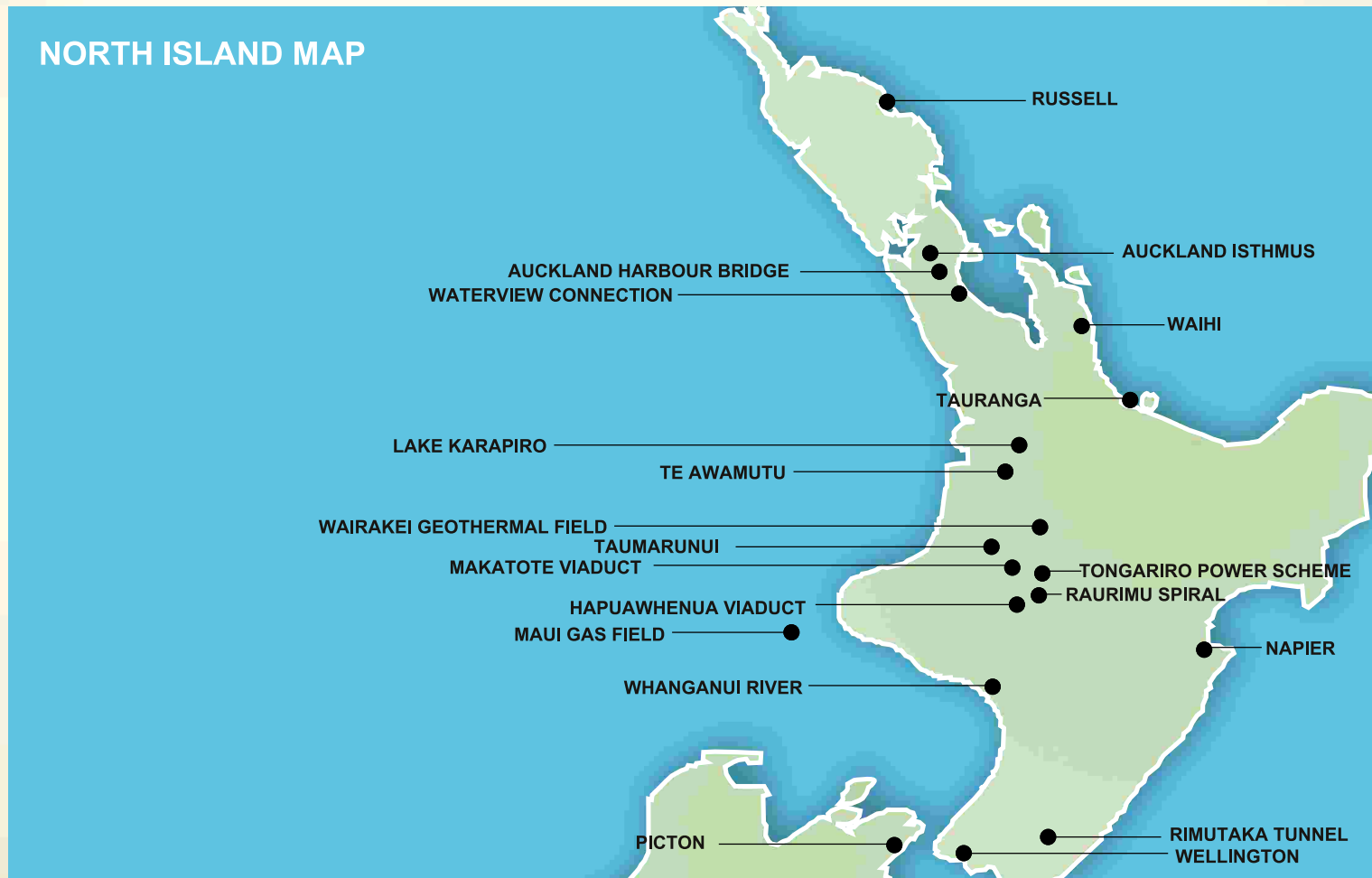


Alan Windsor was one of the crew who survived the shipwreck. He speaks about the sinking of the Wahine at the entrance to Wellington harbour.

(PORTS AND SHIPPING Part 4)

Regional locations

These maps show some of the New Zealand locations mentioned in *Making New Zealand*. Teachers might like to consider if there are locations in their own region which connect to the themes of the series. These could provide the basis for local student investigations.



Regional locations



ROADS

Episode 1

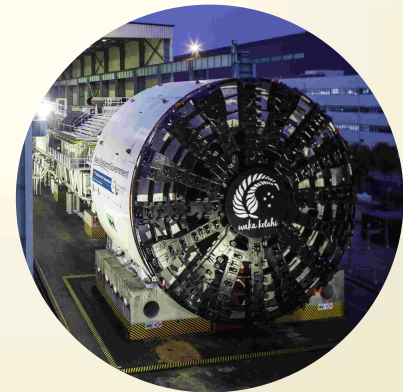
The **ROADS** episode examines the development of roading in New Zealand from the rough early routes to the multi-billion dollar motorway projects of today.

The episode profiles State Highway 73 through Arthur's Pass – a stagecoach route in the West Coast gold rush days and nowadays home to one of the country's most innovative engineering achievements – the Otira viaduct.

The construction of the Milford Road and Homer Tunnel is studied – a Depression-era project in a harsh and unforgiving environment. Today the Milford Road is New Zealand's most valuable tourist route and is kept open year round by the dedicated work of the maintenance contractors who, when required, take to helicopters and lob high explosives high into the mountains to set off avalanches in a controlled fashion.

The building of the Auckland Harbour Bridge is another case study in the episode – the route across the Waitamata Harbour was on drawing boards and in local body dreams for 100 years before it was finally realised. Historian and politician Michael Bassett, and newspaperman Garth Gilmore, are among Bridge fans that tell its remarkable story.

Modern motorway and road tunnel construction is examined by profiling the Waterview Connection, a government-designated 'road of national significance' that completes Auckland's motorway ring network. In sharp contrast, the country's first major highway, the Great South Road from Auckland to the Waikato, was constructed largely by soldiers with picks and shovels in the New Zealand Wars.



ROADS

Episode 1 Before viewing

Teachers might like to use the following ideas to support activities such as:

- a research and discovery approach, set around the school or in a nearby location - for example, a local road or railway line, or a nearby museum
- a group activity using web-based research for example, the use of transport by the New Zealand dairy industry, discovery about the 'Think Big' projects in the 1970s
- a local inquiry relating to family/iwi/hapū histories for example, the houses and lives of early settlers in the region, and working lives before mechanisation.

Starter questions

- If we arrived in New Zealand in the 1800s, how would we have travelled around?
- Who uses roads today and why and what new roads might be needed in the future? Why? And what might they look like?
- What part do roads play in helping New Zealand's economy for example in agriculture, manufacture and primary industries?
- Who designs our roads and what skills do they need?
- How has the technology that road builders use changed? What difference has this made and why?
- How do we use the roads in our local region?

Activities

- Explore the history of your town/city can you discover where the first road was built, and why? Consider what roads might be needed in the future.
- Imagine you are an engineer and you need permission from the council to build a new road in your neighbourhood. How will you convince the council to agree to this? You will need to provide the why, where, and how information that the council will need to make their decision.



ROADS

Episode 1 While viewing

“Do now”

Teachers may like to consider these class-based ‘do now’ ideas as preparation activities before students watch the series. Copy masters of the Wordfinder activities and blank North Island and South island maps are provided in this guide.

- Complete the Road Wordfinder activity. (Wordfinder handout)
- Write down four things for which we use roads.
- Mark on the map provided where there are three towns or cities connected by State Highway 1. (map handout)

While viewing

Making New Zealand explores how New Zealand’s infrastructure was established. Each programme features insights into what was involved in this, and the people who contributed their skills.

Teachers might like to consider the following ‘while viewing’ activities to encourage students to note some of the key information presented.



Questions

PART 1

- Why were early European settlers in 'for a shock' when they arrived?
- Why did we need lots of roads early on in New Zealand?
- How did early tourism impact on the roads?

PART 2

- Why was it so dangerous to work on the Homer Tunnel?
- Why did only men work on the roading projects?
- Why did it take so long to build the Auckland Harbour Bridge?

PART 3

- How did workers move the Auckland Bridge central span into position?
- What effect did tourism have on the Milford Road?
- Why did the Avalanche Control Programme start?

PART 4

- Why was the Arthur's Pass road so ambitious?
- How did the closeness of earthquake fault lines affect the design?
- Why is road expansion now being questioned?

ROADS

Episode 1 After viewing

The series could provide a catalyst for a range of follow-on learning activities.

PART 1

- Discuss what life was like for the first European settlers in NZ in 1840? Dress up in period clothes and create a short film to recreate the times.
- How long does it take you to go from home to school, or from your home to the nearest port, nowadays? How long would it have taken in 1840s?
- Find photos of the Gold Rush and write a newspaper article about life in the camps.

PART 2

- Ask your teacher to invite an engineer to explain about the building of a road or bridge near the school. Divide a sheet into 'Past' and 'Present' and list the challenges for engineers now and in the past.

PART 3

- Research the Avalanche Control Programme and find out which emergency groups operate in your area.
- List the 'tourist sites' you can visit if you use the Homer Tunnel.

PART 4

- Draw a map of where the Arthur's Pass road goes showing mountains, rivers etc and discuss why this road was difficult to build.
- Find out when the last major earthquake occurred in this area and chart a five year time span of quakes since then.



ROADS

Episode 1 eDMC content

Explore the eTV programme page to find enhanced digital media content for this episode.

<https://www.etv.org.nz/programme.php?id=81534>

eDMC content includes:

- extended video interviews with the following contributors
 - Richard Holyoake | Matthew Wright
 (full transcripts of these interviews are available for download)
- galleries featuring images from the episode
- full transcripts of each episode, available for download
- links to the following Archives New Zealand footage:

New Zealand Marches on
(1938)

Weekly Review No.21 (1945)

Weekly Review No.379 (1948)

Keep Left (1949)

Weekly Review 428 (1949)

Pictorial Parade No.27 (1954)

Four Ways to Milford (1957)

Pictorial Parade No.67 (1957)

Pictorial Parade No.79 (1958)

Pictorial Parade No.83 (1959)

Pictorial Parade No.89 (1959)

Pictorial Parade No.98 (1960)

Pictorial Parade No.107 (1960)

Pictorial Parade No.118 (1961)

Pictorial Parade 119 (1961)

Pictorial Parade 125 (1962)

Pictorial Parade 127 (1962)

South Island By Coach (1963)

Pictorial Parade No.145 (1963)

Pictorial Parade No.149 (1964)

Pictorial Parade No.160 (1964)

Pictorial Parade No.166 (1965)

Roads to Roam (1966)

Pictorial Parade No.206 (1968)

Pictorial Parade No.209 (1968)

Wheels Across the Waitemata
(1961)

Walking Country (1978)

Ferries (1980)

The Open Road (film from NZ
Carriers Association) made by
Reynolds Television

Text

RAIL

Episode 2

The **RAIL** episode begins with the first European settlers who came from places where rail was well established to a place that barely had roads let alone rail. They saw rail as symbolic of a modern, technologically advanced nation and so were very keen to develop it in New Zealand despite a crippling lack of money and dramatically difficult geography. The episode follows the huge effort that went into building the North Island main trunk line including the engineering marvel that is the Raurimu Spiral.

It looks at how the King Country was opened up through the coming of rail and what that meant for the traditional Māori owners and the new pākehā farmers. The famous King Country viaducts at Makatoke and Hapuawhenua are visited and the story of their construction told.

Once the North and South Island were linked up with main trunk lines, and crisscrossed by regional branch lines, railways entered a golden age. The government-owned and run industry was an economic powerhouse. Life on the main trunk line is profiled with a look back at the railway

town of Taumarunui and its famous refreshment rooms. Incredibly New Zealand once built its own locomotives and rolling stock at Railway Workshops around the country – the biggest engineering manufacturing plants of their day. Ambitious projects drove a tunnel nearly 10 kilometres through the Rimutaka Ranges and one of the world's highest rail viaducts bridged the great gorge at Mohaka between Napier and Wairoa.

In time, steam gave way to diesel and electric-powered engines. However steam retains a special place in the memory of trainspotters and ordinary Kiwis alike. Deregulation of the trucking industry and the advent of cheap air travel hit railways hard in its freight and passenger operations. Successive governments downsized, corporatised and sold the Railways off. The result was a disaster out of which rail has only recently started to climb. But New Zealand's rail journey is far from over – there is a renaissance resting on the romance of the past and the realisation that rail freight in particular makes economic and environmental sense.



RAIL

Episode **2** Before viewing

Teachers might like to use the following ideas to support activities such as:

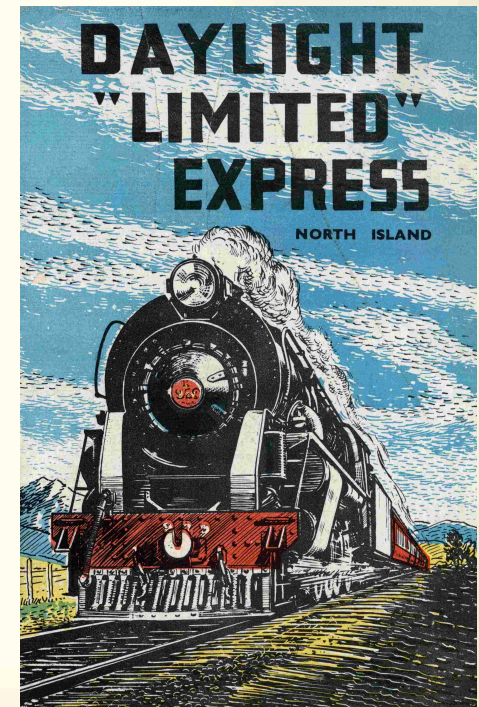
- a research and discovery approach, set around the school or in a nearby location - for example, a local road or railway line, or a nearby museum
- a group activity using web-based research for example, the use of transport by the New Zealand dairy industry, discovery about the 'Think Big' projects in the 1970s
- a local inquiry relating to family/iwi/hapū histories for example, the houses and lives of early settlers in the region, and working lives before mechanisation.

Starter questions

- Why did the early settlers want rail technology?
- Consider how our use of rail has changed over time, and why?
- What are the advantages and disadvantages of rail over road, and vice-versa? Why?
- Consider the statement rail travel is going out of fashion do you agree or disagree with this statement? Why did you think this?
- What part does rail play in helping New Zealand's economy for example in agriculture, manufacture and primary industries?

Activities

- Where is the nearest railway line/station to your town? Is it still in use? If not, why not?
- Imagine you live in a city on a rail line and you need to transport heavy cargo from a big city in another region. Investigate whether to transport it by rail or road. Why did you make your decision?
- A popular rail-related song is 'Taumaranui'. With permission from your teacher, listen to/sing the song and discuss the lyrics. What did the lyrics of this song convey?
<https://www.youtube.com/watch?v=PDMgyeFU74k>



RAIL

Episode 2 While viewing

“Do now”

Teachers may like to consider these class-based ‘do now’ ideas as preparation activities before students watch the series. Copy masters of the Wordfinder activities and blank North Island and South island maps are provided in this guide.

- Complete the Rail Wordfinder activity. (Wordfinder handout)
- Write down four things for which we use railways.
- Mark on the map provided your nearest railway track. (map handout)

While viewing

Making New Zealand explores how New Zealand’s infrastructure was established. Each programme features insights into what was involved in this, and the people who contributed their skills. Teachers might like to consider the following ‘while viewing’ activities to encourage students to note some of the key information presented.



Questions

PART 1

- Where were railways first built? Why were they built there?
- Which railway project built a tunnel through a volcano?
- What strategy did Vogel use to gain permission from the Whanganui hapū to cross their land?

PART 2

- How did the engineer, Robert Holmes, design a railway track up a steep mountain?
- Where did the workers live when building the main trunk line?
- What is meant by the 'Eiffel Tower' of viaducts?

PART 3

- Why did railways get into advertising in the 1920s ?
- Explore if it was unsafe to use steam engines in the Rimutaka Tunnel?
- Why was engine driver Len so scared on his first steam train?

PART 4

- How did railways try to compete with airlines for passengers ?
- What does 'privatisation' mean? How did it affect railways?
- How have railways adapted to modern transport needs?

RAIL

Episode 2 After viewing

The series could provide a catalyst for a range of follow-on learning activities.

Starter ideas

PART 1

- Find out when your nearest railway track or station was built (and whether or not it is still used). Explain what has changed.
- Research how high the old Hapuawhenua viaduct is. Make a model of the viaduct and place a figure on the ground to show the scale.

PART 2

- Dramatise the negotiating discussion between early settlers and Māori about building a railway track through their land.
- Discuss why the Raurimu Spiral was such a great idea. Draw a diagram to show how it worked.

PART 3

- Research the work of an engine driver. Discuss with your teacher the idea of dressing up as an engine driver, and being interviewed by another student about the job of an engine driver in the early railways.
- Write a short story about Tauramanui when the train came in.

PART 4

- Research why the Roll-on/Roll-off (RORO) ferries are often in the news?
- Imagine you are debating the benefits of travelling by rail, ferry or air. What arguments would you use to support each (for and against)?



RAIL

Episode **2** eDMC content

Explore the eTV programme page to find enhanced digital media content for this episode.

<https://www.etv.org.nz/programme.php?id=81536>

eDMC content includes:

- extended video interviews with the following contributors
- Matthew Wright | Len Goodwin | Che Wilson | Neil Atkinson
(full transcripts of these interviews are available for download)
- galleries featuring images from the episode
- full transcripts of each episode, available for download
- links to the following Archives New Zealand footage:

New Zealand Marches On
(1938)

Railways of the Pacific
Wonderland (1939)

Weekly Review No.154
(1944)

Weekly Review No.371
(1948)

Weekly Review No.262
(1946)

Weekly Review No.227
(1946)

The Railway Worker (1948)

New Zealand Railways –
Steam Lives On

Weekly Review No.379 (1948)

Weekly Review No.440 (1950)

Pictorial Parade No.22 (1954)

Pictorial Parade No.28 (1954)

Pictorial Parade No.23 (1954)

Pictorial Parade No.43 (1955)

Pictorial Parade No.35 (1955)

NZ Railway Magazine (1956)

Pictorial Parade No.65 (1957)

Pictorial Parade No.69 (1957)

Pictorial Parade No.81 (1958)

Pictorial Parade No.91 (1959)

Pictorial Parade No.99 (1960)

Pictorial Parade No.145 (1963)

Pictorial Parade No.146 (1963)

Toe Hold on a Harbour (1966)

Pictorial Parade No.200 (1968)

A Train for Christmas (1975)

New Zealand Trains Line By Line

POWER

Episode 3

The **POWER** episode covers the construction of major hydroelectric dams on the Waikato, Clutha and Waitaki Rivers – huge “cathedrals to power” that dramatically changed the landscape and provided electricity to a growing country. Steadily rising demand for power throughout the 20th century put constant pressure on the government electricity and works departments to design and build some of New Zealand's largest engineering projects and then operate and maintain these hydro stations.

The episode also examines the extraordinary work that went into the building of the transmission lines from Lake Manapouri to Bluff, and the DC Link that connected the North and South Islands via the Cook Strait Cable. The pioneering wet-steam geo-thermal development at Wairakei is studied and the relatively recent success of wind generation.

The history of the planning, design, construction and management of New Zealand's electricity system reveals much about the country and its people. It demonstrates the profound impact of

technological innovation and enterprise, and shows the crucial role of New Zealand engineers in developing solutions to complex issues. The story of New Zealand electricity illuminates the relationship between urban and rural New Zealand, the changing patterns of domestic work and leisure, changing forms of transport and the shaping of industry. And, especially since the Lake Manapouri debate of the 1960s and early 70s, electric power generation has been at the heart of how Kiwis view their relationship with the natural environment.

The Making New Zealand episode on Power traces the development of electric power production in New Zealand. It looks at the move from small power schemes for local supply to the huge projects to increase the capacity of the National Grid. There is also consideration of the sustainability (or otherwise) of our traditional generation sources and the impact of power conservation and alternate sources of supply in the future.



POWER

Episode 3 Before viewing

Teachers might like to use the following ideas to support activities such as:

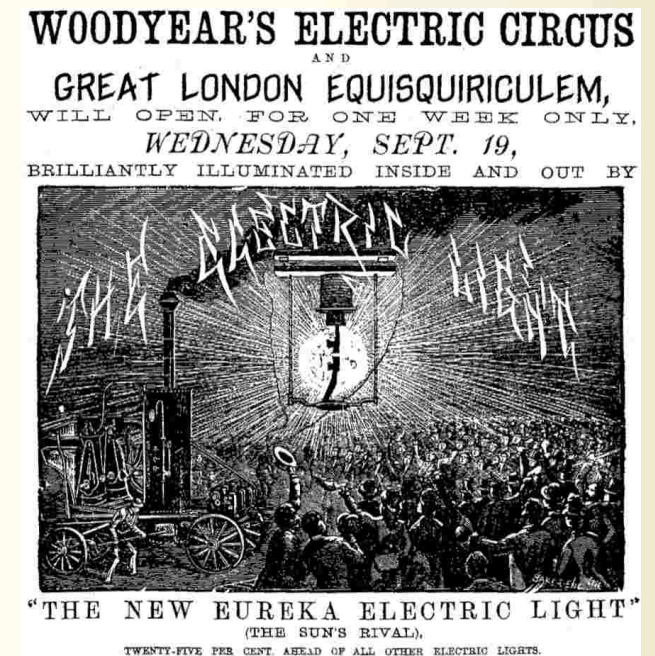
- a research and discovery approach, set around the school or in a nearby location - for example, a local road or railway line, or a nearby museum
- a group activity using web-based research for example, the use of transport by the New Zealand dairy industry, discovery about the 'Think Big' projects in the 1970s
- a local inquiry relating to family/iwi/hapū histories for example, the houses and lives of early settlers in the region, and working lives before mechanisation.

Starter questions

- What power resources are used in your school?
- Where does the power/energy the school is using come from?
- How has power production changed in New Zealand?
- What does 'renewable energy' mean? Find some examples of this.
- What are some future sources of power and why might we need to use them?

Activities

- Find out about Skipper's Canyon and why it needed power.
- In the steam generating plant at Mercer, the boilers used 2,000 tonnes of coal per day. How much is needed every year? What are the sources of the coal and how long will the supply last?
- Discuss: 'Hydro is good for New Zealand but you can't rely on Wind'.
- Find out about the sources of power used by your town/city/area.
- Investigate if there are new approaches being considered for power generation in your area.



POWER

Episode 3 While viewing

“Do now”

Teachers may like to consider these class-based ‘do now’ ideas as preparation activities before students watch the series. Copy masters of the Wordfinder activities and blank North Island and South island maps are provided in this guide.

- Complete the Power Wordfinder activity. (Wordfinder handout)
- Write down four things for which we use power in our school.
- Mark on the map the location of the Clyde Dam. (map handout)

While viewing

Making New Zealand explores how New Zealand’s infrastructure was established. Each programme features insights into what was involved in this, and the people who contributed their skills.

Teachers might like to consider the following ‘while viewing’ activities to encourage students to note some of the key information presented.



Questions

PART 1

- What is meant by the 'heroic engineer'?
- Why did the Karapiro Hydro Station take so long to build?
- How does a hydro station work?

PART 2

- Why did the Ministry of Works build their own towns?
- What are the reasons for a power crisis?
- Why was the country's biggest hydro dam built at Roxburgh?
- How did the workers get the concrete across the river?

PART 3

- What is the impact of weather on hydro generation?
- Why was NZ 'wet steam' technology a world first?
- What was important about the Benmore Station?
- What is a 'DC Line'? When was the New Zealand DC Line completed?

PART 4

- Why were nuclear power stations not built in New Zealand?
- Why were some people unhappy about the Manapouri Project?
- What were the 'Think Big' projects? Give examples.
- What are New Zealand's long-term options for power generation?

POWER

Episode 3 After viewing

The series could provide a catalyst for a range of follow-on learning activities.

PART 1

- Find out where your nearest power station is. How does the power get to your school?
- Ask your teacher to invite an expert to talk to the class about power generation.

PART 2

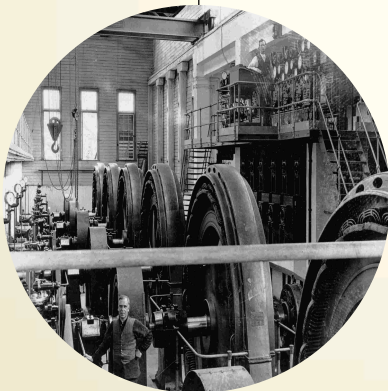
- Imagine you work from home, or are a train driver, or a surgeon, or a teacher. Explain to a friend on the phone what you had to do when the power went off.
- With permission from your teacher, explore this image from the Bullendale Power Station.
<http://www.doc.govt.nz/conservation/historic/by-region/otago/queenstown-wakatipu/bullendale-hydro-heritage/>.
Describe the powerhouse building and its surroundings.

PART 3

- Find out more about the Benmore Power Station (largest earth dam in NZ). Prepare a report and present it to the class.
With permission from your teacher visit this site
<http://www.ipenz.org.nz/heritage/itemdetail.cfm?itemid=2172>
- Describe the challenge of transmitting power to the North Island.

PART 4

- Research nuclear power use overseas. What are the pros and cons?
- Consider having a class debate on the best future power options for New Zealand.



POWER

Episode 3 eDMC content

Explore the eTV programme page to find enhanced digital media content for this episode.

<https://www.etv.org.nz/programme.php?id=81552>

eDMC content includes:

- Tom Jones | Robert Aspden | John E Martin | Mike Williams | Keith Turner
(full transcripts of these interviews are available for download)
- galleries featuring images from the episode
- full transcripts of each episode, available for download
- links to the following Archives New Zealand footage:

Weekly Review No.202 (1945)	Pictorial Parade No.2 (1952)	People of the Waikato (1956)	Pictorial Parade No.125 (1962)
Weekly Review No.203 (1945)	Pictorial Parade No.3 (1953)	Pictorial Parade No.60 (1957)	Pictorial Parade No.132 (1962)
Weekly Review No.297 (1947)	Pictorial Parade No.6 (1953)	Pictorial Parade No.62 (1957)	South Island By Coach (1963)
Weekly Review No.306 (1947)	Pictorial Parade No.12 (1953)	Pictorial Parade No.64 (1957)	Airborne
Weekly Review No.317 (1947)	Pictorial Parade No.18 (1954)	Pictorial Parade No.66 (1957)	These New Zealanders No.3 Benmore (1964)
Power From The River (1947)	Pictorial Parade No.28 (1954)	Pictorial Parade No.69 (1957)	Pictorial Parade No.166 (1965)
Weekly Review No.351 (1948)	Pictorial Parade No.29 (1954)	Pictorial Parade No.82 (1958)	The First Half-Million Volt D.C. Transmission Line (1965)
Weekly Review No.370 (1948)	Hot Earth (1955)	Pictorial Parade No.90 (1959)	Pictorial Parade No.169 (1965)
Weekly Review No.405 (1949)	Pictorial Parade No.39 (1955)	Pictorial Parade No 102 (1960)	Pictorial Parade No.180 (1966)
Weekly Review No.411 (1949)	Pictorial Parade No.45 (1956)	Oil Search in New Zealand (from Pictorial Parade No.62) (1957)	Pictorial Parade No.183 (1966)
New Zealand Mirror No.8 (1950)	Pictorial Parade No.49 (1956)	Pictorial Parade No.106 (1960)	
Rock Bottom at Waikaremoana (1950)	Pictorial Parade No.52 (1956)		

PORTS & SHIPPING

Episode 4

The **PORTS AND SHIPPING** episode traces New Zealand's maritime history from the early days of Māori waka and flat-bottomed scows that plied the coasts and rivers to the glory days of the Union Steamship Company and today's massive container ships. Shipping – by waka, whaleboat, sailing boat or steamship – dominated the local and national freight business from first settlement by Europeans until the early 20th century.

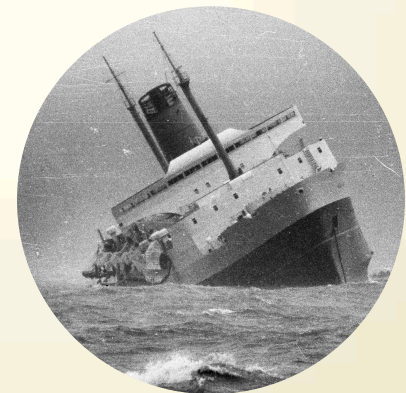
Ports were established on harbours and rivers alongside the developing cities and towns. This episode looks specifically at the history of the port of Auckland and the port of Wanganui.

Coastal shipping provided New Zealand's first North-South transport main trunk, decades before the railway main trunk line became effective. The introduction of refrigerated shipping, increasing use of steamships, and improved port facilities all contributed to rapid growth in the New Zealand shipping industry. Better wharves, improved

cargo-loading gear, and harbour dredging became commonplace.

Cook Strait ferries run by the Railways Department provided a vital link between the North and South Island but the arrival of Roll-on-Roll-off (RORO) ferries in the early 1960s sounded the death knell for coastal shipping and many smaller ports and a big reduction in numbers of waterside workers.

The coming of containerisation sent a tsunami through the New Zealand shipping industry revolutionising port infrastructure, cargo handling and the ships themselves. More change came with government deregulation and New Zealand shipping sailed into very testing waters indeed. Innovative companies such as Pacifica are weathering the storm but the industry has many challenges still in front of it. This episode of *Making New Zealand* examines how the future of New Zealand shipping and ports may play out.



PORTS & SHIPPING

Episode 4 Before viewing

Teachers might like to use the following ideas to support activities such as:

- a research and discovery approach, set around the school or in a nearby location - for example, a local road or railway line, or a nearby museum
- a group activity using web-based research for example, the use of transport by the New Zealand dairy industry, discovery about the 'Think Big' projects in the 1970s
- a local inquiry relating to family/iwi/hapū histories for example, the houses and lives of early settlers in the region, and working lives before mechanisation.

Starter questions

- What kind of ships are used today?
- How do they compare with the ships of the past – for example in areas such as size, power, speed and distance, cargo capability?
- Where is your nearest port? Is it still operating?
- What part has it played in the past, and what cargo is it handling today??
- Why was the port built there? Was it difficult to build? Why?
- Why do some ports have to close, or have to change?
- How will/could ports and shipping play a role in the future of transport? Why?

Activities

- Find out about changes to cargo storage - from bulk to containers.
- Consider how changes in technology have affected ships and shipping in the past. Will that change in the future?
- Consider new ways ports are being used – for example with more cruise ships visiting New Zealand. How does this benefit, or otherwise, our country?
- Consider why Auckland has become such an important port for New Zealand, and find other ports that are also growing in importance. Why?



PORTS & SHIPPING

Episode 4 While viewing

“Do now”

Teachers may like to consider these class-based ‘do now’ ideas as preparation activities before students watch the series. Copy masters of the Wordfinder activities and blank North Island and South island maps are provided in this guide.

- Complete the Ports and Shipping Wordfinder activity. (Wordfinder handout)
- Write down four things for which we use our ports.
- Mark on the map one of New Zealand’s major ports. (map handout)

While viewing

Making New Zealand explores how New Zealand’s infrastructure was established. Each programme features insights into what was involved in this, and the people who contributed their skills.

Teachers might like to consider the following ‘while viewing’ activities to encourage students to note some of the key information presented.

Questions

PART 1

- Why did the Māori use portage?
- What does it mean to be ‘at the mercy of the wind and tide’?
- How much coal would a scow carry in one season in the Far North?

PART 2

- Why was Captain Daldy called a visionary? What does that mean?
- What are the reasons for so many shipwrecks around New Zealand’s shores?
- Why was refrigerated transport important to NZ?
- Why was James Mills the first New Zealand born person to be knighted for shipping?

PART 3

- How large were the Union Steamship Company’s ships in the early 1900s?
- Why did people stop using coastal sailing scows for sea transport?
- Why did watersiders go on strike in 1951?

PART 4

- What were the advantages of using the Aramoana Interislander ship?
- What was learned from the sinking of the Wahine?
- Why was the change to containerisation so efficient?

PART 5

- What are the main ports in New Zealand now? Has that changed?
- What are the advantages of moving goods by sea?
- Does land or sea transport have the largest carbon footprint?



PORTS & SHIPPING

Episode 4 After viewing

The series could provide a catalyst for a range of follow-on learning activities.

PART 1

- Research and describe the many different types of boats and ships used in New Zealand.
- Make a map of the major and minor ports around the coast, and what ships and cargo they handle.

PART 2

- Ask your teacher to invite a local boatie to come and speak to the class about water depth and safety along the coasts. Prepare a safety guide for boaties.
- Research the importance of refrigeration to the NZ economy.
- Ask your teacher to consider doing this experiment. Compare milk/meat that has been a week in cold storage with some kept outside. Report on the results.

PART 3

- Find out why the 1951 Watersiders' Strike/Lockout happened. Write a newspaper article to describe the reasons and the events.
- Why was the New Zealand Steamship Company called the 'Southern Octopus'? With your teacher's permission, visit this site <http://www.nzshipmarine.com/history/companies>

PART 4

- Ask your parents/whānau about any ferry trips they have taken for example between the North and South Islands. Share their story and experiences with the class.
- With your teacher's permission, explore the Wahine story. Draw a diagram to show what happened to the Wahine in 1968. Use the original newspaper articles for research.

PART 5

- Debate: Could the world's largest container ship berth in Auckland?
- Consider what would be the most eco-friendly method of transporting goods?

PORTS & SHIPPING

Episode 4 eDMC content

Explore the eTV programme page to find enhanced digital media content for this episode.

<https://www.etv.org.nz/programme.php?id=81599>

eDMC content includes:

- extended video interviews with the following contributors
- Russell Stone | Alan Windsor | Emmanuel Makarios | Jim Doyle | Gavin McLean
(full transcripts of these interviews are available for download)
- galleries featuring images from the episode
- full transcripts of each episode, available for download
- links to the following Archives New Zealand footage:

New Zealand Marches On (1938)

Railways of the Pacific

Wonderland (1939)

Country Lads (1941)

Weekly Review No.67 (1942)

Wanganella Saves (1947)

Weekly Review No.366 (1948)

Weekly Review No.374 (1948)

Weekly Review No.428 (1949)

Beautiful New Zealand (1949)

Weekly Review No.436 (1950)

Weekly Review No.450 (1950)

Four Cities (1951)

Moana Roa (1951)

The Encircling Sea (1952)

Tauranga, Bay of Plenty (1952)

Pictorial Parade No.9 (1953)

Pictorial Parade No.27 (1954)

Pictorial Parade No.40 (1955)

People of the Waikato (1956)

Pictorial Parade No.69 (1957)

Safe Cargo Handling (1957)

General Wharf Safety (1958)

Pictorial Parade No.91 (1959)

Pictorial Parade No.99 (1960)

Pictorial Parade No.122 (1962)

Pictorial Parade No.130 (1962)

Pictorial Parade No.138 (1963)

Pictorial Parade No.146 (1963)

Pictorial Parade No.160 (1964)

Pictorial Parade No.209 (1968)

Union Trans-Tasman (1969)

Pictorial Parade No.239 (1970)

Container Countdown (1982)

Union Steamship Company of NZ

Wahine-related content

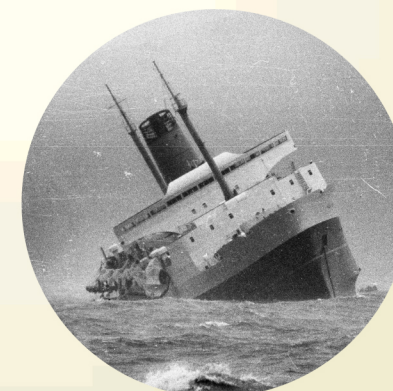
Wahine Disaster 45 years On

Wahine Day (1973)

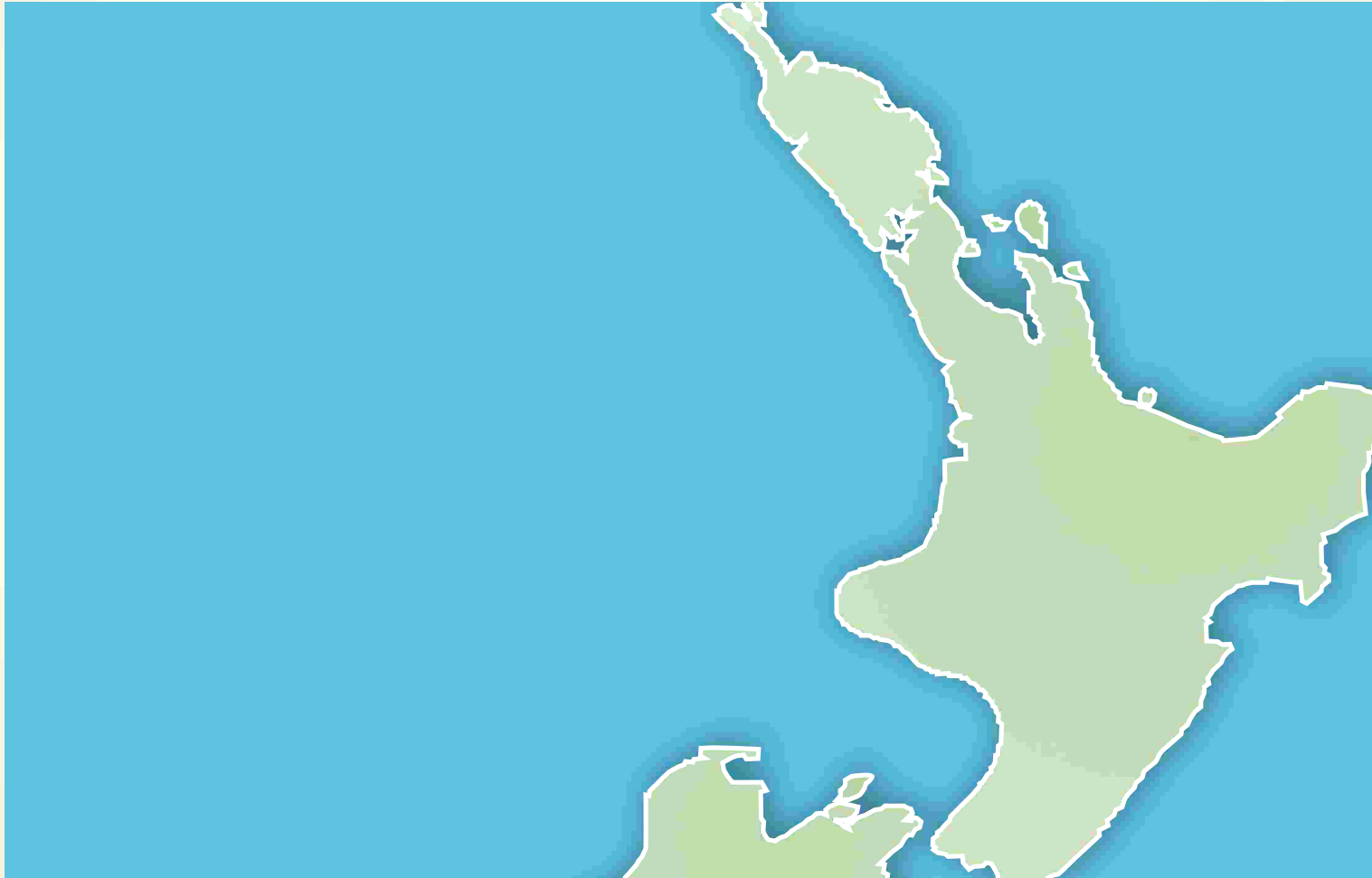
Wahine in the News

The Wahine Disaster

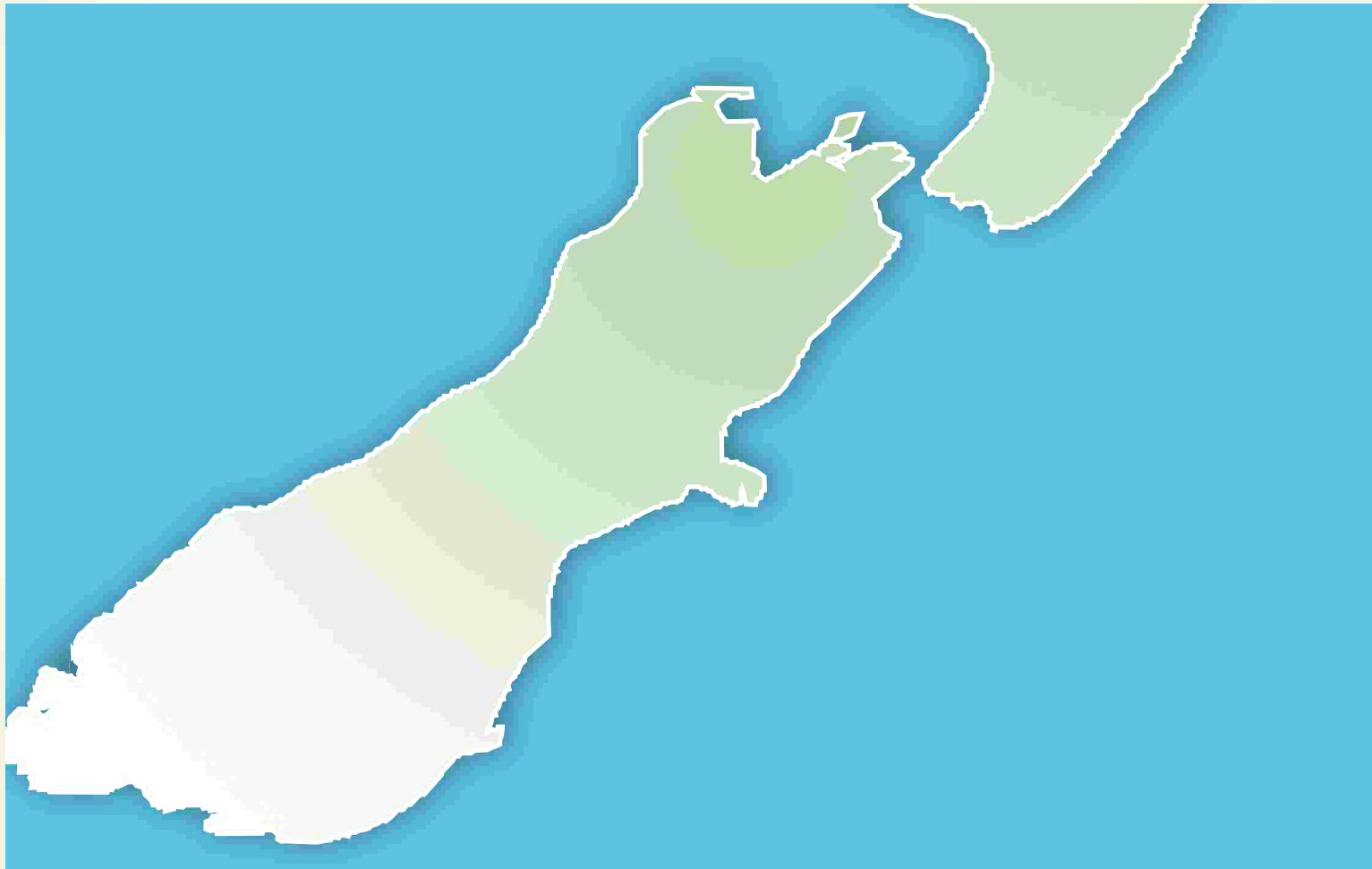
Wahine Footage 1



North Island Map



South Island Map



Resources - Wordfinder masters

Road

H	E	K	U	L	R	V	T	B	P	M	K	N	U	P
V	B	X	G	M	Y	X	H	J	W	H	Y	G	D	F
U	X	I	I	N	U	D	F	N	T	L	M	K	L	B
T	P	J	Y	I	D	Y	J	A	H	C	K	G	I	M
E	U	N	E	V	A	Y	Q	D	E	M	D	I	T	F
S	Q	U	V	M	R	M	O	T	G	L	T	Y	V	C
L	I	D	W	U	F	O	L	D	C	K	G	H	O	V
G	A	T	D	Q	R	T	N	E	C	S	E	R	C	X
Q	X	N	U	R	S	O	F	U	U	Q	D	Y	W	M
A	W	I	E	F	R	R	U	U	O	M	A	Z	Y	O
P	D	U	M	U	Y	W	N	R	X	W	O	I	X	Q
O	K	Z	H	S	U	A	L	B	H	S	E	W	O	J
T	T	E	A	S	S	Y	W	G	I	D	T	I	M	D
A	U	X	V	R	V	R	I	M	Y	D	T	U	S	Q
J	A	K	U	Z	K	H	Q	R	O	A	D	E	H	Y

MOTORWAY
HIGHWAY
ROAD
LANE
CRESCENT
AVENUE

Resources - Wordfinder masters

Rail

A	L	E	E	L	S	F	A	C	C	C	P	Y	W	W
I	L	A	Z	K	Z	H	H	S	F	A	C	N	U	A
W	C	H	T	C	U	D	A	I	V	R	N	H	F	M
E	G	R	H	A	K	O	G	T	M	R	U	V	N	M
Q	I	P	Y	R	R	N	Z	T	E	I	J	E	Q	S
O	W	I	K	T	R	K	Q	N	N	A	U	U	M	G
Q	O	O	X	I	B	M	I	O	Y	G	P	K	A	C
F	T	C	D	R	C	G	I	X	X	E	T	N	M	H
W	U	Y	O	A	N	T	F	Y	D	A	G	M	V	W
P	V	L	Z	E	A	R	H	N	J	C	H	Z	L	T
B	F	P	R	T	W	T	O	C	T	R	A	F	Z	J
Q	D	A	S	C	X	Z	K	J	F	C	S	X	Q	P
H	I	I	A	B	D	H	A	N	P	C	V	G	G	X
L	A	O	U	W	M	U	T	G	S	R	M	P	K	Y
J	K	I	B	Y	Y	N	X	J	S	I	I	N	G	M

TRACK
RAIL
STATION
ENGINE
VIADUCT
CARRIAGE

Resources - Wordfinder masters

MAKING NEW ZEALAND  Study Guide

Power

Y	T	Q	S	N	R	L	S	V	B	A	N	D	O	S
T	I	C	V	Y	K	D	X	W	F	L	Q	N	M	H
I	X	Z	N	X	I	Y	A	R	A	O	T	I	G	H
C	P	X	V	K	G	A	A	M	N	O	N	L	H	H
I	O	E	E	C	Z	L	R	D	Y	I	A	Y	P	C
R	F	C	J	C	L	E	I	J	R	G	D	S	C	B
T	I	K	X	M	H	N	P	E	J	R	E	I	K	T
C	V	X	B	T	Q	F	N	H	O	I	A	M	N	U
E	R	O	O	D	M	J	I	O	N	T	T	L	T	Z
L	L	E	L	A	J	C	B	K	O	G	R	A	O	Q
E	G	E	K	M	H	A	G	G	A	I	T	R	F	S
H	R	Z	Z	K	R	O	T	A	R	E	N	E	G	R
I	O	K	R	V	O	W	E	M	M	X	A	L	B	R
T	M	I	V	X	Q	F	M	E	Y	U	U	V	K	E
S	L	A	I	A	D	D	Y	Q	L	W	R	R	W	A

HYDRO

DAM

GENERATOR

GEO THERMAL

ELECTRICITY

SOLAR

Ports and Shipping

Y	T	H	Q	B	Z	M	R	Z	X	N	Q	V	H	K
Z	D	M	X	Q	F	D	W	K	W	T	R	P	O	W
L	I	H	W	N	P	F	P	B	H	C	I	N	V	A
C	D	H	E	X	C	M	U	W	D	H	A	R	C	A
O	Y	G	H	P	A	M	R	J	S	I	F	W	L	H
F	K	P	Q	X	R	V	P	X	W	M	J	M	X	R
H	T	N	Z	H	G	B	M	O	M	A	N	S	F	Q
Q	O	R	T	A	O	B	J	U	R	W	K	H	G	A
E	R	H	A	W	E	D	S	Z	W	T	T	A	E	C
T	W	B	K	D	K	H	W	B	O	E	B	Y	M	O
N	J	E	C	R	E	L	X	W	R	Y	I	D	K	J
Y	F	F	A	O	A	U	Z	B	T	J	E	K	D	I
B	Q	O	U	J	C	X	F	U	V	U	M	F	Z	R
U	S	B	H	K	N	O	X	C	C	Q	R	Z	T	D
V	M	C	M	N	C	J	F	B	G	L	Y	E	M	B

CARGO
PORT
SHIP
TRADE
BOAT
WAKA

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