

# Activity 11: The future of our estuaries



Let's apply our learning to create a positive future for our estuaries



## CURRICULUM LINKS

### Learning areas

#### Science: Levels 1–4

- Social Science: Social studies.
- Living world.
- Nature of Science: Investigating in Science; Participating and contributing.

#### Science capabilities

- Use evidence.
- Critique evidence.
- Interpret representations.
- Engage with science.

#### Te Marautanga o Aotearoa

- Tikanga ā iwi.
- Pūtaiao: The natural world

#### Other curriculum links

- English: Speaking, writing and presenting; Reading, listening and viewing

### Learning intentions

#### Students are learning to:

- understand how to think about the possible futures for an estuary.

### Success criteria

#### Students can:

- describe a positive future for a local estuary and start planning.

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# BACKGROUND NOTES

## THE FUTURE OF OUR ESTUARIES

A lack of well-functioning estuaries will threaten our food supply, flood protection, recreational opportunities and coastal ecosystems. A range of protection and conservation measures will be needed in the future to preserve the health of our estuaries and access to their resources. It is important that we consider the impact of our own actions as well as decisions by the wider community when thinking about our future estuaries.

## KAITIAKITANGA AND ESTUARIES

Kaitiakitanga is a way of thinking about and looking after the environment to help maintain the balance between everything within it. It can be loosely translated as ‘protection’ or ‘guardianship’.

In Te Ao Māori (the Māori world), humans have a responsibility to keep the physical and spiritual balance of the environment intact. Kaitiaki are tangata whenua (indigenous people) who have been given responsibility through ancestral connections to protect and look after an area’s resources. Kaitiaki help to restore ecosystems through a holistic approach, recognising that all things are interconnected. Students can support kaitiaki and tangata whenua with their roles.



Manawatu Estuary. Photo: Helen Kettles, DOC

## A FUTURE FOCUS

The future focus principle involves students looking to the future to predict what could happen and thinking about how this might affect estuaries and their communities. Students can think about different possible futures, both positive and negative. Thinking about the range of possible futures can give insight into how decisions and actions in the present can shape future consequences.

Approaching learning with a future focus/futures thinking requires the consideration of three aspects.


1. How things might be in the future.
2. How we might learn and teach in the future (how will schools look in the future?).
3. What life might be like for students in their future lives – helping to prepare them for future challenges and issues.



# BACKGROUND NOTES

## THE FUTURE FOCUS PRINCIPLE AND HOPE FOR THE FUTURE

The future focus principle is learning about and for the future. Although it is important that we recognise the likely possibility of a challenging future, we can keep the focus on the positive possibilities for our estuaries when teaching Levels 1-4. There is plenty to be hopeful about, and many individuals and groups are doing inspiring work that is contributing to healthy future estuaries and oceans. For more information about the future focus principle in the New Zealand Curriculum, visit the Te Kete Ipurangi (TKI) website.

 New Zealand Curriculum Principles – Future Focus

 Future Focus videos

## A WHOLE CATCHMENT APPROACH AND ECOSYSTEM-BASED MANAGEMENT

In the future, we will need to use many different tools to preserve the health of our estuaries and the wider marine environment. As the human population increases and there are greater demands and impacts on estuaries and the wider environment, more community knowledge and action will be needed.

Ecosystem-based management addresses the different stakeholders and interests in the wider marine environment, while aiming to meet the needs of the community into the future.

Catchment management plans and marine spatial plans are blueprints for how the public and groups in the community can contribute to healthy estuaries: balancing human needs with ecosystem health. There are many positive examples of these for estuaries and harbours around New Zealand.





Orewa Estuary. Photo: Shan Walker, EfS Initiatives



# LEARNING EXPERIENCE 11: THE FUTURE OF OUR ESTUARIES

## Resources for this activity

- Living Waters documentary *The future*.
  - ▶ The Future
- Land, Air, Water Aotearoa (LAWA) *River of the Month: Waikouaiti River, Otago video*.
  - ▶ LAWA - River of the Month: Waikouaiti River, Otago
- Outlook for Someday documentary *Land-River-Sea* by Kura o Matihetihe.
  - ▶ Land-River-Sea
- DOC's Restoring Estuaries map
  - ▶ Restoring Estuaries
- Student learning sheet  *Future consequences of an issue for your estuary* (page 10)
- Poster:  *Water quality – how does the future shape up?* (page 11)

## Vocabulary

Future, problem-solving, kaitiakitanga, kaitiaki, tangata whenua, community, sharing, positive, worst, scenario, likely, consequences.

## Links

**To open the links throughout this resource without losing your place in the document, follow either of these steps:**

- Right click on the link and click **Open Hyperlink**. Now the link will be opened in new tab.
- Hit the **Ctrl** key while you left click the link. This will also force the browser to open the page in a new tab.

Either of these methods will open the link in a new tab leaving the teaching resource open.



Focus question  
How can we contribute to a positive future for our local estuary?



# INTRODUCING STUDENTS TO THINKING ABOUT THE FUTURE OF OUR ESTUARIES

*Note: These learning experiences are suggestions only. Teachers are encouraged to adapt and change the material to suit their students' needs and interests.*

## Reviewing what is happening for your estuary

- Reflect on your findings from *Activity 10: The current status of our estuary*.
- Which issue was of most concern to students during their inquiry? Ensure that this focus issue is relevant to your community. Discuss the issue and its impact on your community, living things and the environment. Record ideas.

## Sequence for thinking about the future of an issue for your estuary



## Working with tangata whenua in your area



### Kaitiakitanga

- Watch the Outlook for Someday film *Land-River-Sea* by Kura o Matihetihe.
  - ▶ Land-River-Sea
  - After viewing, discuss the meaning of kaitiaki. What does it mean to look after your gifts (eg your resources such as kaimoana)? (See background notes.)
- View LAW A's *River of the Month: Waikouaiti River, Otago* video, which shows how the Otago community is working together with iwi for a positive future for the Waikouaiti River (3 min 29 s).
  - ▶ LAW A - River of the Month: Waikouaiti River, Otago
- Examine DOC's Restoring estuaries map to find iwi and other groups who may be working to restore your local estuary.
  - ▶ Restoring Estuaries



## Supporting kaitiaki

- Students can support kaitiaki in their roles and can work alongside iwi. Ask whānau and iwi who are affiliated to your school about how they are involved in estuary restoration or protection. Is there an opportunity to support their efforts?
- To find out about iwi who are responsible for kaitiakitanga in your rohe (area), you could contact your local council or check Te Kāhui Māngai (Directory of Iwi and Māori Organisations).

 Te Kāhui Māngai


### Inquiry stage 1: Planning for action



## Thinking about the future of your local estuary

- Explain the future focus principle to your students (see background notes). Thinking about the future involves using our imaginations and wondering what life could be like as time goes on.
- Learn about how the local community is working together with councils, DOC, iwi and students to improve the long-term health of the Porirua Harbour by viewing the Living Waters documentary *The future*.

 Living Waters - The Future

- Ask students to share their ideas with a buddy about what they think the state of their local estuary and catchment will be in 10–15 years' time. What could the estuary possibly be like in the future?
- Discuss what the **best potential future** for your focus issue looks like. Also, what could the worst possible future for the issue look like? How could your focus issue look in 20 years' time?
- Students can record their ideas about possible futures and the consequences of these futures on the  *Future consequences of an issue for your estuary student worksheet* (page 10).
- When considering long-term consequences, think about what could happen over time if the short-term consequences occurred?
- Which future do students believe is the **most likely** to occur and why? What unpredictable factors could alter the future? (Eg climate change, natural disasters, new inventions)
- Share ideas about how estuaries might be important to the future health of our oceans and marine environment. How could losing the healthy functioning of our estuaries affect our communities?



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**Activity 11: The future of our estuaries**  
PROTECTING OUR ESTUARIES

## REFLECTING ON KNOWLEDGE

### What is the best possible future you can help to create?

- What is your community's vision for your estuary? How can you contribute to this vision?
- Share the ideas students recorded on the *Future consequences of an issue for your estuary* worksheet about the **best possible future** for your estuary and discuss how that future might be realised. What could individual students, their families and the wider community do to ensure the best possible future happens?
- Ask your local council or environmental groups about any future plans for your estuary and what is being done to enhance the health of the catchment. Gather information and determine where your findings and ideas sit in the big picture for the estuary. To see an example of a community plan for an estuary, including what could happen in the future, read the Waimea Inlet restoration guide, which includes information on future-proofing for issues such as climate change and sea level rise.

 [Waimea Inlet restoration](#)

- How could students contribute to a positive future for your estuary and the wider marine environment? Brainstorm ideas.
  - Students can draw their vision of a positive future for their estuary on the *Future consequences of an issue for your estuary* worksheet (page 10). Watch this video about the *Waders and Wonders of Ōrewa Estuary* exhibition by Kiwi Conservation Club (KCC), which shows kids' ideas and art works expressing what Orewa Estuary could look like in future once pest control has started.
-  [Waders & Wonders of Orewa Estuary exhibition](#)
- In  *Activity 12: Environmental action for estuaries* we will look at possible direct actions that could contribute to a positive future.

## EXTENDING LEARNING

- If students have been investigating a particular species, consider how this species might be affected by the focus issue. How can your students contribute to a positive future for this species?
- Find out more about ecosystem-based management of the marine environment by exploring resources from LEARNZ and Science Learning Hub.

 [LEARNZ - What is ecosystem-based management?](#)

 [Looking at ecosystem-based management \(EBM\)](#)





## MORE RESOURCES RELATING TO THE FUTURE FOCUS PRINCIPLE / FUTURES THINKING

- Sustainable Seas National Science Challenge.
  - 🔗 Sustainable Seas Challenge
- LEARNZ Sustainable Seas virtual field trip.
  - ▶ LEARNZ - Sustainable Seas
- Science Learning Hub's Sustainable Seas National Science Challenge article.
  - 🔗 Sustainable Seas National Science Challenge
- Science Learning Hub's Environmental thinking and planning with ecosystem-based management (EBM) activity.
  - 🔗 Environmental thinking and planning with ecosystem-based management (EBM) activity
- Science Learning Hub's Futures thinking toolkit.
  - 🔗 Futures thinking toolkit
- Ministry of Education's Why the future focus principle is important video, in which National Director of Future Problem Solving, Robyn Boswell, speaks about the importance of the future focus principle.
  - ▶ Why the future focus principle is important
- Smithsonian presentation about the possible futures of our oceans.
  - ▶ The future of oceans



## FUTURE CONSEQUENCES OF AN ISSUE FOR YOUR ESTUARY



The issue		
Describe the possible futures for this issue What would it look like if ...	What could happen in the short term?	What could happen in the long term?
The issue gets worse:		→
		→
The issue stays the same:		→
		→
The issue gets much better:		→
		→
What would you like your estuary to be like in the future?		

Google Docs version:  *Future consequences of an issue for your estuary.*

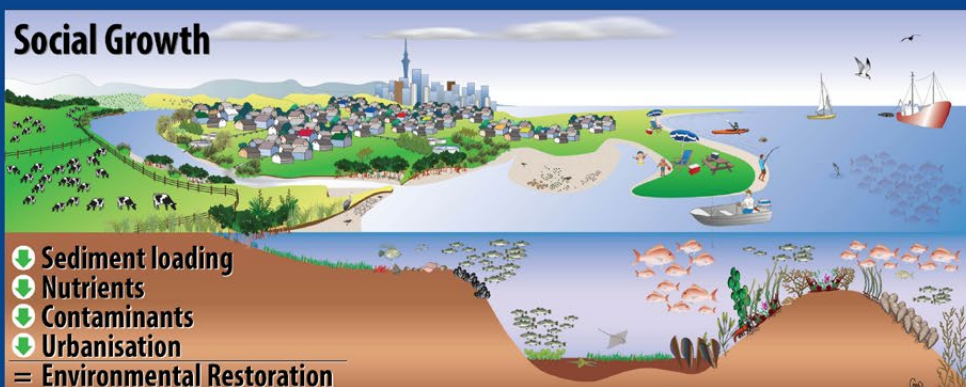
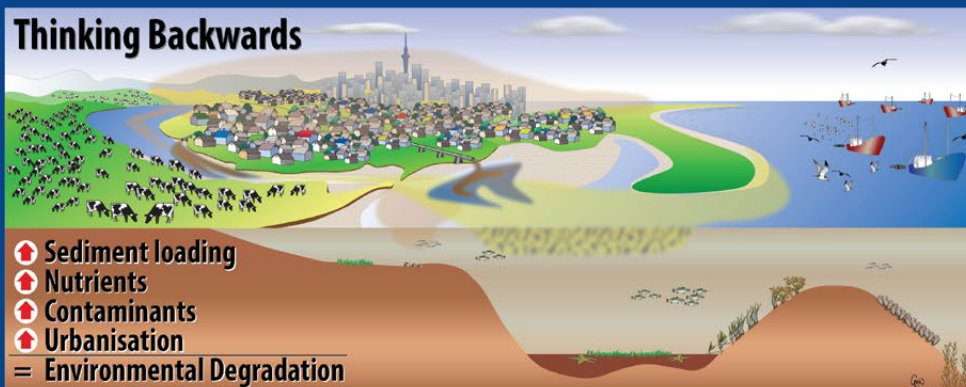




Marine Futures



# Water quality – how does the future shape up?



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This poster was compiled by Max Oulton (University of Waikato) and Brian Smith, Carol Lindquist, Katie Cartner, Michael Townsend and Niall Broekhuizen (NIWA). Image courtesy of NIWA, Cawthron Institute, University of Auckland and the Marine Ecology Research Group.

