Activity 10: The current status of your estuary

Let's reflect on your findings to come to conclusions about your estuary

CURRICULUM LINKS

Learning areas	Learning intentions	Success criteria
Science: Levels 1–4 ▪ Living world: Ecology. ▪ Nature of Science: Communicating in science; Participating and contributing. ▪ Social Sciences: Social studies. **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** ▪ Mathematics: Levels 1–4: Statistics.	**Students are learning to:** ▪ explore what is currently happening in their local estuary ▪ reflect on how people have influenced the estuary over time.	**Students can:** ▪ record current activities in their local estuary ▪ identify an issue of concern for their estuary that is having an impact on animals or humans.

July 2020 R141142

CONTENTS

BACKGROUND NOTES

THE CURRENT STATUS OF YOUR ESTUARY

Students can reflect on their learnings and investigations about their local estuary. Organise and summarise data and information, including the wider perspectives of the community, to reach conclusions about the current status of the estuary. Further research may be needed to identify patterns or trends.

FINDING OUT ABOUT WHAT IS HAPPENING IN YOUR ESTUARY

Environmental groups, local councils and other organisations may have information and reports about what is being done to enhance the health of your estuary. Talk to others about what is already happening before starting to plan your own activities and actions in the estuary as this will save time and energy. For further information, see DOC's Monitoring estuaries and Restoring estuaries maps.

Monitoring Estuaries

Restoring Estuaries

MONITORING YOUR ESTUARY OVER TIME

Monitoring plants, animals and habitats over time can build up a picture of the species, patterns and health of an estuary. Monitoring is best carried out at least once a season to account for seasonal trends. Knowledge and understanding of the usual habitats and species that are present, along with seasonal variations in these, make it easier to see significant changes or problems emerging over time. Performing only one individual test or survey does not provide as much information as we cannot see or understand the natural patterns of the area. See *Activity 9: Visiting Estuaries* for ideas about monitoring.

Invertebrates found in seagrass. *Photo: Helen Kettles, DOC*

LEARNING EXPERIENCE 10:

THE CURRENT STATUS OF YOUR ESTUARY

Resources for this activity

- DOC's Monitoring estuaries map.
  Monitoring Estuaries
- DOC's Restoring estuaries map.
  Restoring estuaries
- Student worksheet *Monitoring cockles at Pāuatahanui Inlet*
- Student worksheet *Thinking about the current status of your estuary*

Focus question

What can we conclude about our estuary and how can we share our findings?

Vocabulary

Issue, impact, history, conclusions, summary, information, situation, monitoring, ecosystem, survey, population.

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.

INTRODUCING STUDENTS TO ASSESSING THE CURRENT STATUS OF AN ESTUARY

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

Estuary monitoring and restoration

- Monitoring over time can give us an indication of changes in estuaries and the habitats they contain. It can help to detect any problems or issues and give us valuable information about the impacts of human activities.
- Monitor your estuary over time using the New Zealand Marine Studies Centre's Marine Metre Squared (Mm2) project tools.

  Marine Metre Squared
- Reflect on the information you obtained and the map of your estuary from *Activity 6: Estuaries for everyone*. Identify groups of people working in your community who are having a positive or negative impact on your local estuary and coastal environment. Is any restoration, monitoring, pollution or sedimentation happening in your local catchment?
- To see if any agencies of groups are monitoring your estuary, explore DOC's Monitoring estuaries map.

  Monitoring Estuaries
- To discover whether local restoration groups or iwi are already working to restore your local estuary and to find out more about their activities, view DOC's Restoring estuaries map and the Nature Space website.

  Restoring Estuaries

  NatureSpace
- Who are the different people that are involved in restoration? What are their roles and how do they work together?

The history of your local estuary

- Reflect on the findings you made during your inquiry to try to understand what has happened to your local estuary over time. Ask local long-term residents if they have photos of the coast or estuary from the distant past. Compare these with current photos and note any changes you see.
- What changes have iwi and tangata whenua seen in the estuary over time? (See also *Activity 7: Te Ao Māori and estuaries*)

Community monitoring of cockles: Guardians of Pāuatahanui Inlet

- The Guardians of Pāuatahanui Inlet (GOPI) have been monitoring the cockle population in Pāuatahanui, near Wellington, since 1976. They have seen changes in the numbers of cockles over the years.
- Students can view an example of the data GOPI have collected at the inlet on page 9 of this resource. Introduce the terms 'monitoring', 'ecosystem', 'survey' and 'population' before asking students to complete the worksheet.
- Students can read the text, examine the graph and data, and answer the questions on the student worksheet.
- Discuss how data from community monitoring might help scientists from agencies such as DOC and local councils.

For more information, see the GOPI website.

The Guardians of Pauatahani Inlet: Cockles of the inlet

REFLECTING ON LEARNING

Inquiry stage 9: Review and reflect

The current status of your estuary: collating information

- At this point, students can take the opportunity to reflect on the overall findings you have made during the inquiry. Are any patterns or trends emerging from the evidence and data you have gathered? This may involve sharing information with other organisations.
- Organise and sort the information you have gathered into different types of information relating to your estuary – eg estuary habitats, people and the estuary, health of the estuary, animals of the estuary, issues for the estuary. You could create a large wall display of your data and results.

Looking back at *Activities 6, 7, 8* and *9*, reflect on the following aspects.

People and the estuary

- Who have you spoken to about your estuary? How are groups and individuals involved with the estuary and catchment? What does your community think and feel about your estuary? What are the community's views and perspectives?
- How are tangata whenua connected to and involved with the estuary?
- What experiences have you had in (or near) your estuary?

The health of the estuary

- What observations, results and data have you gathered about your estuary?
- Do you think that your estuary is healthy? (Examine your results to get ideas.)

- Is your estuary a healthy place where you can gather kaimoana? If not, was it in the past?

Locals surveying fish at Waituna Lagoon.
Photo: Helen Kettles, DOC

Animals and other living things in the estuary

- Which animals live in your local estuary? Have these changed over time? Why/why not? What do the changes tell us? (Eg an increase in nutrients could cause algal blooms, reducing the suitability of the habitat for some animals.)
- Are there some healthy habitats in your estuary? How do you know they are healthy? (See *Activity 8: Healthy estuaries*.)

Issues for the estuary

- Is there a particular issue of concern for your estuary that is causing problems for animals and/or people?
- How is your estuary different today from how it was in the past? What could be responsible for any negative changes?

Thinking about an environmental issue for your estuary

Identify a focus issue that is relevant to your community and estuary → Reflect on the past and collate information to reach a conclusion about the current situation → Share your findings and take steps towards a positive future for your issue

Inquiry stage 5: Coming to conclusions

- Students can write a summary of their findings, as illustrated in the example below.

Summary of inquiry findings about our estuary		
Three things we found out about our estuary ▪ ▪ ▪	Three things we found out about living things in the estuary ▪ ▪ ▪	What else do we want to know about our estuary?

Google Docs version: Summary of inquiry findings about our estuary

- Students can also complete the student activity sheet *Thinking about the current status of your estuary* on page 11.

EXTENDING LEARNING

Inquiry stage 9: Review and reflect

Note: This inquiry stage of sharing can be completed at a different point in the inquiry if that seems more appropriate for your students. This stage could also feature more than once in your learning journey.

- Share students' data and findings from their inquiries and investigations. This could be through a presentation, assembly item, hui, report, blog, meeting, photo display or newsletter item.
- Talk about what is happening in your estuary and what issues are relevant for local people. What messages about your estuary are important to share?
- Alternatively, you could share your conclusions and findings through an online tool such as

  voicethread.com, popplet.com, wordclouds.com, tellagami.com
- Information could also be shared by making a video or media publication, as shown in the following example from the Kiwi Conservation Club (KCC).

  Waders & Wonders of Orewa Estuary exhibition
- Visit local residents or other organisations (eg councils) who are also involved with this issue. See if you could collaborate with them to address the issue.

OTHER RESOURCES RELATING TO THE CURRENT STATUS OF ESTUARIES

- Science Learning Hub's Estuaries and farmland run-off resource.

  Estuaries and farmland run-off
- Science Learning Hub's Estuary issues and protection resource.

  Estuary issues and protection
- Science Learning Hub's Estuaries in New Zealand resource.

  Estuaries in New Zealand
- DOC's Meet the locals video on Waikanae locals who are helping to restore their estuary.

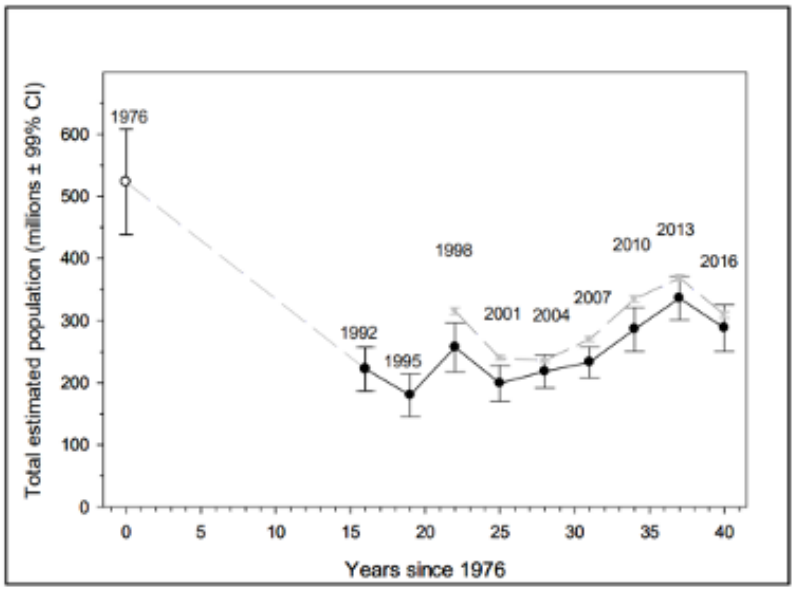
  Meet the Locals – Estuary

MONITORING COCKLES IN PĀUATAHANUI INLET

For decades, the Guardians of Pāuatahanui Inlet (GOPI) have been surveying the cockle/tuangi population at their local estuary. They perform surveys every 3 years. There are millions of cockles in the Pāuatahanui Inlet. They are an important component of the ecosystem because they provide the main source of food for many shorebirds and fish species and also filter the water and help keep it clean. Students often help GOPI with their monitoring.

Measuring cockles. *Photo: Fiona Foxall*

Line graph of the estimated cockle population in the Pāuatahanui Inlet from 1976 to 2016



Sourced from NIWA report on the *Community survey of cockles December 2016*.
Reproduced with permission from GOPI.

Questions:

1. **What was the estimated number of cockles at Pāuatahanui Inlet in 1976?**
2. **What do you notice about the changes in the numbers of cockles over the 40 years?**
3. **What do you think could have caused these changes in numbers?**
4. **What is the current population of cockles at Pāuatahanui Inlet?**
5. **Should GOPI be concerned about the change in numbers? Why/why not?**

Read the full report at Community survey of cockles December 2016.

Google Docs version: Monitoring cockles in Pāuatahanui Inlet (does not include graph).

Possible answers

1. Approximately 525 million cockles.
2. The number of cockles has changed over the years. The population decreased from 1976 to 1995 and then increased gradually up until 2013. It then slightly decreased again in 2016.
3. Changes in the environment and the numbers of predators can affect the number of cockles. The decline from 1976 to 1995 will be related to the large number of new houses that were built in the catchment at that time. This building work caused a lot of mud to be washed into the Pāuatahanui Inlet and smother the cockles due to poor sediment control. The decrease in numbers in 2016 may have been caused by a large flood that affected the inlet.
4. Approximately 290–300 million cockles.
5. They should be concerned but the situation has improved in the recent past, with the exception of 2016. Numbers have recovered slowly from the big drop between 1976 and 1995 but we don't know if they will ever return to their original numbers. We'll have to keep up to date with what the Guardians find next time they do their survey!

THINKING ABOUT THE CURRENT STATUS OF YOUR ESTUARY

Is your estuary healthy or unhealthy? What evidence do you have to support this idea?	
Which activities have an impact on the health of your estuary? What evidence do you have to support your ideas?	
What is your community doing to help your estuary? What is improving the health of the estuary?	
What is the most concerning issue for your estuary? What has caused this issue? Which species are you concerned about?	
What can you do to look after your estuary and catchment?	

Google Docs version: Thinking about the current situation for your estuary.