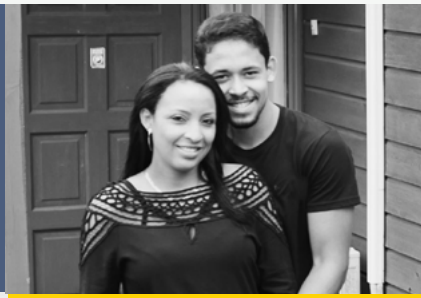
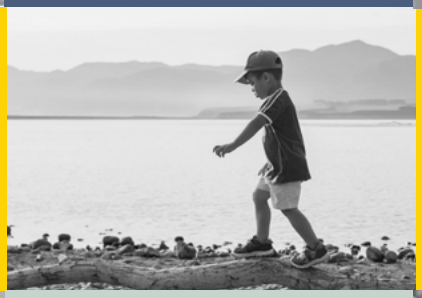
WHERE TO GO FOR CLIMATE CHANGE DATA?

How quickly is the sea level changing on my coastline?

Where do I find information about flooding in my neighbourhood?



What do we know about our past and future climate?



How bad will marine heatwaves or drought become?

How could our river flows change because of climate?

Our community needs local climate research, where do we begin?

If you want to learn more about what climate change means for your community, or support whānau to wānanga what their future could look like under climate change, this infosheet is a starting point.

Changing with our climate

START ADAPTATION PLANNING TODAY

WHERE TO GO FOR CLIMATE CHANGE DATA?

We know that useful climate change information is often hard to find and even harder to understand. We also know that supporting communities to make decisions about their futures means supporting them to access and understand the changes that are happening and likely to happen into the future. Your community's own experiences and mātauranga are of equal value to the data and information we refer to in this infosheet. We encourage you to consider both kinds of "data" alongside each other.

There are many local and national resources avaliable to help you explore climate hazards and information, for example:

- How your community may be exposed to sea-level rise and future coastal flooding
- What information currently exisits on future and past temperature and rainfall
- How marine heatwaves or drought might change in the future
- What we know about climate impacts on the volume of water in our rivers.

What is not covered in this infosheet?

This infosheet doesn't cover the cultural, social, biological, economic, political, spiritual or whakapapa impacts, which are deeply entwined with the physical impacts of climate change.

> *"These data tell us we need to start adapting to our changing climate now. Organisations, iwi and hapū, councils and communities up and down the country are experiencing these impacts already. We need to really focus on how we can support their adaptation planning today."*

KATE TURNER, KNOWLEDGE BROKER, DEEP SOUTH CHALLENGE

PROJECTIONS FOR THE ATMOSPHERE

For your region: General overview

The Ministry for the Environment (MfE) provides broad summary projections for the different impact areas, such as temperature, drought, wind, etc. This is very broad and most useful for those who are new to the way climate scientists talk about climate change. Climate change modelling in New Zealand is led by NIWA, the Crown Research Institute for climate, freshwater and ocean science.

» Ministry for the Environment | Climate change projections per region

For your region: More comprehensive

Most regional councils have now commissioned climate projection and impacts reports. Many parts of the country, such as the Kāpiti Coast, Northland, Hawkes Bay and South Dunedin, are now going through comprehensive climate adaptation planning processes with their communities, which often include updating what is known about future climate and its impacts, locally. These regional reports and local planning processes are often the most comprehensive assessment of existing knowledge on climate projections, and in some cases impacts, for your region.

» Simply search "climate change projections and impacts for [your region]"; or look on your regional council website. There are often interactive maps and data portals also available, which are noted below.

For Aotearoa

This report describes the underlying national climate modelling that we currently use in New Zealand for risk and impacts studies, and for the regional council reports.

» Ministry for the Environment | Climate Change Projections for NZ (2018)

You can view this information online, where you can map things like seasonal temperature change or number of frost days into the future around the country. You can explore different global models to understand what the range in results is; the "six-model average" gives you a central indication of change, and looking at different models will give you a sense of the variability between the models which predict the range of possible futures we may need to adapt to.

» NIWA | Our Future Climate NZ

For researchers

If you would like access to these data for your research, a brief outline of what is available can be found on our website: https://deepsouthchallenge.co.nz/resource/climate-data-information-for-researchers/

CONNECTIONS BETWEEN LAND & SEA

Sea-level rise

Local information about future sea-level rise is available, and you can view and download the data for your region. These projections have been created by taking sea-level rise projections for New Zealand as a whole and adding local land movement trends to them. So, for example, if the coastline in your rohe has been historically slumping or subsiding (and continues to subside), the expected sea-level rise will be a lot higher than if the land has been uplifting.

» NZSeaRise | Maps

Flooding

Your community's lived experience will guide you, especially if you're familiar with devastating flood events. Your local council also holds flooding information, often available on their respective data portals (e.g. coastal flood maps available for Northland Regional Council and Tauranga City Council.) If what you're looking for isn't available, it's often worth asking, as extra maps may be held by the council.

» Flooding due to rivers overtopping and/or extreme rain: Though research is trying to tackle this, there is currently no national map suite for inland flooding for different intensity/frequency storm events. Councils will hold information for your region or district. These maps vary in terms of how they take climate change into account, or in some cases don't yet.

» Many councils have explored coastal flooding hazards in response to climate change. If your region or district council has not, the Deep South Challenge has supported NIWA to complete national-scale mapping of future coastal flooding due to sea level rise and storm events. Please get in touch.

Coastal erosion

You will know where the land is unstable or eroding in your area better than anyone. To understand coastal erosion at a regional scale, some councils have commissioned assessments, some of which include a climate change component. Bay of Plenty Regional Council and Hawkes Bay Regional Council, for example, have data portals that show this mapping.

River flows

Changes to the natural flow of our rivers are expected with climate change. Researchers have modelled these changes, however, these data best represent changes to average flow, rather than extremely high or low flow. Some analysis of when you might see impacts on water availability and some extremes such as the "100-year" flood have also been completed.

» DSC research led by NIWA | Climate impacts on the national water-cycle

Suspended sediment

High levels of sediment in our waterways disrupt ecosystems and mahinga kai by blocking light and smothering river beds. With an increase in the strength and frequency of storms, rivers that run through erodible land are at risk of transporting increased levels of sediment. Sediment "load" and "yield" have been modelled under future climate change; these identify potential changes in the amount of sediment suspended in rivers and accumulating in lakes or at river mouths. Some regional councils have commissioned local modelling of these changes. Enquire with them first, as this information may not be online. If there is no locally-specific modelling for your area, national analysis has been completed which can be interpreted down to a catchment-scale.

» DSC and Our Land and Water research led by Manaaki Whenua Landcare Research | Climate change impacts on suspended sediment loads in NZ

PROJECTIONS FOR THE LAND & SEA

Drought

Drought affects our ability to grow food and have a secure supply of drinking water, and increased summer temperatures alongside decreased rainfall means it is likely we will see more summertime drought with climate change. Researchers have explored what future drought might look like; maps of spring and summer drought indices can be found on page 21 of this report.

» DSC research led by NIWA | Projected changes in New Zealand drought risk

Fire risk

Wildfire can be hugely damaging to communities and livelihoods. With changing rainfall, temperature and wind patterns, climate change is expected to increase the frequency, severity and season length of weather fire conditions in New Zealand. Researchers have investigated what wildfire risk looks like in a changing climate, and how we might better reduce this risk and prepare our communities.

» Scion | Adapting and mitigating wildfire risk due to climate change: extending knowledge and best practice

Marine heatwaves

Periods of unseasonably high ocean water temperatures are becoming more common, affecting the well-being of our coastal oceans, and impacting survival and health of kaimoana, kelp and many ocean species. Some fish are adapting by moving south, into areas they haven't been seen before. Researchers have investigated how the behaviour of marine heatwaves will change over the century in both the deep and coastal ocean.

» DSC research led by NIWA | Marine heatwaves and the link with climate extremes

CURRENT CLIMATE & ENVIRONMENTAL MEASUREMENTS

Environmental data is operationally collected and synthesised by different agencies. Some of the first places to look are noted below.

STATISTICS NZ AND THE MINISTRY FOR THE ENVIRONMENT

Ministry for the Environment and Statistics NZ | Environmental Reporting

Statistics NZ and the Ministry for the Environment publish reports for different environmental "domains" every six months, detailing observed trends in land use, our marine environment, the atmosphere and climate, the state of our freshwater, and air quality. A "state of the environment" synthesis report is published every three years.

Statistics New Zealand | Indicators

The indicators used in this reporting are also available, with interactive tools available for many datasets. For example:

- Ocean indicators, including recent sea surface temperature trends, coastal sea-level rise trends (based at four port locations), primary productivity, and others;
- Atmosphere and land indicators, including drought, extreme wind, temperature, extreme rainfall, land use trends, and others.

Ministry for the Environment | Data Service

The underlying datasets for these indicators, and many more, can be found on the Ministry for the Environment's Data Service.

LAND WATER AOTEAROA (LAWA)

This site shares information about lake, river and ground water quality, air quality and land use. LAWA is a collaboration between Te Uru Kahika - Regional and Unitary Councils Aotearoa, Cawthron Institute, the Ministry for the Environment, the Department of Conservation, and Statistics New Zealand.

COUNCIL DATA

Councils hold a lot of environmental data (oceans, rivers, land, air) taken from observation sites they monitor (e.g. Gisborne District Council, Otago Regional Council), some of which is made available online. Search for [your region's council] environmental maps and data" to see what is available online, and contact your council directly if there are data you are interested in but cannot find.

NATIONAL ENVIRONMENT DATA CENTRE

This website collates many of the public environmental data services from Crown Research Institutes, including a drought monitor, ocean acidification observations, recent river flow data for selected rivers and projections of extreme "high intensity" rainfall. For climate specifically, the site is linked to Cliflo, where you can find long-term observation records from weather stations (temperature, rainfall, wind, etc.).

Where to go for more information?

In the first instance we recommend reaching out to the organisations hosting the data. Some organisations are not funded or resourced to answer public questions so a response may take some time, or be only partial.

Many other kinds of research can also support proactive decision-making and help us work for the futures we want in the face of climate change. To have a look at some of the adaptation research from the Deep South Challenge: Changing with our Climate, visit https://deepsouthchallenge.co.nz/our-research/ and explore the Vision Mātauranga and Impacts & Implications pages.

We hope this infosheet is useful to you on your journey towards climate resilience. We know that our changing climate is one of many factors in decision-making and planning, and though not all of these data will be relevant to your situation, we hope you find what you need to get started.

The future is uncertain, whether due to climate change or otherwise, and we know we can still act despite less-than-perfect information.

IF YOU HAVE QUESTIONS OR COMMENTS ABOUT THIS INFOSHEET, PLEASE CONTACT OUR CLIMATE CHANGE KNOWLEDGE BROKER: KATE.TURNER@NIWA.CO.NZ

Changing with our climate

START ADAPTATION PLANNING TODAY

WE CAN ADAPT, WE'VE DONE IT BEFORE, WE CAN DO IT AGAIN