

Nature-Based Solutions for Climate Action

Aya Morris – Fulbright New Zealand Science & Innovation Graduate



From Aotearoa to New York City



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Resilient Coastal Communities Project

Columbia Climate School



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United Nations Sustainable Development Goals



SUSTAINABLE DEVELOPMENT GOALS



TE KUNENGA | MASSEY
KI PŪREHUROA | UNIVERSITY
UNIVERSITY OF NEW ZEALAND



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The UN SDGs - Masters Research



- **SDG 11 Sustainable Cities and Communities**



- **SDG 13 Climate Action**



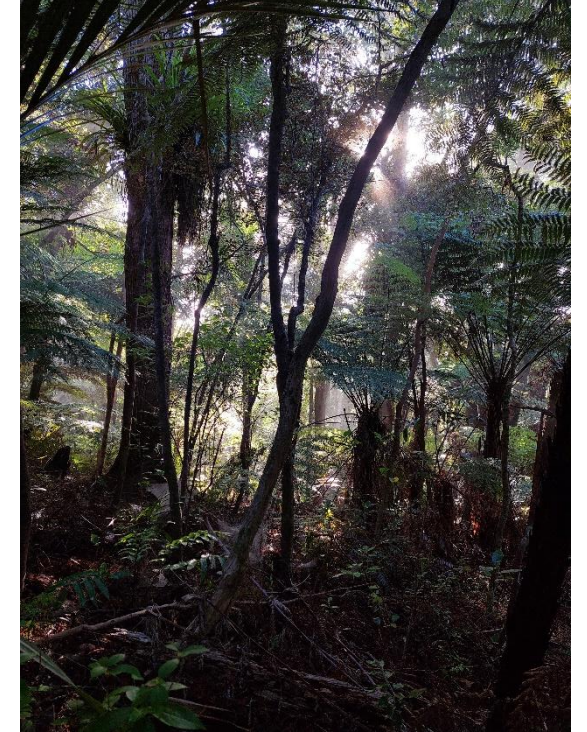
- **SDG 14 Life Below Water**



Visiting United Nations HQ



Nature-Based Solutions



Climate Change Mitigation and Adaptation

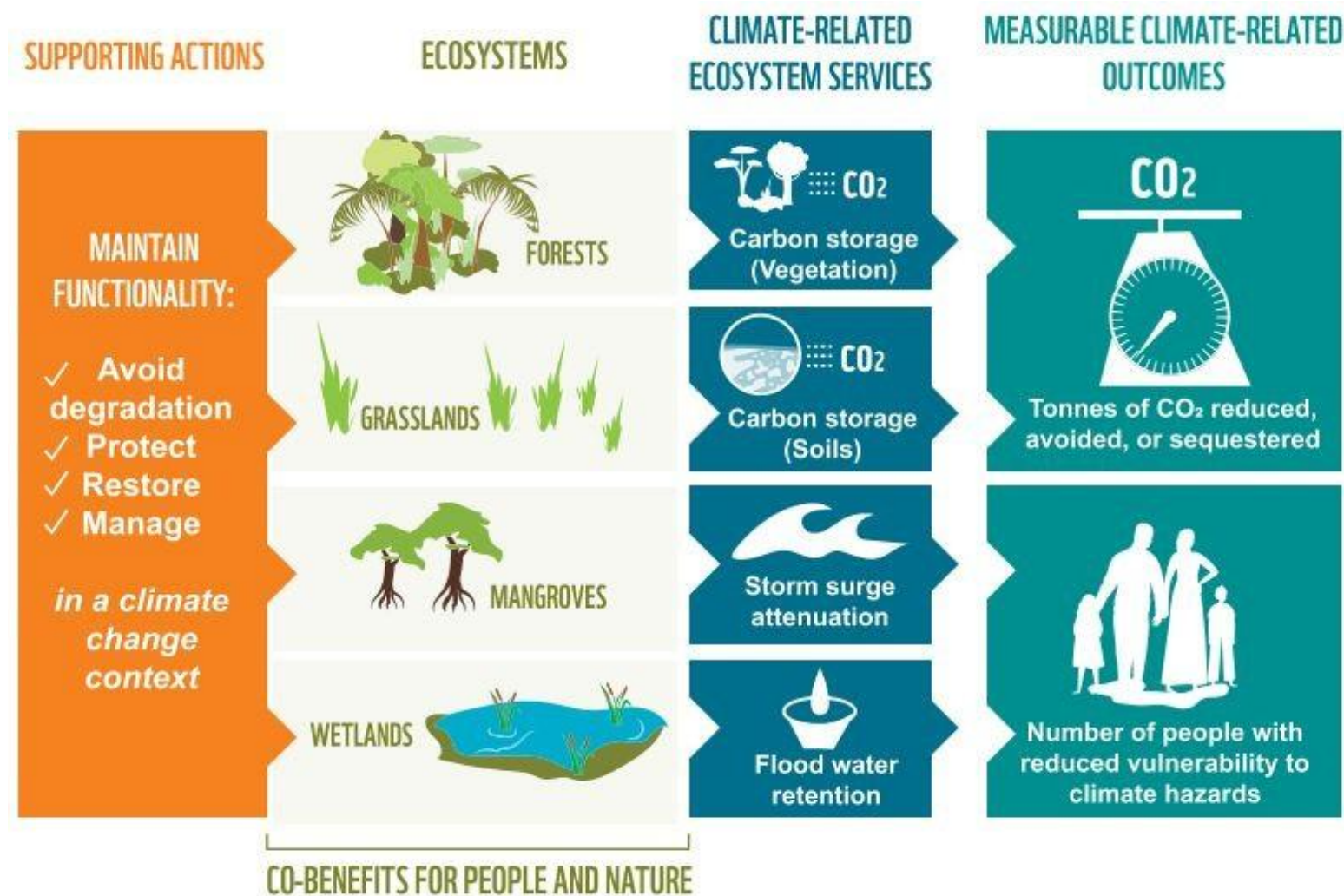
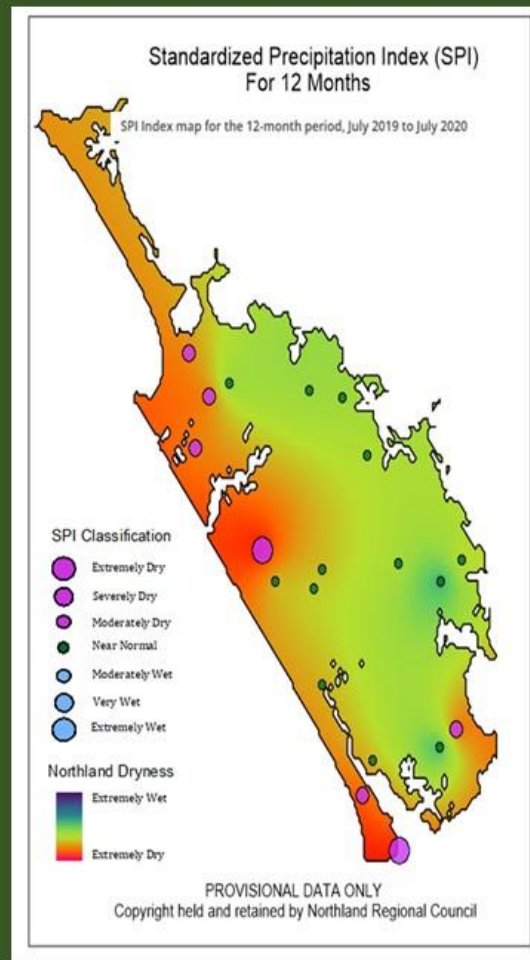
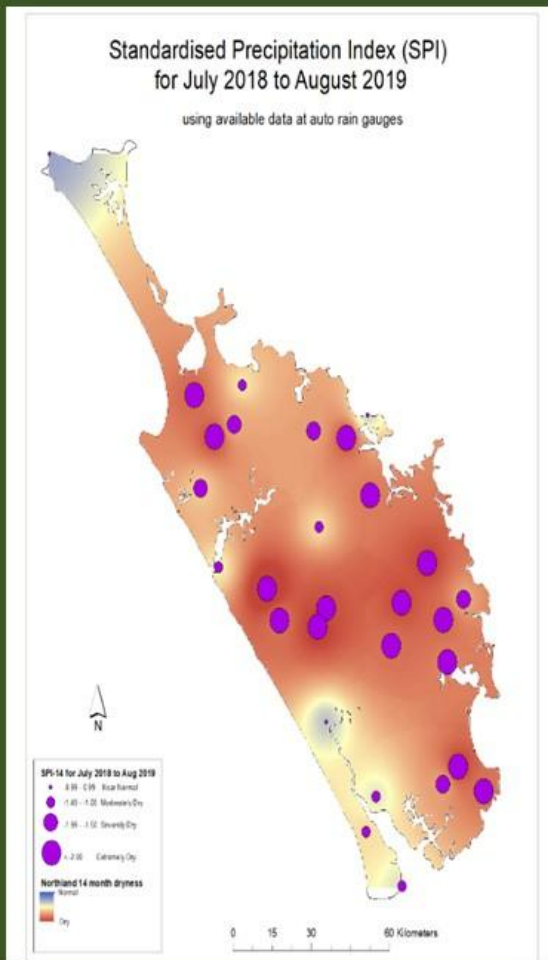
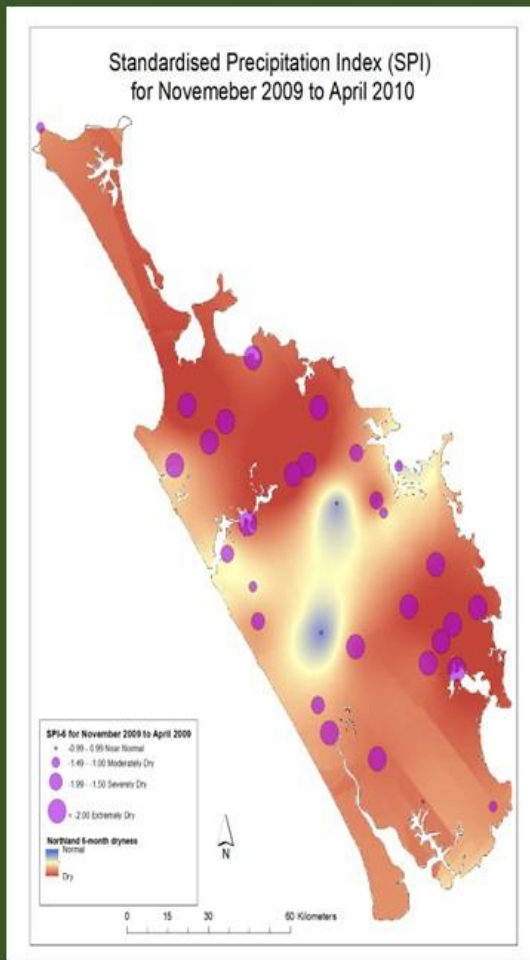


Figure 1. An illustration of WWF's definition of Nature-based Solutions to climate with some examples

Source: WWF, 2019. Note that it is an illustration using some examples. Key ecosystems such as seagrasses and coral reefs are missing.

Increasingly frequent droughts for Far North



NEW ZEALAND / WEATHER

Far North in desperate need of rain

10:07 am on 13 January 2021

Matthew Theissen, First Up producer

matthew.theissen@rnz.co.nz

Share this

Water restrictions are likely for more parts of the Far North if there is not significant rainfall soon, and the forecast is not good.



<https://www.rnz.co.nz/news/national/434441/far-north-in-desperate-need-of-rain>



Increasingly frequent wildfires for Far North

NEW ZEALAND / EMERGENCY SERVICES

Kaimaumau fire: Firefighters working to control month-old blaze

4:32 pm on 17 January 2022

Share this     

Fire and Emergency is warning hot windy weather in the Far North may lead to flare ups in the month-old blaze burning near Waiharahara.



A view of the fire at Ahipara taken last night. Photo / Chad Cottle

<https://www.nzherald.co.nz/nz/ahipara-fire-under-control-evacuated-residents-still-not-allowed-to-return-home/MNKMMQFQUDH67XKQENTLYZAGAE/>



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<https://www.rnz.co.nz/news/national/459697/kaimaumau-fire-firefighters-working-to-control-month-old-blaze>

Increasingly frequent flooding for Far North

Far North downpour: Woman rescued from rising floodwaters, cars lost to floods

Gabrielle McCulloch and Denise Piper · 14:05, Aug 19 2022



<https://www.stuff.co.nz/national/weather-news/300665239/far-north-downpour-woman-rescued-from-rising-floodwaters-cars-lost-to-floods>



Nature-Based Solutions for Natural Disaster

THE MANGROVE ECOSYSTEM

Extreme Conditions and Extremely High Biodiversity

Mangrove forests are found on coastlines in tropical and subtropical areas. The mangrove tree looks a bit strange because its roots are partially above water, making the tree look like it's standing on many gnarly stilts. The roots are exposed to help the tree take in oxygen in a waterlogged environment. Fish, shrimp, crabs, and mollusks are among the organisms that take shelter within mangrove roots. This ecosystem is home to considerable biodiversity, but is unfortunately threatened by shrimp farming and rising sea levels. In some countries, shrimp farming clears large sections of mangroves to build holding tanks and processing facilities. The maps below show the changes to the mangrove ecosystem in Honduras from 1987 to 1999, where much of it has been removed to store shrimp brought in from the Gulf of Fonseca.



1987



1999

Leaves and branches that have fallen into the water are called detritus, and are broken down by bacteria to return nutrients to the water.

Detritus

Pink Shrimp
Farfantepenaeus duorarum

Bocourt Swimming Crab
Callinectes bocourti

Hard clam
Mercenaria mercenaria

Gray snapper
Lutjanus griseus

American Crocodile
Crocodylus acutus

Larvae

Great Blue Heron
Ardea herodias

Little Red Bat
Lasiurus minor

Red Mangrove Tree
Rhizophora mangle

Mangrove forests are important nesting spots for shorebirds and migratory birds.



Great Egret
Ardea alba

Brown Pelican
Pelecanus occidentalis

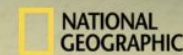


Coastal Protection

Mangrove forests are able to bear the brunt of storms that hit the coast. They reduce the impact of strong waves on anything that lives further inland, including humans. Mangrove trees also protect the coast from erosion by collecting sediments from rivers and ocean tides around their roots. These sediments build up and strengthen the shoreline.

The Ocean's Nursery

Mangrove ecosystems host a lot of biodiversity, in part due to the mangrove tree's strange root system. The roots serve as a nursery for the larvae of many fish species, such as barracuda, tarpon, and snook. This is where fish can develop into adults before moving out to the big, unforgiving ocean. In fact, around one-third of all marine fish species are sheltered from predators in mangrove forests as juveniles.



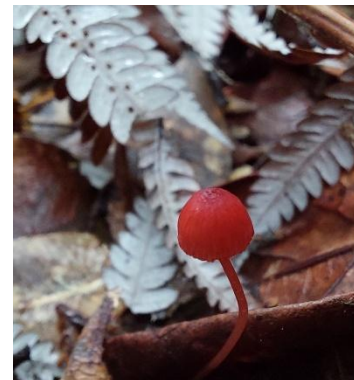
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Forests Prevent Erosion and Capture Carbon



Mycelium and Carbon: Biodiversity Benefits



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Natural or Nature-Based Infrastructure

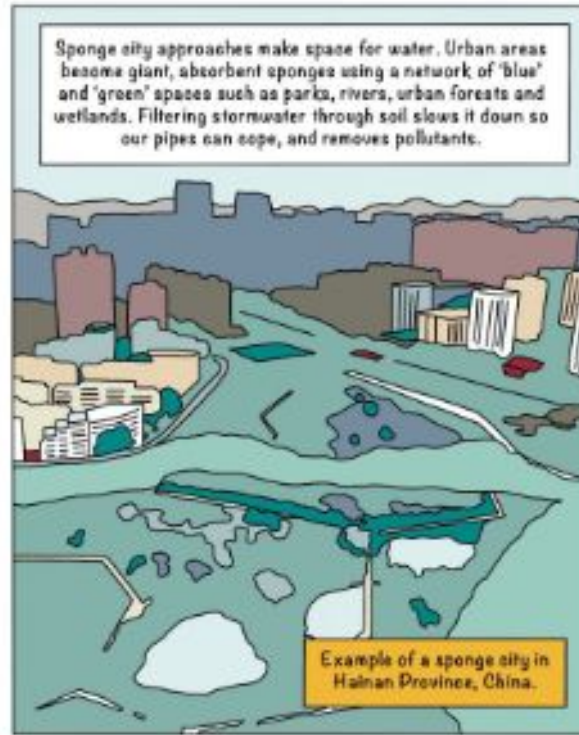
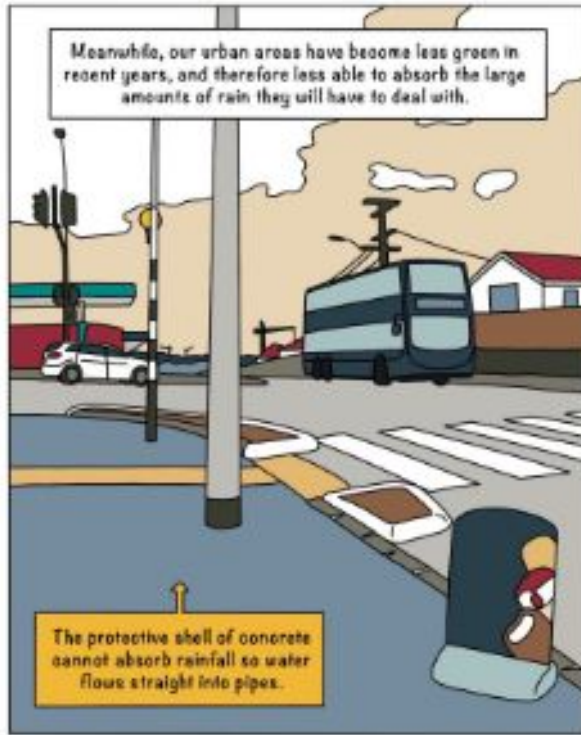
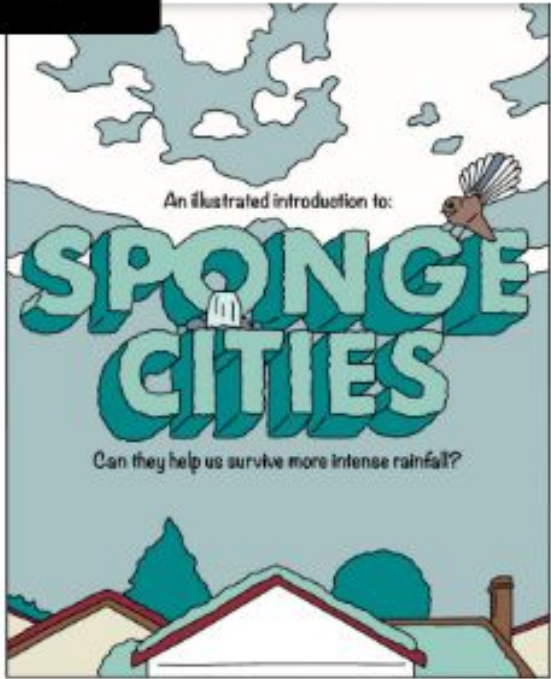
Natural Infrastructure for Water Management

Investing in nature for multiple objectives

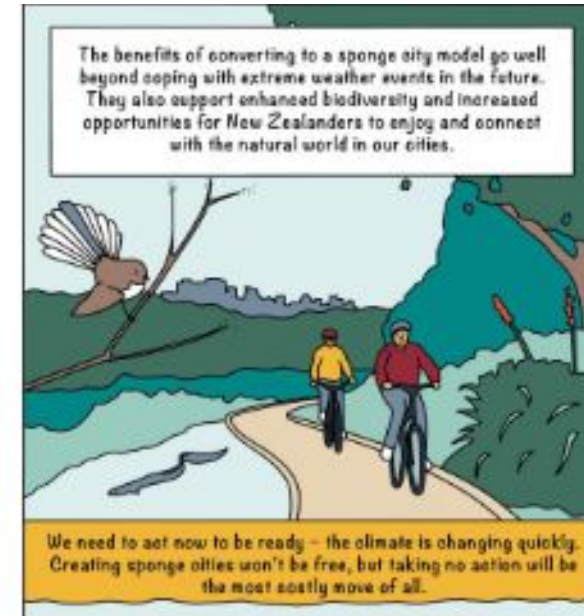
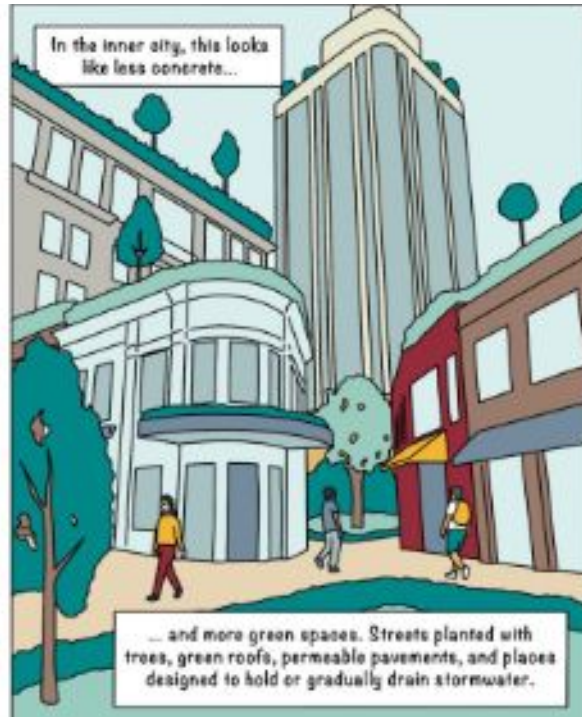
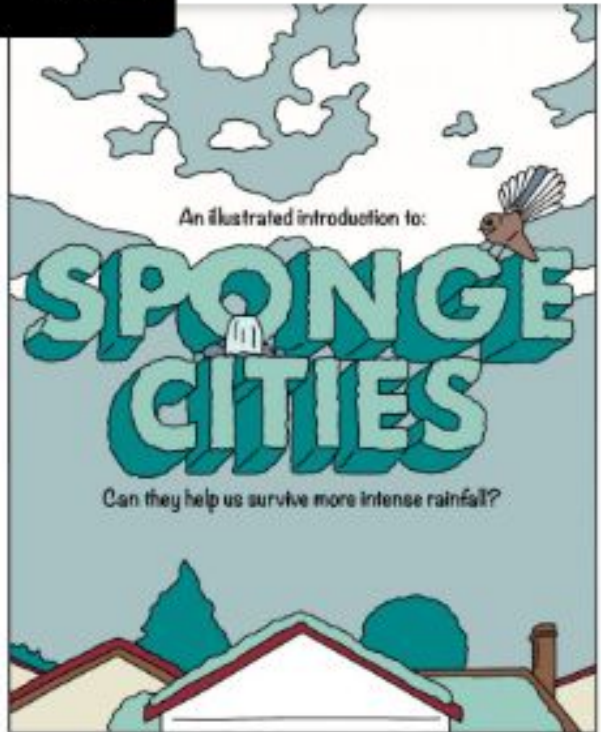


Natural or semi-natural infrastructure provides services for water resources management with equivalent or similar benefits to conventional (built) 'grey' water infrastructure. The composition, structure, and function of natural infrastructure assets in river basins, and the way they interplay with built 'grey' infrastructure will determine the primary services and co-benefits produced. Further information can be found in UNEP (2014). *Green Infrastructure Guide for Water Management: Ecosystem-based management approaches for water related-infrastructure projects.*

Sponge Cities



Green Infrastructure



Created for The Helen Clark Foundation by Alex Scott. Visit helenclark.foundation and wsp.com/en-nz/ to learn more.



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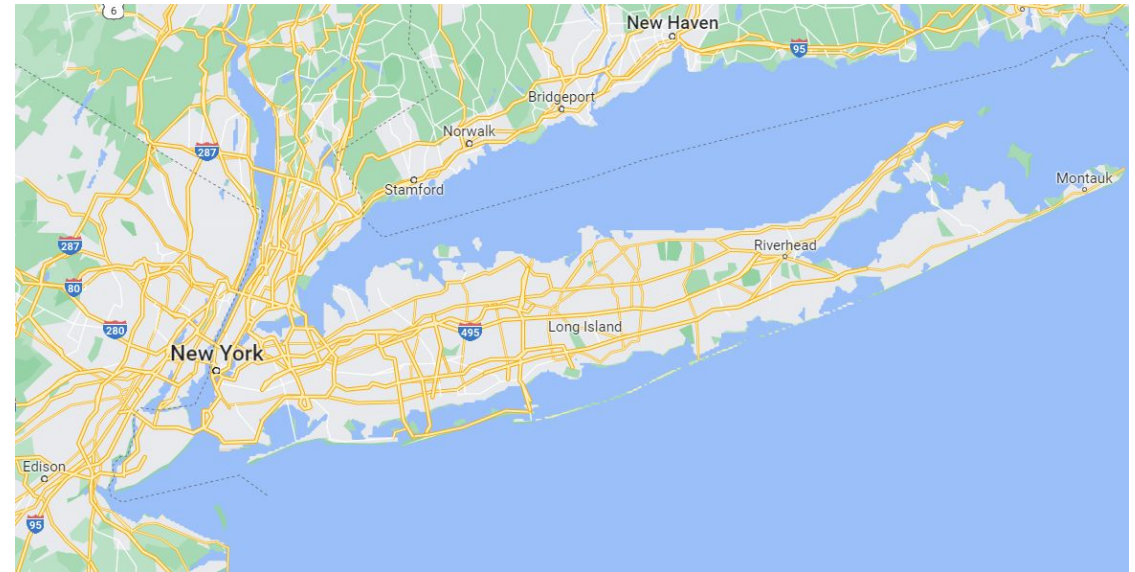
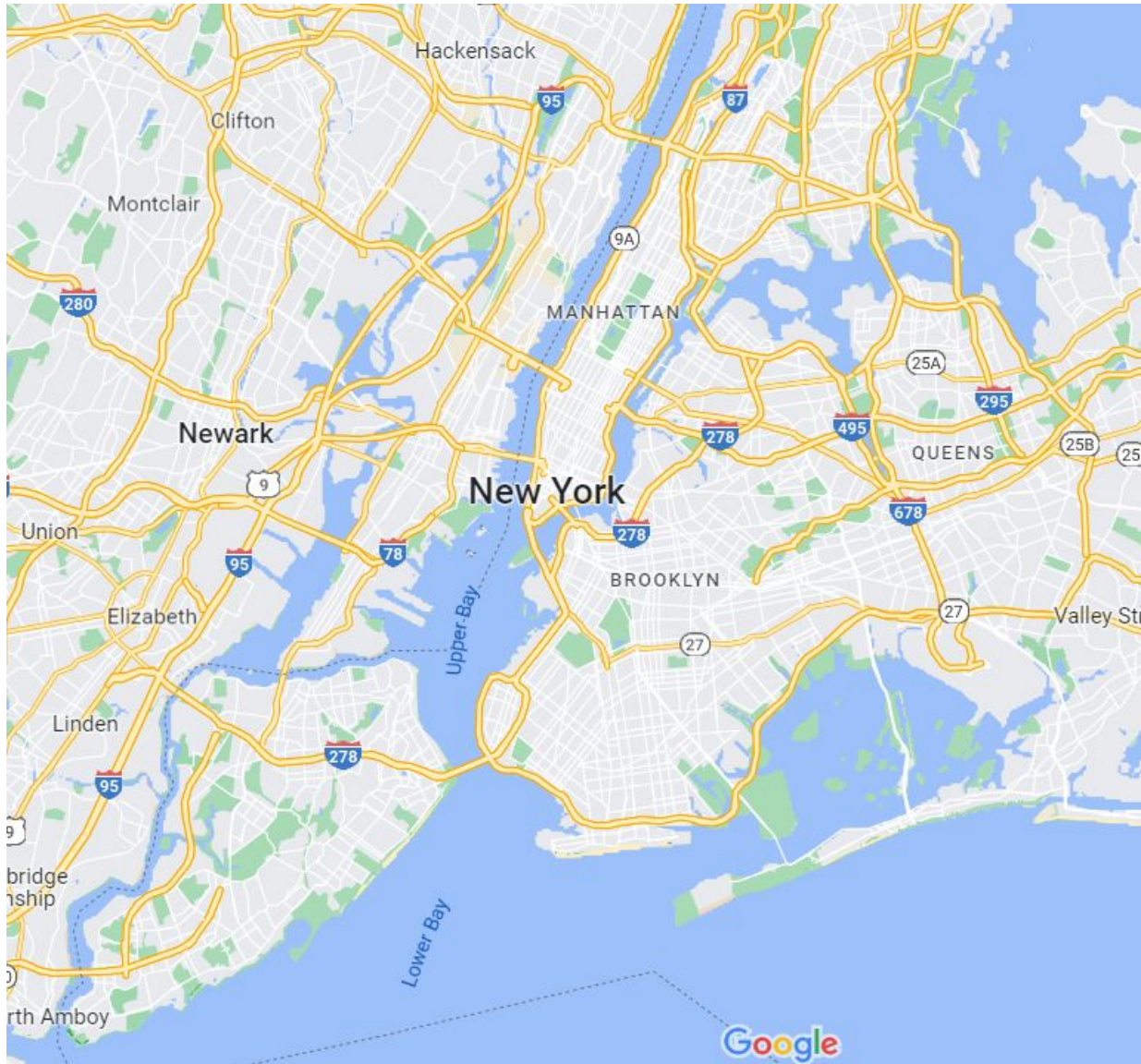
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The Hudson River Greenway



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New York City: A City of Islands and Rivers



Five boroughs of New York City:
Manhattan, Brooklyn, Queens,
the Bronx and Staten Island



Source: Google Maps

Superstorm Sandy: In 2012, the 2nd-costliest hurricane ever to strike the USA



2012 Hurricane Sandy: Facts, FAQs, and ...
worldvision.org



Hurricane Sandy facts and information
nationalgeographic.com



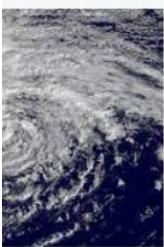
Superstorm Sandy | Path & Facts ...
britannica.com



Superstorm Sandy
cnbc.com

Google Images. (2022). Search result for Superstorm Sandy.

USACE. (2022). *New York-New Jersey Harbor and Tributaries Coastal Storm Risk Management Feasibility Study: Draft Integrated Feasibility Report and Tier 1 Environmental Impact Statement*. US Army Corp of Engineers, New York District.



Hurricane Sandy ...
npr.org



Climate change meant Hurricane Sandy ...
newscientist.com



Superstorm Sandy Changed America's Grid ...
greentechmedia.com



Why the science of Superstorm Sandy was ...
foxweather.com



nt N.J. ...



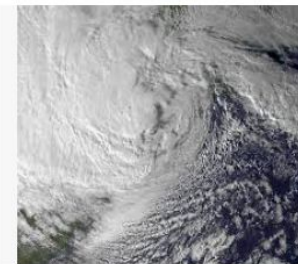
Superstorm Sandy



Hurricane Sandy: The Superstorm ...



Hurricane Sandy: Facts & Data | Live ...



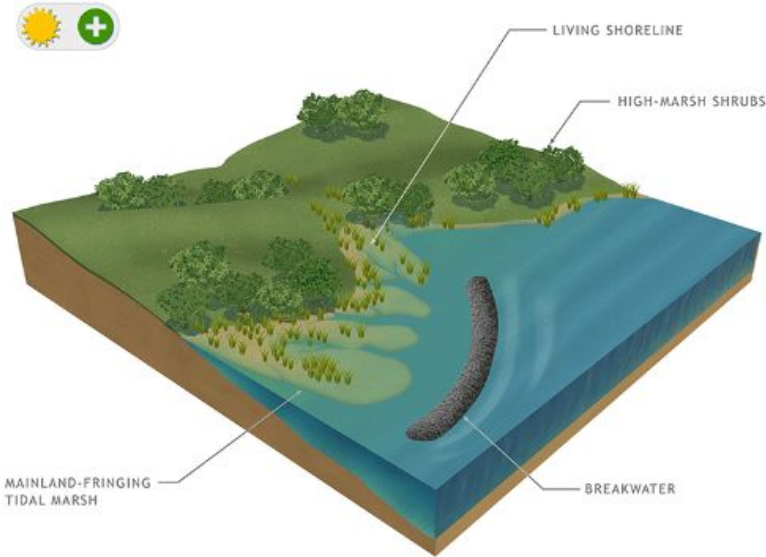
Effects of Hurricane Sandy in New Yo...



HATS Water-Based Features



GIF showing deployable floodwall to halt flood advancement



GIF of wetlands being protected by a breakwater

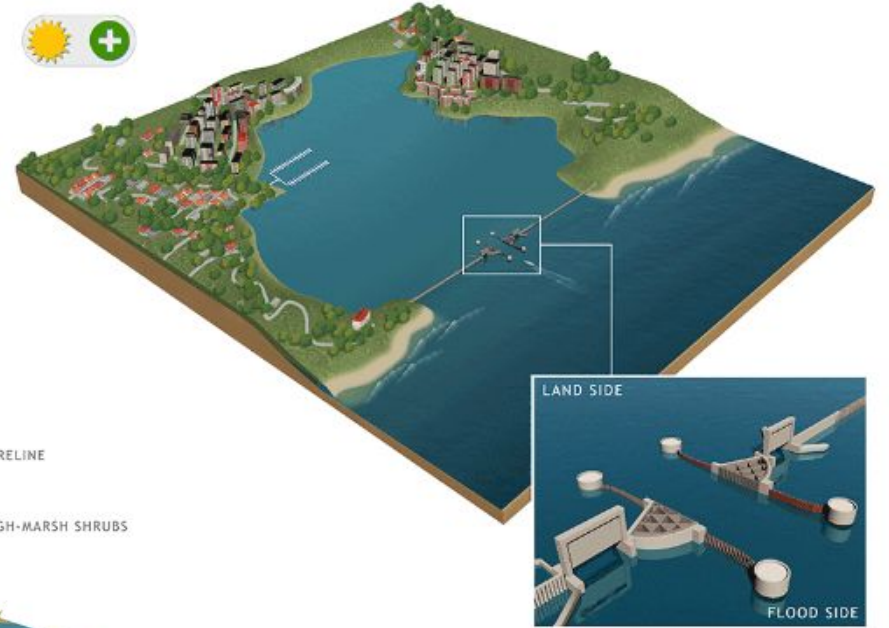
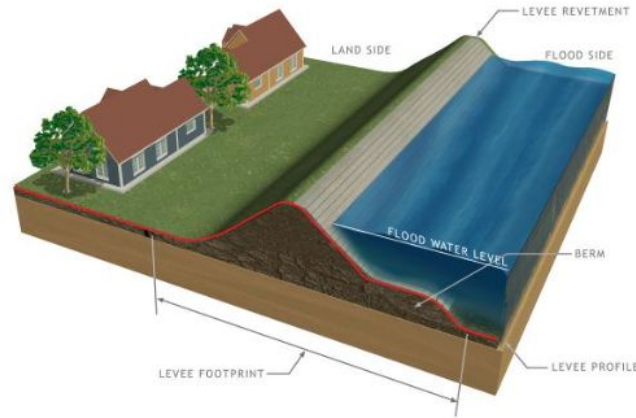
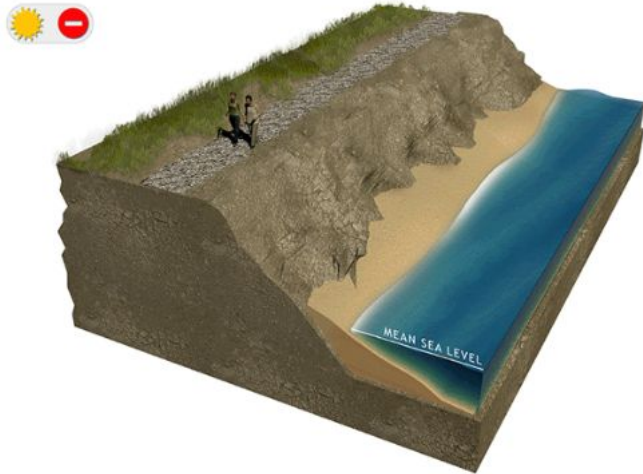
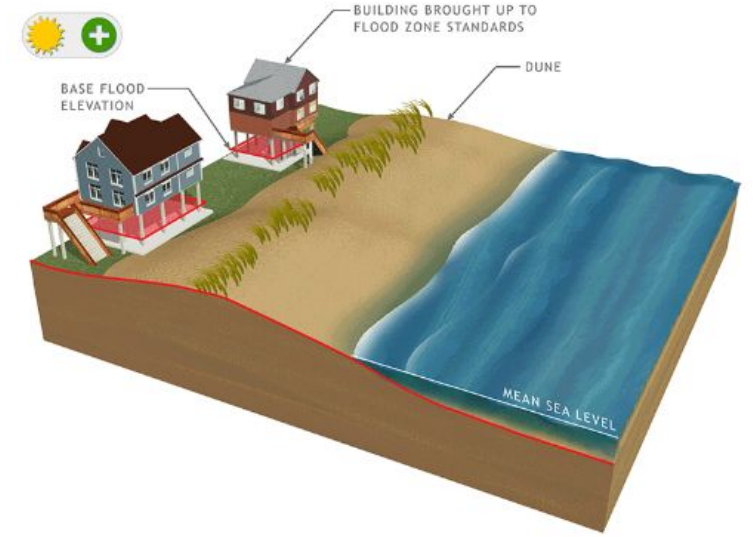


Diagram showing how Storm Surge Barriers can operate

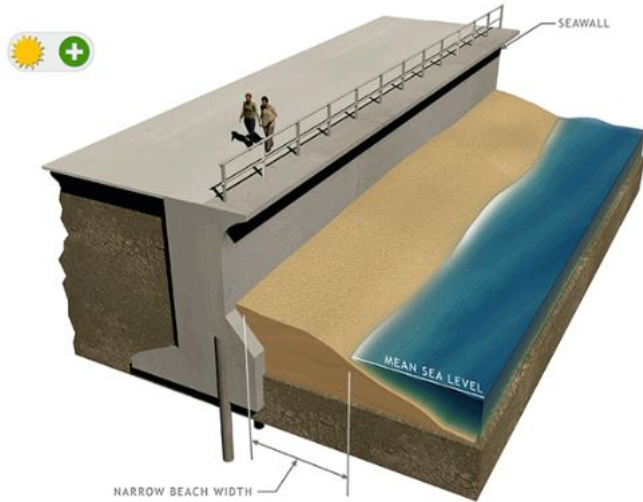
HATS Shoreline-Based Features



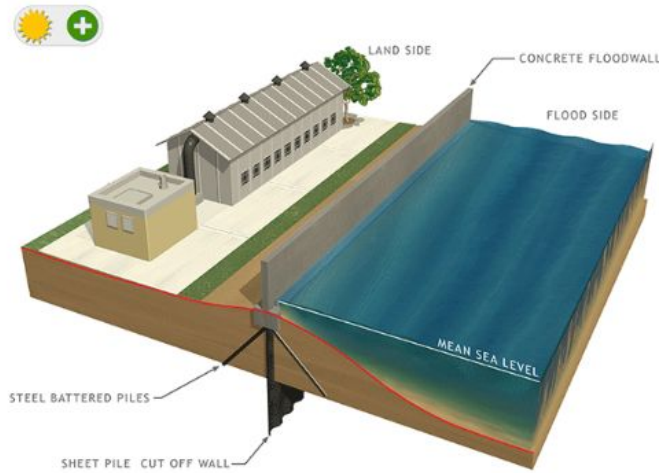
Depiction of a levee with flood water levels



GIF showing how elevated structures might handle floodwater levels



GIF showing how seawalls can manage flood water levels



Two GIFs showing an embankment (top) and a floodwall (bottom)

South Bronx Unite and the H.E.Arts Center Proposal: A Public Meeting



- Environmental justice movement
- Inequitable access to the waterfront and green space

Youth Climate Justice Workshop

Red Hook Farms, Brooklyn



- Flood risk for environmental justice communities

Youth Climate Justice Workshop Washington Heights, Manhattan



- Extreme heat risk for environmental justice communities

Newtown Creek Alliance



20 Year Celebration
Green Roofs Rain Gardens
Environmental education

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Sandy + 10



ROUNDTABLE 9: AUDITORIUM ARE NEIGHBORHOODS MORE RESILIENT TODAY? (3:30)

Program details and
link to bios here

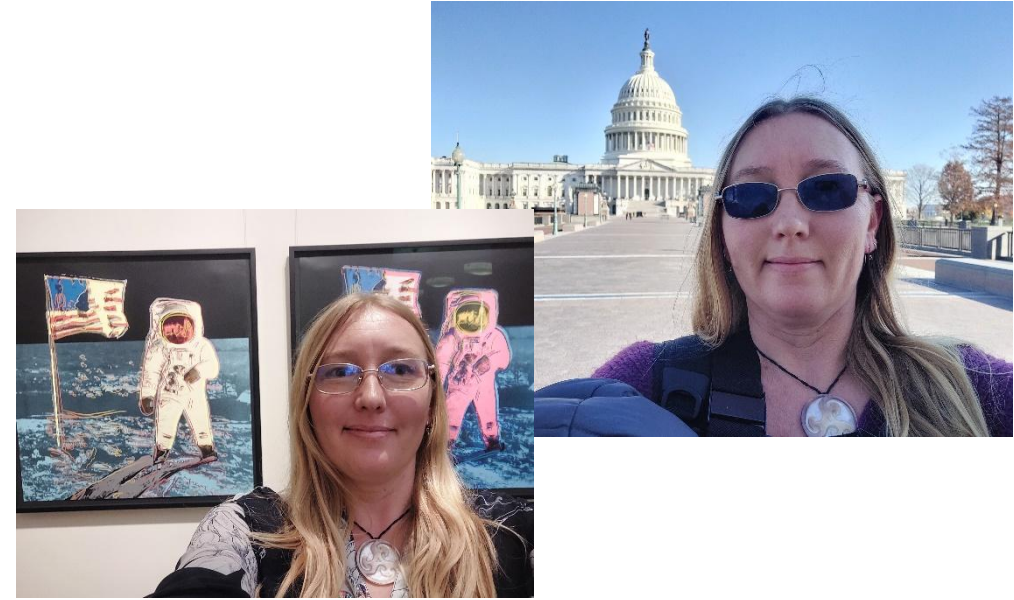


- **Paul Gallay**, Senior Staff Associate, Center for Sustainable Urban Development (moderator)
- **Pamela Pettyjohn**, Co-Founder and President of the Coney Island Beautification Project
- **Damaris Reyes**, Executive Director at GOLES
- **Arif Ullah**, Executive Director at South Bronx Unite
- **Melissa Miles**, Executive Director at NJ Environmental Justice Alliance
- **Kelly Vilar**, Chief Executive Officer at Staten Island Urban Center



Community Organisation Panelists:
Are neighbourhoods more resilient today?

Measuring What Matters: Nature-Based Solutions



- National Academy of Sciences, Washington DC



Hawai'i Green Growth



- A locally developed dashboard to measure sustainability

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Te Mana O Te Wai

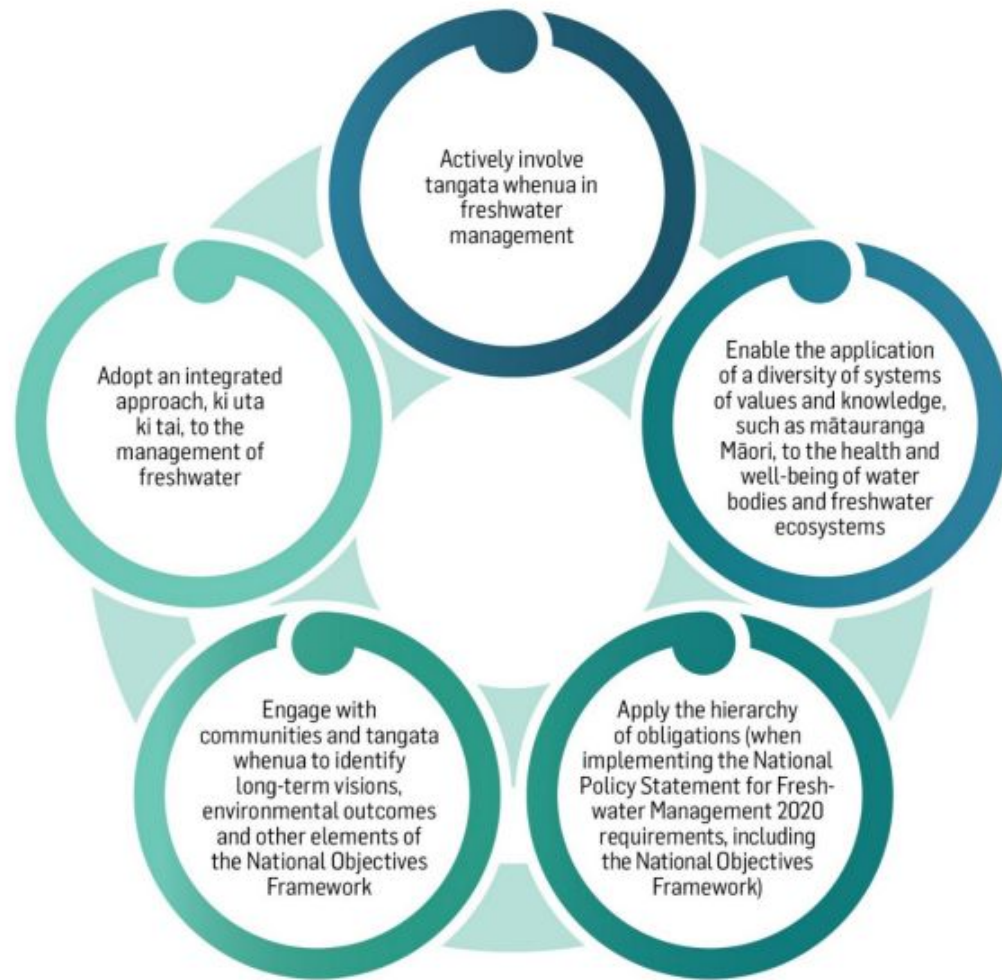


Figure 1: How regional councils must give effect to Te Mana o te Wai

- Actively involve tangata whenua
- Integrated approach
- Long-term visions
- Apply diverse values and knowledge systems
- Hierarchy of obligations

How can rural landowners implement NBS?



Do it online: Find Pay Submit



Grants for fencing and/or planting on erosion-prone land



Publications

COLUMBIA CLIMATE SCHOOL
Climate, Earth, and Society

State of the Planet

AGRICULTURE CLIMATE EARTH SCIENCES ECOLOGY ENERGY HEALTH SUSTAINABILITY

VIEWPOINTS

CLIMATE, EDUCATION

Resilient Coastal Communities and Climate Adaptation: Lessons from New York for New Zealand

BY AYA MORRIS | JANUARY 20, 2023 Comments




Flooding in New Zealand in 2022. Photo: Aya Morris

<https://news.climate.columbia.edu/2023/01/20/resilient-coastal-communities-and-climate-adaptation-lessons-from-new-york-for-new-zealand/>

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UNIVERSITY OF NEW ZEALAND

Sustainable Cities and Communities in a Changing Climate: Lessons from New York

Aya Morris



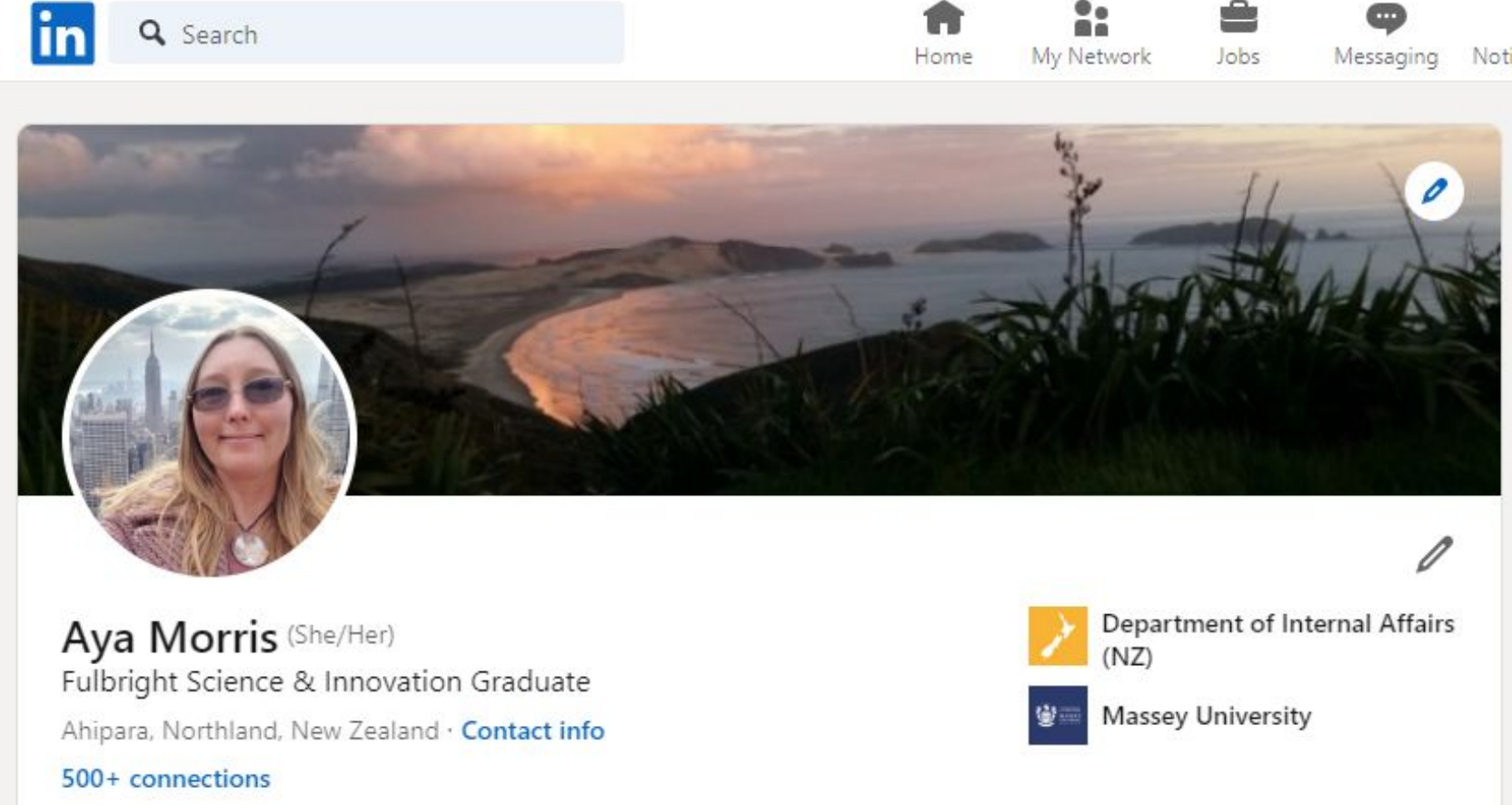
Institute of Development Studies Working Paper

April 2023

<https://mro.massey.ac.nz/handle/10179/18229>



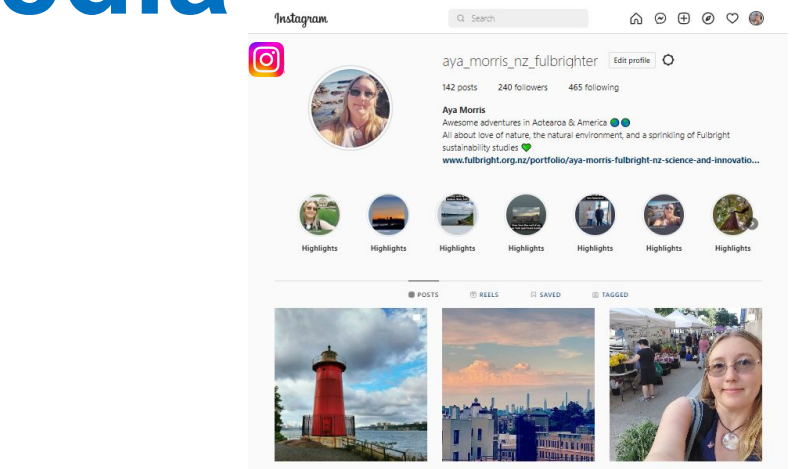
Linked In + Social Media



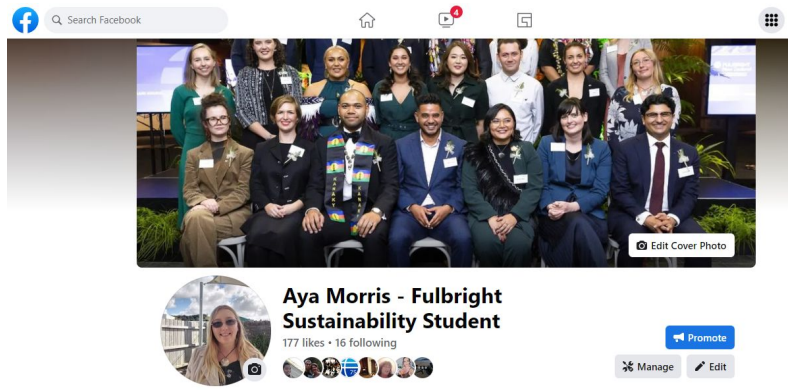
The image shows a LinkedIn profile for Aya Morris. At the top, there is a navigation bar with icons for Home, My Network, Jobs, Messaging, and Notifications. Below this is a search bar and a large background image of a coastal landscape at sunset. A circular profile picture of Aya Morris is on the left. To the right of the profile picture, there is a pencil icon for editing. Below the profile picture, the name "Aya Morris" is displayed with "(She/Her)" next to it. Underneath the name, it says "Fulbright Science & Innovation Graduate" and "Ahipara, Northland, New Zealand · Contact info". At the bottom left, it says "500+ connections". To the right of the profile information, there are logos for the "Department of Internal Affairs (NZ)" and "Massey University".

Aya Morris (She/Her)
Fulbright Science & Innovation Graduate
Ahipara, Northland, New Zealand · [Contact info](#)
500+ connections

Department of Internal Affairs (NZ)
Massey University



The image shows an Instagram profile for Aya Morris. At the top, there is a search bar and navigation icons for home, camera, gallery, and profile. Below this is the profile picture and the name "aya_morris_nz_fulbrighter". To the right of the name, it says "142 posts", "240 followers", and "465 following". Below the name, there is a bio: "Aya Morris Awesome adventures in Aotearoa & America All about love of nature, the natural environment, and a sprinkling of Fulbright sustainability studies". Below the bio, there is a link: "www.fulbright.org.nz/portfolio/aya-morris-fulbright-nz-science-and-innovatio...". Below the bio, there are several highlight icons. Below the highlights, there are three post thumbnails: a lighthouse, a sunset over a city, and a portrait of Aya Morris.



The image shows a Facebook profile for Aya Morris. At the top, there is a search bar and navigation icons for home, notifications, and groups. Below this is a cover photo of a group of people. Below the cover photo, there is a profile picture and the name "Aya Morris - Fulbright Sustainability Student". To the right of the name, it says "177 likes · 16 following". Below the name, there are several icons representing different categories. To the right of the icons, there are buttons for "Promote", "Manage", and "Edit".

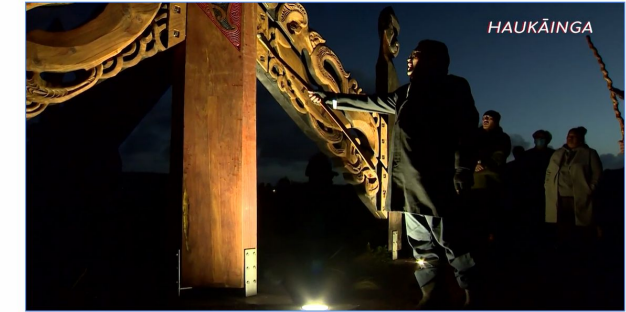


The image shows the logo for Fulbright New Zealand. It features a blue globe icon with a white cross-like shape inside. To the right of the icon, the text "FULBRIGHT New Zealand" is displayed in a large, bold, blue font. Below this, the text "TE TŪĀPAPA MĀTAURANGA O AOTEAROA ME AMERIKA" is displayed in a smaller, blue font.

Locally-led initiatives for freshwater quality



Gateway to Kaitiāia is Unveiled



Aug 4, 2022, 2:36 pm

The Te Hiku Open Spaces Revitalisation project reached another milestone with the unveiling of Orongo, a grouping of carved tumu, at the southern entrance to Kaitiāia near Mowea Park. One of the older names for Kaitiāia is Orongotea and the tumu commemorates this Maori history and is but one



<https://www.youtube.com/watch?v=HCZSOPAv2EA>



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