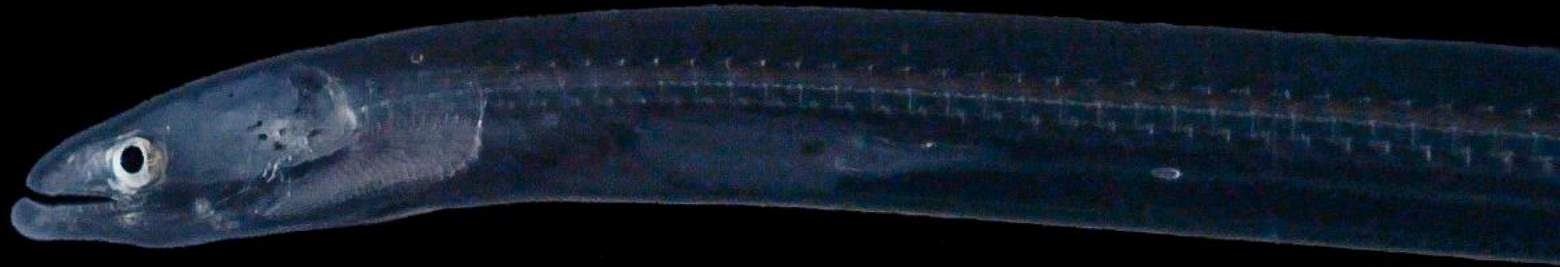


Update on glass eel research on the Rangitāiki Awa June 2020



Eimear Egan and Siobhan Nuri

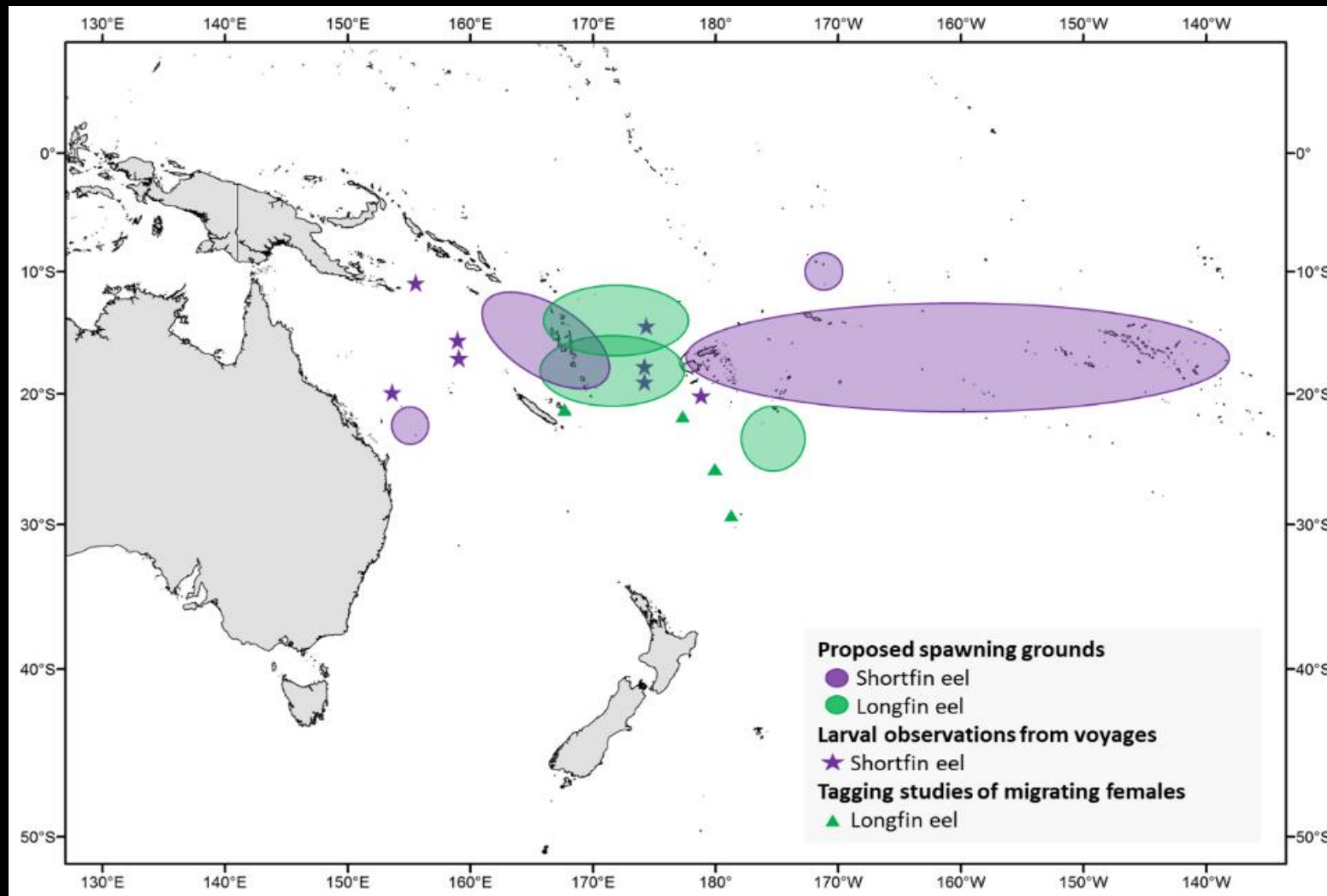
eimear.egan@niwa.co.nz

022 369 4080

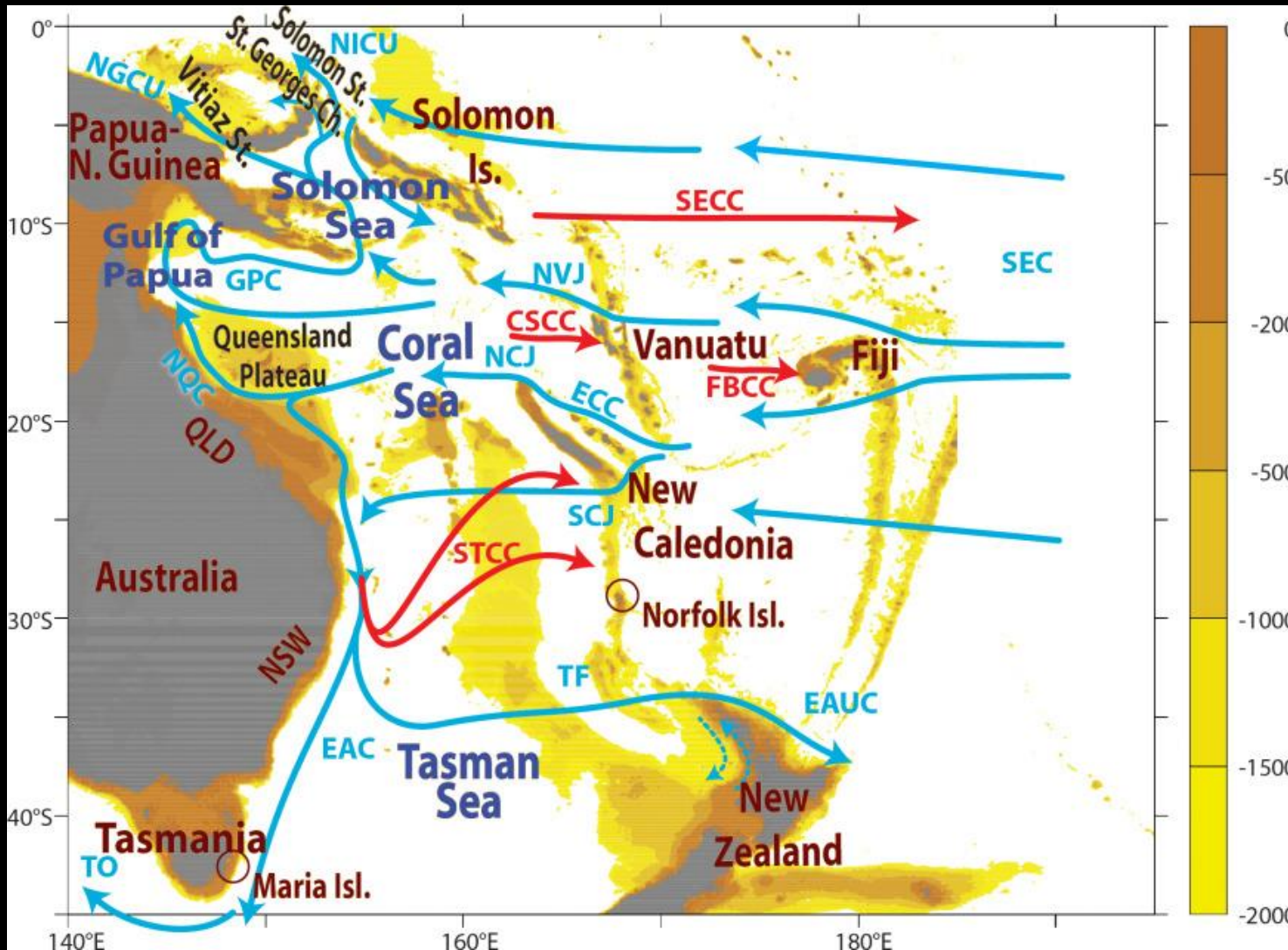
Research aim: understand the marine life of tuna



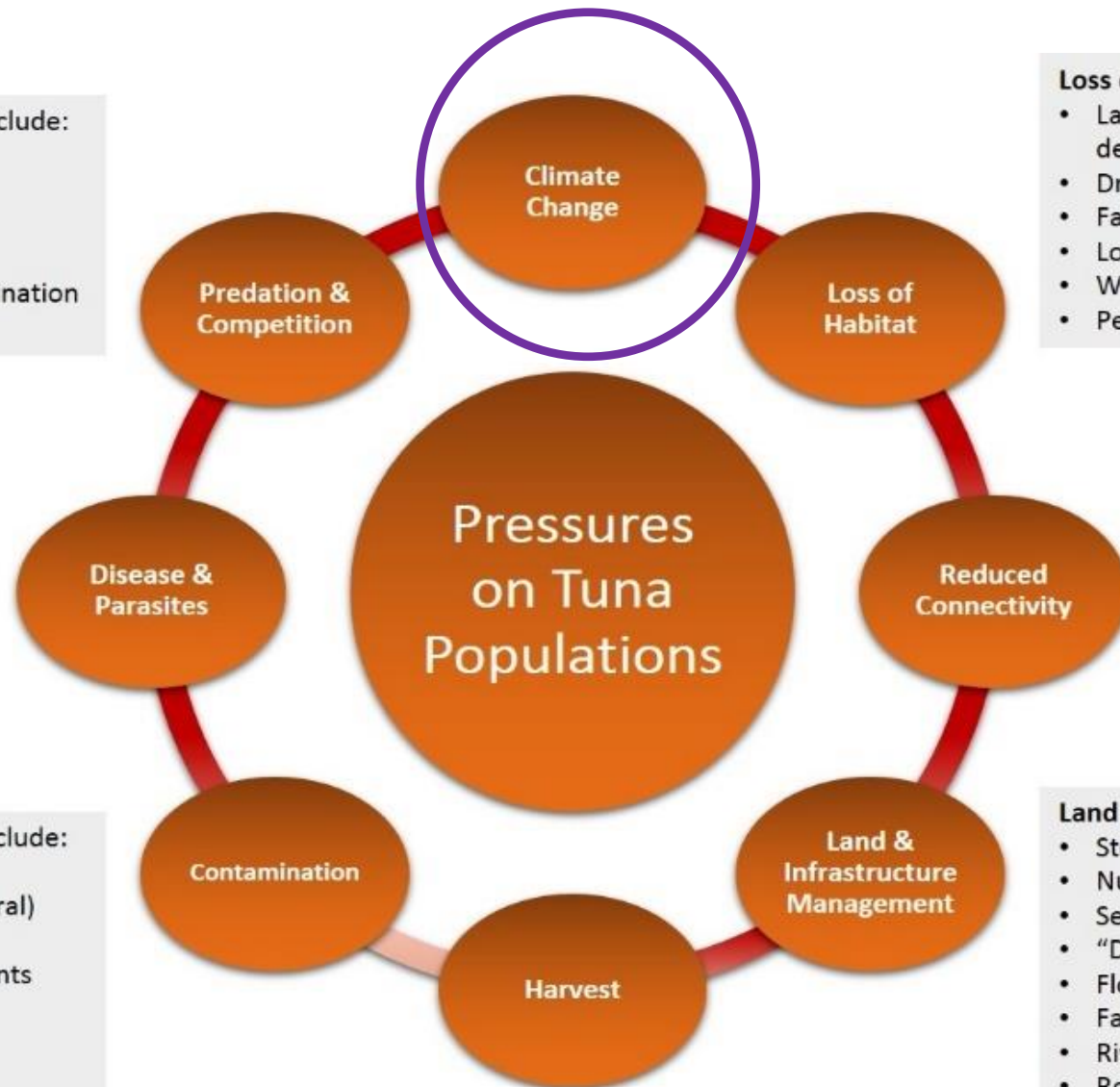
Spawning grounds are somewhere in the Western Pacific Ocean



Use ocean currents to make it to Aotearoa



- Believe East Australian Current is important pathway to Aotearoa
- But might also use a more direct route south of Fiji



Predation & Competition - Examples include:

- Shags
- Trout
- Pest fish
- Acclimatisation societies' eel extermination campaigns of the 1930s-1960s

Loss of Habitat - Examples include:

- Land use change (e.g., farming, agriculture, forestry, urban development)
- Drainage of wetlands & swampy areas
- Fairway channel maintenance
- Loss of riparian vegetation
- Willow removal
- Pest plants

Reduced Connectivity - Examples include:

- Hydroelectric dams
- Culverts, weirs, fords
- Flood control schemes – stopbanks & flood gates
- Water extraction
- River mouth closures
- NB: Turbines & flood pumps also cause direct mortality events

Land & Infrastructure Management - Examples include:

- Stock in waterways
- Nutrient management
- Sediment management
- "Drain" clearance
- Flood control
- Fairway channel maintenance
- River straightening
- Road infrastructure
- River/stream diversions
- Stormwater management
- Water extraction
- Instream barriers

Harvest includes:

- Commercial
- Customary
- Recreational

Disease & Parasites - Examples include:

- Tape worms
- Nematodes (includes shagworm)
- Protozoa (cysts)

Contamination - Examples include:

- Pesticides
- Geothermal sources (natural)
- Geothermal power
- Point source pollution events
- Stormwater
- Road runoff
- Industry

Research questions

A) Spawning site origins

1. Where do longfin and shortfin eels reproduce?

2. Do LF and SF eels share spawning areas?

3. Do LF and SF eels repeatedly spawn in the same place?

Research questions

B) Larval dispersal routes

1. What oceanic larval dispersal routes do LF and SF use?

2. Does the ocean dispersal routes differ between LFE and SFE

3. Does the ocean dispersal routes differ within and among years?

Rangitāiki glass eel sampling 2019



Rangitāiki glass eel sampling 2019



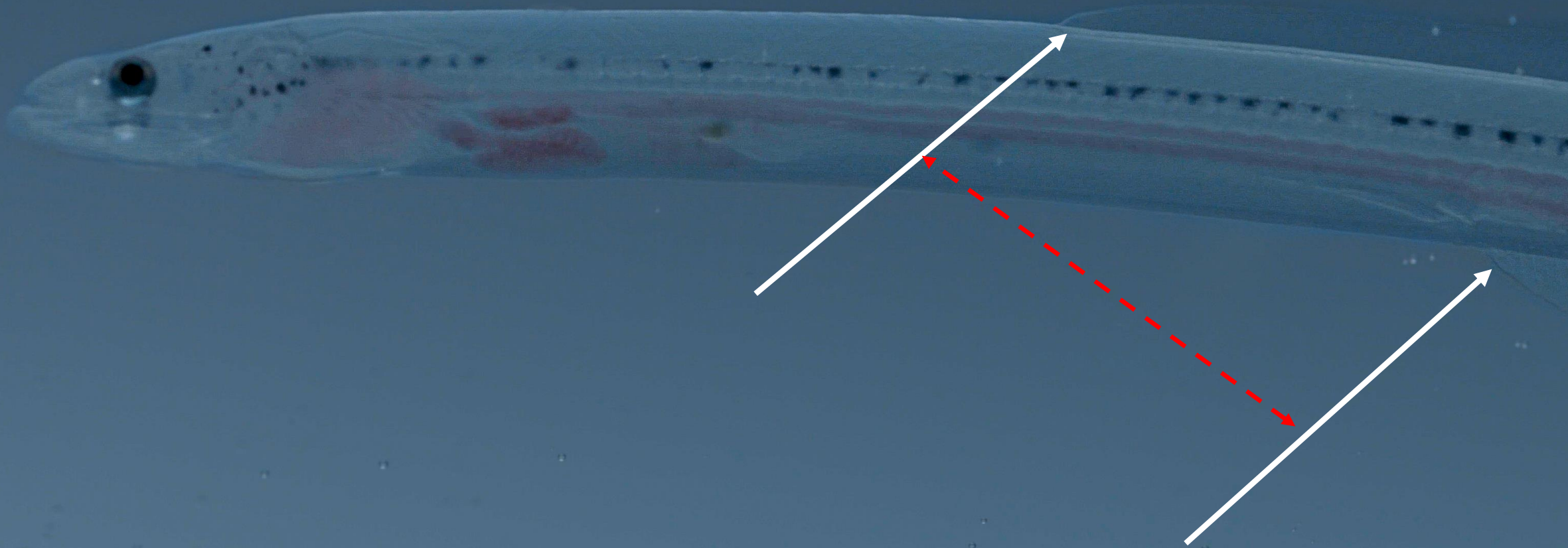
Custom-made fyke nets from Tasmania



Our lab at Thornton Beach Holiday Park!

- Go through our total catch, count all fish species
- Identify number of longfin and shortfins in catch
- Take a sub-sample for analyses in the lab

Position of fin to identify if the glass eels are longfins or shortfins



Shortfin glass eels from the Rangitāiki River



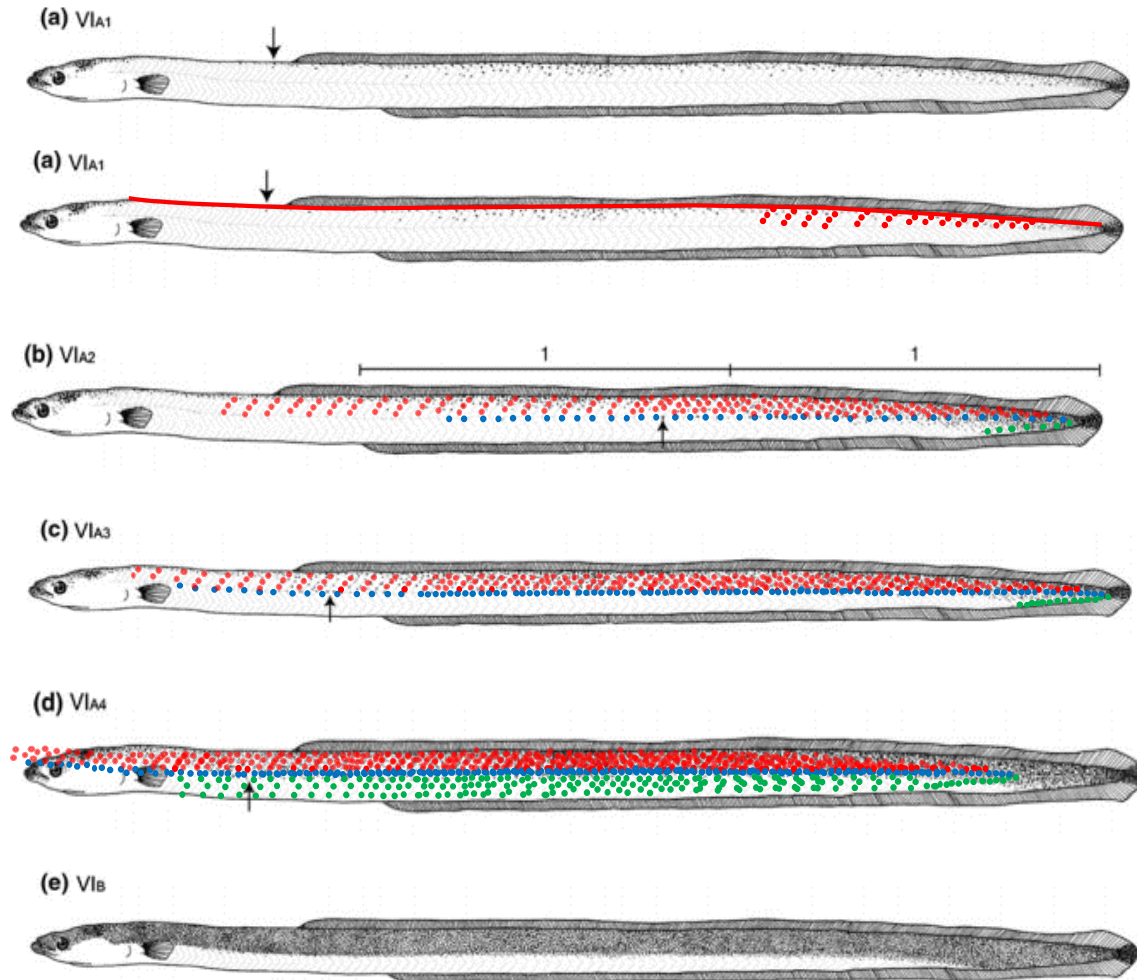
NIWA
Taihoro Nukurangi



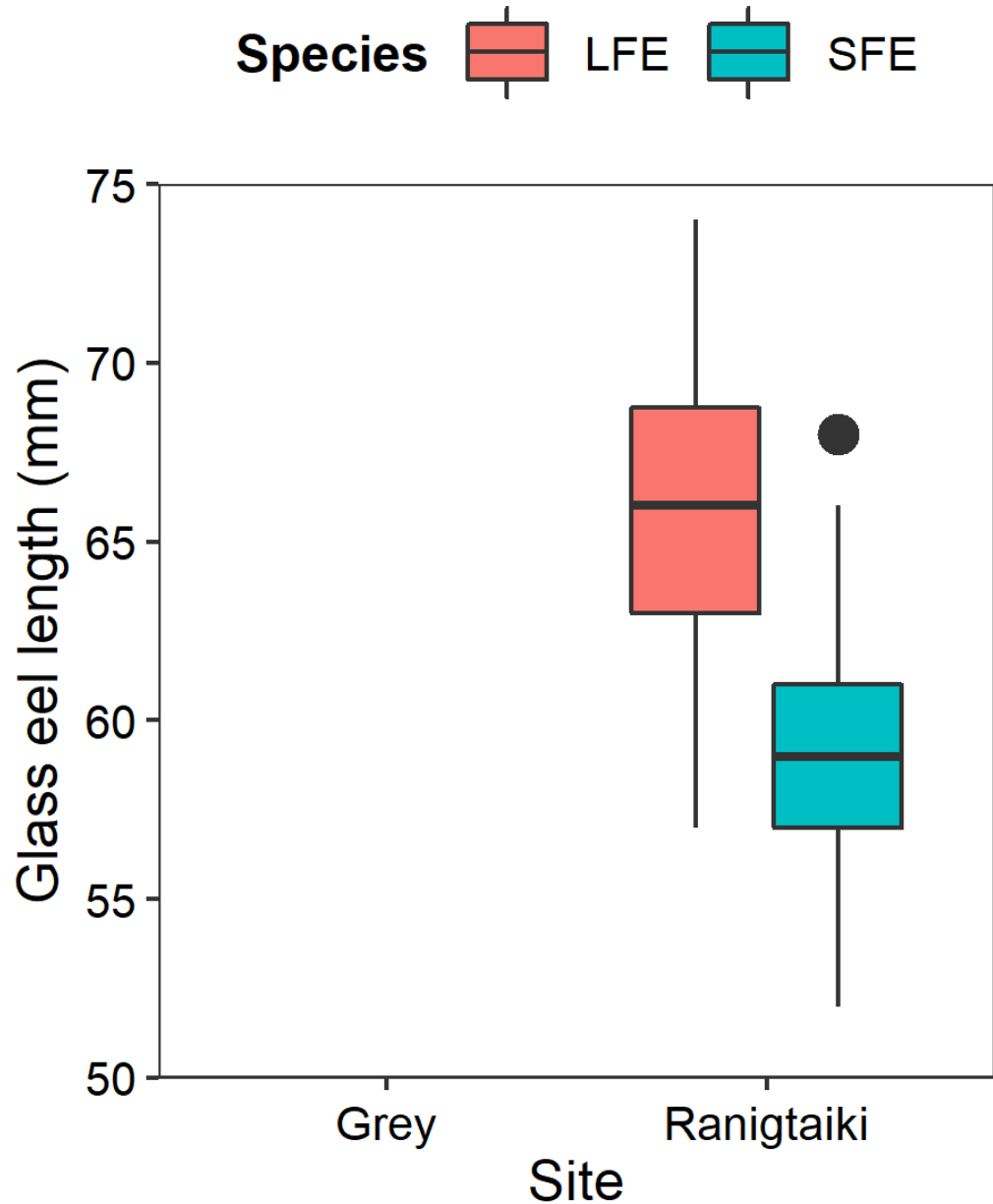
26% LFE caught in July
52% LFE caught in August

Dates sampled 2019	LFE	SFE
18 th July	Yes	Yes
1 st August	Yes	Yes
16 th August	Yes	Yes
17 th August	Yes	Yes
31 st August	No	Yes
14 th Sept	Yes	Yes
30 th Sept	Yes	Yes
1 st Oct	Yes	Yes
17 th Oct	Yes	Yes
17 th Nov	No	Yes
Total caught	54	394

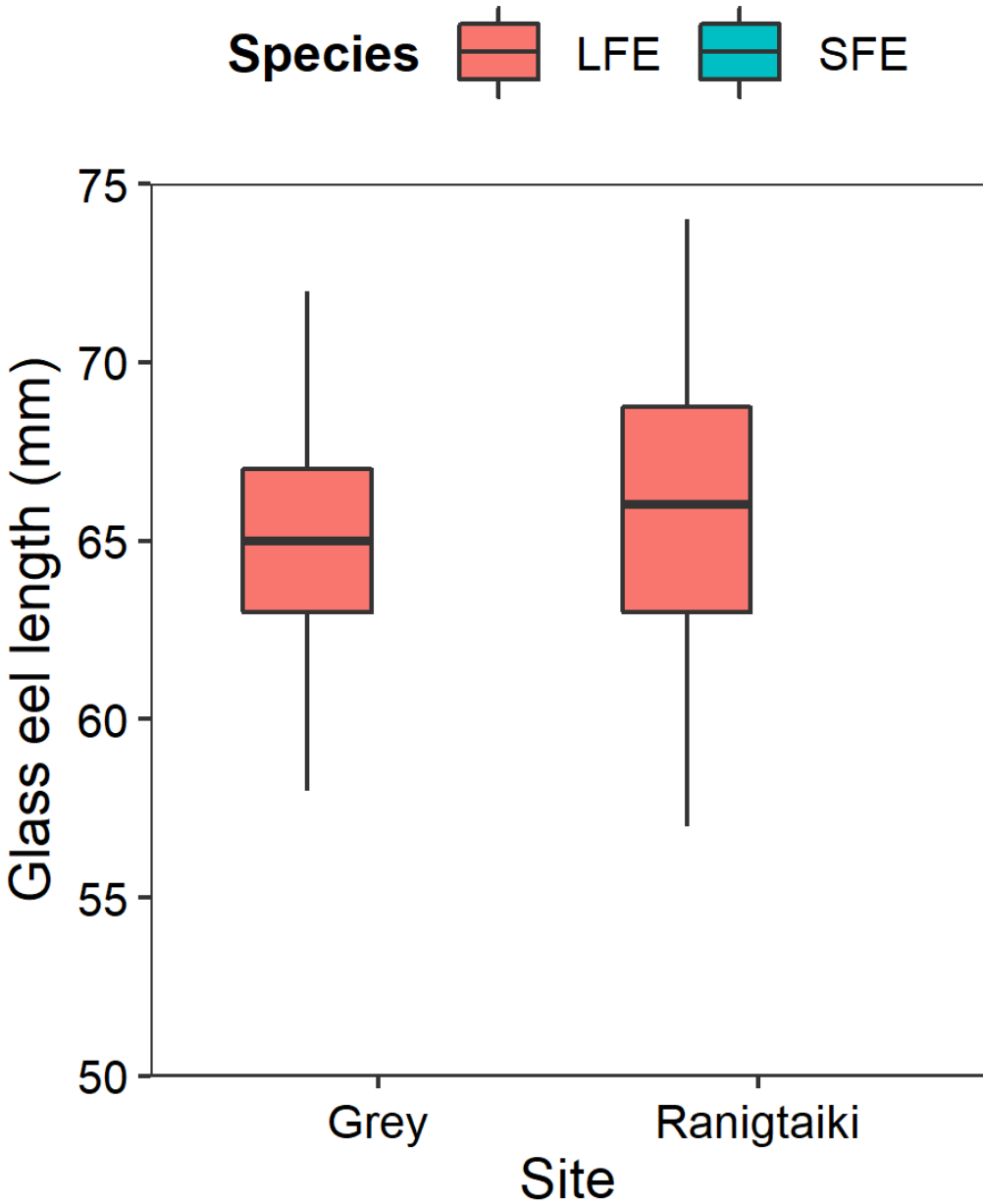
Check stages of pigmentation/colouration



- 90% of **shortfins** were straight in from the sea – stage 5B (newly arrived)
- 94% of **longfins** were stage 5B (newly arrived)

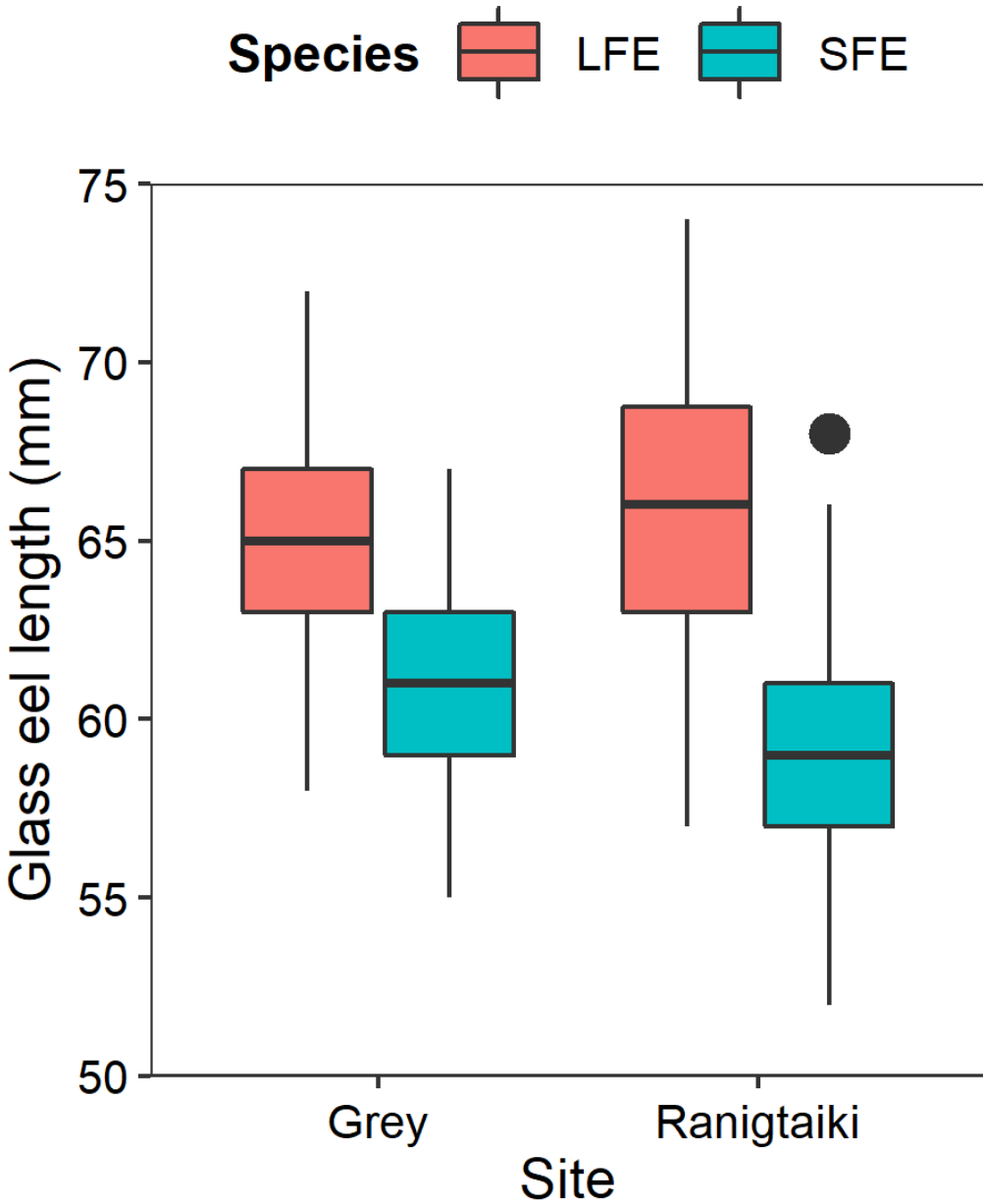


- Longfin glass eels are larger than shortfin glass eels
- Longfin size range = 57 mm – 74 mm
- Shortfin size range = 52 mm – 68 mm



- For comparison, **longfin** glass eels arriving to Rangitāiki and Grey River (South Island) are same size

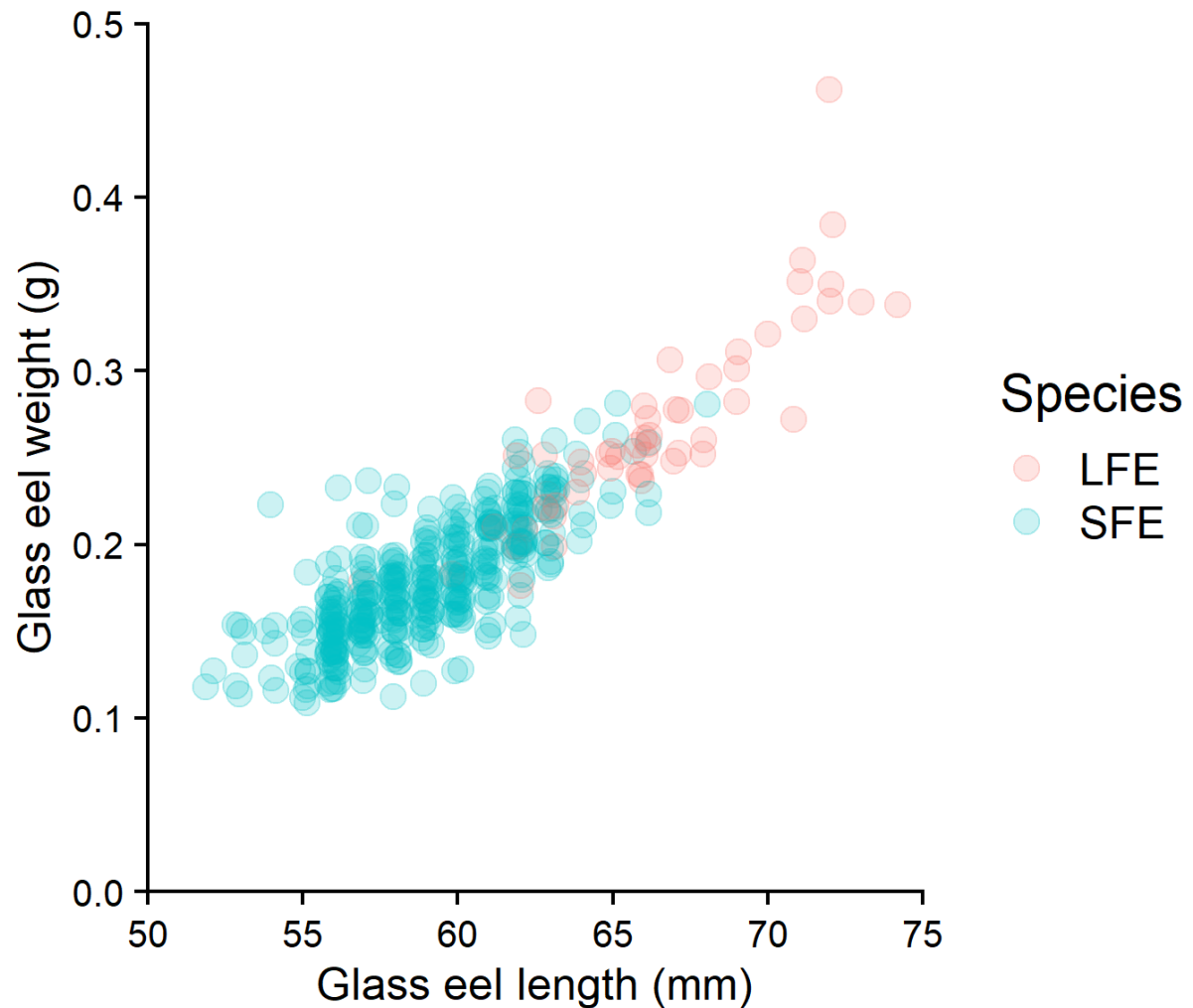




- The average size of **shortfin** glass eels arriving to Rangitāiki and Grey River (South Island) are same size

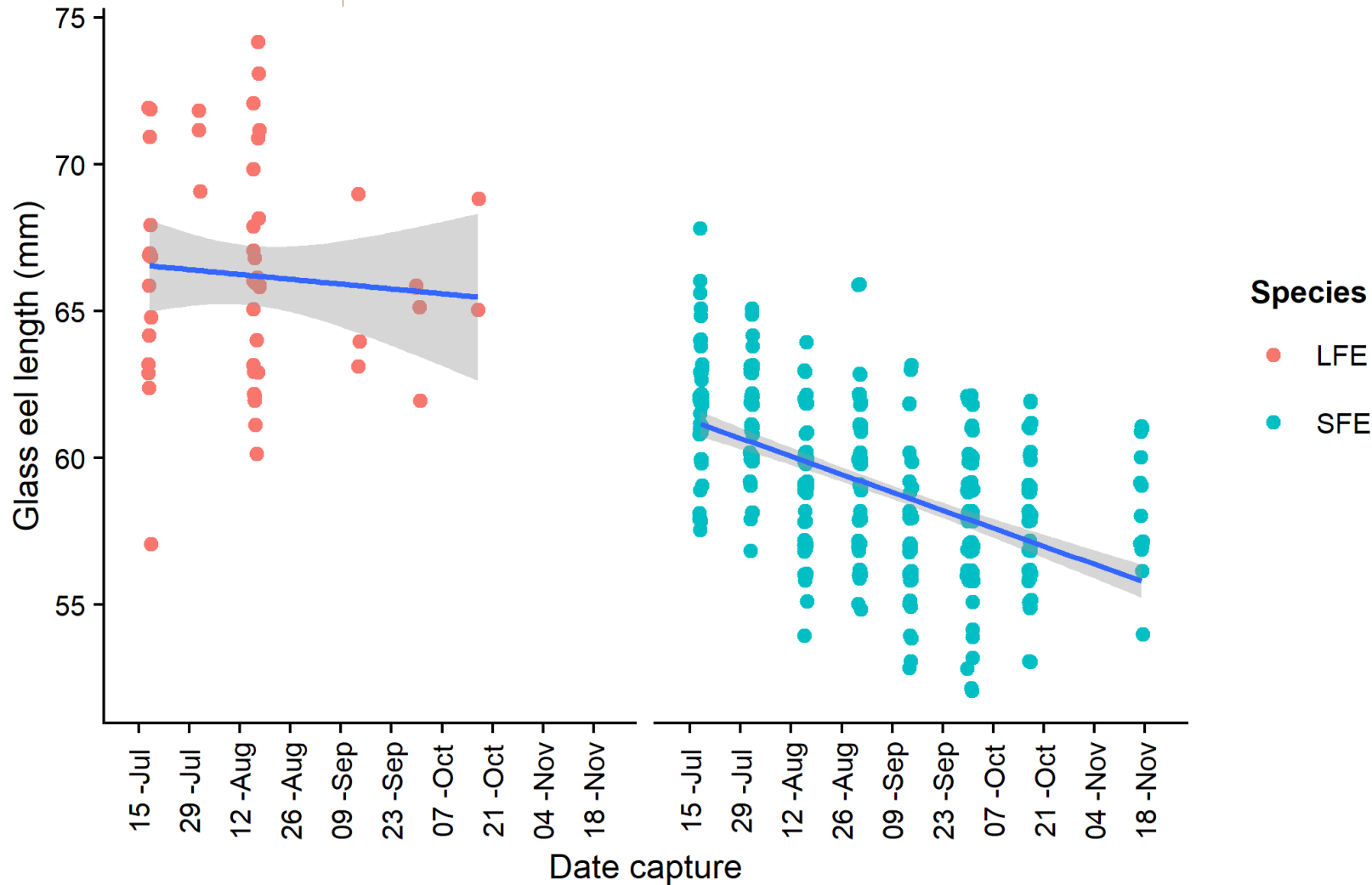


Longfin glass eels arriving into the Rangitāiki are heavier than shortfins



- Longfin weight range = 0.18g – 0.46g
- Shortfin weight range = 0.1g – 0.28g

In the Rangitāiki, **shortfin** glass eels arriving later in the season are smaller



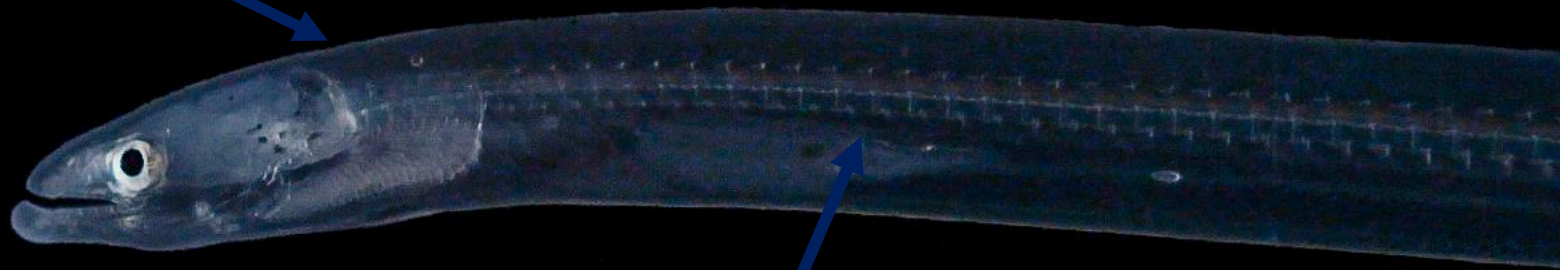
- Longfin glass eel size does not change over the season
- However numbers are low (54 in total)

Lab work July – December 2020

Remove ear bone (otolith)

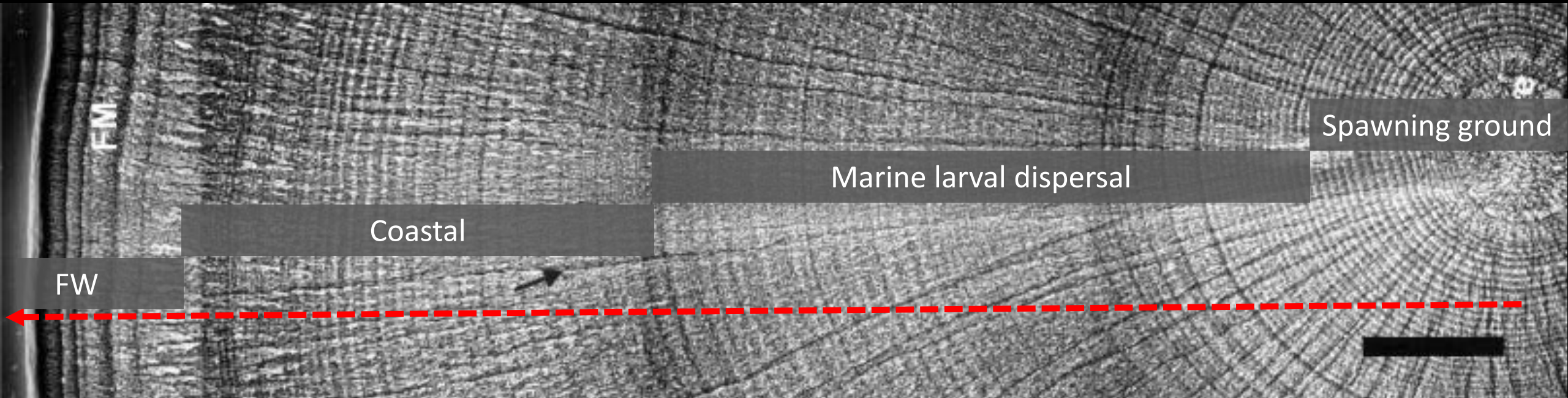


Behind schedule due
to COVID-19



Remove vertebrae to get a sample of
their flesh

Measurements of the daily growth rings

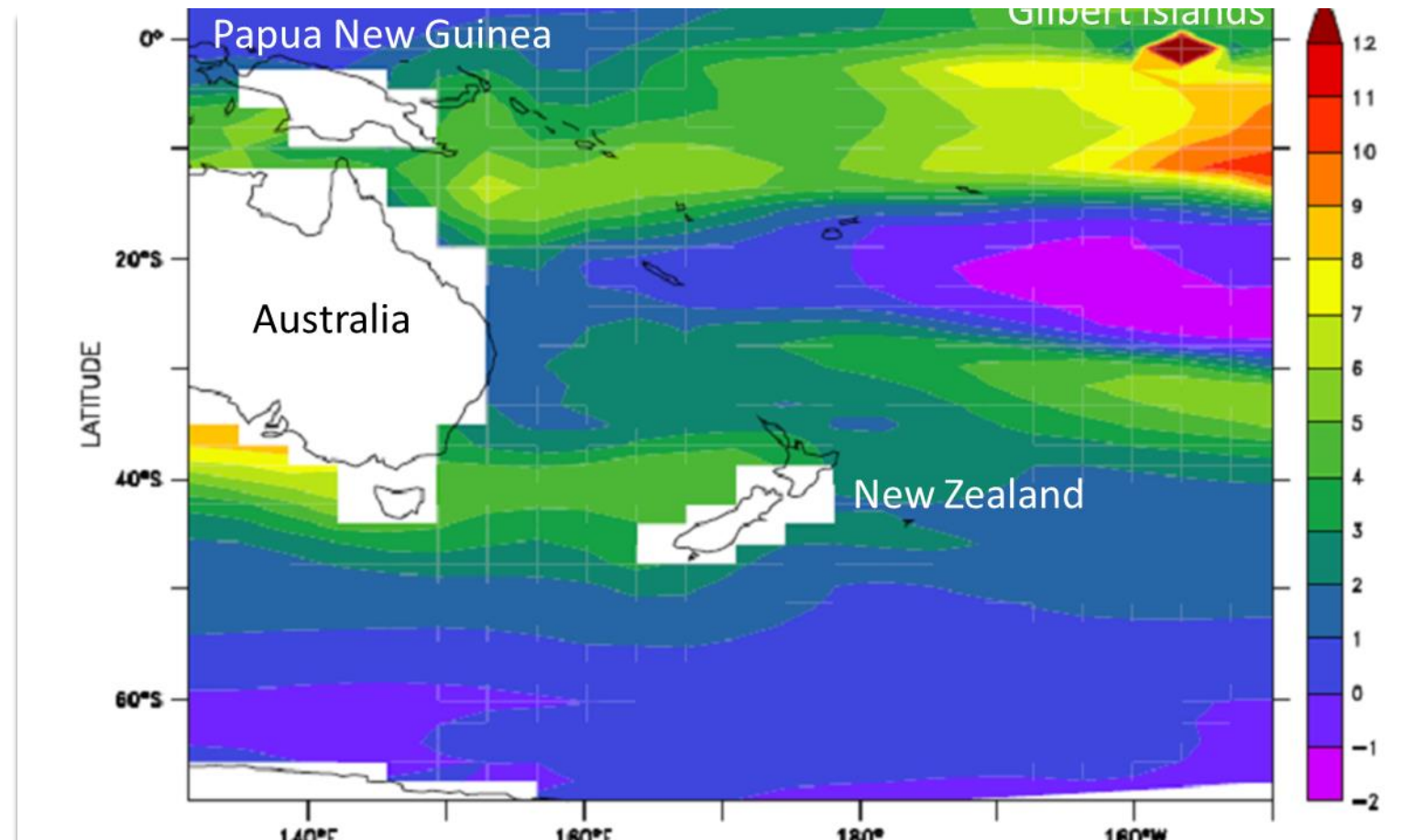


- A catalogue of information contained in otoliths
 - Age (length of time taken to reach NZ)
 - Birth date
 - Daily growth rates



Chemistry of glass eels tissues

- What have they eaten?
- If they have lived in different parts of the ocean, will the chemistry of their diet differ?



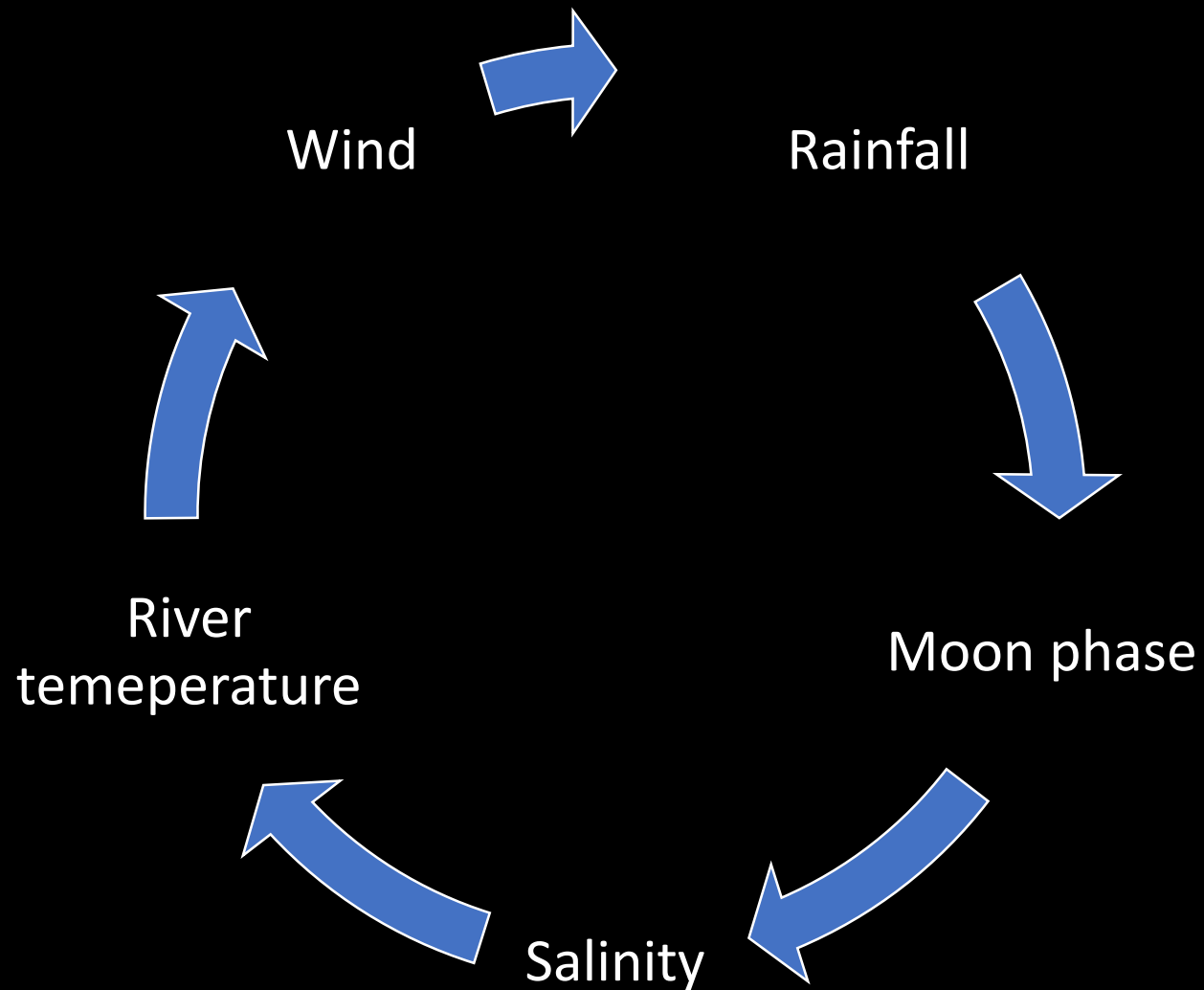
Rangitāiki glass eel sampling timetable 2020

Proposed sampling dates		Moon phase
June	6th/7th	Full
	21st/22nd	New
July	8th/9th	Full
	21st/22nd	New
August	4th/5th	Full
	19th/20th	New
September	5th/6th	Full
	17th/18th	New
October	1st/2nd	Full
	17th/18th	New
November	1st/2nd	Full
	17th/18th	New
December	2nd/3rd	Full
	15th/16th	New



- 14 sampling events planned
- Before sunset
- Between 5pm – 2am
- Sample for 3 – 4 hours

June 2020 - install a “seabird” logger to measure environmental conditions





Siobhan Nuri

- Ngāti Ranginui
- Doing Masters in Science at University of Waikato
- Leading sampling and analyses this year in Rangitāiki for her studies
- Opportunity to also sample Tarawera river for comparison if forum agree?

Help from our interns



Pātai?