Estimating biomass and monitoring paua populations following the Kaikoura Earthquake

Kaikoura Earthquake Marine Research Presentation

Dr. Tom McCowan – Paua Industry Council Ltd.

Dr. Phil Neubauer – Dragonfly Data Science

DRAGONFLY Data Science

Fisheries New Zealand

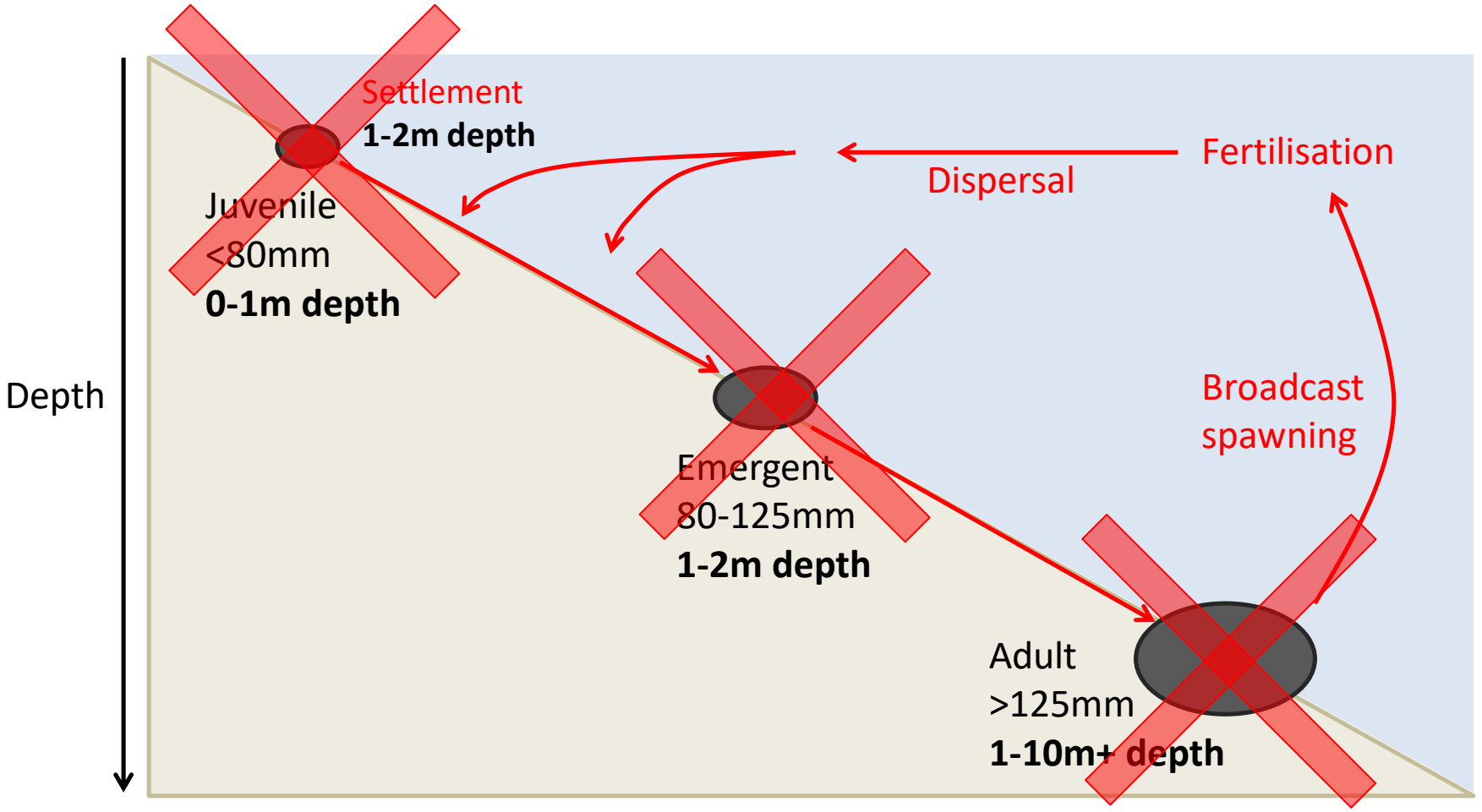
Tini a Tangaroa

Coastal uplift up to 5m

High paua mortality

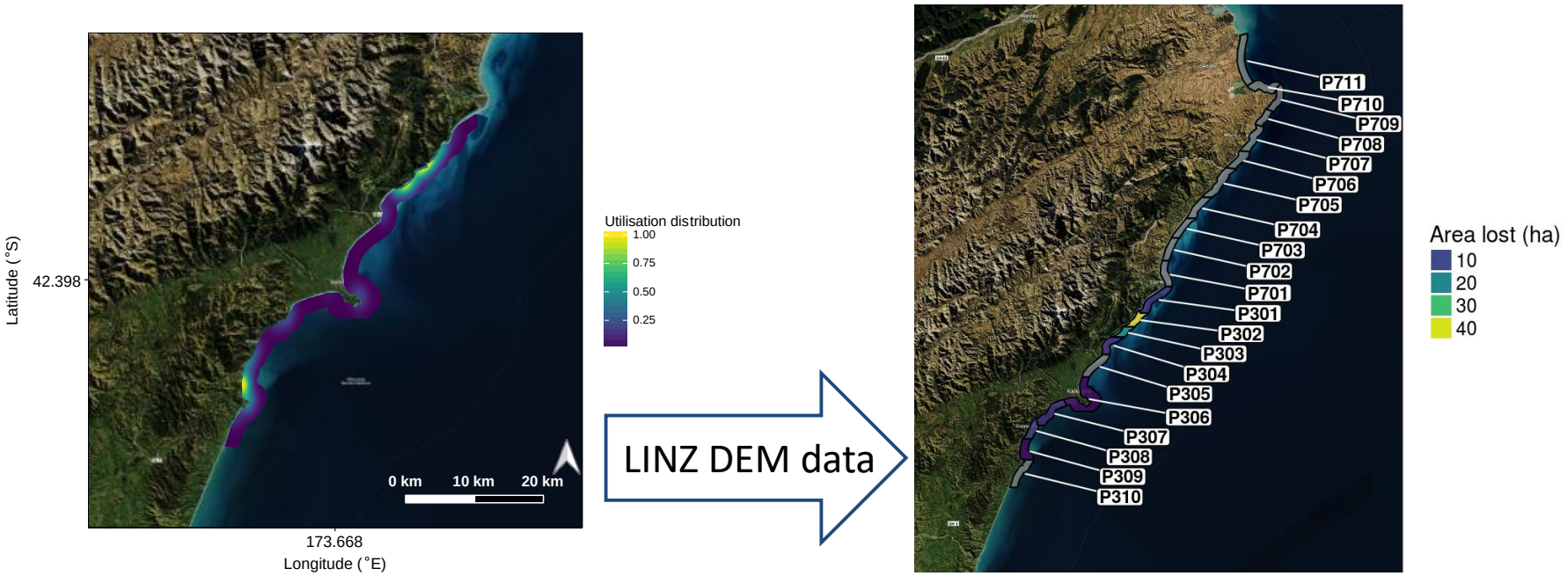
Loss of critical paua habitat

Paua life-cycle



Assessing loss to the fishery

Estimation of area lost to the fishery (Neubauer, 2017)



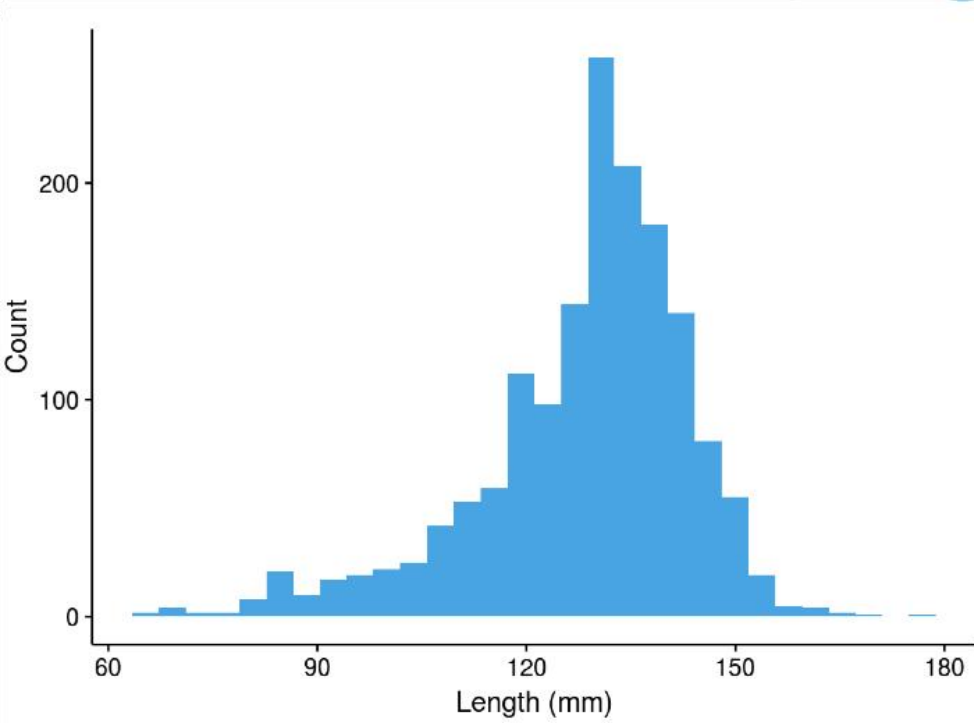
- Estimated 21% of fished areas (by catch weight) were impacted by uplift
- Unquantifiable loss of juvenile habitat

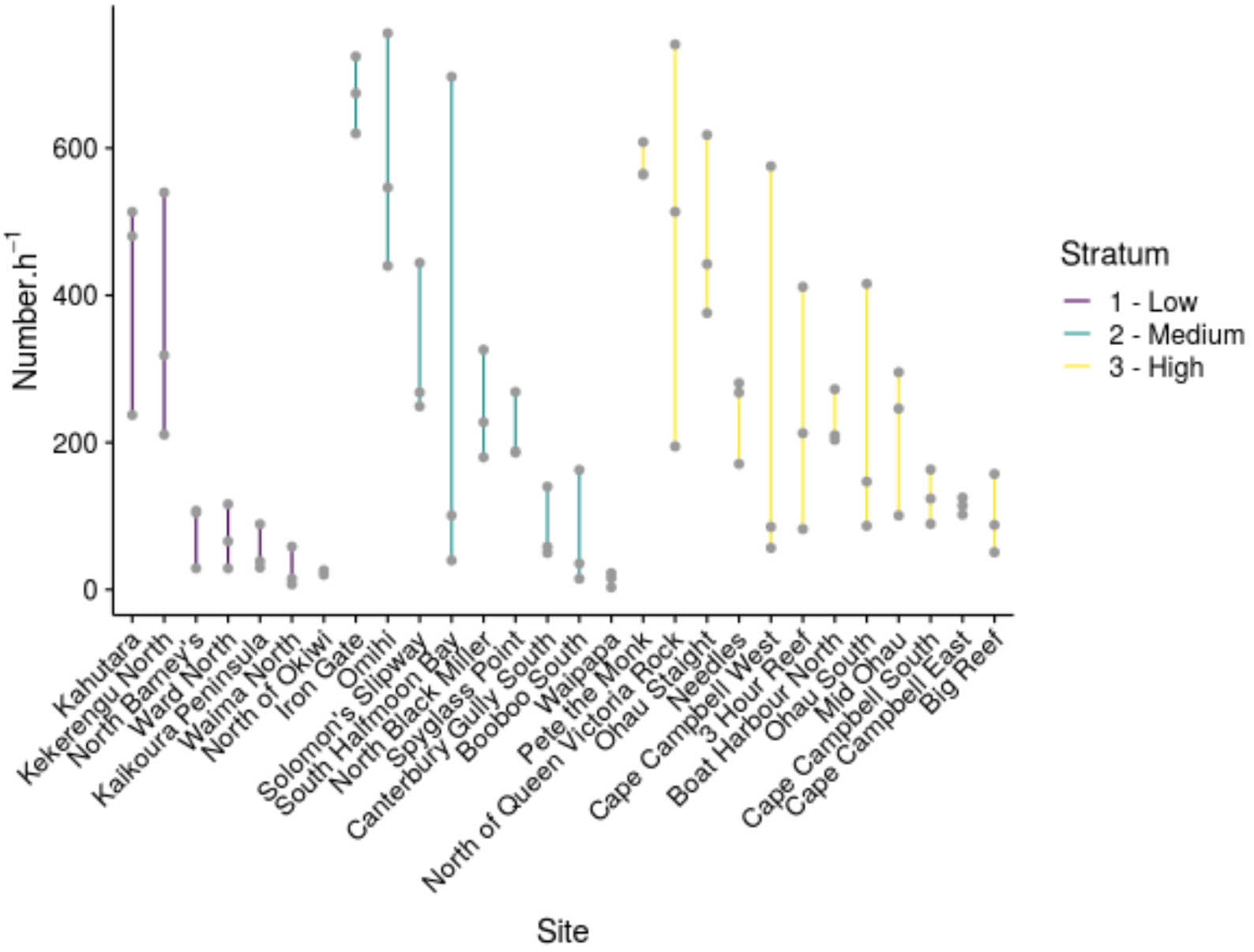
Objectives

- To estimate paua biomass in the earthquake-affected areas to inform management decisions

- To monitor individual paua populations to detect future recruitment and recovery


43 Sites surveyed
83 individual monitoring points
14,000 paua measured
Average size 130mm


Count
200
100
0
60
90
120
150
180
Length (mm)


Number.h^{-1}
0
200
400
600
Site
Kahutara
Kekerengu North
North Barney's
Ward North
Kaikoura Peninsula
Waima North
North of Okiwi
Iron Gate
Omihi
Solomon's Slipway
South Halfmoon Bay
North Black Miller
Spyglass Point
Canterbury Gully South
Booboo South
Waipapa
Pete the Monk
North of Queen Victoria Rock
Ohau Staight
Needles
Cape Campbell West
3 Hour Reef
Boat Harbour North
Ohau South
Mid Ohau
Cape Campbell South
Cape Campbell East
Big Reef
Stratum
1 - Low
2 - Medium
3 - High

Results

Strata densities

QMA	Stratum	mean
PAU3	1 - Low	0.04
PAU3	2 - Medium	0.13
PAU3	3 - High	0.11
PAU7	1 - Low	0.04
PAU7	2 - Medium	0.03
PAU7	3 - High	0.05

Strata biomass

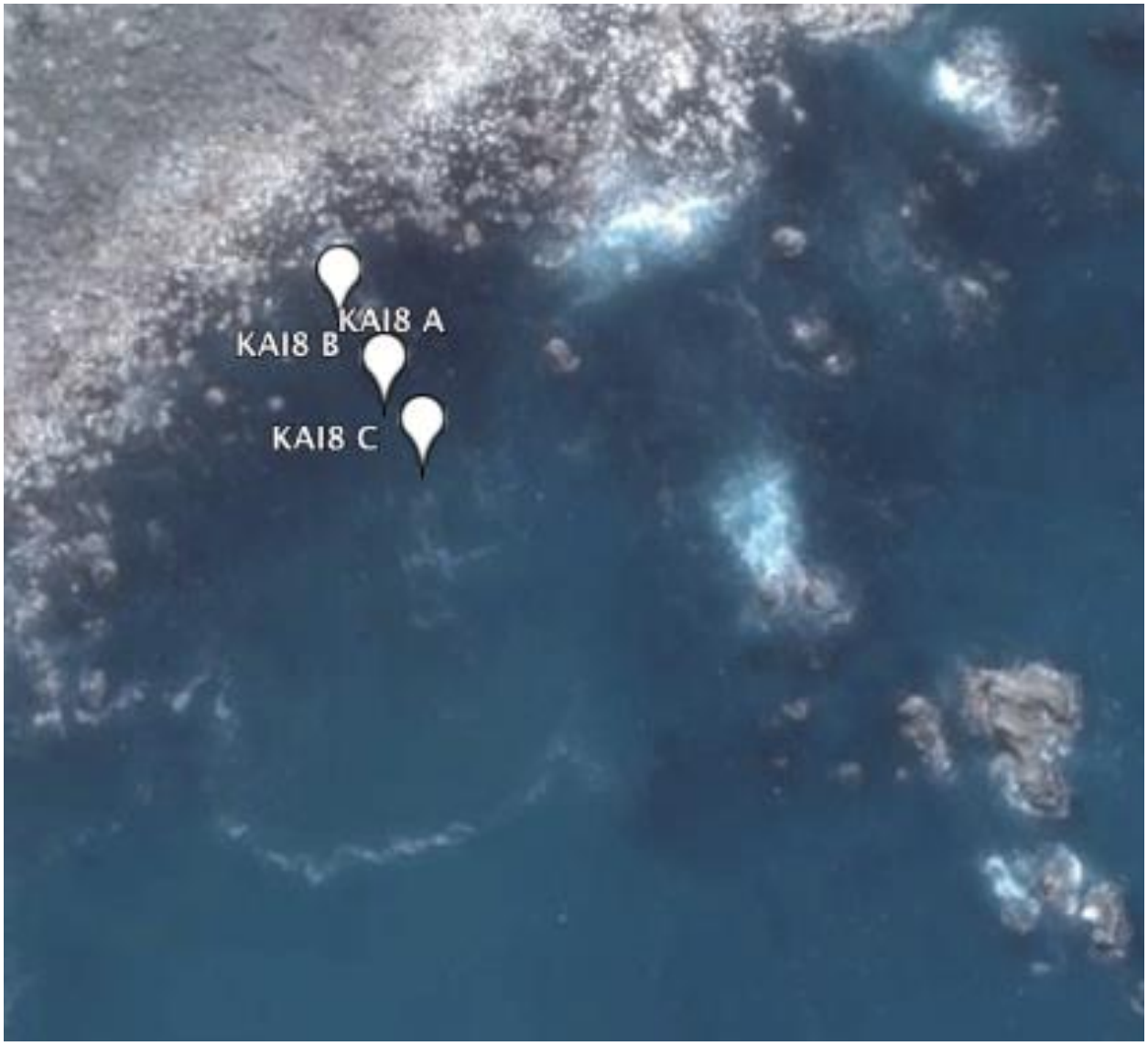
QMA	Stratum	mean
PAU3	1 - Low	21.27
PAU3	2 - Medium	46.38
PAU3	3 - High	2.34
PAU7	1 - Low	17.18
PAU7	2 - Medium	8.87
PAU7	3 - High	1.17

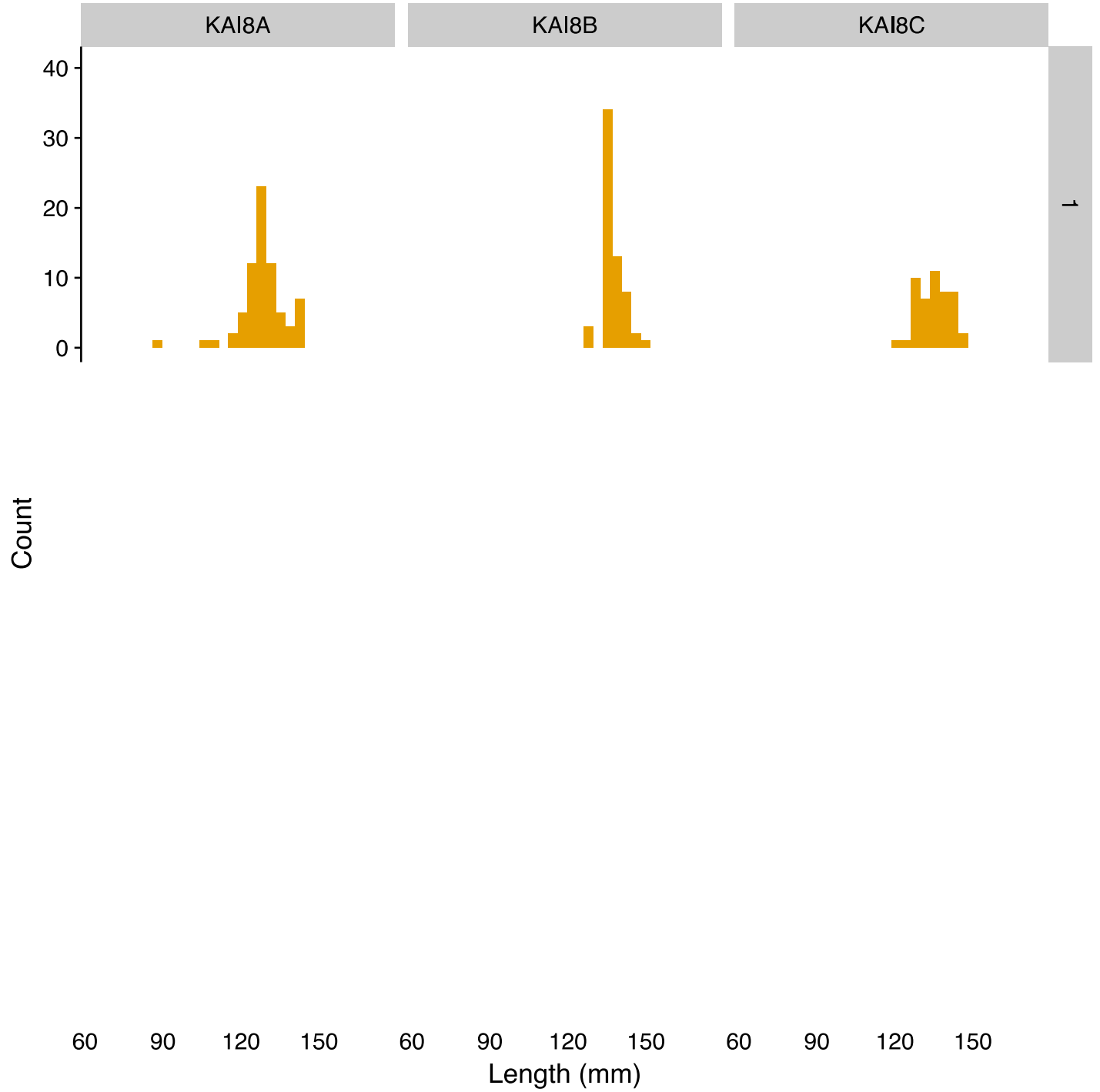
Regional biomass

QMA	mean
PAU3	69.98
PAU7	27.22

- Site and region-wide density estimates
- Baseline for future monitoring

Monitoring Populations




KAI8A
KAI8B
KAI8C
1
40
30
20
10
0
Count
60
90
120
150
Length (mm)


Queen Vic Rock A

Other projects

1. Monitoring juvenile paua recruitment – ‘Paua Motels’

1. Monitoring recruitment

1. Monitoring recruitment

Other projects

1. Monitoring juvenile paua recruitment – ‘Paua Motels’

2. Reseeding

- 176,000 reseeds over four sites
- Omihi to Paparoa Point

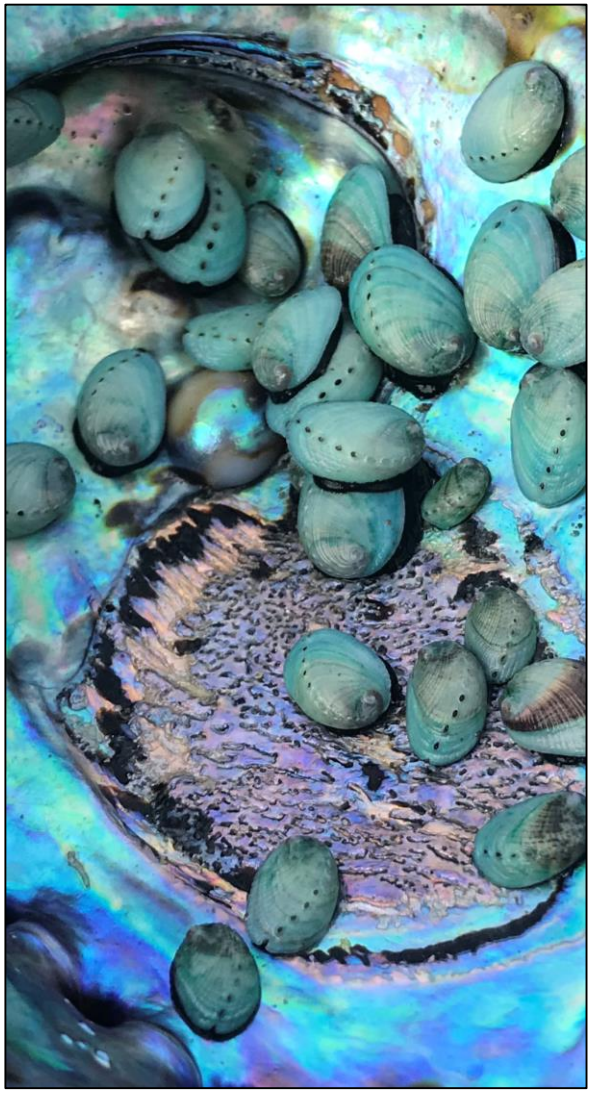
2. Reseeding

2. Reseeding

2. Reseeding

Outlook

- Ongoing monitoring:
  - Fishery, site and aggregation level
  - Recruitment
- Continued reseeding
- Accounting for habitat is critical
- Stock assessment
  - Future projections
  - Account for introduction of fishing



Thank you

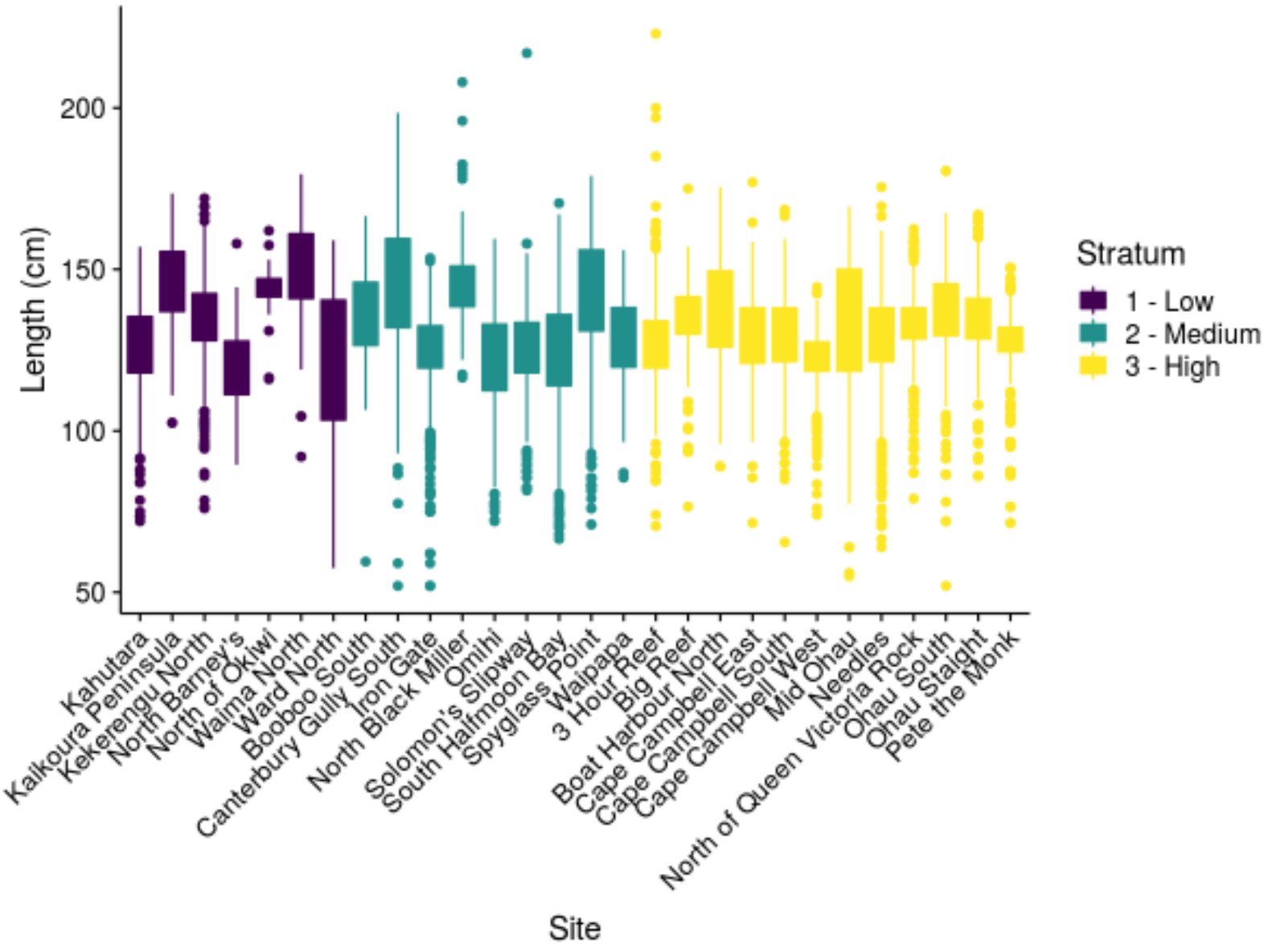
- Fisheries New Zealand
- Dragonfly Data Science
- PauaMAC3 divers
  - Jason Ruawai
  - Phil Richardson
  - Marty Pattison
  - Shayne Cuff
- PauaMAC7 divers
  - Tim McLeod
  - Pat Reid
  - Barry Chandler

Fisheries New Zealand

Tini a Tangaroa

DRAGONFLY

Data Science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