

Controlling Non-indigenous Crustaceans

CASE STUDY:

Charybdis japonica in NZ

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Home

Japan

Korea

China

Taiwan

Malaysia

Thailand

Introduced

NZ

Australia?

(1 record)



Objectives

To trial a control programme for the non-indigenous crab *Charybdis japonica*.

1. Review control techniques
2. Select a control method to trial
3. Implement a control programme



Review of control methods



Control methods

Application

Efficacy

Advantages

Constraints

Impacts

Cost

Target species

Life History

Ecology



Charybdis japonica

Portunid =
swimming crab

Intertidal –
estuaries & bays



Up to **120 mm**

Territorial

4 years

**Generalist
predator**

Aggressive!



Control methods for crustaceans

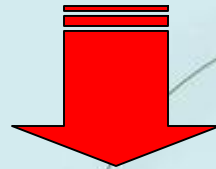
Environmental modification

Biological control

Physical removal

Sterilisation

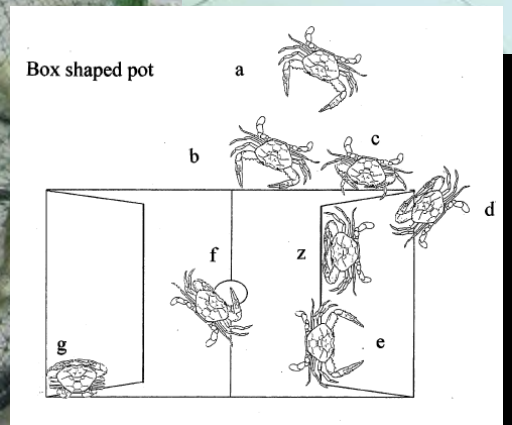
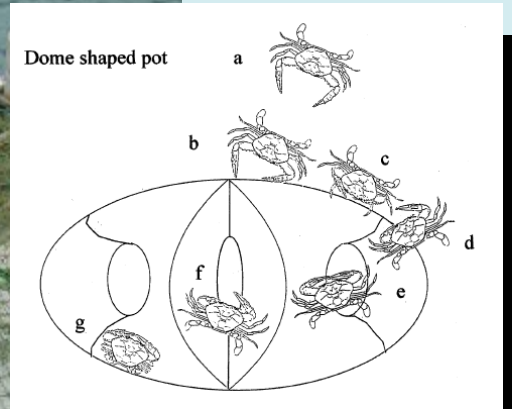
Chemical control



**Integrated Pest Management
strategy**



Field trial of crab trapping



Lab trial of chemical controls & barrier options

Formulations

Lime

Emamectin benzoate

Copper oxychloride

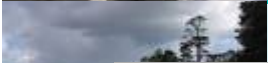
Carbaryl

Applications

Broadcast

Bait

Barrier materials



Laboratory trials



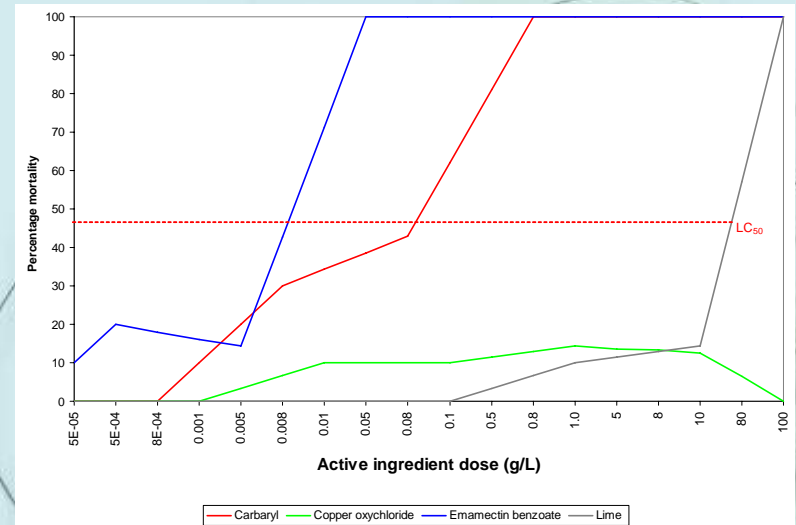
AUT lab



Ovalipes catharus

Broadcast chemical treatment

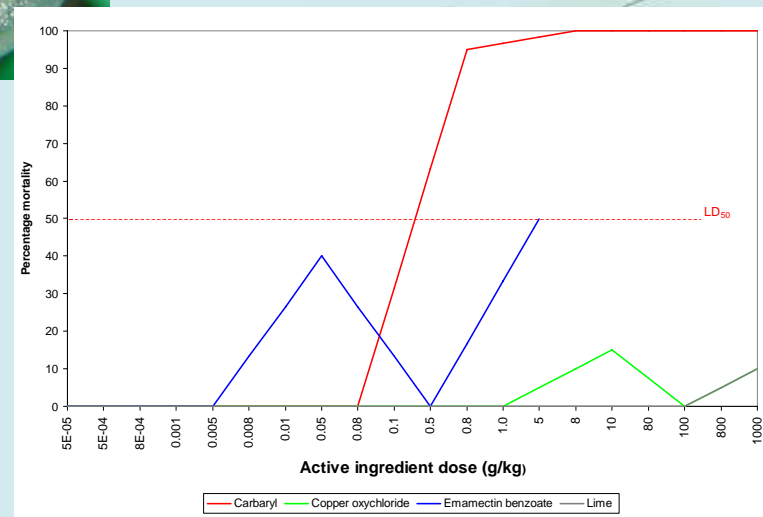
Chemical	LC ₅₀ (g/L)
Carbaryl	0.091
Emamectin benzoate	0.015
Lime	18.4
Copper oxychloride	



Poison bait application



Carbaryl
~~Emamectin benzoate~~
~~Lime~~
~~Copper oxychloride~~



Barrier options



Chemical-soaked rope

Bubble 'curtain'



Summary of pilot trials

- Opera-house traps catch *Charybdis*
- Carbaryl is lethal to portunid crabs
- Baits can be used to apply biocide
- Barrier options ineffective



IPM strategy

Physical removal
intensive trapping



Chemical control
poison baits





Regulatory Approval

Environmental Risk Management Authority

Permit to trial a chemical formulation in containment

Auckland Regional Council

Resource consent to discharge a contaminant

NZ Ministry of Fisheries

Special permit and notification of fish poison



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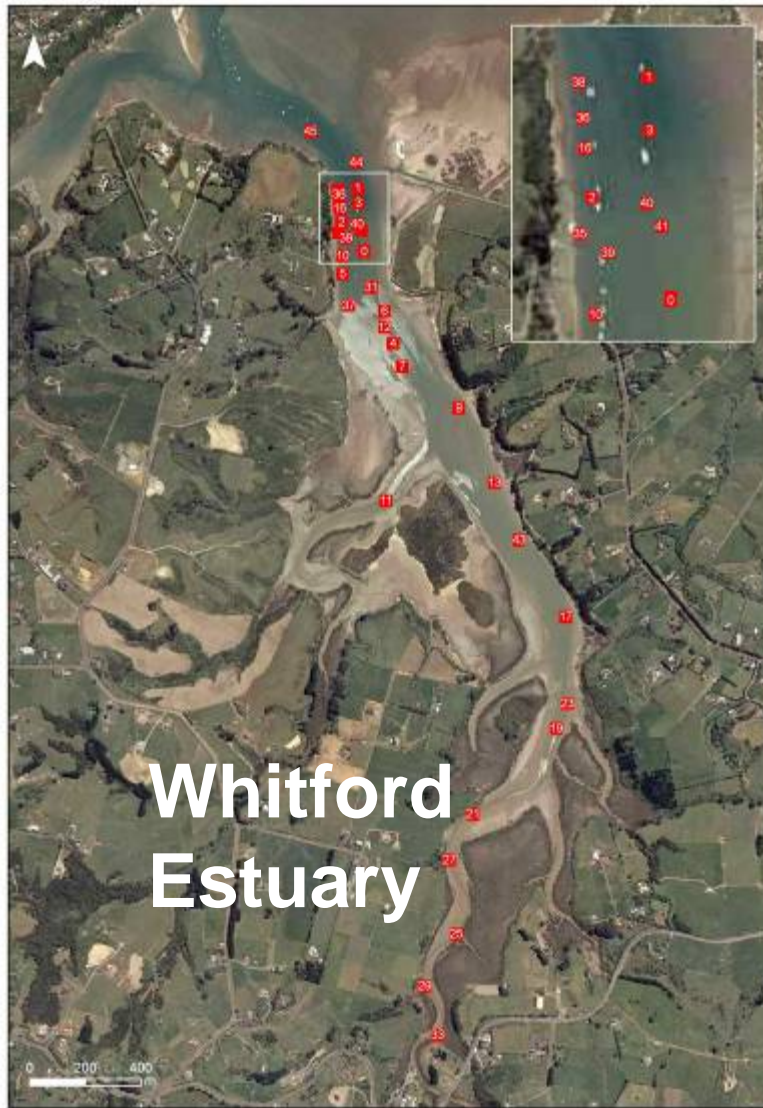
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Special permit and notification of fish poison



Back to Plan A

Fish-down by intensive trapping
without chemical bait

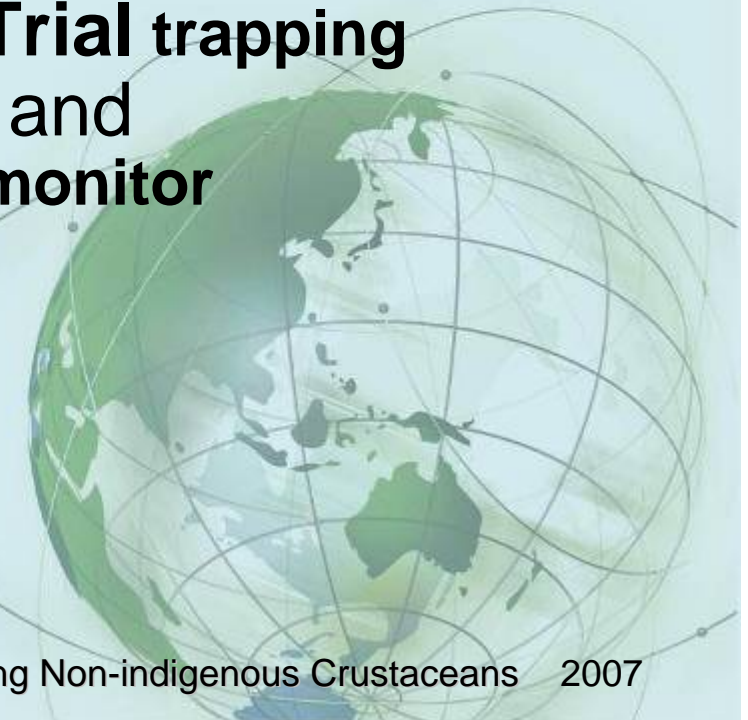




Whitford Estuary



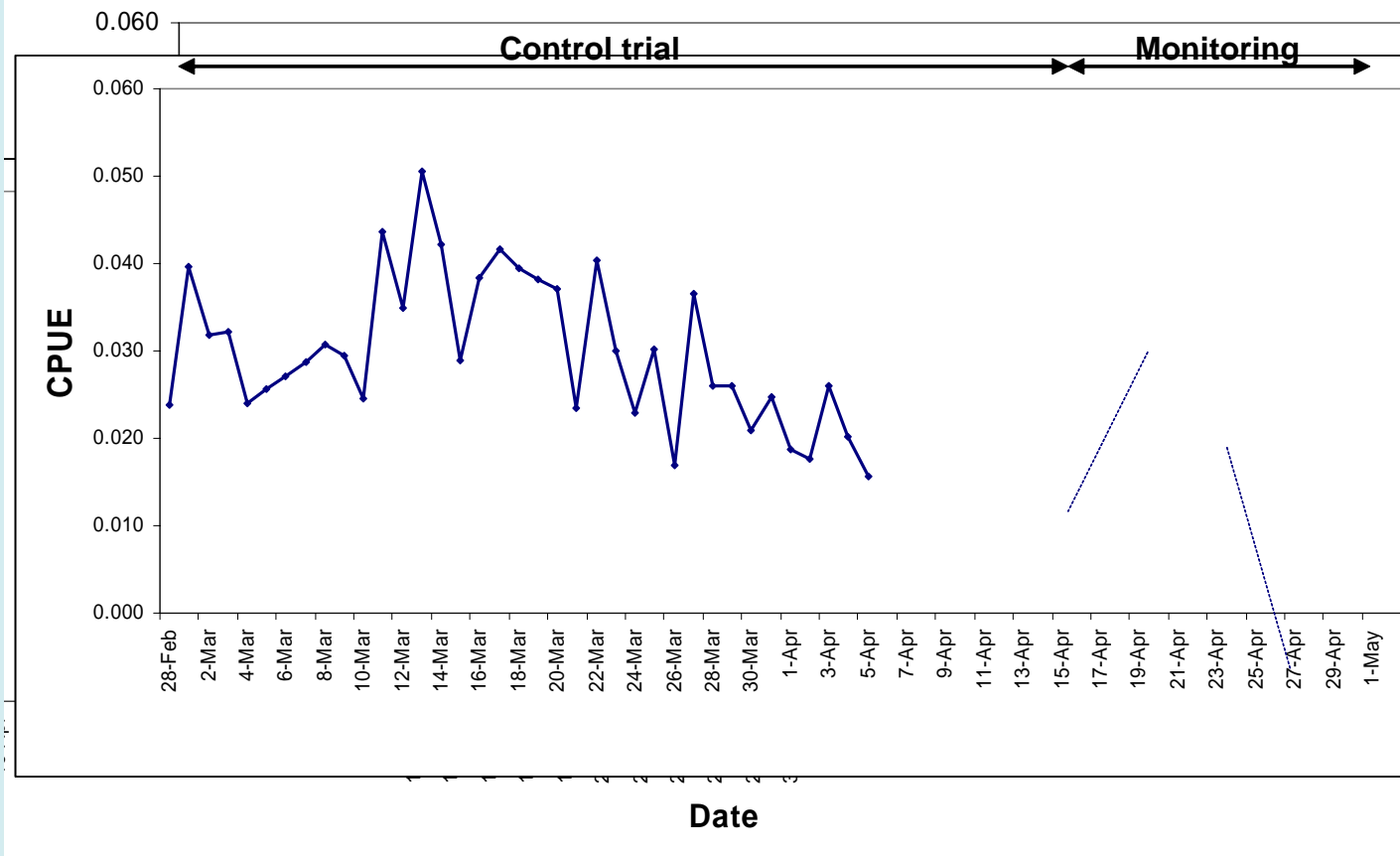
Trial trapping and monitor



Preliminary results

CPUE over time for total *C. japonica*

Catch rate =
no. crabs / trapping hrs

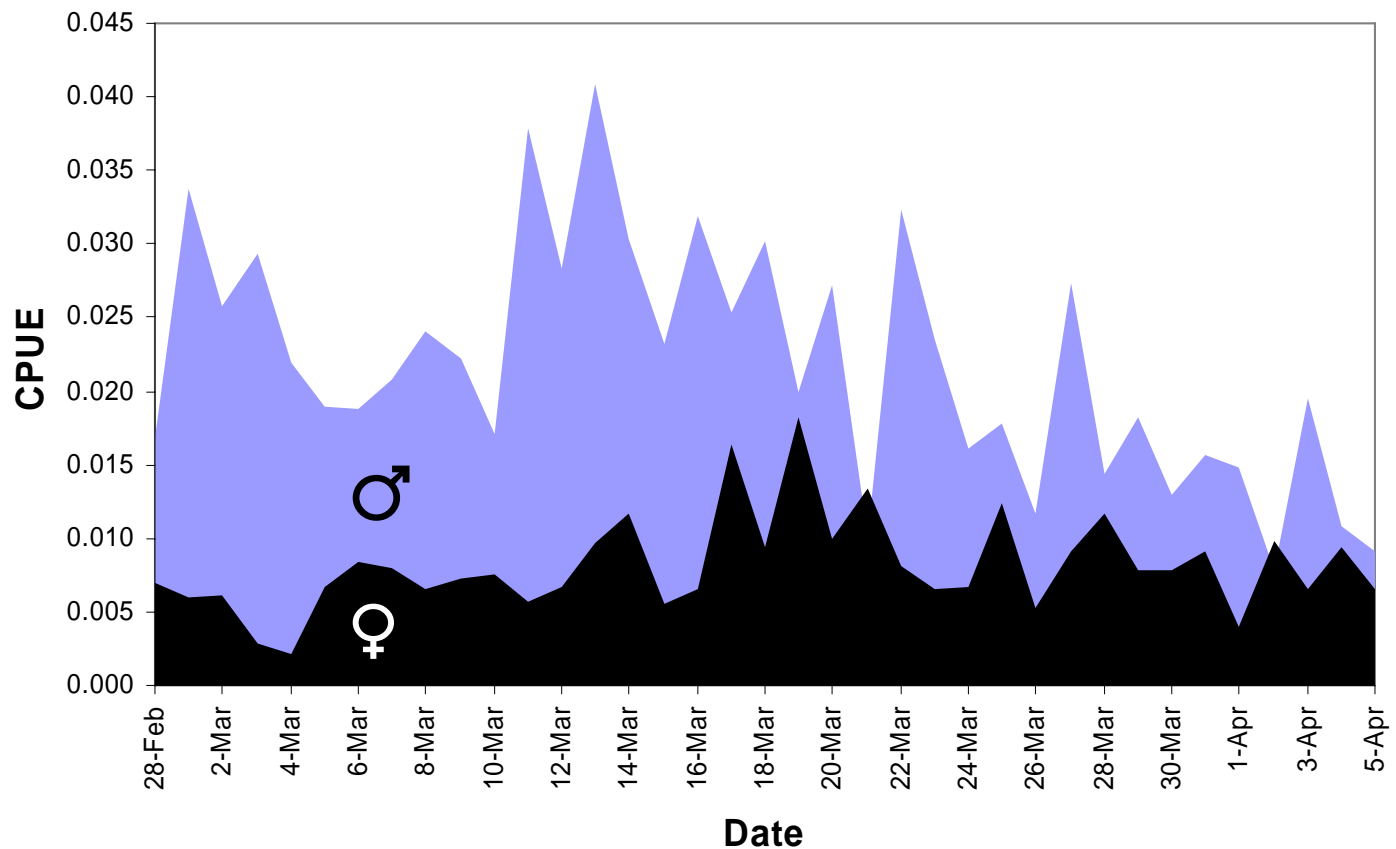




Preliminary results

CPUE over time for male and female *C. japonica*

Catch rate =
no. crabs / trapping hrs



Preliminary results



Spatial trends

Environmental variables

Rain fall
Temperature

Biological information

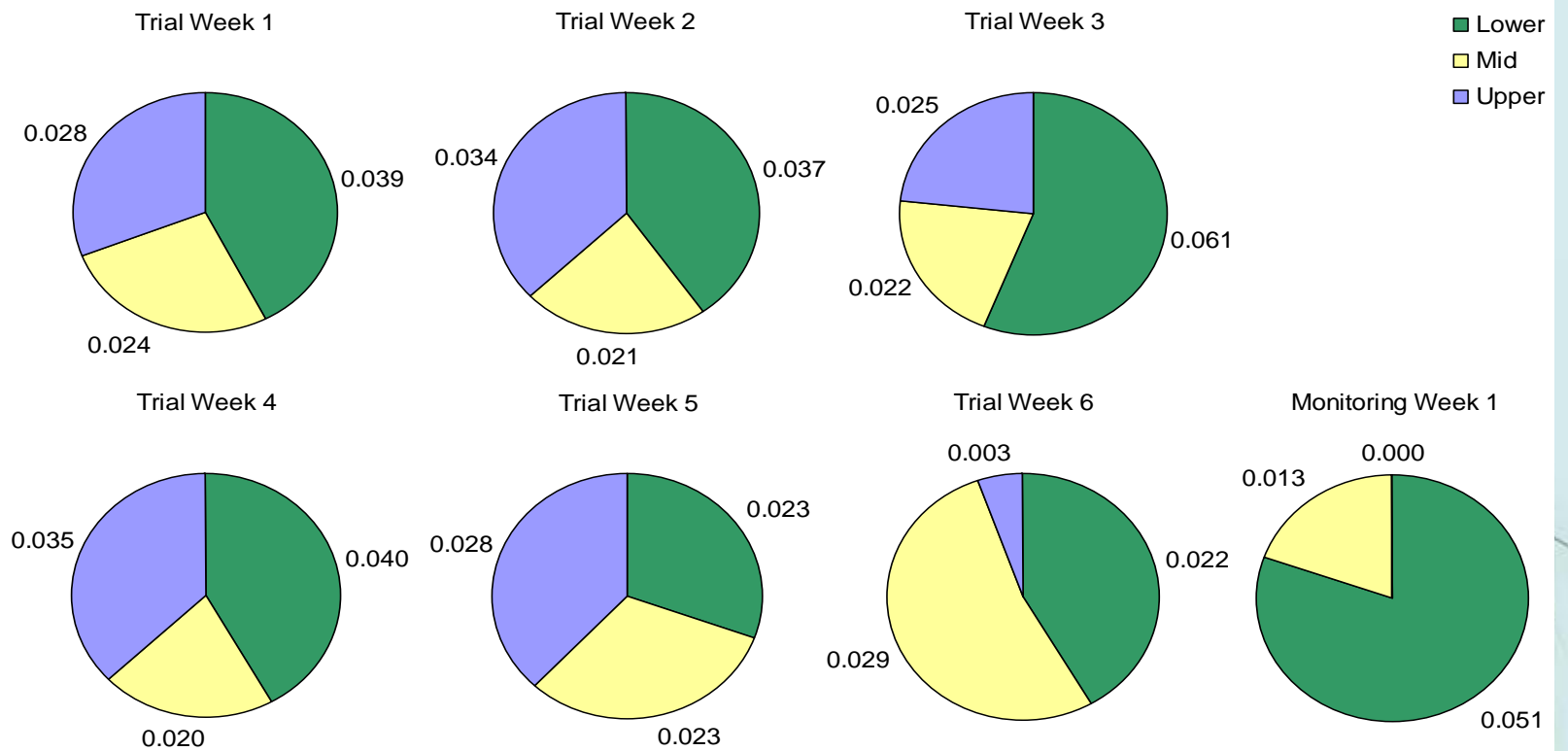
Morphological variations
Size distributions
Gravid females
Juvenile specimens?
Moulting (soft shell) specimen
Spatial trends throughout the estuary



Morphological variations

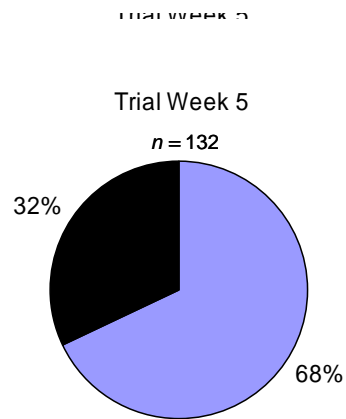
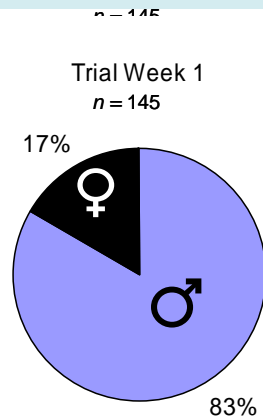
Preliminary results

CPUE over time and area



Preliminary results

Sex ratio over time



n = 208
n = 208

n = 231
n = 231

n = 169

%

36%

37%

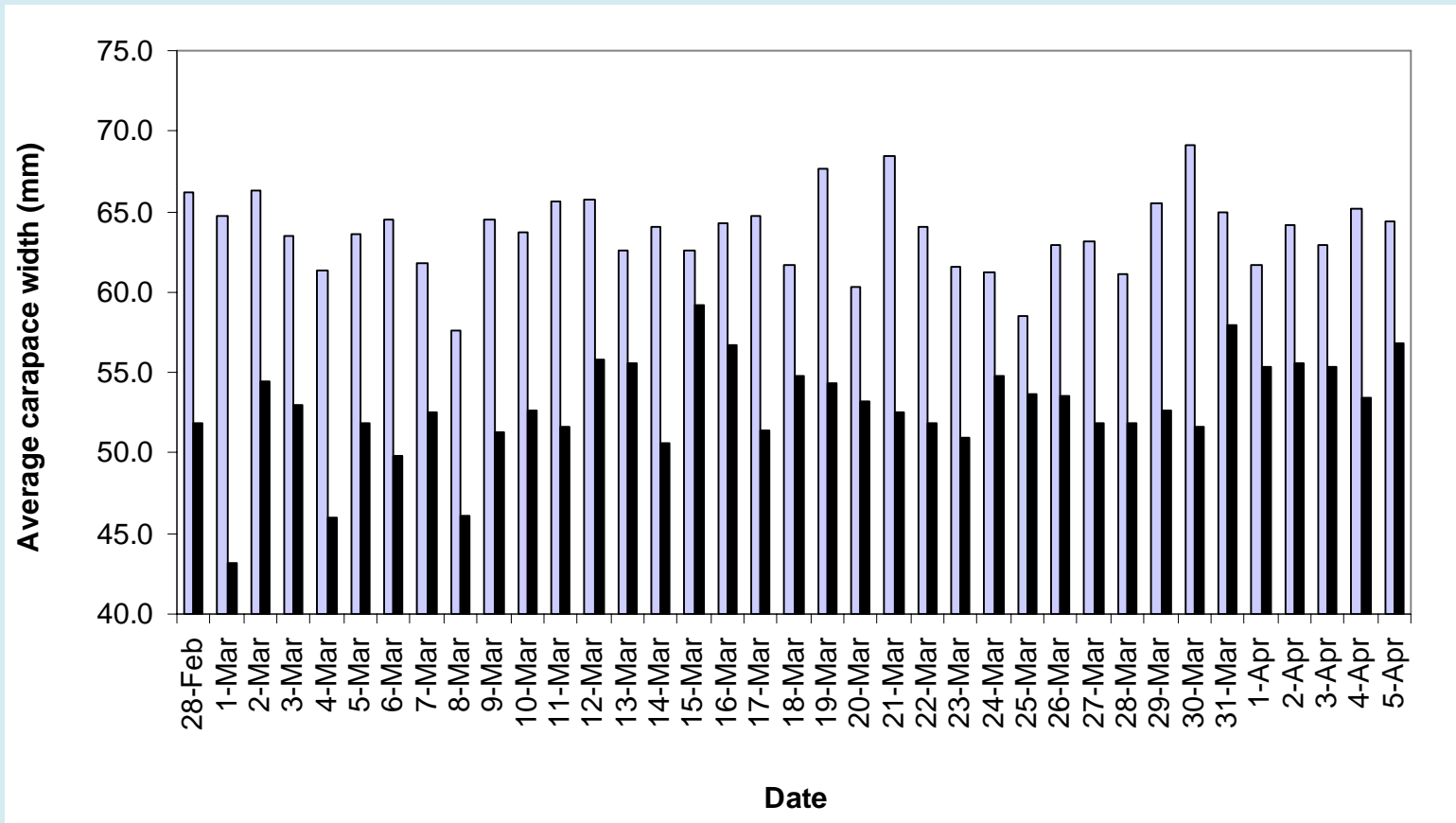
Winter Monitoring

0%

100%

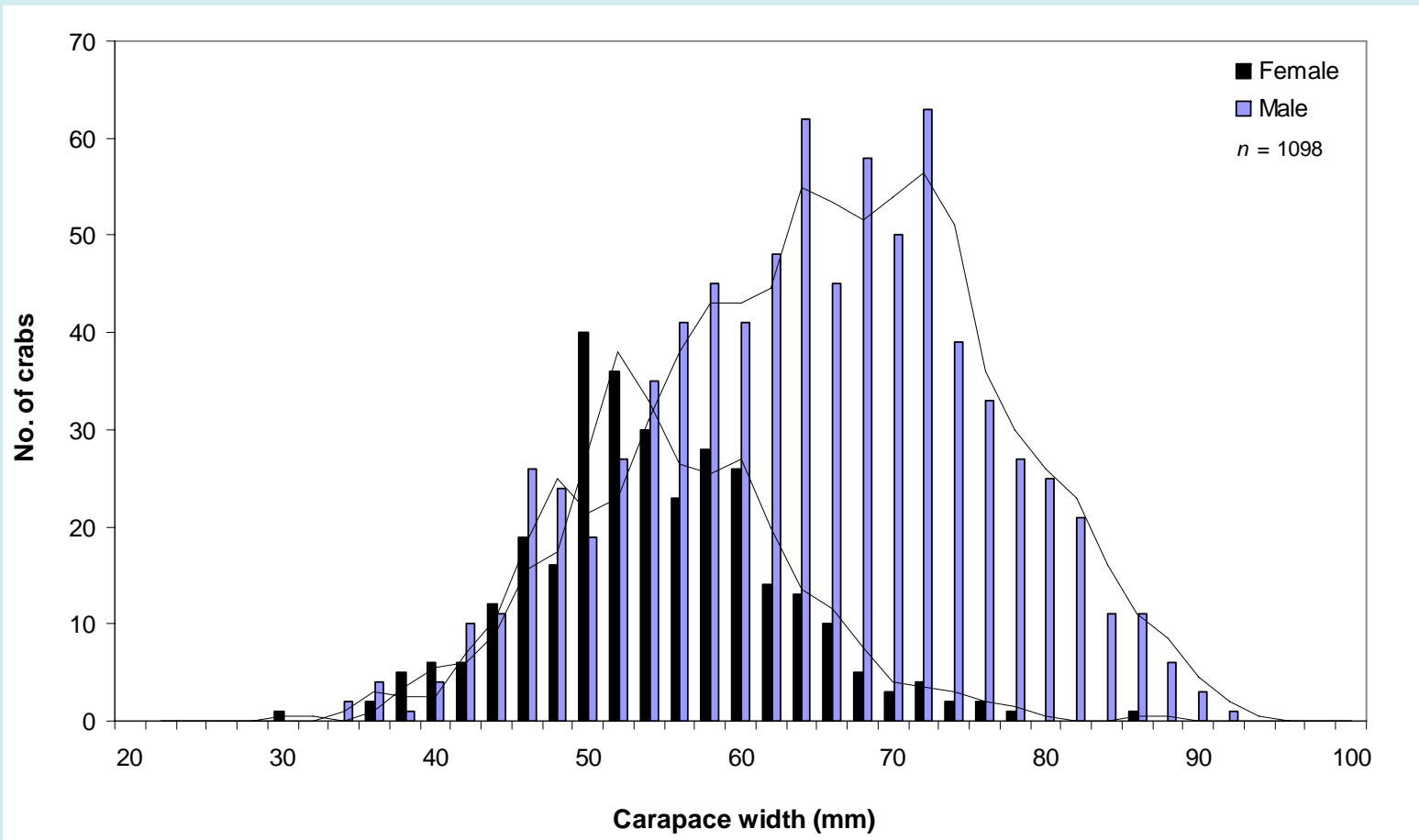
Preliminary results

Size distribution over time



Preliminary results

Size frequency distribution



Some things to consider

Regulatory Approval

Customary & cultural issues

Cost e.g., labour intensive

Environmental constraints e.g., weather, tides

Public involvement





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