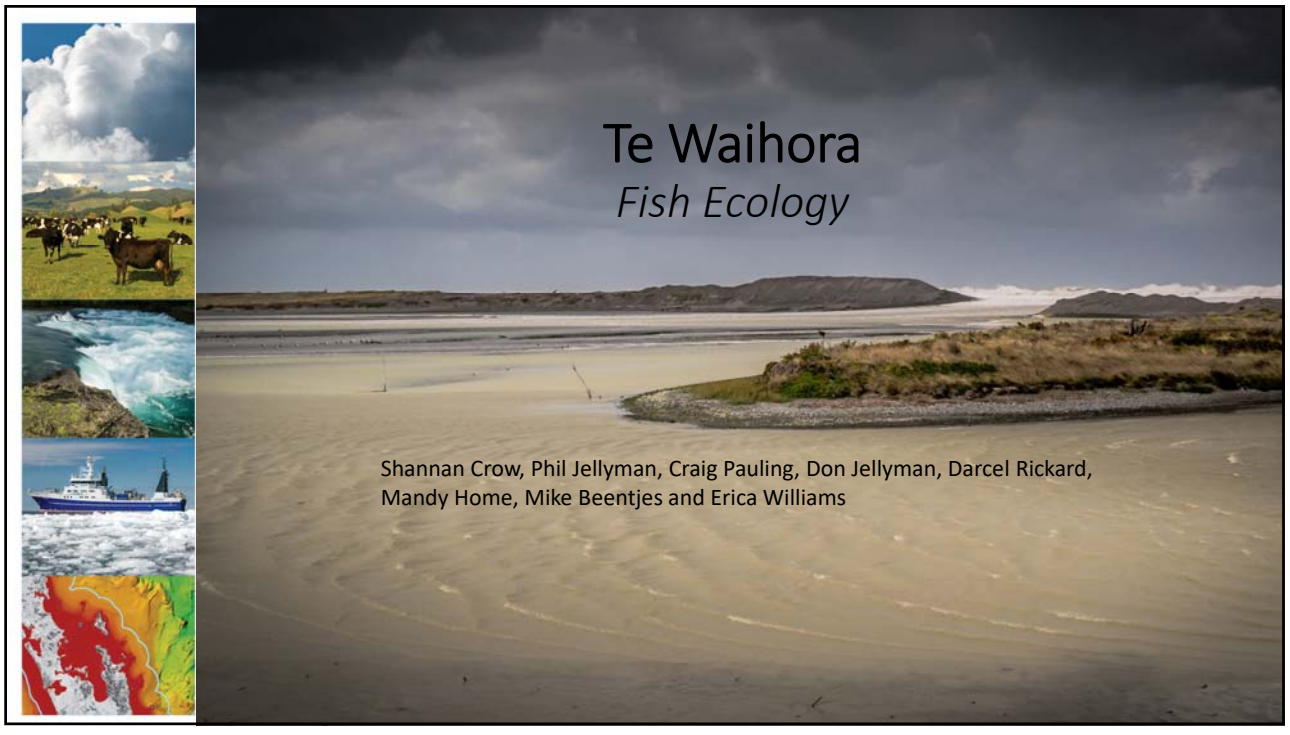

NIWA
Taihoro Nukurangi
FRESHWATER


Te Waihora
Fish Ecology
Shannan Crow, Phil Jellyman, Craig Pauling, Don Jellyman, Darcel Rickard,
Mandy Home, Mike Beentjes and Erica Williams

Te Waihora fish ecosystem

- Te Waihora has a rich fish ecosystem
- 46 species of fish
  - 26 freshwater/estuarine species

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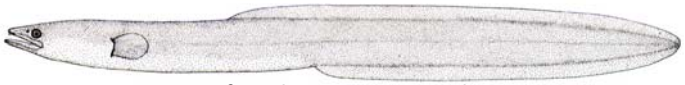
Key fish species

Tuna



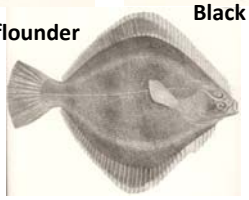
Longfin eel – up to 2 m & 25 kg

Shortfin eel – up to 1.1 m & 3 kg

Yellowbelly flounder

Black flounder

Pātiki



Sand flounder

Common bully

Inanga

Common smelt

Trout ?

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State of the Lake 2017: Fish

- STATE
  - How has the eel population changed over the last 50 years?
- PRESSURE
  - Natural lake outlet closure
- RESPONSE
  - Lake opening regime
  - When do juvenile fishes enter the lake?

Whakaora Te Waihora

- Fish recruitment
- Common bully population structure
- Horomaka kōhanga (tuna movement study)
- Productivity survey (tuna and patiki)
- Existing data collation

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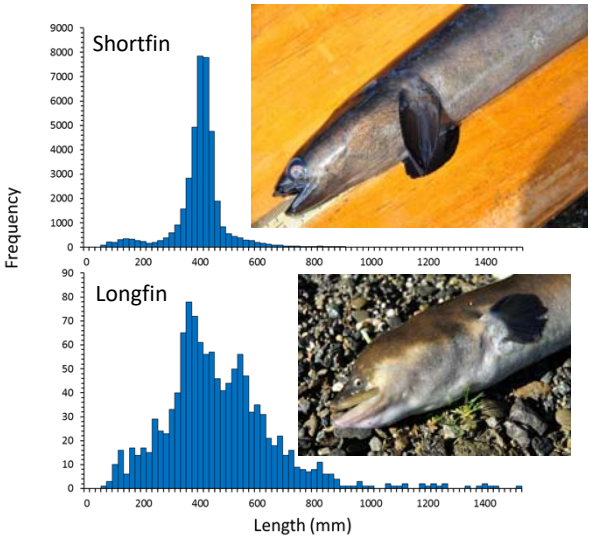
How has the tuna population* changed over the last 50 years?

- Dominated by shortfin eel
  - 40,000 shortfins
  - 1,200 longfins



* Research data (no data from MPI databases)

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How has the tuna population* changed over the last 50 years?

- Dominated by shortfin
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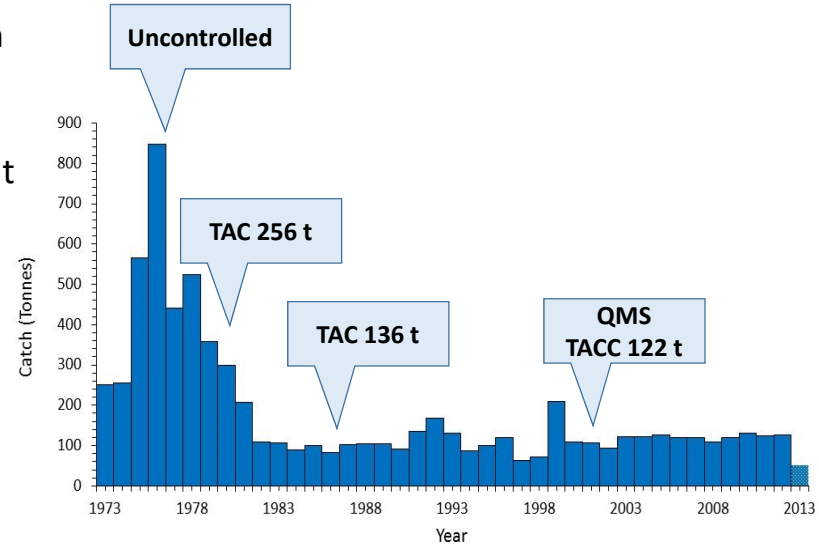
- Commercial catch ~122 t
  - 250,000-500,000 tuna
- 1970's uncontrolled
  - Almost ½ NZ catch



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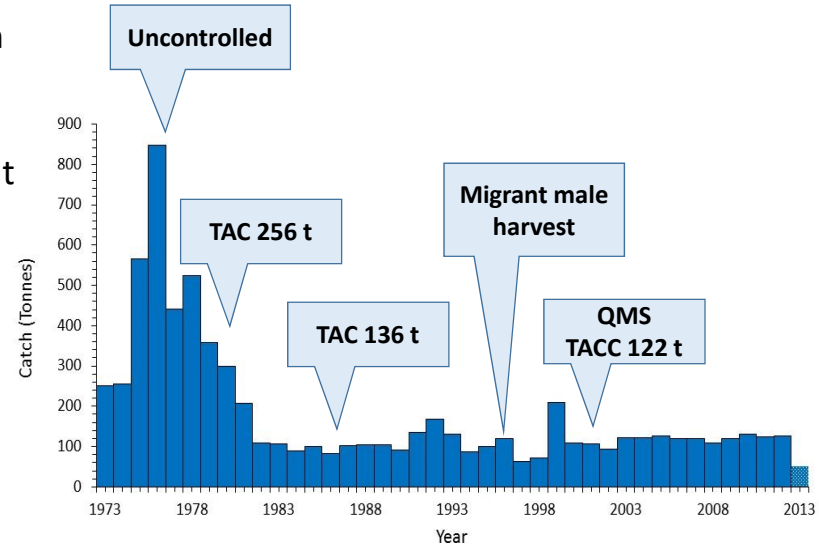

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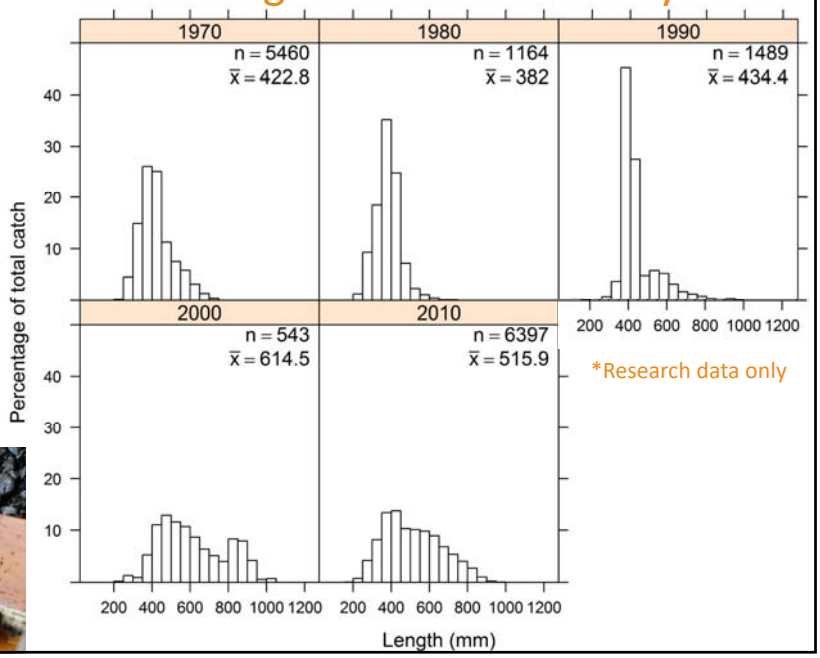
- Shift to larger fish



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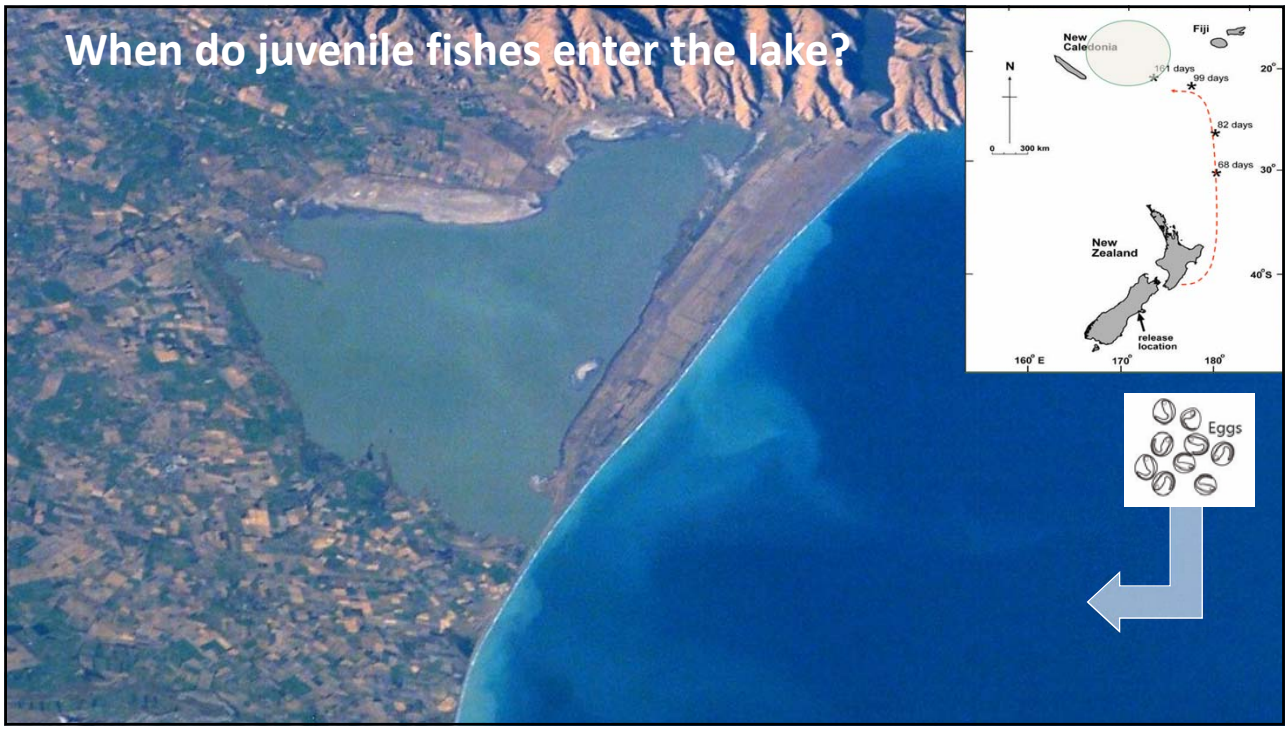
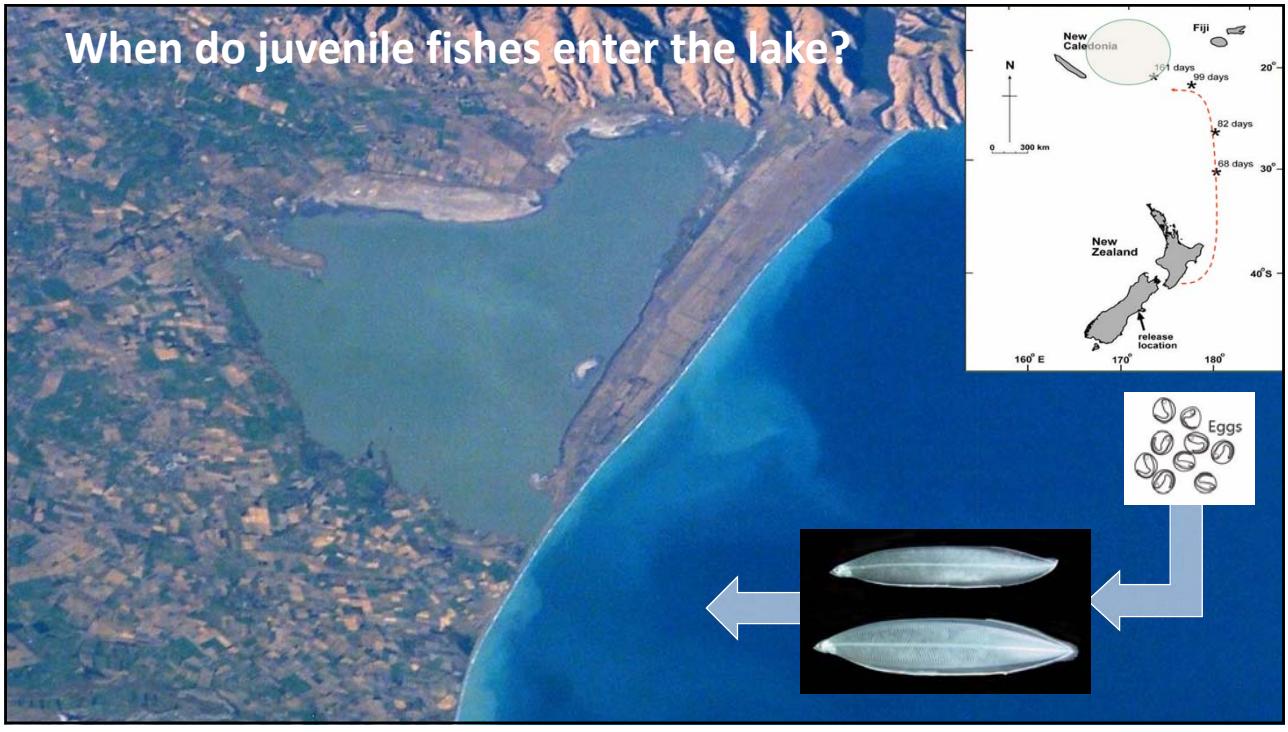

When do juvenile fishes enter the lake?
New Caledonia
Fiji
N
0 300 km
161 days
99 days
82 days
68 days
20°
30°
New Zealand
40°S
release location
160° E
170°
180°
Eggs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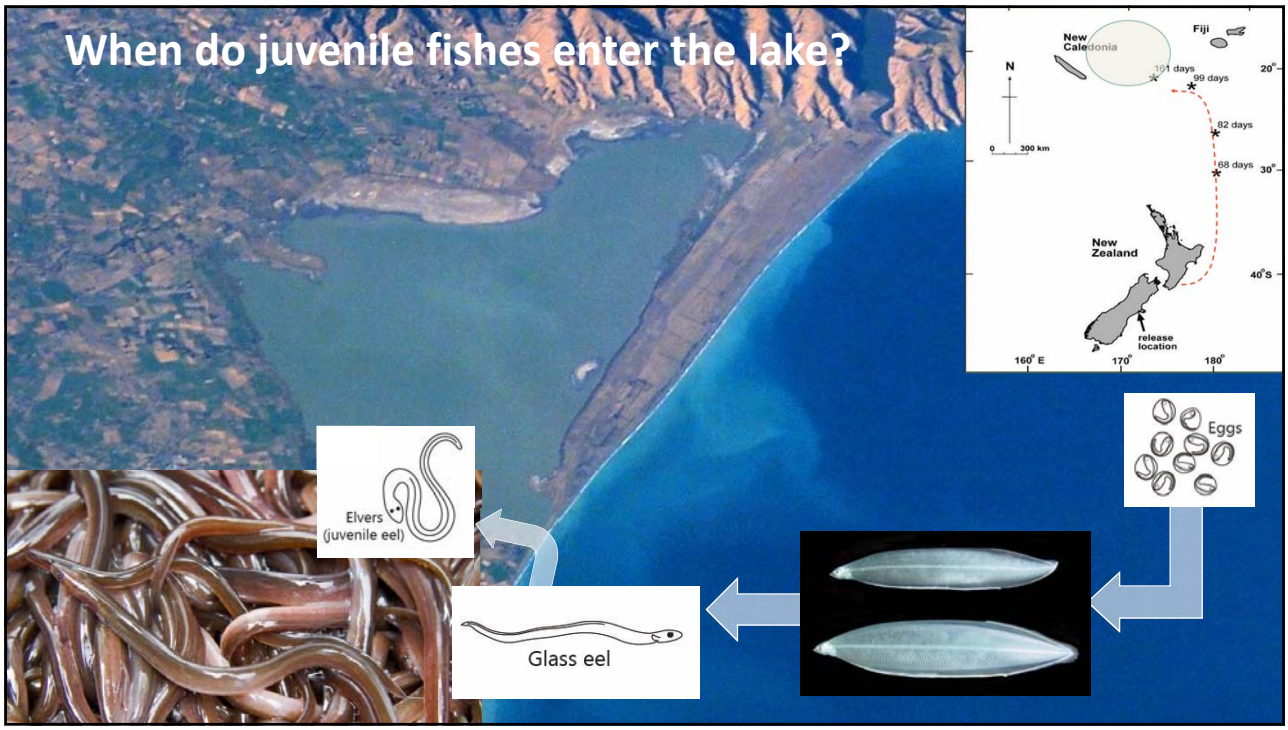
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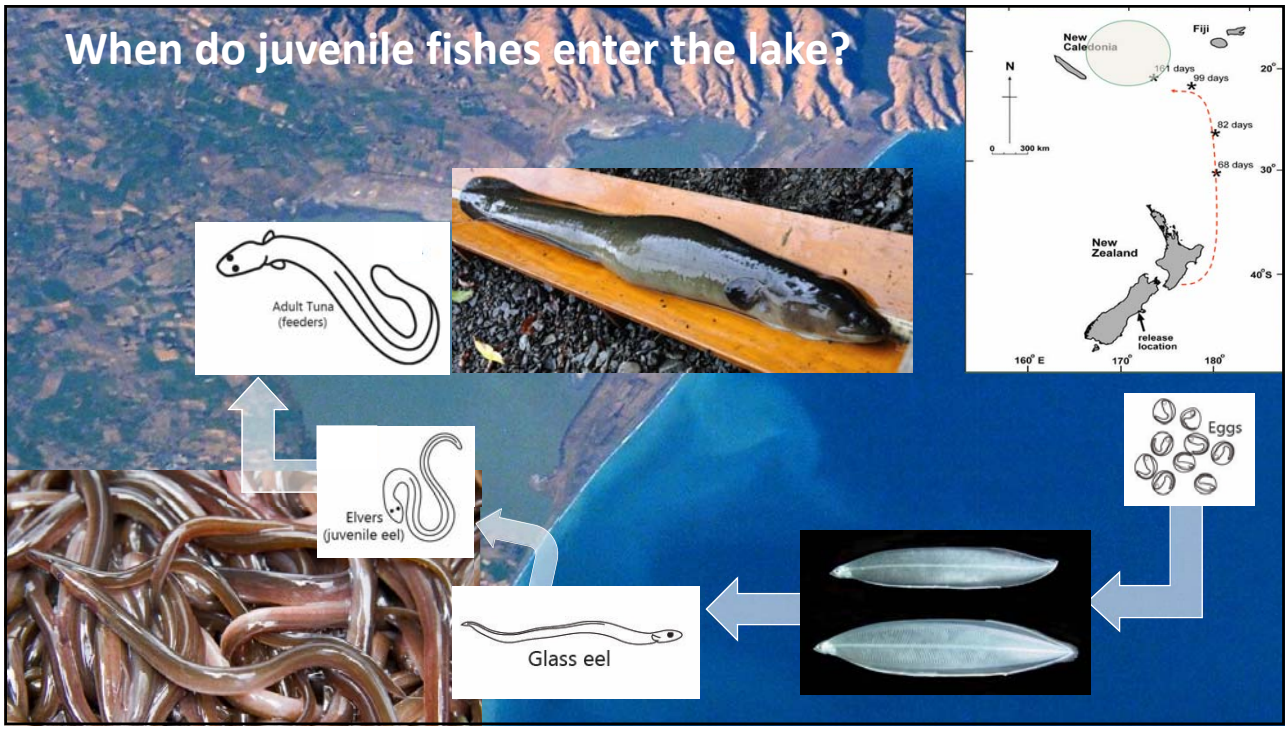
Eggs
Elvers (juvenile eel)
Glass eel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Adult Tuna (feeders)
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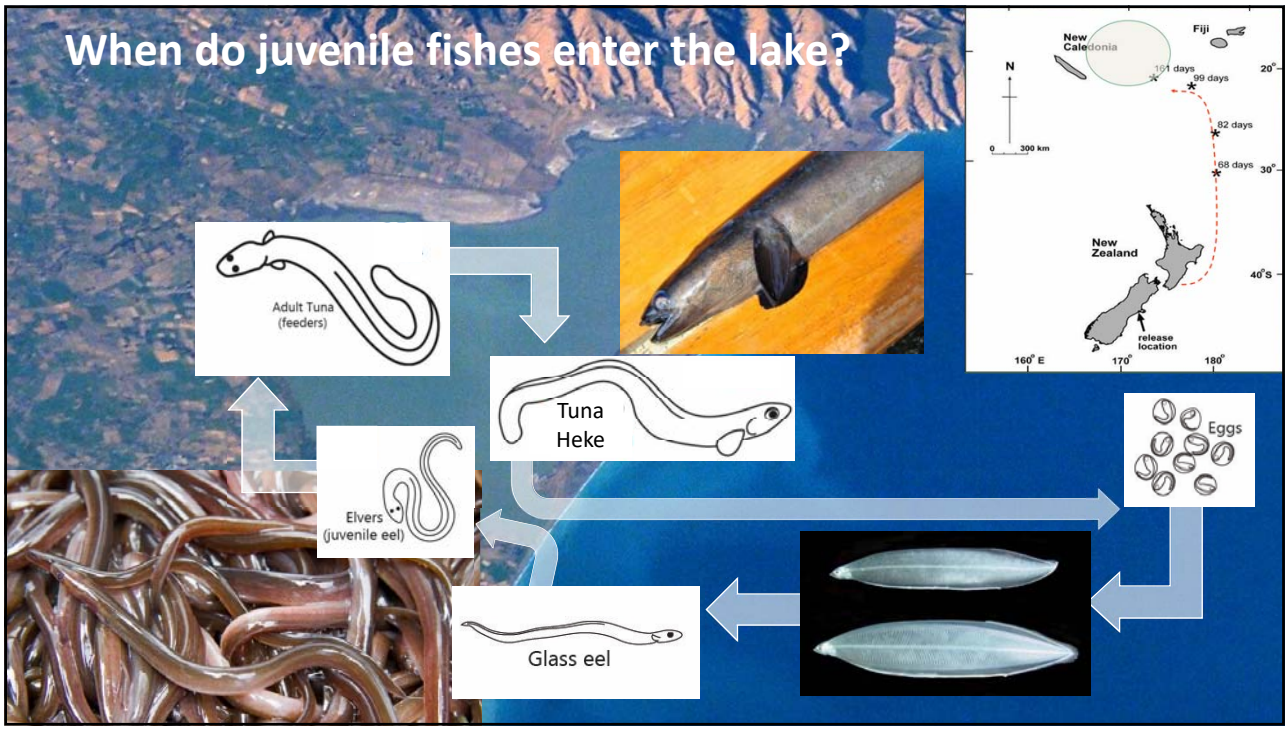
Glass eel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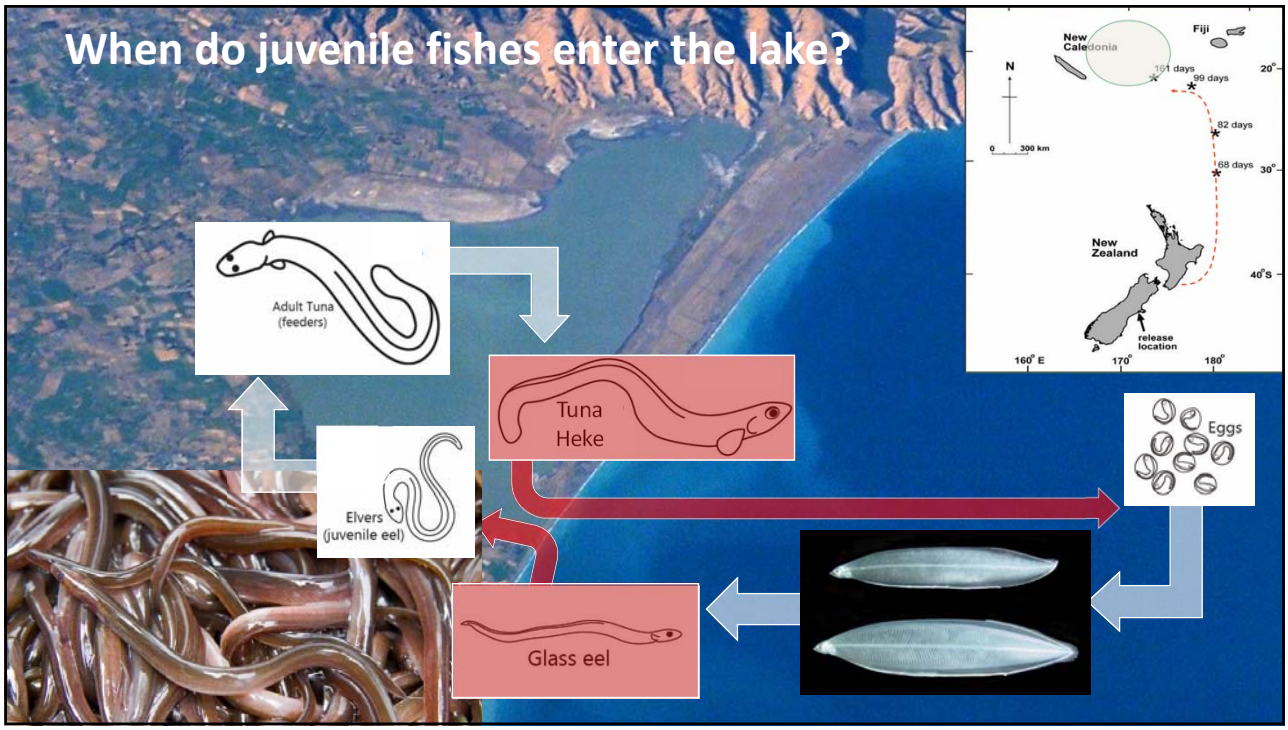
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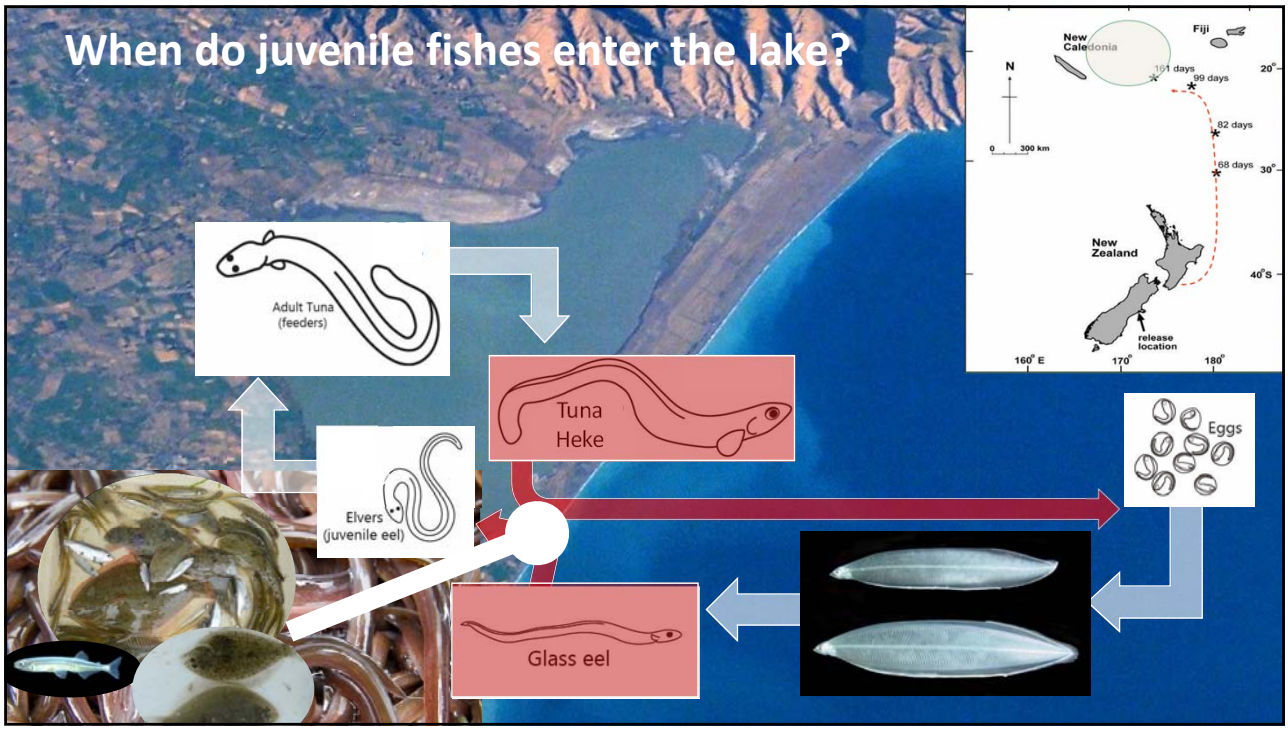

When do juvenile fishes enter the lake?

- Opened to improve fish access (WCO)
  - 1st April-15th June (outgoing tuna heke)
  - 15th Sept-15th October (incoming fish recruitment)
- Considerations for lake openings
  - Different species entering the lake at different times
  - Lake openings can be short (average of 20 days)
  - Openings costly (takes up to a week)
  - Timing of the opening is important to maximise recruitment

When do juvenile fishes enter the lake?

- Sampled fish recruitment into Te Waihora over 3 years
  - Used fine meshed fyke nets
  - 46,000 fishes captured

When do juvenile fishes enter the lake?

Fish species (common name)	Size	Time of year											
	(mm)	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Shortfin eel	<70												
Longfin eel	<70												
Torrentfish	<50												
Inanga	<60												
Lamprey*	>450												
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Brown trout*	<55												
Yelloweye mullet	<65												
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Sand flounder*	<35												
New Zealand sprat	<55												

= Present study

= Past studies

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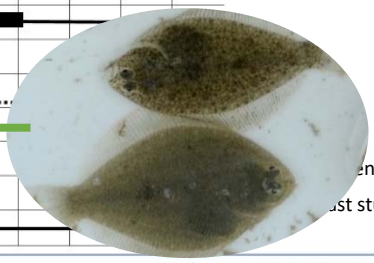

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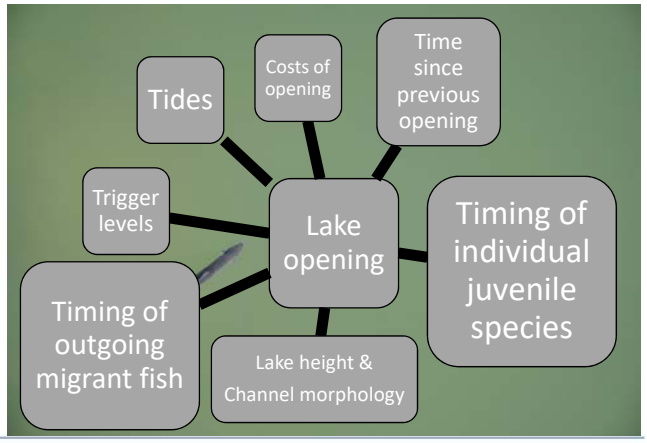
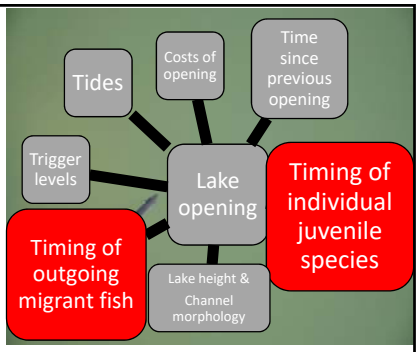
Lake opening regime for fish?

- Conclusions
  - Complex system for setting lake opening regimes
    - Timing will depend on trade-offs between many values



Lake opening regime for fish?

- Conclusions
  - Complex system for setting lake opening regimes
  - Just focussing on fish
    - ≥9 days between 15 April-31 May – Tuna heke, pakiki



WCO

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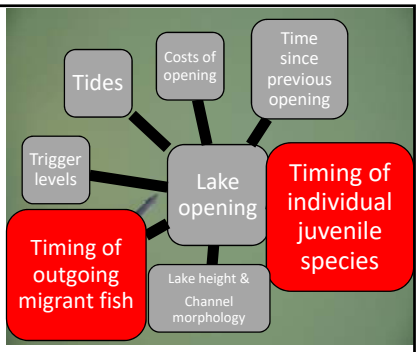

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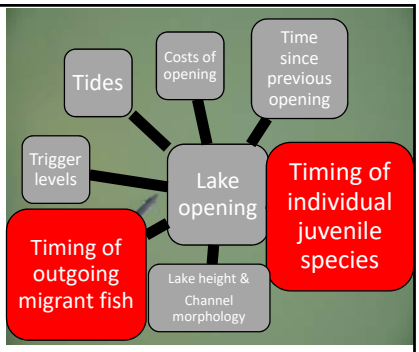
    - >25 days between 15 Sept-15 November – longfin and shortfin



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WCO

Acknowledgements

Ngāi Tahu – Terrianna Smith, Don Brown, Nigel Scott, Kelly Smith, Channel Thoms, Hannah Mitchell, Mandy Home, Craig Pauling

NIWA - Greg Kelly, Amber Sinton, Julian Sykes, Don Jellyman, Erica Williams, Helen Rouse, Dave Rowe, Marty Bonnett, Mandy Home

ECan - Michael Greer, Melissa Shearer, Alex Ring, Tim Davie, David Murphy, Sjaan Barbour

Whakaora Te Waihora Partners

Aquatic Rehabilitation Programme/Cultural Keystone Species