

CSP16205-1 POP2016-05

Yellow-eyed penguin diet and indirect effects on prey composition

Collation of biological information

Yellow-eyed penguin / hoiho

Megadyptes antipodes



Distribution



Distribution



Almost all species
information originates
from mainland

Foraging behaviour



7.42 km

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image © 2013 DigitalGlobe
Image © 2013 TerraMetrics

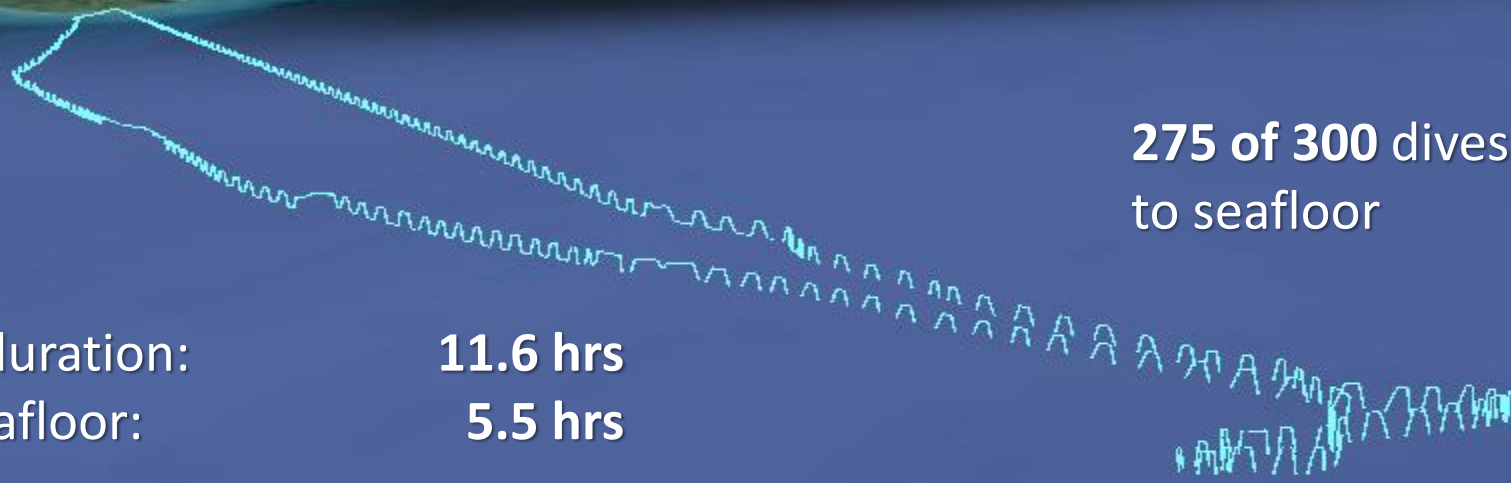
Google earth

Foraging behaviour



275 of 300 dives went to seafloor

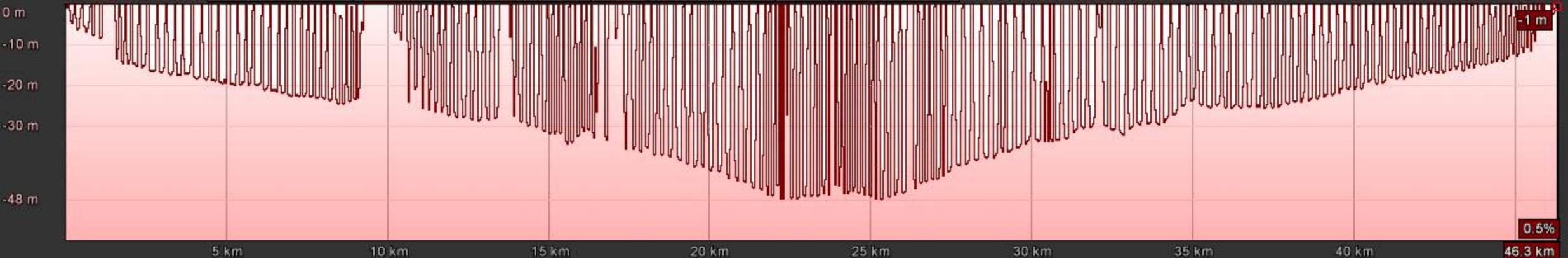
Total trip duration: **11.6 hrs**
Time spent at seafloor: **5.5 hrs**



Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image © 2013 DigitalGlobe
Image © 2013 TerraMetrics
Image Landsat

Google earth

Graph: Min, Avg, Max Elevation: -48, -16, 0 m
Range Totals: Distance: 46.4 km Elev Gain/Loss: 5700 m, -5700 m Max Slope: 29.3%, -27.7% Avg Slope: 8.9%, -9.3%





Yellow-eyed penguin diet



van Heezik (1990a)

Otago, Catlins (1984-1986)

van Heezik (1990b)

Whenua Hou (1984)

Moore & Wakelin (1997) Otago Peninsula, Long Point (Catlins)

Browne et al. (2011)

Stewart Is/Rakiura, Whenua Hou (2007)



Dominant prey species



Red cod

Pseudophycis bacchus

Dominant prey species



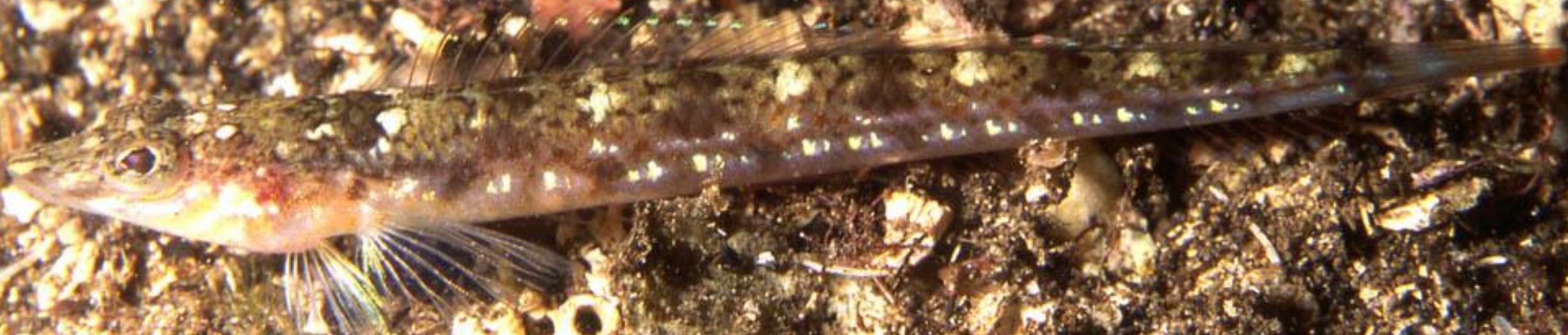
Blue cod

Parapercis colias

Dominant prey species

Opalfish

Hemerocoetes monoptygius





Other prey

Slender sprat

Sprattus antipodum

Other prey



Arrow squid

Nototodarus sloani

Other prey



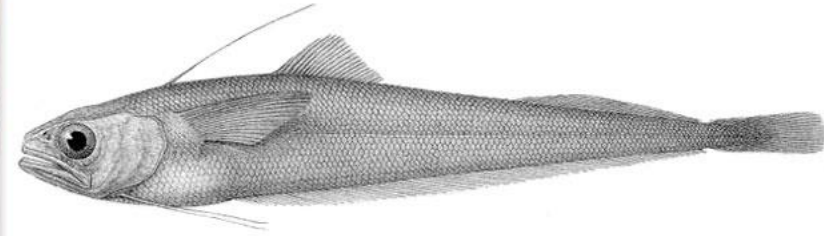
Silverside

Argentina elongata



Tarakihi

Nemadactylus macropterus



Ahuru

Auchenoceros punctatus

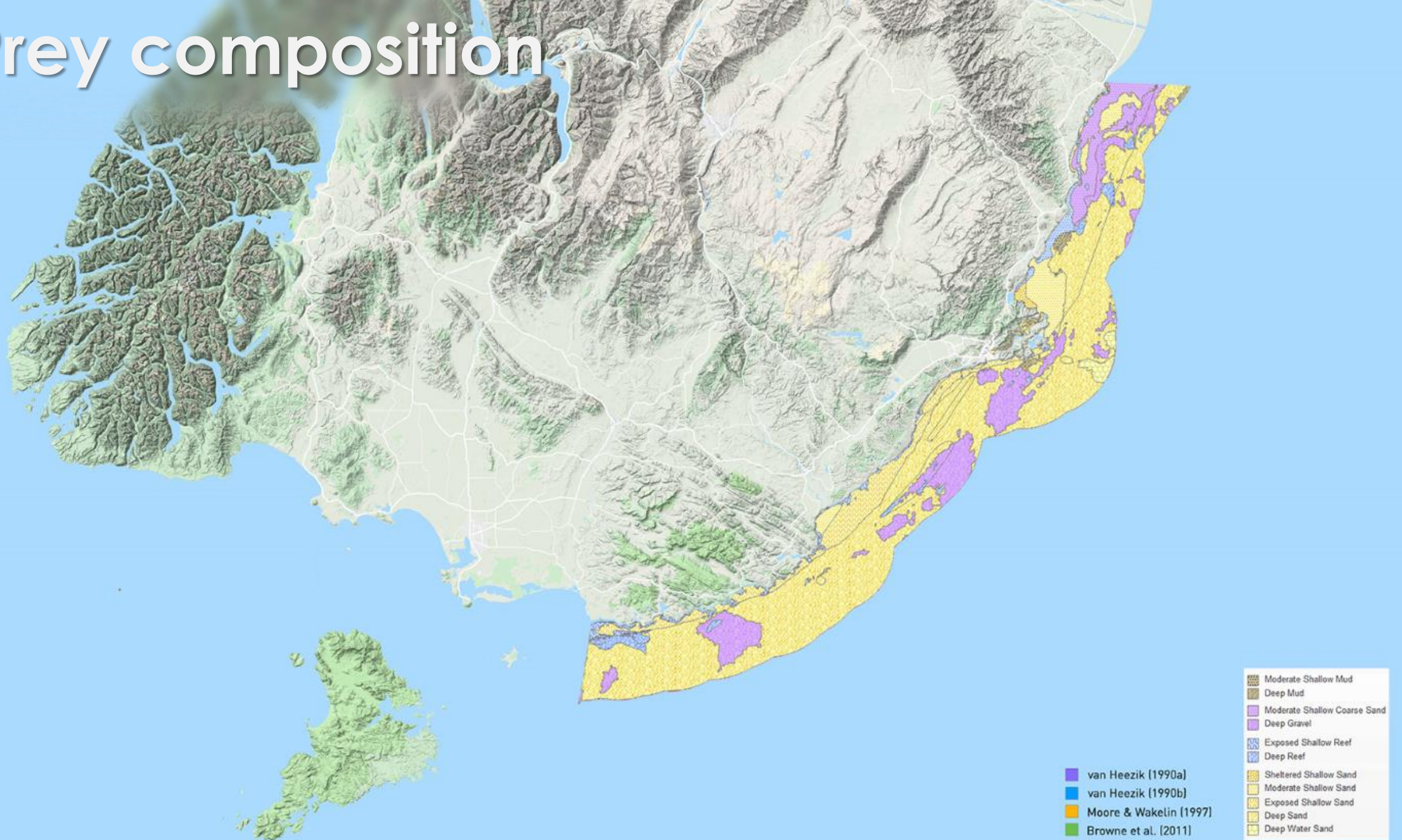
Blue cod capture

Opalfish capture

Jellyfish harvesting



Prey composition



Prey composition



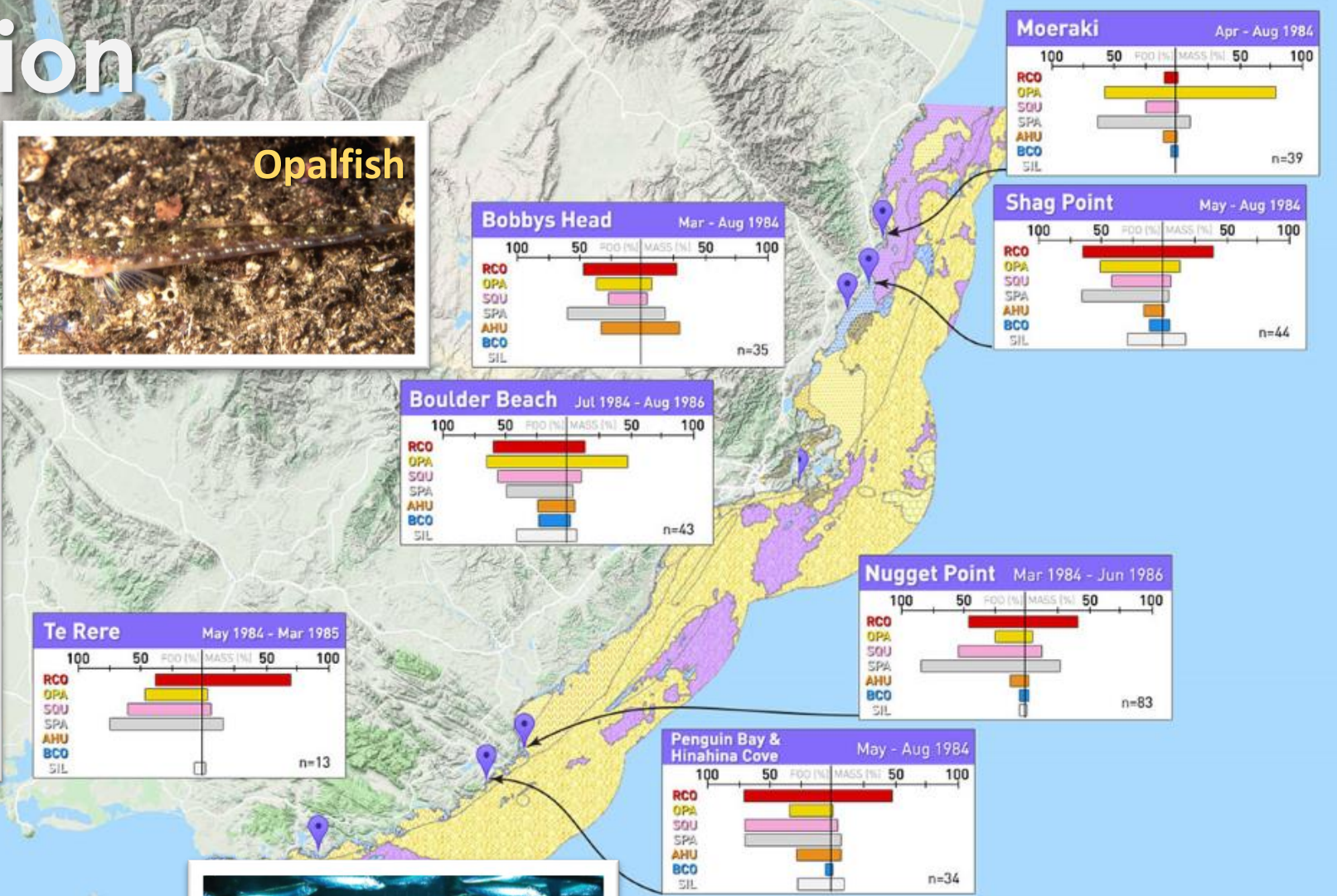
Red Cod



Opalfish

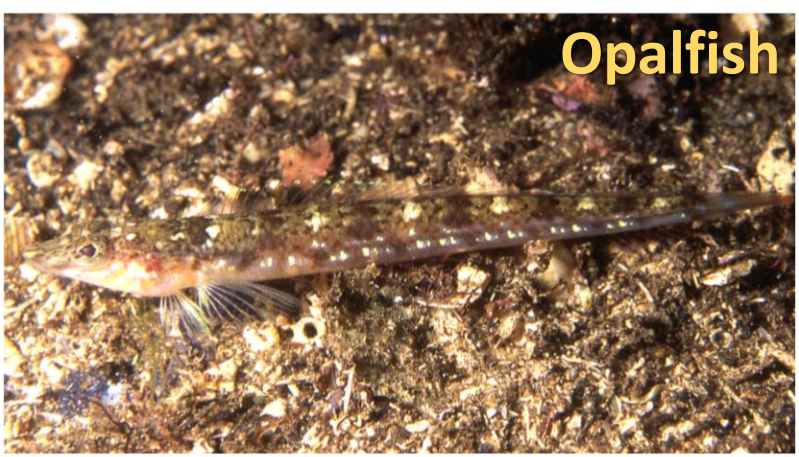


Slender sprat



1984-86

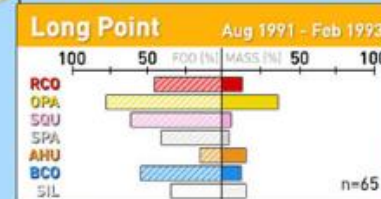
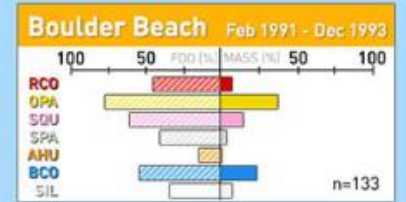
Prey composition



Opalfish



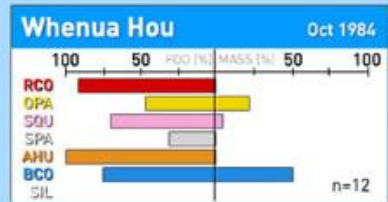
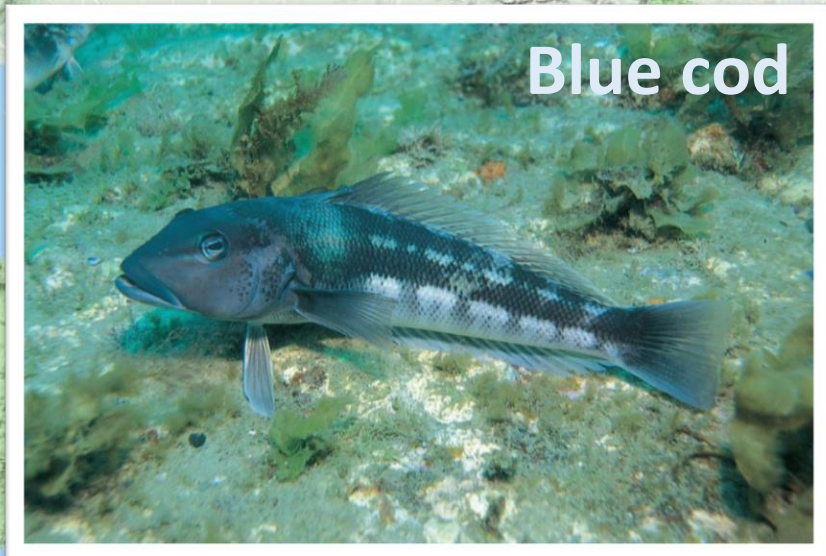
Blue cod



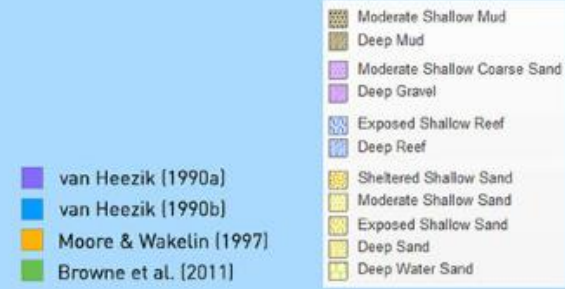
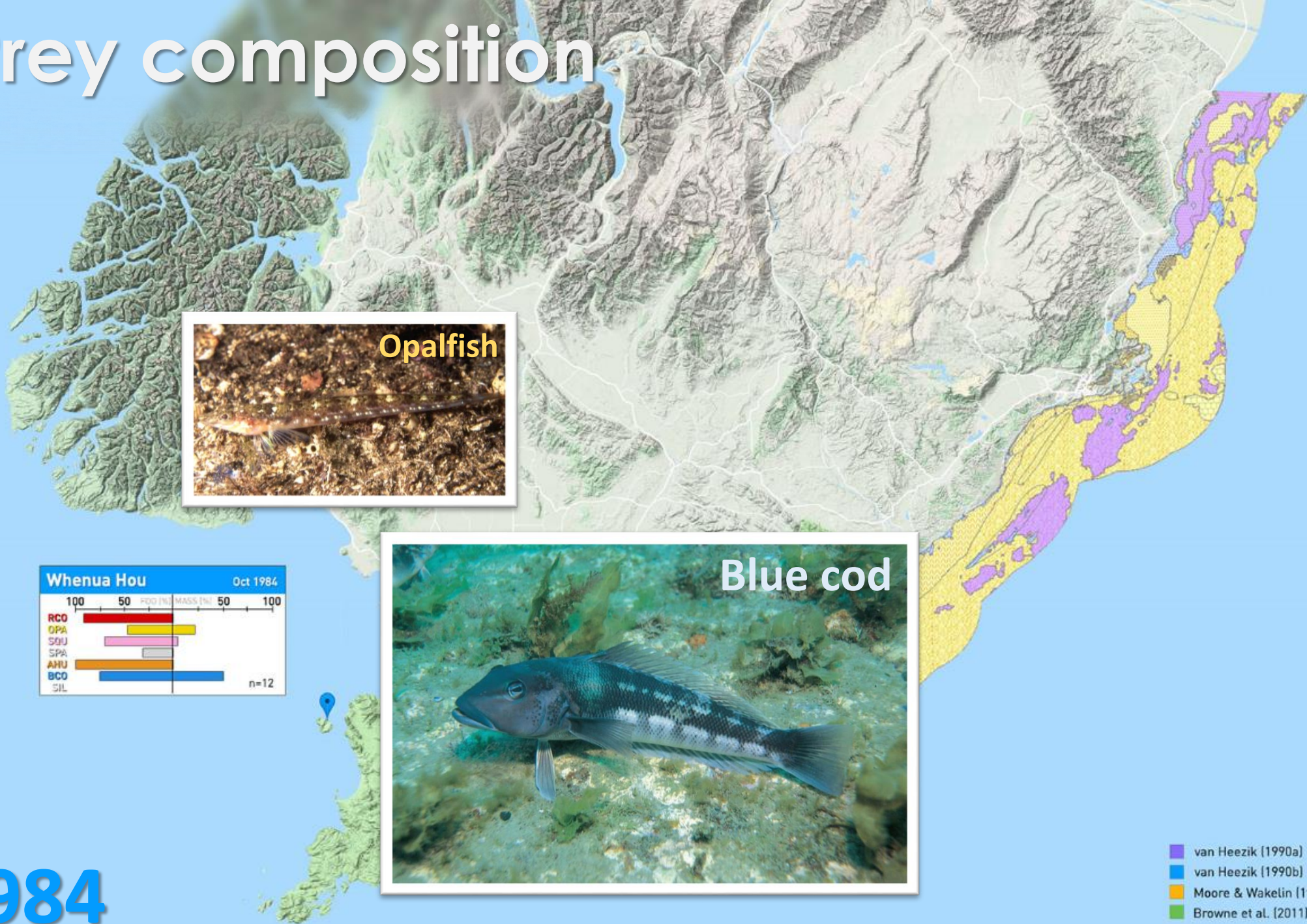
- van Heezik (1990a)
- van Heezik (1990b)
- Moore & Wakelin (1997)
- Browne et al. (2011)

1991-93

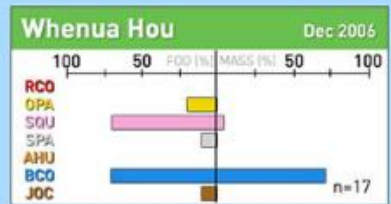
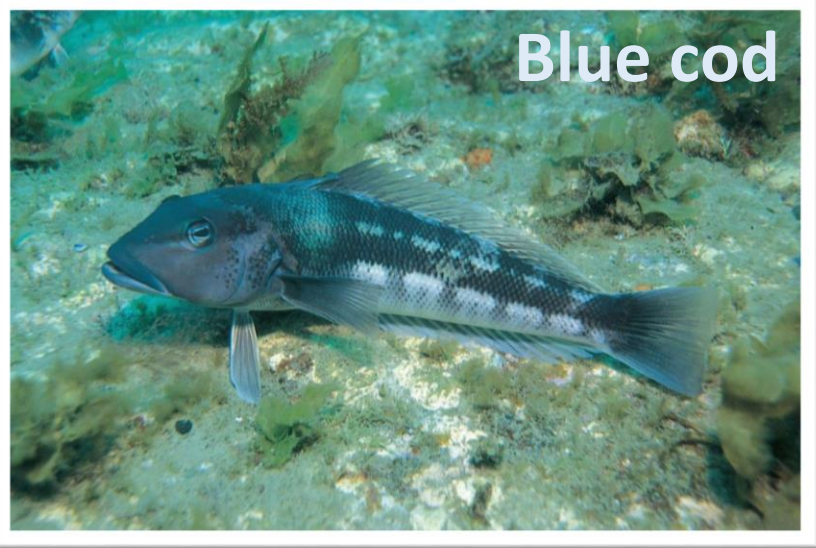
Prey composition



1984



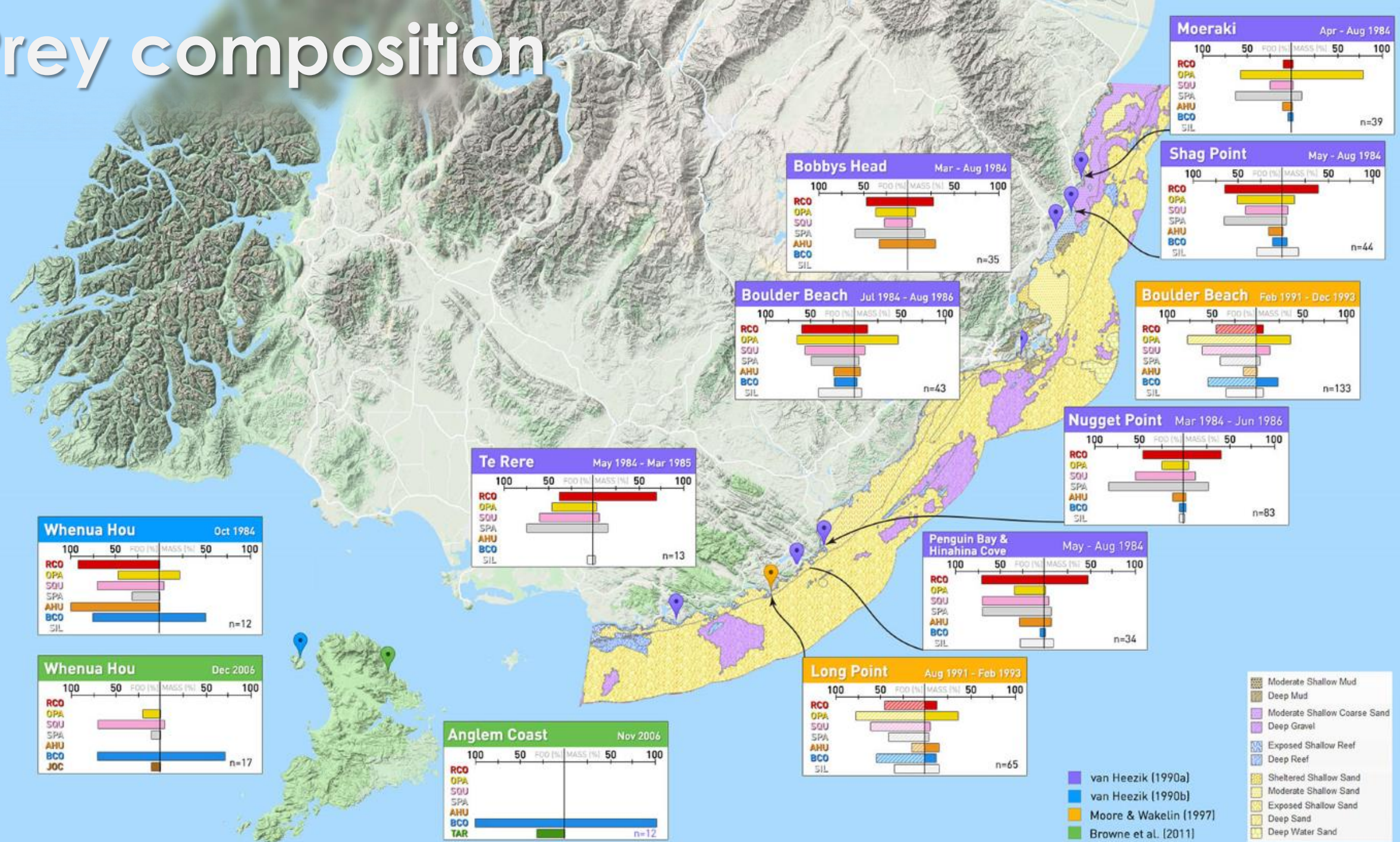
Prey composition



- van Heezik (1990a)
- van Heezik (1990b)
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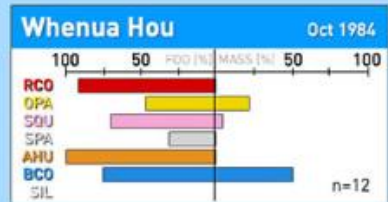
2006

Prey composition



Prey composition

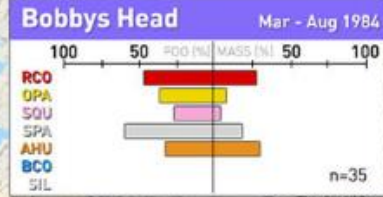
breeding success
chicks/pair



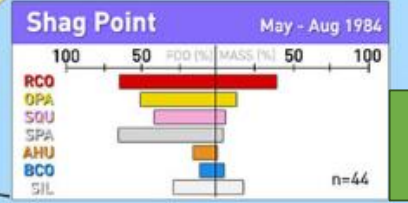
1.0



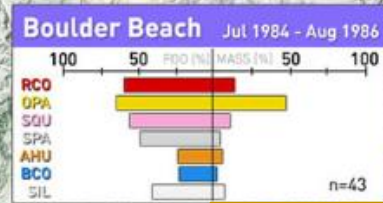
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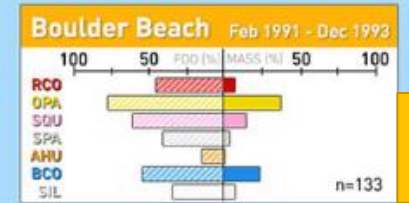
2.0



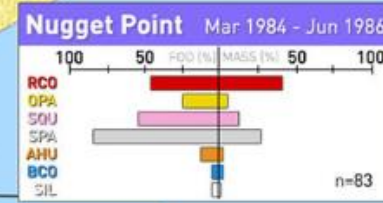
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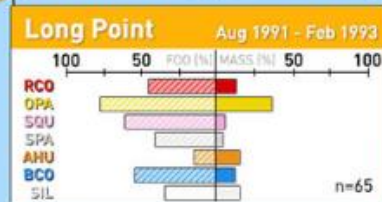
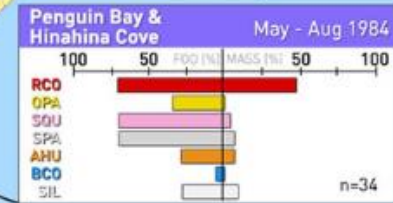
1.40



1.27



1.83

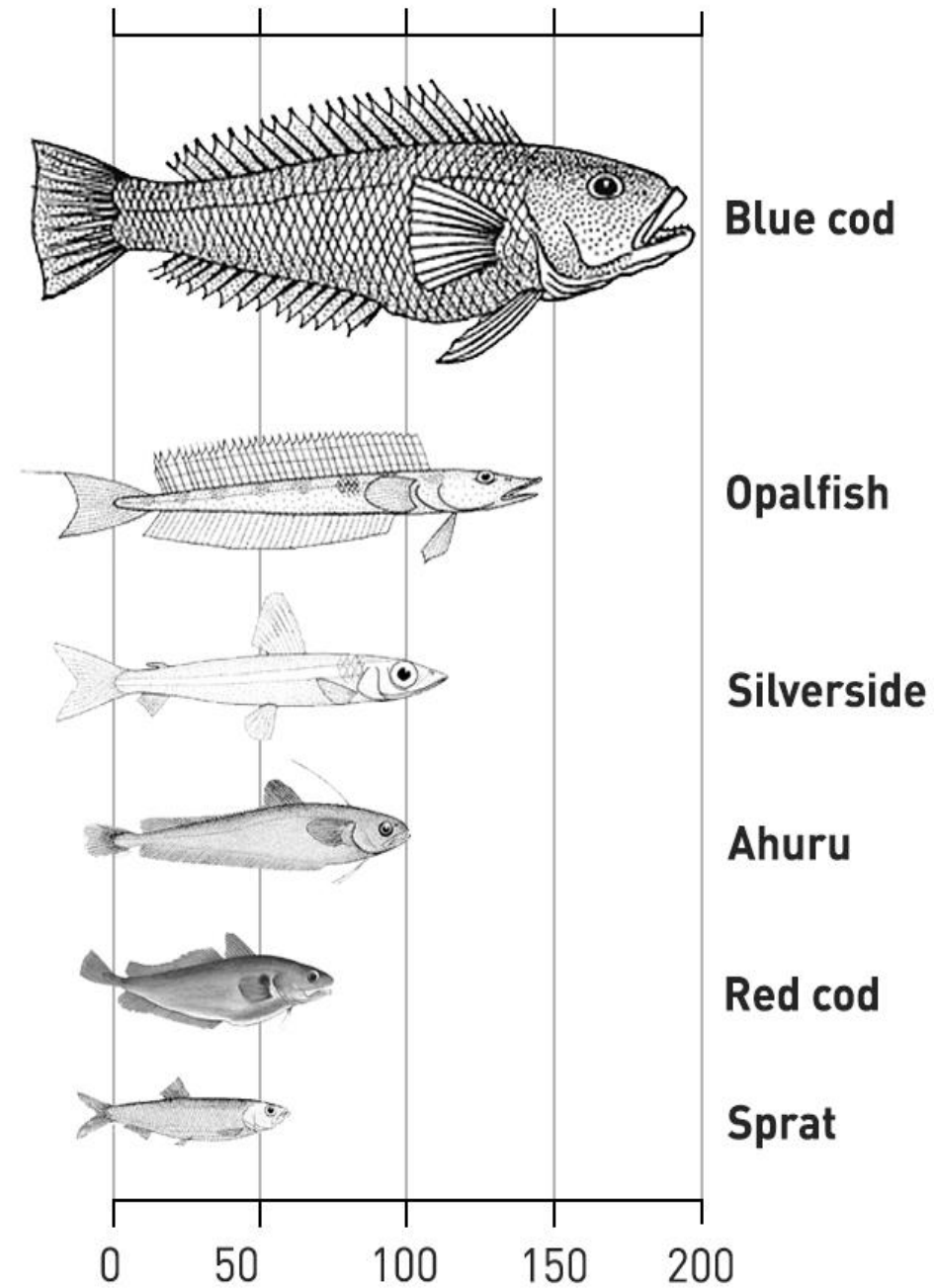
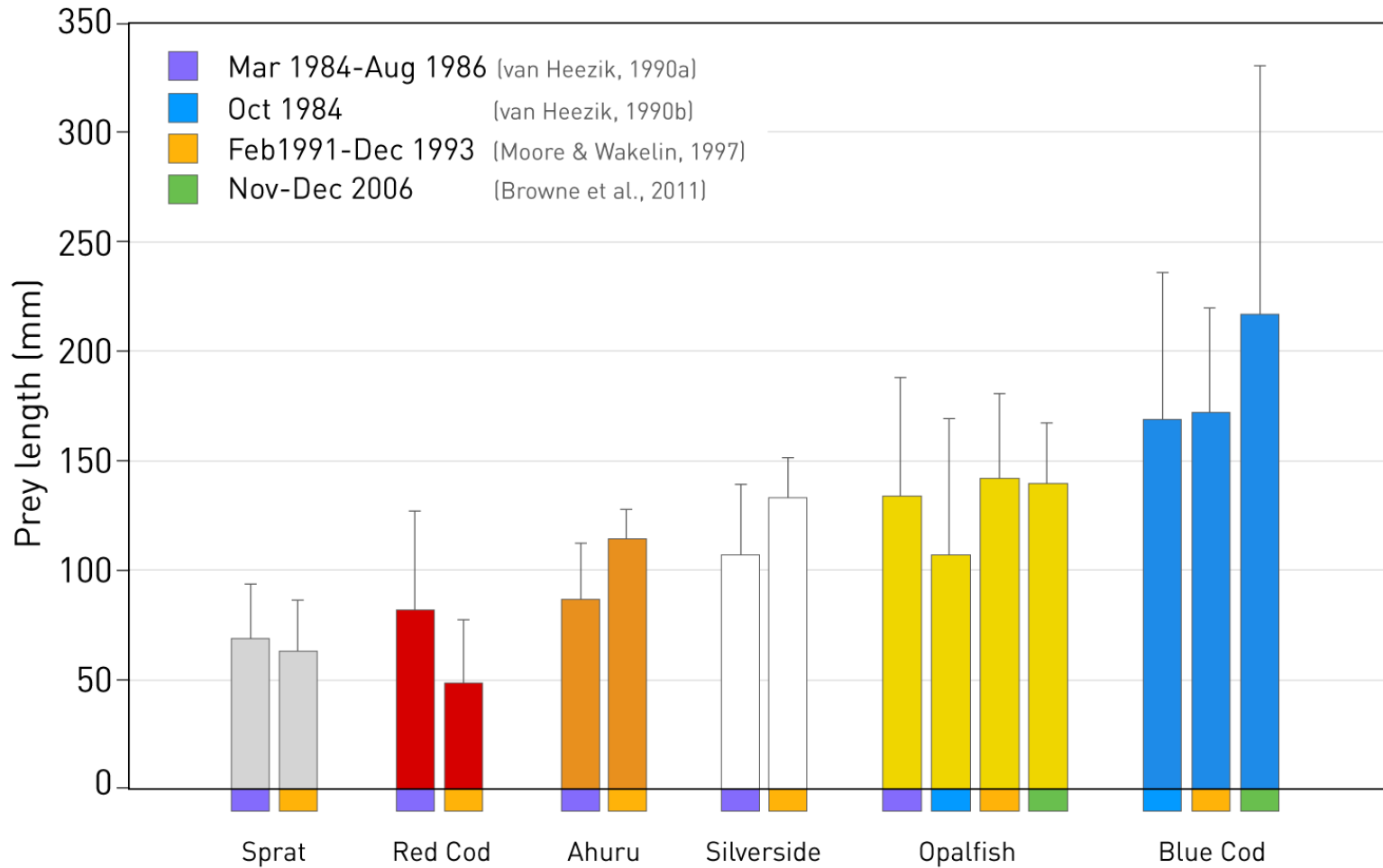


1.31

- Moderate Shallow Mud
- Deep Mud
- Moderate Shallow Coarse Sand
- Deep Gravel
- Exposed Shallow Reef
- Deep Reef
- Sheltered Shallow Sand
- Moderate Shallow Sand
- Exposed Shallow Sand
- Deep Sand
- Deep Water Sand

- van Heezik (1990a)
- van Heezik (1990b)
- Moore & Wakelin (1997)
- Browne et al. (2011)

Prey sizes



too big to
swallow
for chicks



Recommendations

1. Foraging monitoring programme
2. Non-invasive diet monitoring (i.e. faecal DNA, cameras)
3. Stable isotope screening programme & database (blood & feathers)
4. Catch up on YEP foraging ecology & diet in sub-Antarctic populations