PPO2012-08 Pitt Island Shag foraging ecology

MIKE BELL

Wildlife Management International Limited, PO Box 607, Blenheim 7240, New Zealand

mike@wmil.co.nz

Presentation of draft final results to the Department of Conservation
CSP Technical Working Group

1 August 2013

Specific Objectives

Draft final results.

Overall Objective

To describe the foraging ecology of Pitt Island shags.

Specific Objectives

1. To describe the spatial distribution and dive profiling of Pitt Island shag foraging behaviour at the Chatham Islands.
2. To describe the diet of Pitt Island shags at the Chatham Islands.

POP2012-08 Pitt Is. shag foraging ecology

Pitt Island shag

- Endemic to the Chatham Islands
- Nationally endangered
- High – Moderate risk from fishing
- Significant population decline in last 15 years - 729 pairs in 1997, down to 434 in 2011
- Little known about ecology and breeding biology

POP2012-08 Pitt Is. shag foraging ecology

Methods

- GPS tracking
- GPS devices attached to central back of birds
- Time depth recorders (TDR's)
- TDR's attached to plastic leg band
- Birds captured at nest
- Duel deployment (both GPS and TDR attached to each bird)
- Birds need to be recaptured to recover devices and download data

POP2012-08 Pitt Is. shag foraging ecology

Results

- 27 birds caught and devices deployed
- 17 birds re-caught and devices recovered
- Birds not recovered due to nest failure, and hence birds no longer occupying nest sites-

    9/10 Predation

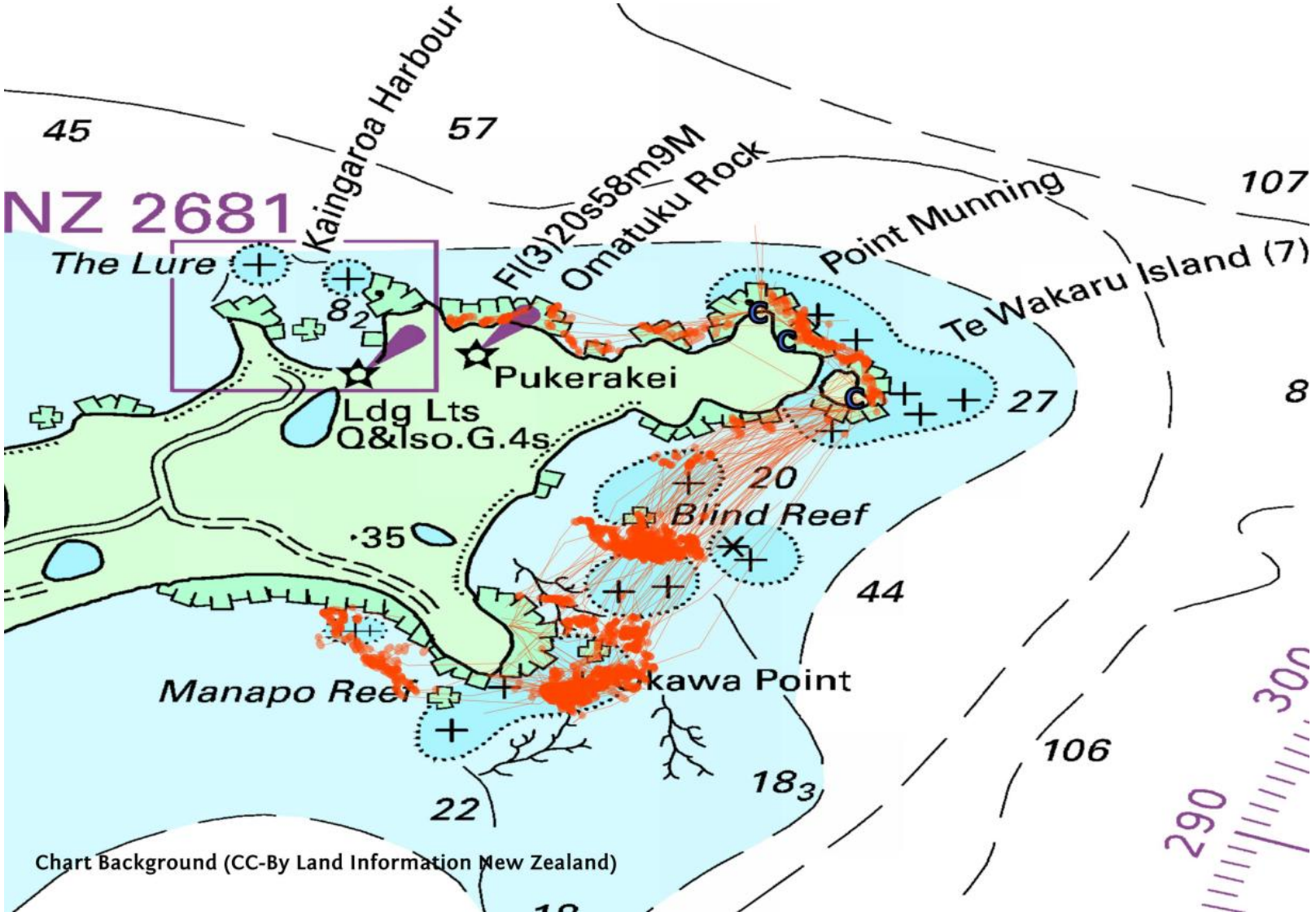
    1/10 chick death at hatching

Results – foraging behaviour

- Foraging area data from 15 of the 17 GPS devices recovered
- 79 individual foraging trips
- Mean foraging distance 5.2km (range 0.4-18.2km)
- No difference between NE and Waitangi birds
- Observed difference between sexes, but unlikely to be a real difference as influenced by behaviour of one male

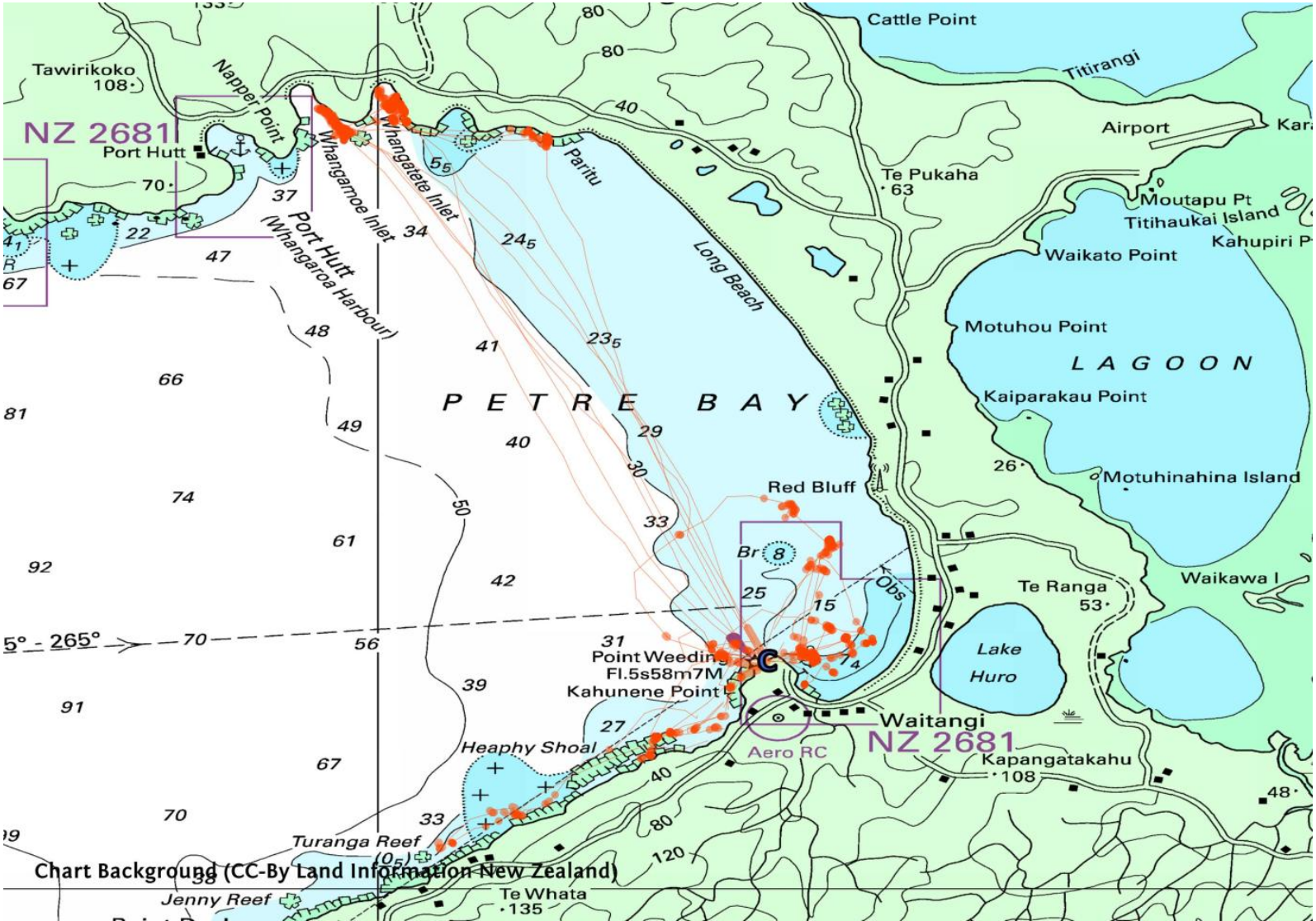
POP2012-08 Pitt Is. shag foraging ecology

Results – foraging range Pt Munning and Te Whakuru



POP2012-08 Pitt Is. shag foraging ecology

Results – foraging range Waitangi



Results – foraging behaviour

- High forging site fidelity
- Individual birds returning to the same areas to forage-

    60% of birds feeding in one location only

    33% in two locations

    7% (one bird) in three locations

Results – diving behaviour

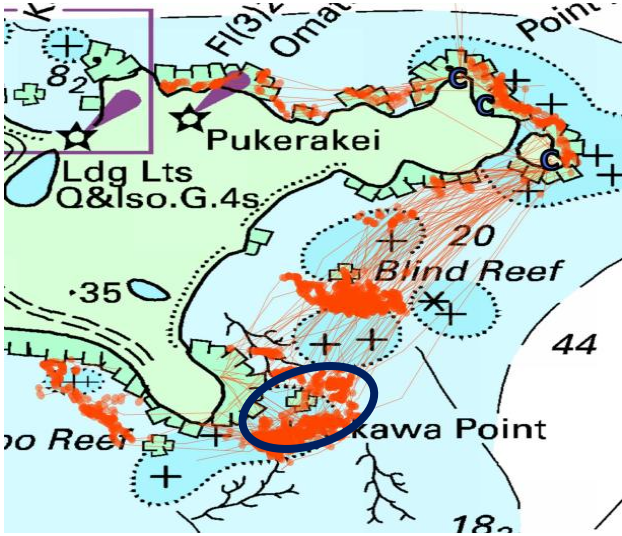
- Dive data from 10 of the 17 TDR devices recovered
- 39 full foraging trips, 4 partial trips
- 6709 dives

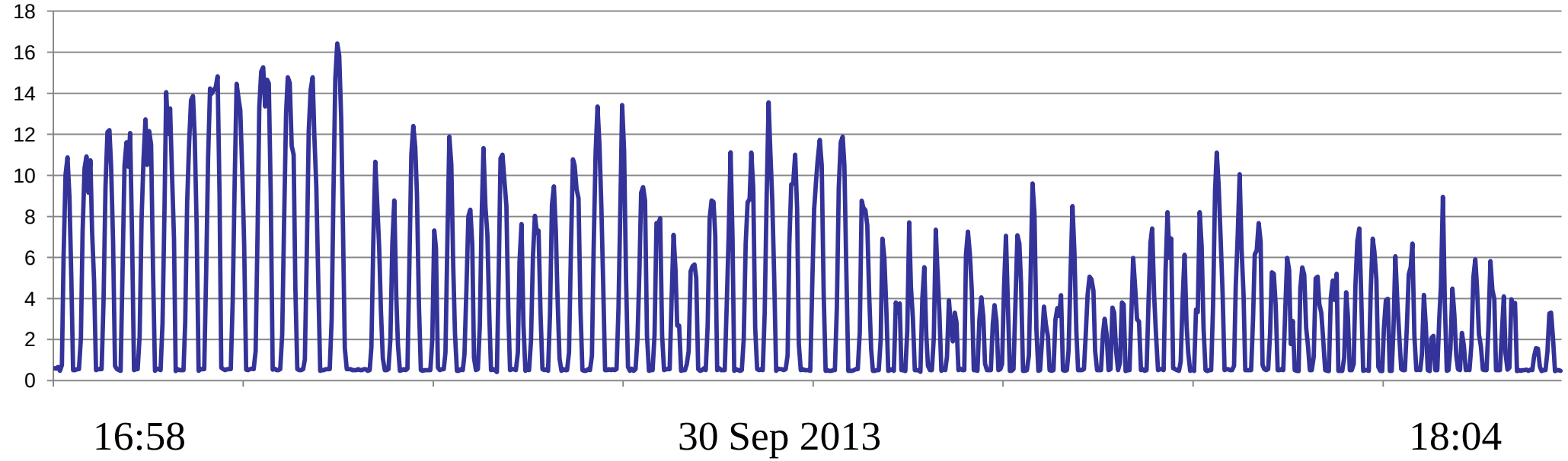
POP2012-08 Pitt Is. shag foraging ecology

Results – data recovered

A12, Female breeding at Point Munning

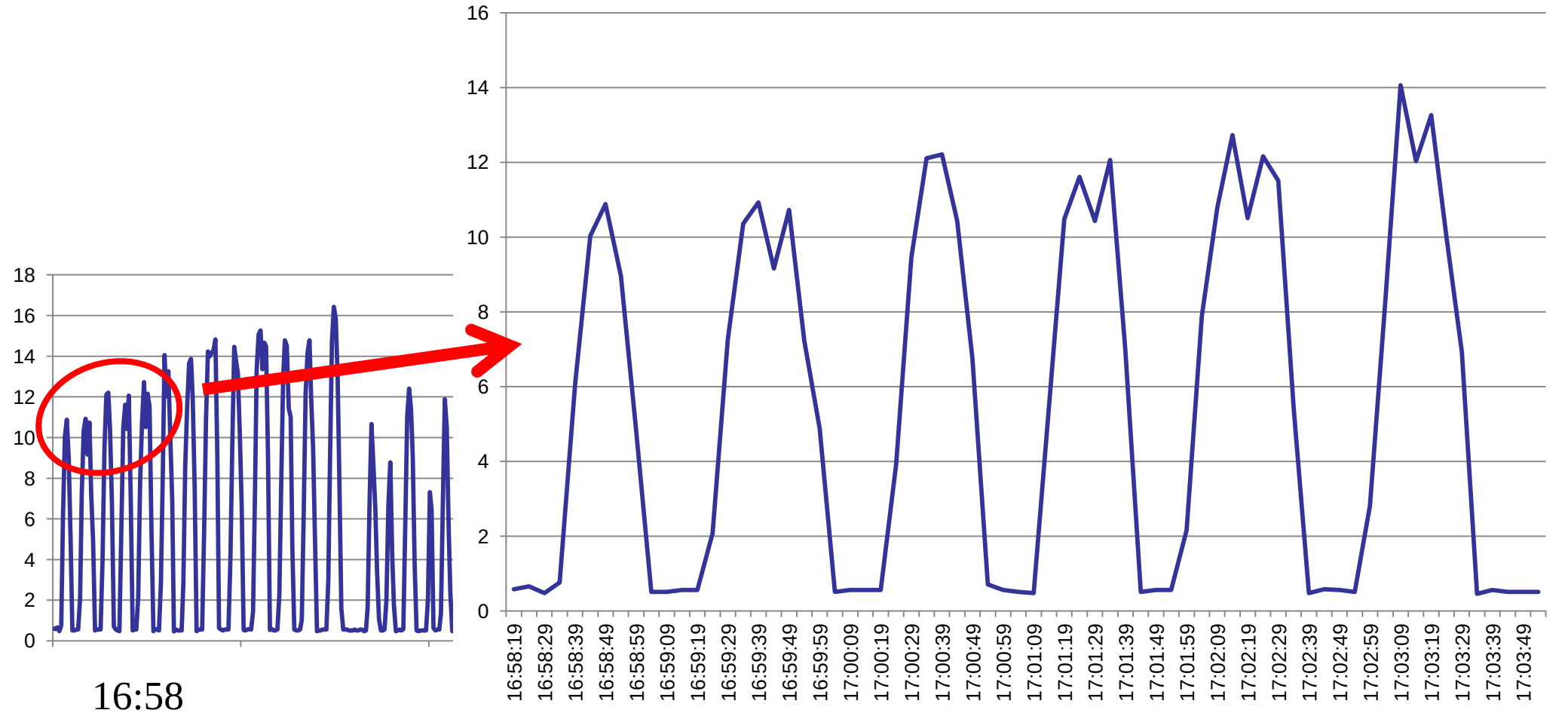
Foraging trip to Okawa Point





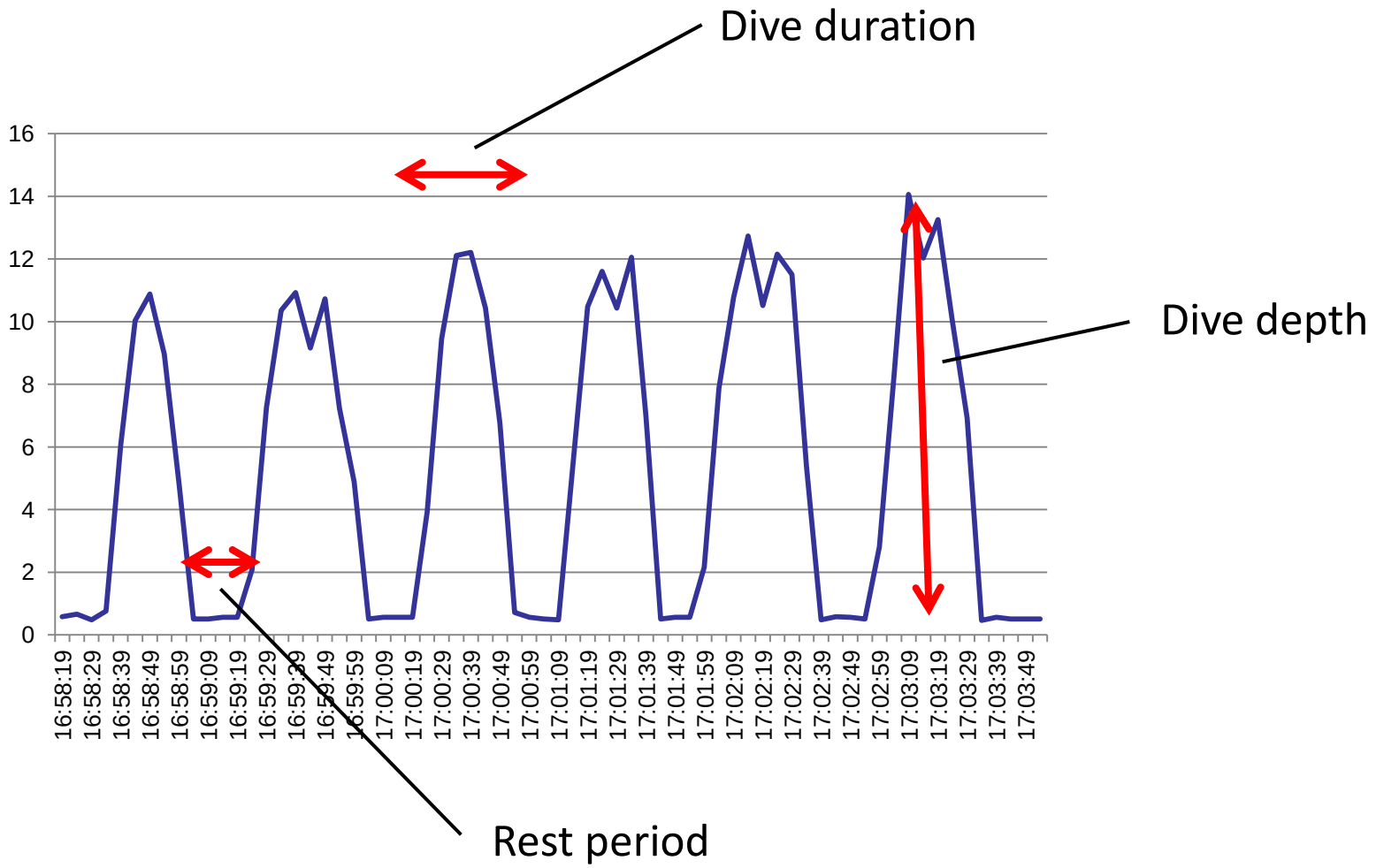
POP2012-08 Pitt Is. shag foraging ecology

Results – data recovered



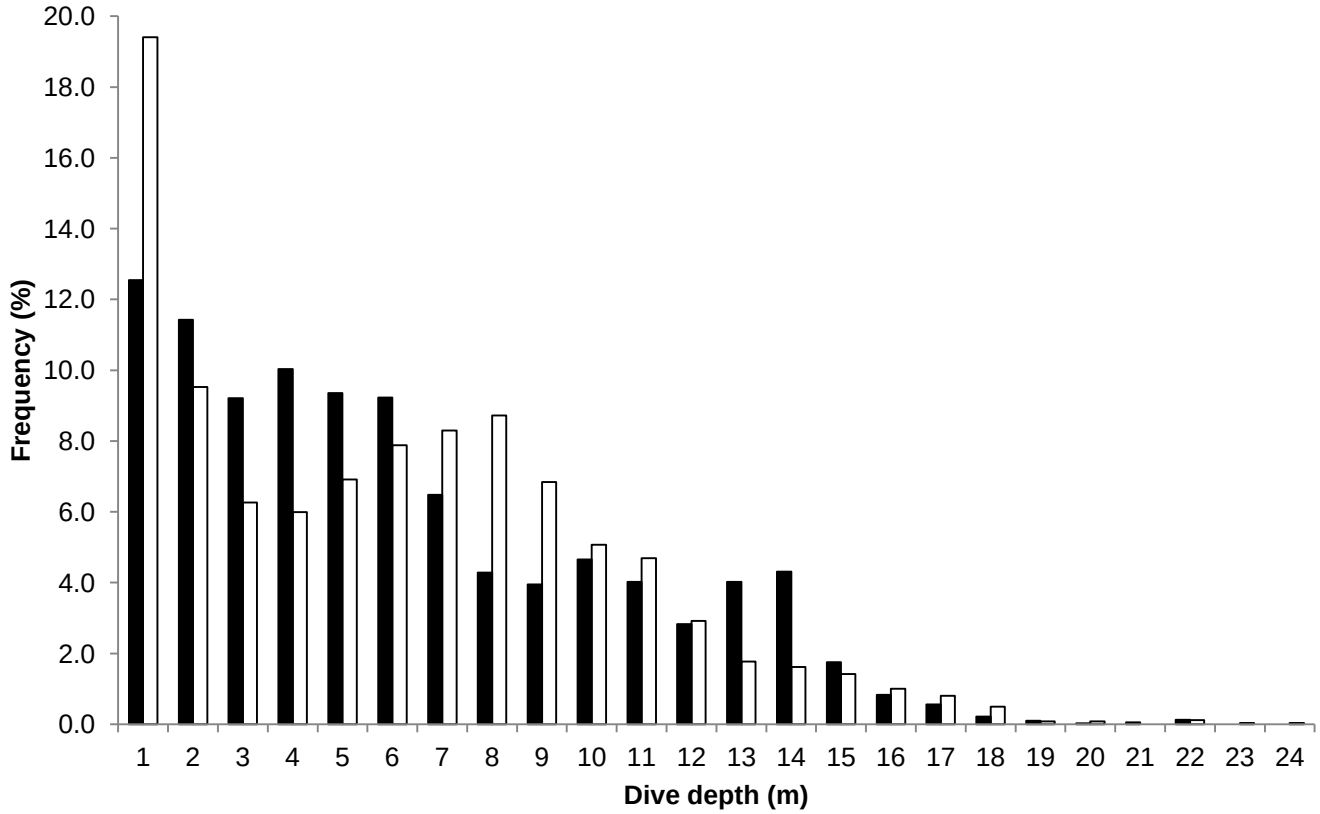
POP2012-08 Pitt Is. shag foraging ecology

Results – data recovered



Results – dive depth

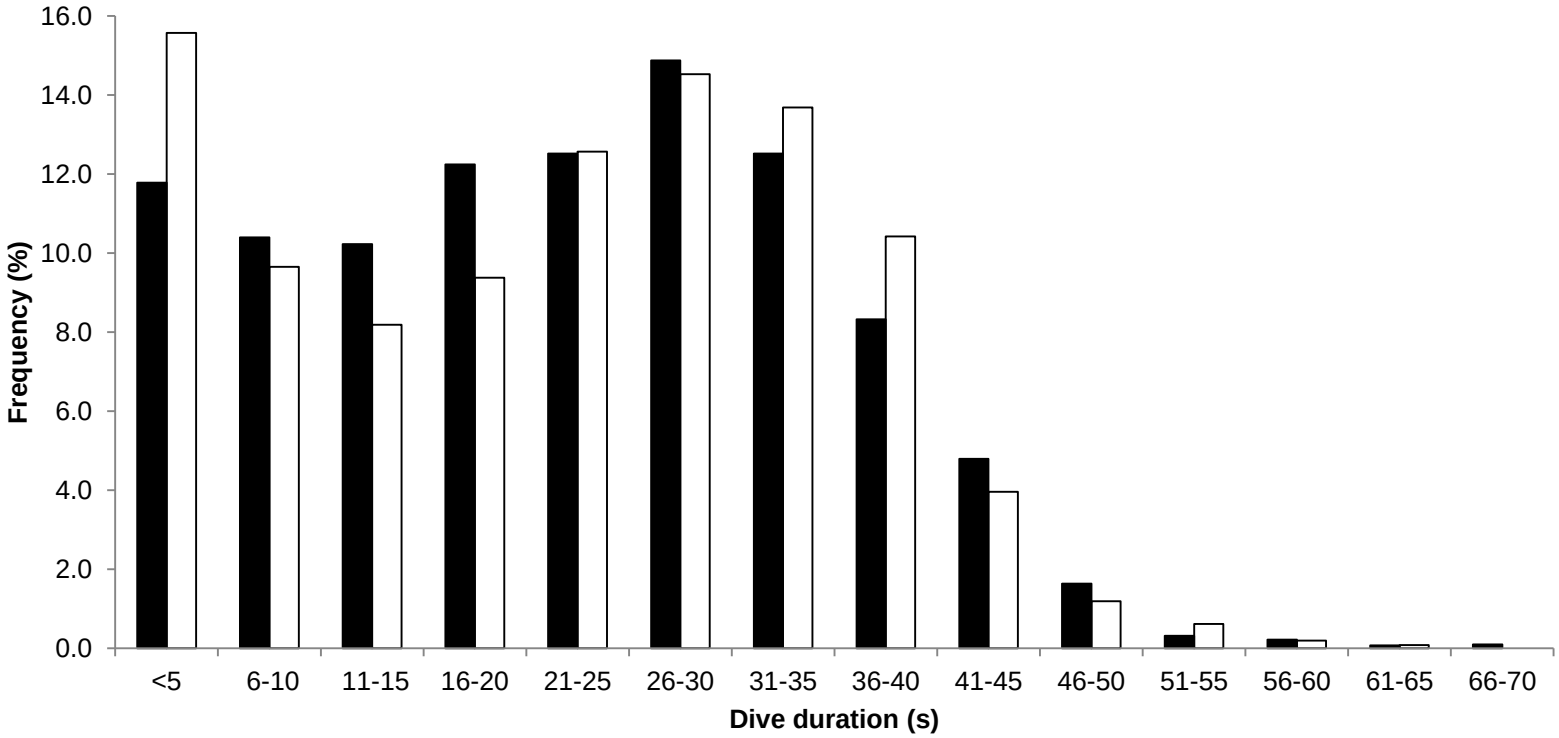
- Mean dive depth 6.6m; max 24.4m; 90% of dives <13m
- No difference between the sexes



POP2012-08 Pitt Is. shag foraging ecology

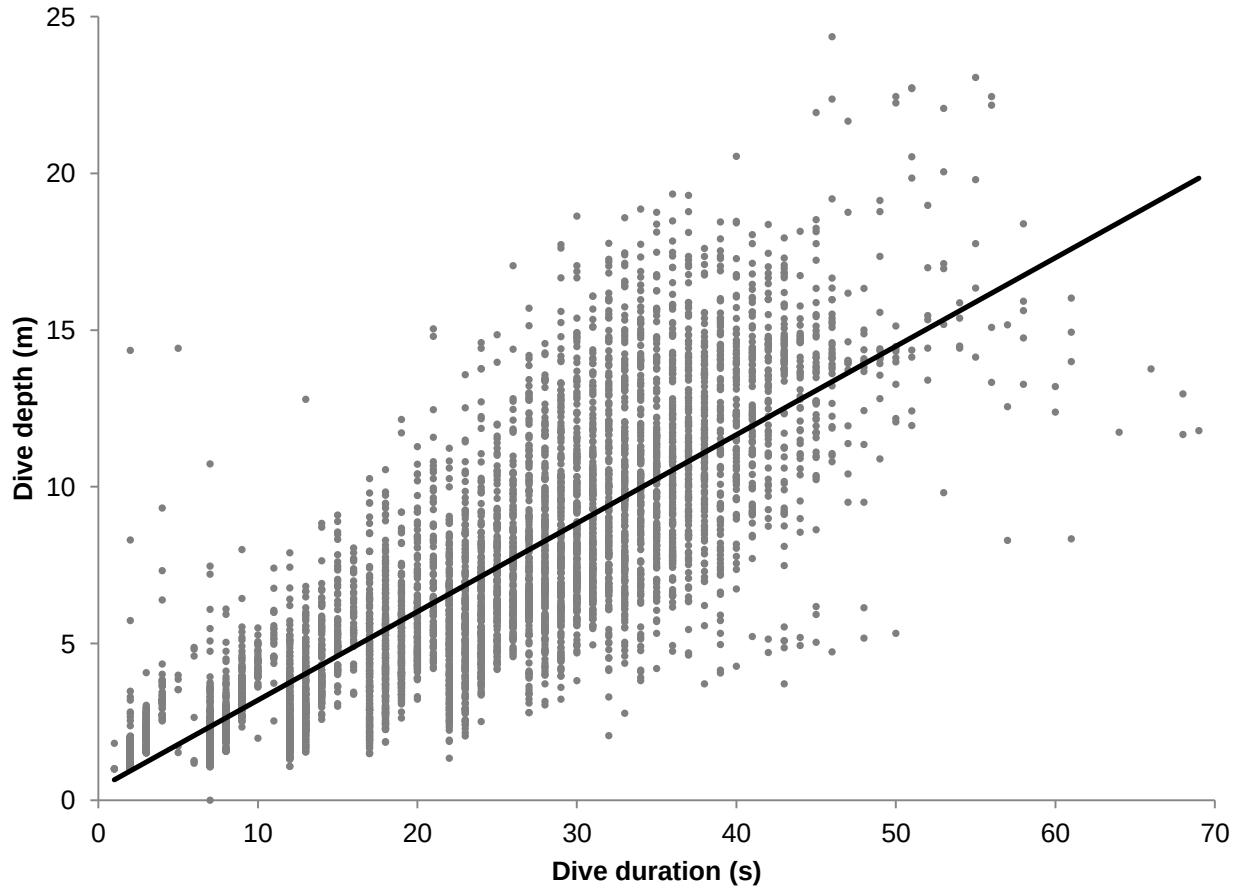
Results – dive duration

- Mean dive duration 22s, max 69s, most dives <40s
- No difference between the sexes



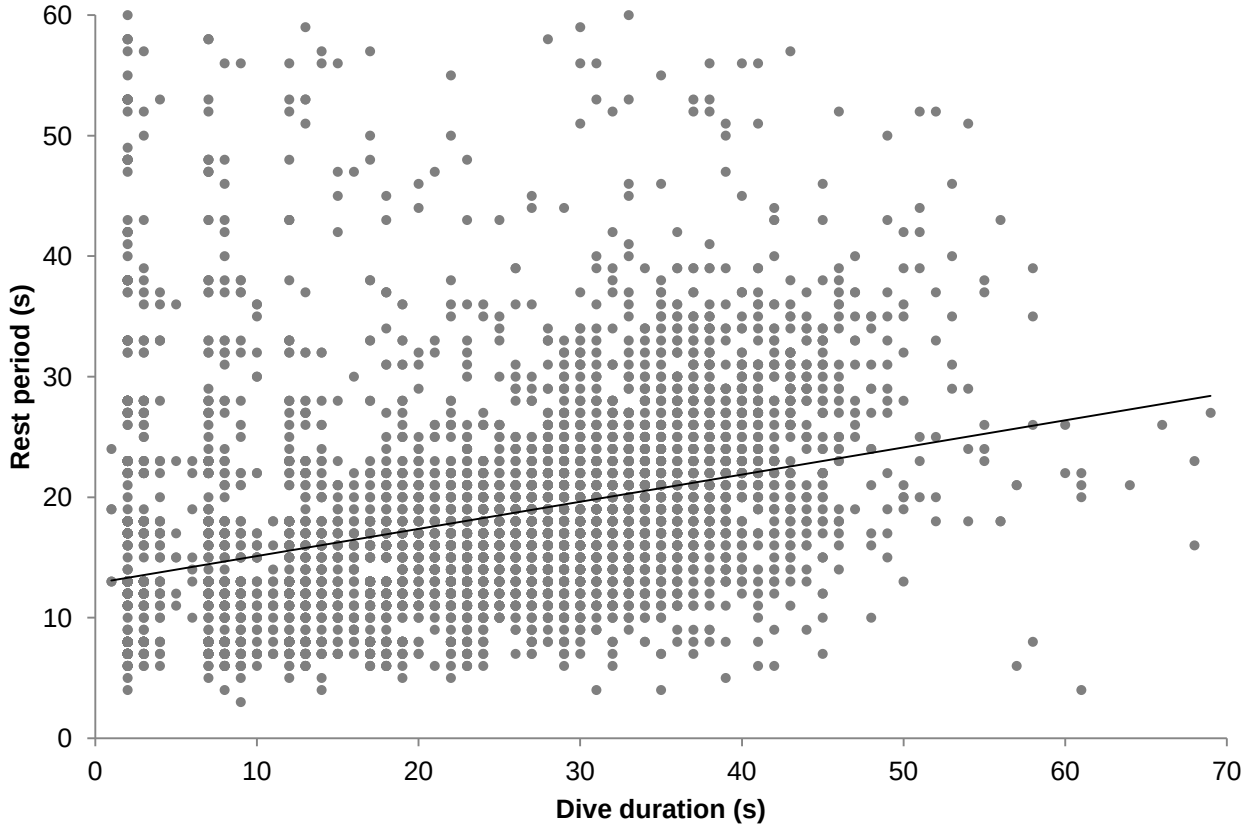
Results – dive duration and depth

- Strong relationship between dive duration and depth



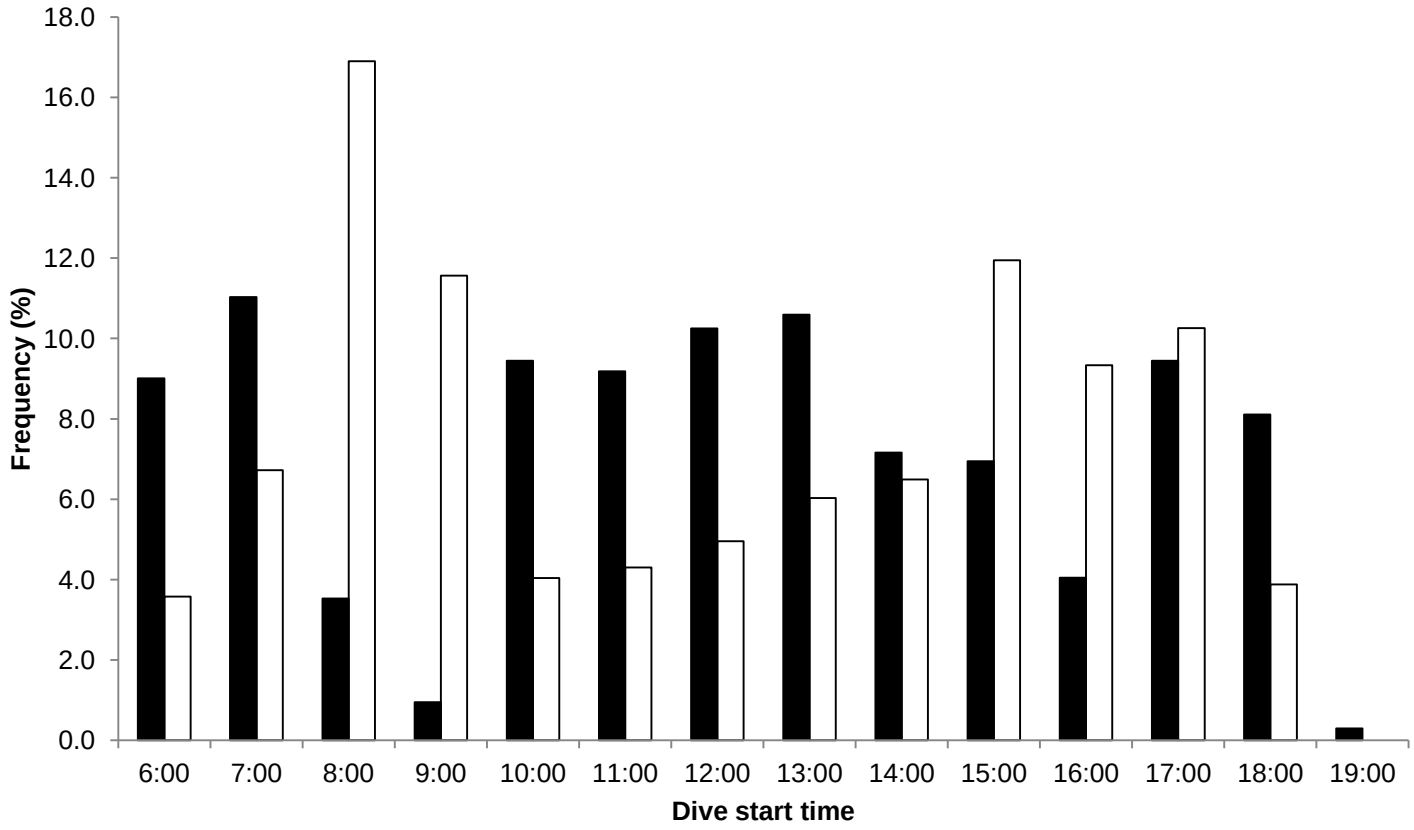
Results – rest period

- Mean rest period 19s, no difference between the sexes
- weak relationship between dive duration and rest period



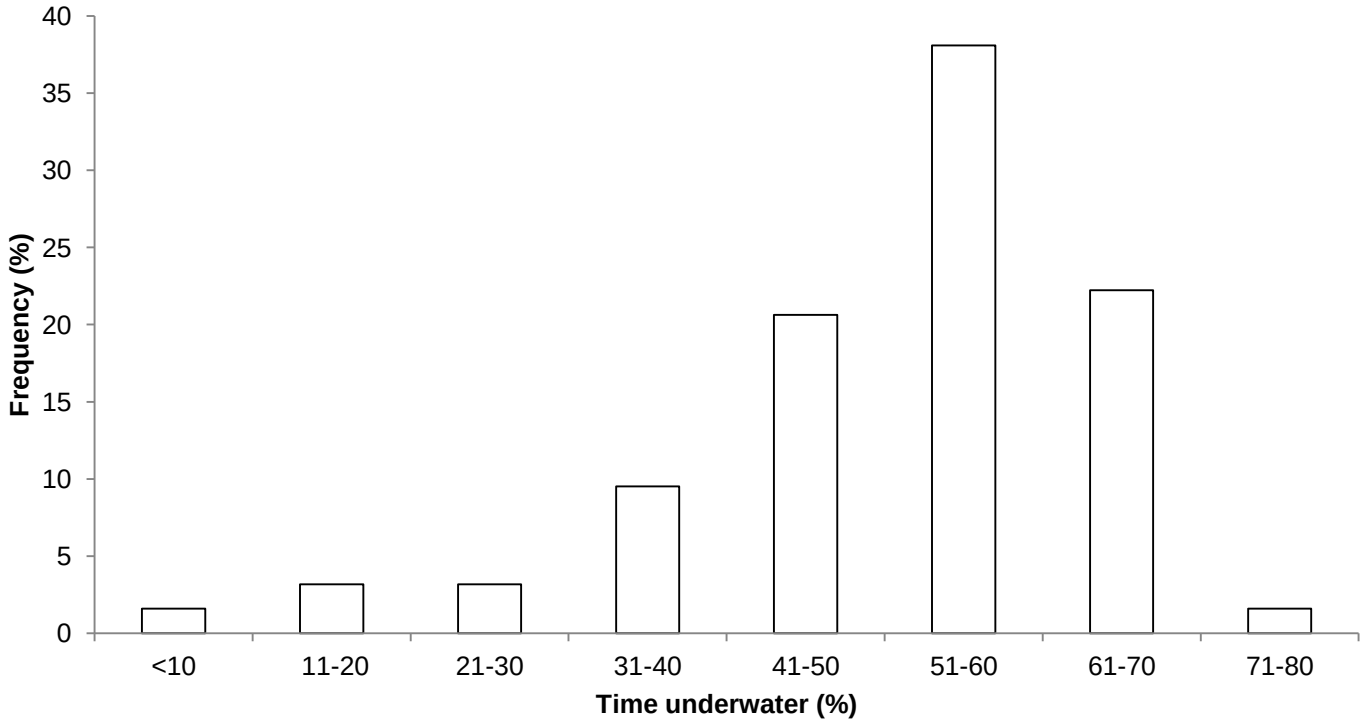
Results – Daily foraging timing

- All dives during daylight, with no clear daily pattern



Results – Foraging efficiency

- Birds spent an average of 50% of foraging time underwater per trip (41-70%)
- No regional or sex difference



Results – Foraging area comparison

- Linked GPS and TDR data – 39 foraging trips
- Some difference in foraging parameters from different areas

	Foraging trips	Mean trip duration	Mean dives/ trip	Mean dive duration (s)	Mean rest period (s)	Mean depth (m)	% underwater
Okawa Point	19	01:07:14	83	27.5	24.2	9.4	53.4
Te Whakuru I.	3	0:33:25	92	9.0	20.0	2.7	31.7
Waitangi	9	0:53:17	85	22.7	20.3	6.4	51.5
South Coast	3	1:26:03	115	26.3	23.0	8.0	54.1
Port Hutt Bays	5	01:44:52	133	25.2	21.8	6.7	54.7

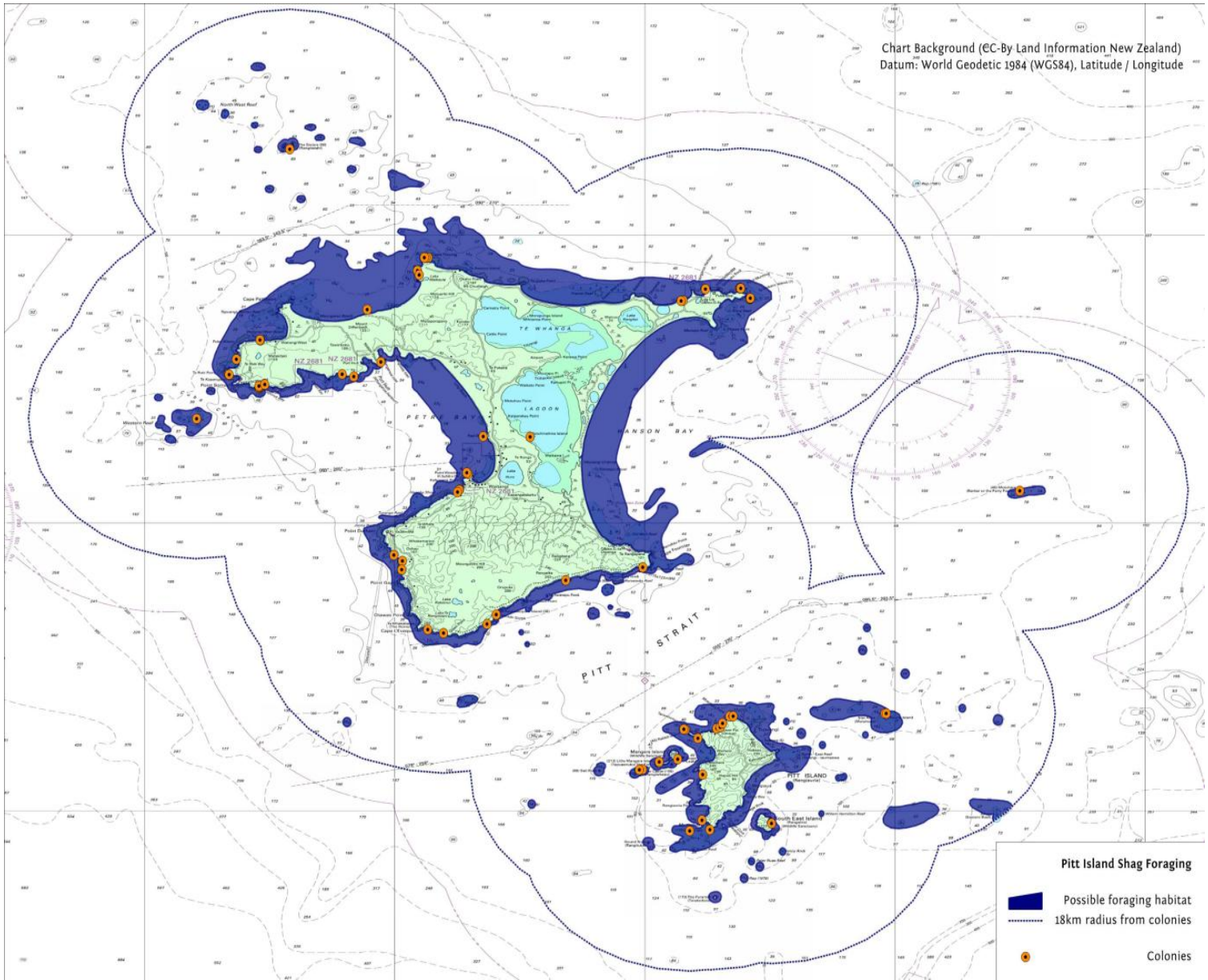
Results – Estimating species foraging range

Use foraging parameters to estimate foraging range

- Foraging range 18km
- Max dive 25m

Possible to determine overlap with commercial rock lobster fishery

POP2012-08 Pitt Is. shag foraging ecology



Results – Overlap with commercial rock lobster fishery

- Foraging range covers all coastal waters of the Chatham Islands.
- However as 90% of dives <13m, most significant bycatch risk during January and February when pots set close to shore

Recommendations

- Undertake further foraging studies –
  - Investigate regional differences in foraging behaviour and efficiency
  - Investigate foraging behaviour and efficiency during other stages of breeding (i.e. chick rearing)
  - Determine drivers in variable timing of breeding at different colonies

Recommendations

- Undertake a ecological studies
  - Breeding biology
  - Breeding success and causes of failure
  - Focusing on possible causes of population decline

Acknowledgements

Thanks to landowners in the Chatham Islands who allowed access across their property for us to undertake this research; in particular Bruce Tuanui, Jack Daymond, Jim Murrison, and Abe Neilson. WMIL staff Mark Fraser assisted in the field, and Kelvin Floyd produced the maps. This project was funded by the Department of Conservation's Conservation Services Programme (www.doc.govt.nz/mcs) project POP2012-08 (100% Crown funded). Additional funding was provided by Forest & Bird following a grant from The Mohamed bin Zayed Species Conservation Fund and we are grateful for this support.