POP2012/03: Black petrels - at-sea distribution and population estimate

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Presentation of results from black petrel 2012/13 breeding season to the Department of Conservation CSP Technical Working Group

1 August 2013

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OBJECTIVES:

- Provide detailed at-sea foraging distributional data of black petrels during the breeding season, suitable for inclusion in fisheries risk assessments; and
- Estimate the black petrel population size at Great Barrier Island and describe the population trend by comparing the estimate to relevant existing data.

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Department of Conservation Te Papa Atawbai

STAGE OF PROJECT:

- **Part of long-term research project on Great Barrier Island (since 1995/96 breeding season)**
- Status reports delivered following three field visits to colony
  - December 2012 [egg-laying]
  - January/February 2013 [chick rearing]
  - April 2013 [chick fledging]
- Draft final report delivered (30 July 2013)
  - Bell, E.A.; Sim, J.L.; Scofield, P.; Francis, C.; Landers, T. 2013. At-sea distribution and population parameters of the black petrels (*Procellaria parkinsoni*) on Great Barrier Island (Aotea Island), 2012/13.
- **Presentation of draft final results**

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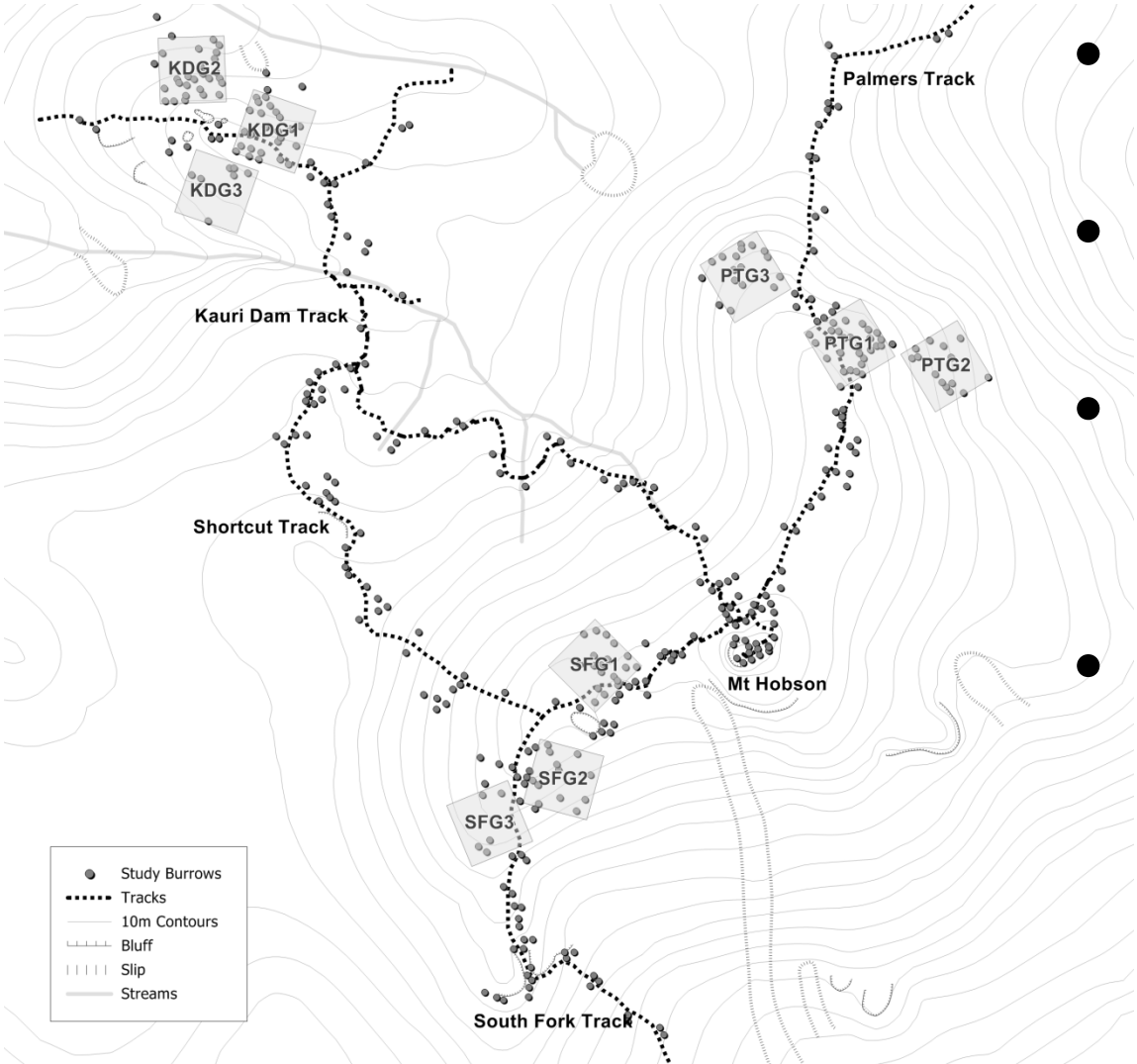
STUDY SITE:



- Covers 35 hectares around the summit
- **423** numbered burrows
- **416** study burrows (including **156** in nine census grids)
- Burrows are accessed through entrance or study hatch

METHODS:

1. Population parameters:

- ✓ Mark-recapture of adults at the colony
- ✓ Monitor study burrows
- ✓ Estimate population (and determine trends)
- ✓ Determine breeding success (and causes of failures)
- ✓ Random transects through study area






METHODS (POP. PARAMETERS):

1a Study burrows:

- Checked regularly during each visit to colony
- Band or identify every adult in burrow
- Determine breeding state of burrow
- Egg, chick, non-breeding, non-occupied, collapsed …
- Identify reason for breeding failures
- Night searches of known take-off sites (for banded birds)






METHODS:

1b Transects through entire study area:

- Random GPS start points
- Random compass bearing from the start point
- 400 m length
- 2 metre strip on either side of transect central line (minimising the edge effect):
  - Burrows east or north of the central line counted if any part of the burrow entrance within the 2-m strip
  - Burrows west or south of the central line counted if the entire burrow entrance within the 2-m strip.

METHODS:

2. At-sea distribution and behaviour:

- ✓ High-resolution GPS logger devices
- ✓ Time-depth recorders
- ✓ Determine foraging range and diving behaviour at sea during breeding season
- ✓ Determine risk from, and overlap with, fisheries

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METHODS (AT SEA DISTRIBUTION):

2a Deploy high-resolution GPS loggers

- I-GotU™ GT-120 GPS data-loggers
- 16 g units that measured 44 mm x 28 mm x 10 mm
- Taped to back

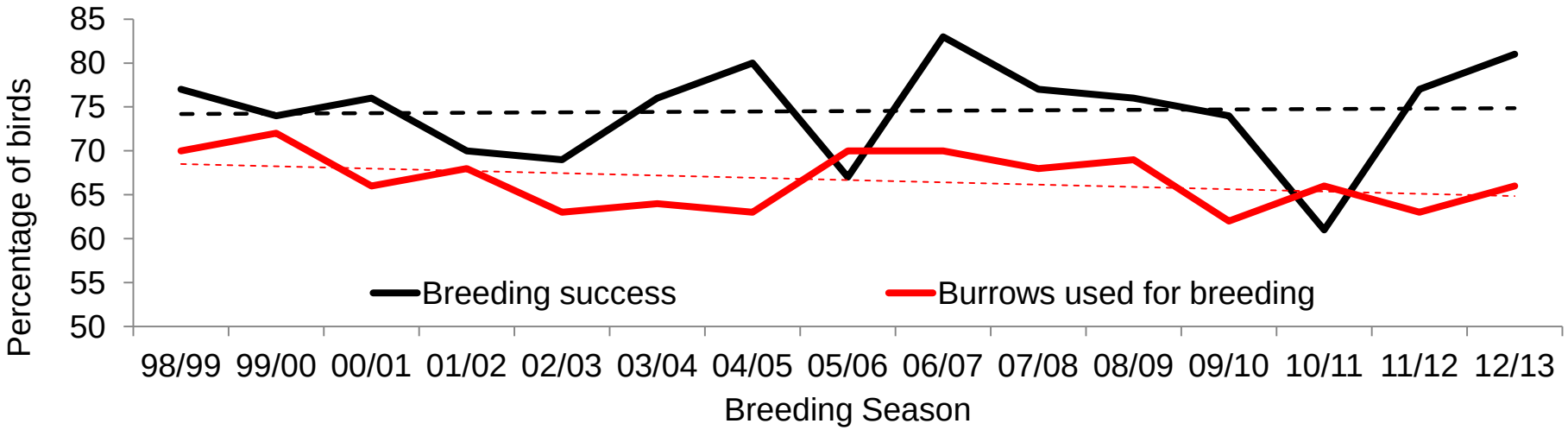
2b Deploy Time-Depth-Recorder devices

- Lotek™ LAT1900-8 Time-Depth Recorders
- 2 g units that measured 8 mm x 15 mm x 7 mm
- Attached to metal leg band with cable ties

RESULTS:

POPULATION PARAMETERS (STUDY BURROWS)

- Number of study burrows used for breeding per year varies from 61-72% **(mean 66.7% ± 0.8; 2012/13 = 66%)**
- Breeding success (chicks fledged from eggs laid) varies from 61-83% per year **(mean = 74.5% ± 1.5; 2012/13 = 81%)**



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RESULTS:

POPULATION PARAMETERS (STUDY BURROWS)

- 2568 banded as chicks (between 1996-2013)
- 179 “chicks” (including 149 banded between 1996-2013) recaptured at the colony
  - Earliest age at first return is 2 years [mean 5.8 ± 0.2]
  - Earliest age at first breeding is 4 years [mean 7.3 ± 0.2]
  - Earliest age at first successful breeding is 4 years [mean 7.4 ± 0.2]
  - Two pre-breeding birds have been caught at sea in South America at age 2 (released alive, but not recaptured at colony)

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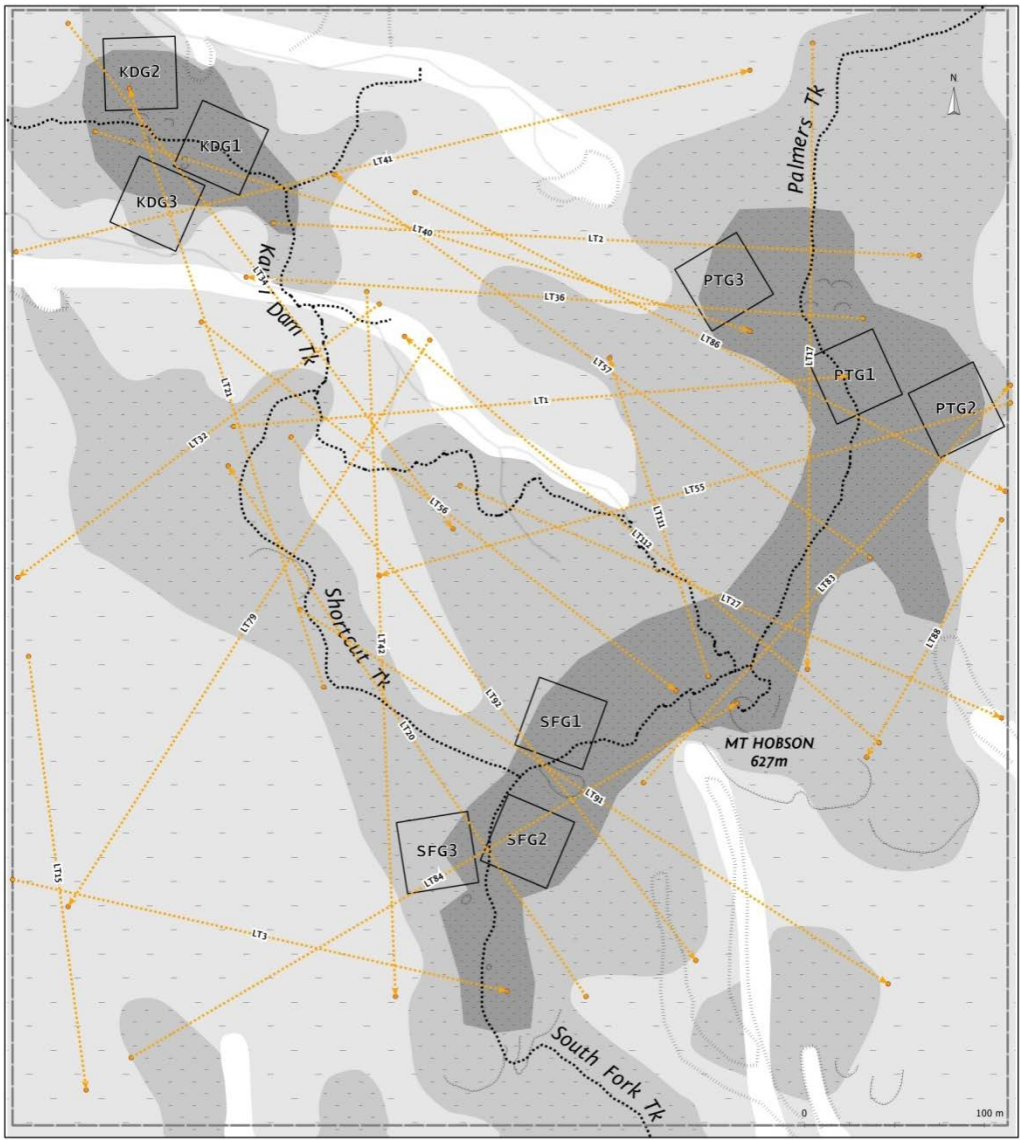
RESULTS: Transects

- 26 transects
- 178 – 400 m
- 4 – 47 burrows
- Stratified into four petrel habitat types (non, poor, medium and high)
- Compared to 2004/05 and 2009/10 transect surveys



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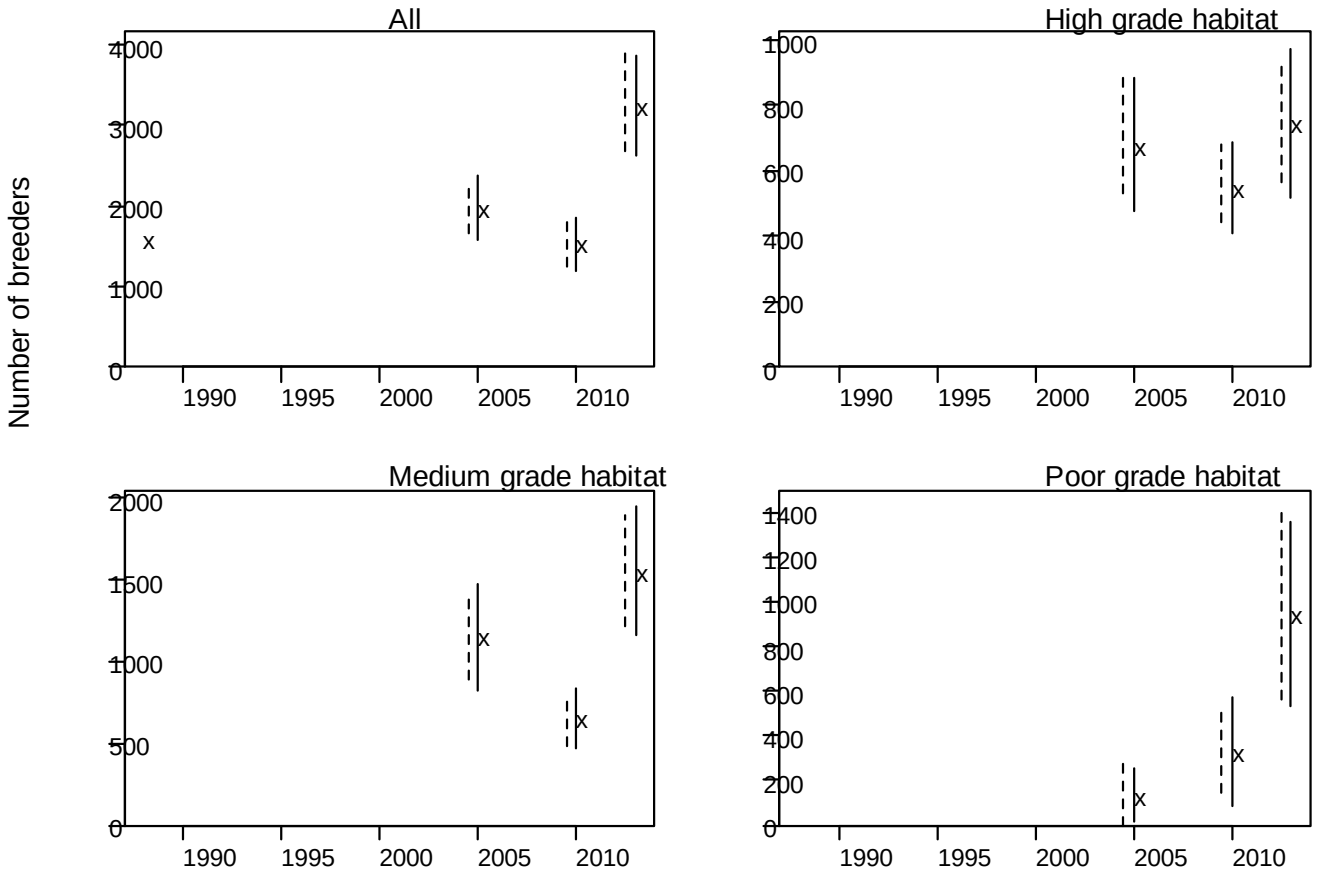
The 2013 estimate of population size was more than double that for 2010 and 65% higher than that for 2005 (across all habitat grades).



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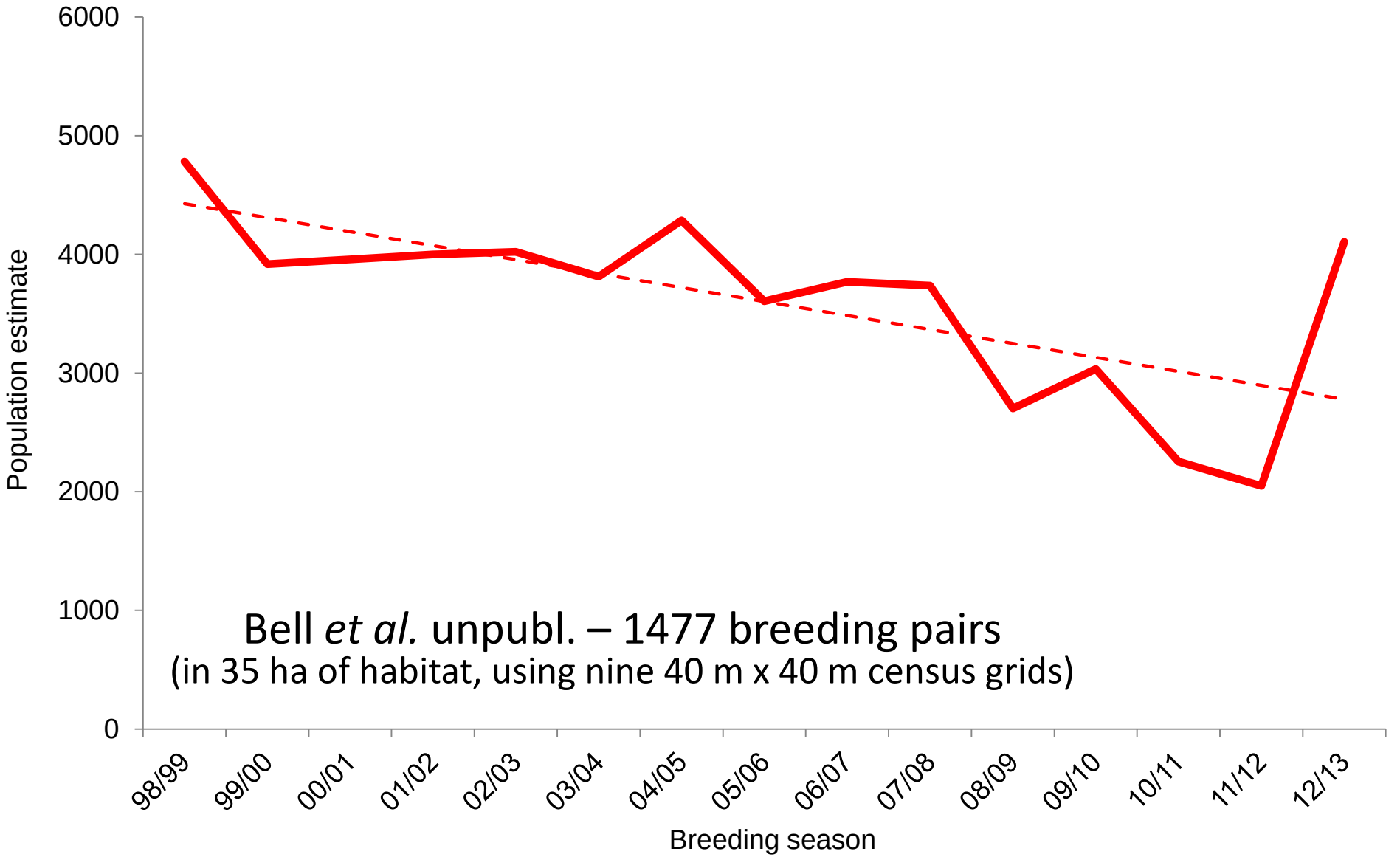

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Is this increase population estimate in transects caused by:

- Higher adult population, or
- Higher proportion of adults breeding in 2013 (compared to 2010 and 2005)

Or is it:

- Higher adult survival
- Improved juvenile survival and recruitment

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RESULTS: GPS Tracking

- 55 devices deployed
  - 36 ♂, 19 ♀
- Worn between 0 and 80 days
- Retrieved 94.5%
  - 3 still at sea (but will have fallen off by now)
- Foraging zones around northern NZ
  - Chick rearing only
  - Generally centred over Hauraki Gulf
  - Range from East Cape to Tasman Sea






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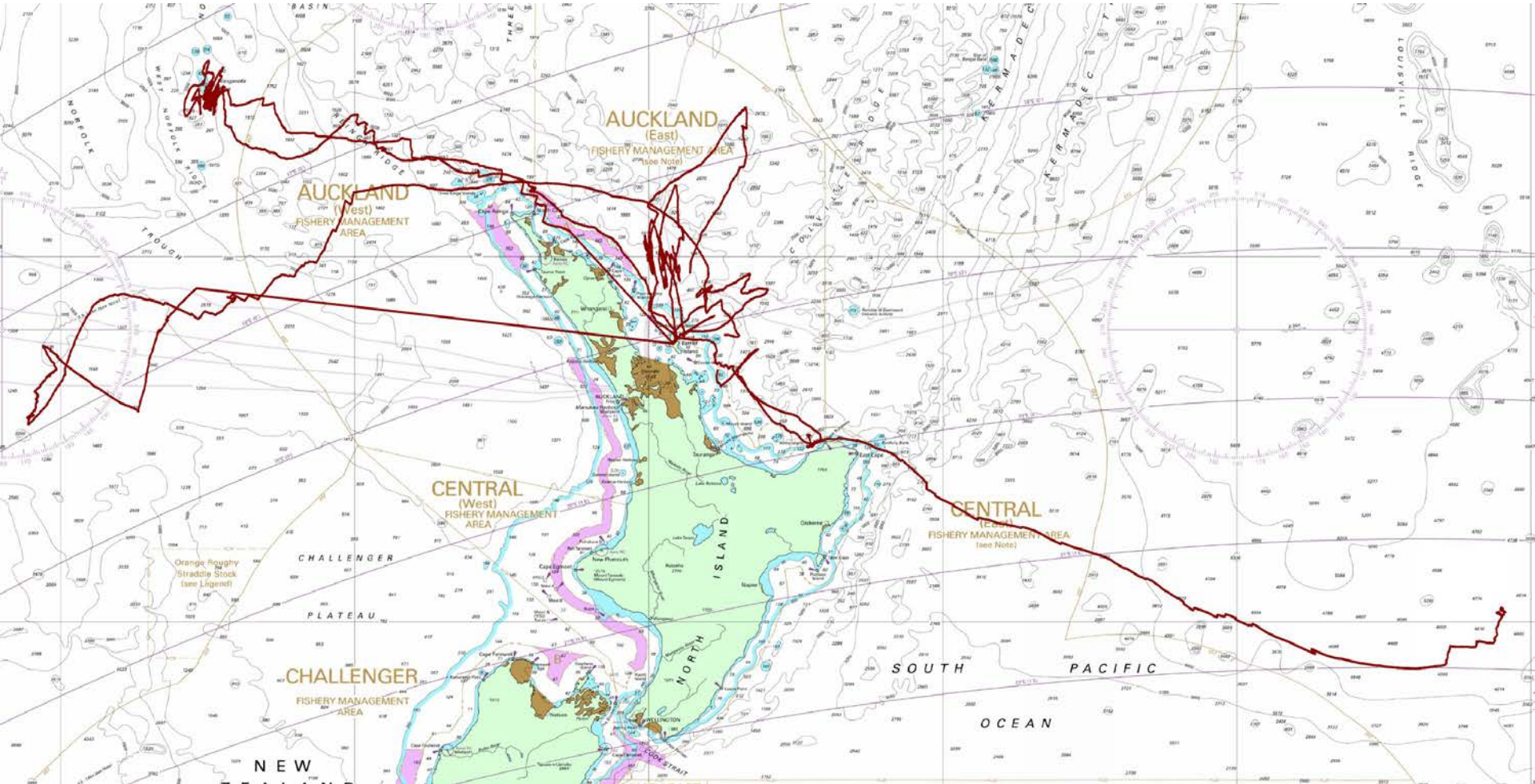
RESULTS: GPS Tracking

- 16 partial or full tracks



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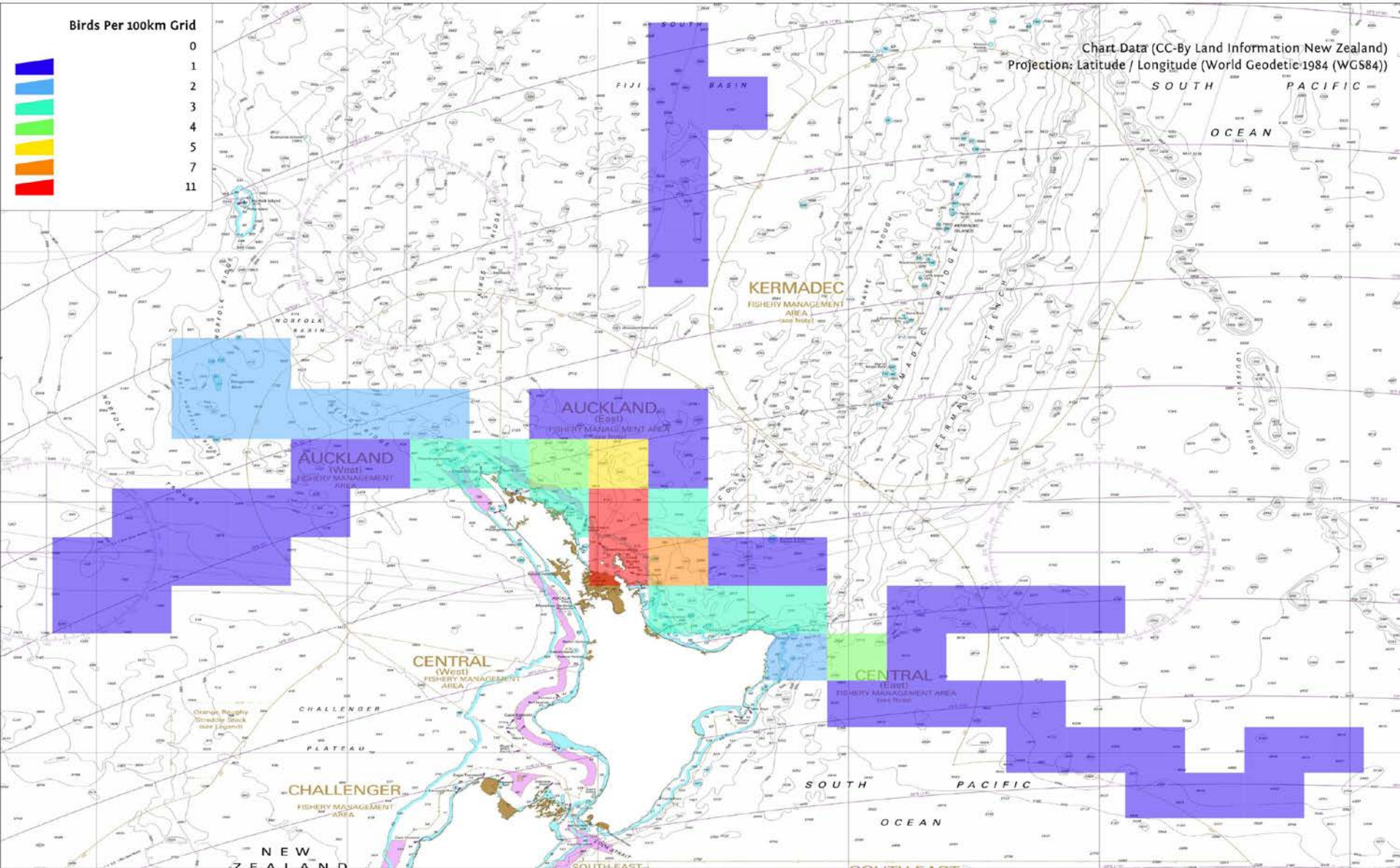

POP2012/03: BLACK PETRELS

RESULTS: TDR devices

- 31 devices deployed
  - 19 ♂, 12 ♀
- Worn between 0 and 88 days
- Retrieved 93.5%
  - 2 still at sea, but will be retrieved next season
- Dives separated by depth:
  - shallow 1-5 m; medium 5.1-10 m; deep > 10 m
- 462 dives (92.4% day, 35% night)
- Maximum dive = -20.1348 m
- Mean (± SEM) = -7.03 ± 2.6 m

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RESULTS: TDR devices

Band	Sex	Burrow	Deployed (days)	Total dives (day)	Total dives (night)	Shallow (1-5 m)	Medium (5.1-10 m)	Deep (>10 m)	Max length (seconds)	Min length (seconds)	Max depth (m)	Min depth (m)
25503	Male	175	7	4	0	3	2	0	32	3	-7.726	-1.3056
28001	Female	175	11	39	3	21	11	0	39	2	-9.8226	-1.02
29682	Female	265	6	92	9	61	26	14	40	1	-20.1348	-1.0098
31023	Female	212	2	13	21	31	3	0	36	1	-9.8736	-1.02
31240	Female	69	2	23	0	13	7	3	44	3	-14.1984	-1.1424
31572	Female	137	2	1	0	1	0	0	2	2	-1.1424	-1.1424
33315	Female	245	1	1	0	1	0	0	2	2	-1.0608	-1.0608
33715	Male	316	2	8	0	8	0	0	13	2	-5.0388	-1.0608
33768	Male	301	2	9	0	9	0	0	7	1	-2.1522	-1.0302
34352	Female	71	3	205	2	188	12	7	57	1	-16.9932	-1.0098
36179	Female	140	1	32	0	18	11	3	32	4	10.7304	-1.1934

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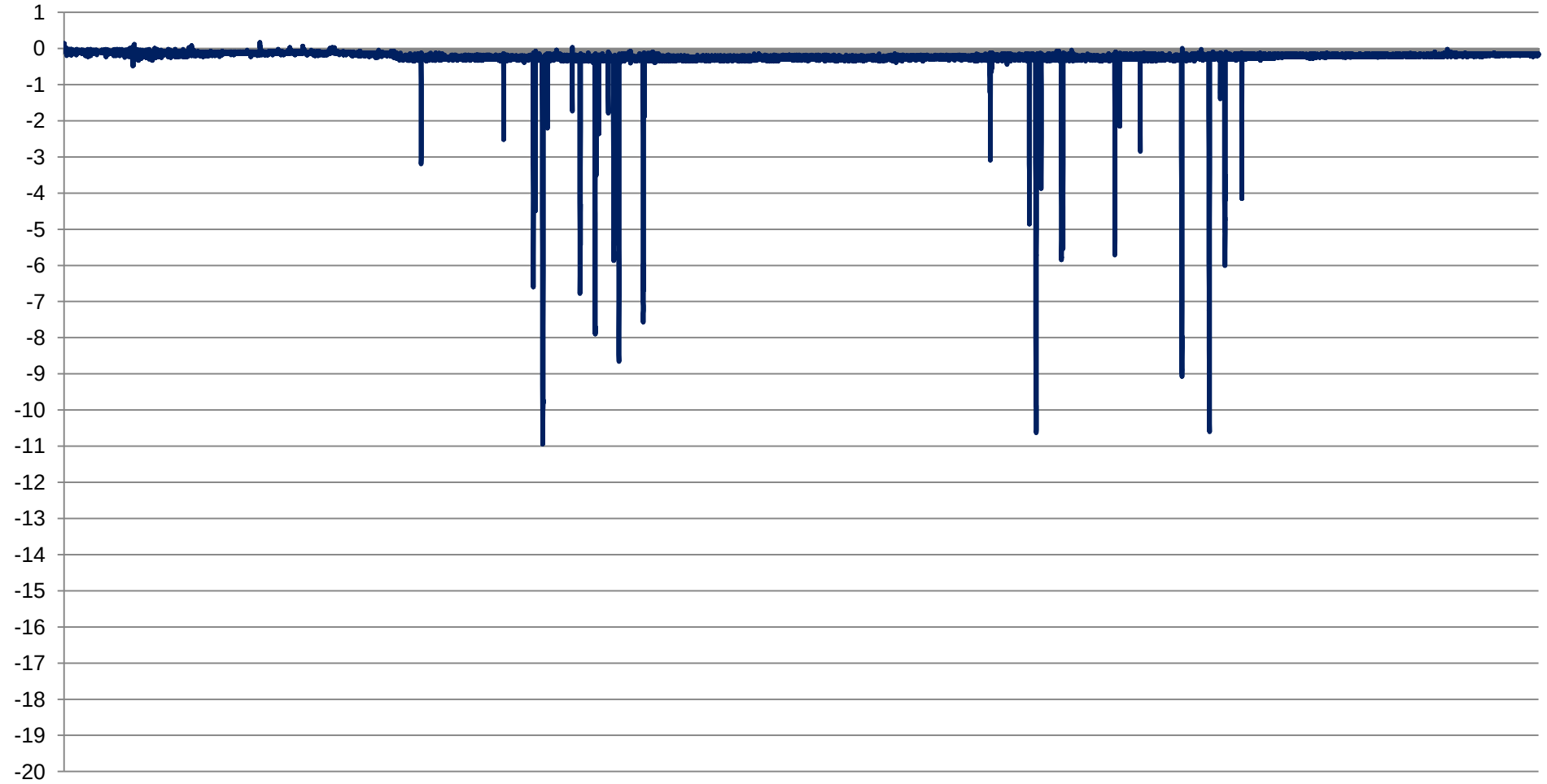
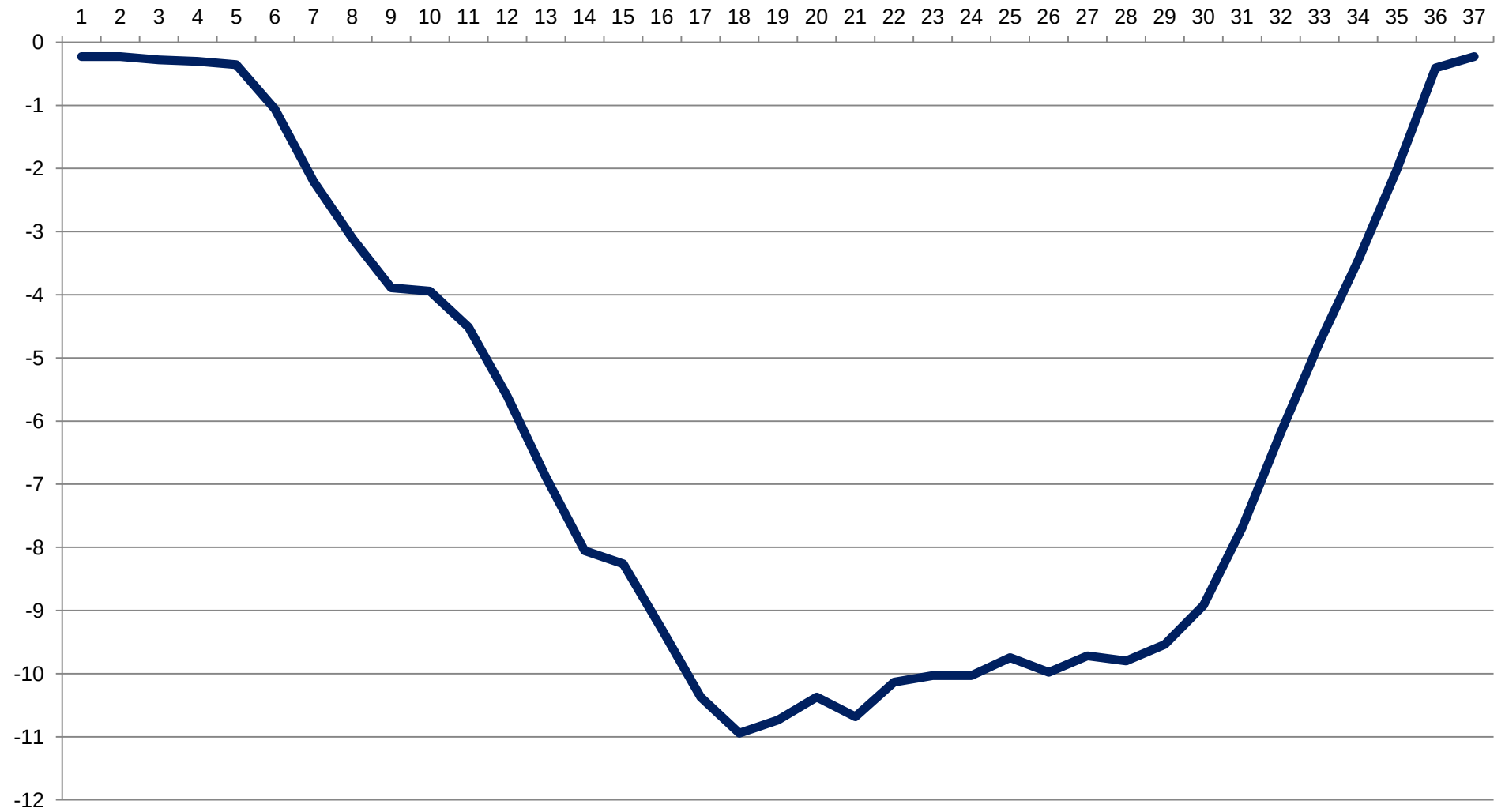
H36179 (♀):

6 December 2012 (10:00:06 to 18:16:25), 32 dives, longest 32 sec., shortest 4 sec.



POP2012/03: BLACK PETRELS

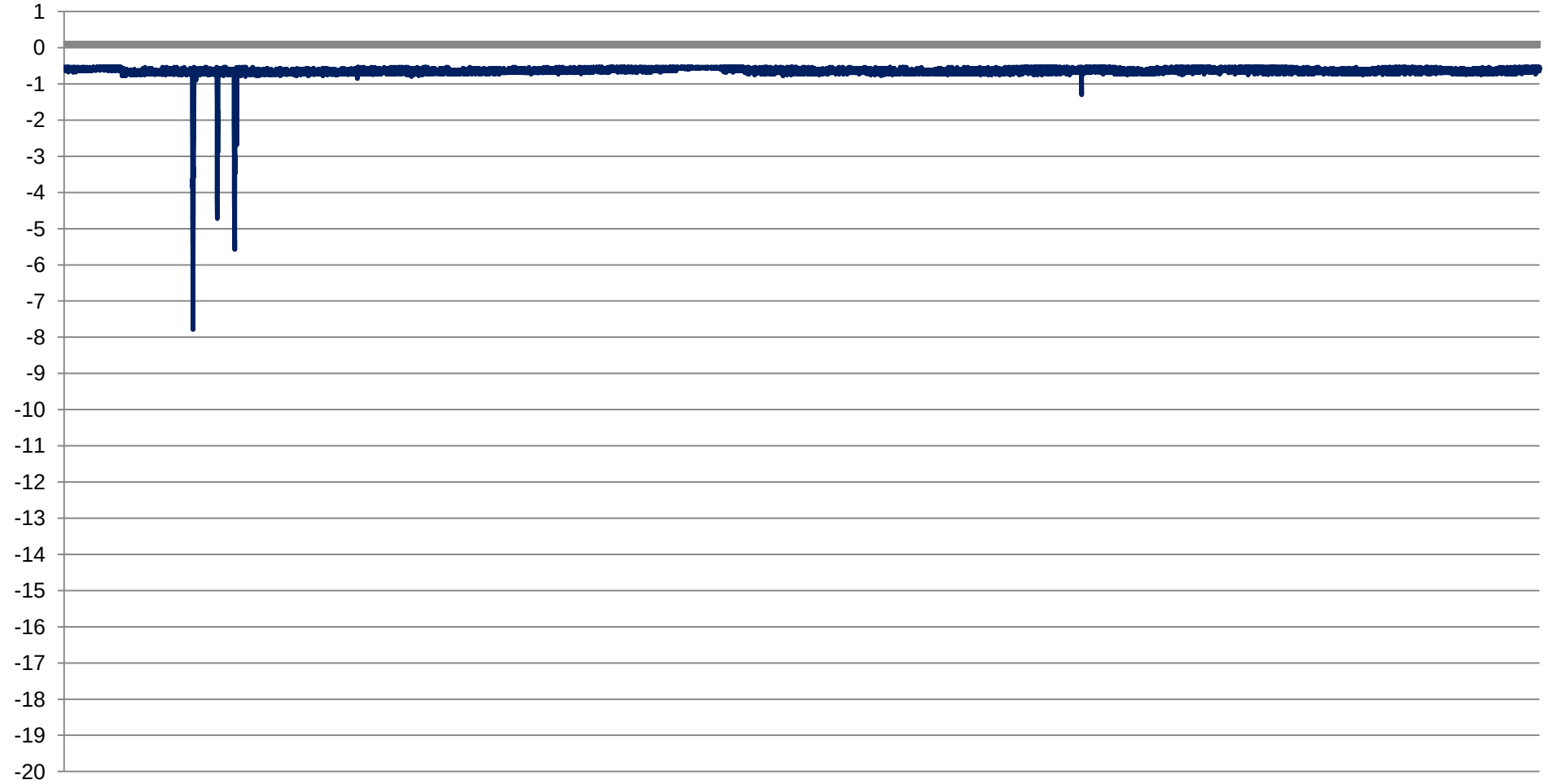
H36179 (♀): 6 December 2012 (12:22:04 to 12:22:36; 32 sec.), -10.7304 m



POP2012/03: BLACK PETRELS

H25503 (♂):

1-2 February 2013 (02:55:56 to 15:17:35), 8 dives, longest 32 sec., shortest 3 sec.



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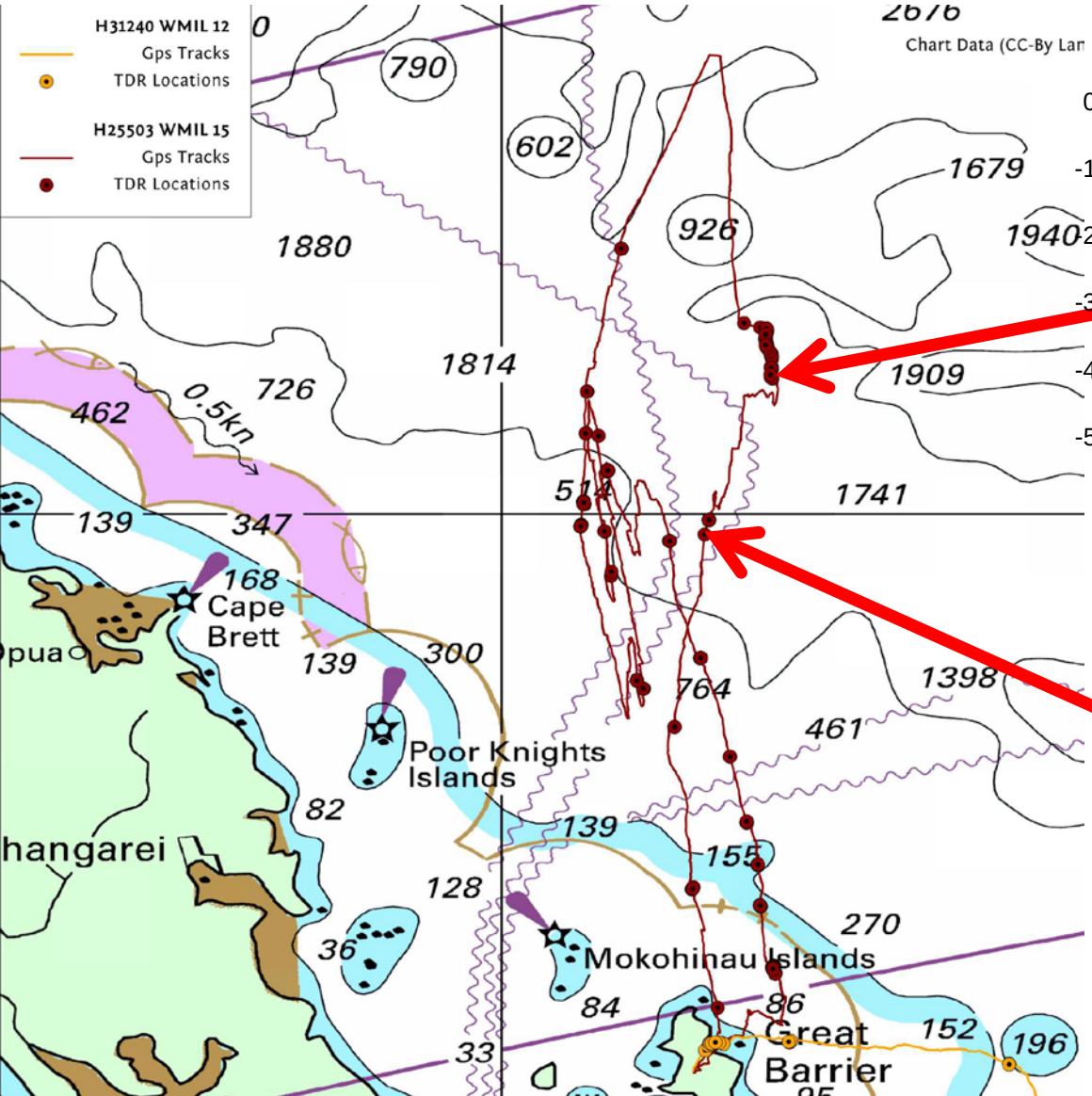
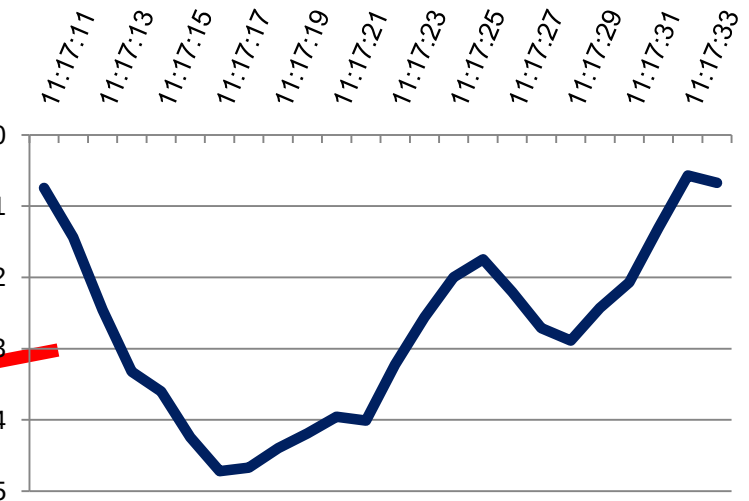
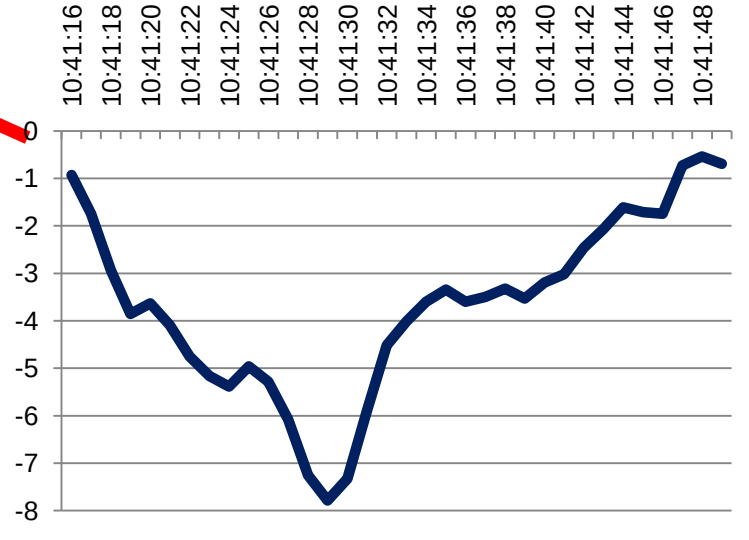




H25503



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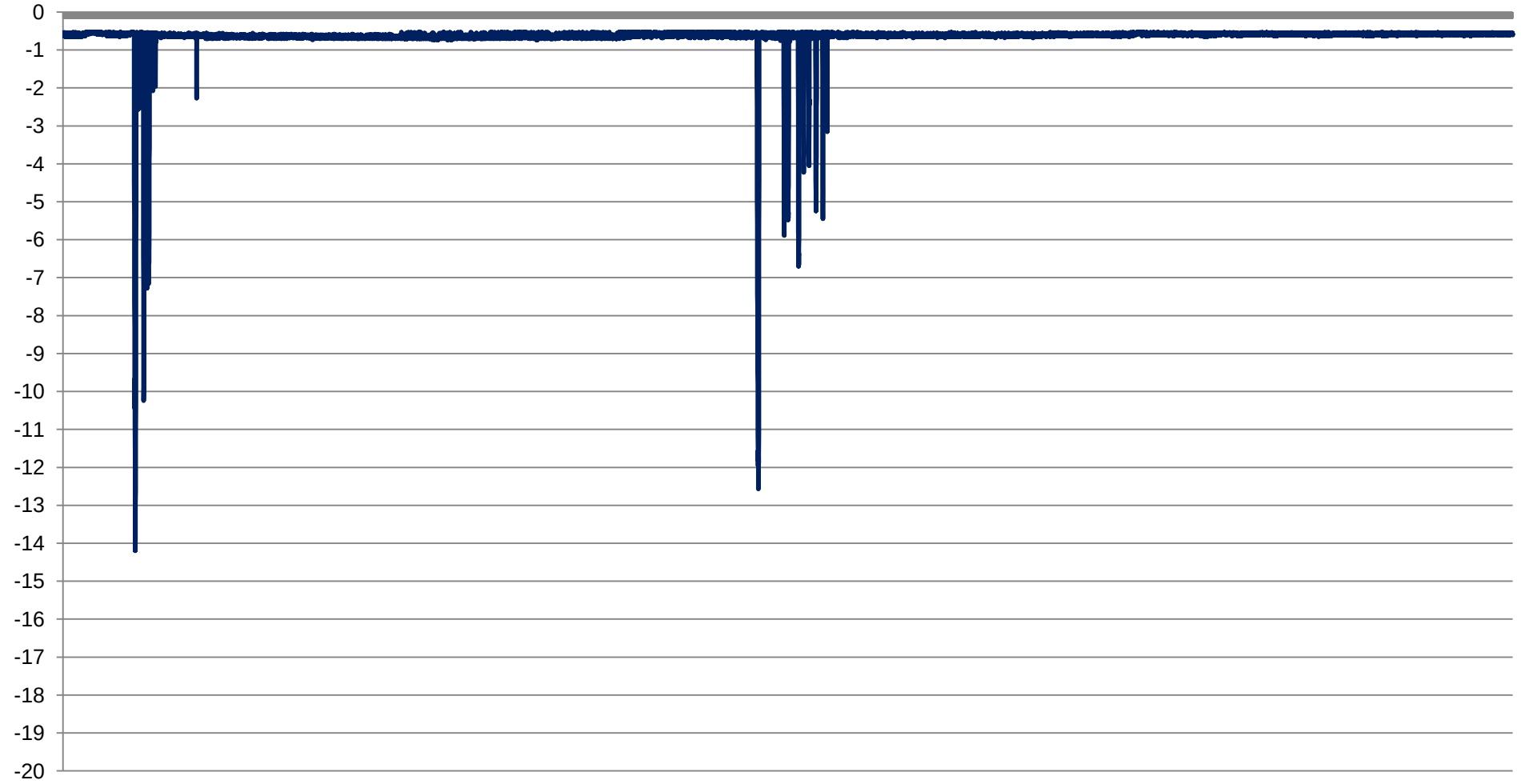
H31240 (♀):

1-2 February 2013 (02:18:46 to 00:36:24), 23 dives, longest 44 sec., shortest 3 sec.



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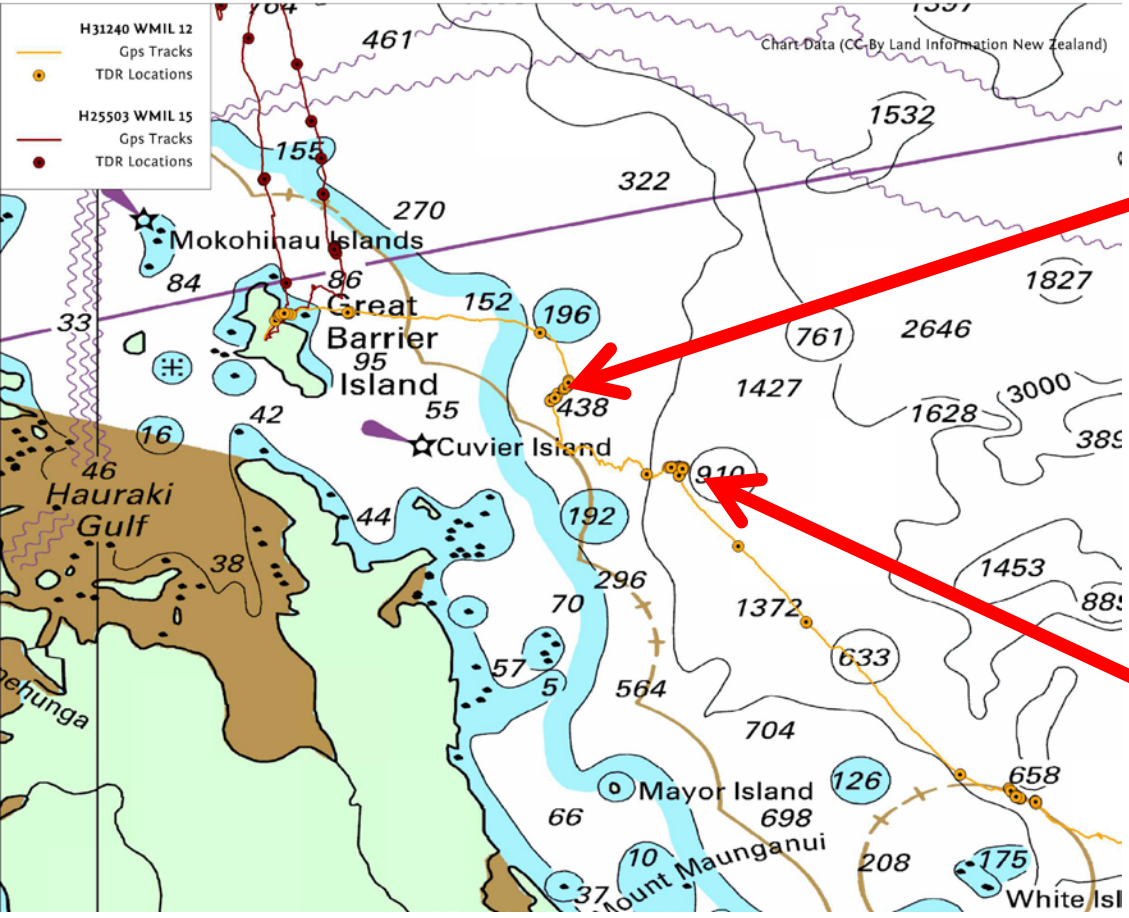
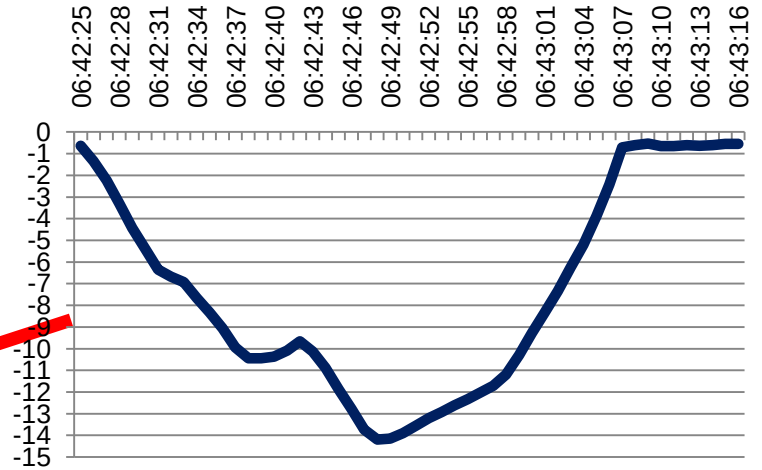
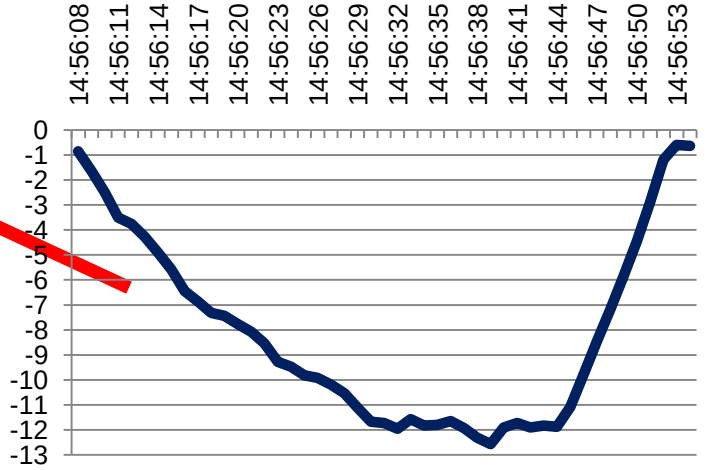




H31240



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OTHER 2012/13 HAPPENS:

- Okiwi School visit (February)
- Banding chicks at Glenfern Sanctuary (9 known burrows)
- Upcoming … Conservation week ("7x7@7" presentation) on GBI in September 2013

The Fluffy Chick

I tenderly reached my hand into the top hatch of the chick's burrow waiting, waiting for the first nip. It didn't take long. The chick's knife like claws raked across my skin. Blood as red as fire came bubbling up yet I felt no pain because in my hand I was holding a giant black petrel chick which was as cute as a puppy and fuzzy as a flower!

My whole class and I (Taric) on the 7/2/13 walked up to the top of Hirakimata, the highest mountain on Great Barrier Island to be with Biz Bell and her team to learn about Black Petrel.

Amazingly Biz and her team have over 450 study burrows and around 5000 black petrel. So here we were following Biz down a steep hill to where four black petrel burrows were to be checked. We carried on checking, banding and twinking.

Biz has been doing this work for 17 years because she absolutely loves the work and the birds. When she handles them she has a smile that almost splits her face in half. She actually caresses the birds. Sadly though without funding she won't be able to do the amazing work she is doing.

Biz is currently researching how deep black petrel dive. She has just attached 25 dive depth monitors to birds but five of them were eaten and it will take time to get accurate data, plus they are expensive. She is also studying if the population of black petrel is declining or increasing. Sadly it looks like the population is declining so more work has to be done.

For the future of Black Petrel we want them to be able to live in low lying areas and on the main land. This would mean more cat and rat trapping nationwide. Biz has found out lots of things about their food, migration route and numbers but there is still much to learn.

Biz and her team are doing a great job and with more funding they can keep going. Kia ora!

By Taric Speir.

The Mt Heale hut is very comfortable even though some of us had to escape to the deck away from the snorers.

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OTHER 2012/13 HAPPENS:

- Fishing Industry visit (April)
  - Two groups over 3 days
  - Southern Seabird Solutions
  - DVD being produced

NEWS

Petrel lessons paying off

Commercial fishers are being brought on board to help avoid rare black petrel deaths from longlining.

Leigh fishermen have long had a code of practice to stop seabirds becoming snared.

Now they're even helping head the black petrels leaving their nesting sites and night, mainly on Mt Hobson, Great Barrier Island.

At this time chicks are coming out of their nest burrows and furiously flapping their wings. When they feel strong they waddle to a prominent rock and launch themselves, flying off towards South America. They stay at sea around Ecuador and Peru for three years before they come back to Mt Hobson, find a mate and nest.

These birds are as big as hens and as black as night and there are only about 15,000 left in the world. Of these, only 2000 are breeding pairs – most of them nest on Mt Hobson. The population is declining and accidental capture on fishing lines is a key threat, along with cats and rats preying on the young.

For the survival of this

Gulf home: The vulnerable black petrel only breeds in the Hauraki Gulf, mostly on Great Barrier. Photo: BRUCE FOSTER

HOT SPOT

New Zealand and the Hauraki Gulf are a seabird hot spot.

Of the world's 350 seabirds, 140 occur within our exclusive economic zone. Of these 85 breed here.

New Zealand, with 36 species, also has the highest number of endemic species (which only breed here).

The country with the next highest has five.

The Hauraki Gulf sees 26 species of sea bird

8 RODNEY TIMES, OCTOBER 11, 2012 NEWS www.rodneytimes.c

Fishers learn to save gulf's seabirds

By DELWYN DICKEY

You'd think in 1.2 million hectares of sea that commercial fishers and the seabirds that call the Hauraki Gulf Marine Park home could stay out of each other's way.

But commercial fishing boats are like a magnet to birds scavenging fish or bait, often getting hooked or tangled in the process.

As many as 40,000 birds nationally die annually in such circumstances.

This fatal attraction sees some particular problems in the Hauraki Gulf. It's a hot spot to a mass of migratory seabirds and Hauturu/Little Barrier and Tiritiri Matangi islands are sanctuaries for endangered wildlife.

Seabird restoration projects are also under way, including on Cuvier, Motuora and Motuihe islands and at Tawharanui Open Sanctuary.

There are 140 seabird species within New Zealand's Exclusive Economic Zone and of those 36 are endemic – seven times more than any other country, Leigh-based Pterodroma Pelagics gulf seabird tour operator Chris Gaskin says.

The nationally vulnerable black petrel only breeds in the gulf, he says.

A Hauraki Gulf State of the Environment Report released last year shows the gulf in a continued state of decline.

In an effort to reverse that, the Hauraki Gulf Forum has mooted a spatial plan for the Hauraki Gulf Marine Park, along with ecosystem-based management.

Some of the gulf's commercial fishers operate from Leigh and come under the Leigh Commercial Fishermen's Association supplying Leigh Fisheries.

The two groups banded together last month, along with the Primary Industries Ministry and the Conservation Department, to fund a day's workshop for about 50 upper North Island fishers on the latest technology and fishing tips designed to help reduce fishing-related seabird injuries or death.

The workshops are run by the Southern Seabird Solutions Trust, formed 10 years ago to combat seabird losses.

The trust gets funding from the New Zealand Seafood Industry Council, the Conservation Department, the World Wildlife Fund and Te Ohu Kaimoana.

The Pt Wells workshop also dealt with bycatch issues particular to this northern gulf area, and also looked at research by black petrel expert Elizabeth Bell.

These birds are mainly at risk while breeding – between October and April – the 1300 breeding pairs nest only on Great Barrier and Hauturu/Little Barrier.

Ms Bell has a long association with the northern fishing group and supports their efforts to reduce bycatch.

"The Leigh fishing group has been really proactive since the early 1980s about the whole seabird situation and is leading the way really," she says.

"They're seriously trying to reduce seabird impacts and risks from fishing," Ms Bell says.

Some fishers plan a trip to Great Barrier to see where the black petrels nest.

"They're also keen to help with at-sea observations, which is brilliant."

Leigh Commercial Fisherman's Association president Michael Goldsworthy is pleased to see the workshop initiative taking hold.

"We knew there were problems with the birds 20 years ago but back then everyone was concerned about things like turtles in gill nets and drift nets."

Recreational fishers also need to step up to the mark, he says.

"There are ways to scare the birds off so you can fish without hurting them, and recreational fishers need to know that too."

Mr Gaskin agrees. He says recreational fishers have big impacts on seabird populations, though more research is needed to tell exactly how much.

Up to 1500 birds are killed a year as a result of the inshore snapper and bluenose fishery alone, the Primary Industries Ministry says.

Birdlife International ... bal Pacific seabird coo... nator and Forest and ... spokeswoman Karen Ba... supports the workshops.

"Training skippers is ke... getting them to use m... gation and applying it eff... ively," she says.

"If this level of bycatch ... tinues then black petrels ... heading for extinction."

Ms Baird says lack of ... board observers to prov... good information on act... bycatch and mitigation co... see cameras as an alter... tive.

The move towards a H... raki Gulf spatial plan ... also put pressure on fishe... operations to become m... flexible.

"We have good informat... now on where the birds ... being caught," Ms Baird s... "So there may be an op... tunity for a spatial or t... poral closure of part of ... gulf to bottom longline f... ing if we can't get the byca... levels down."

Michael Goldsworthy s... the spatial plan concept ... be difficult to implement ... could impact unfairly on c... mercial fishers.

Having different areas ... fishers and birds won't w... as seabirds will seek ... boats out, he says.

"We're ... McDonald's ... them."

Track record: Banding seabirds like this grey petrel is all part of the job for Wildlife Management International senior ecologist Elizabeth Bell. **Inset:** The vulnerable black petrel.

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Acknowledgements:

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- Thanks to all the field assistants over the years – Ed Ansell, Ros Batcheler, Conori Bell, Philip Bell, Susan Bettany, Jeremy Bird, Dave Boyle, Julia Brooke-White, Matt Brown, Leigh Bull, Lyn Byrne, Jennie Callesen, Reg Cotter, Claudia Duncan, Kelvin Floyd, Mark Fraser, Paul Garner-Richards, Amelia Geary, Clare Green, Annette Harvey, Mike Imber, Halema Jamieson, Dianne John, Vicky Jones, Karen Lomax, Nicky Marriott, Filipe Moniz, Natasha Neale, Patrick Petterson, Thalia Satchleben, Heather Smithers, Ilka Sohle, Penelope Trevathan, Andrew Wards and George Wilson.
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