

POP2012/03: Black petrel (*Procellaria parkinsoni*) population project

ELIZABETH BELL & CLAUDIA MISCHLER

Wildlife Management International Limited, PO Box 607, Blenheim 7240, New Zealand,
biz@wmil.co.nz

Presentation of results from black petrel 2013/14 breeding season
to the Department of Conservation CSP Technical Working Group

20 May 2014

OBJECTIVES:

- To estimate the population trend, fecundity and age-class survival of black petrels at Great Barrier Island (Aotea Island)

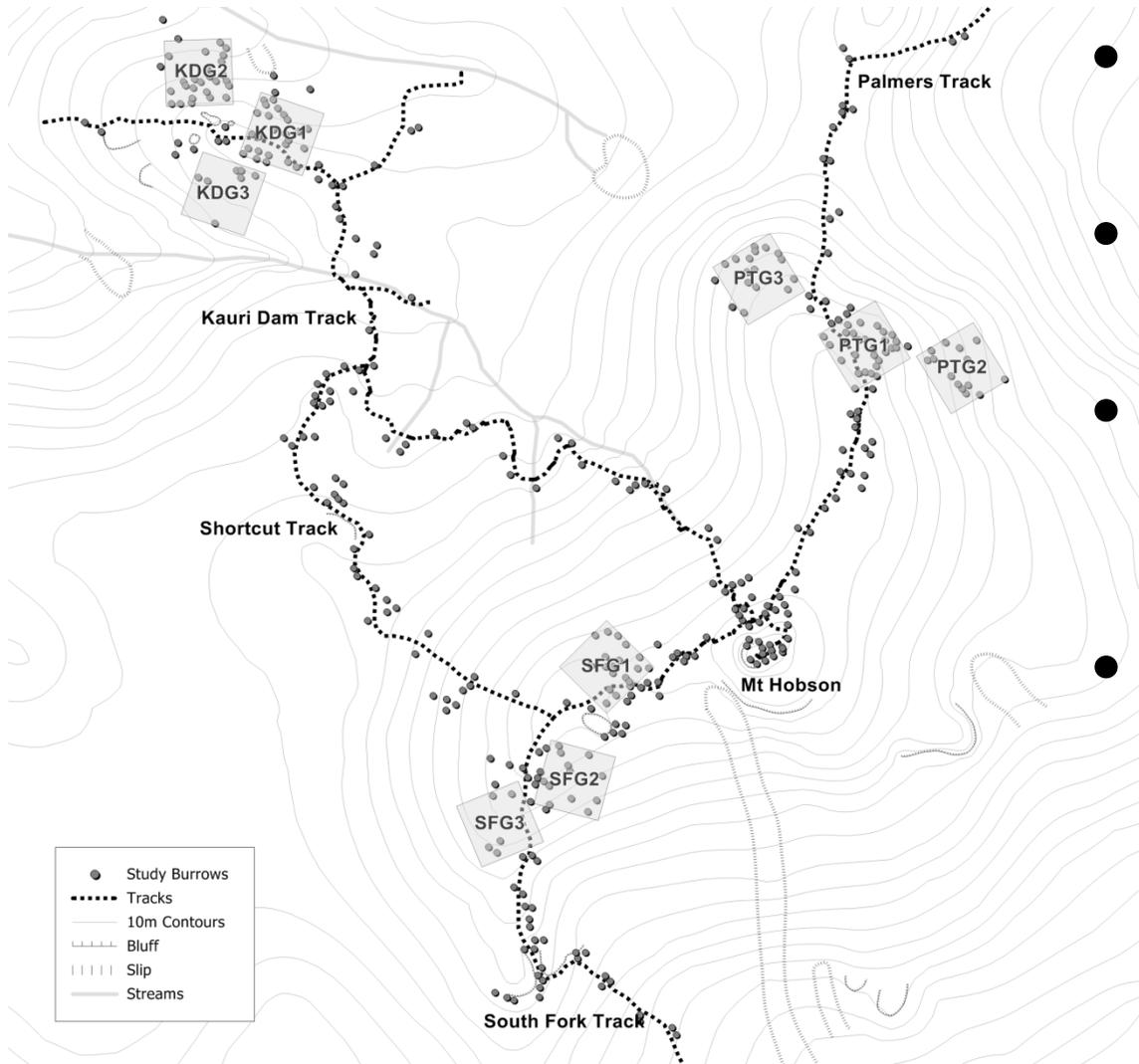


STAGE OF PROJECT:

- Part of long-term research project on Great Barrier Island (since 1995/96 breeding season)
- Status reports delivered following two field visits to colony
 - December 2013 [egg-laying]
 - January/February 2014 [chick rearing]
- Draft final report due to be delivered (30 May 2014)
 - Bell, E.A.; Mischler, C.; Sim, J.L.; Scofield, P.; Francis, C.; Abraham, E.; Landers, T. XXXX. Population parameters and at-sea distribution and behaviour of the black petrels (*Procellaria parkinsoni*) on Great Barrier Island (Aotea Island), 2013/14.
- **Presentation of draft final results**



STUDY SITE:



- Covers 35 hectares around the summit
- **424** numbered burrows
- **411** 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)



METHODS (POP. PARAMETERS):

1. 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 (POP. PARAMETERS):

2. Modelling

- Programme MARK
 - Presence/Absence of all black petrels
 - Survival estimates; recapture probabilities; site fidelity etc.
- NIWA's SEABIRD Model
 - Updating previous modelling (2009/10 season); trend, etc.
- Dragonfly analysis
 - Population trend, survival estimates; recapture probabilities; effects of effort, sex, age of birds, etc.



METHODS (AT-SEA):

2. At-sea distribution and behaviour:

- ✓ Determine foraging range during the chick rearing stage (guard stage)
- ✓ Determine diving behaviour at sea



METHODS (AT-SEA):

2. At-sea distribution and behaviour:

- ✓ High-resolution I-GotU™ GT-120 GPS data-loggers
- ✓ 16 g units that measured 44 mm x 28 mm x 10 mm
- ✓ Taped to back
- ✓ 33 devices deployed in January/February



METHODS (AT-SEA):

2. At-sea distribution and behaviour:

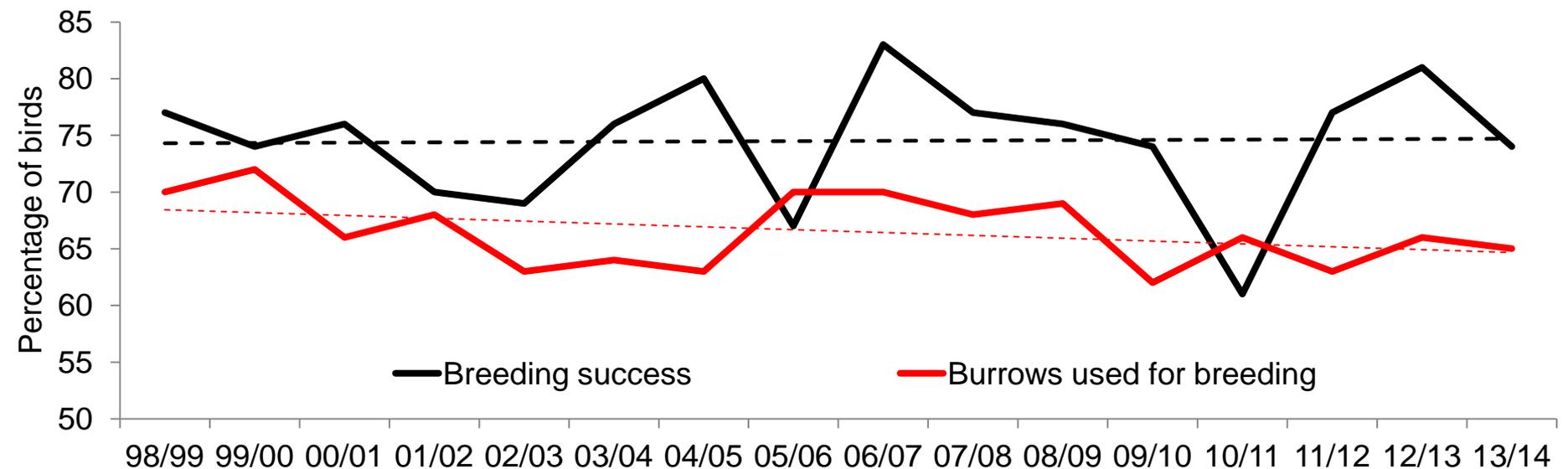
- ✓ Lotek™ LAT1900-8 Time-depth recorders
- ✓ 2 g units that measured 8 mm x 15 mm x 7 mm
- ✓ Attached to metal leg band with cable ties
- ✓ 17 devices deployed in January/February



RESULTS:

POPULATION PARAMETERS (STUDY BURROWS)

- Number of study burrows used for breeding per year varies from 62-72% (mean 66.6%; **2013/14 = 64.5%**)
- Breeding success (chicks fledged from eggs laid) varies from 61-83% per year (mean = 74.4%; **2013/14 = 72%**)



RESULTS:

POPULATION PARAMETERS (STUDY BURROWS)

- 2875 adults banded (2252 between 1995-2014)
- 2801 banded as chicks (between 1996-2014)
- 204 “chicks” (including 171 banded between 1996-2013) recaptured at the colony
 - Earliest age at first return is 2 years [mean 5.4 ± 0.3]
 - Earliest age at first breeding is 4 years [mean 7.1 ± 0.2]
 - Earliest age at first successful breeding is 4 years [mean 7.2 ± 0.2]



RESULTS:
POPULATION PARAMETERS
(MODELING)
OVER TO ED FROM DRAGONFLY



RESULTS: **GPS Tracking**

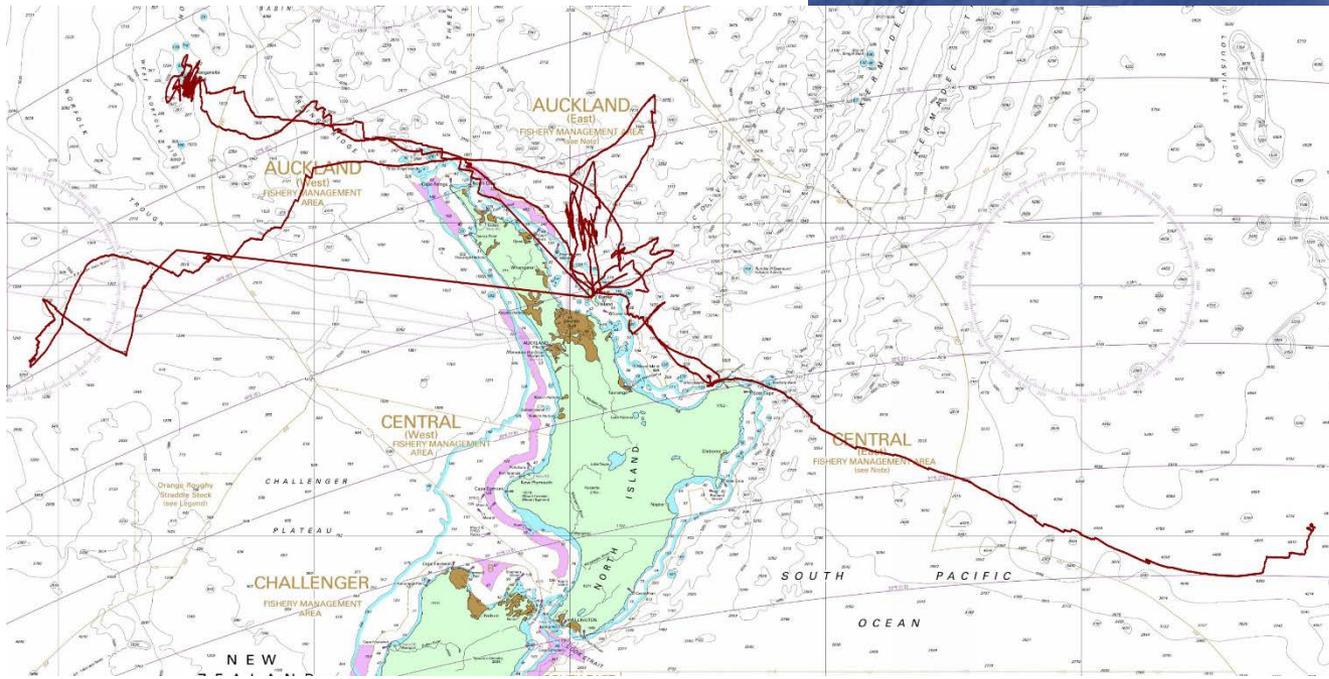
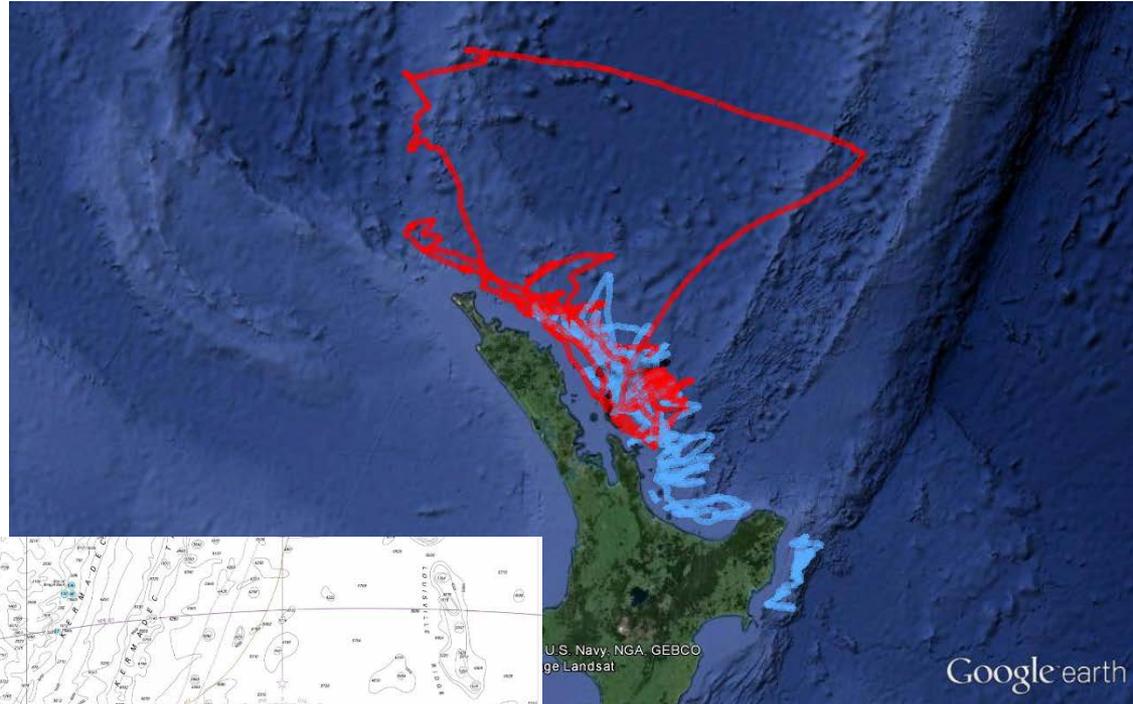
- 33 devices deployed
 - 14 ♂, 7 ♀, 12 unknown sex
 - Worn between 1 and 10 days
 - Retrieved 23 (72.8%)
 - 9 still at sea (but will have fallen off by now)
 - Foraging around northern NZ and East Cape
 - Early chick rearing only
 - Generally centred over Hauraki Gulf



RESULTS: GPS Tracking

- 13 full tracks
- 6 partial tracks

Compared to 2012/13 ...



RESULTS: TDR devices

- 20 devices deployed
 - 11 ♂, 6 ♀, 3 unknown sex
- Worn between 0 and 10 days
- Retrieved 60%
 - 8 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
 - 94.4% shallow, 3.4% medium, 2.2% deep
- 1462 dives (83.7% day, 16.3% night)
- **Maximum dive = -34.1348 m**



RESULTS: TDR devices

BAND	SEX	BURROW	TDR	DEPLOYMENT (hours at sea)	TOTAL NUMBER OF DIVES						DEPTH OF DIVE (m)		LENGTH OF DIVE (sec)	
					TOTAL	DAY	NIGHT	SHALLOW (< 5m)	MEDIUM (5.1-10 m)	DEEP (>10 m)	MAX	MIN	MAX	MIN
28046	M	81	T2085	138.3	71	63	8	51	11	9	-17.0	-1.1	42	4
28370	F	81	2857	58.9	52	49	3	44	3	5	-34.3	-1.0	75	1
30874	M	66	2835	62.45	59	58	1	56	3	0	-7.9	-1.0	39	1
31172	M	68	2825	180.8	22	21	1	20	2	0	-5.9	-1.3	13	2
31240	F	69	2838	96.6	41	40	1	20	14	7	-17.9	-1.0	51	1
33052	M	31	2856	83.4	51	51	0	33	6	12	-22.2	-1.0	70	1
33264	M	243	2821	23.2	1114	898	216	1114	0	0	-3.6	-1.0	16	1
34852	F	252	T2082	39.7	9	9	0	7	2	0	-9.9	-1.1	24	2
35213	M	396	T2083	46.4	22	14	8	16	6	0	-8.6	-1.1	39	4
35406	U	131	2827	22.3	2	2	0	2	0	0	-1.2	-1.2	4	3
36181	?F	194	2845	34.1	19	18	1	17	2	0	-5.9	-1.1	20	1

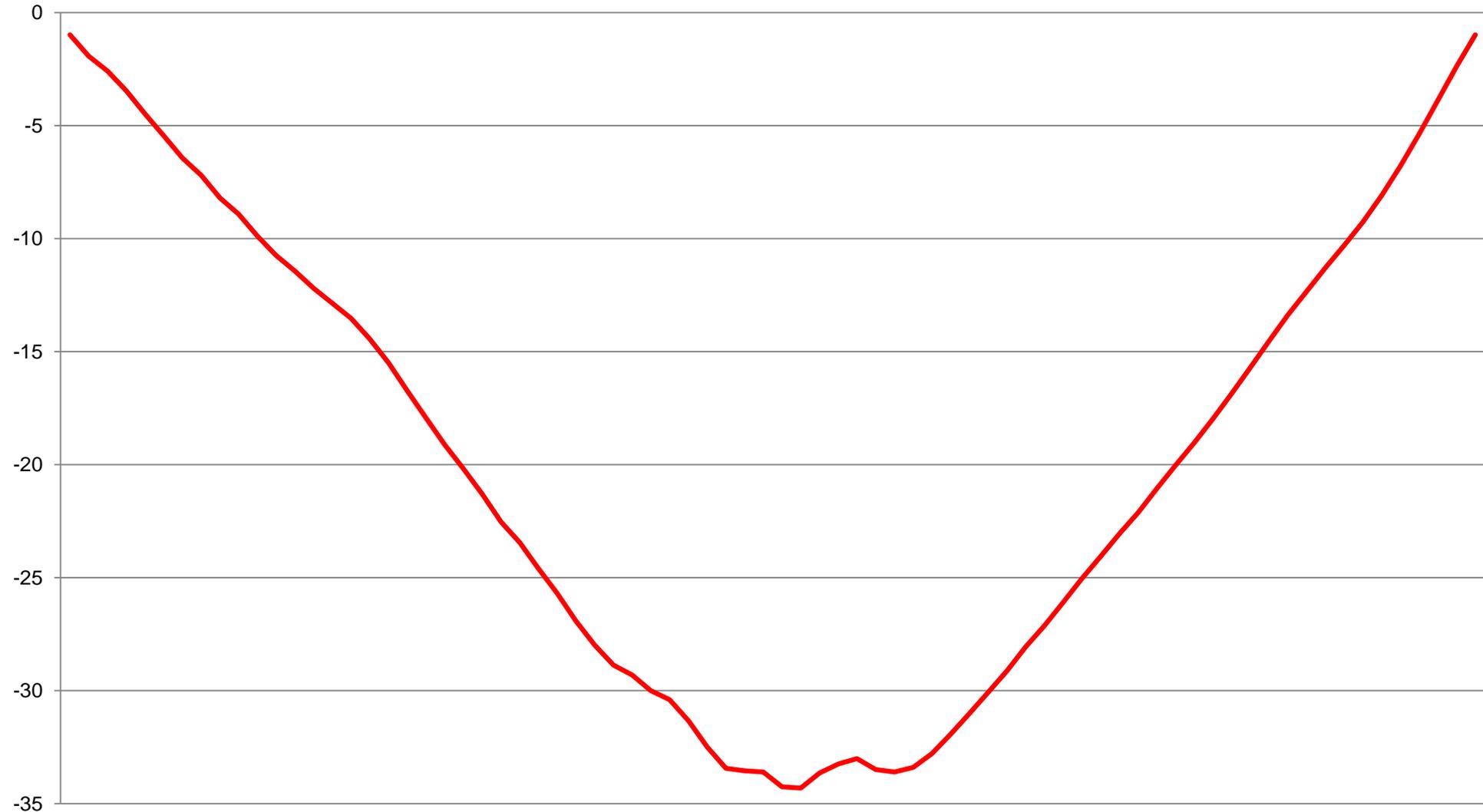


H28370 (♀):

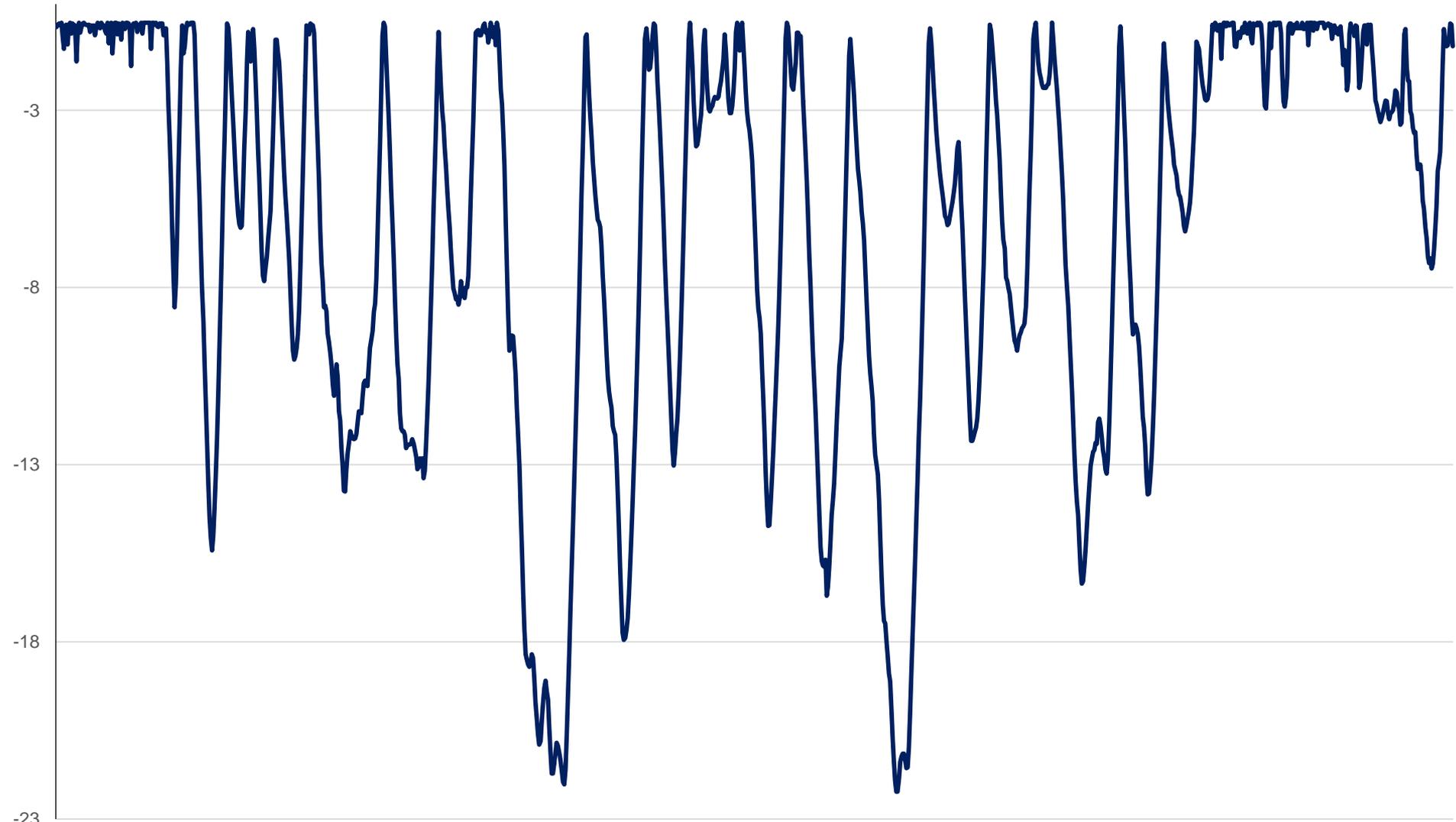
28 January to 30 January 2014 (07:55:37 to 18:47:47), 52 dives, longest 75 sec.



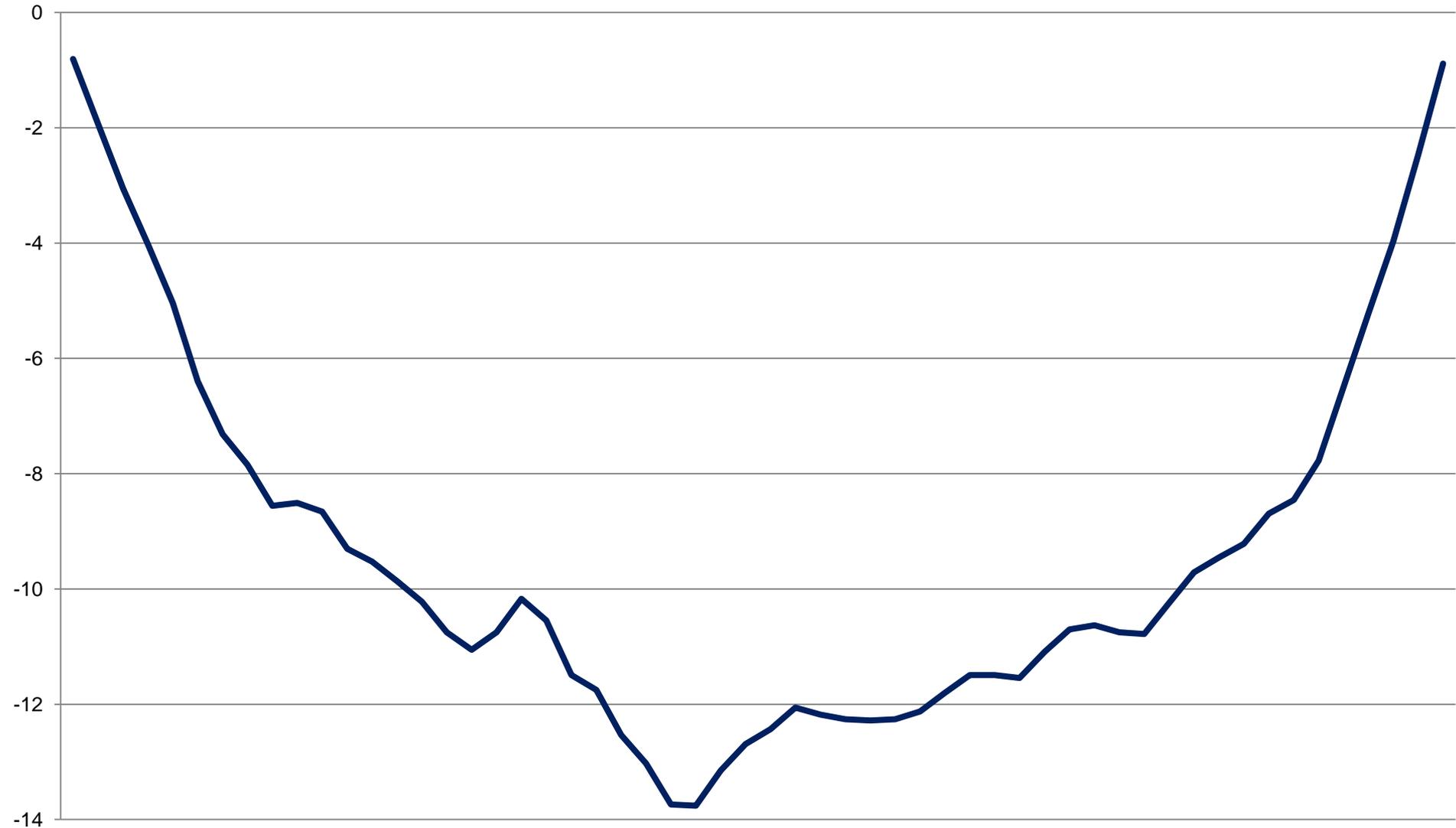
H28370 (♀): 29 January 2014 (09:11:23 to 09:12:12), 49 sec., 34.3 m



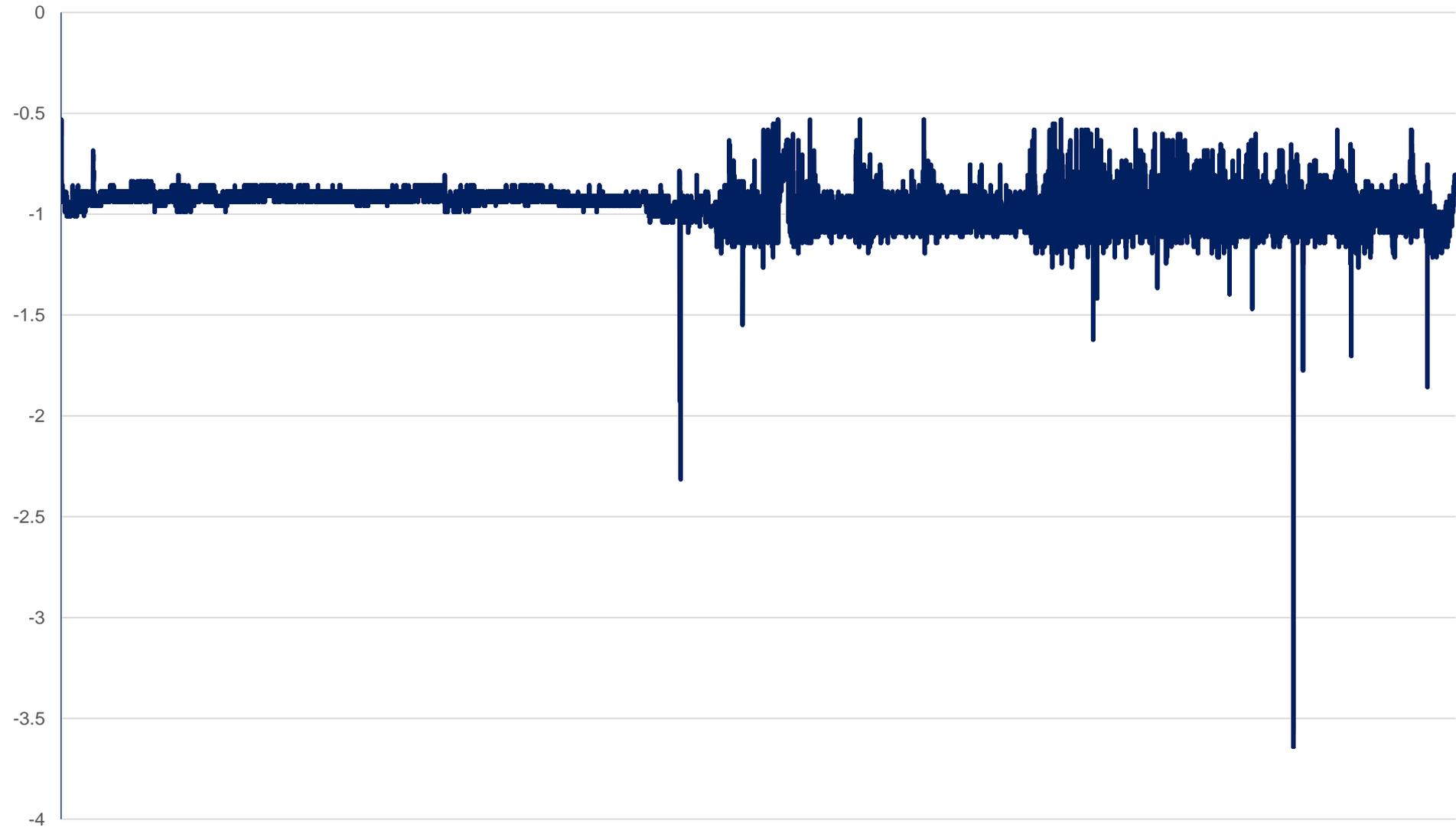
H33052 (♂): 23-26 January 2014 (08:51:44 to 20:10:47), 51 dives, 70 sec. max.



H28046 (♂): 24 January 2014 (13:46:10 to 13:47:05), 55 sec., 13.8 m



H33264 (♂): 22-23 January 2014 (21:14:07 to 20:52:12), 1114 dives, 3.6 m max.



OTHER 2013/14 HAPPENS:

- Presentation to Sanford's Ltd (December 2013)
- Fishers visit (December 2013)
- Okiwi School visit (February 2014)
- Conservation Week Winners visit (February 2014)
- Banding chicks at Glenfern Sanctuary (April 2014)



Acknowledgements:

- The 2013/14 research has been jointly funded by WMIL, DOC (GBI), DOC (CSP), Southern Seabird Solutions Trust, Auckland Council and Auckland University.
- Research since 1995 has been funded by Fishing Industry (via Conservation Services Levies through the Conservation Services Programme), Crown Conservation Funding from the Department of Conservation, anonymous philanthropists and privately.
- Special thanks to all present and past staff at the DOC Great Barrier Area Office.
- 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.
- **Annual reports are published by DOC and are available from www.doc.govt.nz**





Any questions?