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Merthyr Mawr Dune Rejuvenation Works Topographic Survey Report

Kenneth Pye & Simon J. Blott

Kenneth Pye Associates Ltd

Report No: 96

Date: March 2014



About Natural Resources Wales

Natural Resources Wales is the organisation responsible for the work carried out by the three former organisations, the Countryside Council for Wales, Environment Agency Wales and Forestry Commission Wales. It is also responsible for some functions previously undertaken by Welsh Government.

Our purpose is to ensure that the natural resources of Wales are sustainably maintained, used and enhanced, now and in the future.

We work for the communities of Wales to protect people and their homes as much as possible from environmental incidents like flooding and pollution. We provide opportunities for people to learn, use and benefit from Wales' natural resources.

We work to support Wales' economy by enabling the sustainable use of natural resources to support jobs and enterprise. We help businesses and developers to understand and consider environmental limits when they make important decisions.

We work to maintain and improve the quality of the environment for everyone and we work towards making the environment and our natural resources more resilient to climate change and other pressures.

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Evidence at Natural Resources Wales

Natural Resources Wales is an evidence based organisation. We seek to ensure that our strategy, decisions, operations and advice to Welsh Government and others are underpinned by sound and quality-assured evidence. We recognise that it is critically important to have a good understanding of our changing environment.

We will realise this vision by:

- Maintaining and developing the technical specialist skills of our staff;
- Securing our data and information;
- Having a well resourced proactive programme of evidence work;
- Continuing to review and add to our evidence to ensure it is fit for the challenges facing us; and
- Communicating our evidence in an open and transparent way.

This Evidence Report series serves as a record of work carried out or commissioned by Natural Resources Wales. It also helps us to share and promote use of our evidence by others and develop future collaborations. However, the views and recommendations presented in this report are not necessarily those of NRW and should, therefore, not be attributed to NRW.

Merthyr Mawr Dune Rejuvenation Works: Topographic Survey, March 2014

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Contents

About Natural Resources Wales..... ii

Evidence at Natural Resources Wales iii

Contents..... v

1. Job Summary 1

2. Error Checking..... 2

3. Monitoring Results..... 3

4. Field Photographs 16

Data Archive Appendix..... 25

1. Job Summary

KPAL Job No:	060514
Report Date:	06/05/2014
Client:	Natural Resources Wales
Client Job Title:	Merthyr Mawr Dune Rejuvenation Works
Survey conducted:	11 th March 2014
Instruments used:	Leica Viva NetRover controller and GS08 SmartAntenna mounted on GLS30 pole (2 m) Leica RX900 controller and ATX900 antenna mounted on GLS30 pole (2 m) Leica GX1230 RTK base station mounted on GST20-9 tripod Leica RX1210T Field Controller Pacific Crest ADL Vantage radio transceiver (430-470 MHz)
No. of data points:	937
RTK Control Station:	Wooden post surveyed-in using Leica Smartnet GPRS (BM1). Note that the original wooden post (BM1) had been lost/removed since installation in May 2013: Easting: 286181.439 m Northing: 176305.793 m Height: 4.692 m OD
RTK Backup Station:	Wooden signpost (BM3) 56 m NNW of Control Station above. Note that second backup station (wooden post BM2) had been lost/removed since installation in May 2013.
Fixed profiles:	Eight existing profile lines (1-8, previously surveyed on 14 May 2013) were resurveyed and compared with data surveyed from 2008 LiDAR and 14 May 2013 ground survey. Four new profile lines (9-12) were surveyed and compared to positions interpolated from the DEM for 14 May 2013 and 2008 LiDAR. Six additional profile lines (13-18) were surveyed across the newly activated area which was not surveyed in 2013 – these data were compared with the 2008 LiDAR. Chainages along profile lines were interpolated at positions on a straight-line between the start and finish positions from the first survey.
Summary report	
Compiled by:	Simon J. Blott BSc MRes PhD FGS
Checked by:	Kenneth Pye ScD PhD MA CGeol FGS

2. Error Checking

Table 1. Average quality control for all 937 data points

	1-D (height) quality control	2-D (position) quality control
Average	9.0 mm	5.6 mm
StDev	2.5 mm	1.5 mm

Table 2. Measured location of Benchmark 3 (signpost)

	Easting	Northing	Height
Surveyed with Smartnet corrections (14 May 2013)	286154.133	176354.702	4.698
Surveyed with Smartnet corrections (11 March 2014)	286154.204	176354.740	4.727
Difference between May 2013 and March 2014	+71 mm	+38 mm	+29 mm
Surveyed with base & rover, start of survey Error:	286154.197 -7 mm	176354.792 +52 mm	4.739 +12 mm
Surveyed with base & rover, end of survey Error:	286154.172 -32 mm	176354.820 +80 mm	4.736 +9 mm

3. Monitoring Results

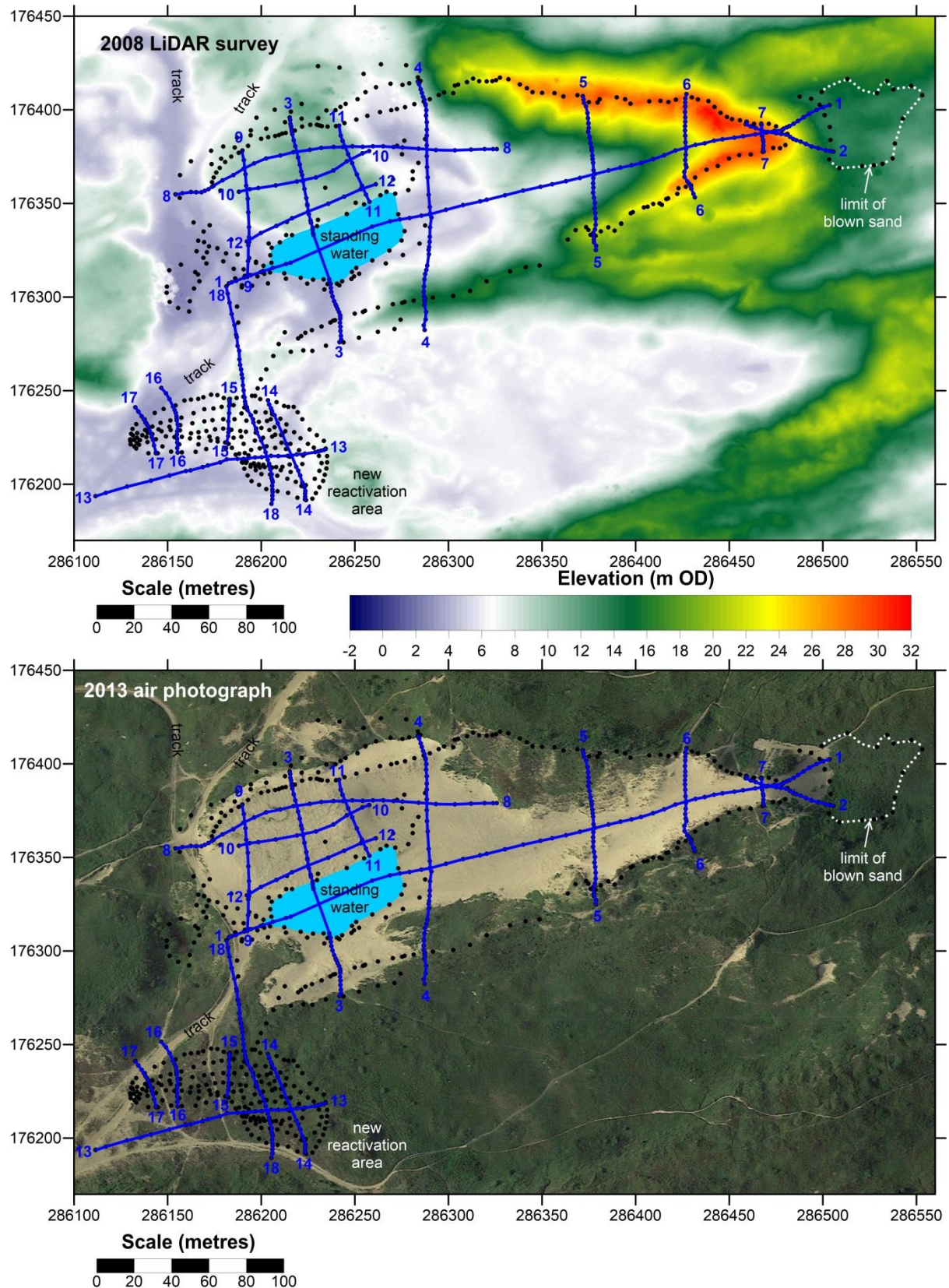


Figure 1. Locations of data points (black dots) and cross-profiles (blue lines), overlaid on 2008 LiDAR and 2013 air photographs.

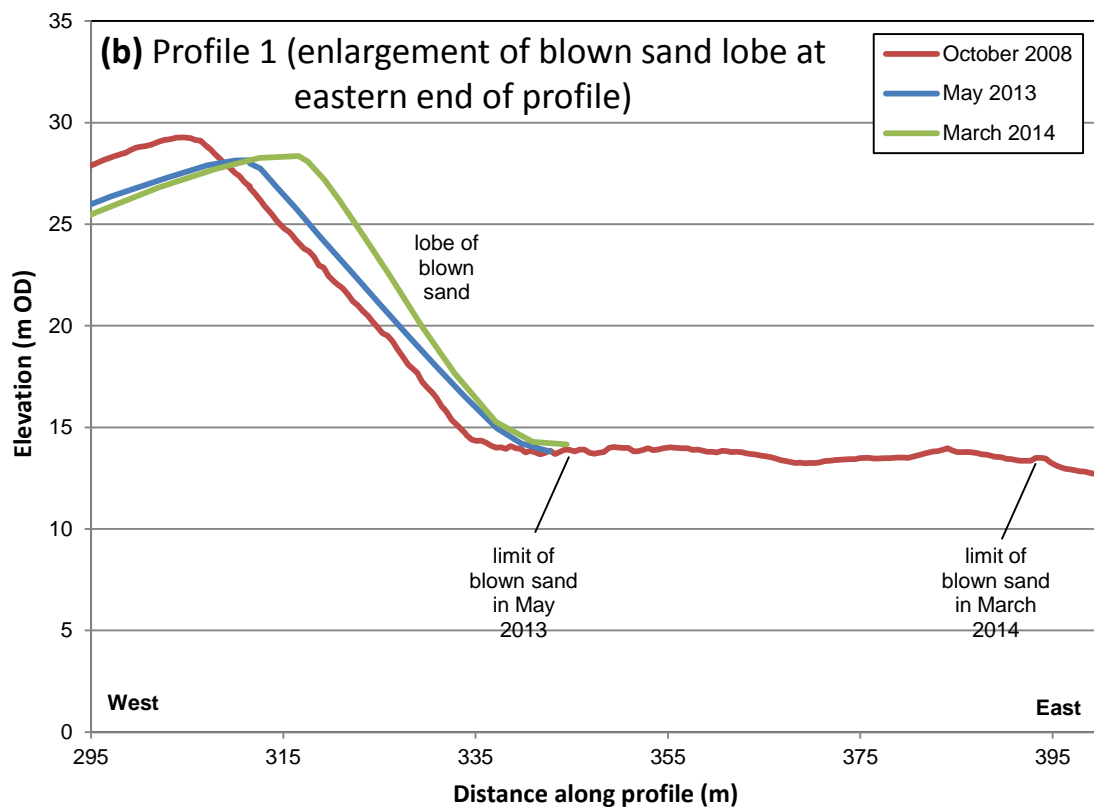
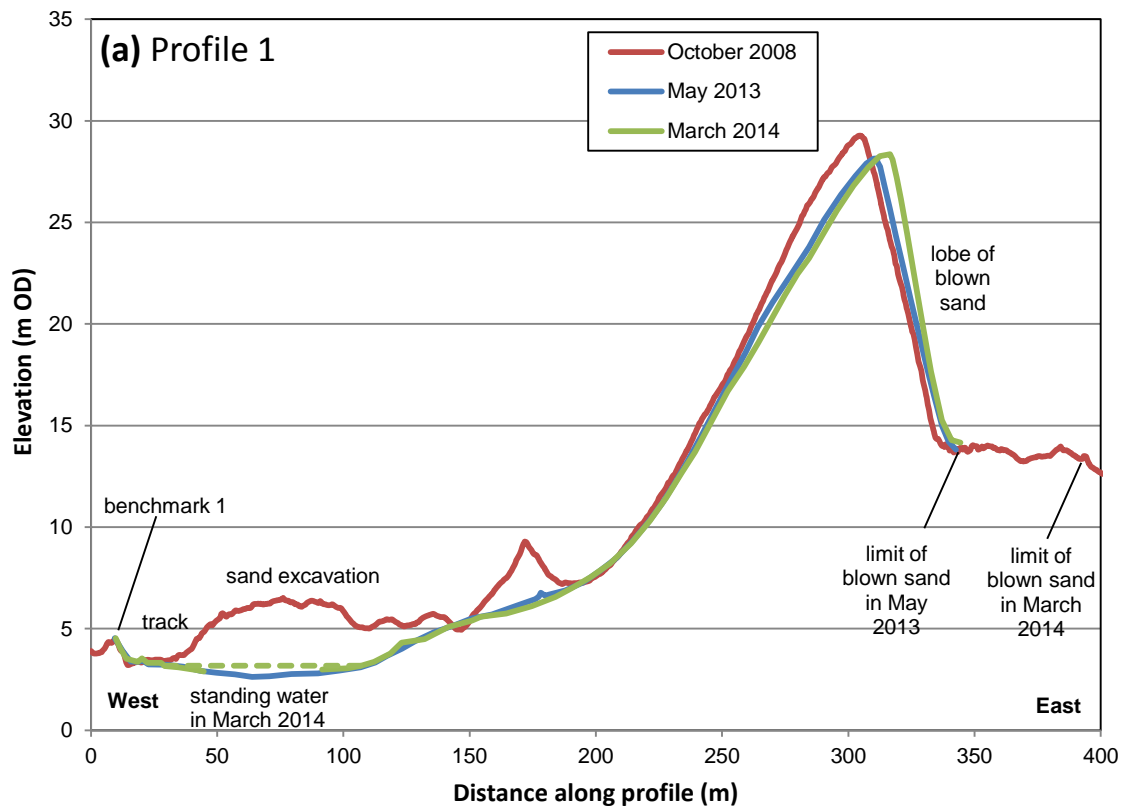


Figure 2. Cross-profiles, at the locations indicated in Figure 1, measured from the ground surveys on 14 May 2013 and 11 March 2014, and LiDAR aerial survey in October 2008. Note that the horizontal and linear scales vary considerably.

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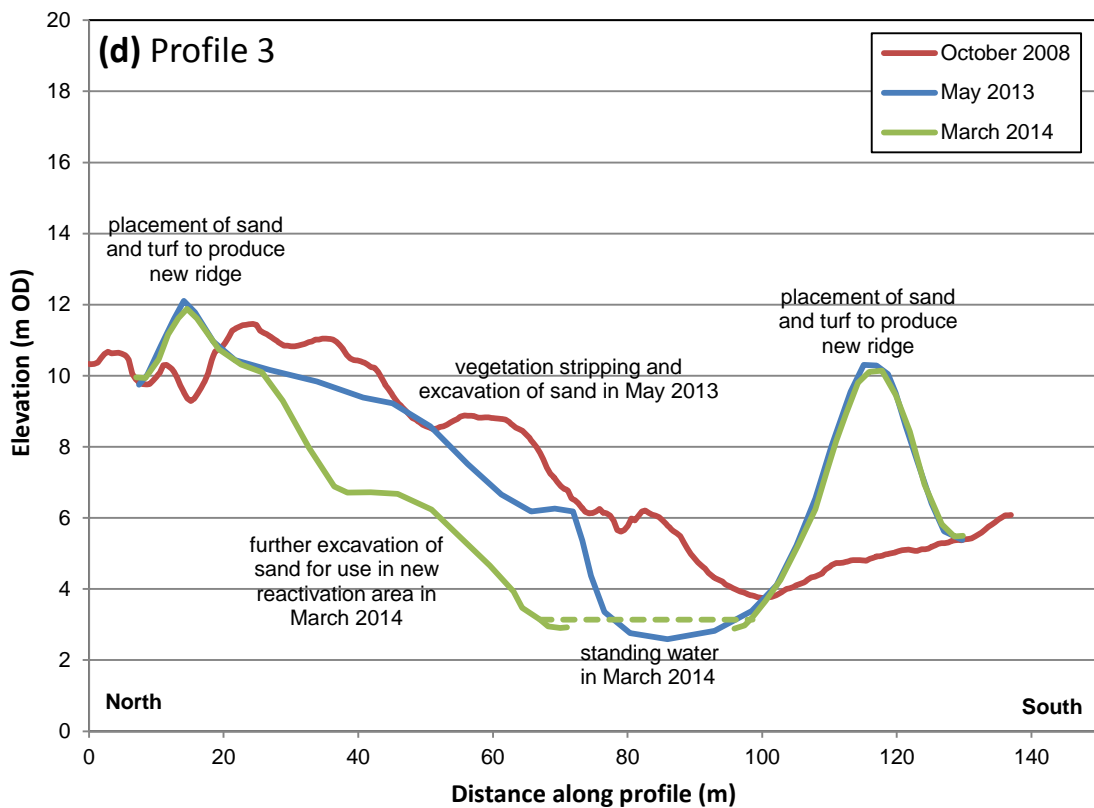
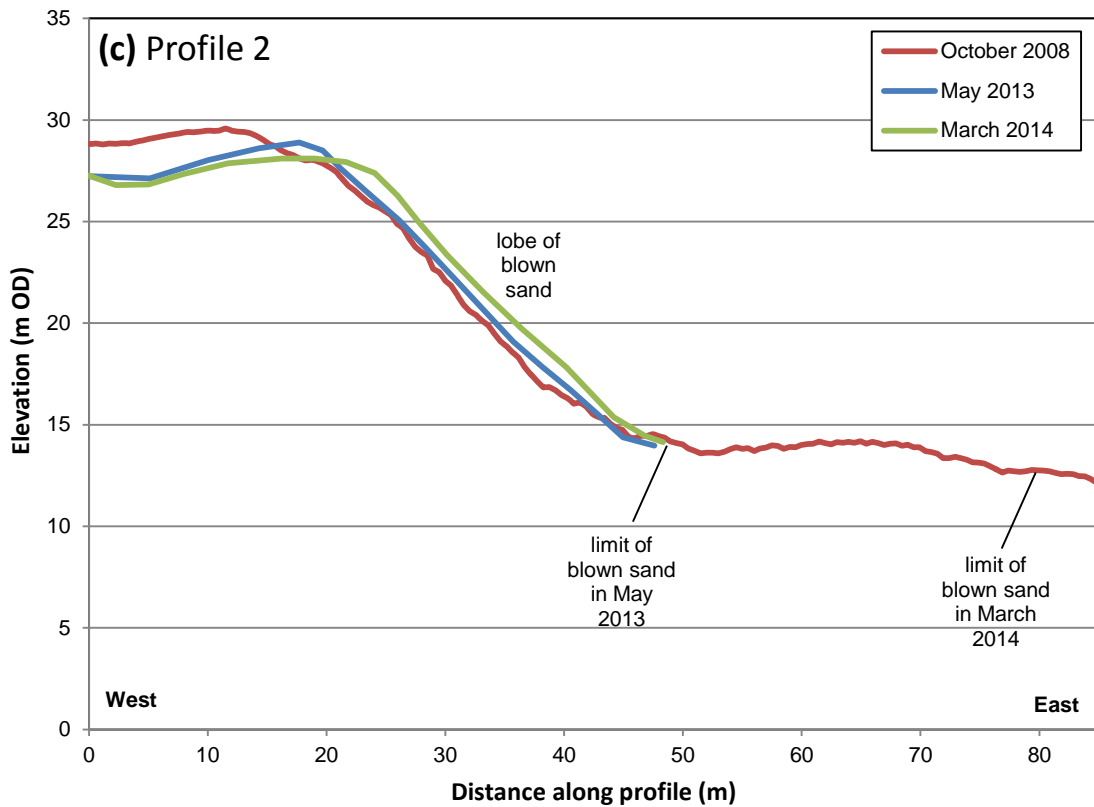


Figure 2. continued.

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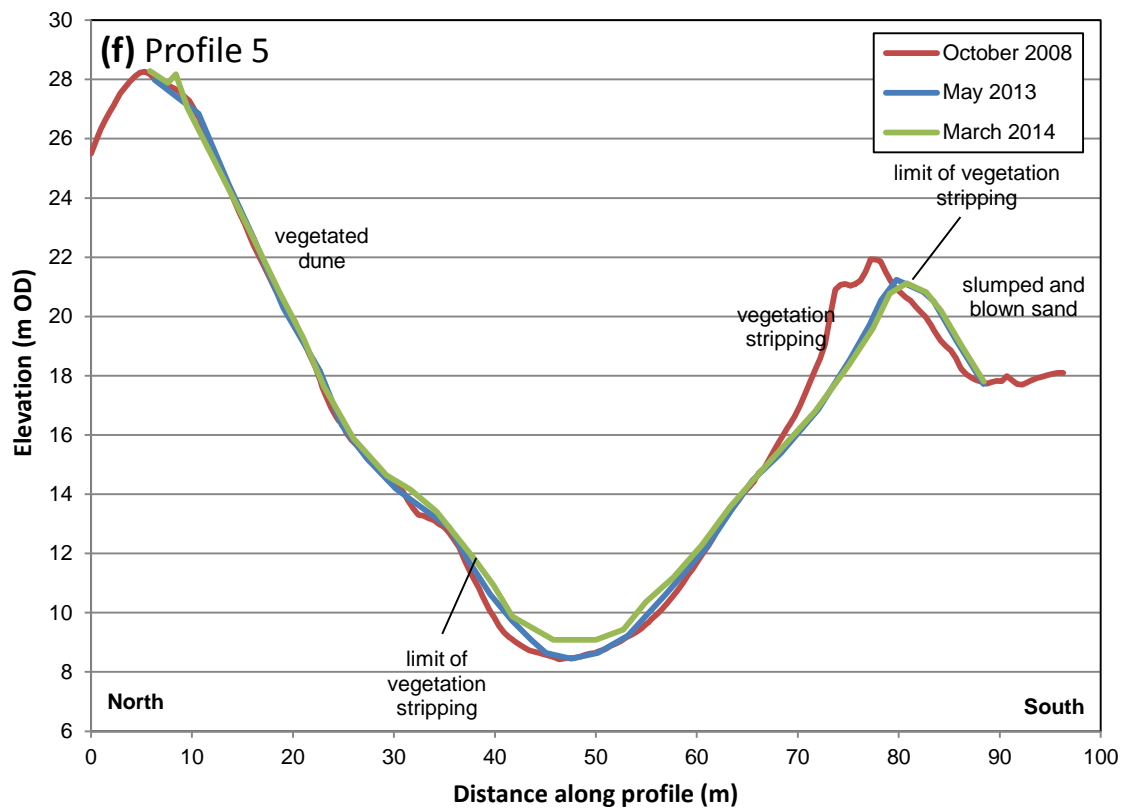
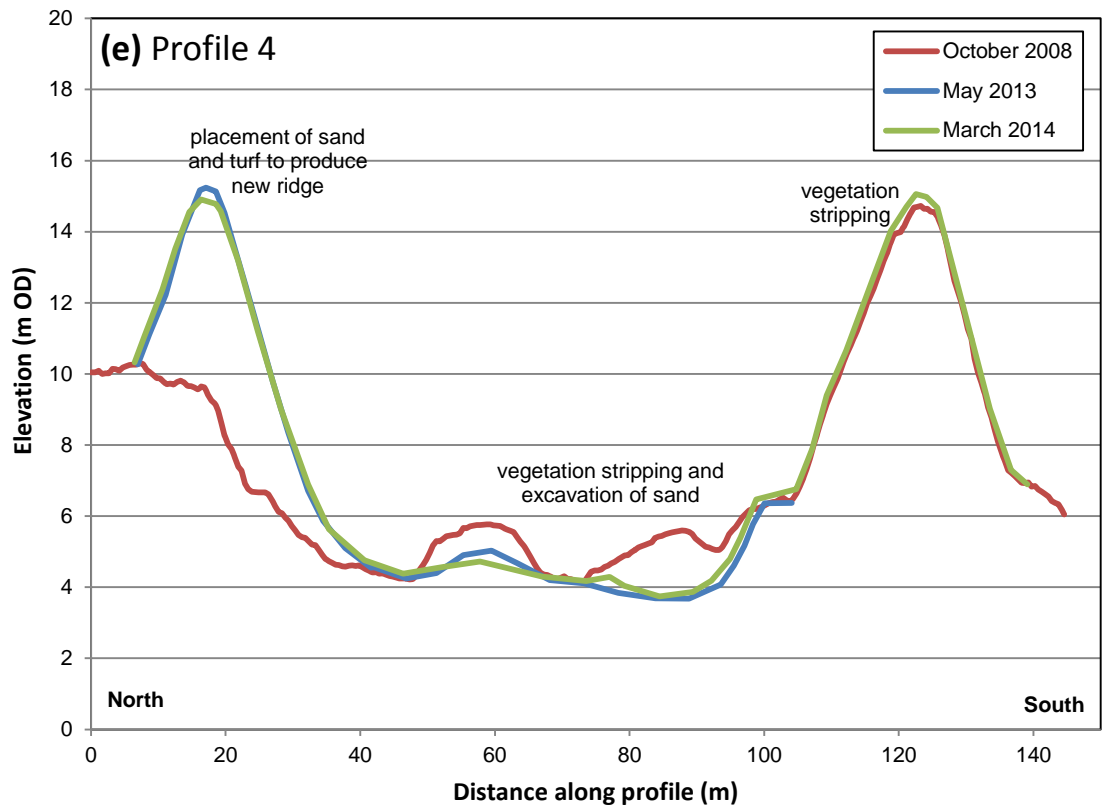


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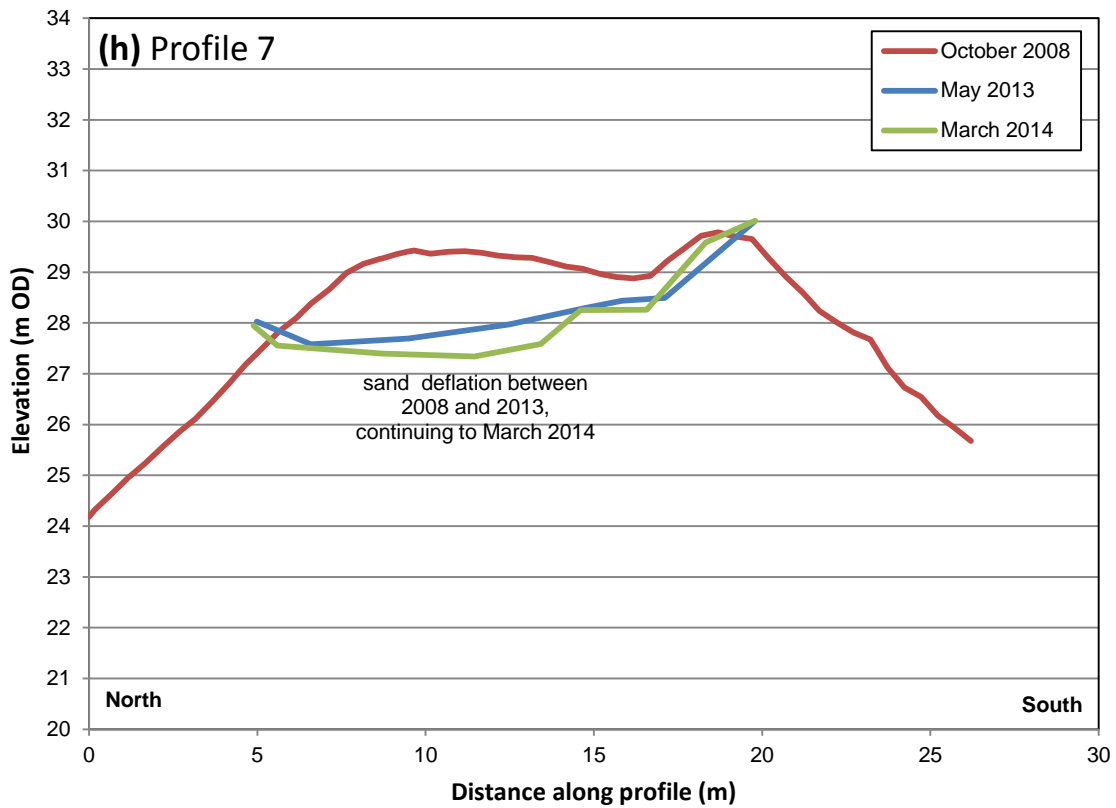
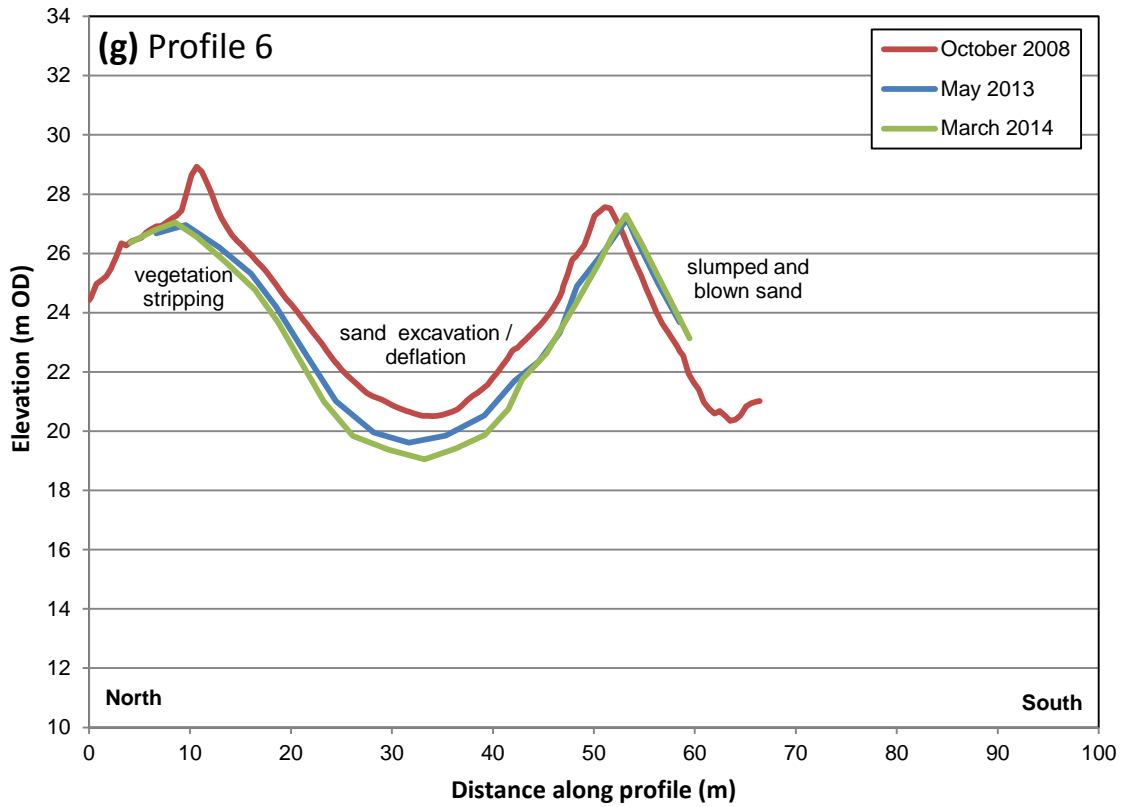


Figure 2. continued.

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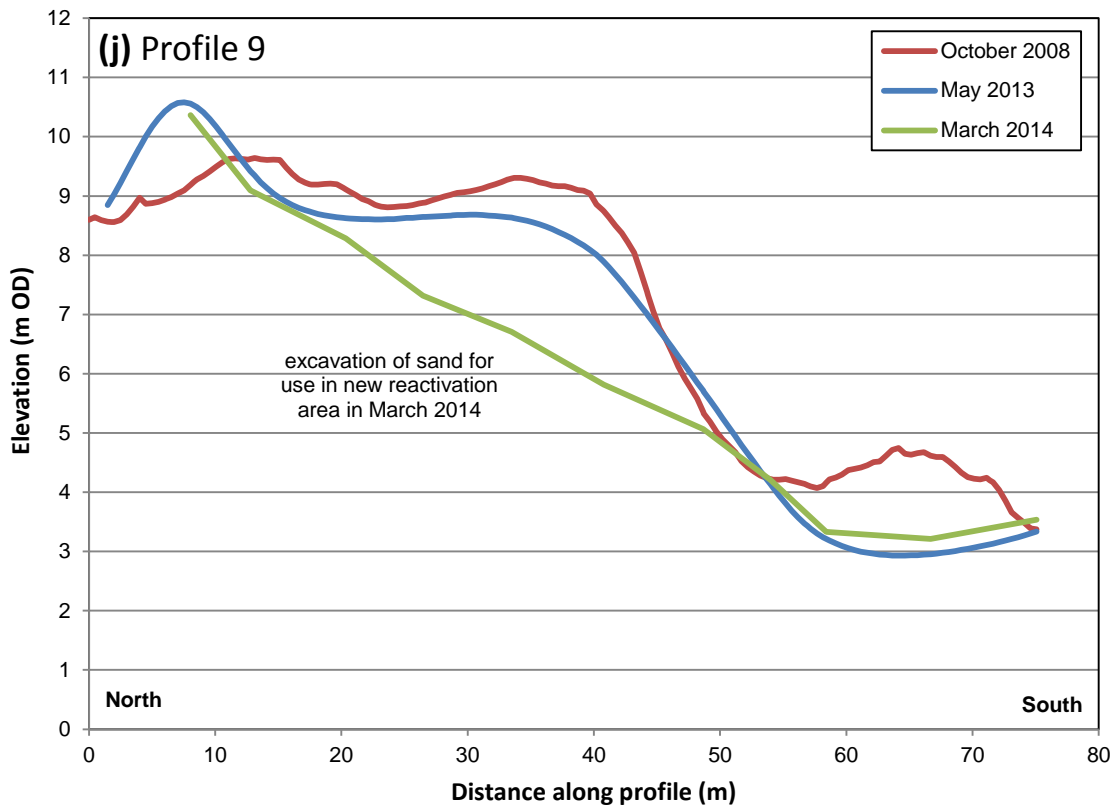
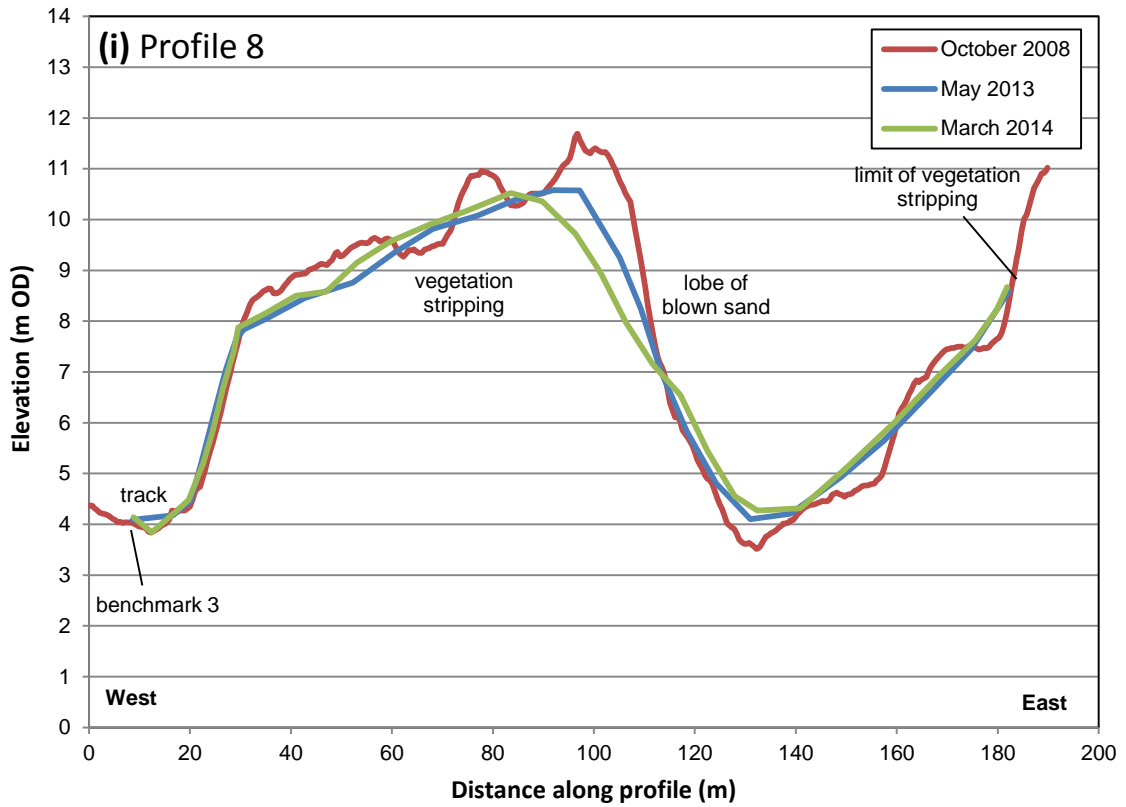


Figure 2. continued.

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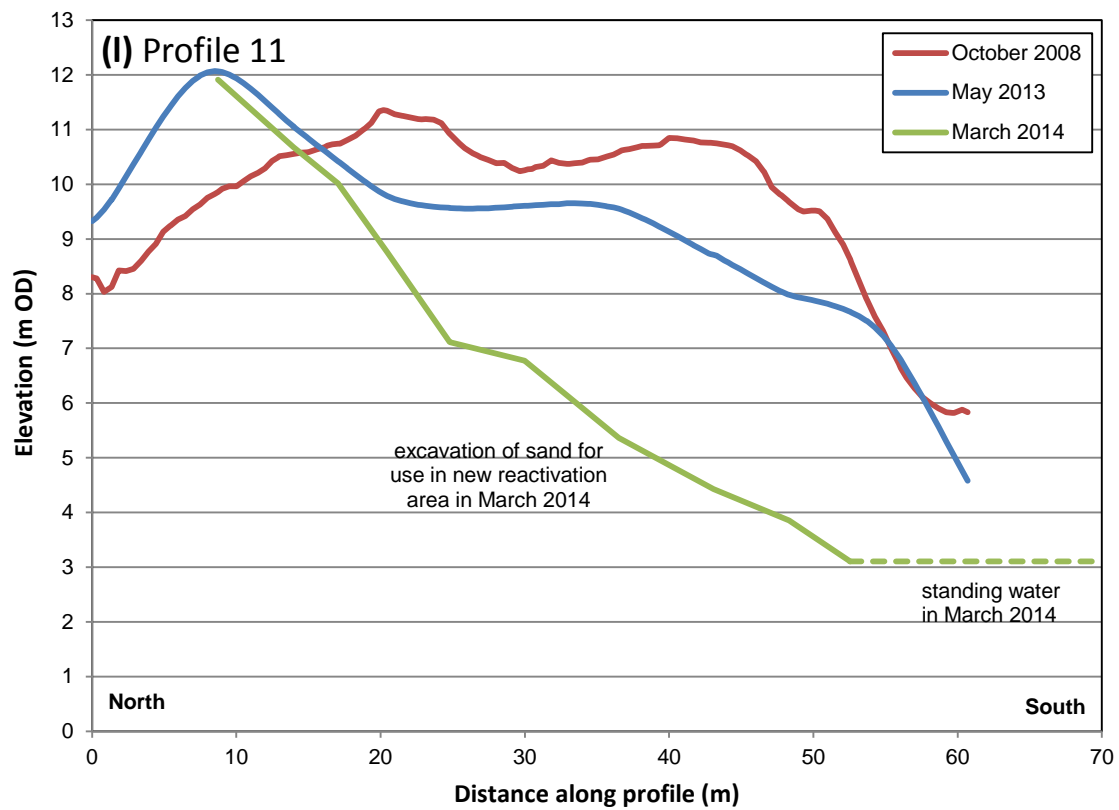
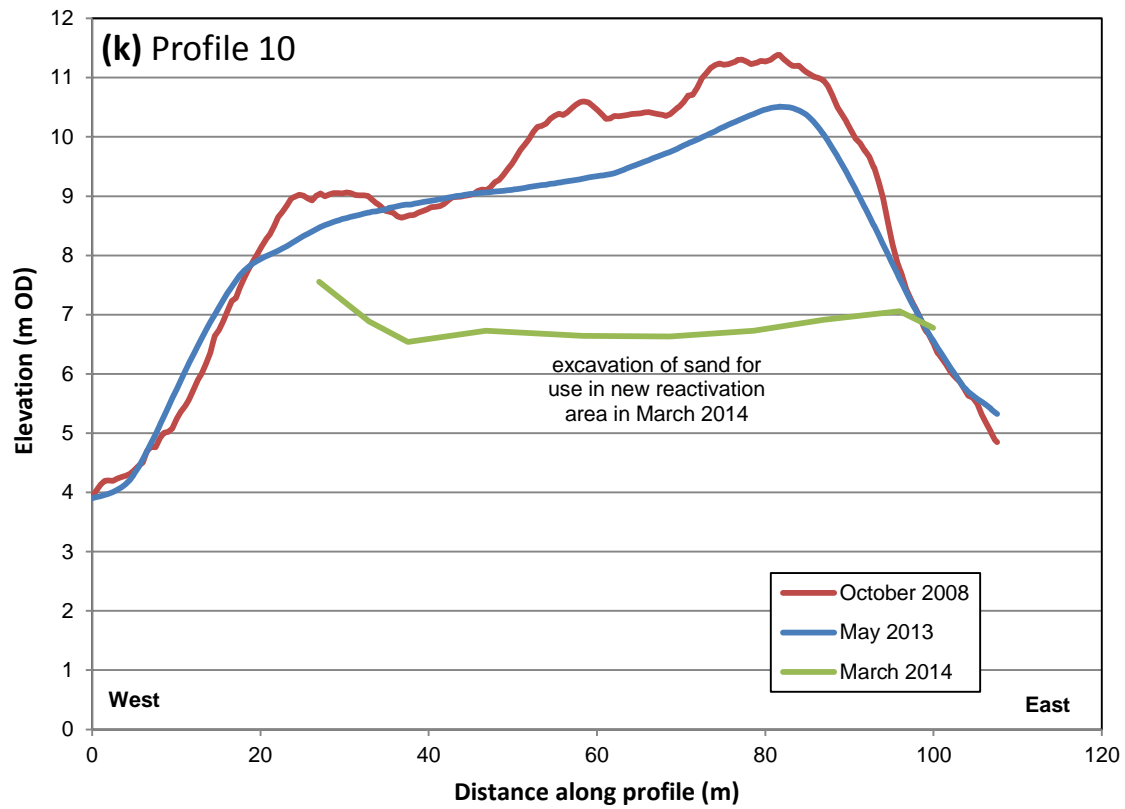


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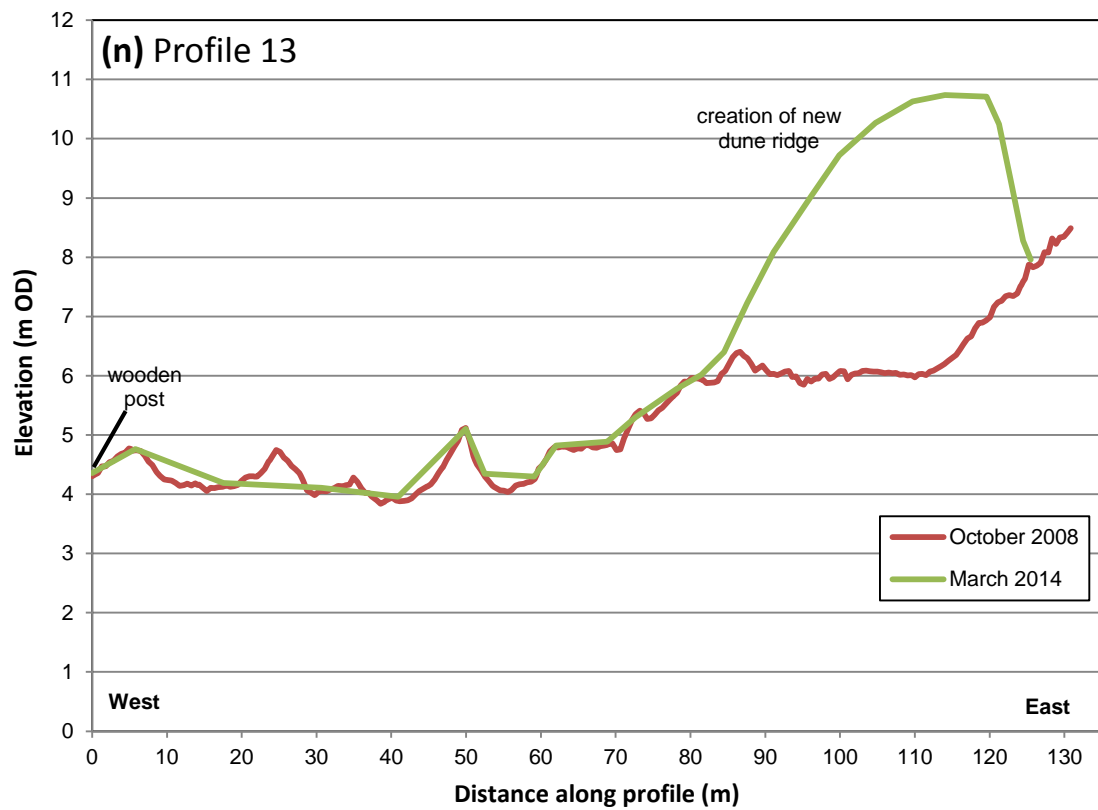
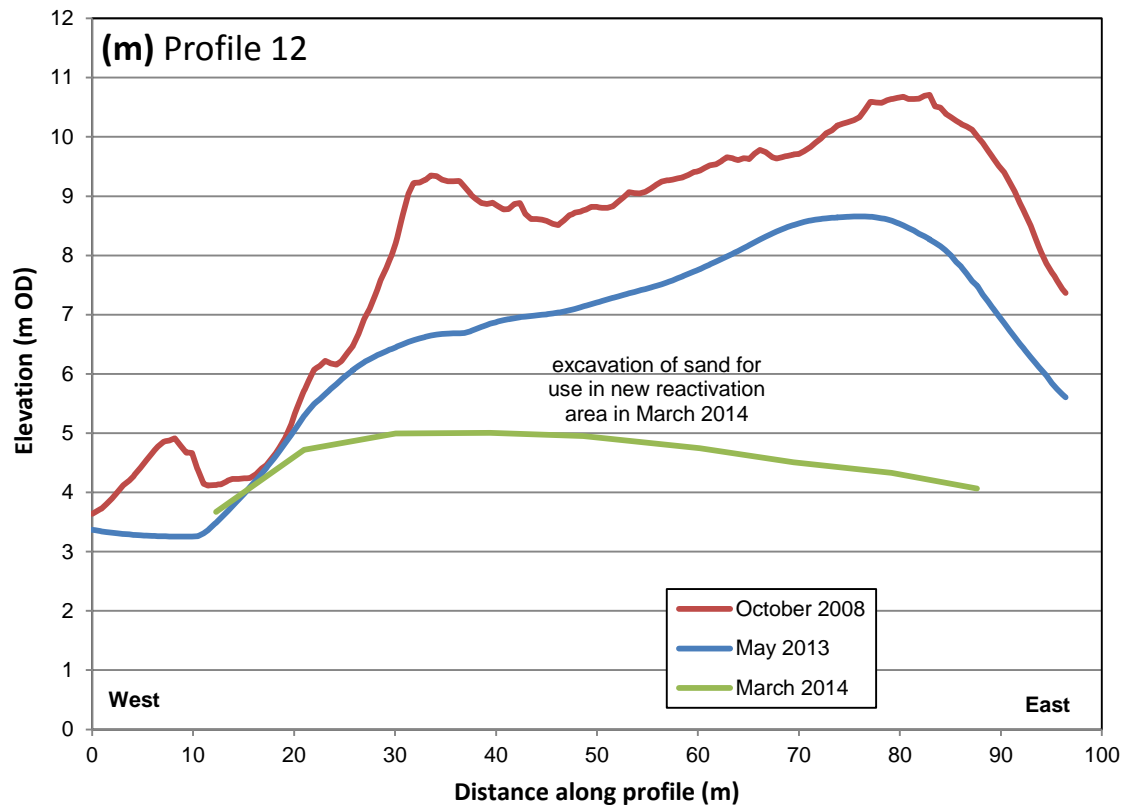


Figure 2. continued.

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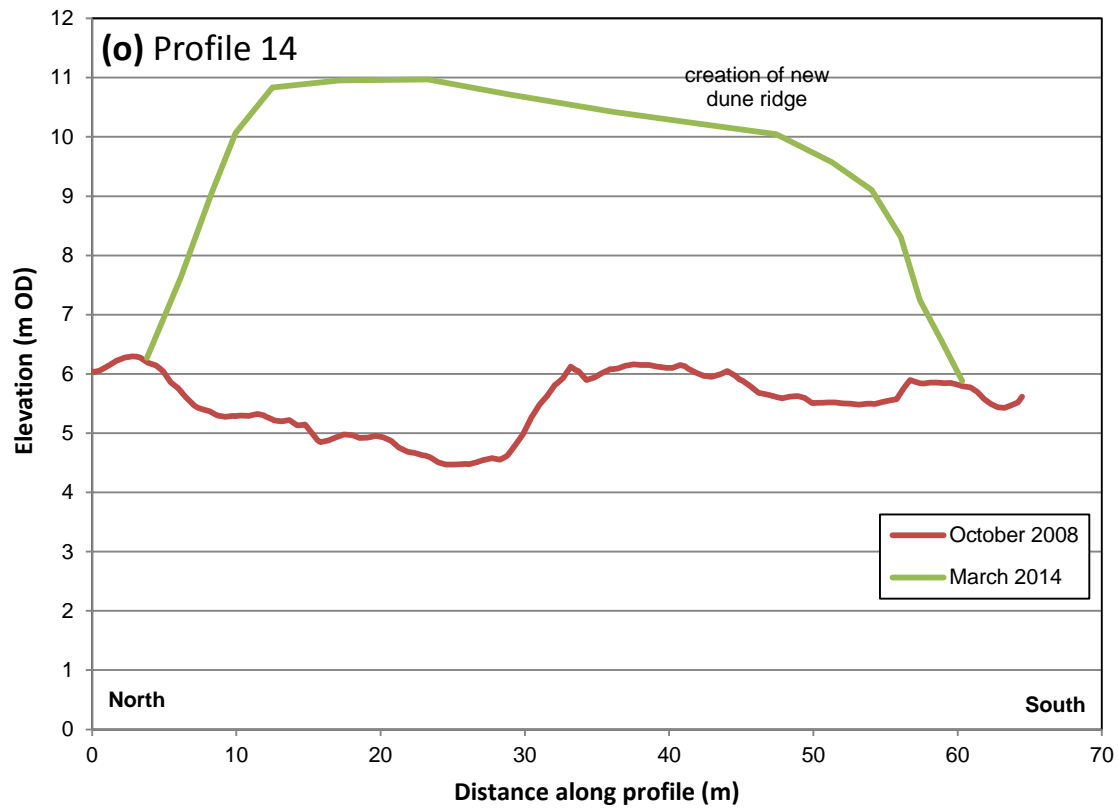


Figure 2. continued.

Merthyr Mawr Dune Rejuvenation Works: Topographic Survey, March 2014

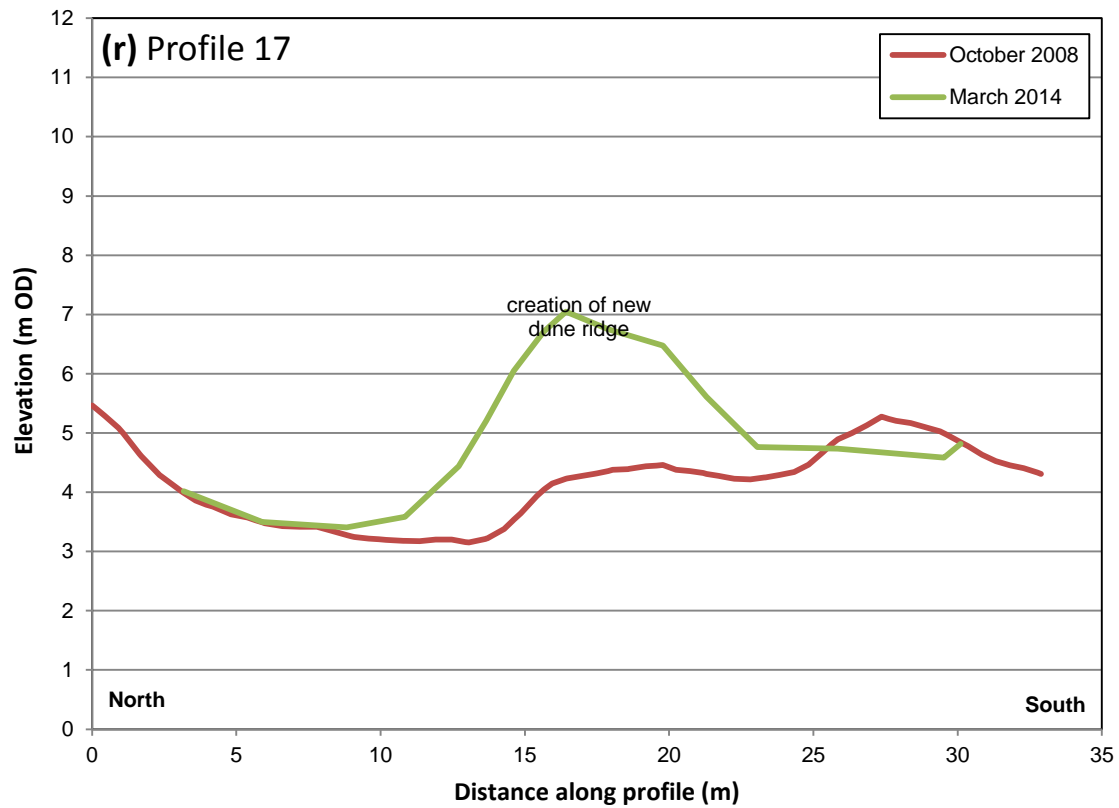
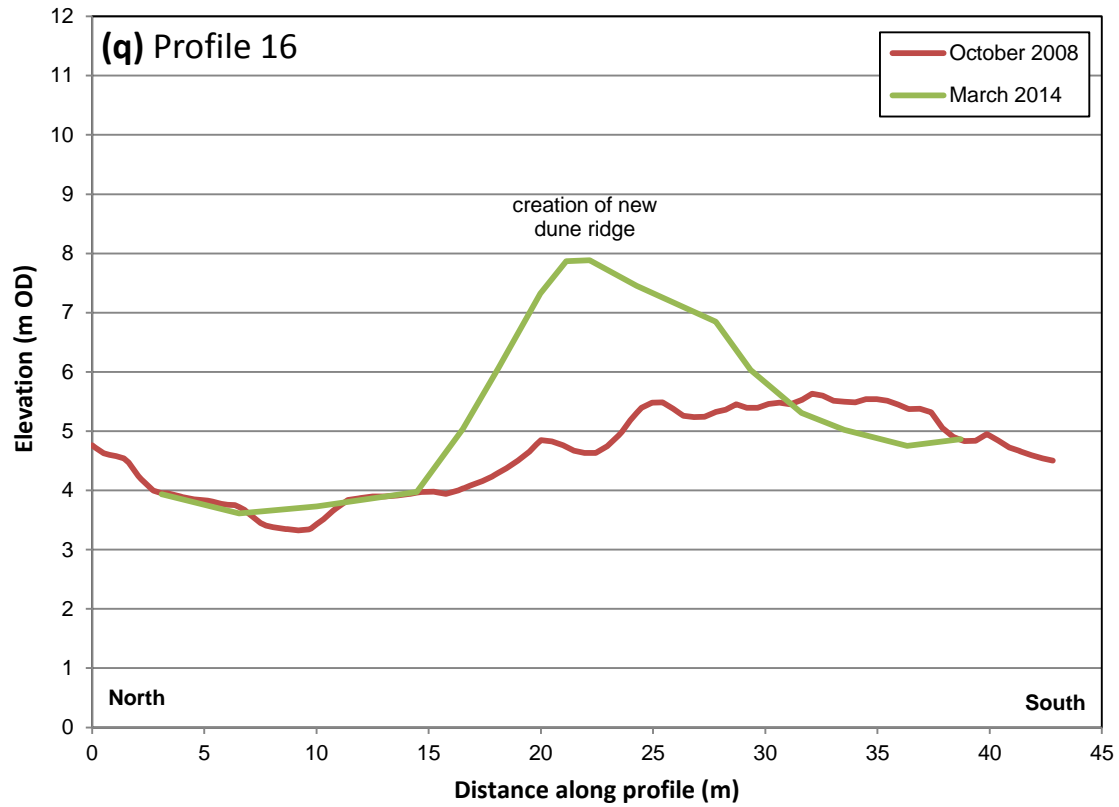


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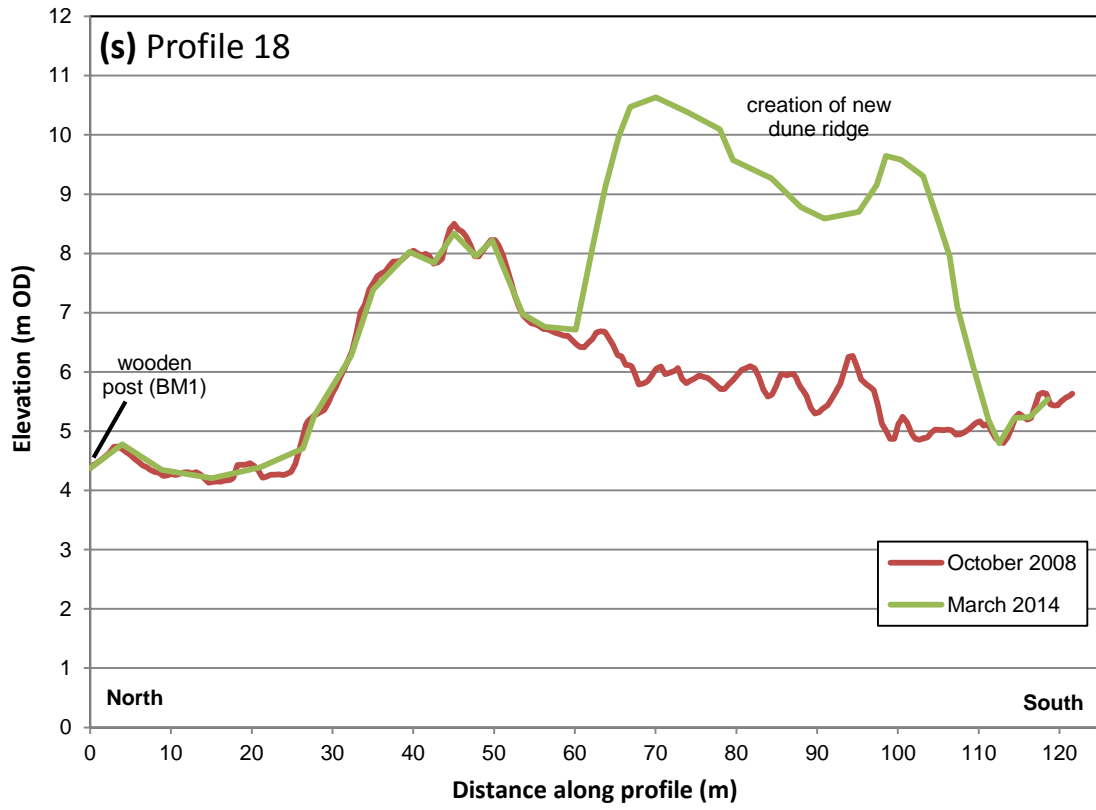


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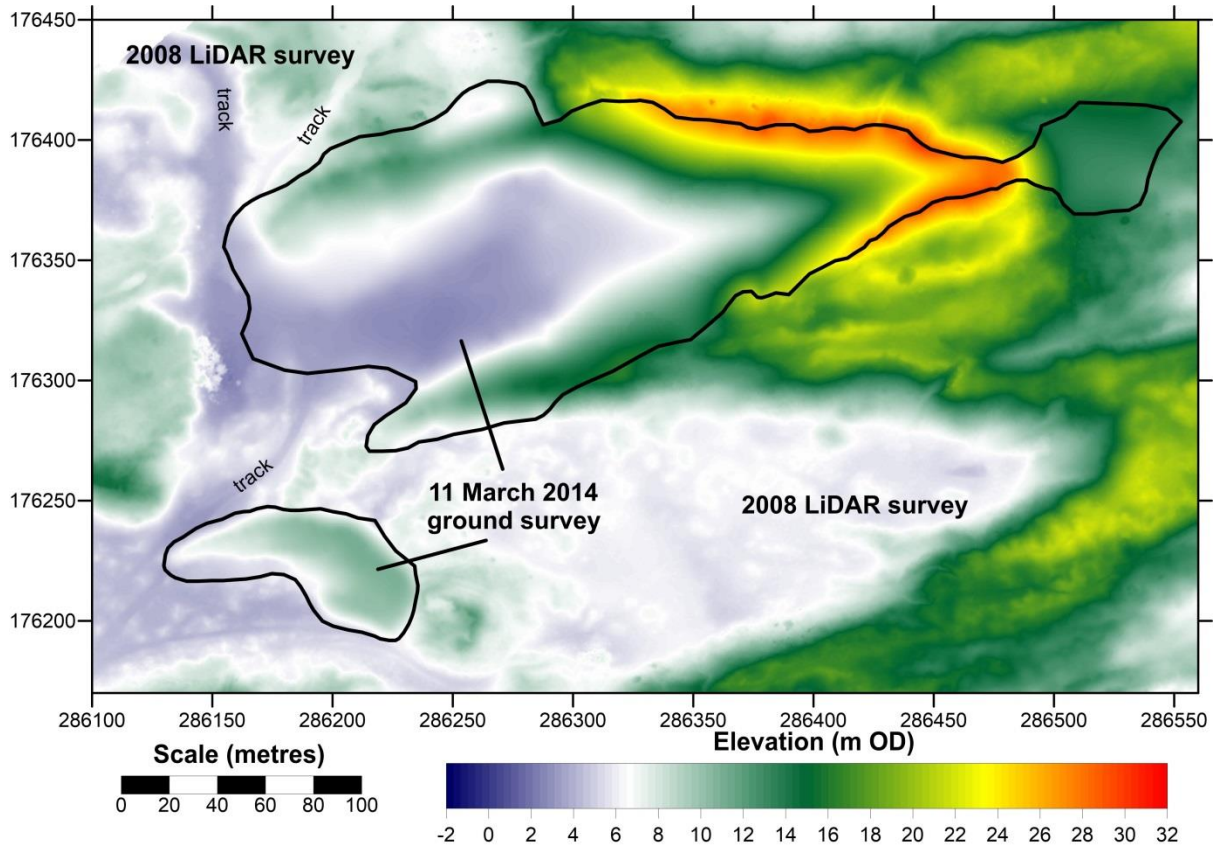


Figure 3. Digital elevation model of the restoration works site surveyed on 11 March 2014, with the black line indicating the limit of the survey. The areas outside the black line are taken from the LiDAR survey flown in October 2008.

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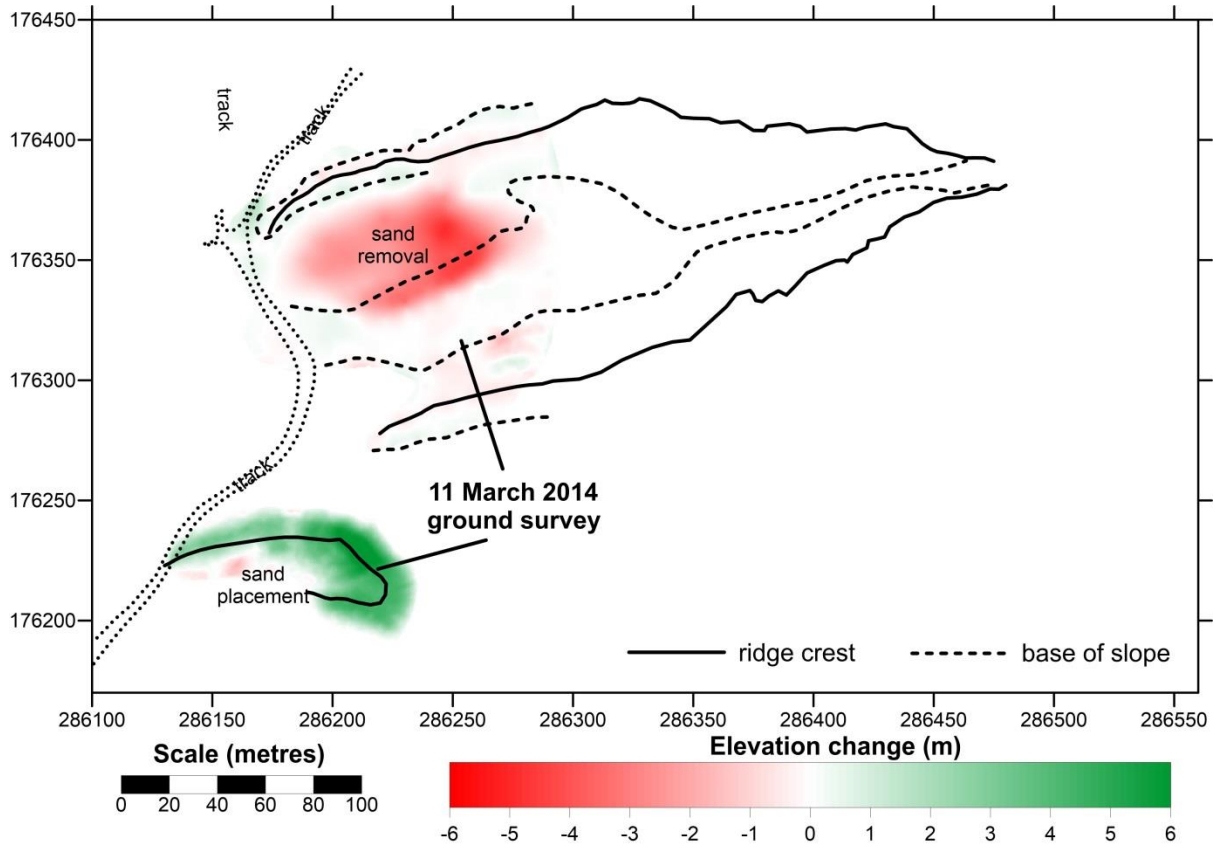


Figure 4. Change in elevation between the ground surveys on 13 May 2013 and 11 March 2014.

4. Field Photographs

Taken 11 March 2014

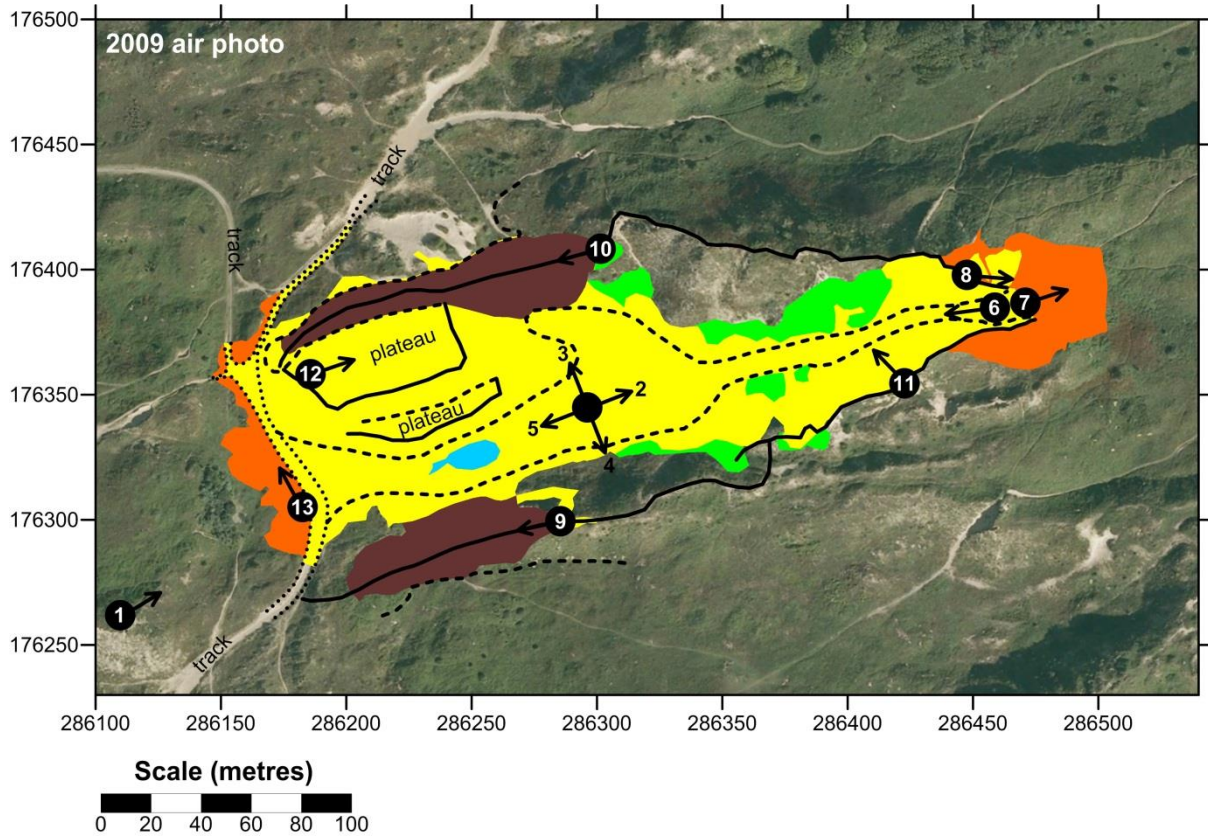


Figure 7. Locations of field photographs. Numbers indicate photograph numbers, while arrows indicate the direction of the photograph

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Photograph 1. Central axis of the dune, looking east



Photograph 2. View looking west from the upwind end of the deflation corridor



Photograph 3. The western arm of the dune, looking eastward



Photograph 4. The western arm of the dune, looking westward



Photograph 5. The western arm of the dune, looking southeast towards the crest



Photograph 6. The western side of the dune 'nose', looking southeast



Photograph 7. The crest of the active slip face at the dune 'nose', with surface covering of fine gravel megaripples



Photograph 8. View eastwards over the Ogmore valley from the south side of the dune crest

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Photograph 9. View westwards from the dune crest along the axis of the dune



Photograph 10. View west along the western arm of the dune; second phase works visible in the left hand distance



Photograph 11. The eastern arm of the dune, looking westwards; gravel surface lag evident



Photograph 12. View towards the south from the seaward end of the eastern arm; Phase II works in top right



Photograph 13. View north-eastwards across the Phase II works



Photograph 14. The slip face of the PHade II works, looking north



Photograph 15. The eastern side of the Phase II works, showing slip faces

Data Archive Appendix

Data outputs associated with this project are archived at 'Newborough Warren Dune Restoration; project 419, media 1491' on server-based storage at Natural Resources Wales.

The data archive contains:

- [A] The final report in Microsoft Word and Adobe PDF formats.
- [B] An Excel file named (Merthyr Mawr Survey 11-03-2014.xls) of data points (x,y,z)

Metadata for this project is publicly accessible through Natural Resources Wales' Library Catalogue <http://libcat.naturalresources.wales/webview/> (English Version) and <http://libcat.naturalresources.wales/cnc/> (Welsh Version) by searching 'Dataset Titles'. The metadata is held as record no [115843]

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