THE QUATERNARY OF
THE VALE OF PICKERING
Field Guide

Edited by
Paul Lincoln, Laura Eddey, Ian Matthews,
Adrian Palmer and Mark Bateman

2017
The Quaternary of the Vale of Pickering
Field Guide

Edited by
Paul Lincoln, Laura Eddey, Ian Matthews, Adrian Palmer and Mark Bateman

2017

Geovisionary (Lidar) image of the Vale of Pickering looking toward the east.
NextMap Britain Elevation data from Intermap Technologies. DIGMAP GB _NERC. From Powell et al., (2016).
Acknowledgements:

In preparing and compiling this Field Guide we owe particular thanks to all of the contributors to the guide and also for cartographic assistance to Jenny Kynaston (Royal Holloway, University of London), who drafted or re-drafted many of the figures and whose advice in other aspects of the production of the guide has been most useful. Likewise we would like to thank Jonathan Lee (Publications Secretary, QRA), Clare Boston (Meetings Officer, QRA) and Calvin Adlard of Adlard Print & Reprographics Ltd., for useful technical advice and assistance in the production of the Field Guide. Furthermore, we would like to thank Elizabeth Courtney and Tracey Whyte who have been incredibly helpful in organising accommodation for the field trip.

We and the other contributing authors also wish to acknowledge the permissions to use NEXTMAP imagery from Intermap Technologies and LiDAR data through the Environment Agency. Under nearly all circumstances the permission is granted through our educational and research work but the data is of incredible use to earth scientists and archaeologists alike. Laura Eddey and Mark Bateman would like to thank the following people for their support in their research in the Vale of Pickering area: Rob Ashurst, David Birdsall, Sarah Bradley, Jeremy Ely, Cathy Delaney, Alicia Medialeia. Also of great assistance in the field were the BGS DANDO team: Carl Horabin, Dave Morgan and Steve Thorpe, and further thanks goes to Jonathan Lee, Stephen Livingstone, the Marton family at Rise Farm, Paul Morley and family at Ings Farm, Polly and Chris Williams: Finally, the Cook & Son sand quarry at Heslerton are thanked for access to the site.

Andy Josephs, and the Oxford Archaeology team are thanked for their help, particularly in the early stages of investigations at Wykeham Quarry, and also members of Hanson Aggregates including Ben Ayres, Stewart Laws, Dan Senkans and Tim Harvey who have facilitated working at Wykeham Quarry making the work an enjoyable and rewarding experience. Jacob Bendle, Anna Bird, Ben Hanger, Sophie Jarosz, David Lincoln, Jenni Sherriff, and Rhys Timms, are thanked for their help and enthusiasm in the field. Jonathan Holmes is thanked for the identification of ostracod remains from the Seamer Basin, and thanks are also extended to Robert Pigg and Robert Sword for granting access to the Wykeham sites.

For the access to land and financial support to carry out the work in Palaeolake Flixton area, we thank the landowner of Star Carr, Stockdales Haulage firm, English Heritage/Historic England, and Natural England for granting permission to excavate. The excavations at Star Carr have been funded by the European Research Council POSTGLACIAL Project 283938; British Academy Grants SG-44333, SG-47081, and SG-50217; English Heritage/Historic England Grants 5536, 6064, 6793, 6796 and the radiocarbon dating of the site; Natural Environment Research Council Grant NE/I015191/1; and the Vale of Pickering Research Trust. We would like to thank Scarborough Council and Tim Burkinshaw (Cayton and Flixton Wetland and Carrs Project), Margaret Nieke and Jackie Roberts of Natural England for granting permission to core in this field.
List of Contributors:

Ashley Abrook  Centre for Quaternary Research, Department of Geography, Royal Holloway, University of London, Egham, Surrey TW20 0EX, United Kingdom
Mark Bateman  Department of Geography, University of Sheffield, Winter St, Sheffield S10 2TN, UK
Simon Blockley  Centre for Quaternary Research, Department of Geography, Royal Holloway, University of London, Egham, Surrey TW20 0EX, United Kingdom
Ian Candy  Centre for Quaternary Research, Department of Geography, Royal Holloway, University of London, Egham, Surrey TW20 0EX, United Kingdom
Chantal Conneller  Archaeology (SAHC), University of Manchester, Mansfield Cooper Building, Oxford Road, Manchester M13 9PL, United Kingdom
Christopher Darvill  University of Northern British Columbia, 3333 University Way, Prince George BC Canada V2N 4Z9
Laura Eddey  Department of Geography, University of Sheffield, Winter St, Sheffield S10 2TN, UK
Laura Deeprose  Lancaster Environment Centre, Lancaster University, Lancaster, LA1 4YQ, United Kingdom
David Evans  Durham University, Department of Geography, Science Laboratories, South Road, Durham DH1 3LE, United Kingdom
Nicholas Farley  British Antarctic Survey, High Cross, Madingley Road, Cambridge. CB3 0ET United Kingdom
Rebecca Kearney  School of Geography and the Environment, University of Oxford, South Parks Road, Oxford. OX1 3QY.
Paul Lincoln  Centre for Quaternary Research, Department of Geography, Royal Holloway, University of London, Egham, Surrey TW20 0EX, United Kingdom
Ian Matthews  Centre for Quaternary Research, Department of Geography, Royal Holloway, University of London, Egham, Surrey TW20 0EX, United Kingdom
Nicky Milner  Department of Archaeology, The Kings Manor, University of York, York YO1 7EP, United Kingdom
Rachael Osguthorpe  Department of Geography, University of Sheffield, Winter St, Sheffield S10 2TN, UK
Adrian Palmer  Centre for Quaternary Research, Department of Geography, Royal Holloway, University of London, Egham, Surrey TW20 0EX, United Kingdom
John Powell  British Geological Survey, Keyworth, Nottingham. NG12 5GG.
Barry Taylor  
Department of Archaeology, University of Chester, Parkgate Road, Chester CH1 4BJ, United Kingdom

<table>
<thead>
<tr>
<th>Section</th>
<th>List of Contents</th>
<th>Page No:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acknowledgements</td>
<td>iii</td>
</tr>
<tr>
<td></td>
<td>List of Contributors</td>
<td>iv</td>
</tr>
<tr>
<td></td>
<td>List of Contents</td>
<td>v</td>
</tr>
<tr>
<td>1.</td>
<td>Introduction – Paul Lincoln, Laura Eddey and Adrian Palmer</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Physiography of the Vale of Pickering – Laura Eddey</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>Pre-Quaternary Geology of the Vale of Pickering – John Powell</td>
<td>2</td>
</tr>
<tr>
<td>4.</td>
<td>Pre-Devensian Quaternary history of the Vale of Pickering – John Powell</td>
<td>7</td>
</tr>
<tr>
<td>5.</td>
<td>The Late Quaternary Glaciation of the Vale of Pickering – Laura Eddey, Paul Lincoln, Adrian Palmer and Mark Bateman</td>
<td>12</td>
</tr>
<tr>
<td>6.</td>
<td>The Last Glacial Interglacial Transition (16-8 ka BP) in North East England – Ian Matthews, Paul Lincoln, Ashley Abrook and Adrian Palmer</td>
<td>23</td>
</tr>
<tr>
<td>7.</td>
<td>The Flixton area and Star Carr in the context of British Upper Palaeolithic and Early Mesolithic human occupation of Britain – Simon Blockley</td>
<td>32</td>
</tr>
<tr>
<td>8.</td>
<td>Themes to be explored during the Field Meeting – Paul Lincoln, Laura Eddey, Ian Matthews, Adrian Palmer and Mark Bateman</td>
<td>42</td>
</tr>
</tbody>
</table>

**Day One**

9. Staxton Viewpoint – Adrian Palmer | 43 |
10. East Heslerton – Mark Bateman and David Evans | 45 |
11. Kirkham Gorge – Laura Eddey and Paul Lincoln | 53 |
12. Ings Farm, Yedingham – Laura Eddey and Rachael E. Osguthorpe | 60 |

**Day Two**

14. Lithostratigraphy of the Wykeham Quarry area – Paul Lincoln, Ian Matthews, Adrian Palmer and Simon Blockley | 75 |
15. Seamer Basin – Paul Lincoln, Ian Matthews, Adrian Palmer and Simon Blockley | 87 |
16. Wykeham Northern Extension – Paul Lincoln, Ian Matthews, Adrian Palmer and Simon Blockley | 92 |
17. Wykeham Southern Extension – Paul Lincoln, Ian Matthews, Adrian Palmer and Simon Blockley | 103 |
18. Synthesis of the Wykeham palaeoenvironmental records – Paul Lincoln, Ian Matthews, Adrian Palmer and Simon Blockley | 114 |
Day Three

19. The bathymetry and lithostratigraphy of sediments in Palaeolake Flixton, North Yorkshire – Adrian Palmer, Ian Matthews, Ian Candy, Simon Blockley, Alison MacLeod, Christopher Darvill, Nicky Milner, Chantal Conneller, Barry Taylor.

20. Vegetation changes at Palaeolake Flixton during the Late-glacial and early Holocene periods – Ashley Abrook

21. δ¹³C and δ¹⁸O analysis of lacustrine marls from Palaeolake Flixton – Ian Candy, Adrian Palmer, Simon Blockley, Ian Matthews, Alison MacLeod, Nicholas Farley, Amanda Farry, Rebecca Kearney, Ashley Abrook, Christopher Darvill.

22. Excavations at Flixton Island – Nicky Milner, Barry Taylor and Chantal Conneller.

23. Early Holocene Wetland Succession in Lake Flixton – Barry Taylor

24. Archaeological and palaeoenvironmental investigations at Star Carr – Barry Taylor, Chantal Conneller and Nicky Milner

25. Synthesis – Paul Lincoln, Laura Eddey; Ian Matthews, Adrian Palmer, Mark Bateman

References