Appendix G: Large-scale copies of figures

I.J. Andrews

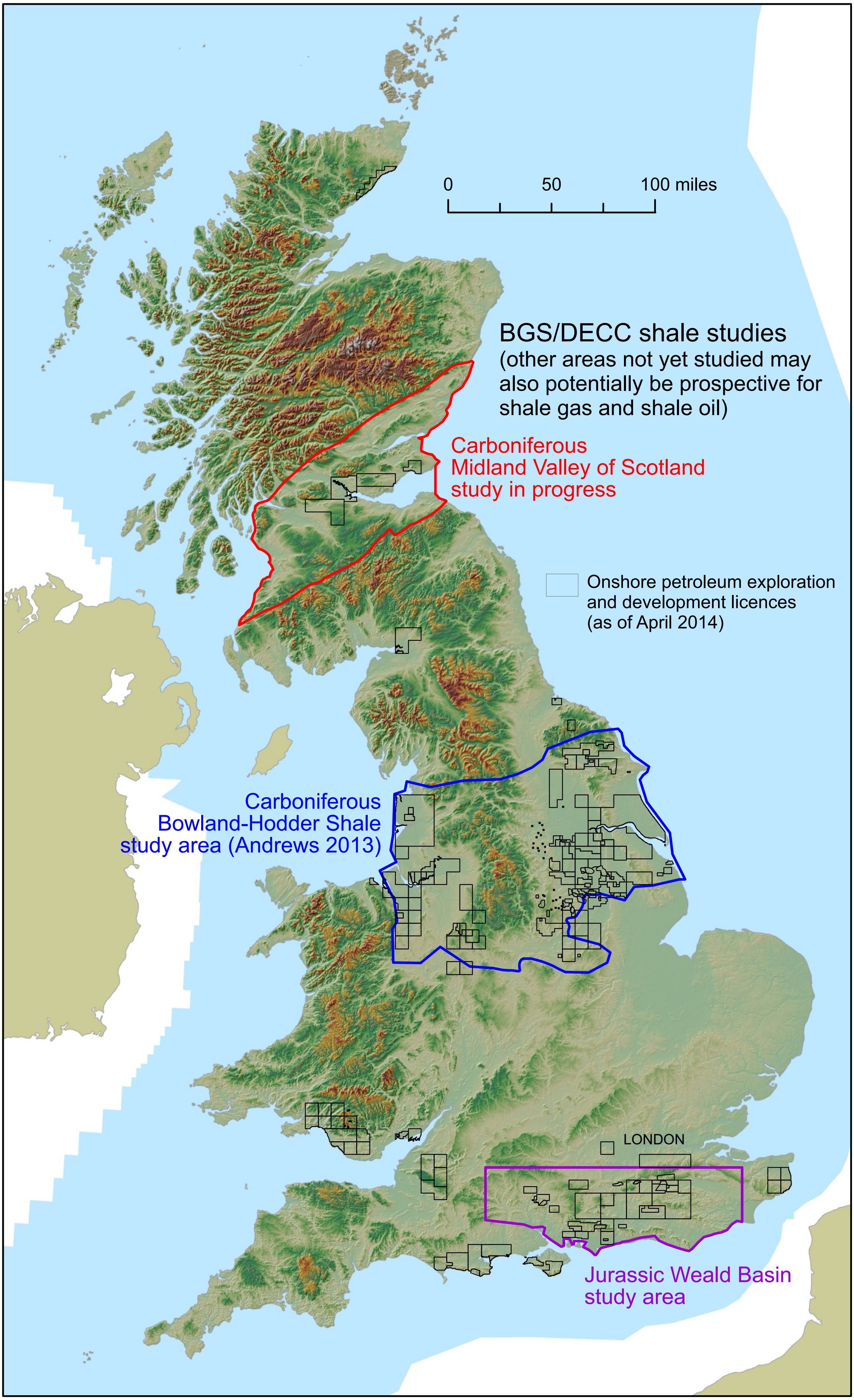


Figure 1. Location of the BGS/DECC Weald study area in southern Britain, together with prospective areas for shale gas in northern Britain and currently licensed acreage. Other shale gas and shale oil plays may exist.

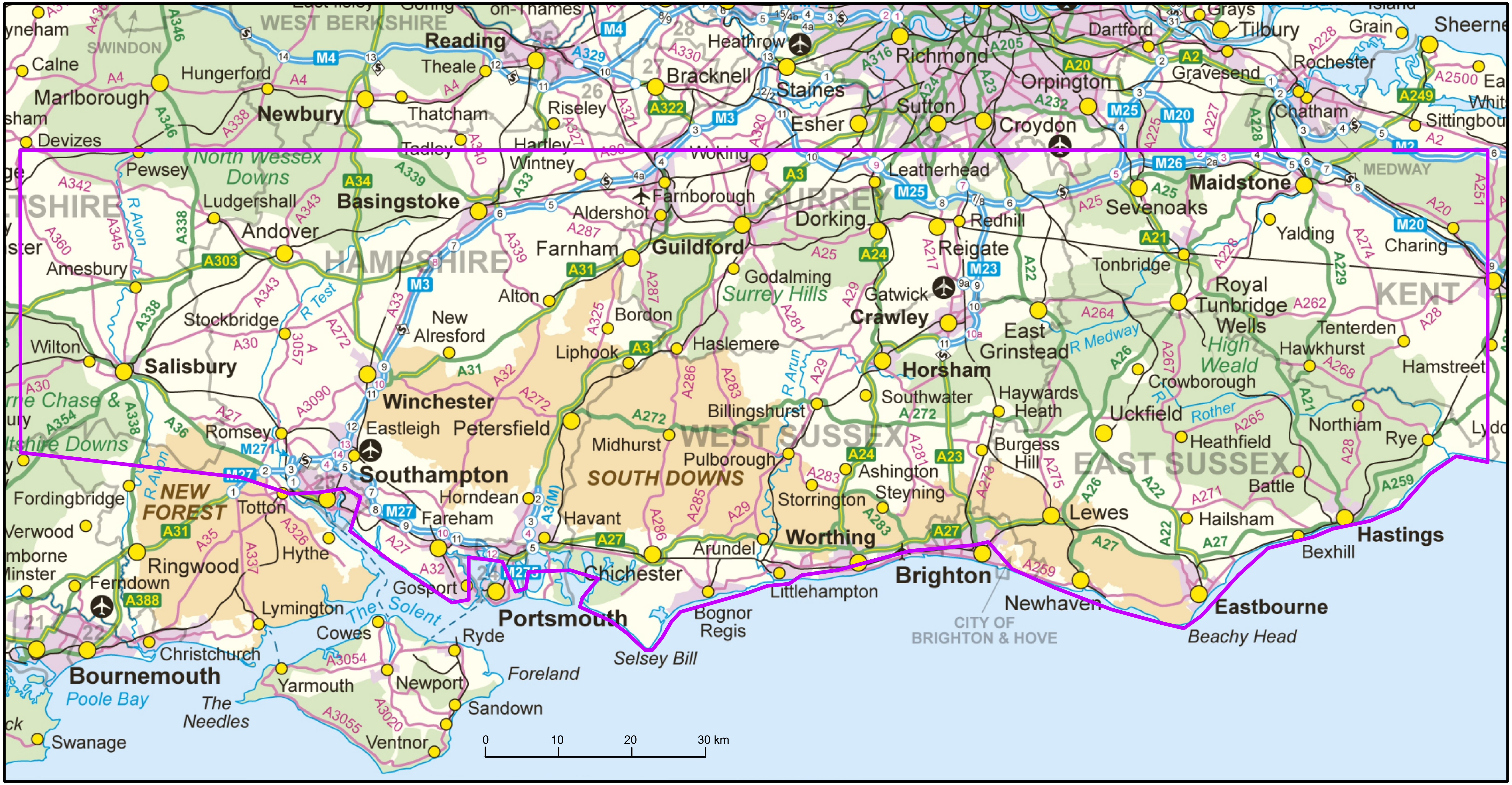


Figure 2. Location of the BGS/DECC shale oil study area, southern Britain. Contains Ordnance Survey data © Crown copyright and database right 2014.

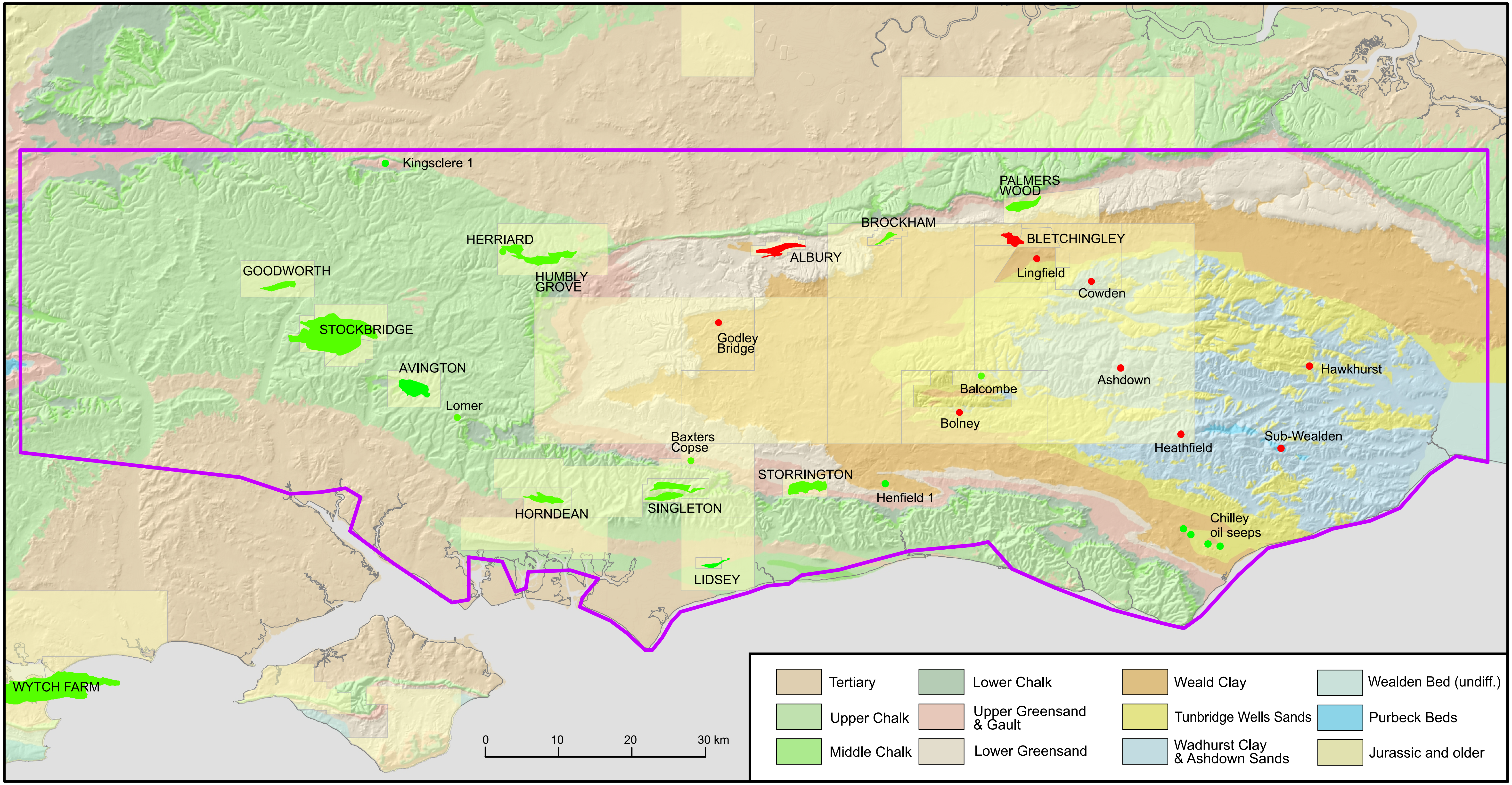


Figure 3. Distribution of producing oil and gas fields and other wells which have tested gas and oil in southern Britain (from DECC data). Green = oil, red = gas; capitals = producing, lower case = other discoveries. Minor surface oil seeps at Chilley (Sussex) are also indicated. Background is outcrop geology with hill shading, also showing petroleum licences as of April 2014.

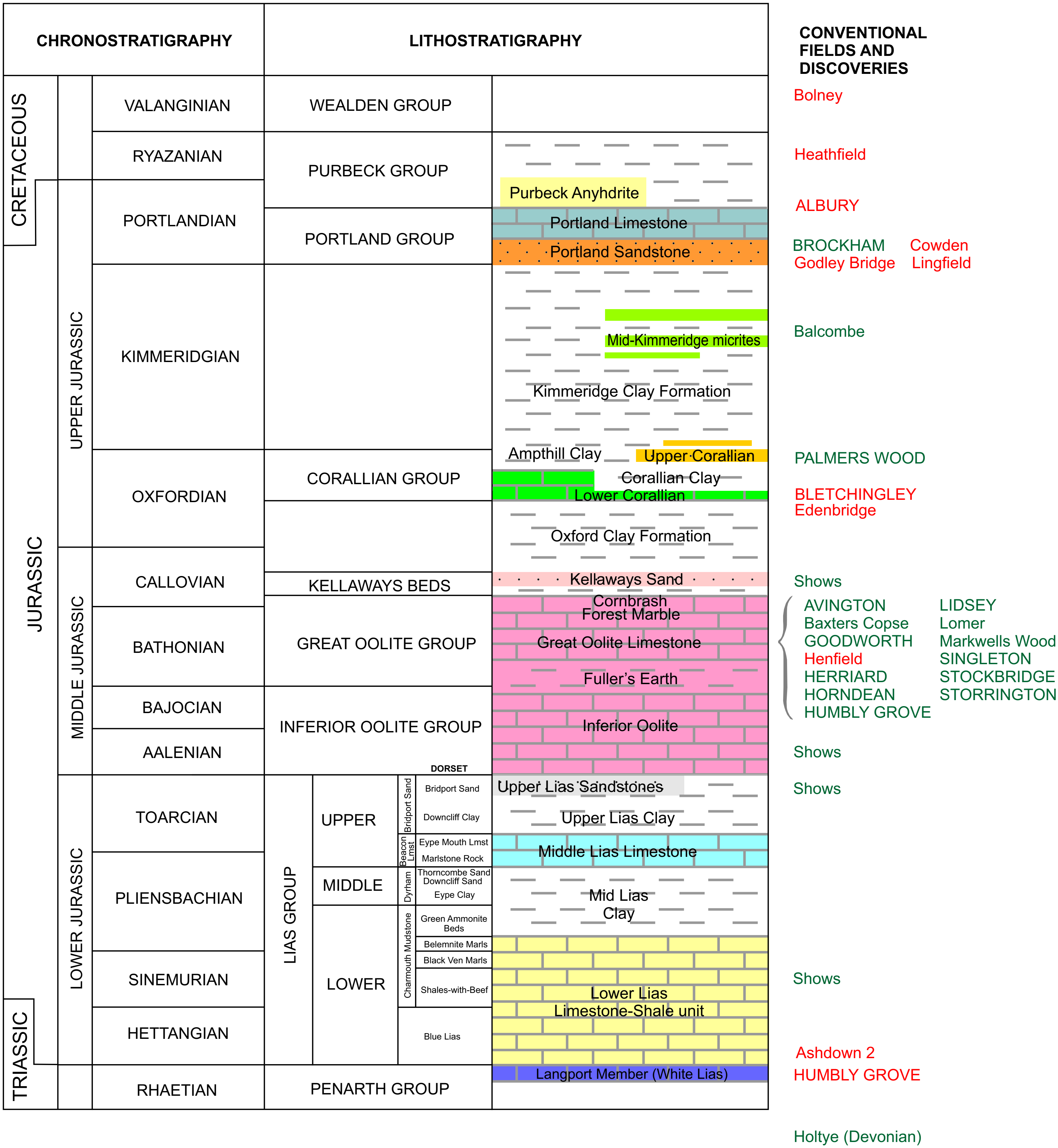


Figure 4. Generalised stratigraphic section for the Jurassic of the Weald area, showing the conventional oil (in green) and gas (in red) fields and other significant discoveries (see Table 4). The Lias stratigraphic names used in this study are informal.

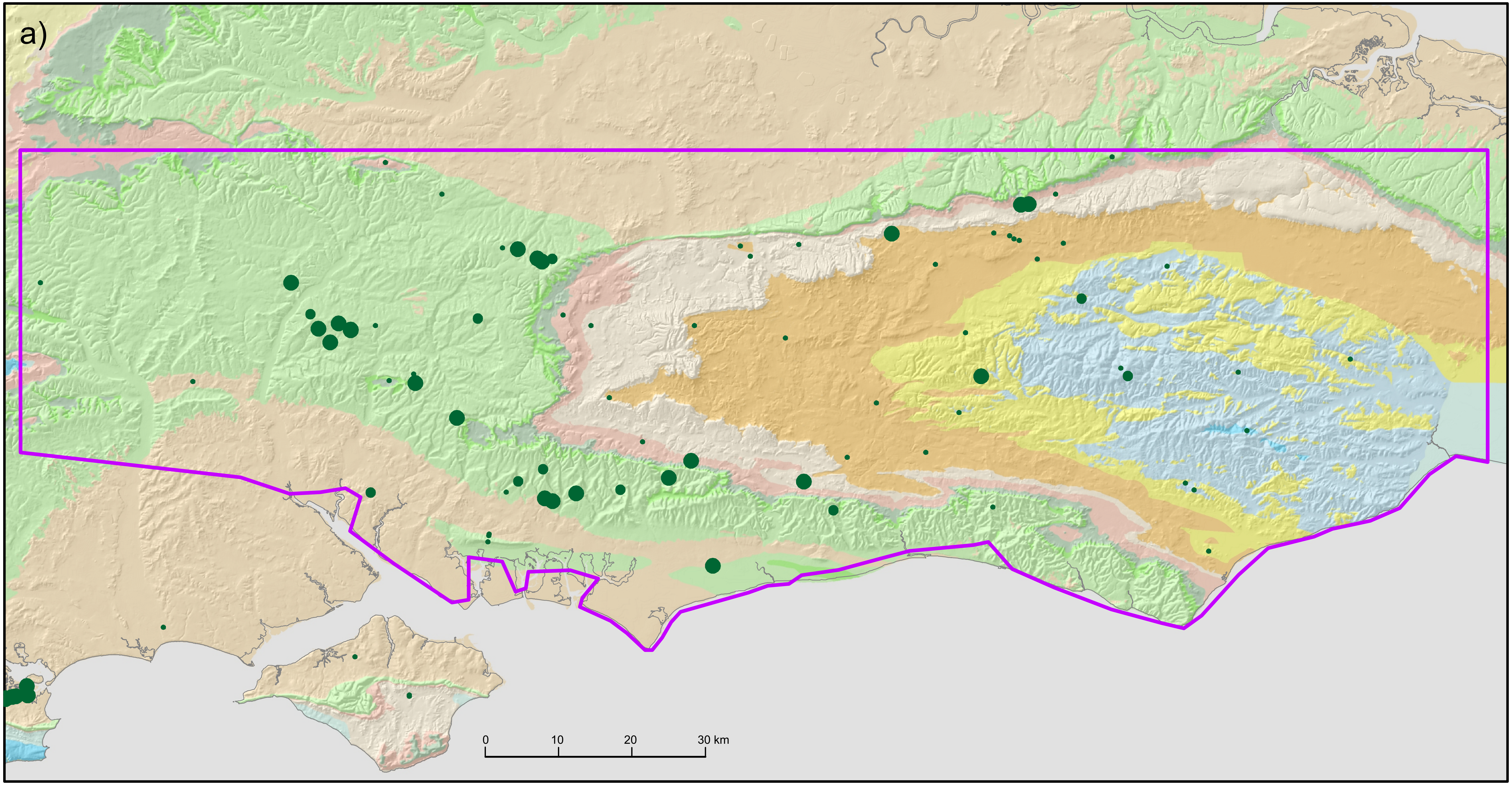
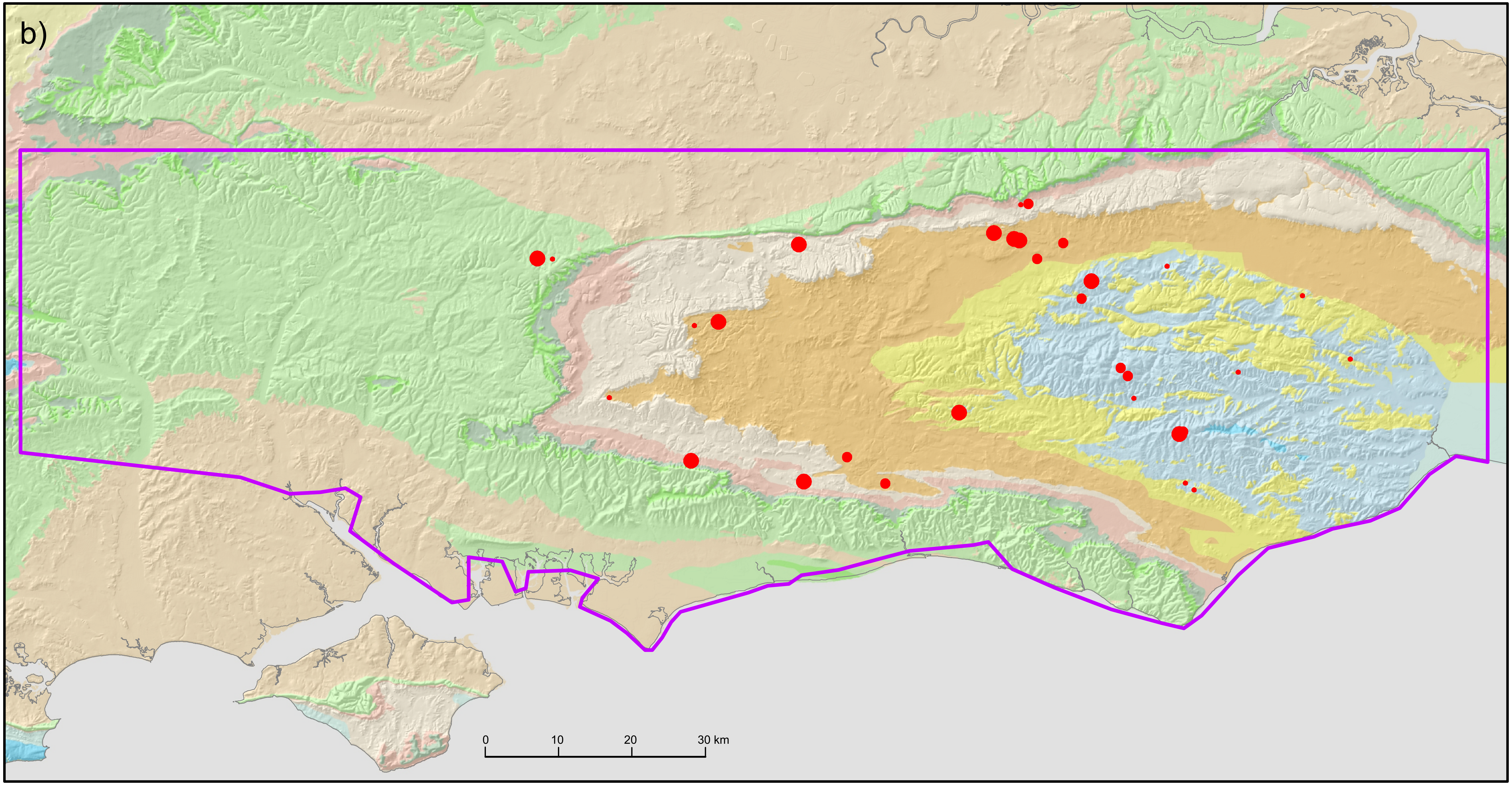


Figure 5. Distribution of (a) all oil and (b) all gas indications in wells in the Weald area, southern Britain. The dot size is proportional to the significance of the hydrocarbons present in each well (poor shows, good shows and discoveries). The distribution of oil and gas fields is shown in Figure 3.



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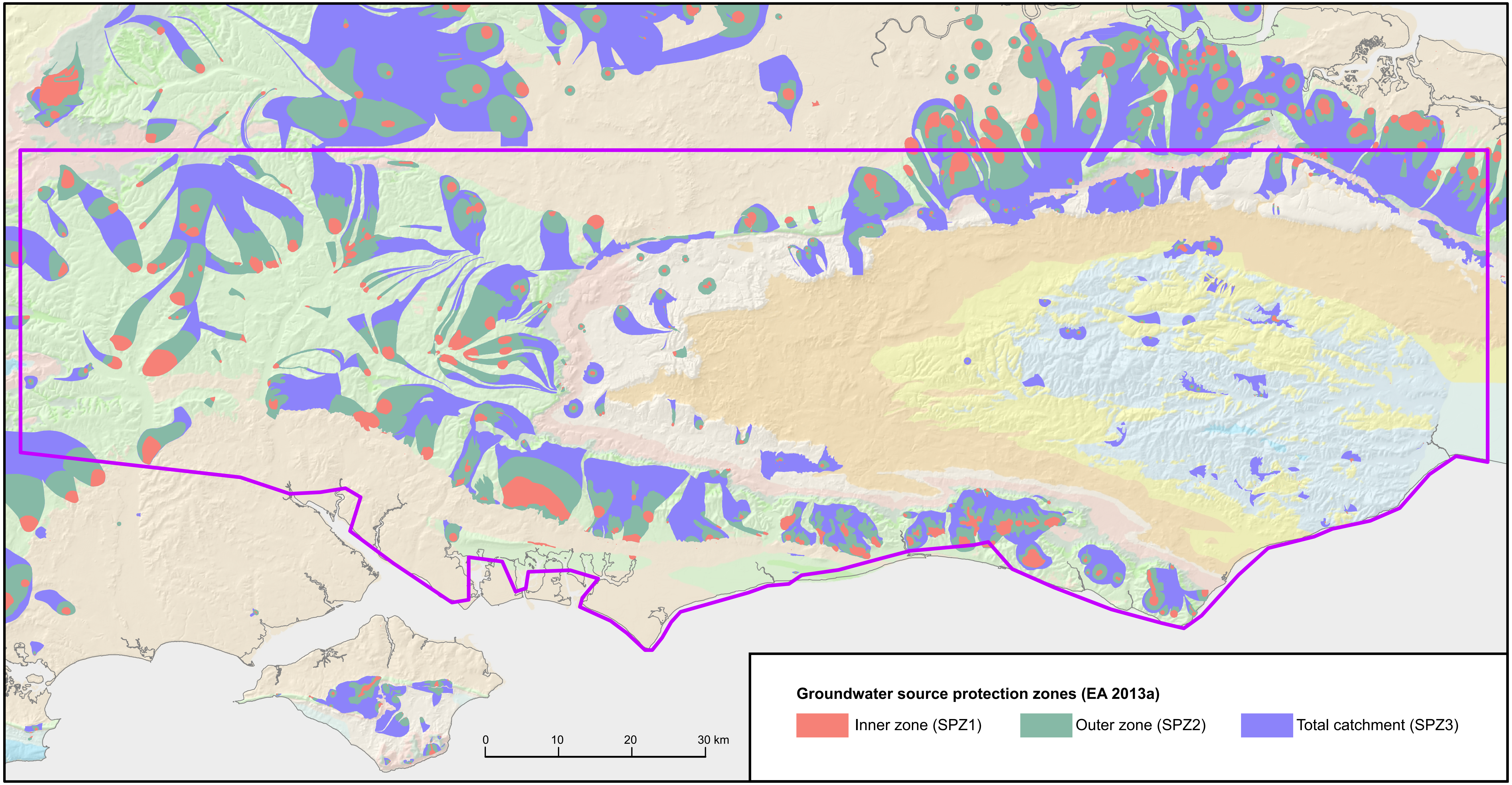

Figure 9. Map showing the groundwater source protection zones (SPZs) in the Weald area (from EA 2013a and maps.environment-agency.gov.uk).

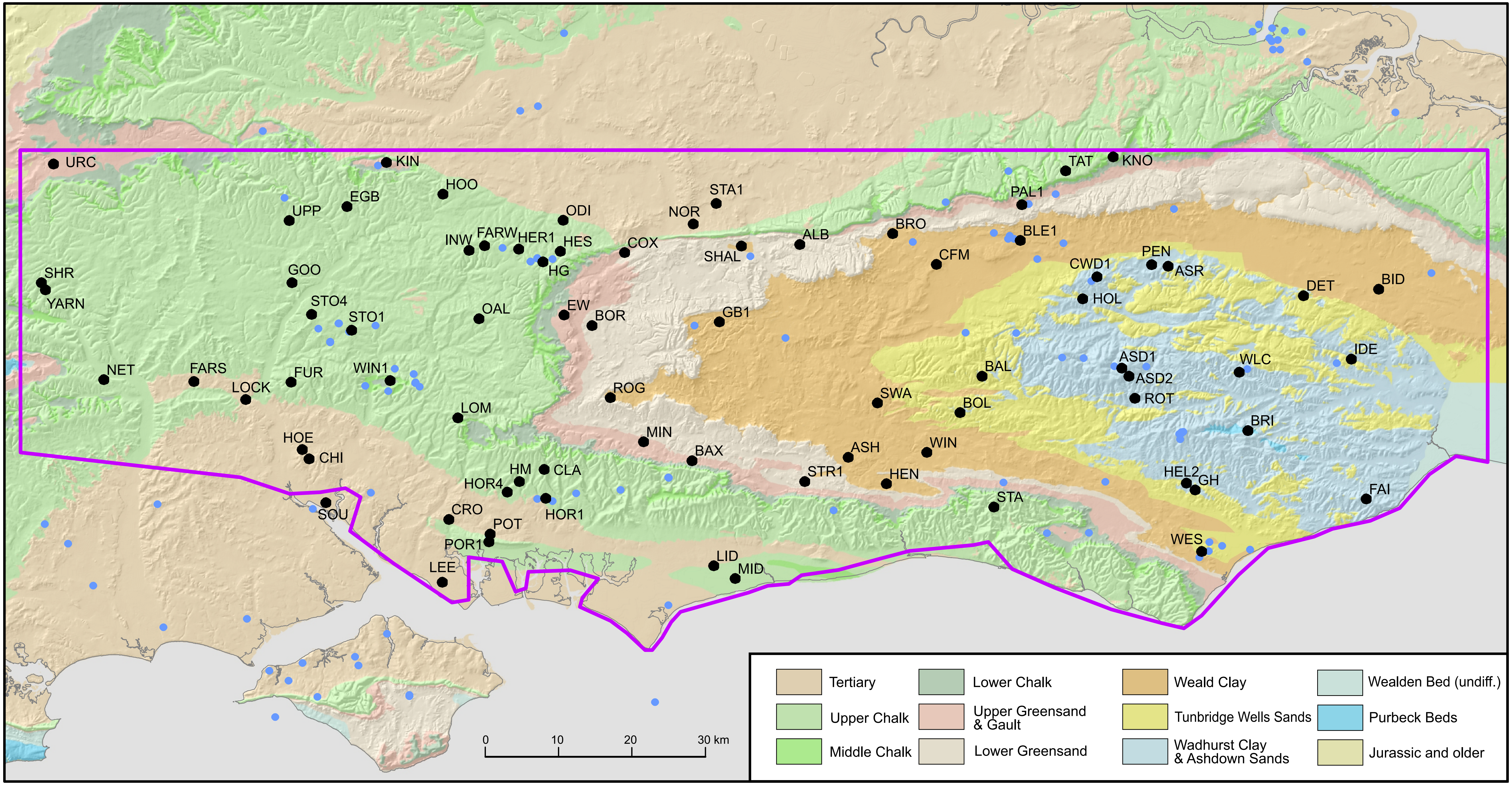

Figure 10. Location of key (black) and other deep wells (blue dots) used to assess the shale potential of the Weald area, southern Britain. See Appendix E for details of well name abbreviations and stratigraphic information.

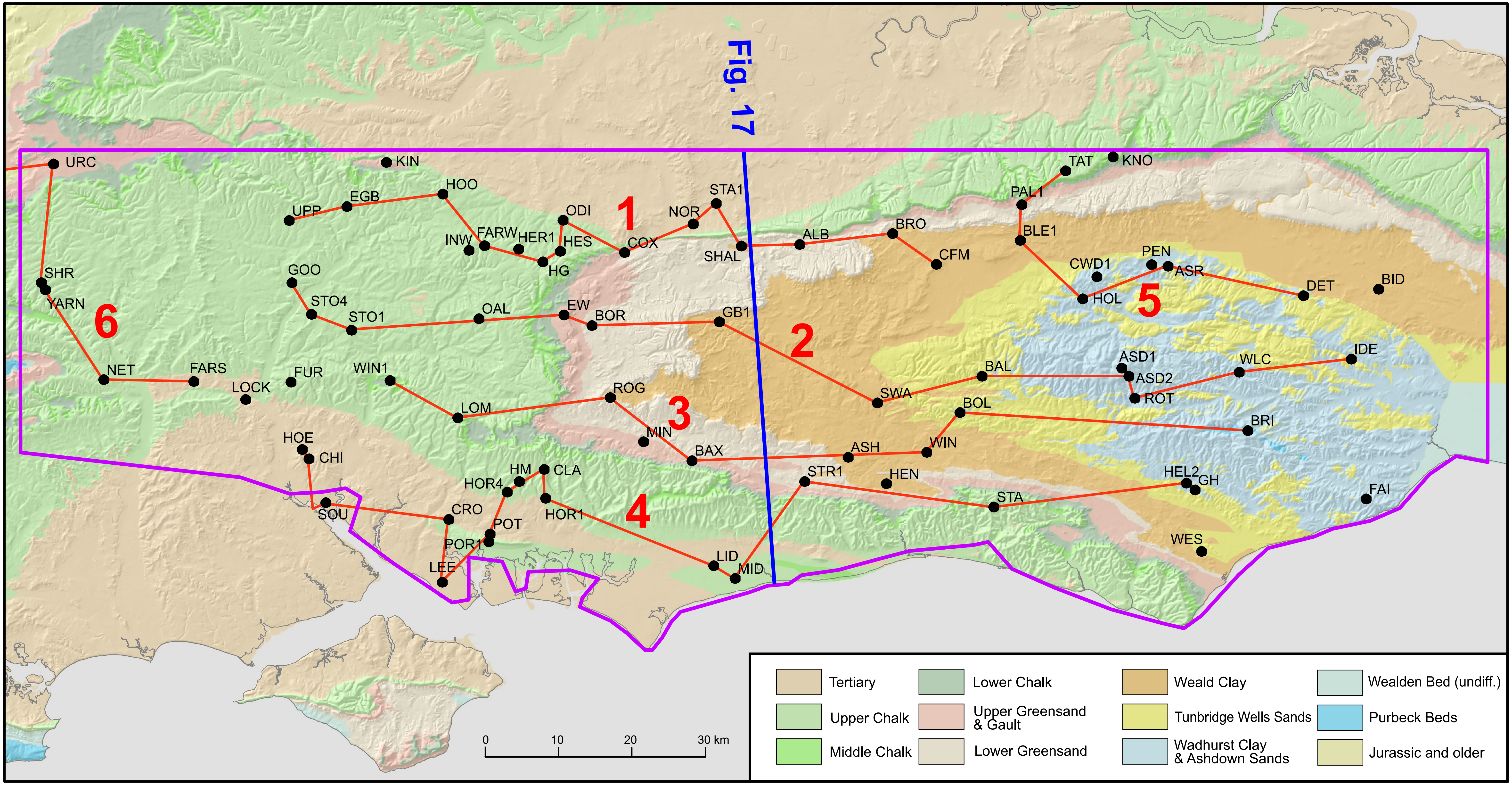

Figure 11. Location of well correlation lines included in Appendix F. See Appendix E for details of well name abbreviations. The location of the cross-section illustrated in Figure 17 is also indicated.

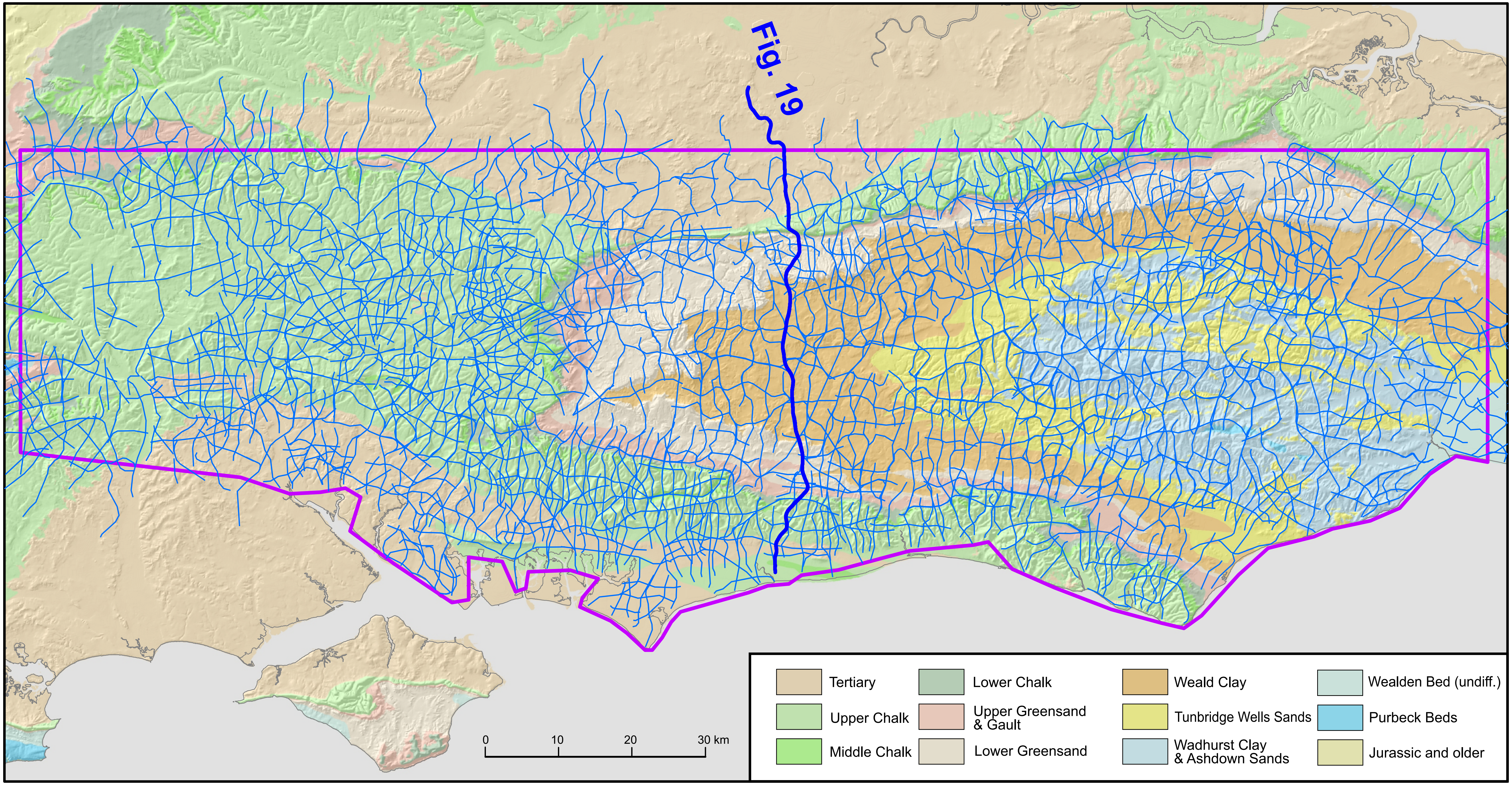

Figure 12. Location of 2D seismic profiles used to assess the shale potential of the Weald area, southern Britain. The location of the regional 2D line illustrated in Figure 19 is also indicated.

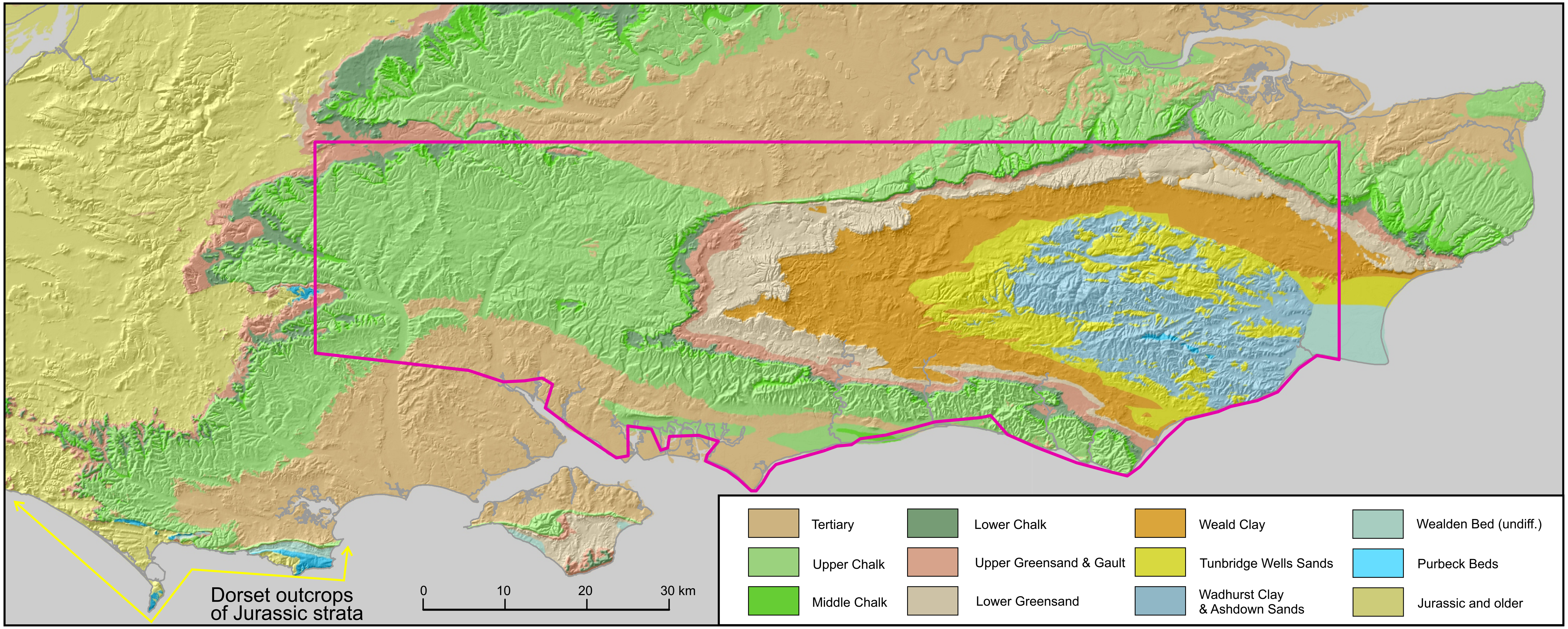

Figure 13. Surface geological map of southern Britain including the Weald study area and the coastal exposures of Jurassic strata in Dorset (from BGS 1:50,000 mapping).

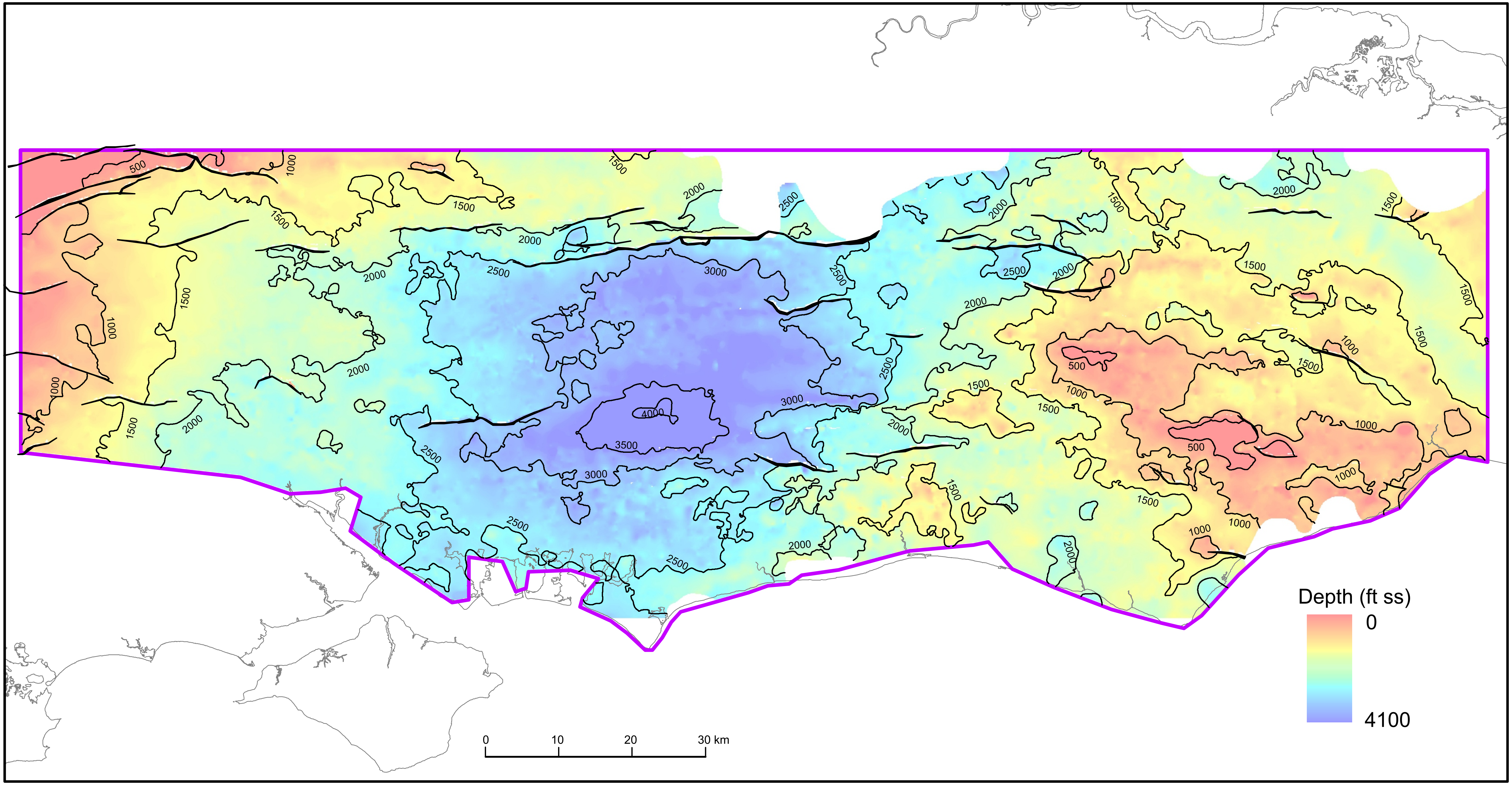

Figure 14. Depth (feet) to the Top Kimmeridge Clay as interpreted in this study.

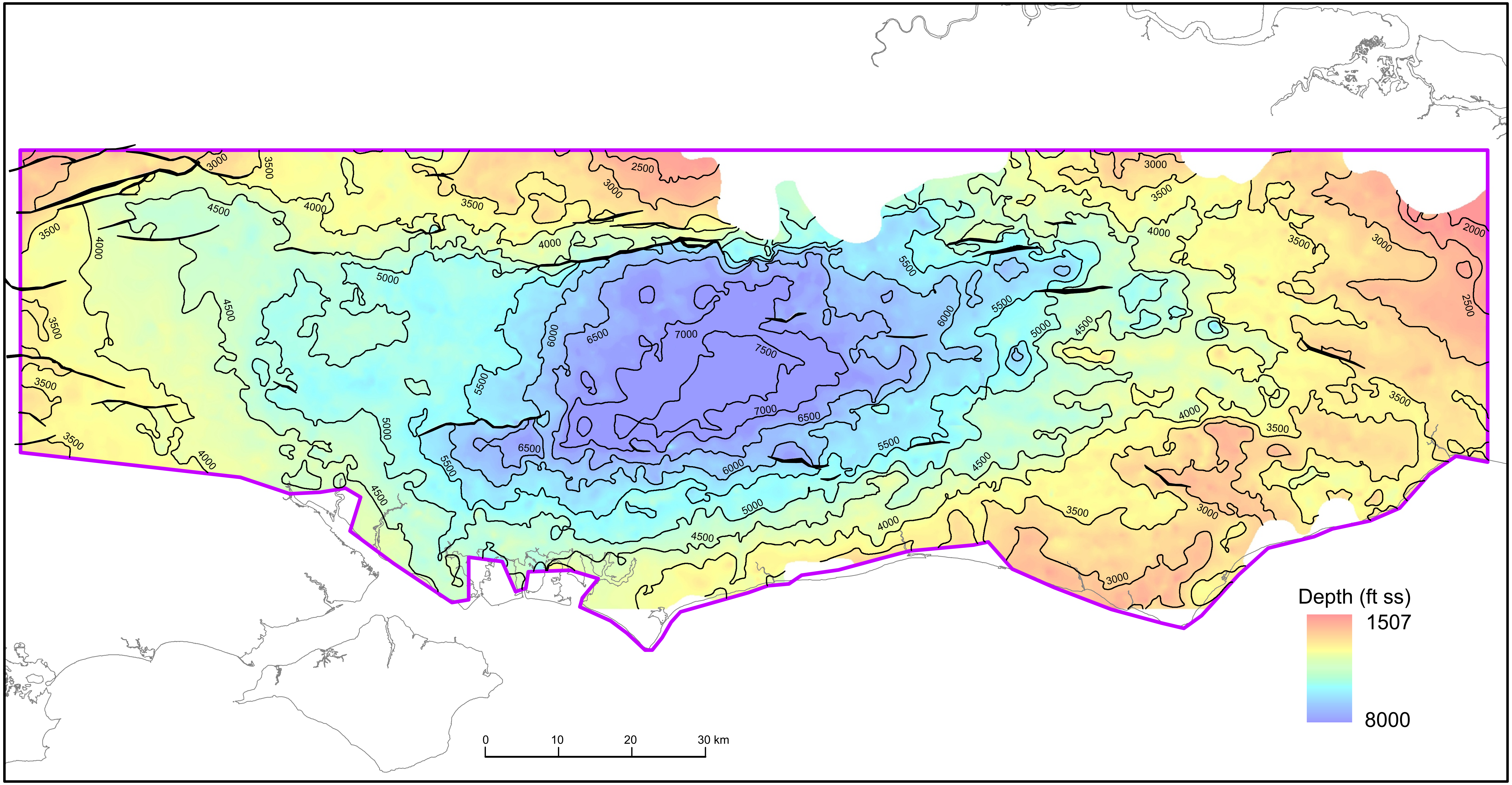

Figure 15. Depth (feet) to the Base Mid Lias Clay as interpreted in this study.

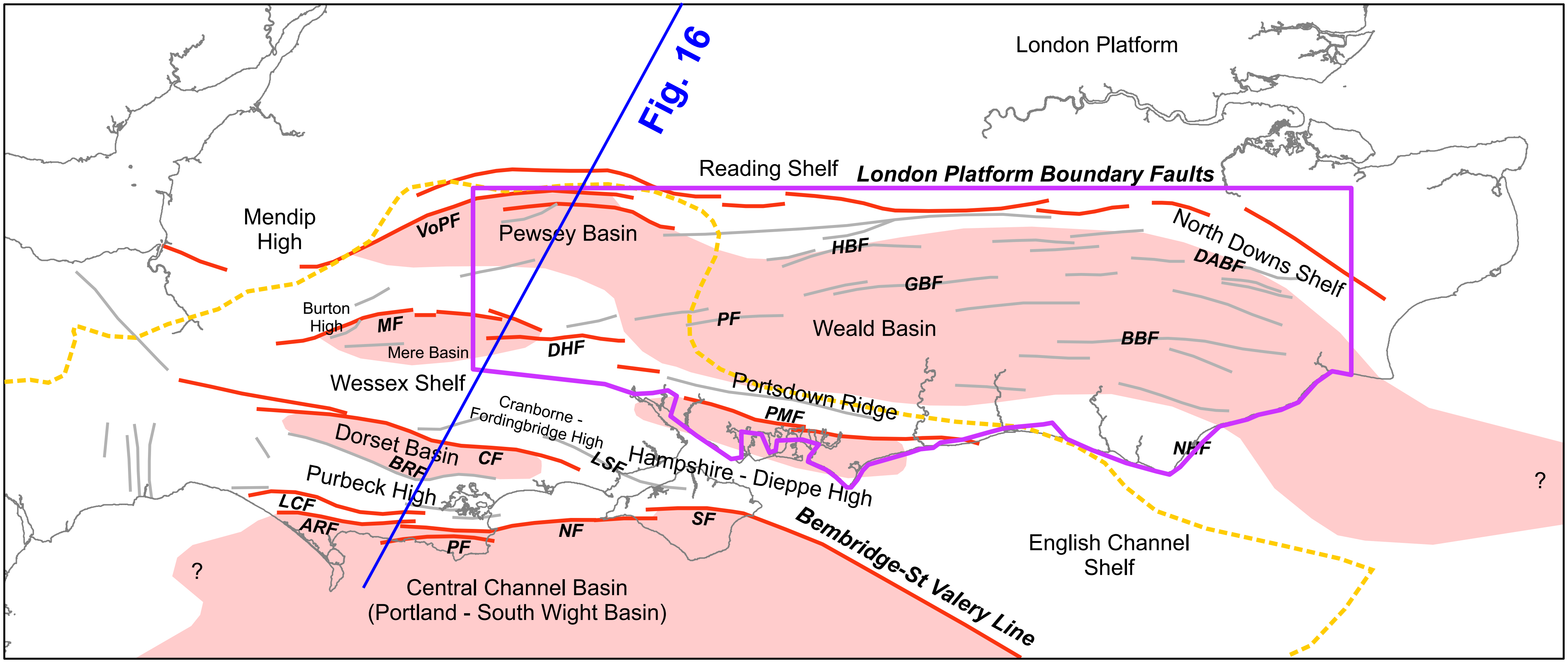

Figure 18. The major Mesozoic structural features of southern England. The location of the cross-section illustrated in Figure 16 is also indicated. Based on Stoneley (1982), Chadwick (1983), Lake (1985), Sellwood *et al*. (1985), Hancock & Mithen (1987), Butler & Pullan (1990), Butler (1998), Hawkes *et al*. (1998), Underhill & Stoneley (1998) and Chadwick & Evans (2005). Abbreviations: ARF = Abbotsbury – Ridgeway Fault; BBF = Brightling – Bolney Fault; BRF = Bere Regis Fault; CF = Cranborne Fault; DABF = Detention – Ashour – Bletchingley Fault; DHF = Dean Hill Fault; GBF = Godley Bridge Fault; HBF = Hog's Back Fault; LCF = Litton – Cheney Fault; LSF = Lymington – Sandhills Fault; MF = Mere Fault; NF = Needles Fault; NHF = Newhaven Fault; PF = Purbeck Fault; PMF = Portsdown – Middleton Fault; SF = Sandhills Fault; VoPF = Vale of Pewsey Fault(s). The term Purbeck – Isle of Wight Fault is used for the fault system extending from Purbeck and across the Isle of Wight. The Wessex Basin *sensu* Underhill & Stoneley (1998) lies south-west of the orange dashed line; this report includes the Pewsey Basin in the Weald area.

Figure 19. Regional 2D seismic line UKOGL-RG-001 across the central Weald Basin (from Butler & Jamieson 2013). See Figure 12 for location.

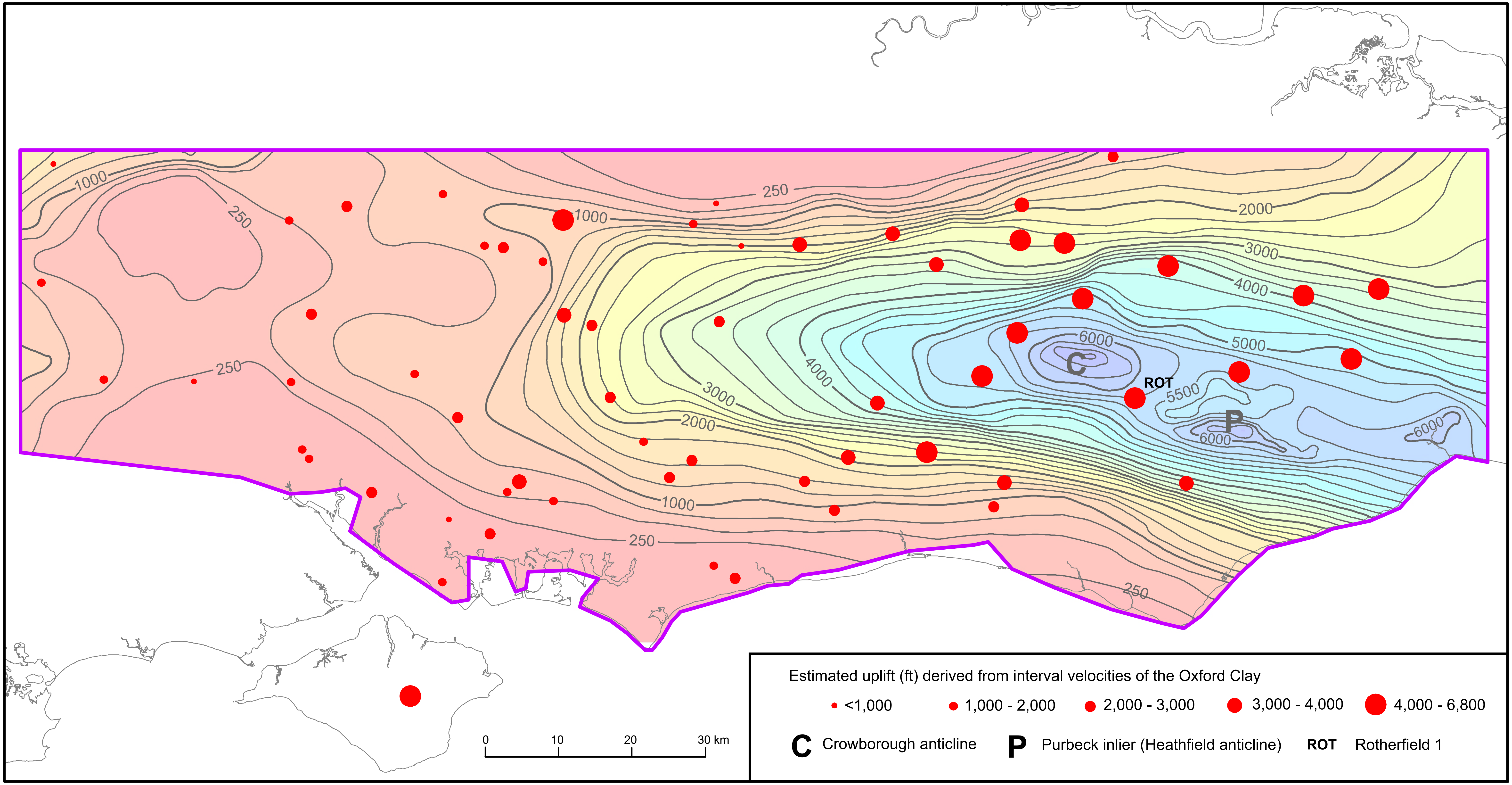

Figure 20. Approximate amount of Cenozoic uplift estimated using the stratigraphic reconstruction of missing strata (contours), with uplift figures at wells estimated using Oxford Clay interval velocities (red dots).

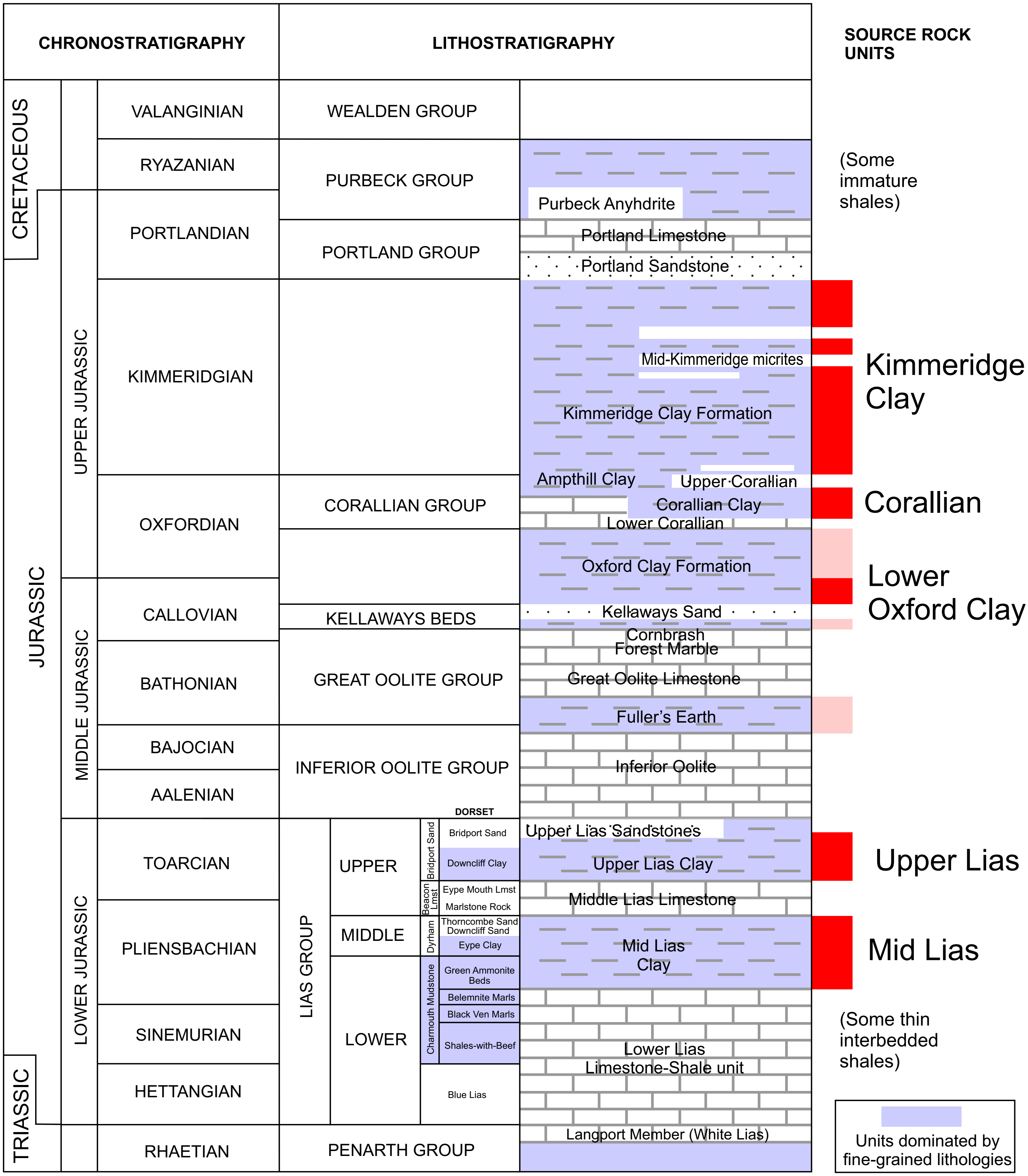

Figure 22. Lithostratigraphical framework of the Jurassic in the Weald Basin, showing the position of the five key argillaceous, source-rock units (in red). Other, potential source rocks are indicated in pink. The Lias stratigraphic names used in this study are informal. The inset of the Dorset Lias succession is taken from Barton *et al*. (2011).

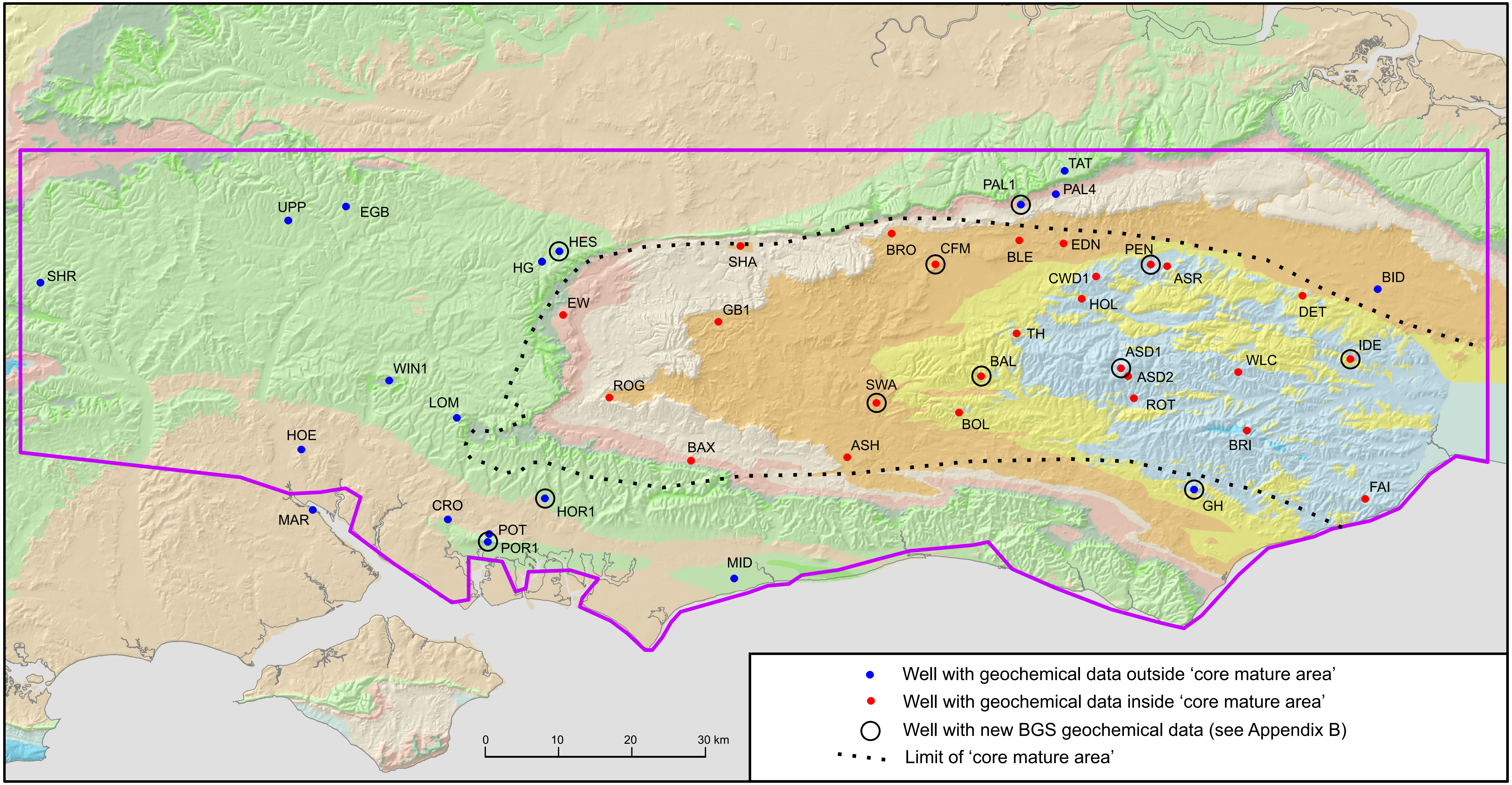

Figure 26. Location of wells for which geochemical data are available. See Appendix E for the key to well name abbreviations.

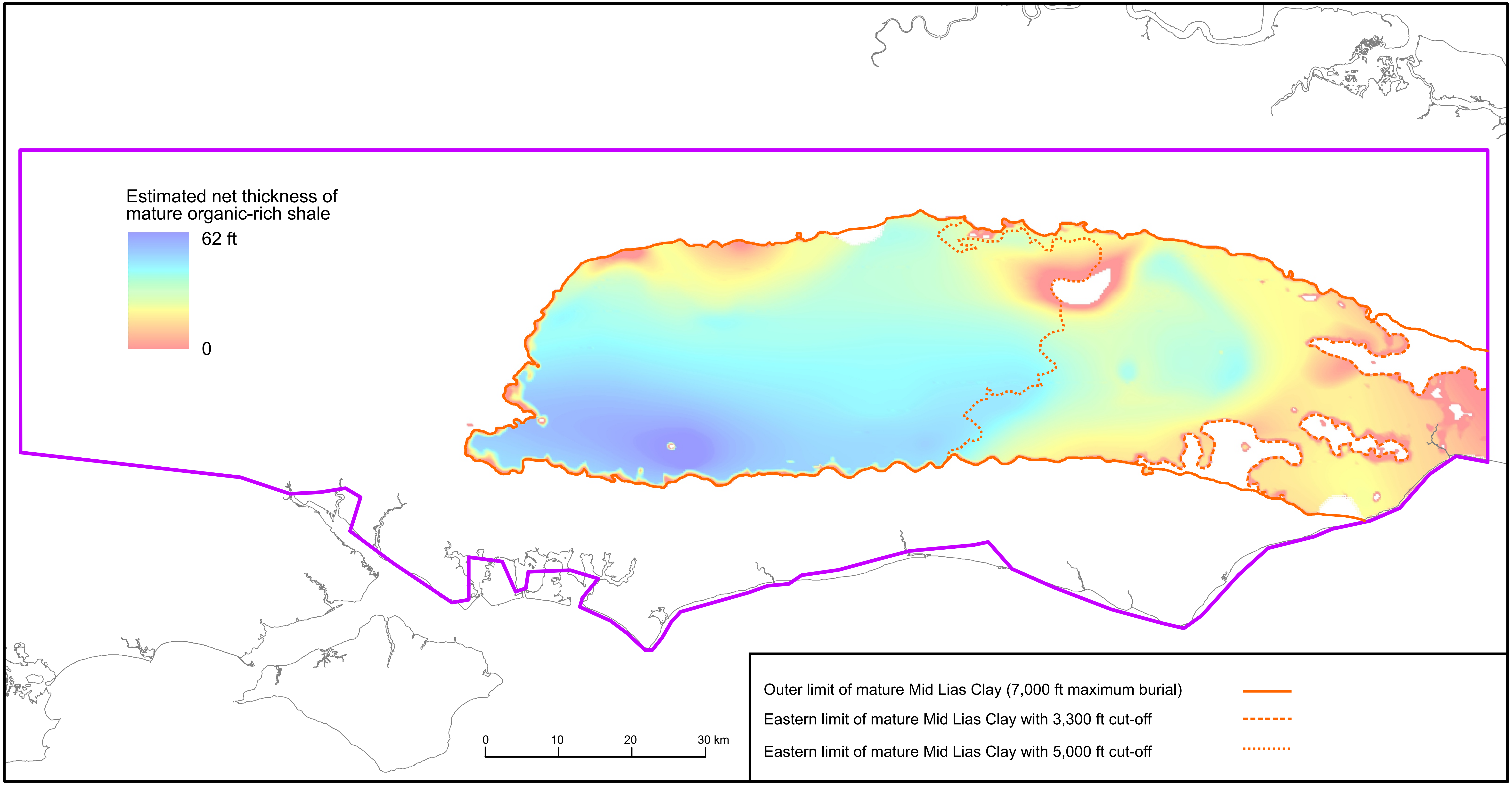

Figure 29. Potential thickness and distribution of organic-rich shales of the Mid Lias Clay that are within the oil window (using a maximum burial depth of 7,000 ft/2,130 m) and at a depth below ground level greater than 3,300 ft (1,000 m). The eastern limit of the area deeper than 5,000 ft (1,500 m) is indicated by the dotted line.

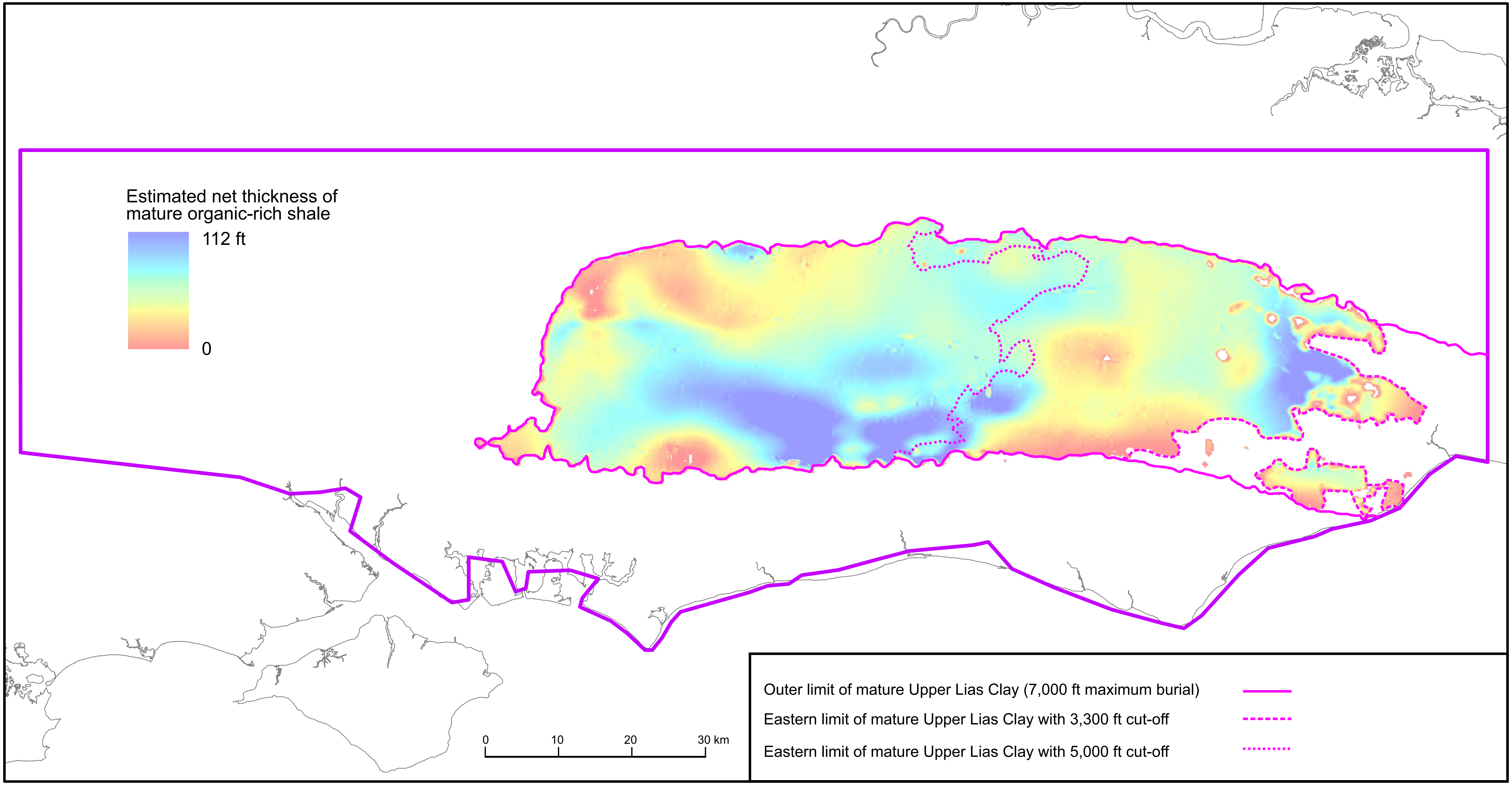

Figure 31. Potential thickness and distribution of organic-rich shales of the Upper Lias Clay that are within the oil window (using a maximum burial depth of 7,000 ft/2,130 m) and at a depth below ground level of greater than 3,300 ft (1,000 m). The eastern limit of the area deeper than 5,000 ft (1,500 m) is indicated by the dotted line.

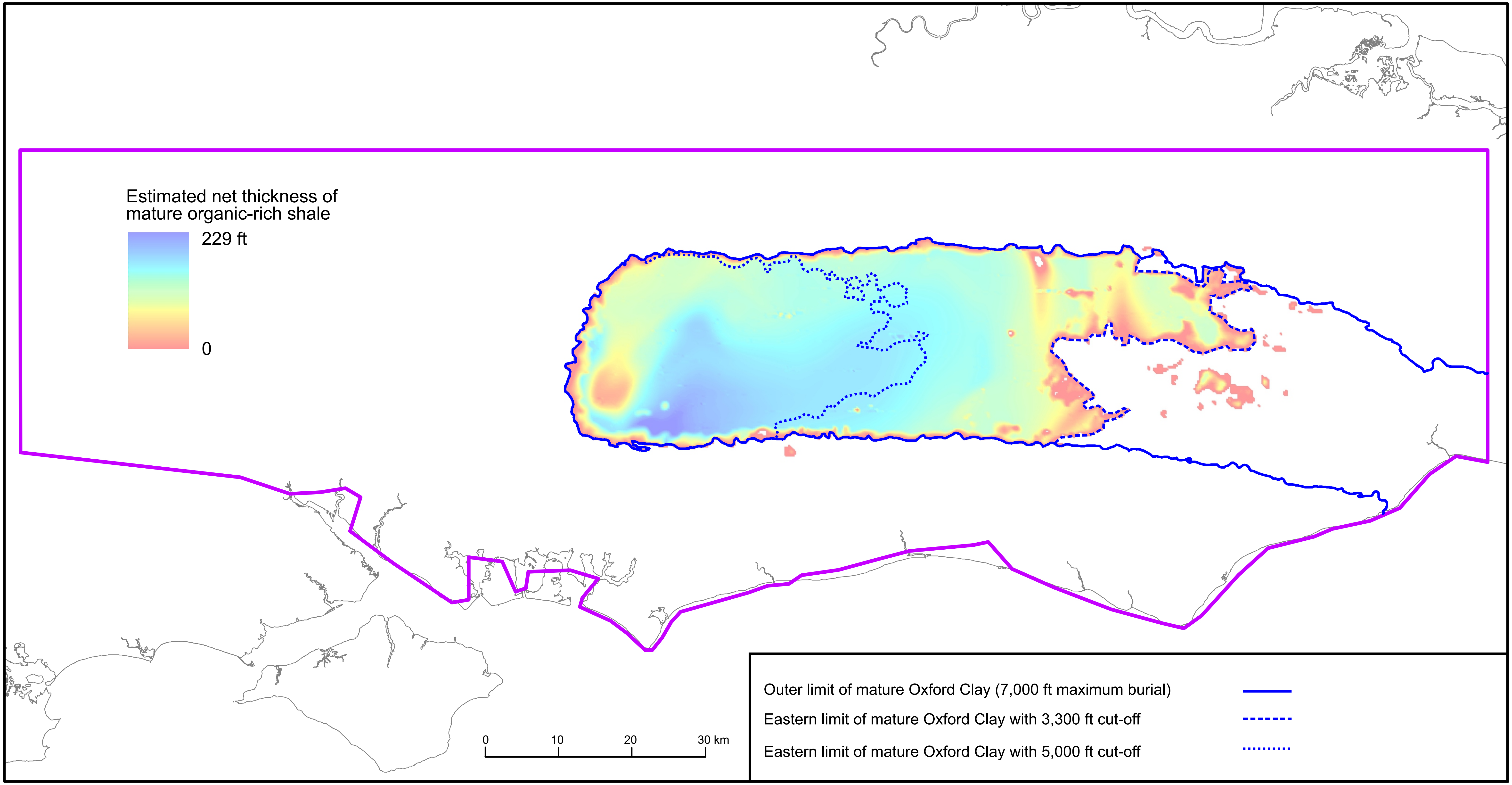

Figure 33. Potential thickness and distribution of organic-rich shales of the Oxford Clay that are within the oil window (using a maximum burial depth of 7,000 ft/2,130 m) and at a depth below ground level greater than 3,300 ft (1,000 m). The eastern limit of the area deeper than 5,000 ft (1,500 m) is indicated by the dotted line.

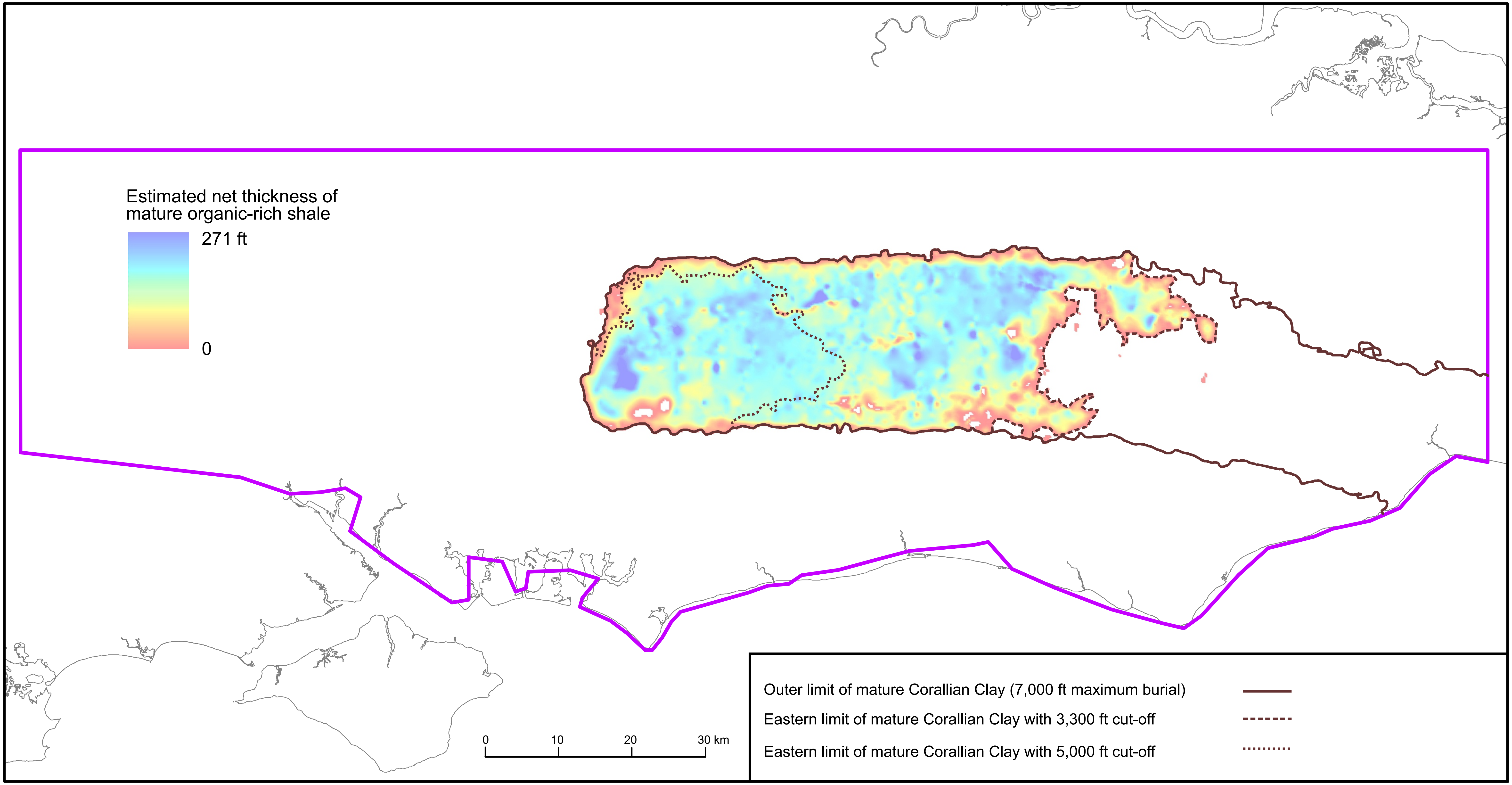

Figure 35. Potential thickness and distribution of organic-rich shales of the Corallian Clay that are within the oil window (using a maximum burial depth of 7,000 ft/2,130 m) and at a depth below ground level greater than 3,300 ft (1,000 m). The eastern limit of the area deeper than 5,000 ft (1,500 m) is indicated by the dotted line.

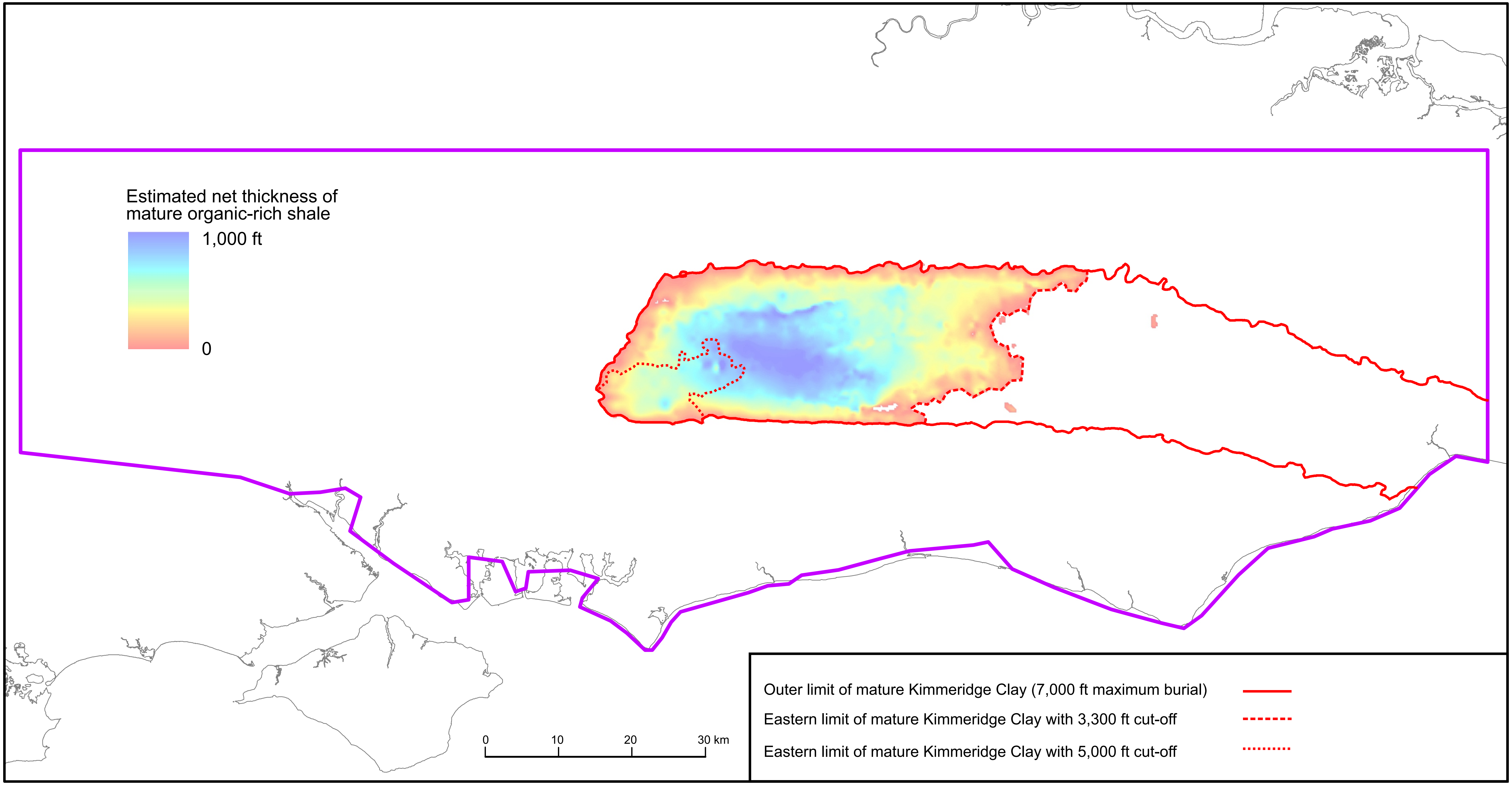

Figure 38. Potential thickness and distribution of organic-rich shales of the Kimmeridge Clay that are within the oil window (using a maximum burial depth of 7,000 ft/2,130 m) and at a depth below ground level greater than 3,300 ft (1,000 m). The eastern limit of the area deeper than 5,000 ft (1,500 m) is indicated by the dotted line.

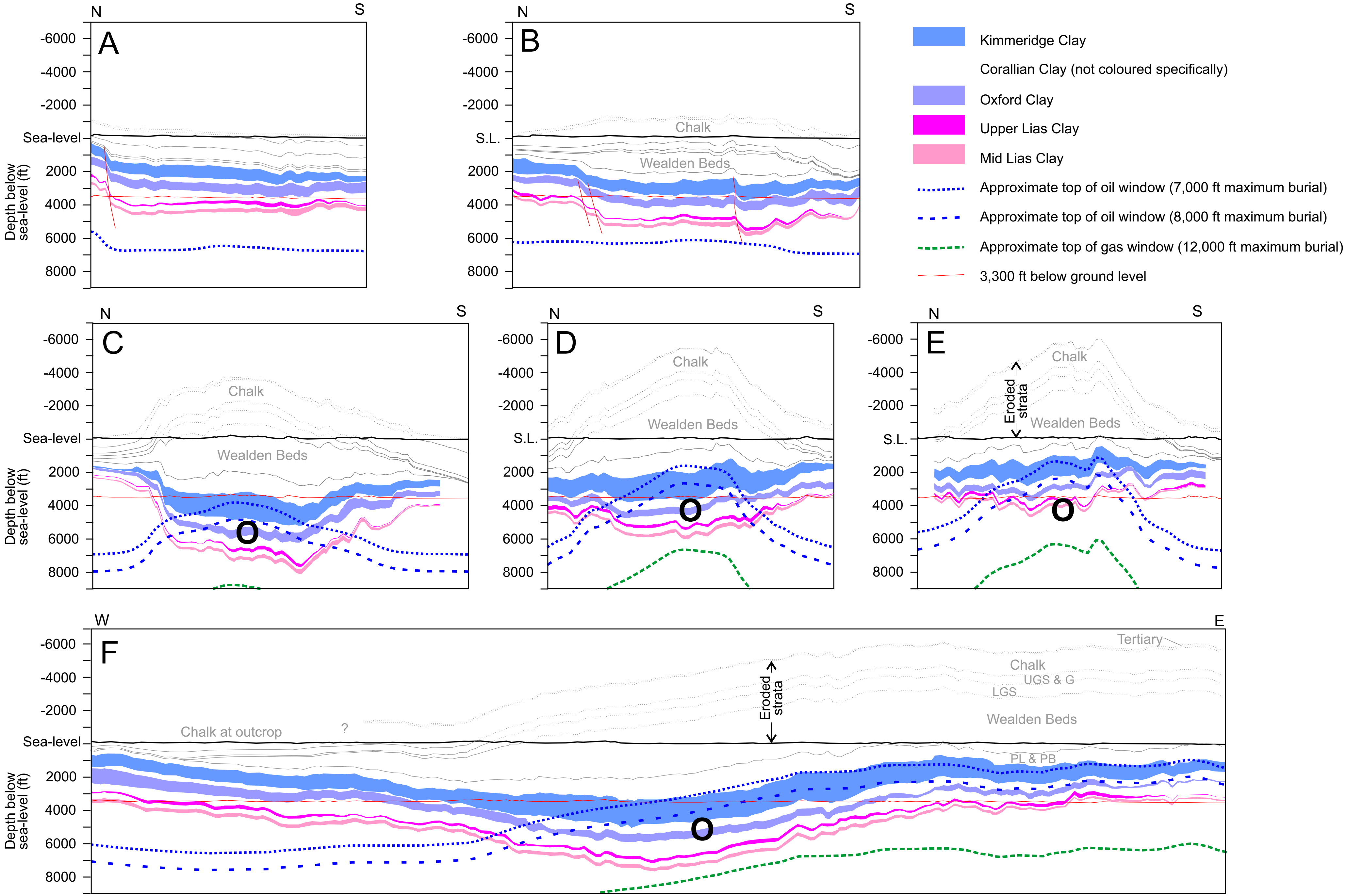

Figure 46. Schematic geological cross-sections indicating where the main Jurassic shales of the Weald Basin might be considered a shale oil target (labelled 'O'). Alternative depths for the top of the oil window are indicated (blue dotted and dashed). Thicknesses of eroded strata (grey dashed) are based on regional isopachs. Faults have been excluded for clarity. For the location of the sections, see Figure 47.

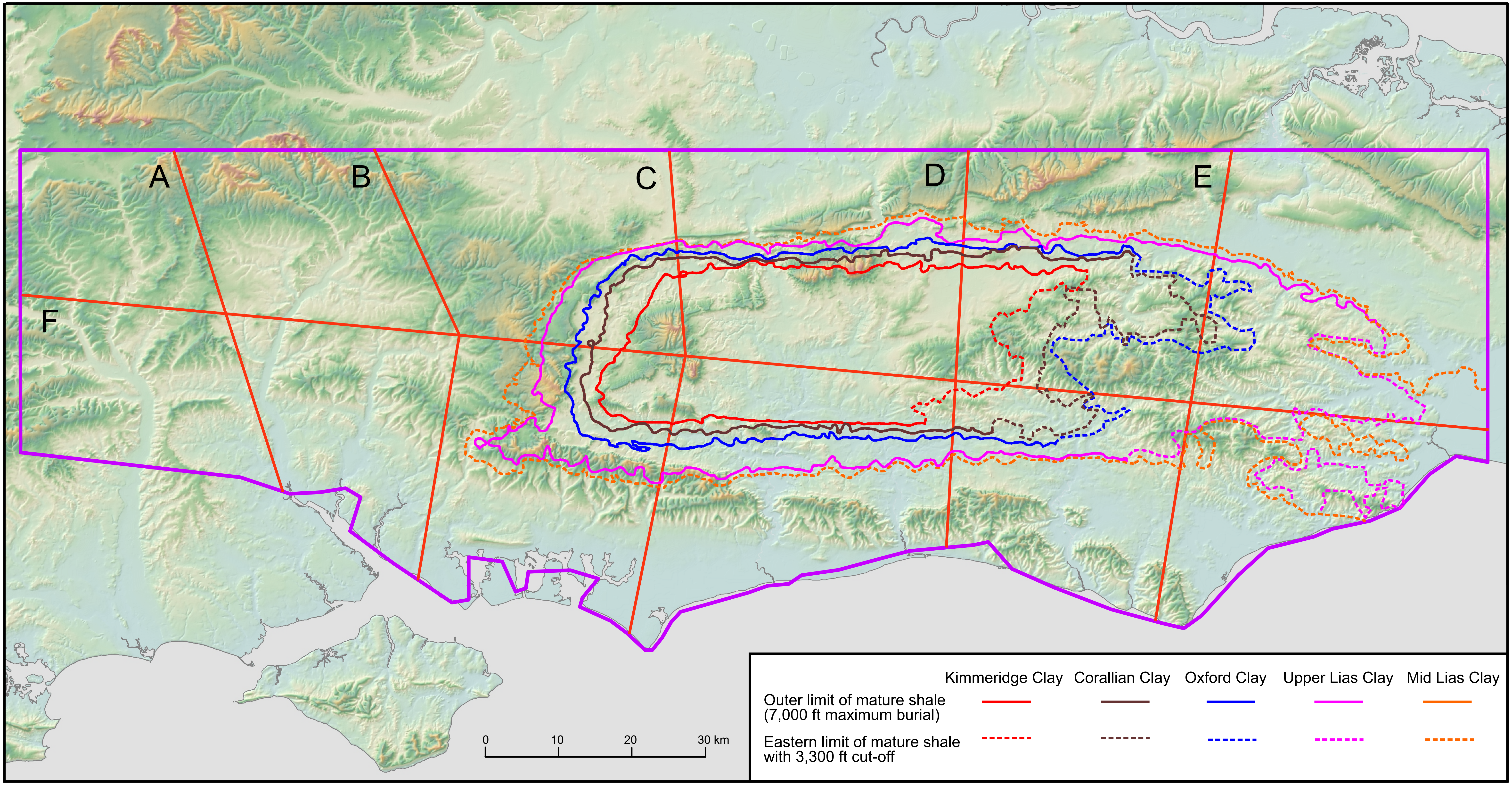

Figure 47. Map showing the location of schematic cross-sections A-F (Figure 46).

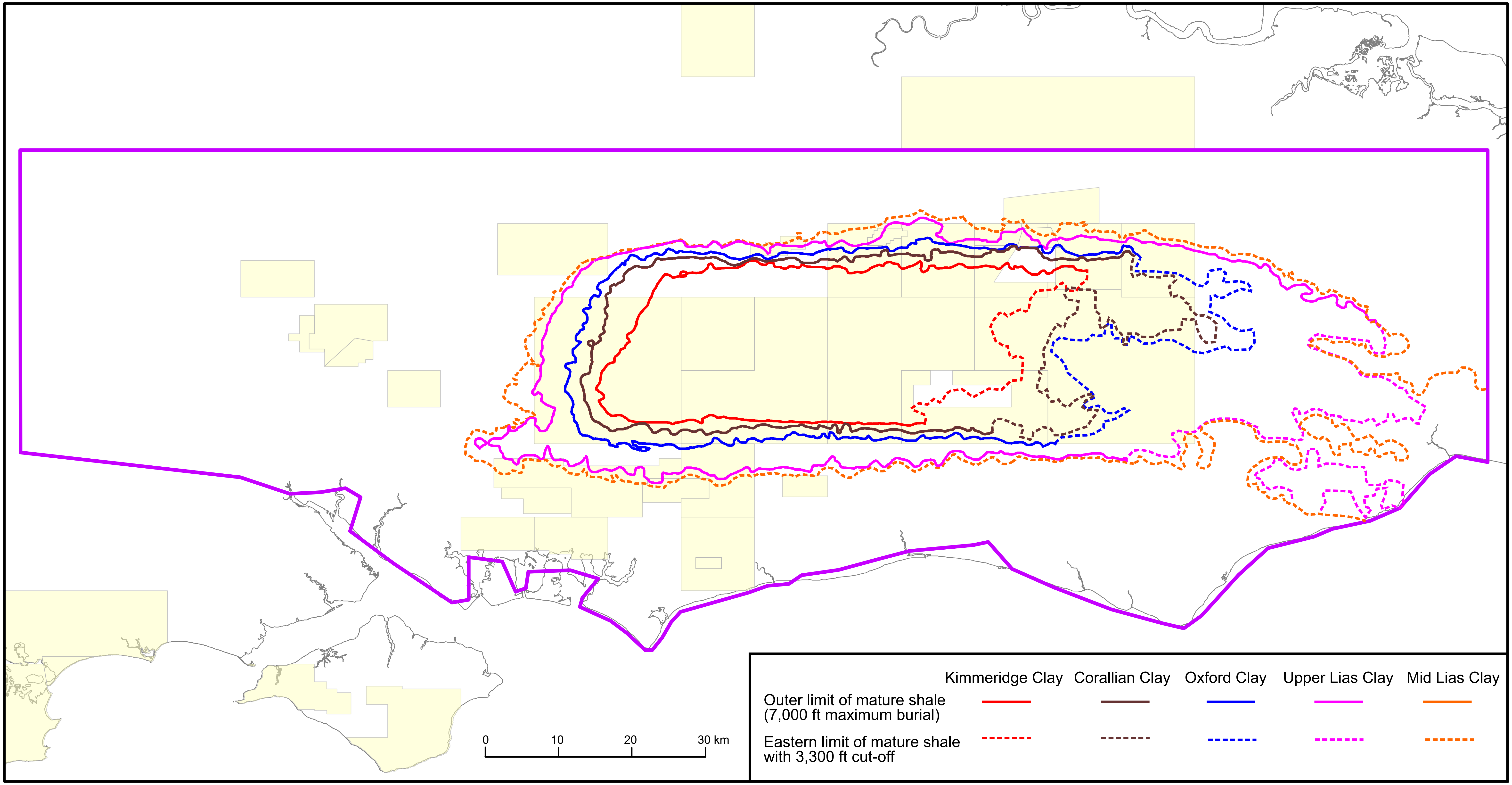

Figure 50. Summary of areas considered prospective for oil in the Jurassic shale units in southern Britain with licensed acreage (as of April 2014) also shown.

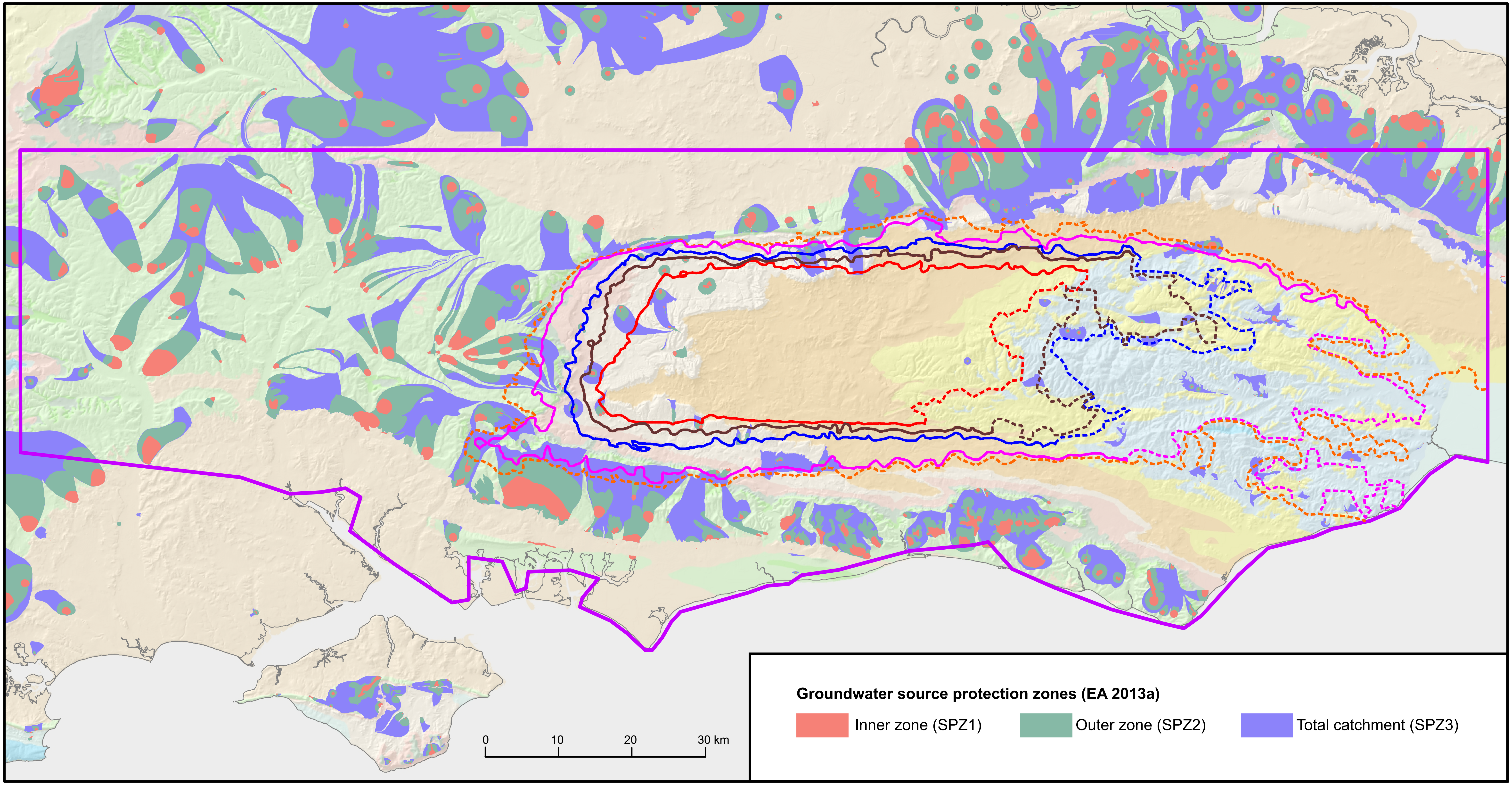

Figure 51. Summary of areas considered potentially prospective for oil in the Jurassic shale units in southern Britain (see Figure 50 for key) with the EA's groundwater source protection zones (EA 2013a) also shown.

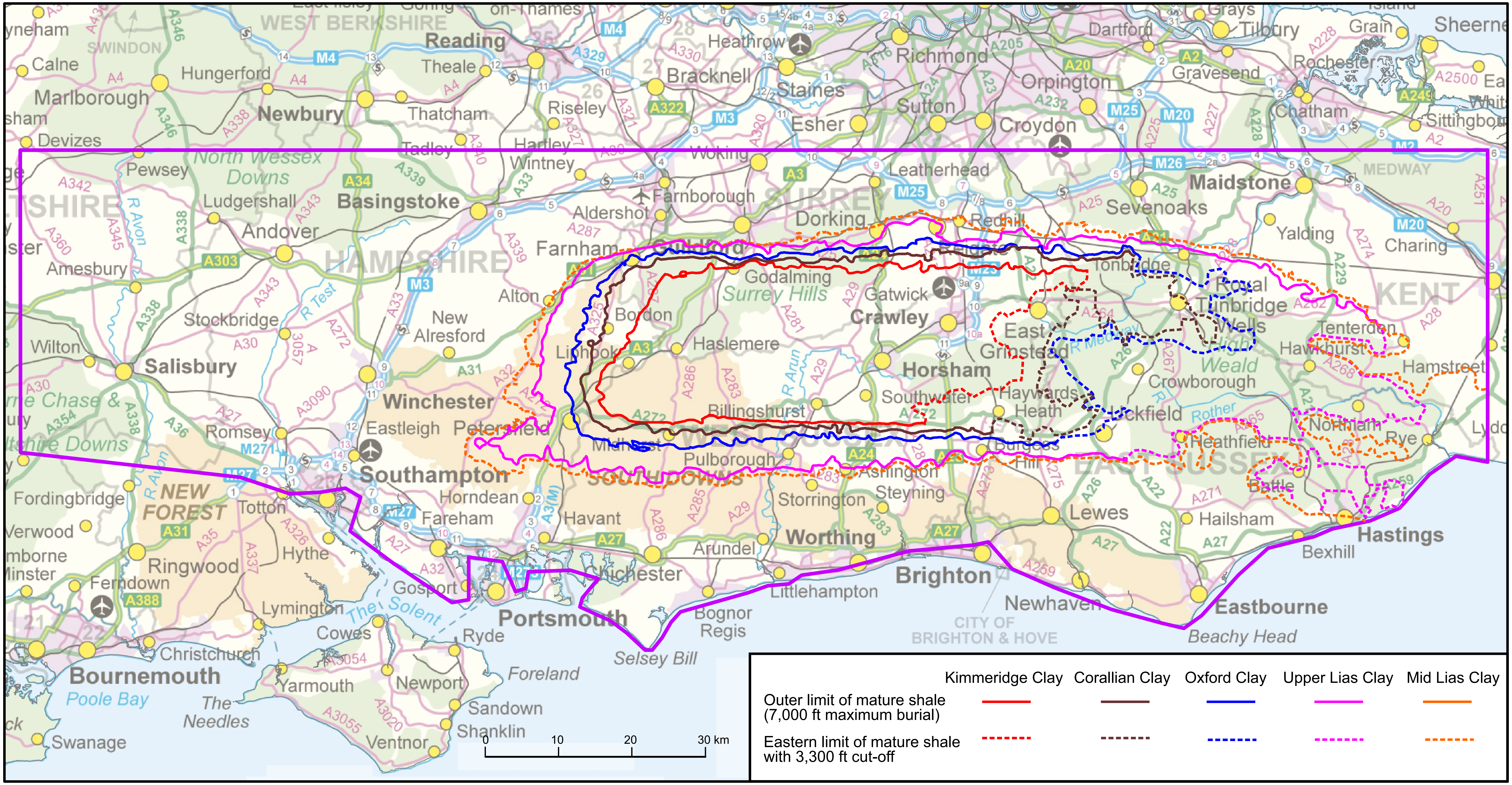

Figure 52. Summary of areas considered prospective for oil in the Jurassic shale units in relation to the urban areas of southern Britain. Contains Ordnance Survey data © Crown copyright and database right 2014.
The South Downs and New Forest National Parks are indicated in pale orange; Areas of Outstanding Natural Beauty are shown in pale green.