Facilitating and Stimulating Exploration – New Publicly Available Geological Maps for the UK Continental Shelf

Henk Kombrink

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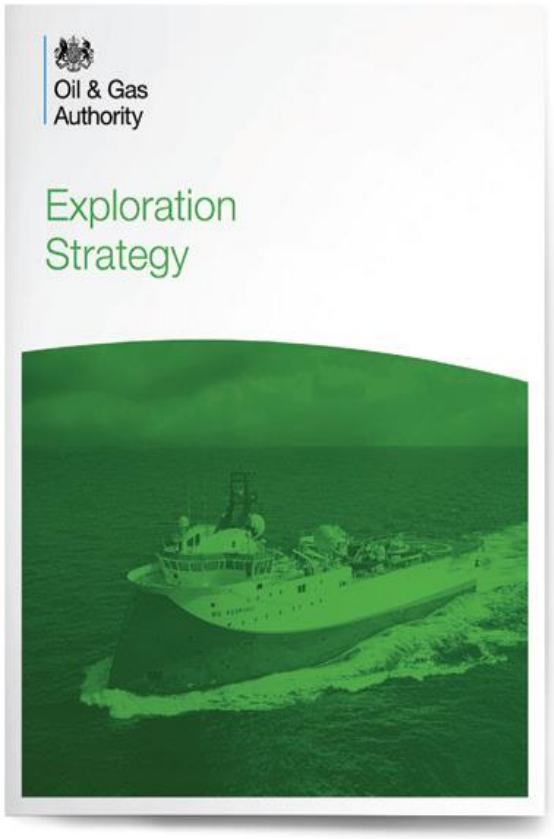
Working together for a safer world

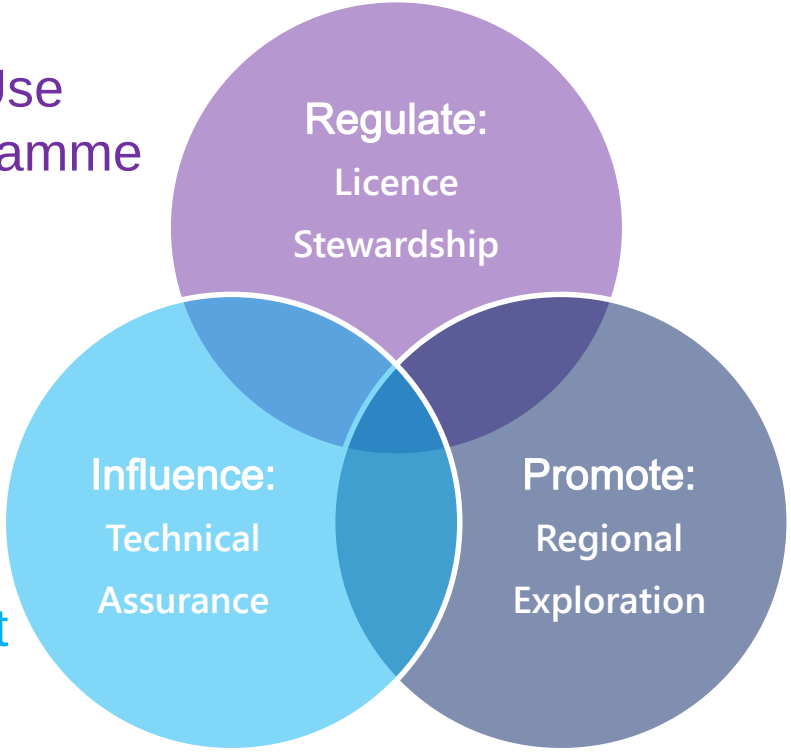
Outline

- OGA Exploration Strategy
- Project context and overview
- Data
- Review of GIS maps – how do they look and how can they be used?

OGA Exploration Strategy



- Licensing Activity
- Optimise Acreage Use
- Monitor Work Programme Delivery



- Portfolio Management
- Improve Technical Standards
- Remove Barriers to Activity

- Play Based Exploration
- Data and Knowledge Sharing
- Global Promotion

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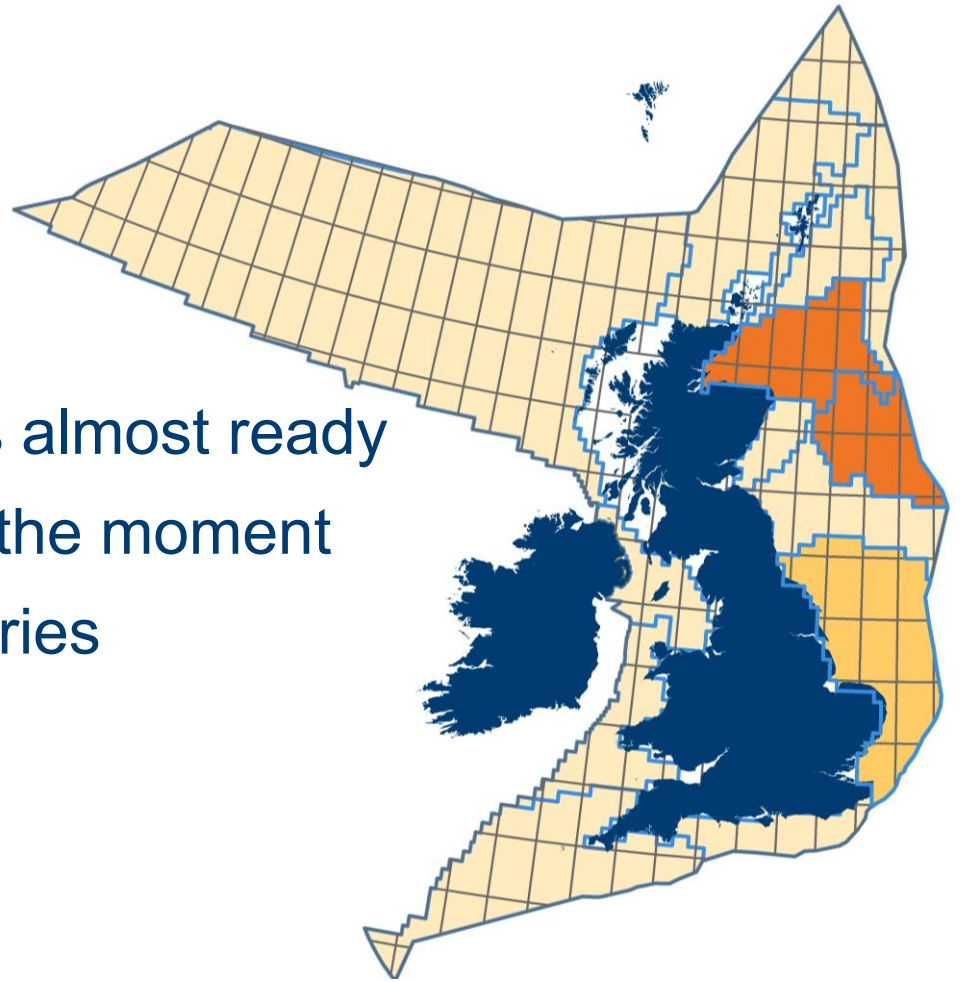
Context

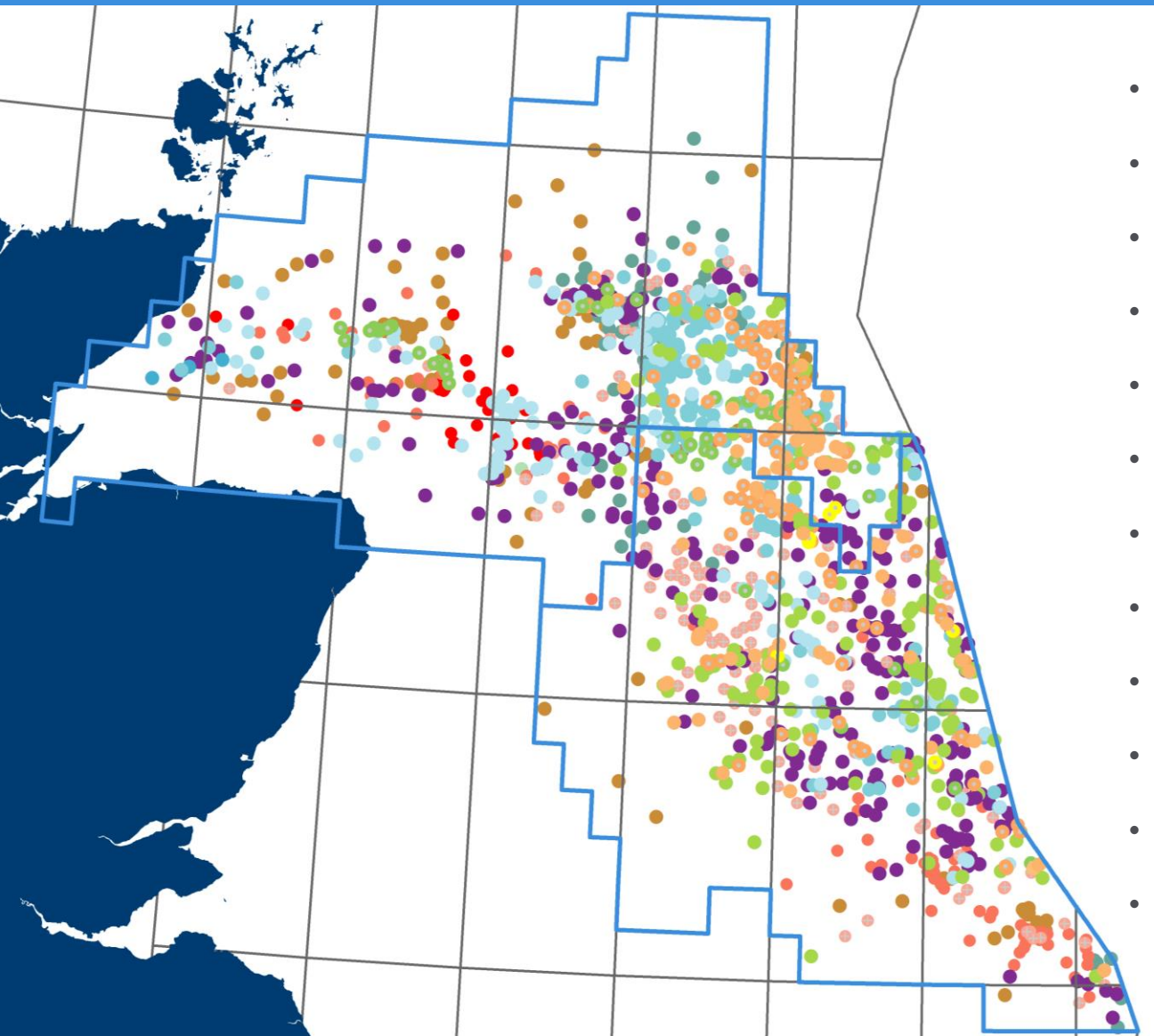
- Maps are being produced at high level, regional scale
- Maps are produced for main geological time intervals – e.g. Upper Jurassic
- All of the data that will be released with the maps is public domain information
- The maps represent geological building blocks to carry out play analysis

Project Overview

- Three year duration
- Work will be done area by area
- Publication of maps on a rolling basis
- Central North Sea and Moray Firth maps almost ready
- Southern North Sea being worked on at the moment
- Data integration with neighbouring countries
- Publication at conferences
- Collaboration with academia
- Software: ArcGIS, Petrel, IP™ and IC™



Maps and Diagrams to be Produced



- Key structure maps
- Isochore maps
- Subcrop maps
- Supercrop maps
- Structural elements maps
- Depositional facies maps
- Reservoir distribution maps
- Source rock maps
- Well penetration maps
- Hydrocarbon occurrence maps
- Stratigraphic diagrams
- Petroleum System Charts

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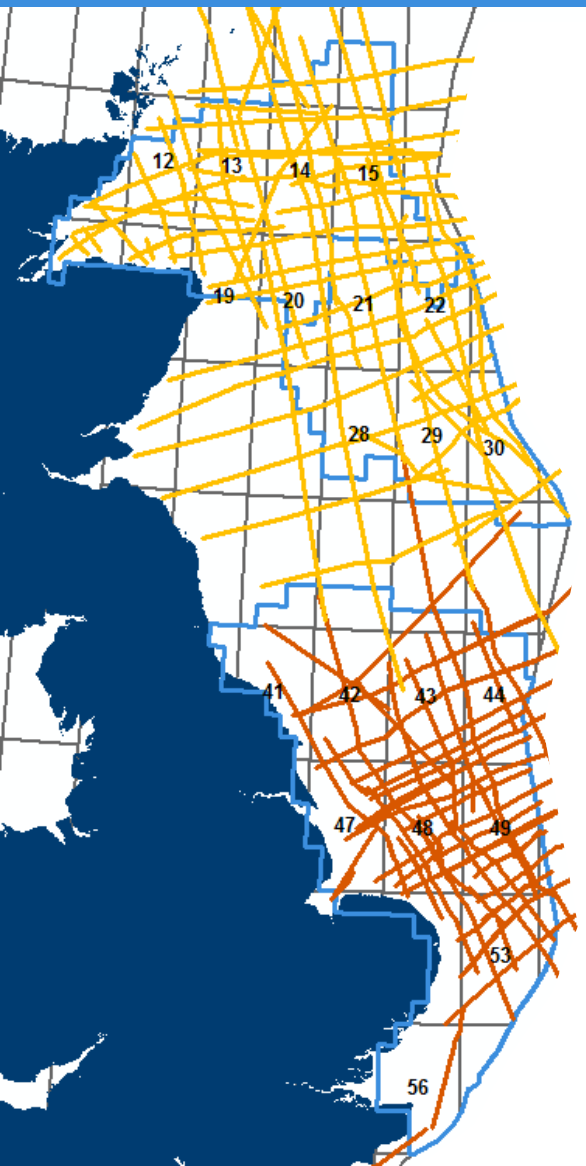
Data – Seismic, Wells and Reports



Seismic data

- 2D Regional lines
- PGS North Sea Digital Atlas
  - Time surfaces
  - Fault polygons
  - Used for the CNS and MF
- SNS: Southern Permian Basin Atlas grids
- OGA-funded 2D surveys will be used for relevant areas, including the interpretation

Well data

- Composite well logs
- End of well reports
- Well tops
- Digital logs
- Deviation files
- Hydrocarbons
- DSTs

Reports

- Ternan

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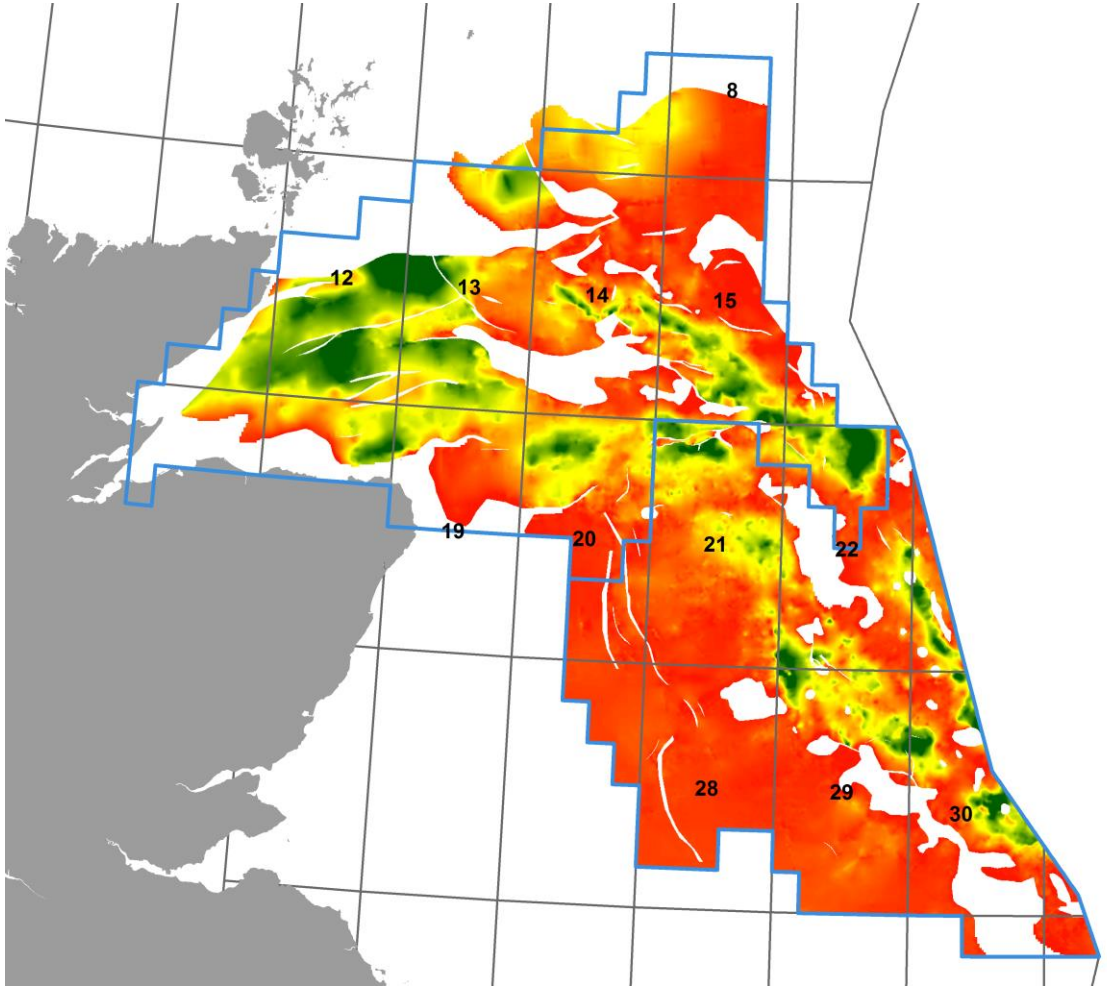
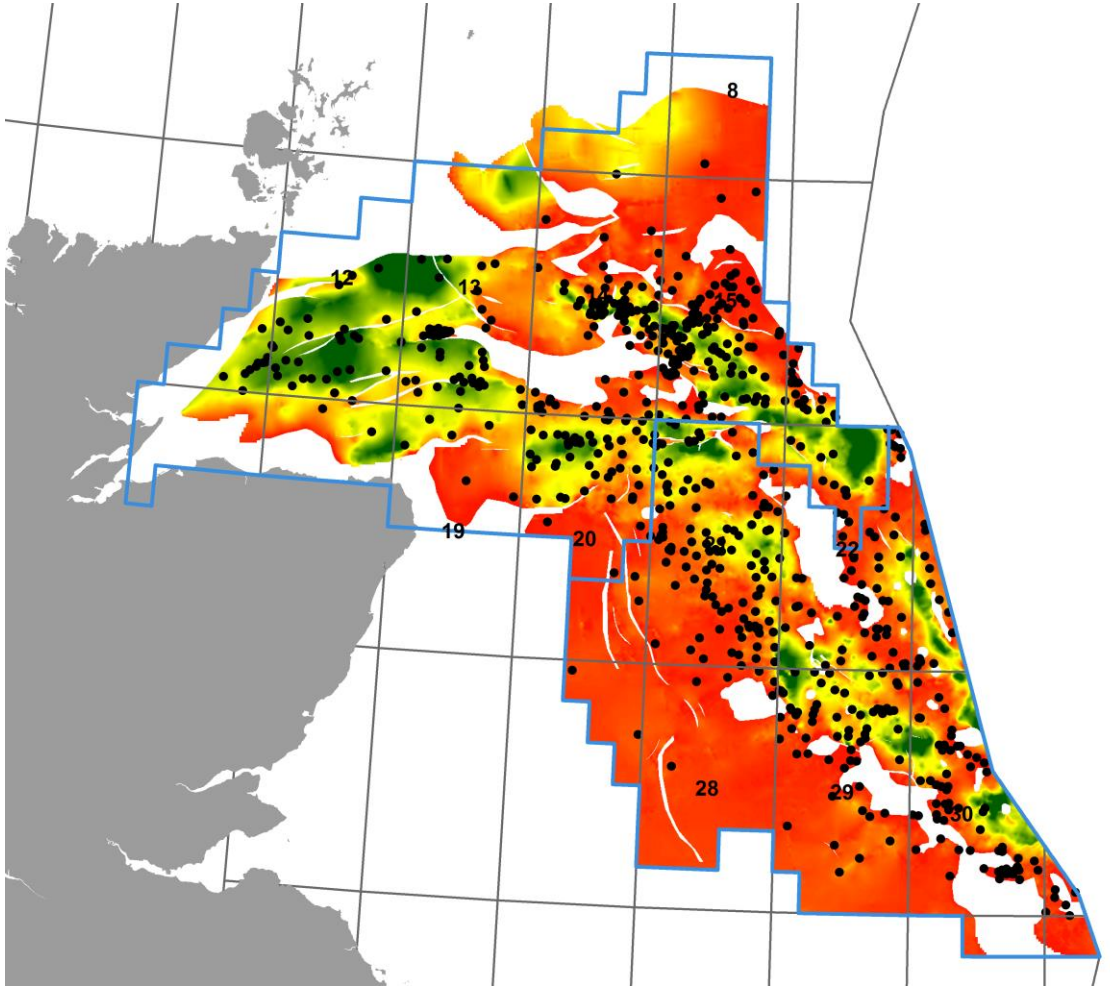
GIS Maps – Thickness Grid Lower Cretaceous



- 250 m grid size
- Red: Lower Cretaceous thin
- Green: Lower Cretaceous thick

- [x] Thickness Grids
  - [ ] 01_Thickness_Top_Balder_Seabed.tif
  - [ ] 02_Thickness_Palaeocene.tif
  - [ ] 03_Thickness_Upper_Cretaceous.tif
  - [x] 04_Thickness_Lower_Cretaceous.tif
  - [ ] 05_Thickness_Upper_Jurassic.tif
  - [ ] 06_Thickness_Middle_Jurassic.tif
  - [ ] 07_Thickness_Lower_Jurassic.tif
  - [ ] 08_Thickness_Triassic.tif
  - [ ] 10_Thickness_Rotliegend.tif

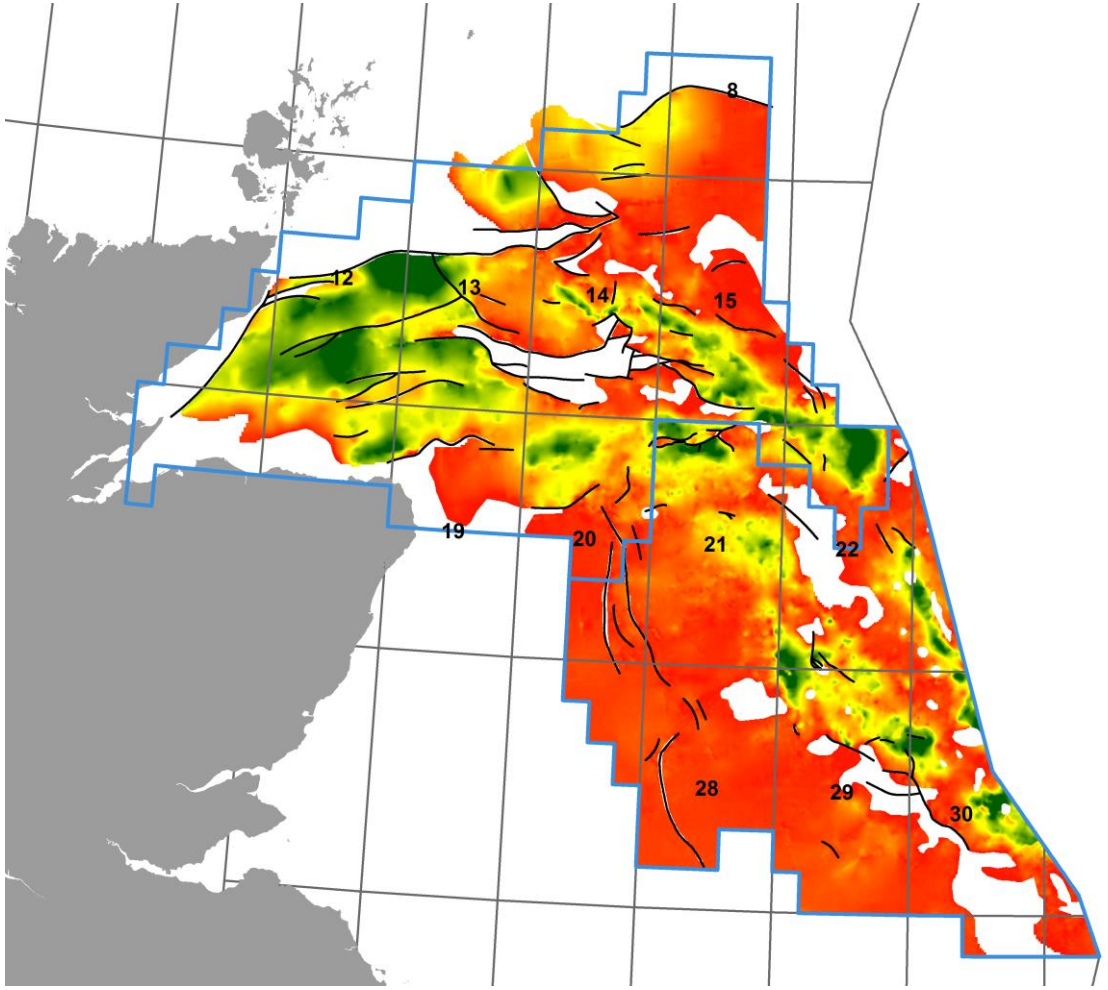
GIS Maps – Thickness Grid Lower Cretaceous tied to Wells



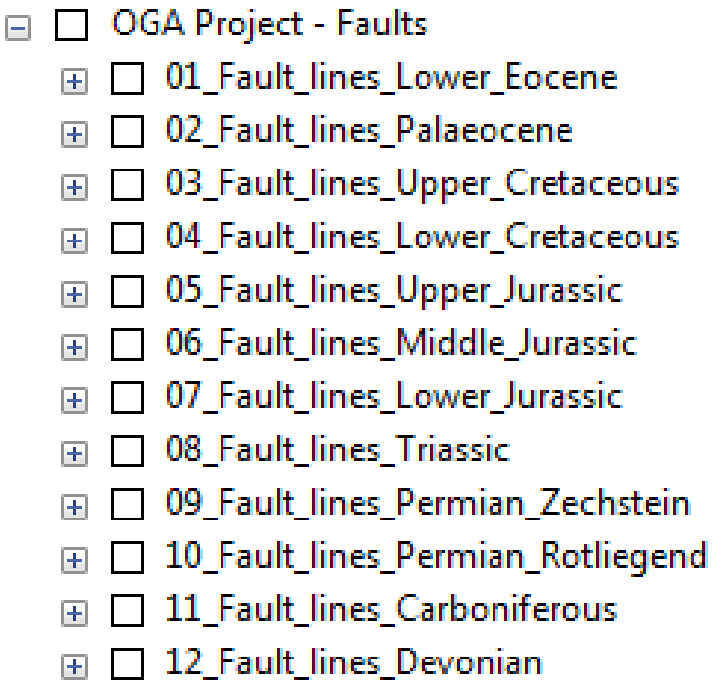
- 715 wells used to tie grid

- OGA Project - Data sets
  - Well data used for the project
  - Well tops used for the project
  - Wells for which a lithology flag was created
  - Wells tied to Top Balder grid
  - Wells tied to Base Palaeocene grid
  - Wells tied to Base Upper Cretaceous grid
  - Wells tied to Base Lower Cretaceous grid
  - Wells tied to Base Upper Jurassic grid
  - Wells tied to Base Middle Jurassic grid
  - Wells tied to Base Lower Jurassic grid
  - Wells tied to Base Triassic grid
  - Wells tied to Base Zechstein grid
  - Wells tied to Base Rotliegend grid
  - 2D seismic

GIS Maps – Thickness Grid Lower Cretaceous and Faults



- Fault lines are based on seismic interpretation and fully consistent with grids



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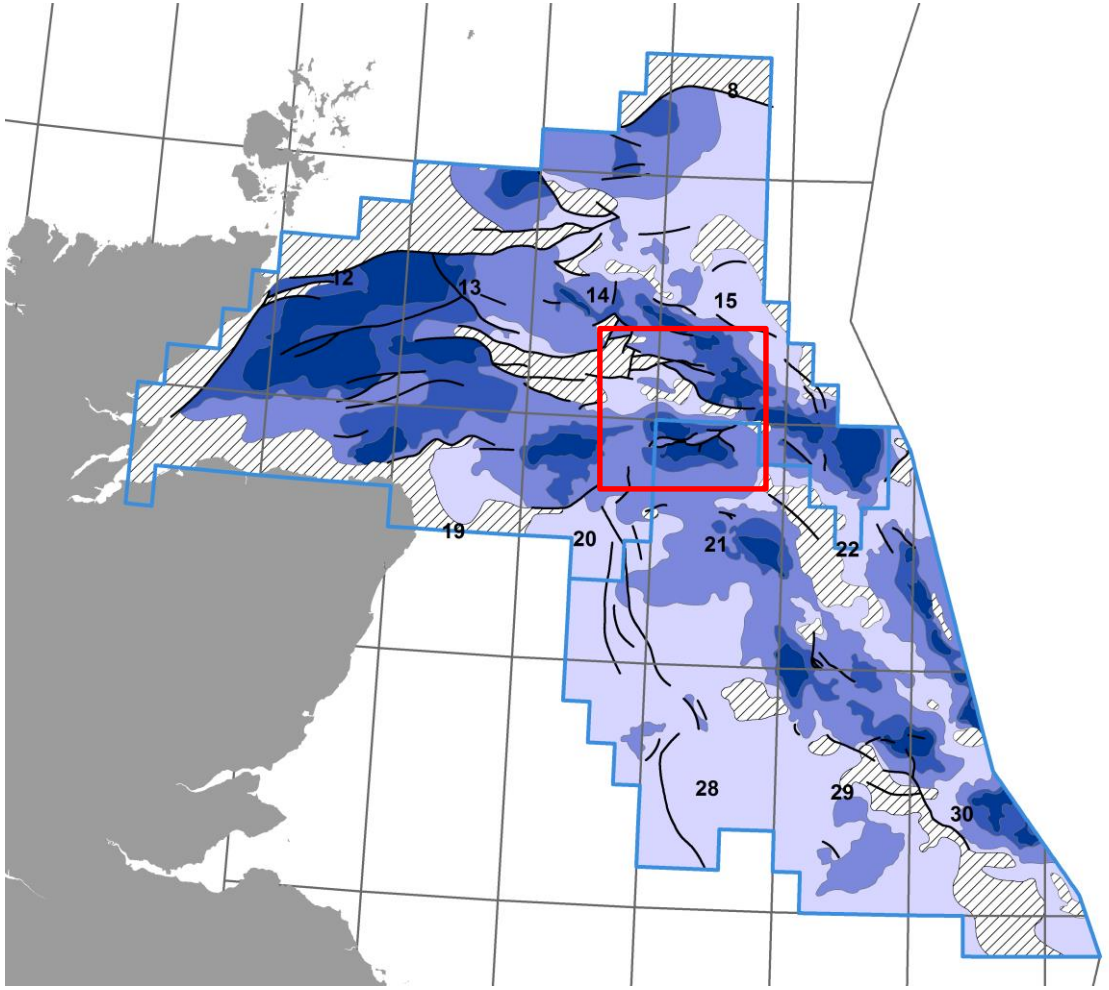
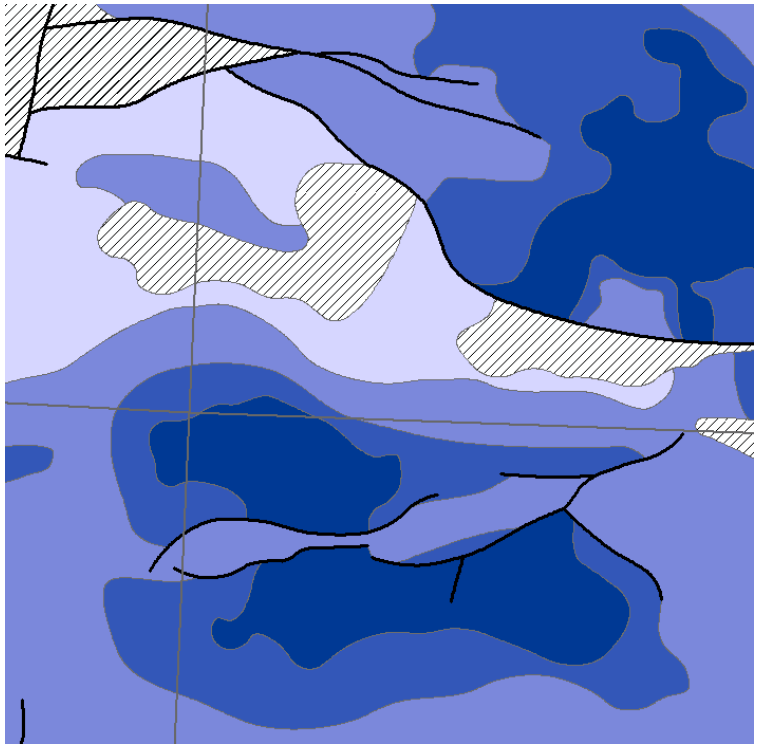
GIS Maps – Structural Elements Lower Cretaceous



- Polygons drawn using thickness distribution from grids and fully aligned to faults



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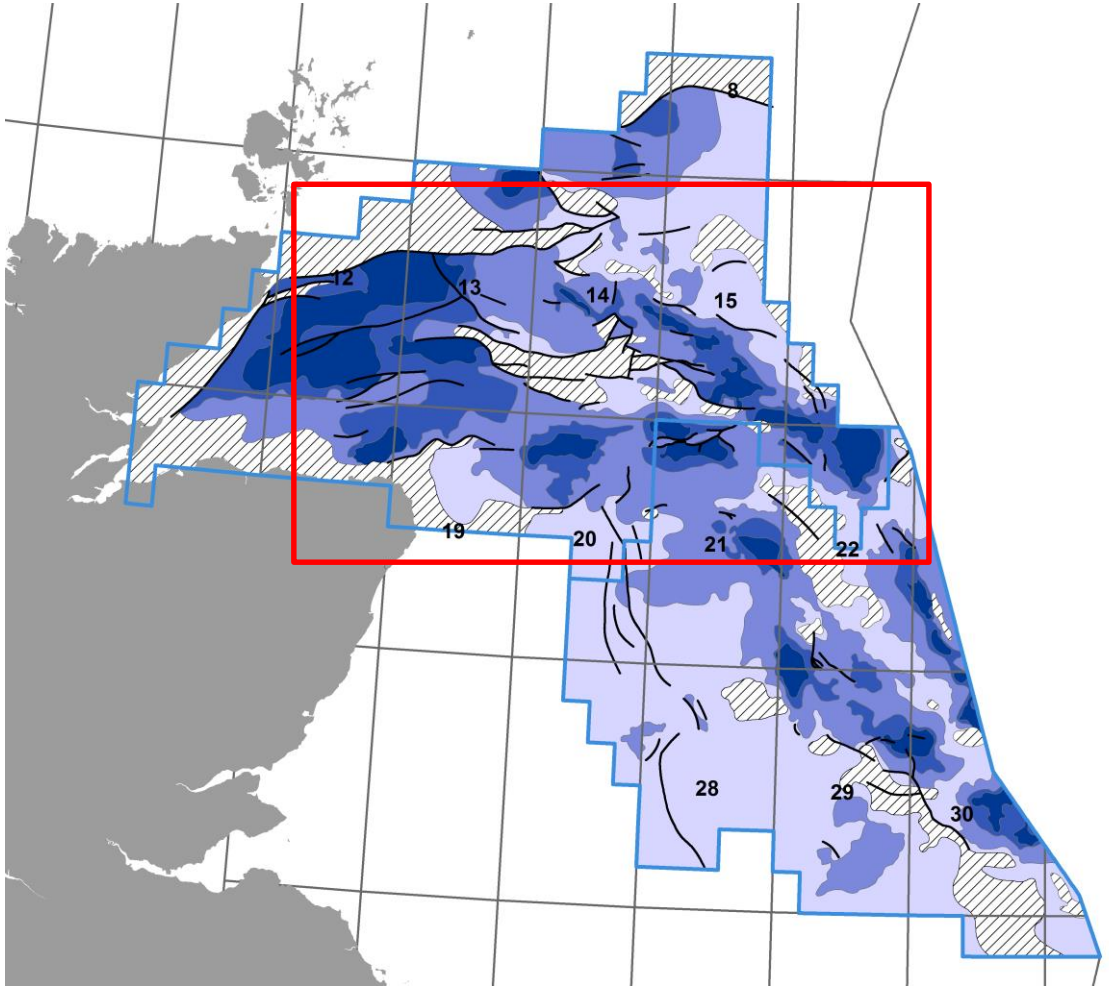

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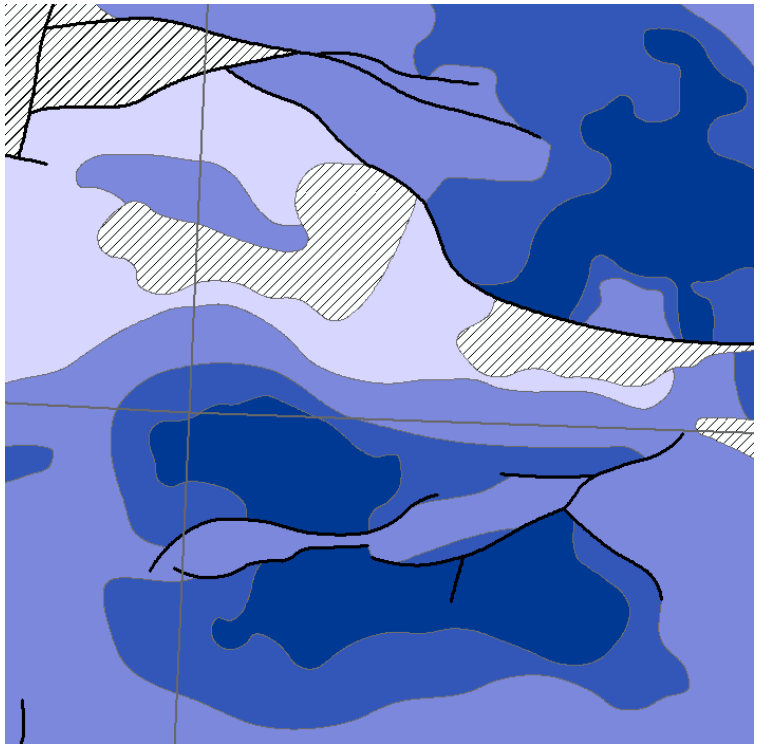
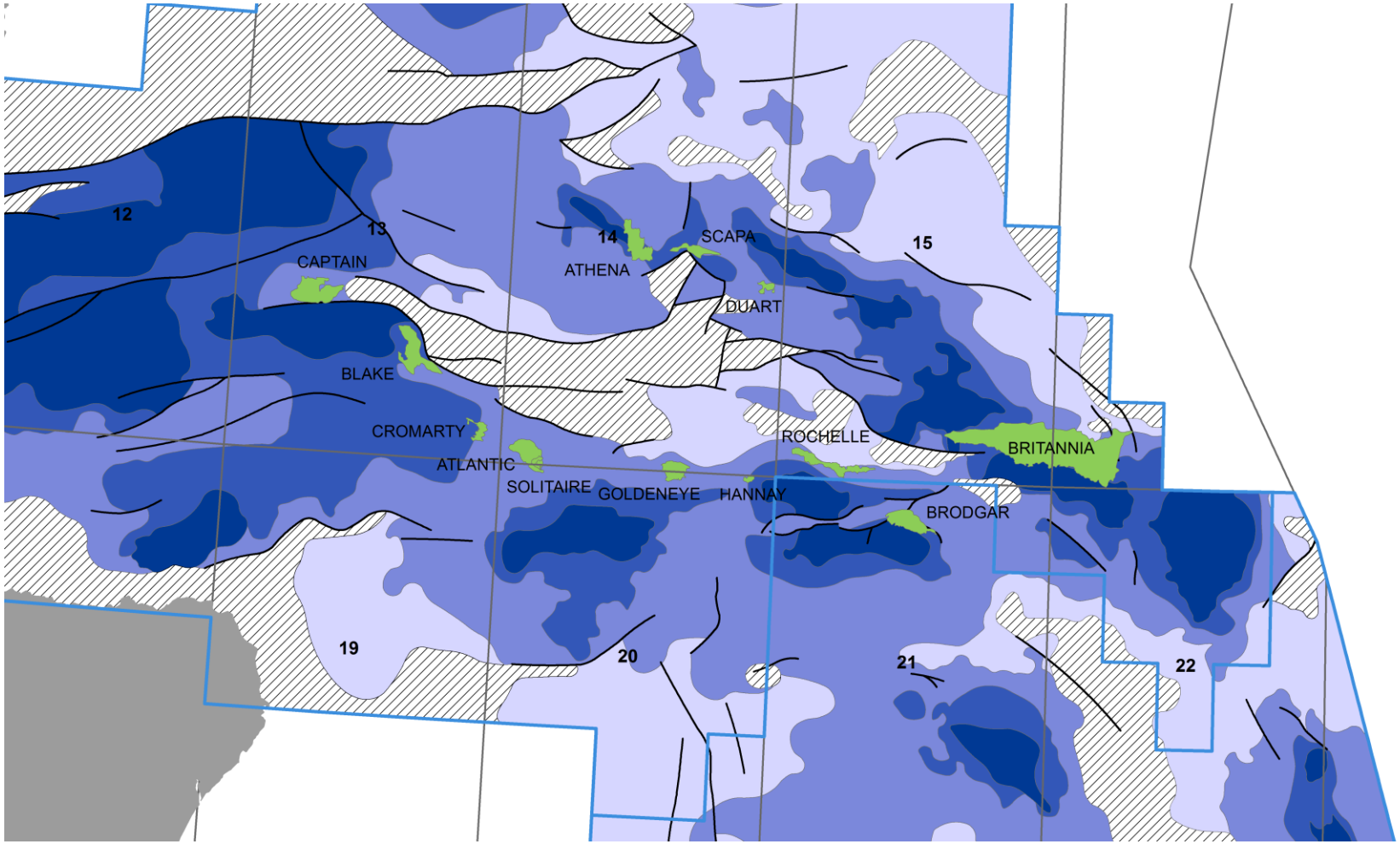
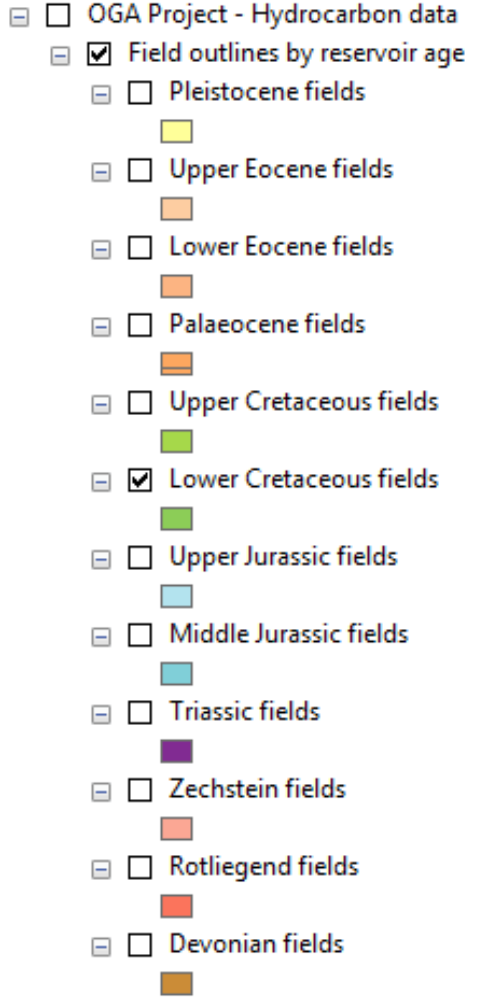


GIS maps – Lower Cretaceous Hydrocarbon Fields





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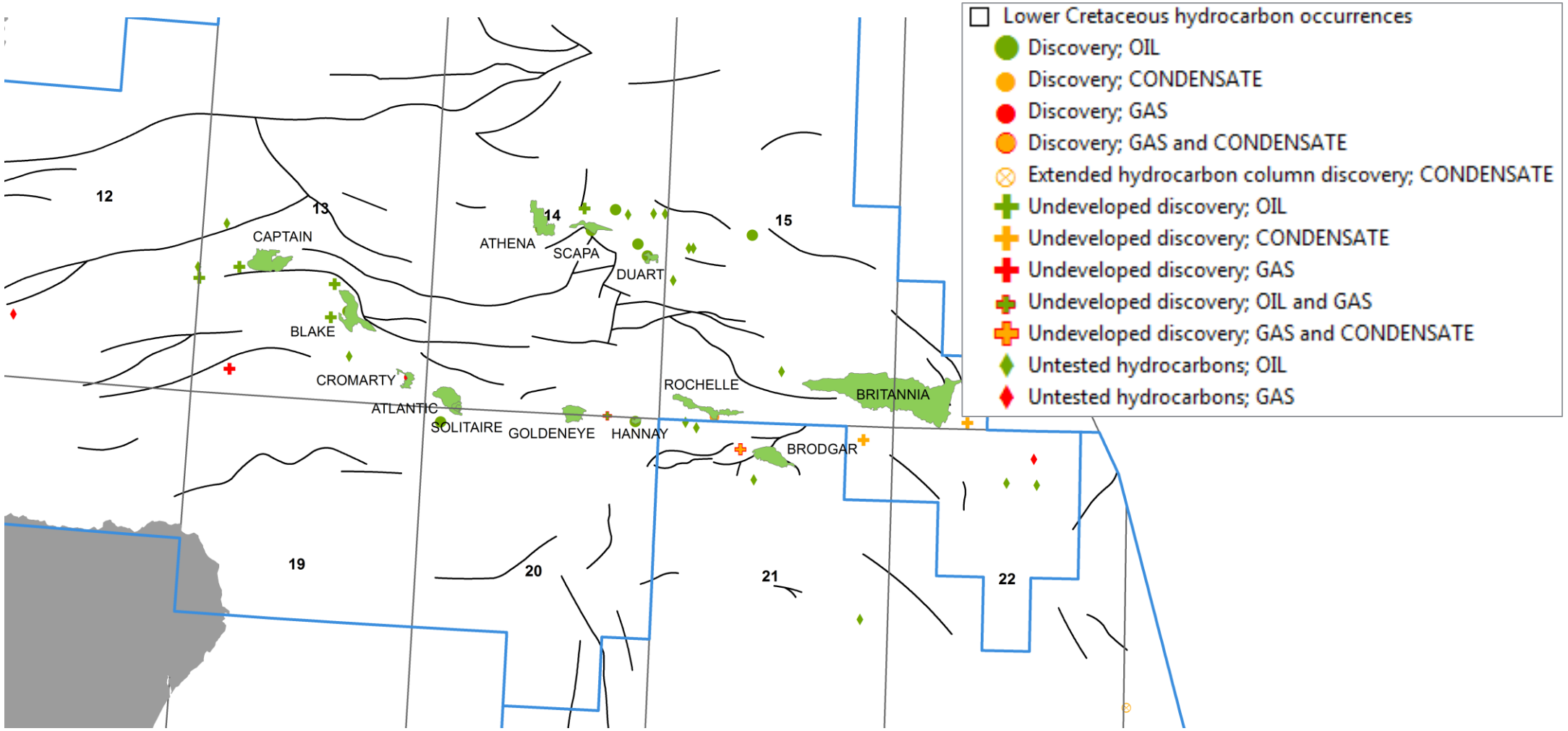
GIS Maps – Lower Cretaceous Hydrocarbon Fields and Occurrences



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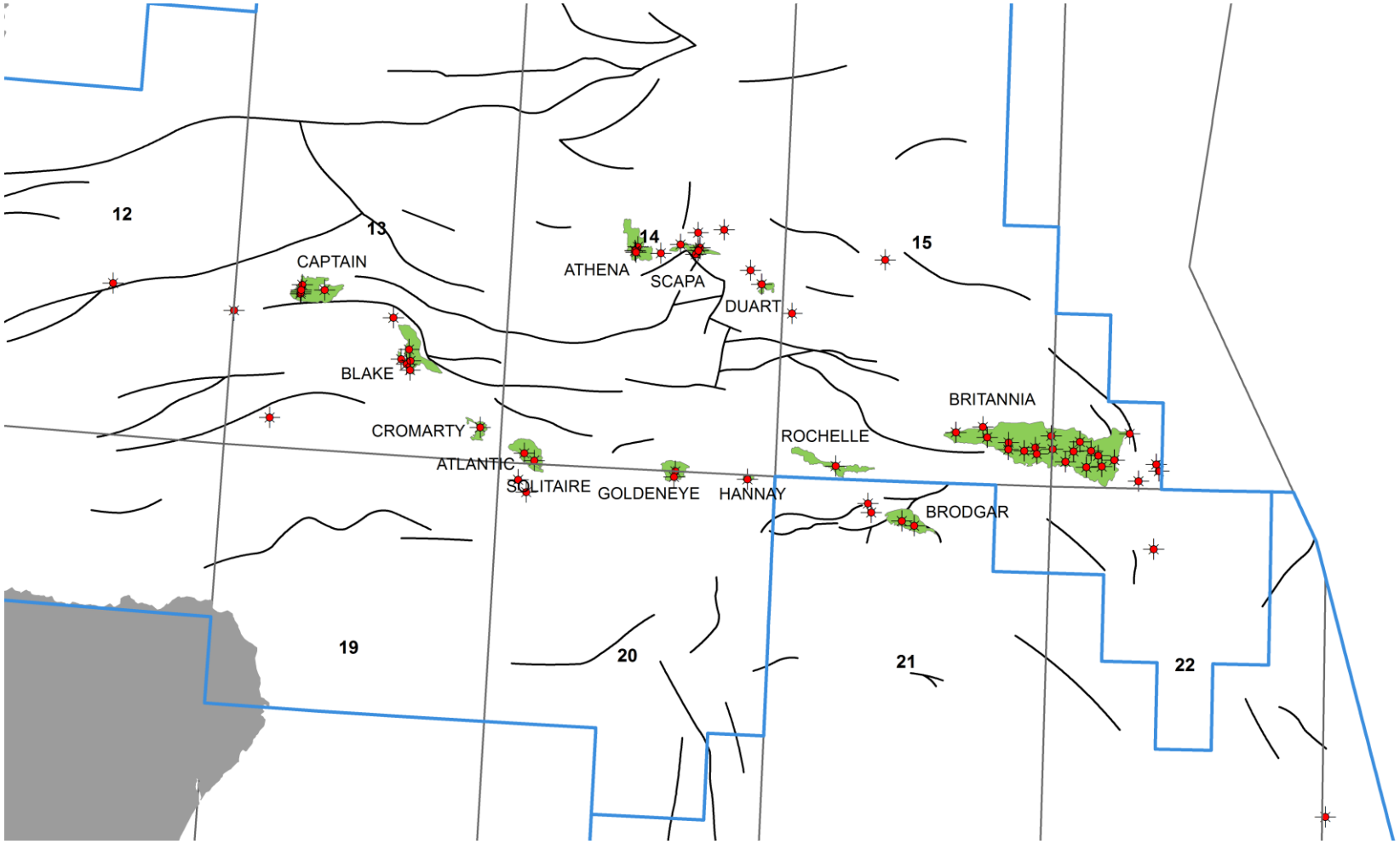
GIS Maps – Lower Cretaceous Hydrocarbon Fields and DSTs



- OGA Project - Drill stems tests
  - DST_wells
  - Drill stem tests - Grid
  - Drill stem tests - Alba
  - Drill stem tests - Frigg
  - Drill stem tests - Upper Eocene
  - Drill stem tests - Balder
  - Drill stem tests - Sele
  - Drill stem tests - Forties
  - Drill stem tests - Lower Eocene
  - Drill stem tests - Balmoral
  - Drill stem tests - Andrew
  - Drill stem tests - Maureen
  - Drill stem tests - Palaeocene
  - Drill stem tests - Upper Cretaceous
  - Drill stem tests - Lower Cretaceous
  - Drill stem tests - Upper Jurassic
  - Drill stem tests - Middle Jurassic
  - Drill stem tests - Lower Jurassic
  - Drill stem tests - Triassic
  - Drill stem tests - Zechstein
  - Drill stem tests - Rotliegend
  - Drill stem tests - Carboniferous
  - Drill stem tests - Devonian

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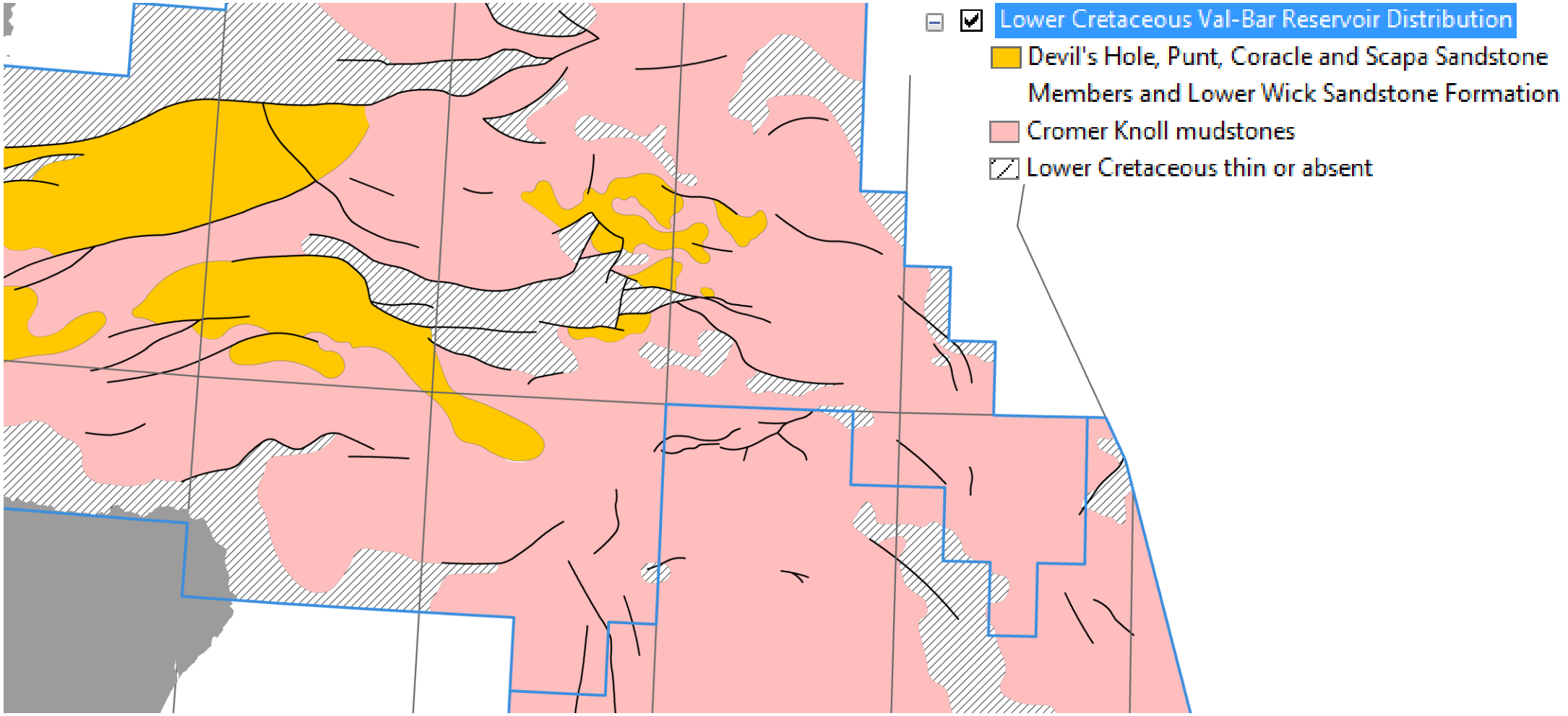
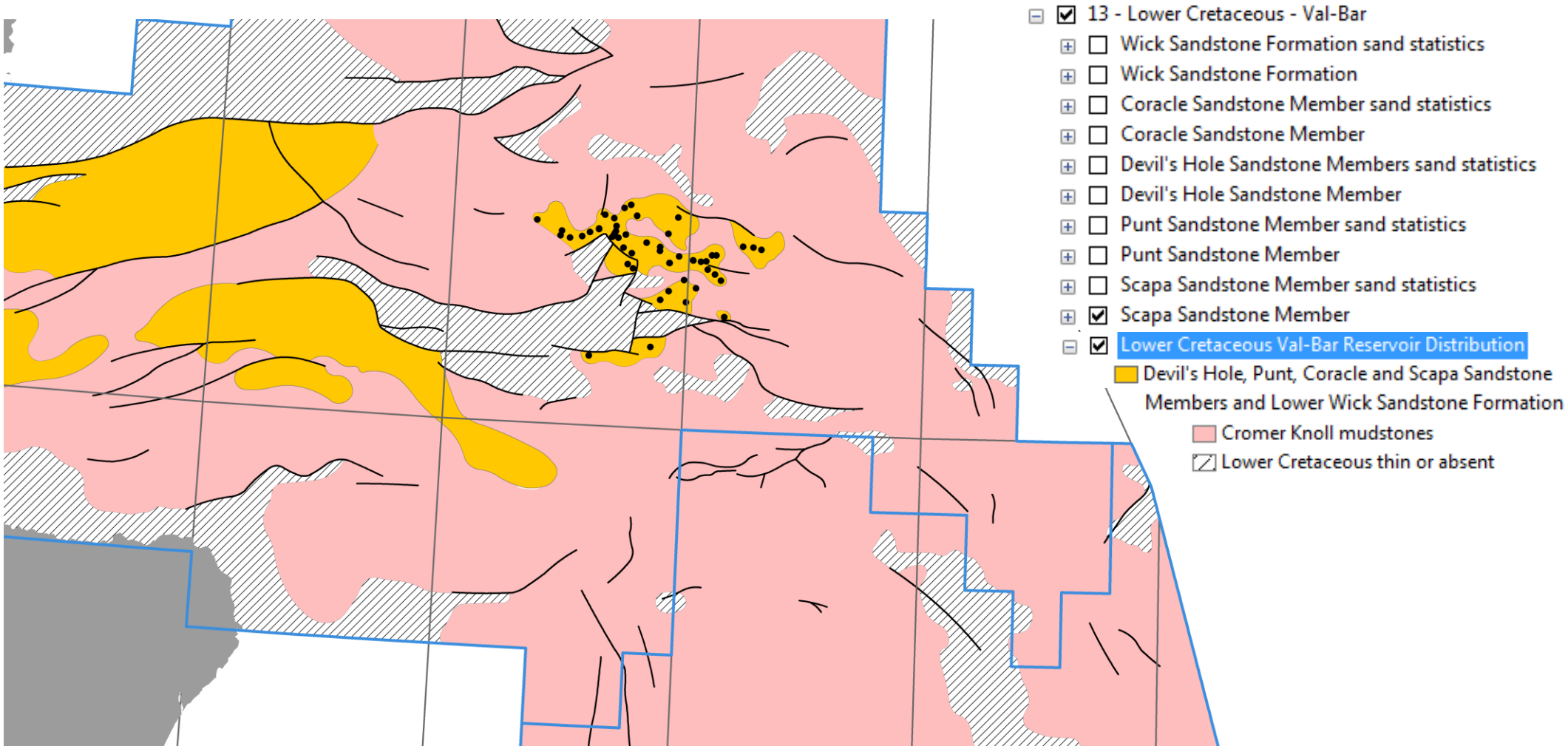
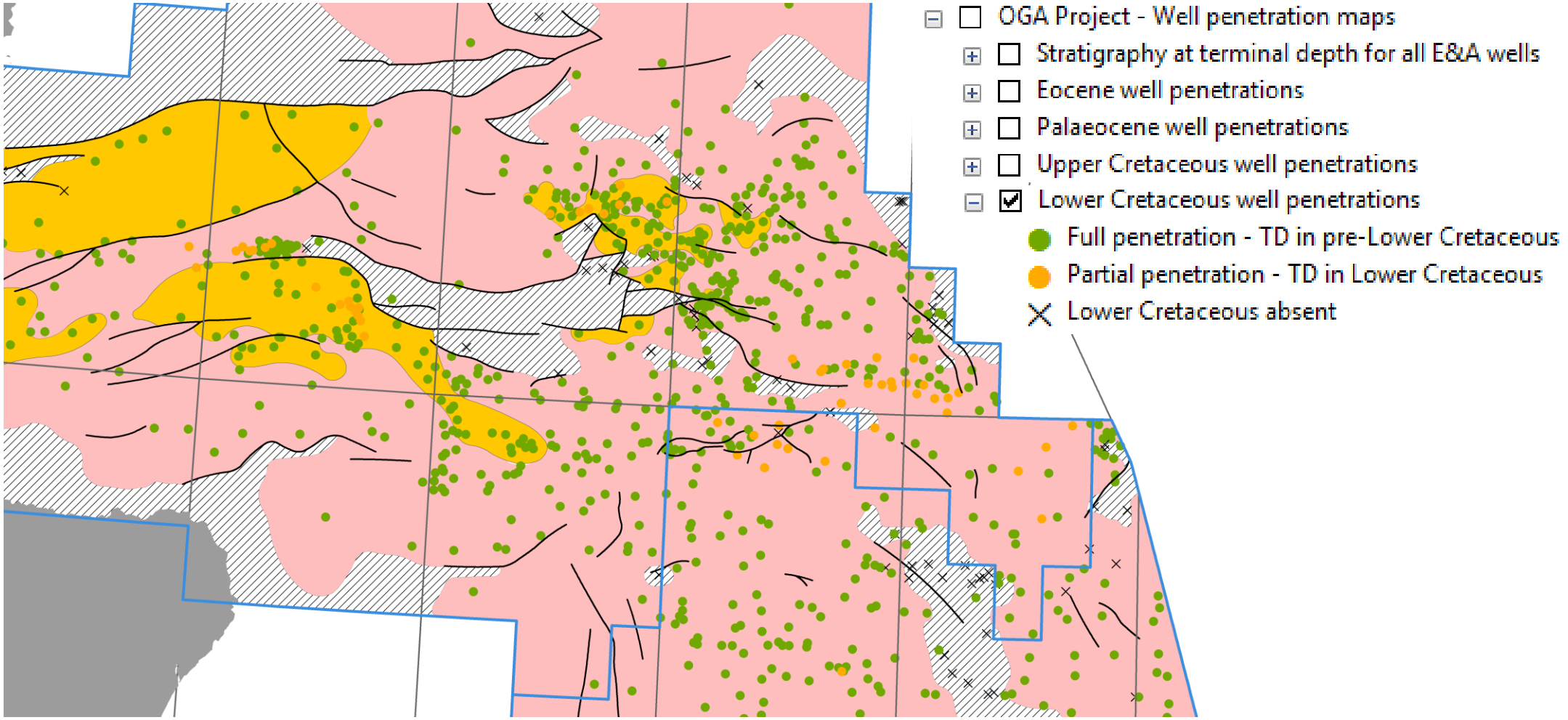
GIS Maps – Lower Cretaceous Valanginian Reservoirs



GIS Maps – Lower Cretaceous Valanginian Reservoirs and Well Tops



GIS Maps – Lower Cretaceous Well Penetrations



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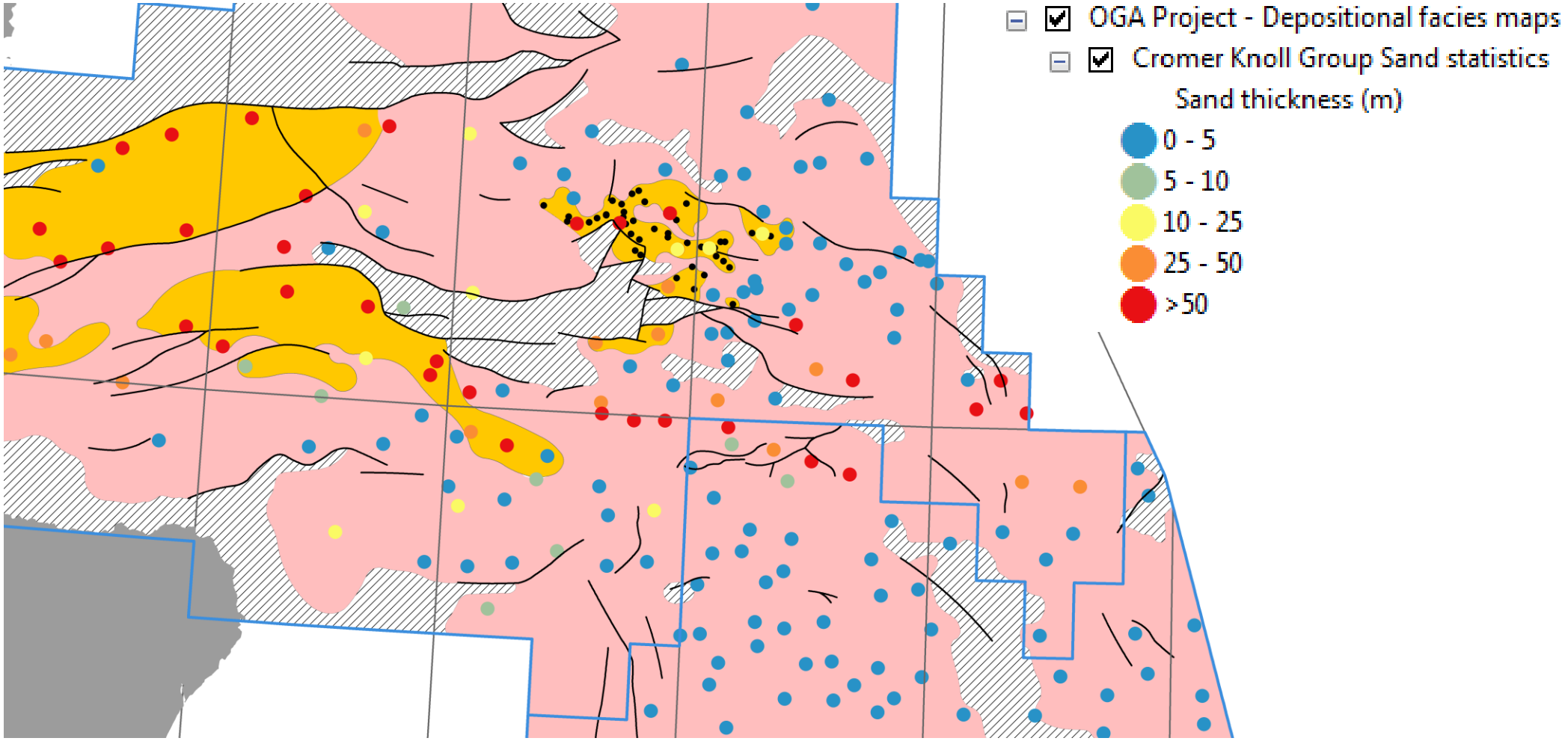
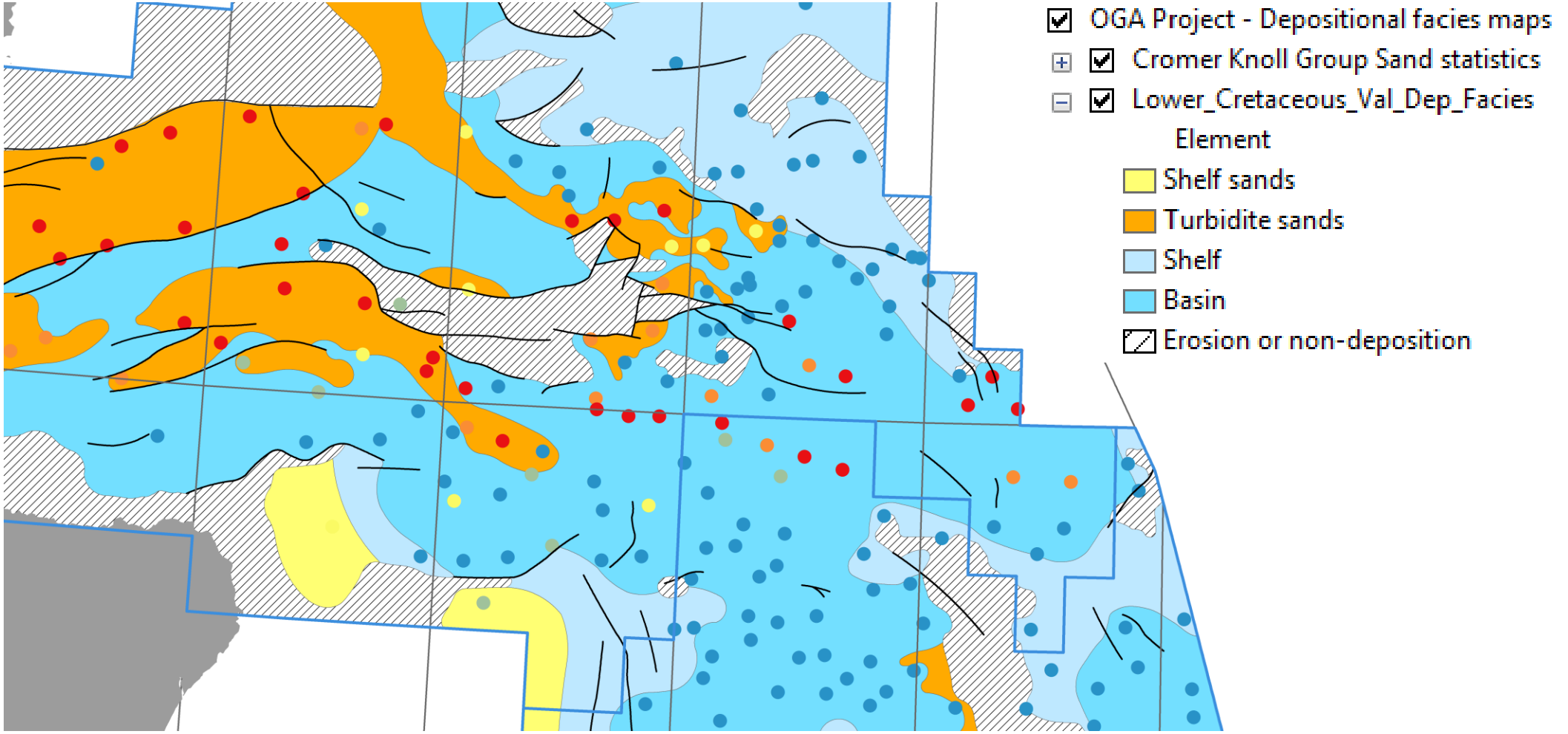
GIS Maps – Lower Cretaceous Sand Thickness



GIS Maps – Lower Cretaceous Valanginian Depositional Facies



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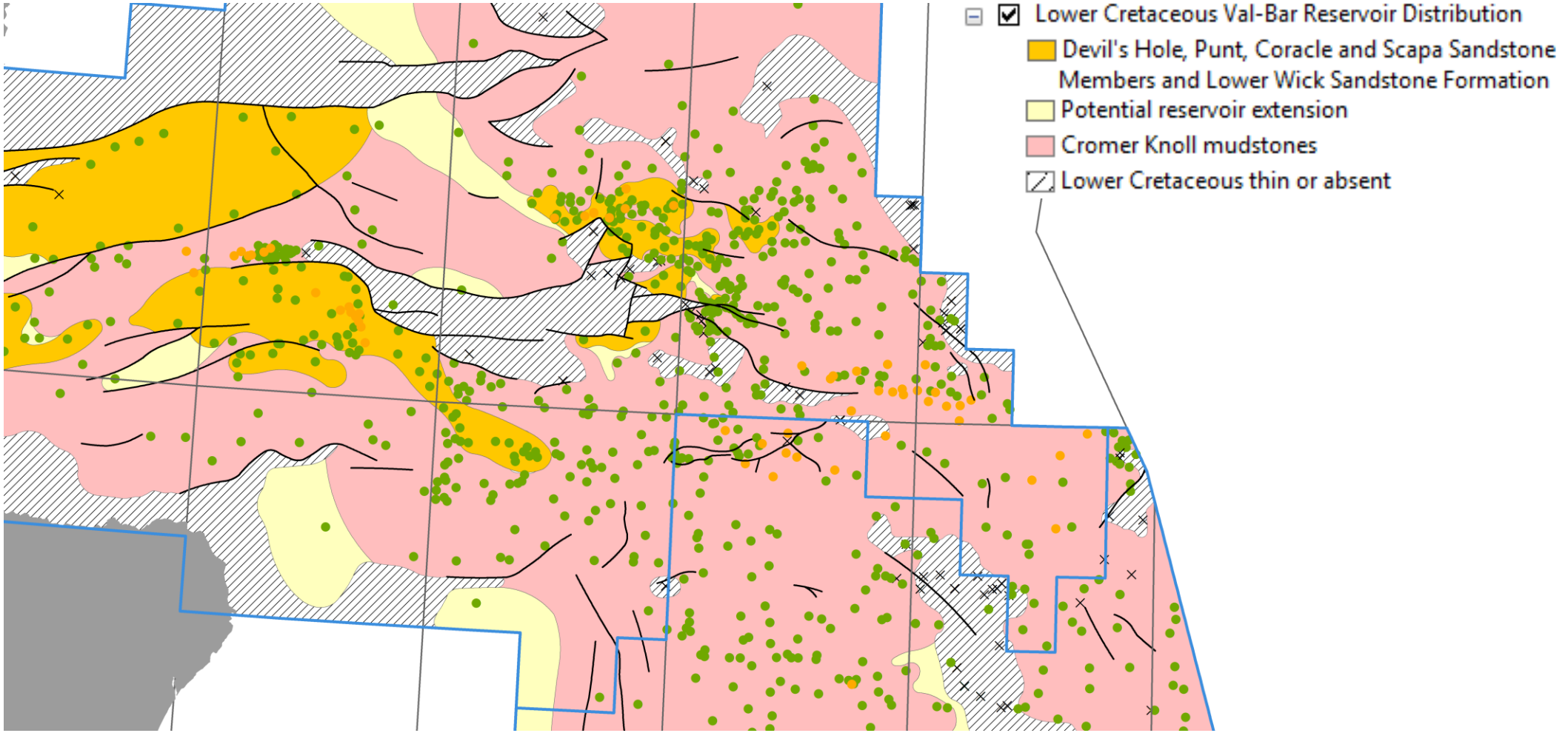
GIS Maps – Reservoir Distribution Maps including Potential Extensions



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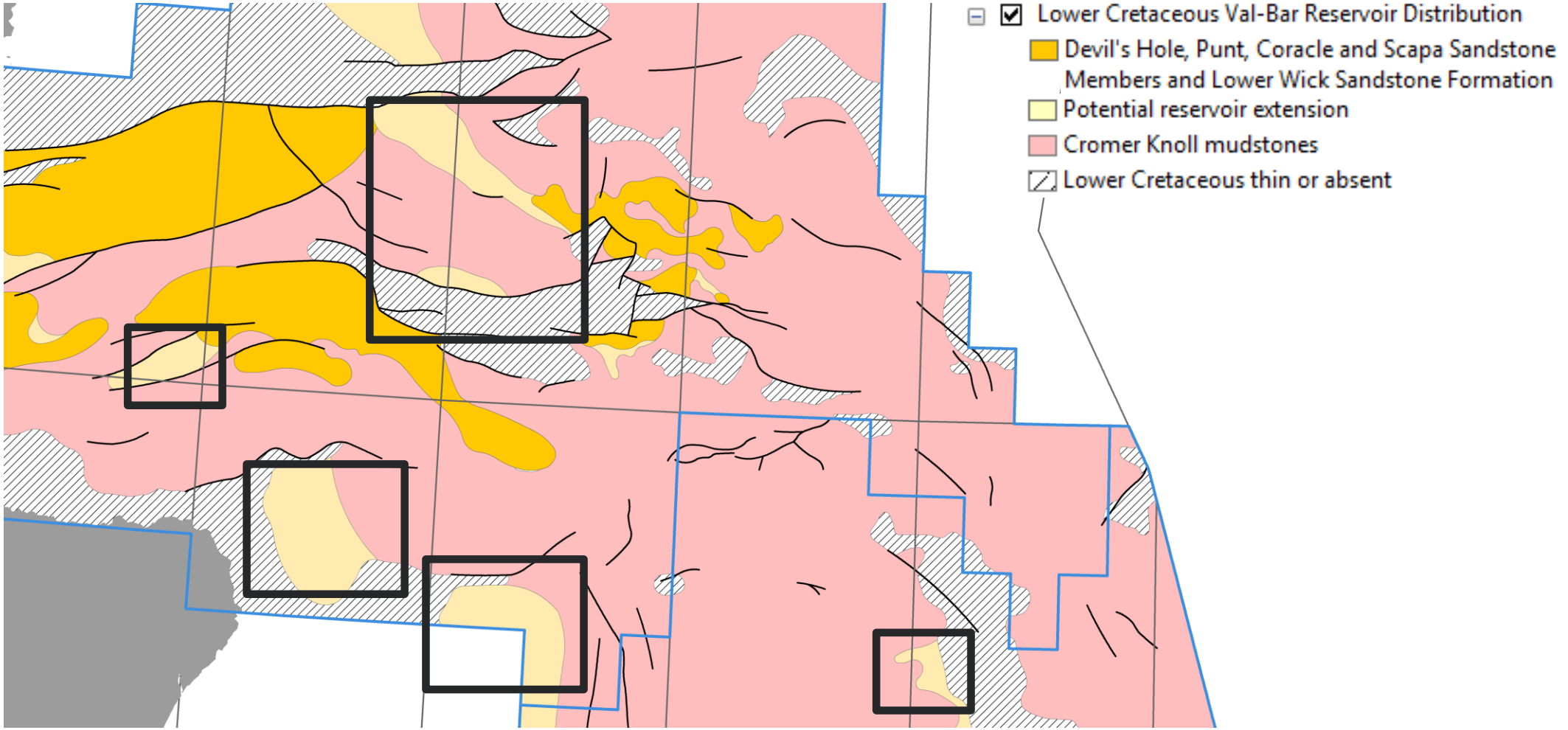
GIS maps – Reservoir distribution maps including potential extensions



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In summary

- This project is the first to enable users to interactively use a wealth of subsurface data and maps for the entire UKCS
- First data pack for Central North Sea and Moray Firth near completion
- Release of Southern North Sea maps late 2017
- Follow Lloyd's Register's LinkedIn Blog posts

Thanks to

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CDA Shared data solutions for the UK offshore oil industry

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