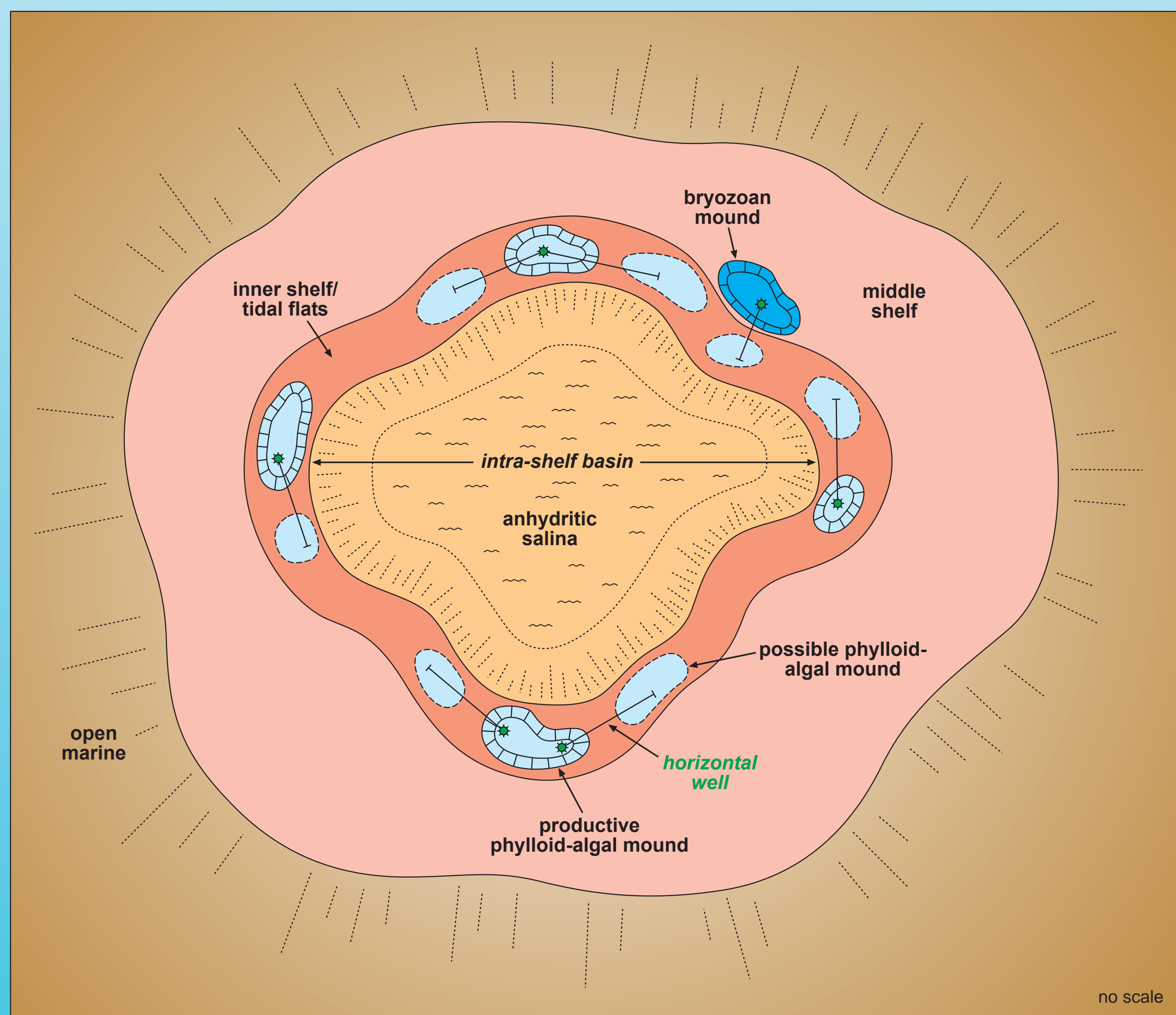
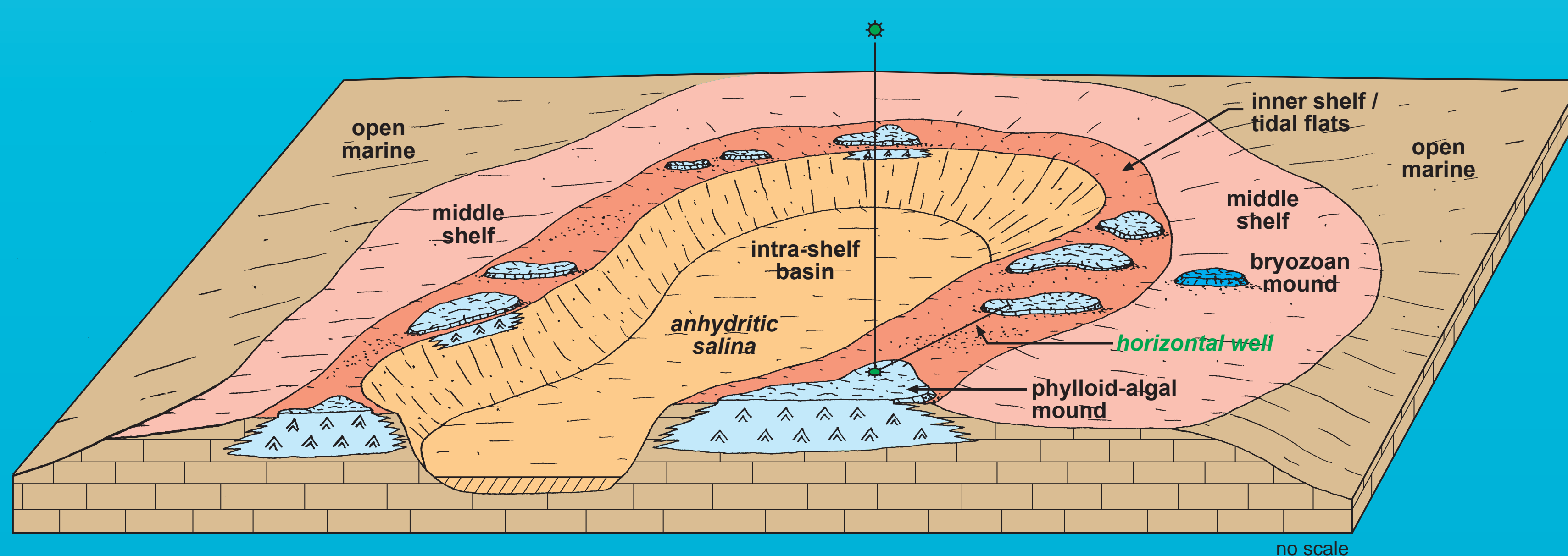


## Using Upper Ismay Intra-Basin Facies Trends for Targeting Future Horizontal Wells



Map view of an ideal upper Ismay intra-shelf basin surrounded by a ring of inner shelf/tidal flat sediments (shown in red) that encase phylloid-algal mound clusters (in light blue). The central portion of the intra-shelf basin is the location of thick anhydrite (in orange) accumulation. Outboard from the inner shelf/tidal flat and mound fairway are low-energy middle shelf and open marine carbonates. Potential targets for future horizontal drilling could be found by drilling from known phylloid-algal reservoirs along the inner shelf/tidal flat trend to encounter previously undrilled porous buildups.



Cut-away block diagram showing the possible spatial relationships of upper Ismay facies types controlled by an intra-shelf basin. Phylloid-algal mounds (in light blue) are the principal reservoir within a curvilinear band that rims the intra-shelf basin. A hypothetical vertical well into a known mound reservoir is used as a kick-off location for horizontal drilling into previously undrained mounds.

### Facies Mapping Database

- Study Area – approx. 750 sq. mi. within Blanding sub-basin of the Paradox Basin.
- Total # wells drilled to the Paradox Fm. within study area - approx. 480 wells.
- Cores interpreted –
  - Upper part – upper Ismay = 41 wells
  - Lower part – upper Ismay = 40 wells
- Additional logs interpreted – upper & lower parts, upper Ismay = 82 wells

### Summary

- The upper Ismay zone is one of two stratigraphic reservoir intervals for the > 50 MMBO produced to date in the Blanding sub-basin of the Paradox Basin.
- This study was undertaken to provide a useful database and methodology for identifying potential horizontal drilling targets within heterogeneous carbonate rocks containing porous phylloid-algal buildups and associated facies.
- A grid of regional log cross sections within the Utah portion of the Blanding sub-basin shows the development of “clean carbonate” packages which contain all of the productive reservoir facies. These clean carbonates abruptly change laterally into thick anhydrite packages.
- Isochore maps of the upper Ismay clean carbonates and the locally thick anhydrites are consistent with a broad carbonate shelf containing several small intra-shelf basins. The intra-shelf basin centers fill with anhydrite following carbonate sedimentation on the remainder of the carbonate shelf.
- Examination of upper Ismay cores identified seven (7) depositional facies:
  - Open Marine
  - Phylloid-Algal Mounds
  - Bryozoan Mounds
  - Middle Shelf
  - Inner Shelf/Tidal Flat
  - Quartz Sandstone Dunes(?)
  - Anhydritic Salinas
- Mapping these seven facies into two intervals (upper and lower parts) of the upper Ismay zone delineates prospective reservoir trends that contain porous, productive buildups.
- The mapped facies trends clearly define anhydrite-filled intra-shelf basins. Projections of the Inner Shelf/Tidal Flat and Mound trends around the intra-shelf basins identify potential exploration targets, which could be developed using horizontal drilling techniques.