

^{AV}Vertically Extensive Definitions of Plays on the Gulf of Mexico Shelf Based on the Principal Sedimentary Events of Fields*

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Vertically Extensive Definitions of Plays on the Gulf of Mexico Shelf Based on the Principal Sedimentary Events of Fields

2007 AAPG Convention

Long Beach, CA

April 2, 2007

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Play Definition



Objectives

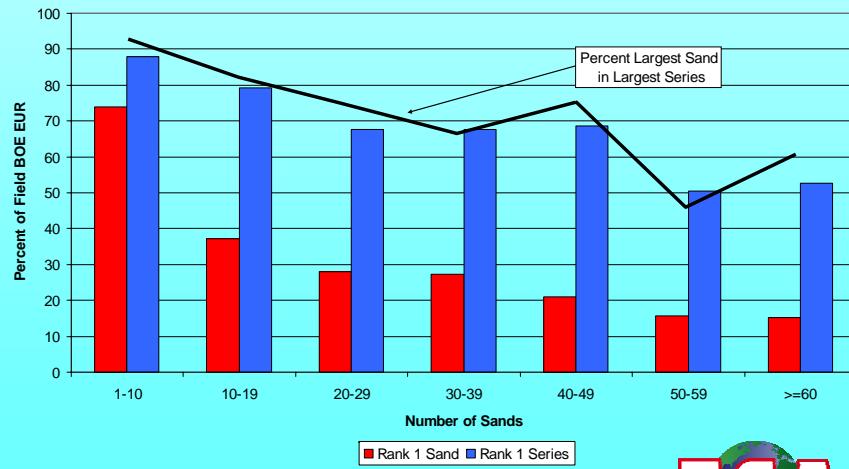
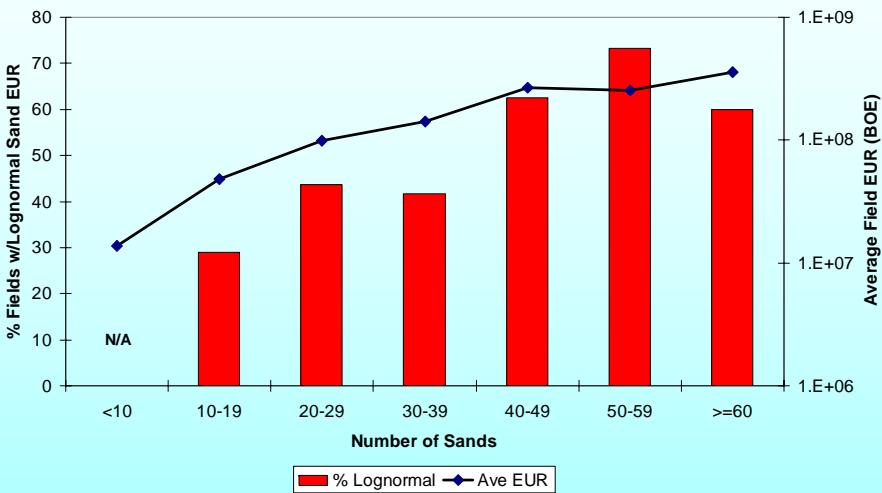
- Assign fields to plays consistent with standard definition
 - Common reservoir, trapping & charging
- Alternative to MMS plays
 - Based on log-character packages in series
 - Larger fields belong to many plays
 - But exploration is field-wise process

Study Area & Data

- Plio–Pleistocene GOM shelf facies:
 - Sand estimated ultimate recovery (EUR) from MMS (2003)
 - Biostratigraphic tops from Fillon (2006)
 - Tops maps & isopachs – This study
 - Environment of deposition from PDI (2006)
- Deeper & distal sections remain

Organization of HCs within Fields

- EUR distributions of sands in fields are highly skewed:
 - Sand EUR is usually lognormal
 - A single series usually dominates
 - Largest (#1) sands anchor most fields



Play Definition

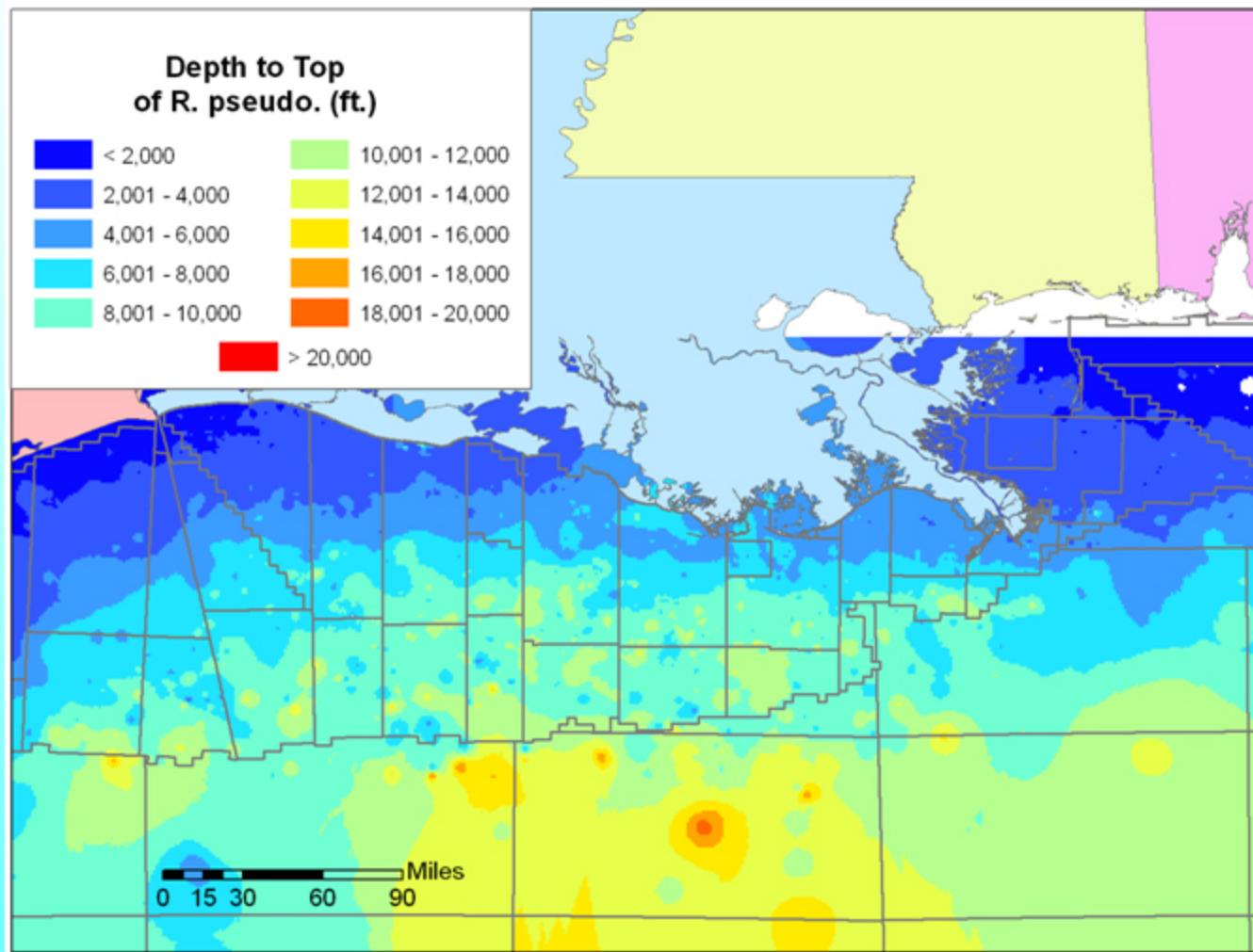
Charts Apply to All GOM Fields



Refining Play Definition

- Dominance of largest sand & series suggest principal sedimentary event
 - A field's play assigned by largest sand
- Accumulations at the core of that event govern the play & define it
 - Play's core contains most of its fields/EUR
 - Outside core sands/fields usually small & randomly distributed

Build Stratigraphic Framework

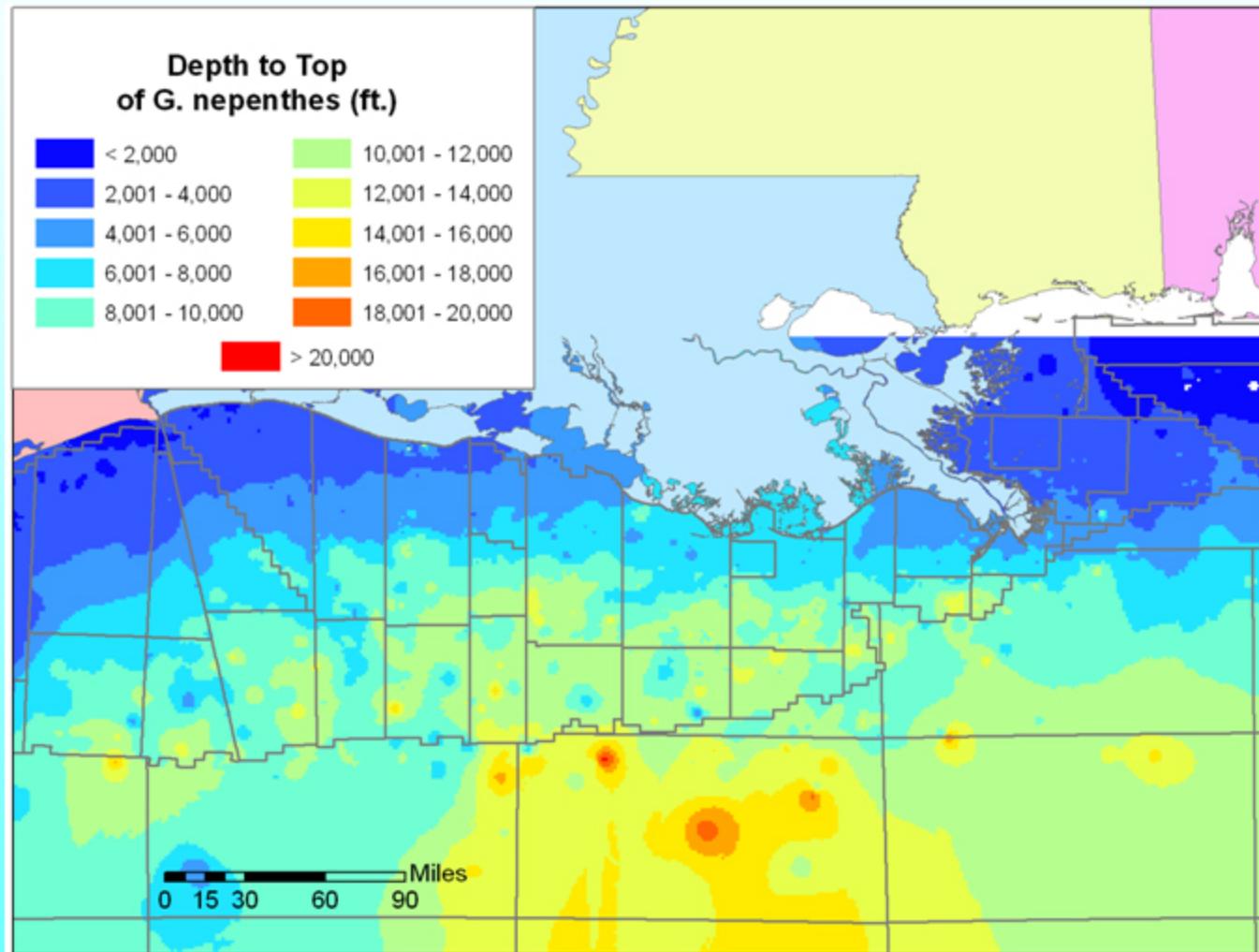


Play Definition

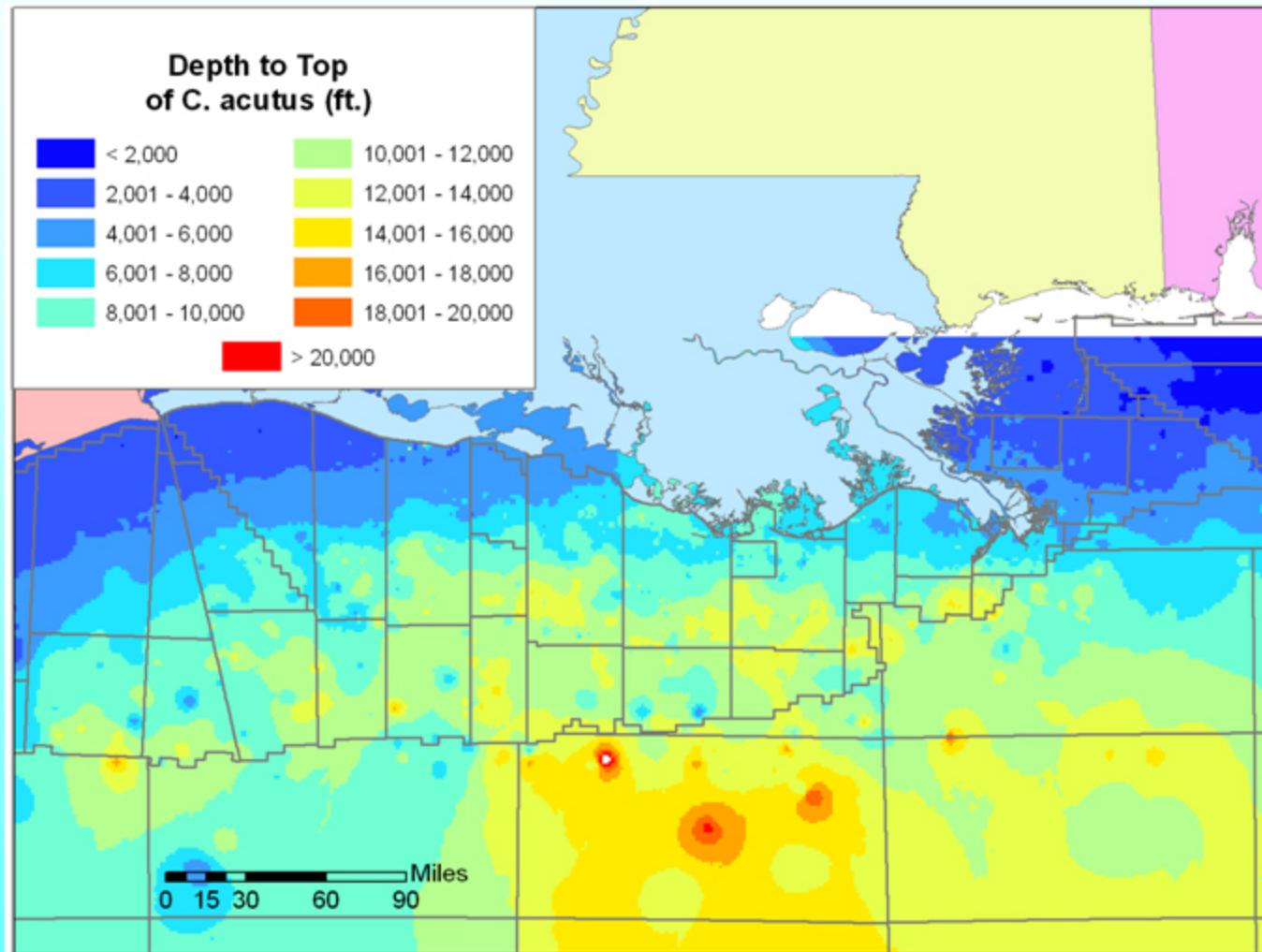
Lower Pliocene



Build Stratigraphic Framework



Build Stratigraphic Framework

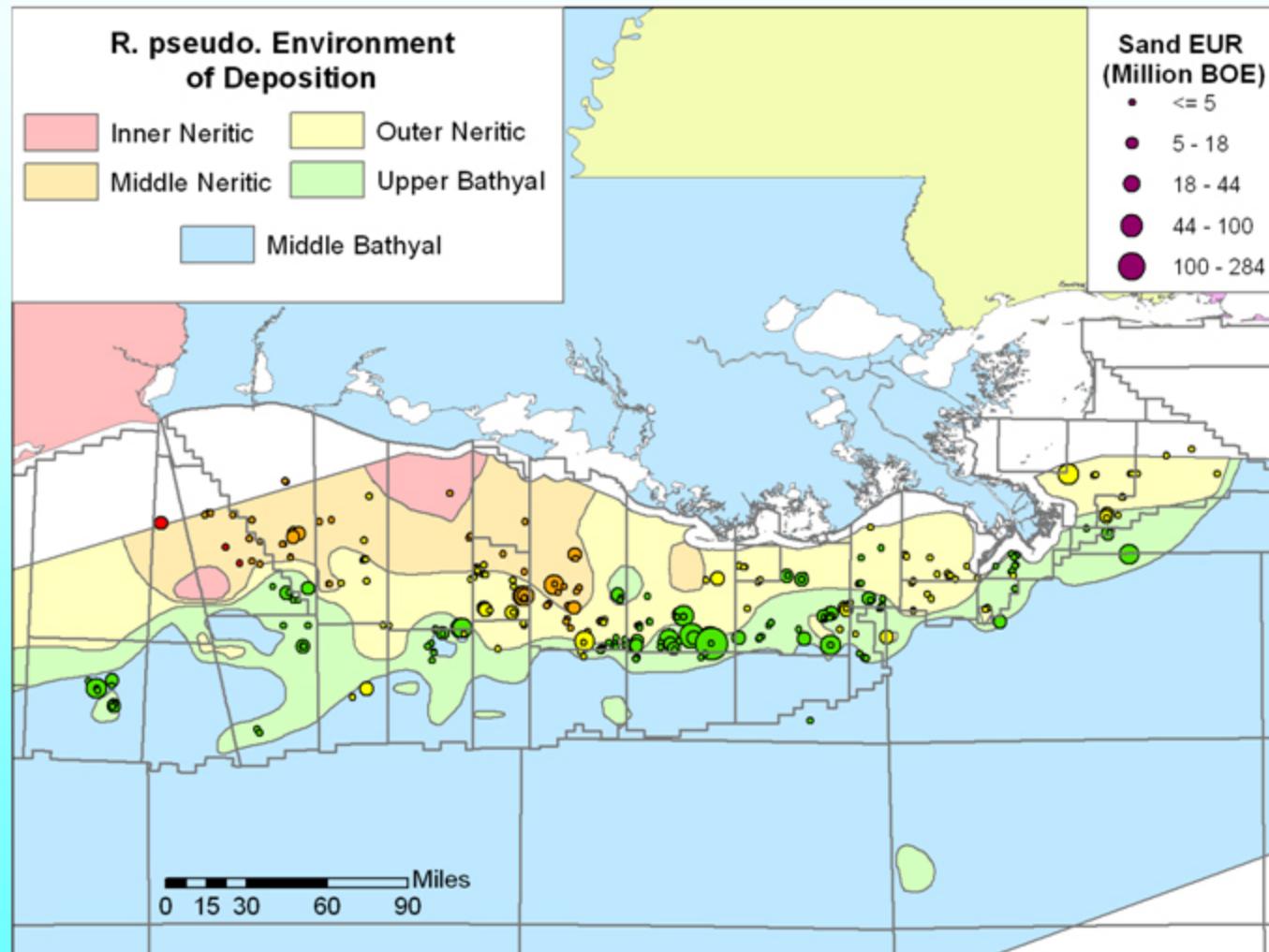


Play Definition

Lower Pliocene



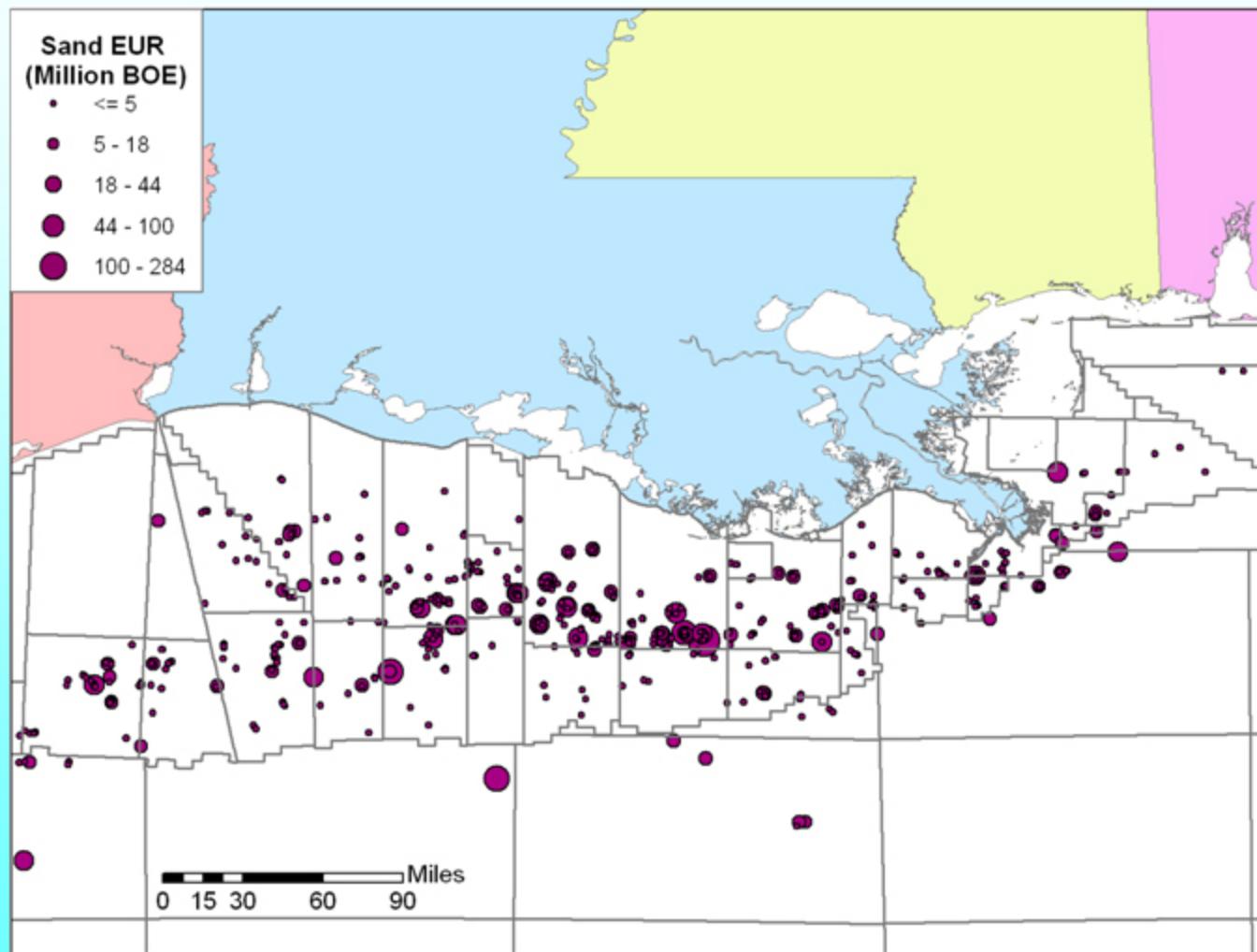
Assign Sands to EOD



Play Definition



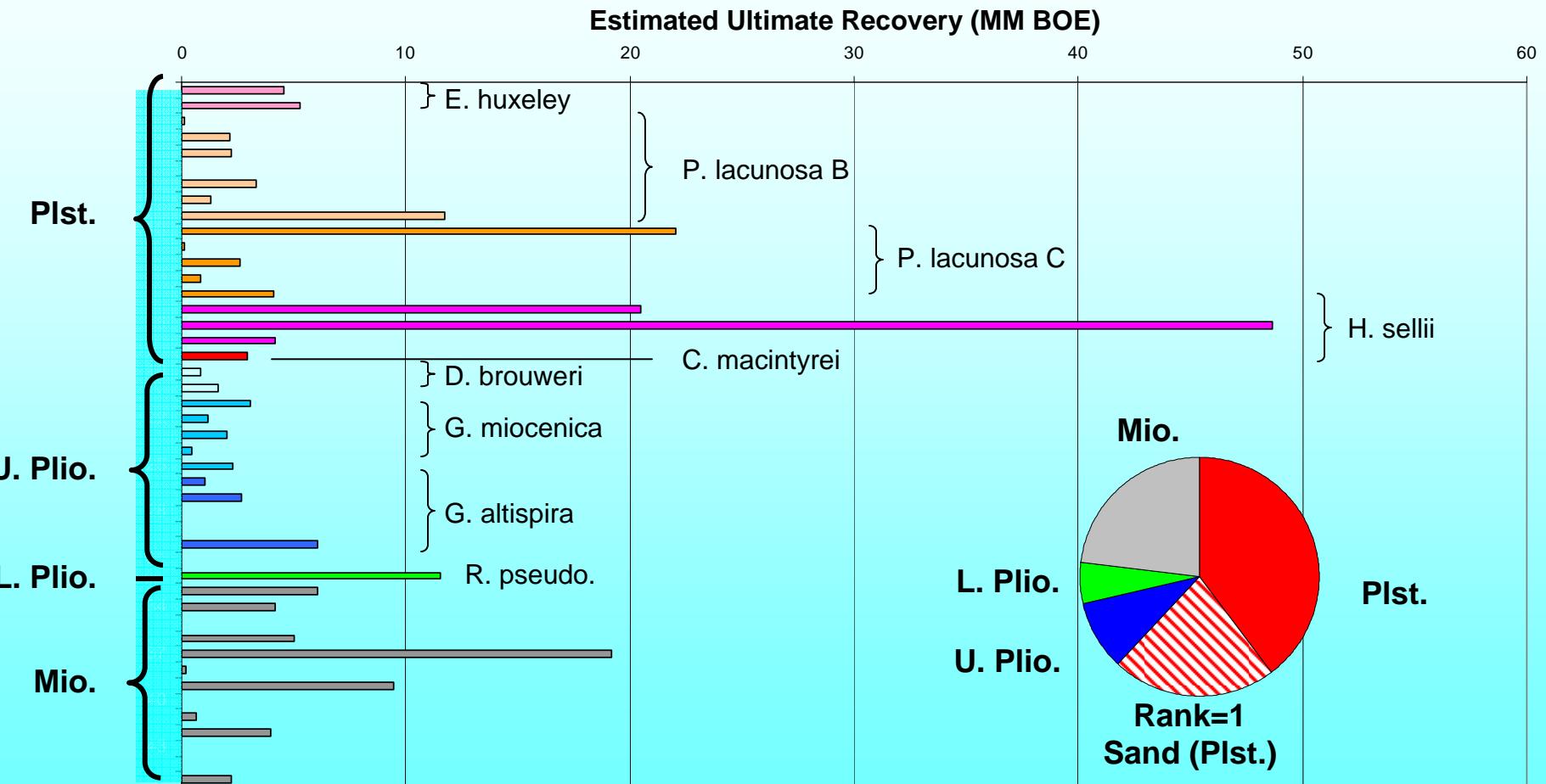
Assign Sands to EOD



Play Definition



Assign Fields to Plays



Play Definition

Eugene Island 266



Define Play Extent & “Core”

- Play extent is total area where fields in play could occur
- Play core contains most of the play's fields & EUR
 - Represents core of process that organized fields in play
 - Areally consistent over deposition of reservoirs in the play's fields

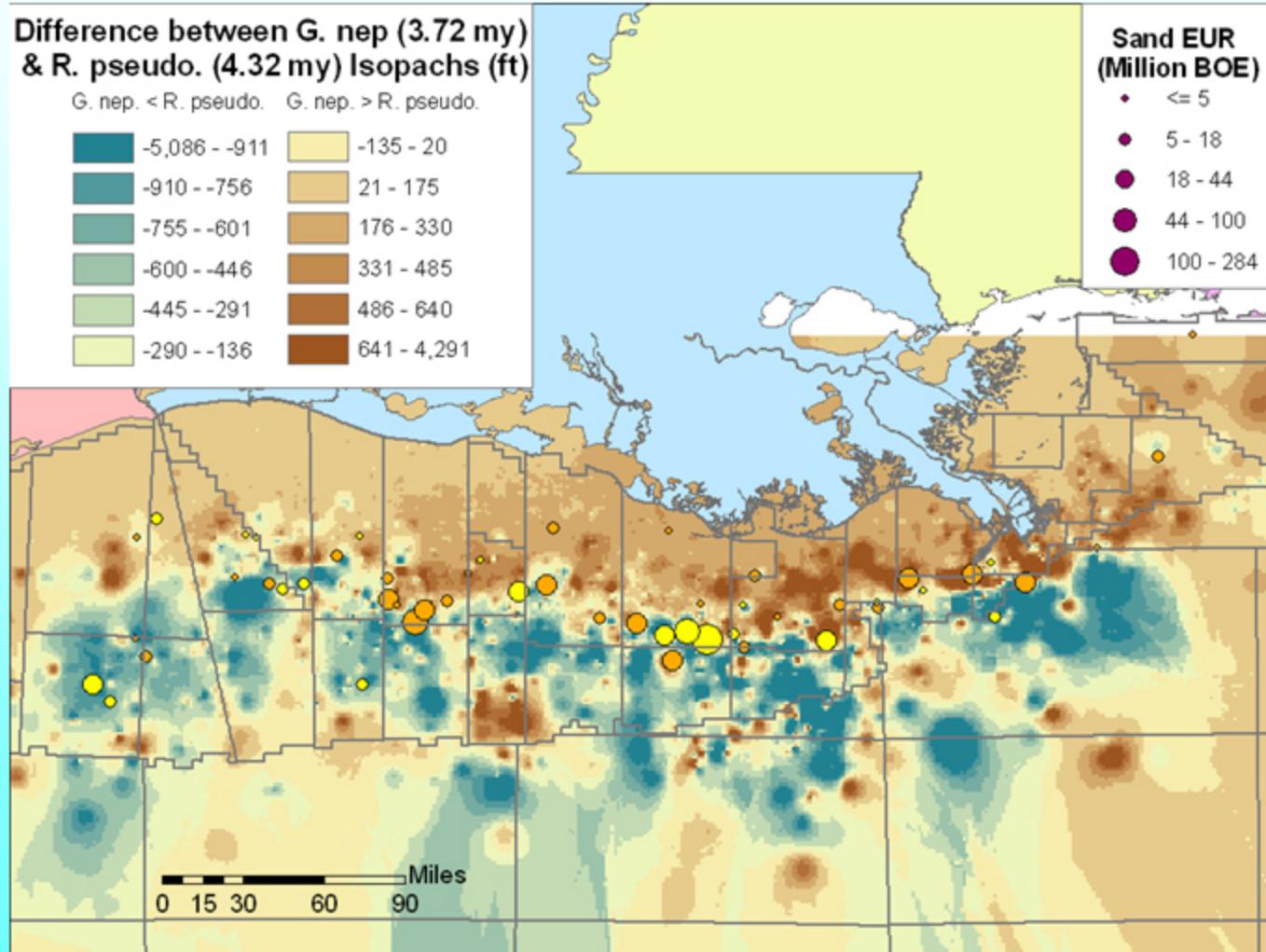
L. Pliocene Shelf Play

Sand EOD:

Orange= Middle Neritic

Yellow= Outer Neritic

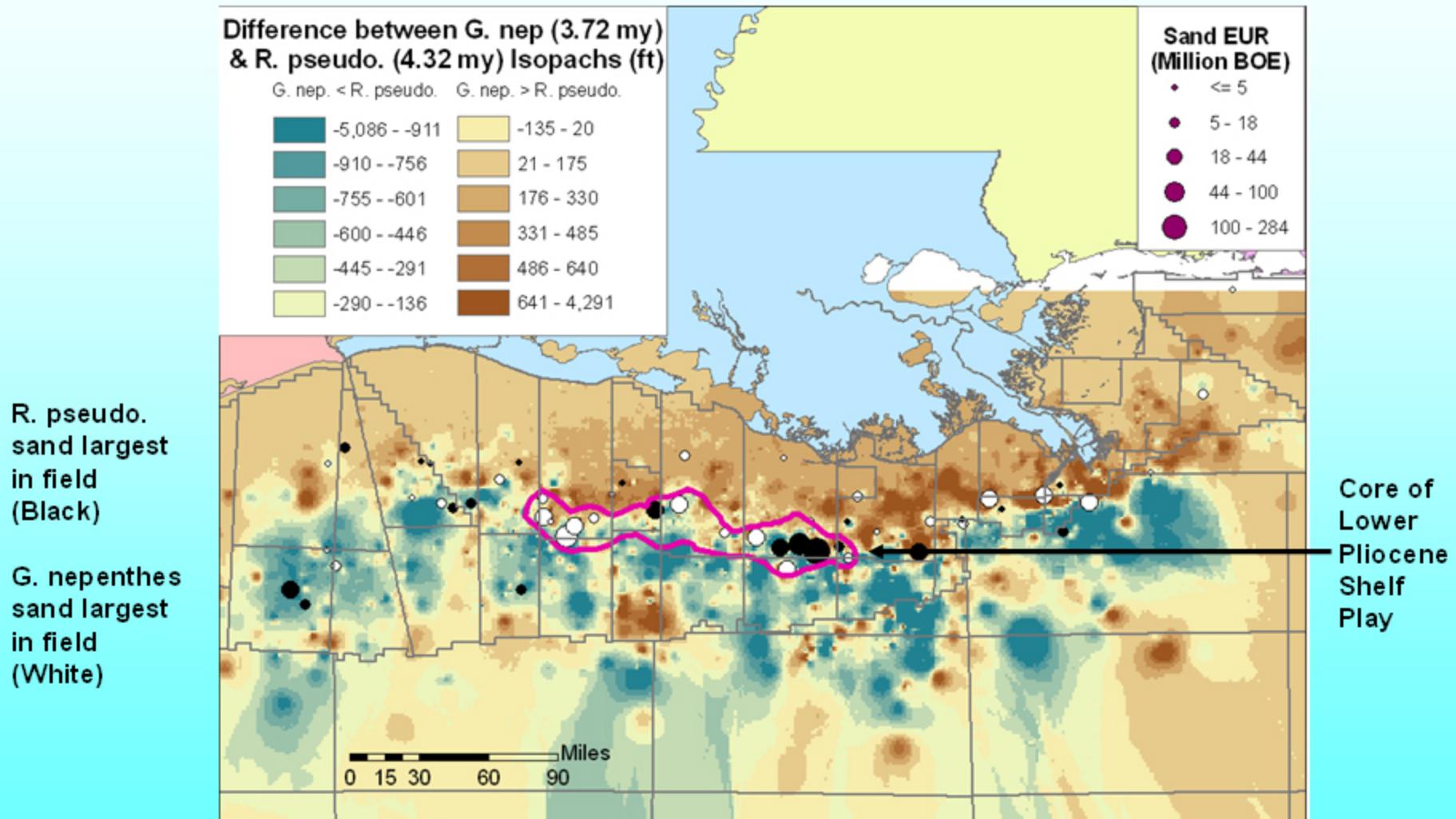
Green= Upper Bathyal



Play Definition L. Pliocene shelf sands where they are largest sand in field (Rank=1)



L. Pliocene Shelf Play



Play Definition L. Pliocene shelf sands where they are largest sand in field (Rank=1)



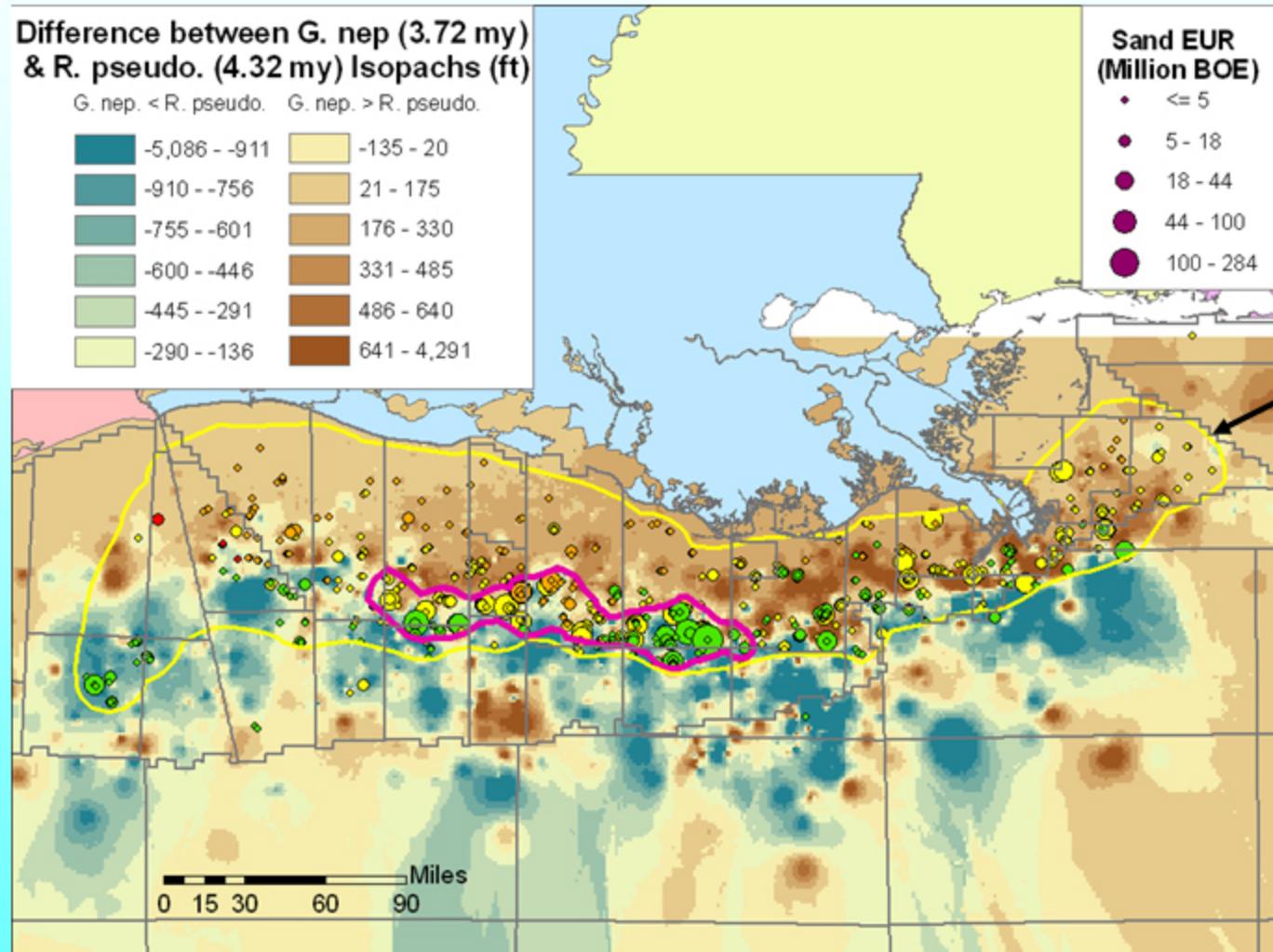
L. Pliocene Shelf Play

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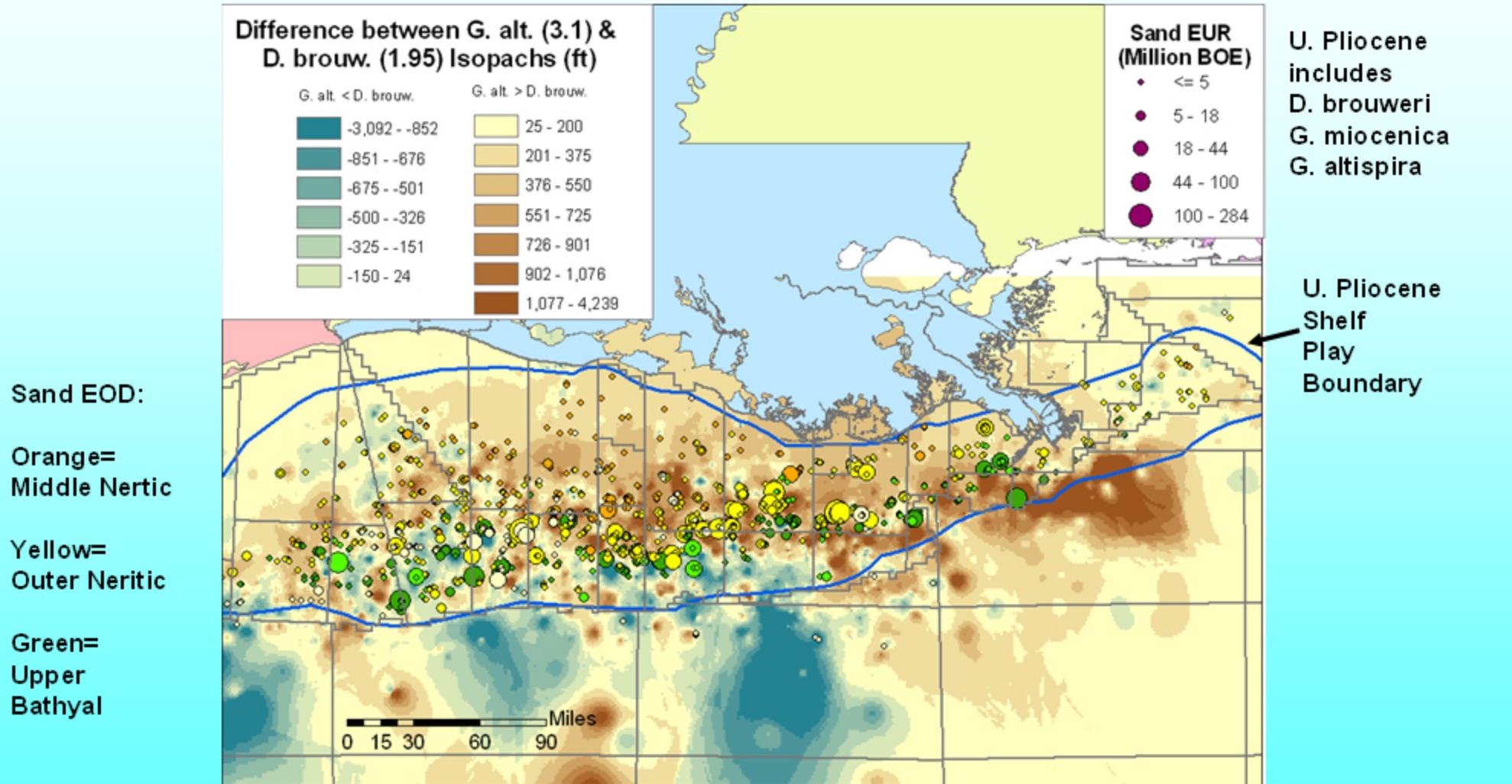
Green= Upper Bathyal



Play Definition



U. Pliocene Shelf Play

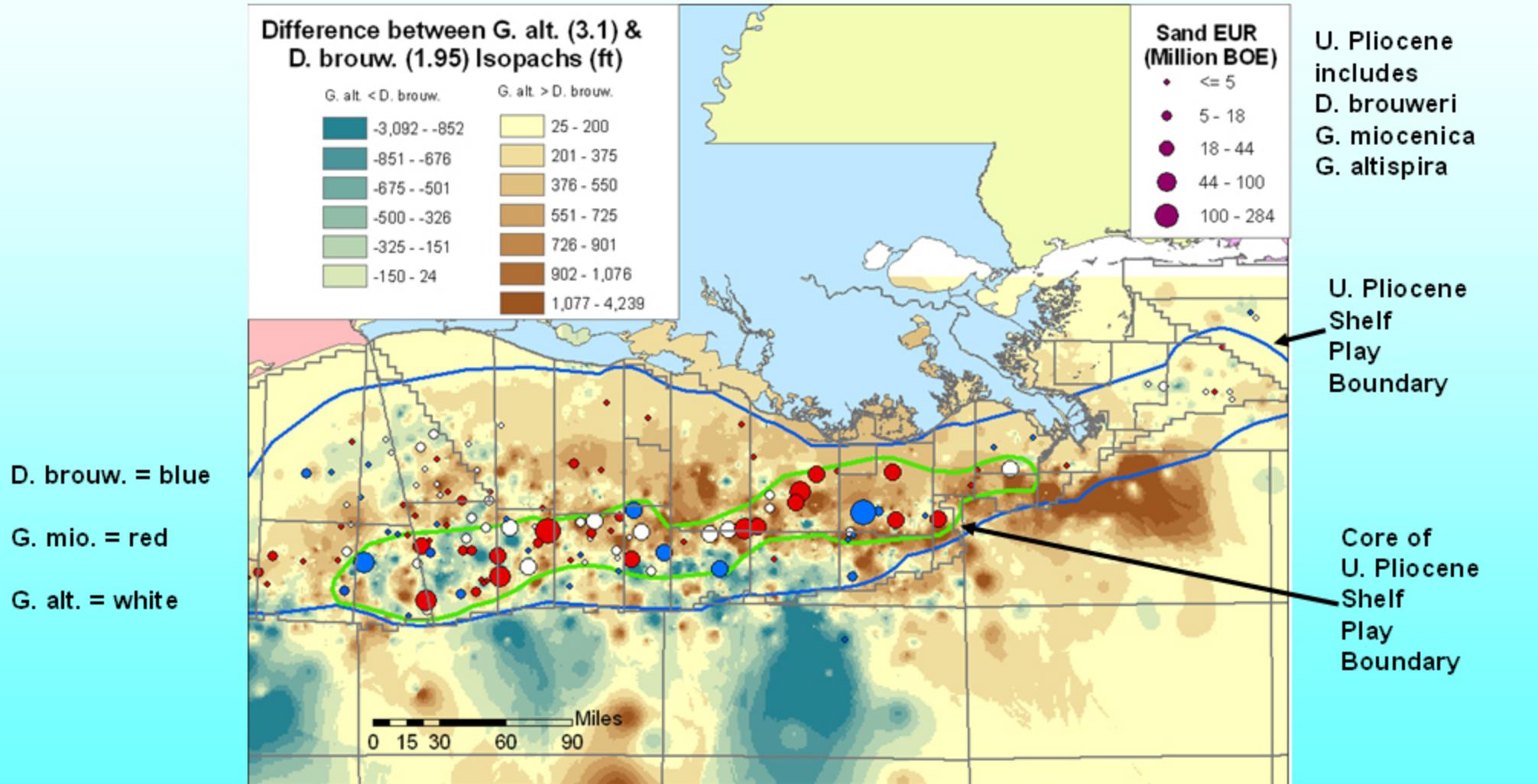


Play Definition

U. Pliocene shelf sands by EOD & EUR
w/difference between G. atl & D. brouw. isopachs



U. Pliocene Shelf Play

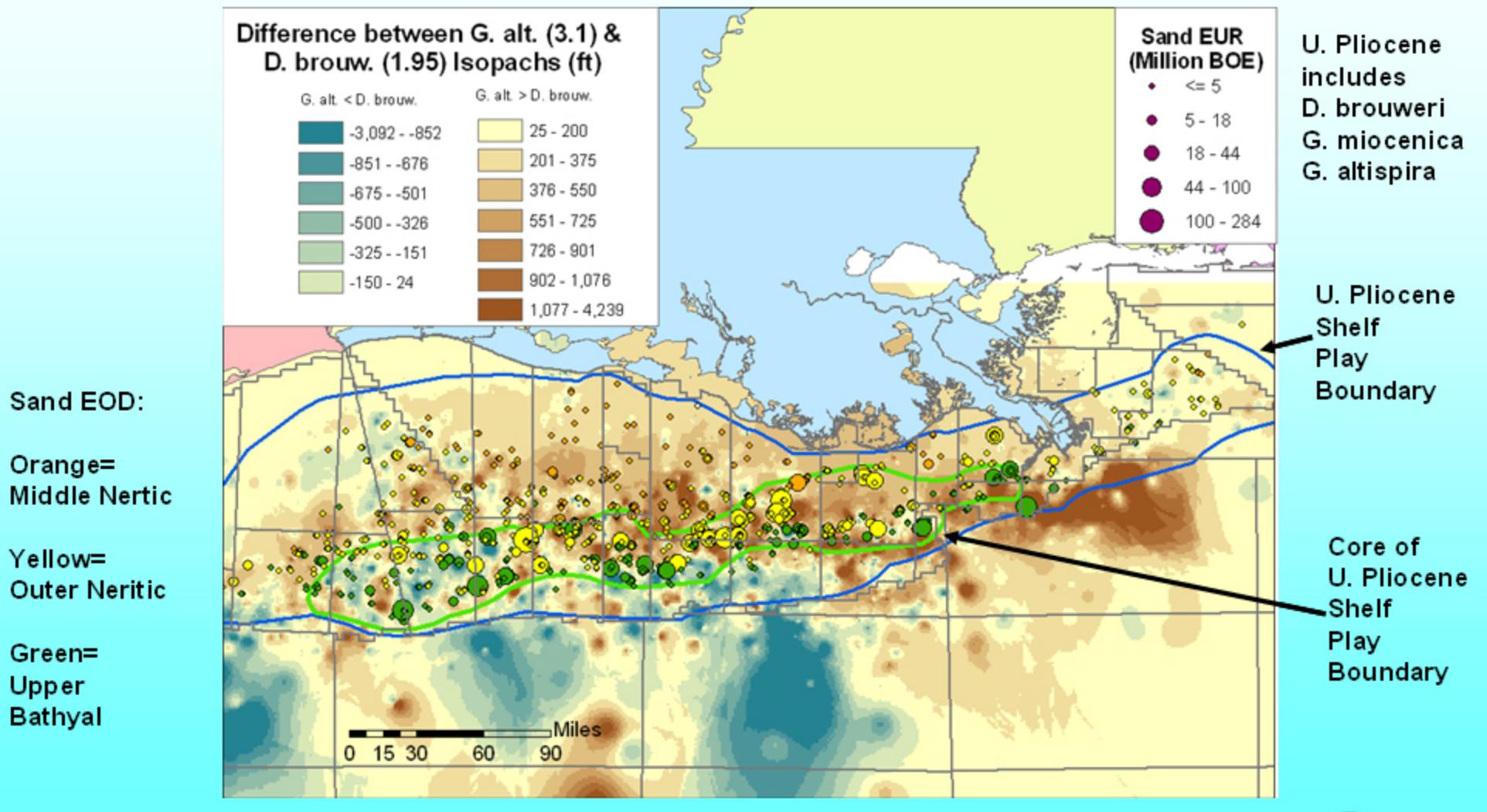


Play Definition

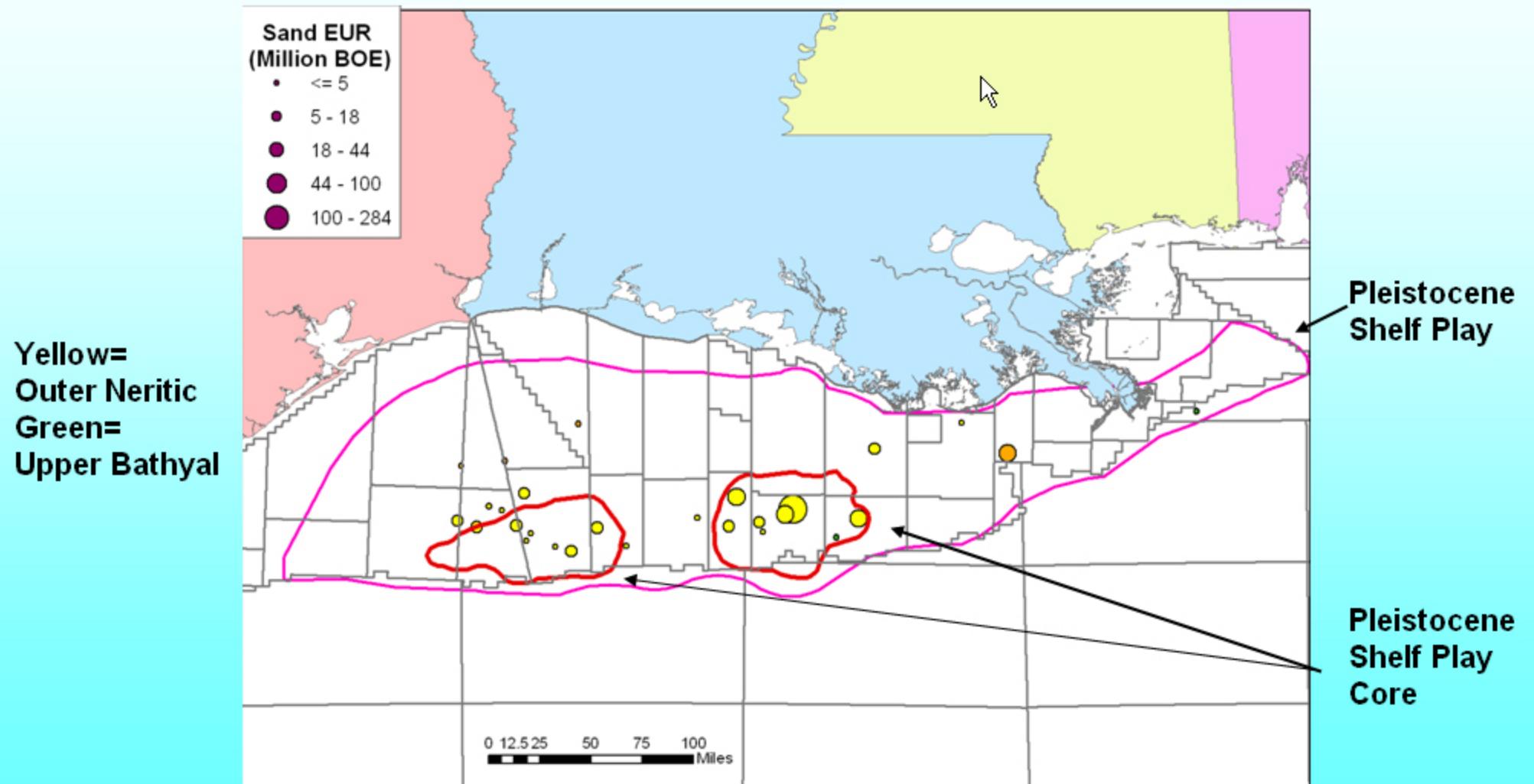
U. Pliocene shelf sands are largest in field (Rank = 1)



U. Pliocene Shelf Play



Pleistocene Shelf Play

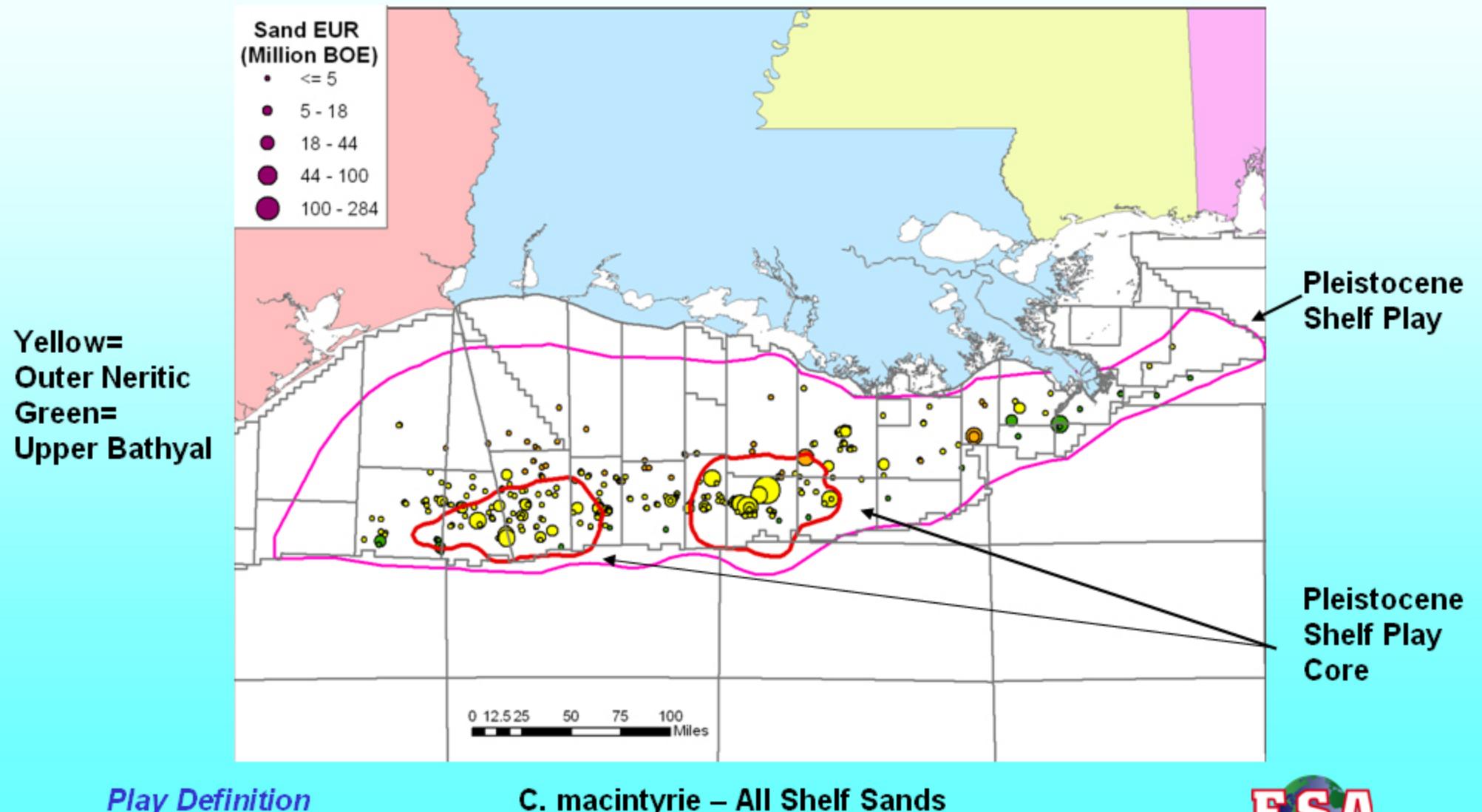


Play Definition

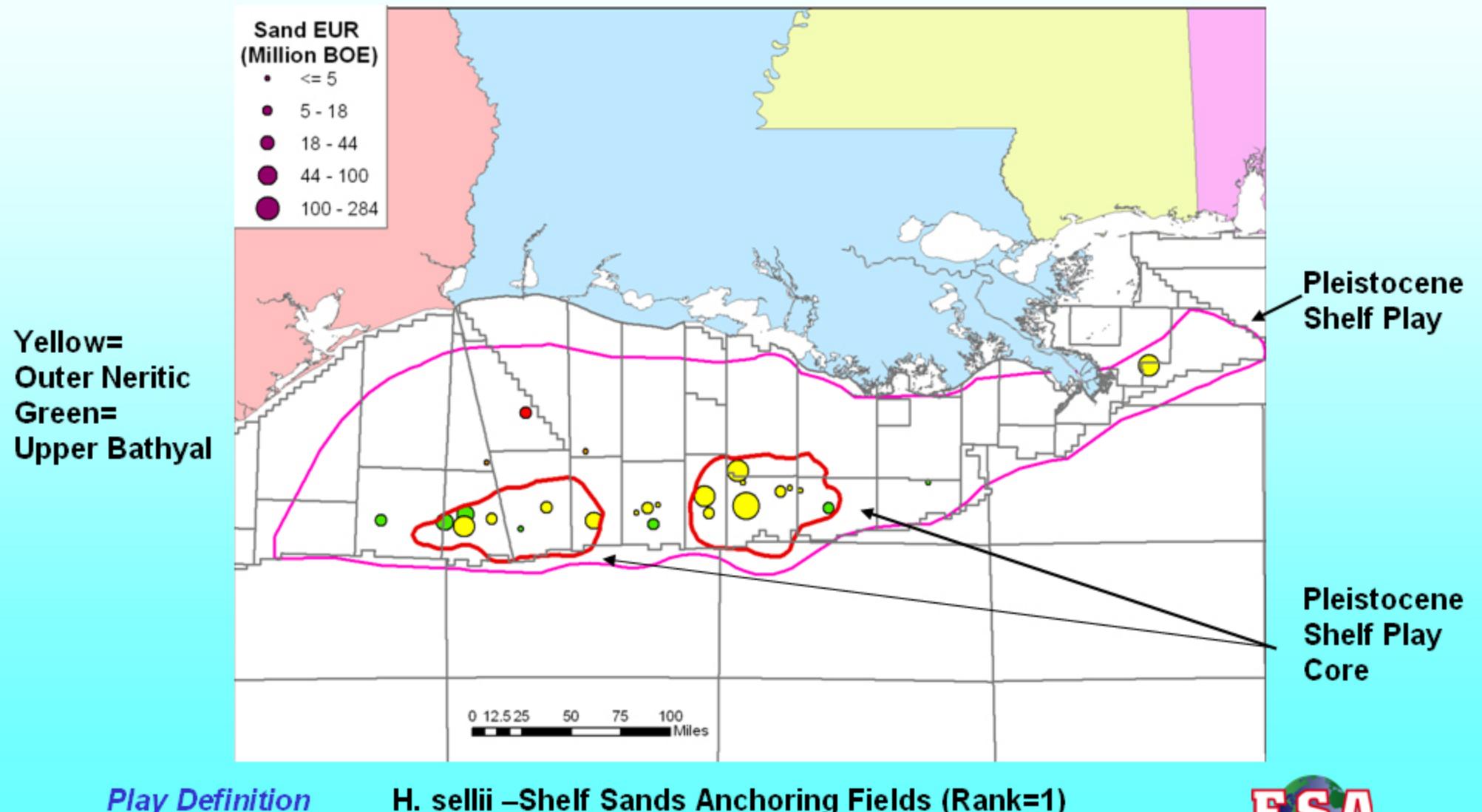
C. macintyrie – Shelf Sands Anchoring Fields (Rank=1)



Pleistocene Shelf Play



Pleistocene Shelf Play

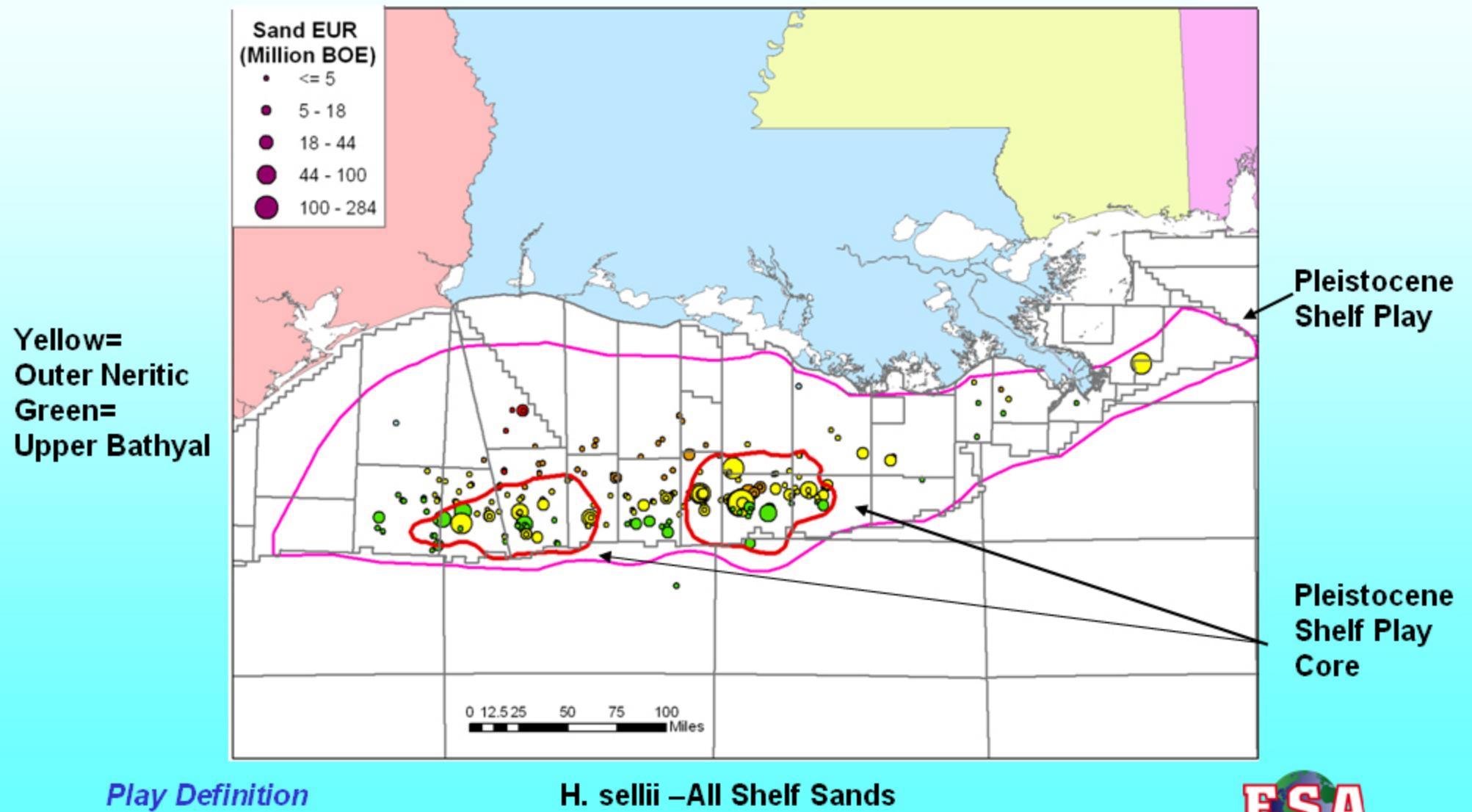


Play Definition

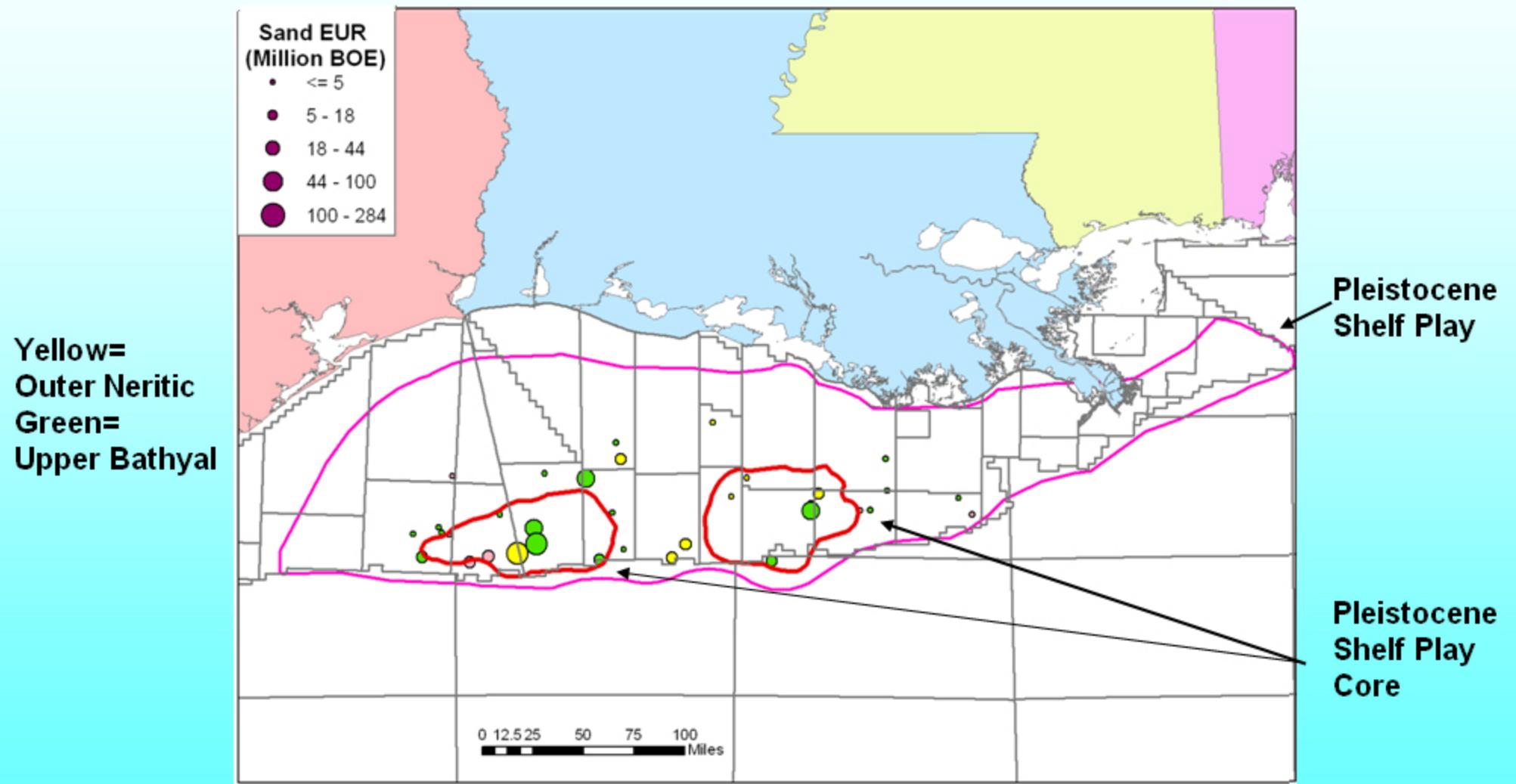
H. sellii –Shelf Sands Anchoring Fields (Rank=1)



Pleistocene Shelf Play



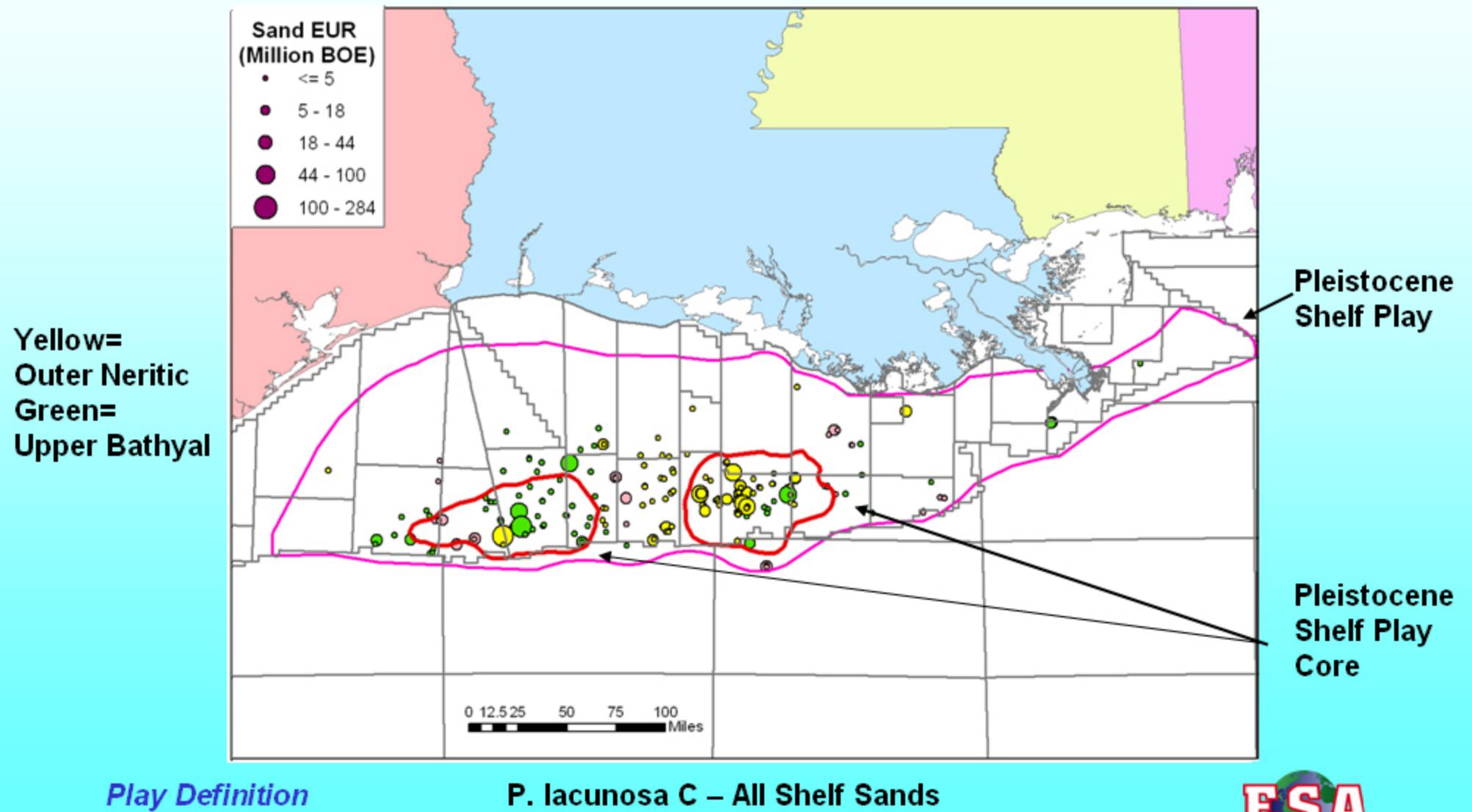
Pleistocene Shelf Play



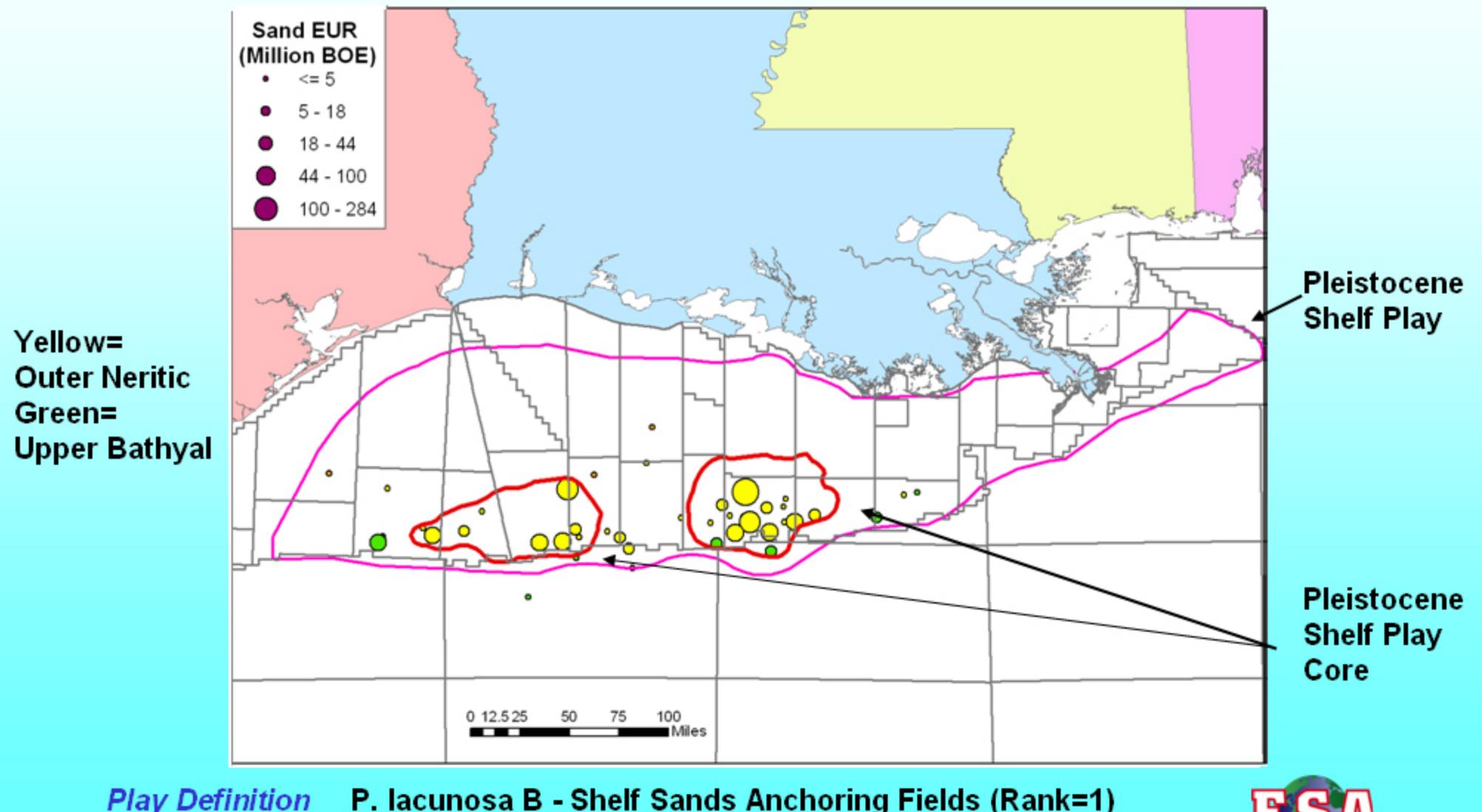
Play Definition P. lacunosa C –Shelf Sands Anchoring Fields (Rank=1)



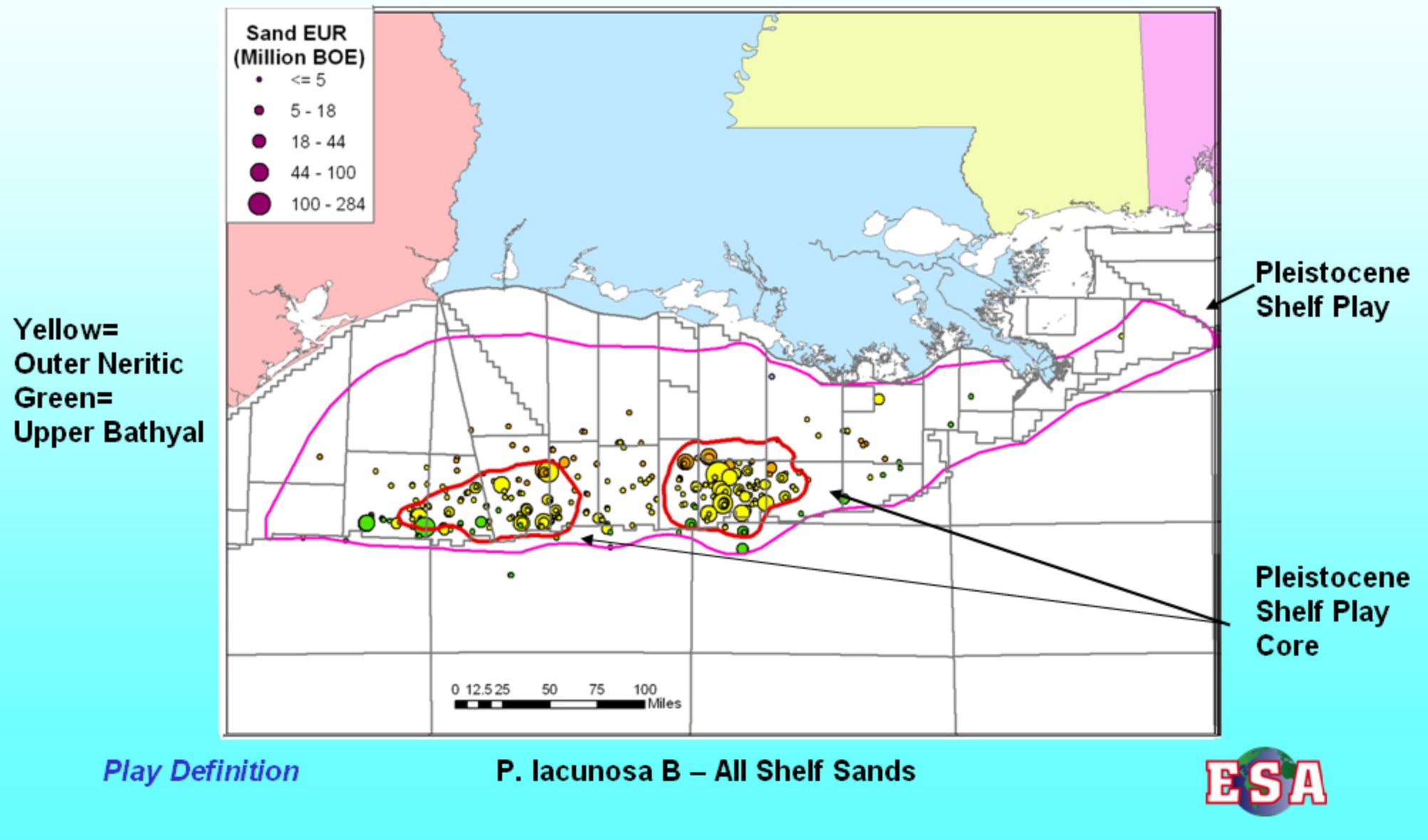
Pleistocene Shelf Play



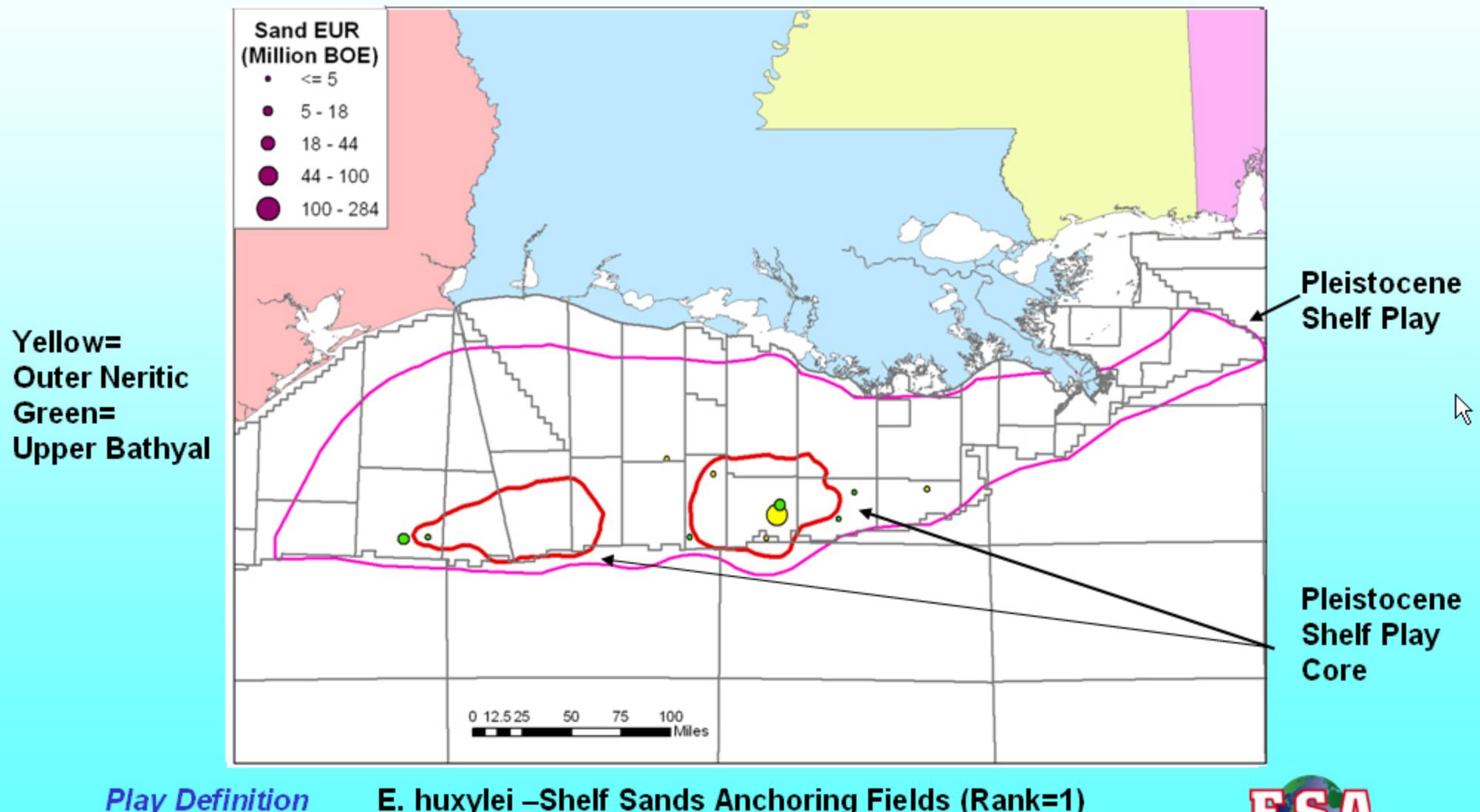
Pleistocene Shelf Play



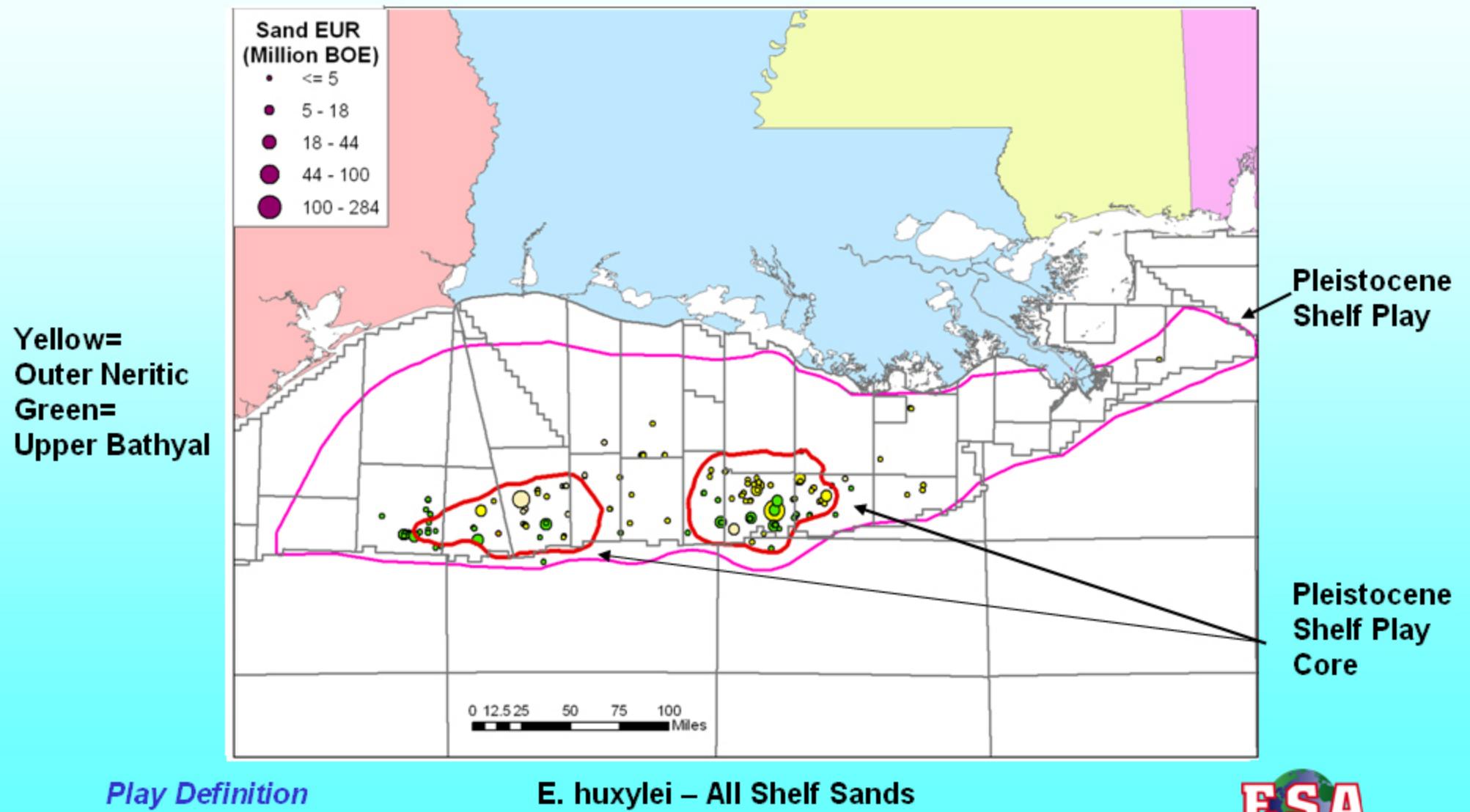
Pleistocene Shelf Play



Pleistocene Shelf Play



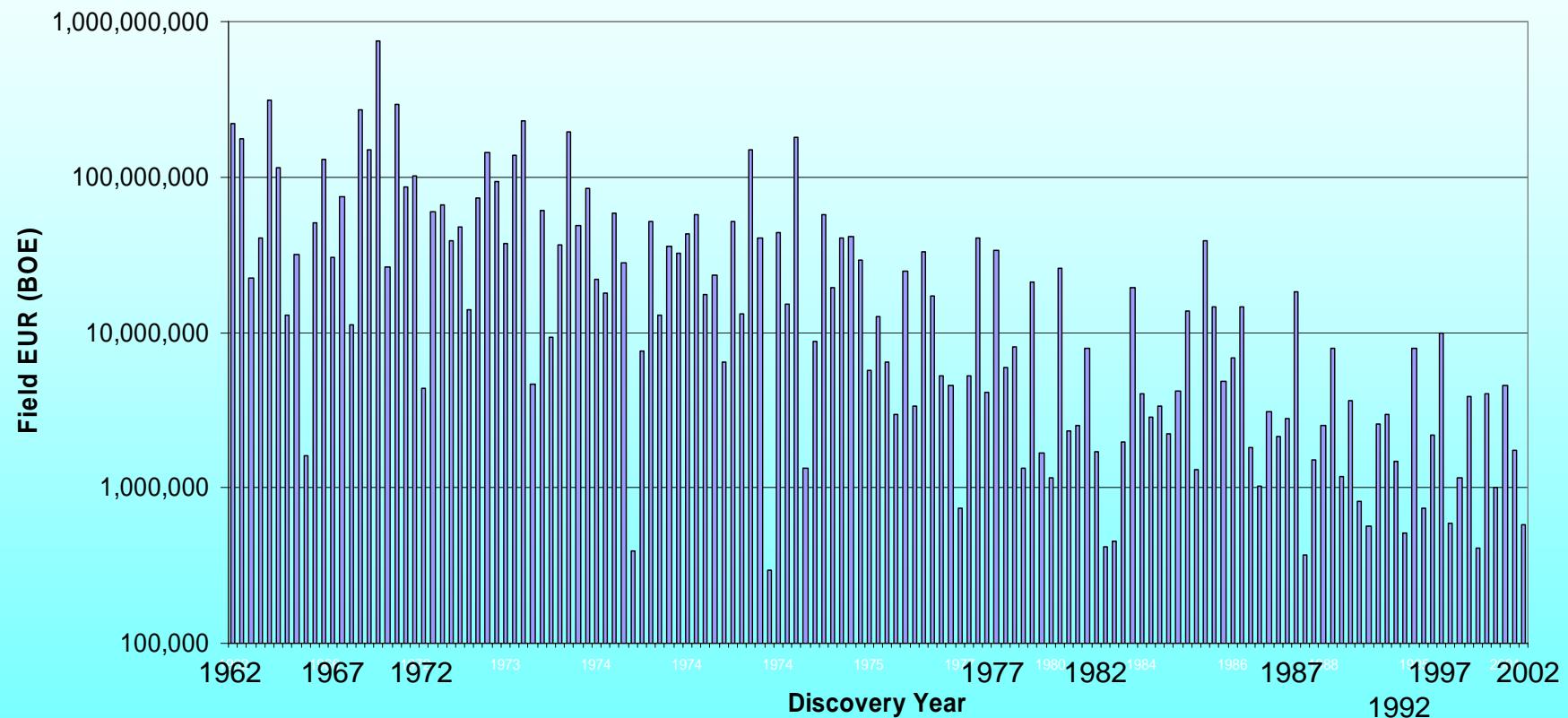
Pleistocene Shelf Play



Largest Sand=Field's Play

- Series of largest sand accounts for bulk of field EUR
- Largest sand 15%-100% of field EUR
- Can apply consistently
- Spatially clusters most/largest of play's fields with organizing geologic event
- Consonant with field-wise analysis

Pleistocene Field Discoveries



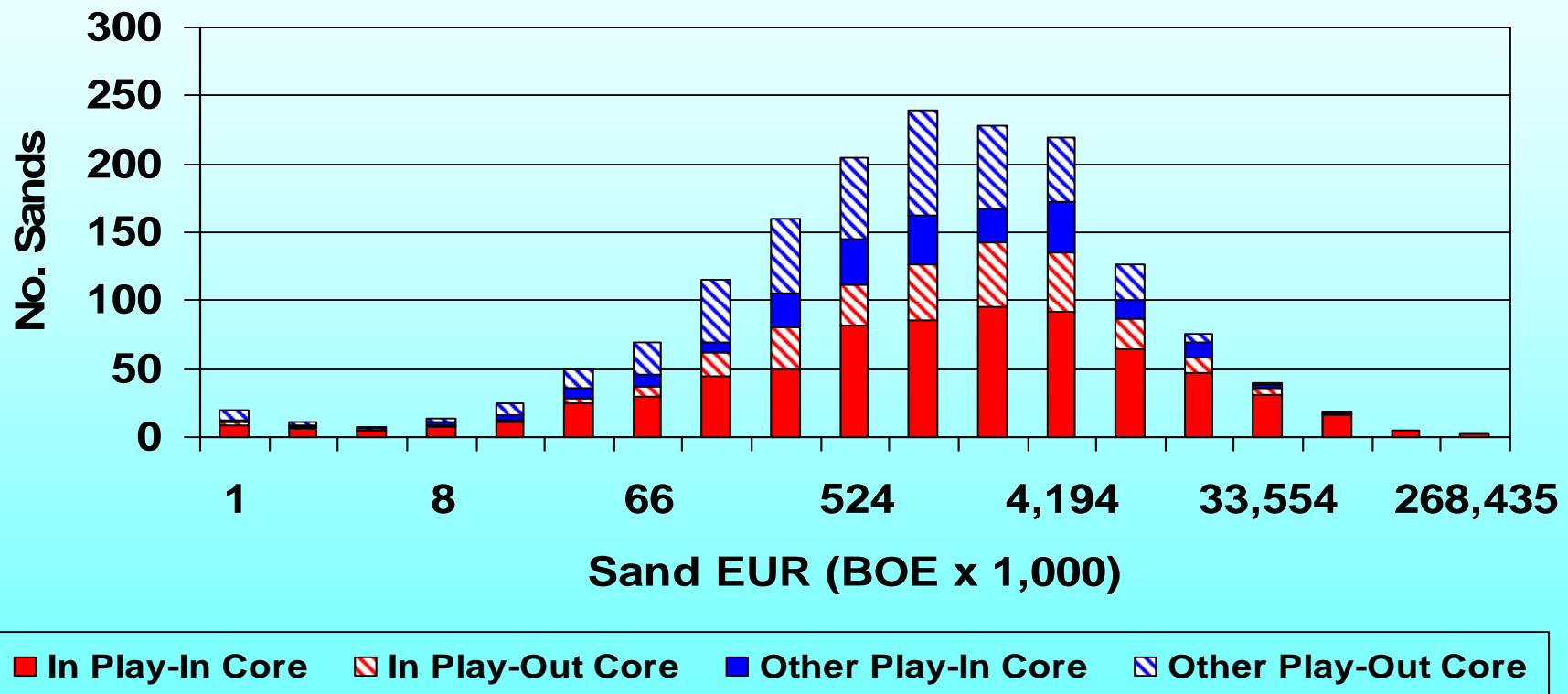
Play Definition



Mapping Play Extent & Core

- Extent defined by where organizing event met conditions for field formation
- Core of play = core of organizing event
 - Not just mapping EUR concentration in mature play
 - Hypothetical play extent/core mapped on geologic criteria before first discovery
- Returns emphasis to play definition

Classification & Size



Mean
EUR
(MM BOE) 5.3 2.6 2.4 1.4
Play Definition



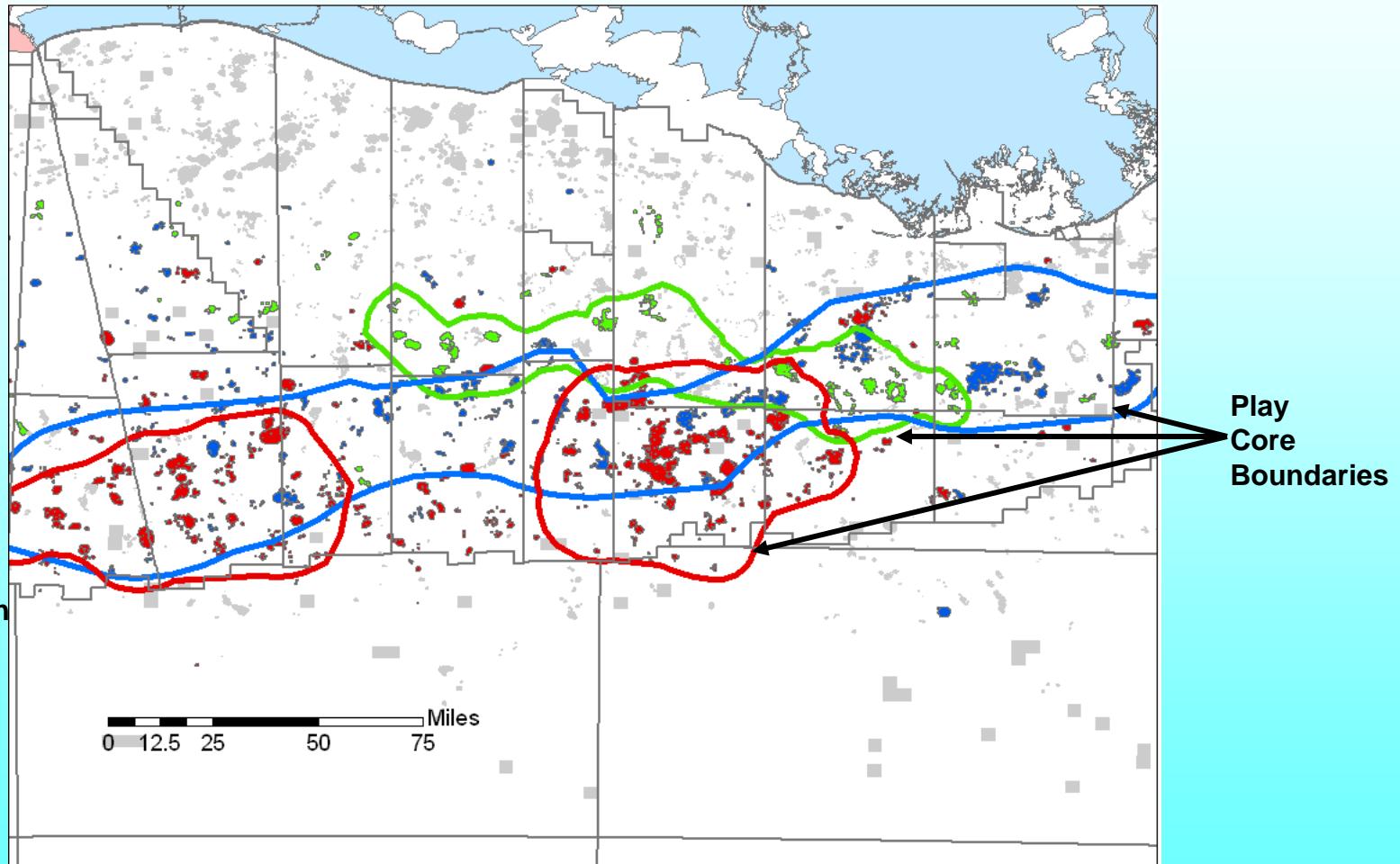
Play Maps

Field &
Play Core
Colors:

Shelf Plst. = Red

Shelf U. Plio = Blue

Shelf L. Plio. = Green



Play Definition

Fields in Grey Are Not Members of 3 Plays Analyzed



Conclusions

- Approach provides
 - Consistent assignment of fields/prospects to plays
 - Alignment of plays with geologic events that organized hydrocarbons spatially
- Approach supports
 - Meaningful play mapping
 - Time/series spatial assessment of risk & remaining resources