

# **Stratigraphic and Depositional Context of the Eaglebine Play: Upper Cretaceous Woodbine and Eagle Ford Groups, Southwestern East Texas Basin\***

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## **Abstract**

The Woodbine and Eagle Ford Groups of the Eaglebine play of the southwestern East Texas Basin have generated considerable interest because of their potential for new hydrocarbon production from both sandstone and mudrock reservoirs. However, the play's stratigraphic and depositional relations are complex and directly relate to the play's exploration challenges.

Productive Woodbine and Eagle Ford (Sub-Clarksville) sandstones intertongue with a poorly defined, subregional mudrock-dominated interval that thins southwestward toward the San Marcos Arch. We propose dividing this succession into two intervals:

- Lower unit, a high-gamma-ray unit at the base of this mudrock succession that is inferred to be equivalent to the Maness Shale and to part of the lower Eagle Ford Group on the San Marcos Arch, and
- Upper unit, a basinward-thickening zone of consistently lower gamma-ray log facies inferred to be equivalent to the Woodbine Group, Pepper Shale, and Eagle Ford Group of the East Texas Basin. Because the Cenomanian-Turonian boundary occurs within the Eagle Ford Group of the East Texas Basin and the lower Eagle Ford section of the San Marcos Arch, most of the Maness-through-Eagle Ford succession exists as a much-thinned (<50 ft [15 m]) section on the arch.

Basinwide integration of the Woodbine sequence-stratigraphic framework shows that the number of fourth-order sequences in the unit decreases westward from 14 in the basin axis to no more than 9 in the most active part of the Eaglebine play because of their systematic depositional pinch out approaching the western basin margin. Depositional facies of the Woodbine sequences vary within the study area, even between stratigraphically adjacent intervals. On-shelf siliciclastic systems include highstand, fluvial- and wave-dominated delta deposits and lowstand, incised-valley-fill fluvial strata. The Eagle Ford Group consists of three fourth-order, highstand-dominated sequences capped by the Sub-Clarksville sandstones that accumulated after the major late Cenomanian-early Turonian flooding event recorded by a basinwide transgressive systems tract at the base of the unit.

### **References Cited**

Ambrose, W.A., T.F. Hentz, F. Bonnaffé, R.G. Loucks, L.F. Brown, Jr., F.P. Wang, and E.C. Potter, 2009, Sequence stratigraphic controls on complex reservoir architecture of highstand fluvial-dominated deltaic and lowstand valley-fill deposits in the Upper Cretaceous (Cenomanian) Woodbine Group, East Texas field: Regional and local perspectives: AAPG Bulletin, v. 93, p. 231-269.

Hentz, T.F., and S.C. Ruppel, 2010, Regional lithostratigraphy of the Eagle Ford Shale: Maverick Basin to East Texas Basin: Gulf Coast Association of Geological Societies Transactions, v. 60, p. 325-337.

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Southwest Section, AAPG  
Wichita Falls, TX**



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ECONOMIC  
GEOLOGY**

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**State of Texas Advanced Resource Recovery**

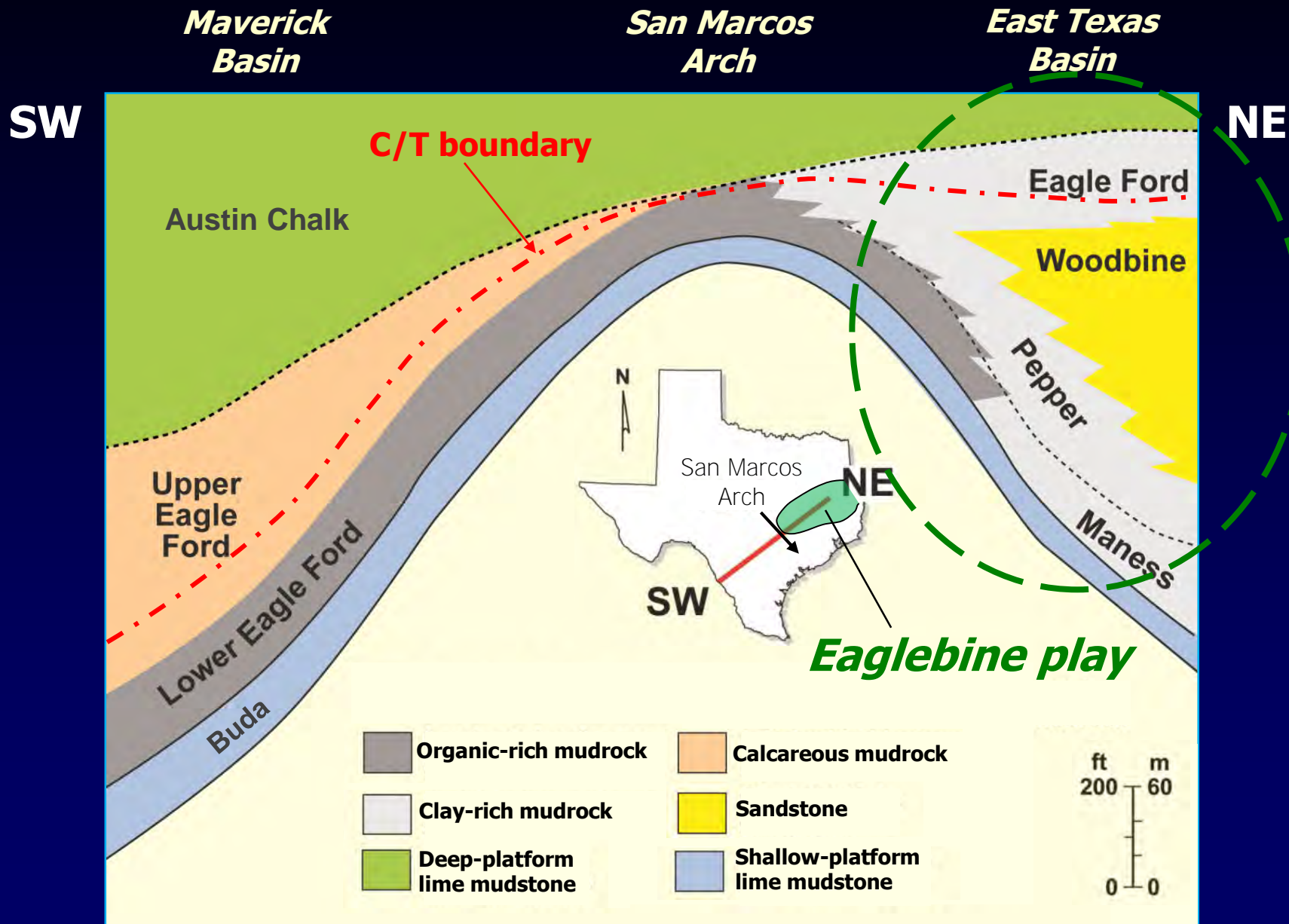
# Objectives

- Lithostratigraphic setting of Eaglebine play (Woodbine & Eagle Ford)
- Regional sequence-stratigraphic framework
- Distribution of Woodbine sandstones in active part of play
- Depositional environments from gross-sandstone mapping  
and core interpretation – modern analogs

## Dataset

- Well-log suites for ~510 wells in the 3,350-mi<sup>2</sup> (8,680-km<sup>2</sup>) study area in SW part of East Texas Basin (Leon, Madison, and western Houston counties)
- >1,100 well logs from the San Marcos Arch to Sabine Uplift
- Three whole cores (145 total ft)

# Regional Lithofacies

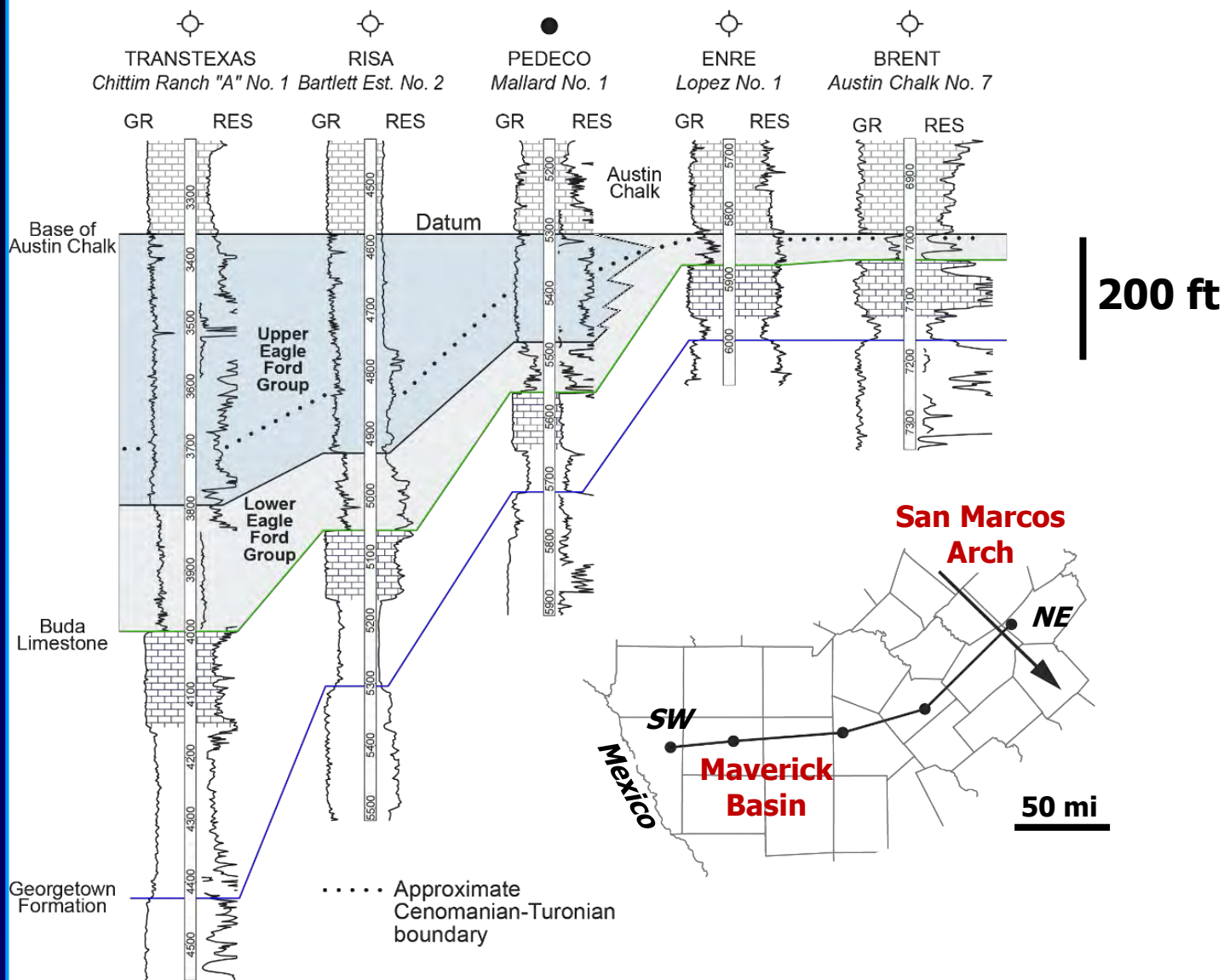


**SW**

# Maverick Basin

# San Marcos Arch

**NE**



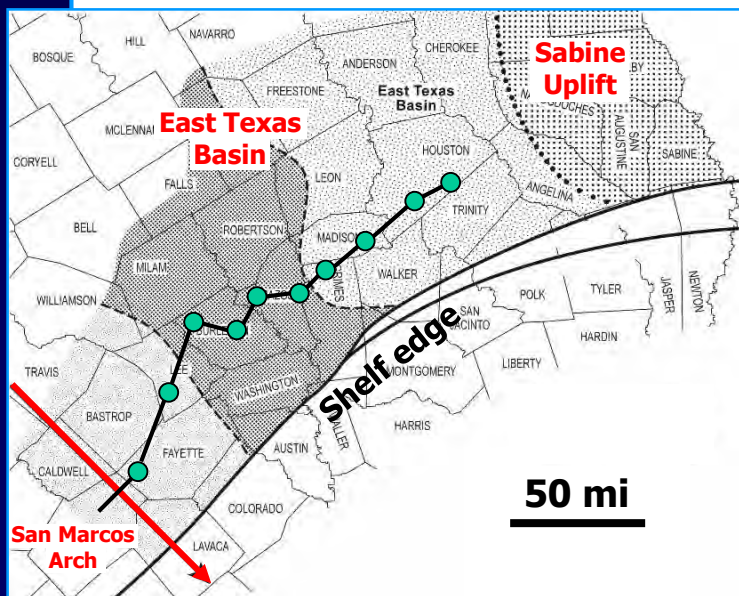
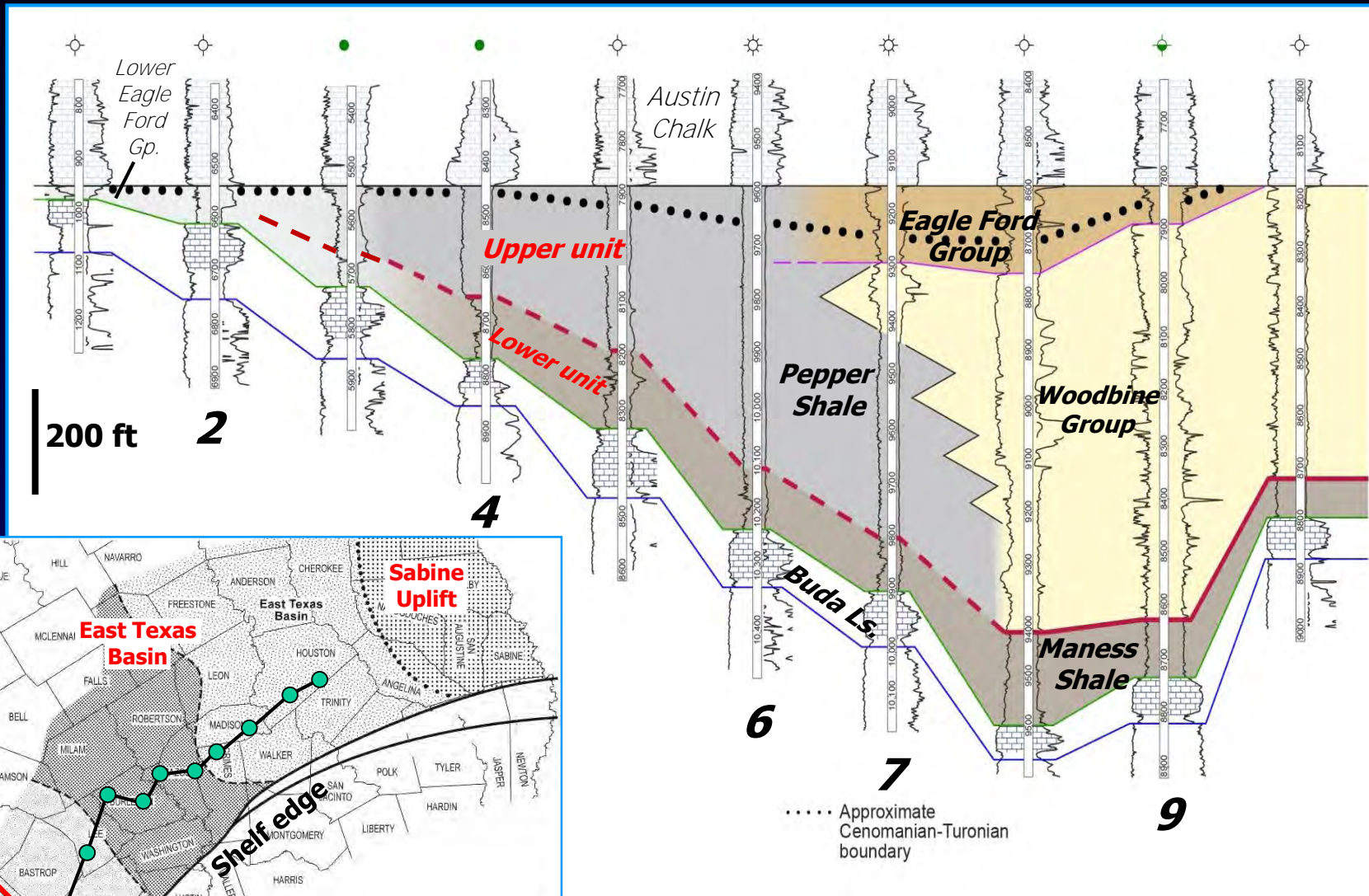


SW

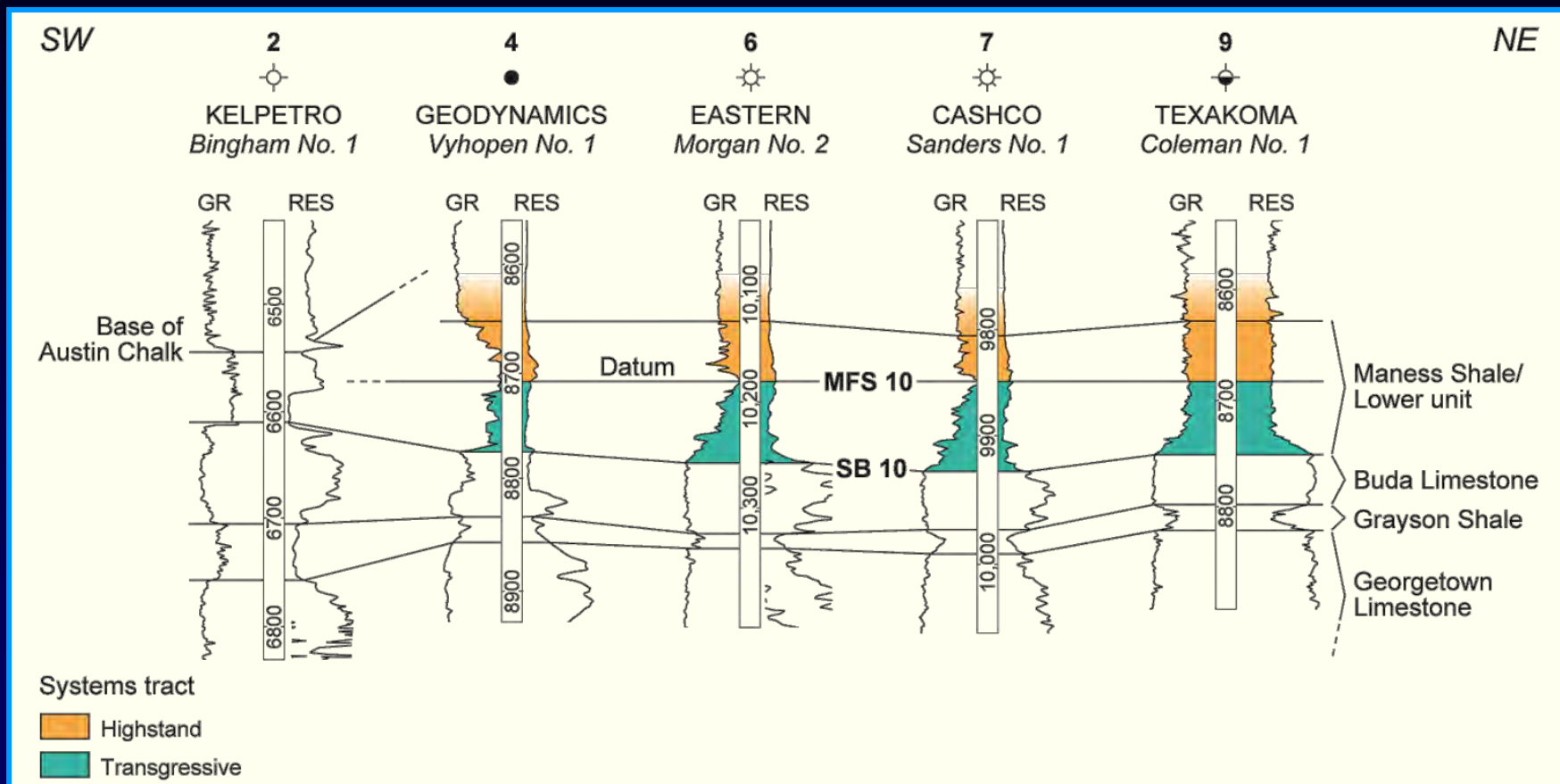
# San Marcos Arch

# East Texas Basin

NE



# Time Correlation: Maness Shale / Lower Unit



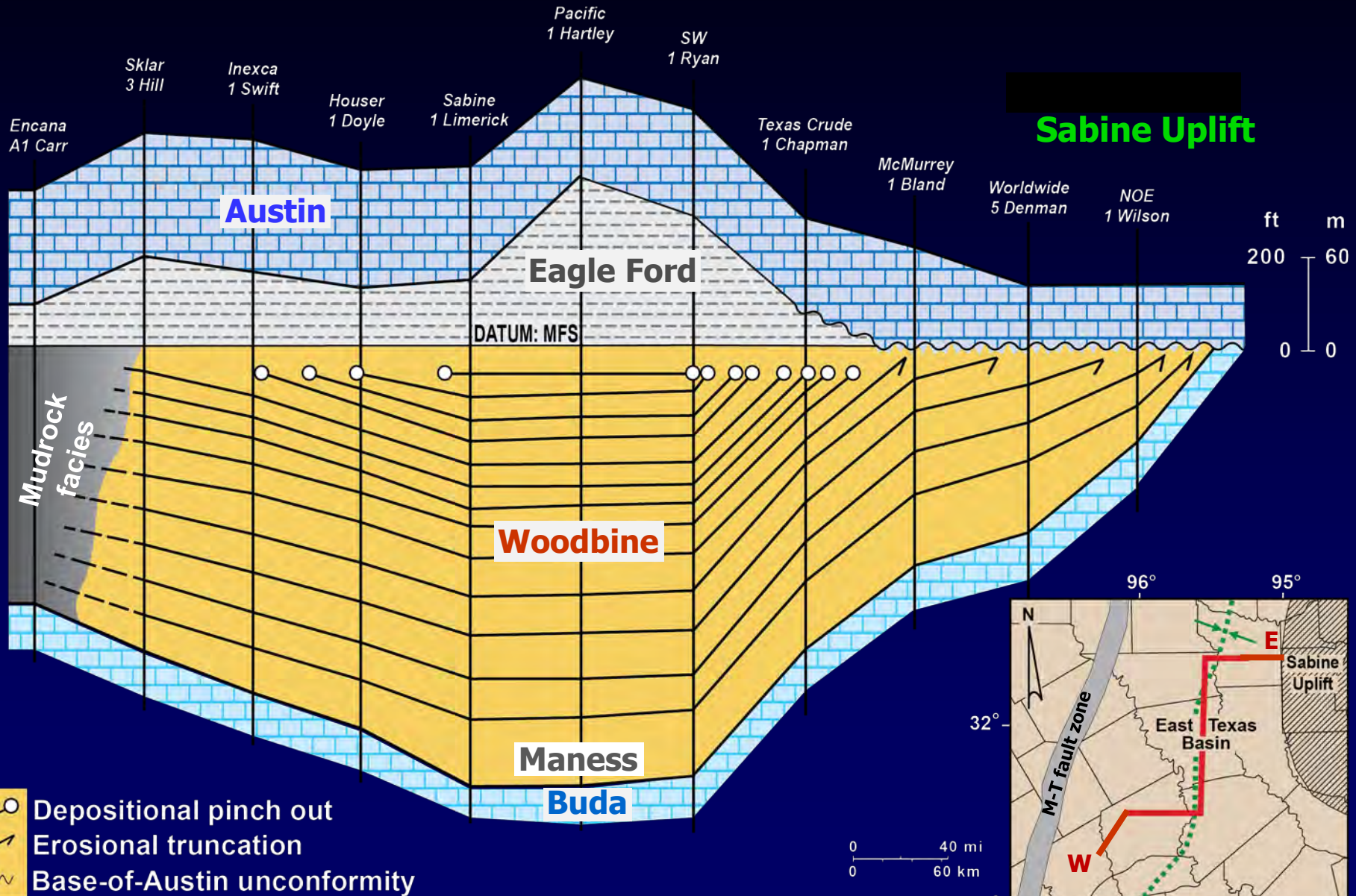


# Sequence-Stratigraphic Model

West

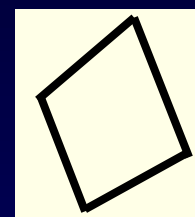
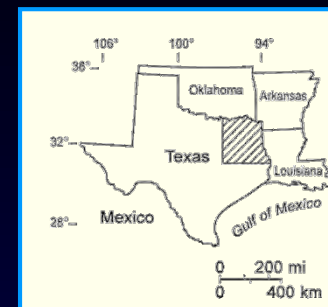
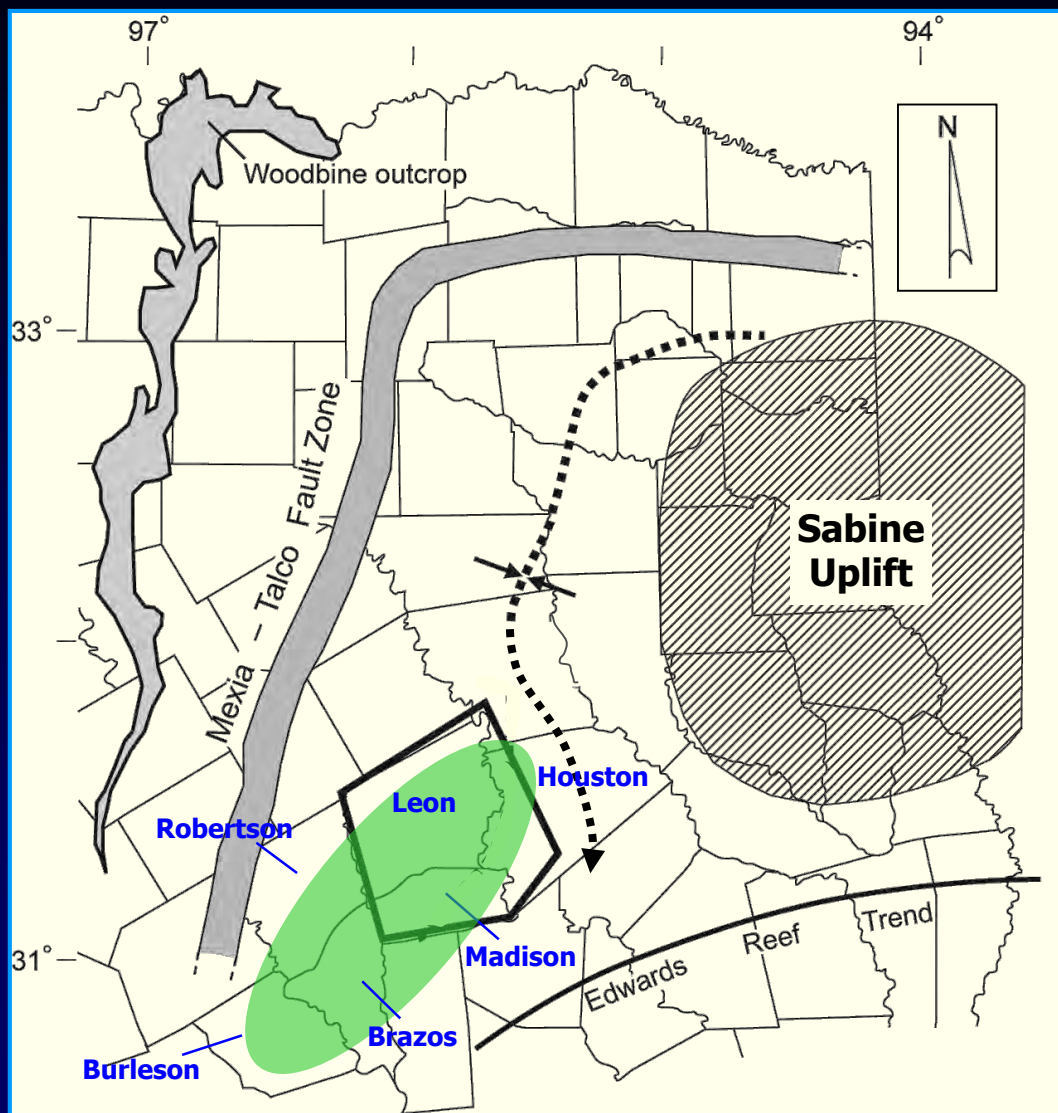
East Texas Basin

East

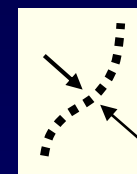


Modified from Ambrose et al. (2009)

# East Texas Basin



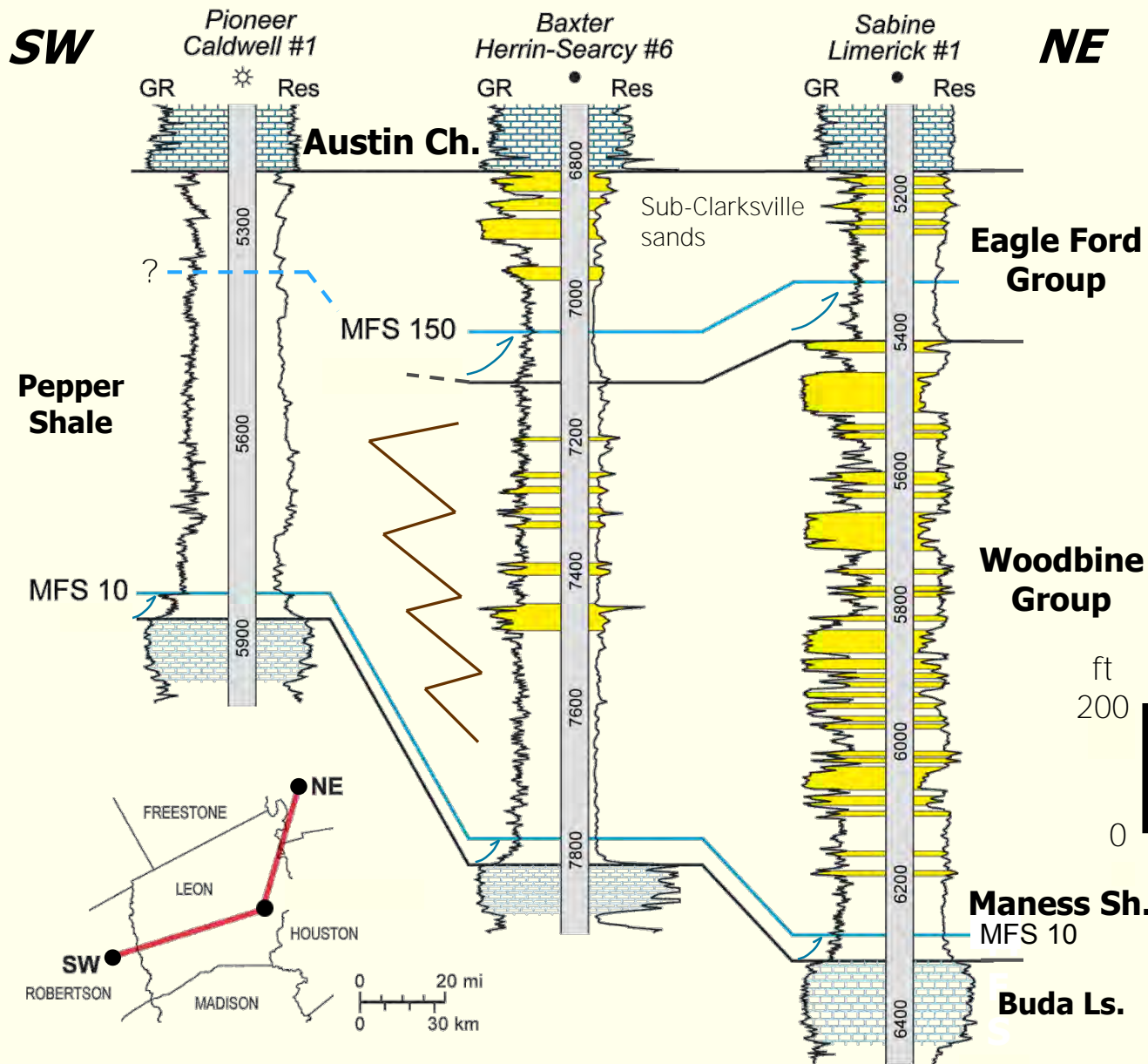
**Study area**



**Basin axis**



**Play area  
(most active)**

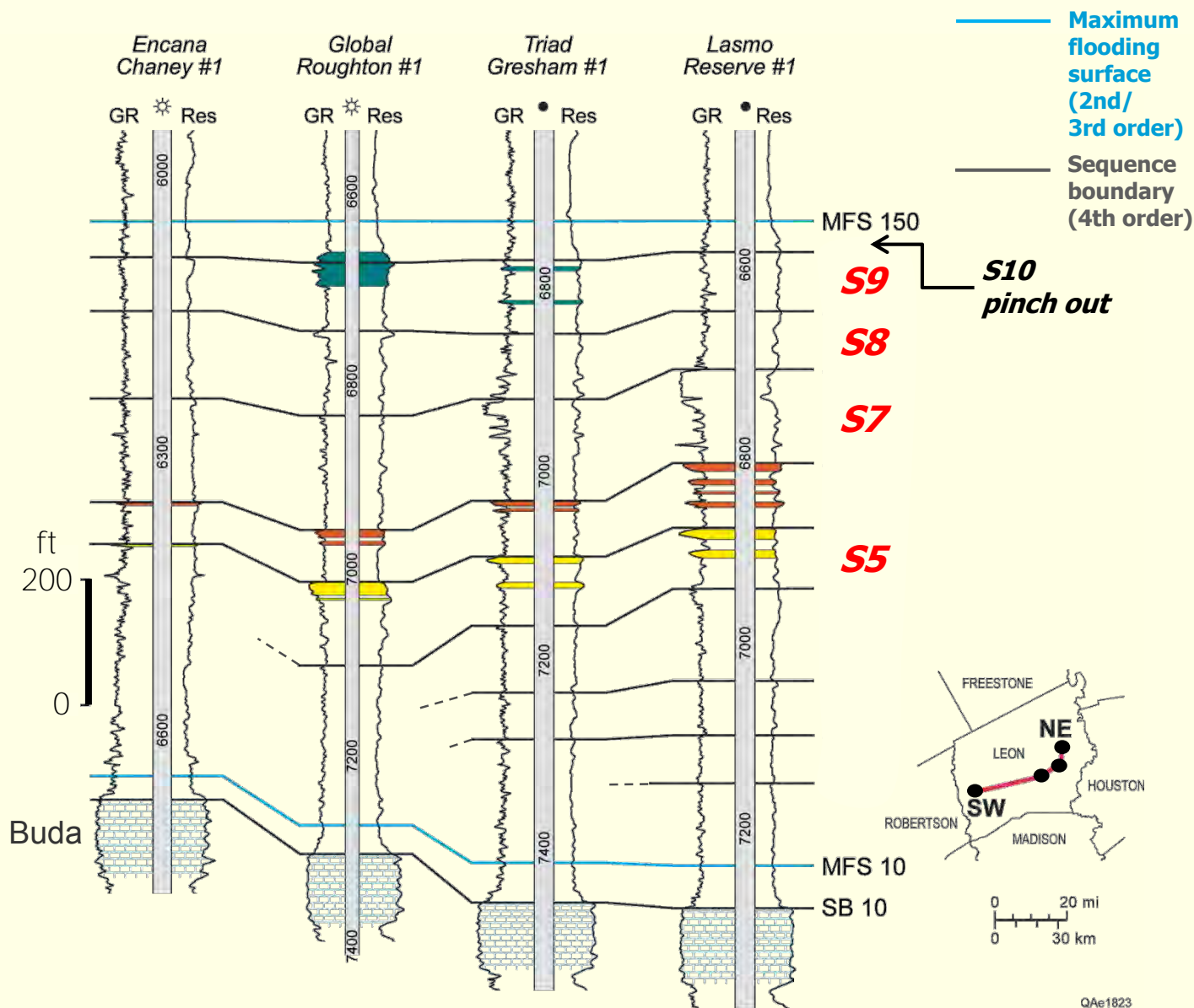


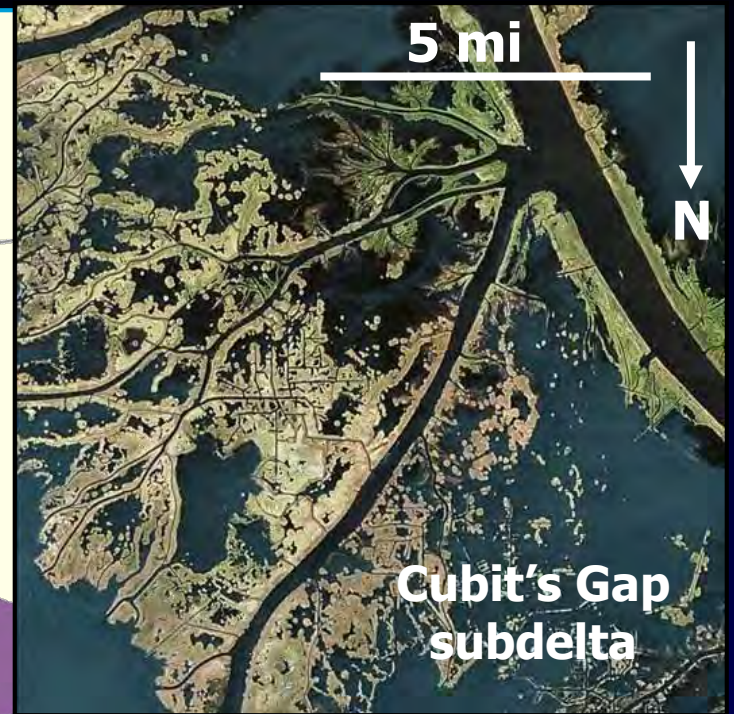
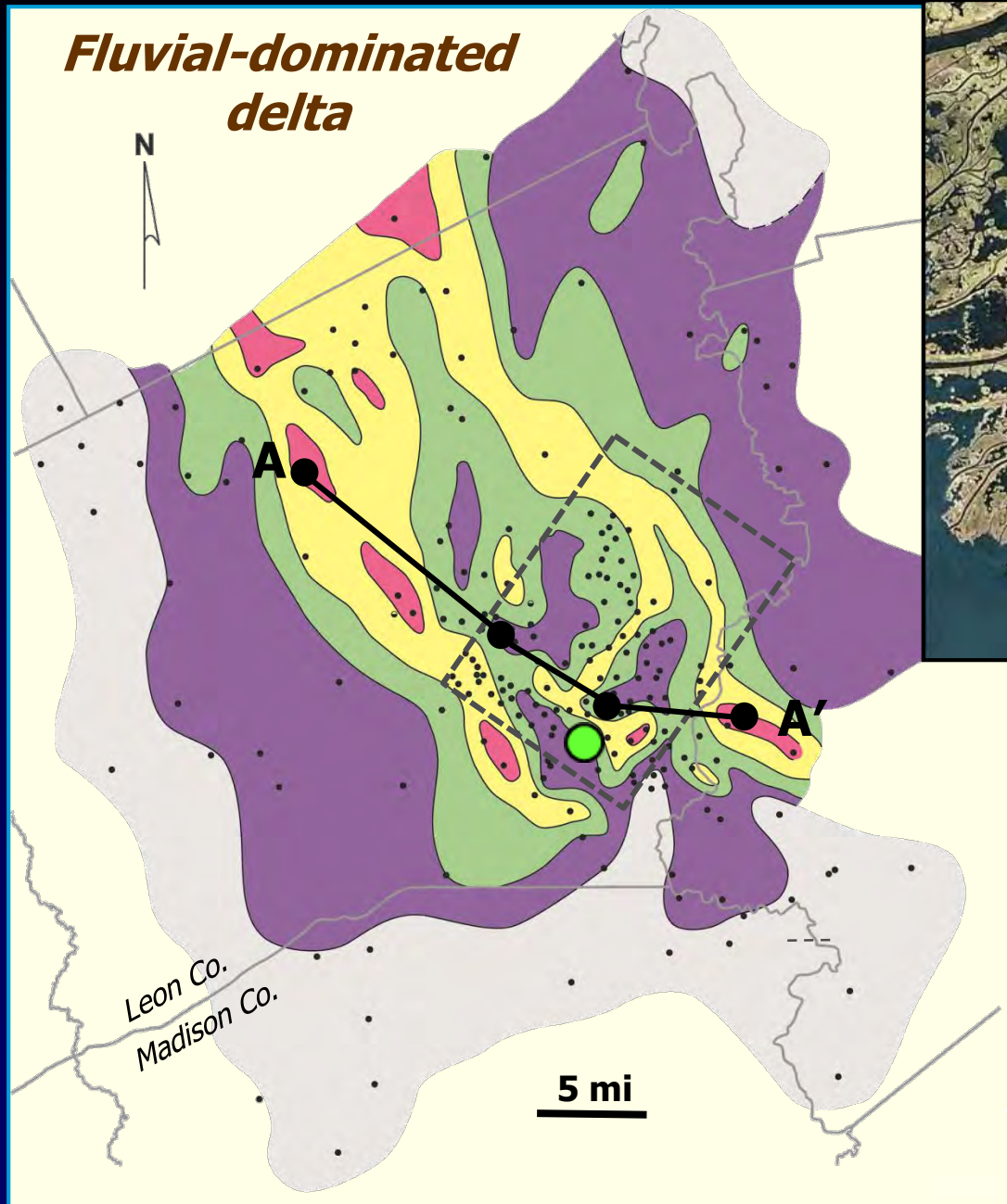
## Sandstone Occurrence: Study Area

Low-order transgressive systems tract



# Mapped Reservoir Zones: Study Area

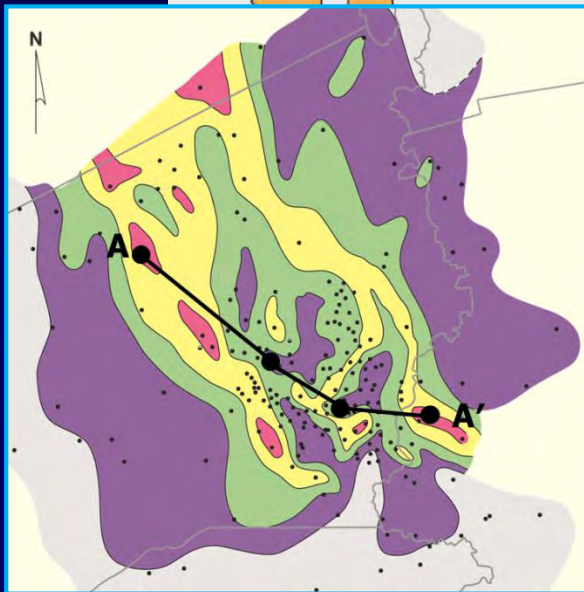
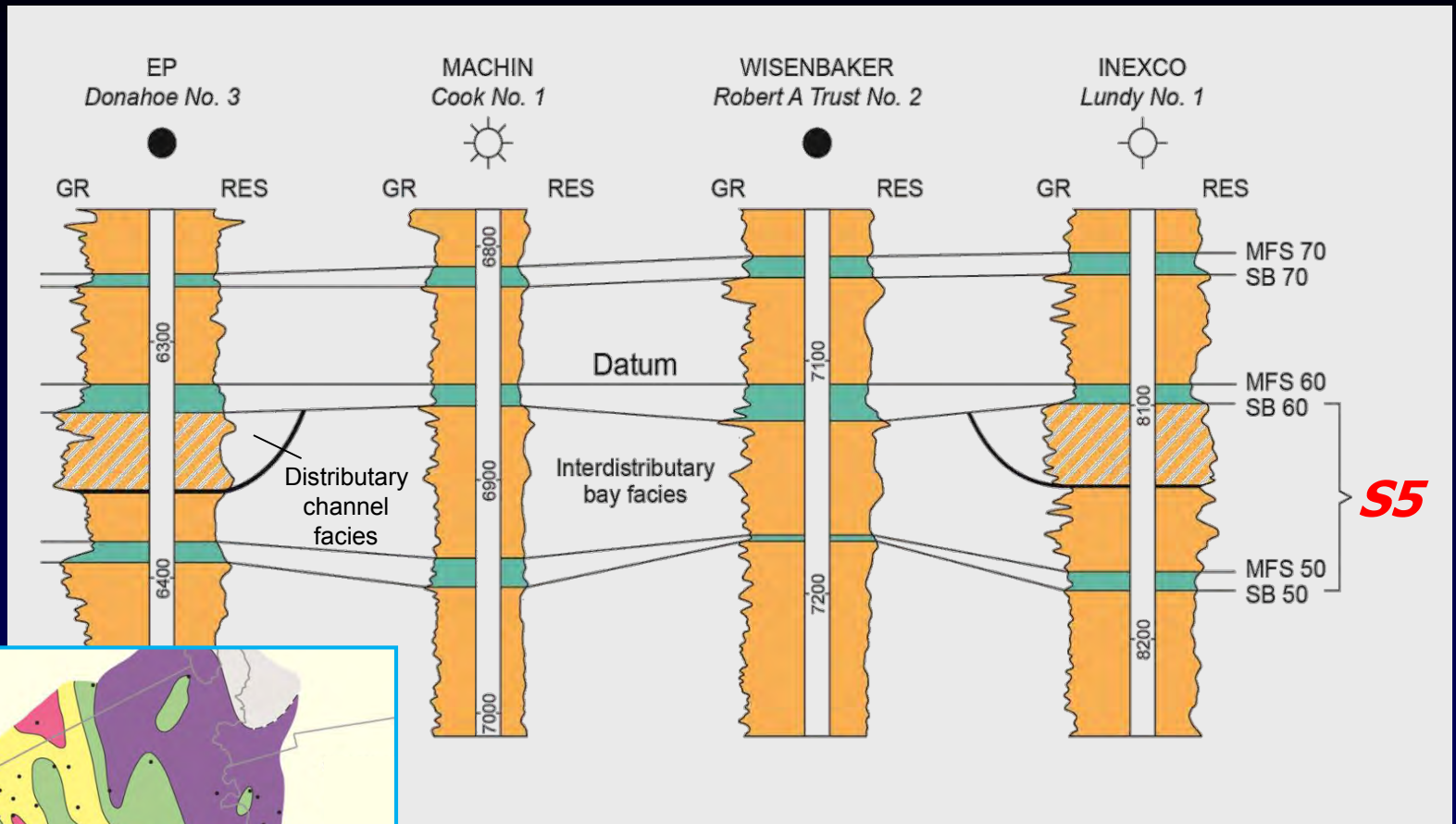




 **Core (*Basin 1 Maude*)**

A

A'



### Systems tract

- Transgressive
- Highstand

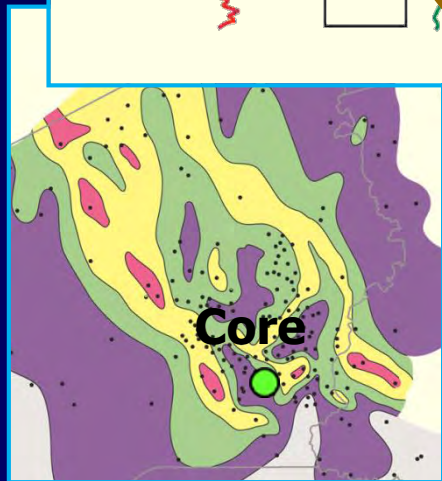
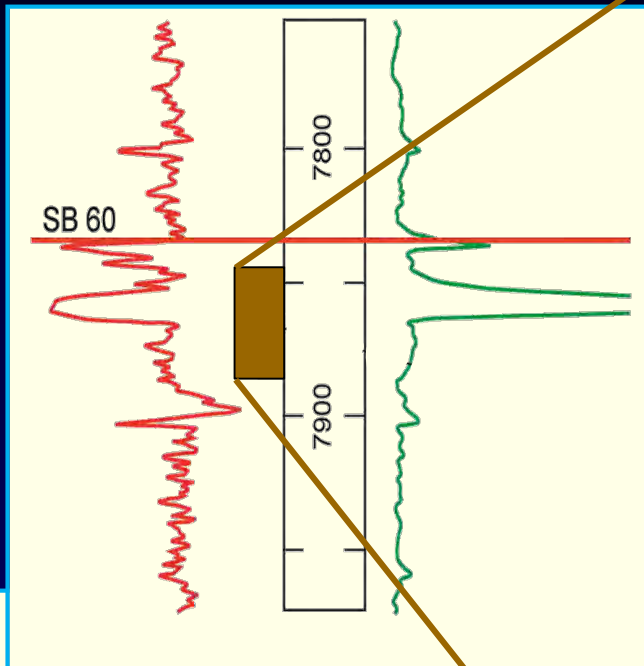


# Basin Maude #1

Core

GR

Res.



Fine | v.f. |

*Upper crevasse  
splay*

*Crevasse  
splay  
channel*

*Levee overbank*

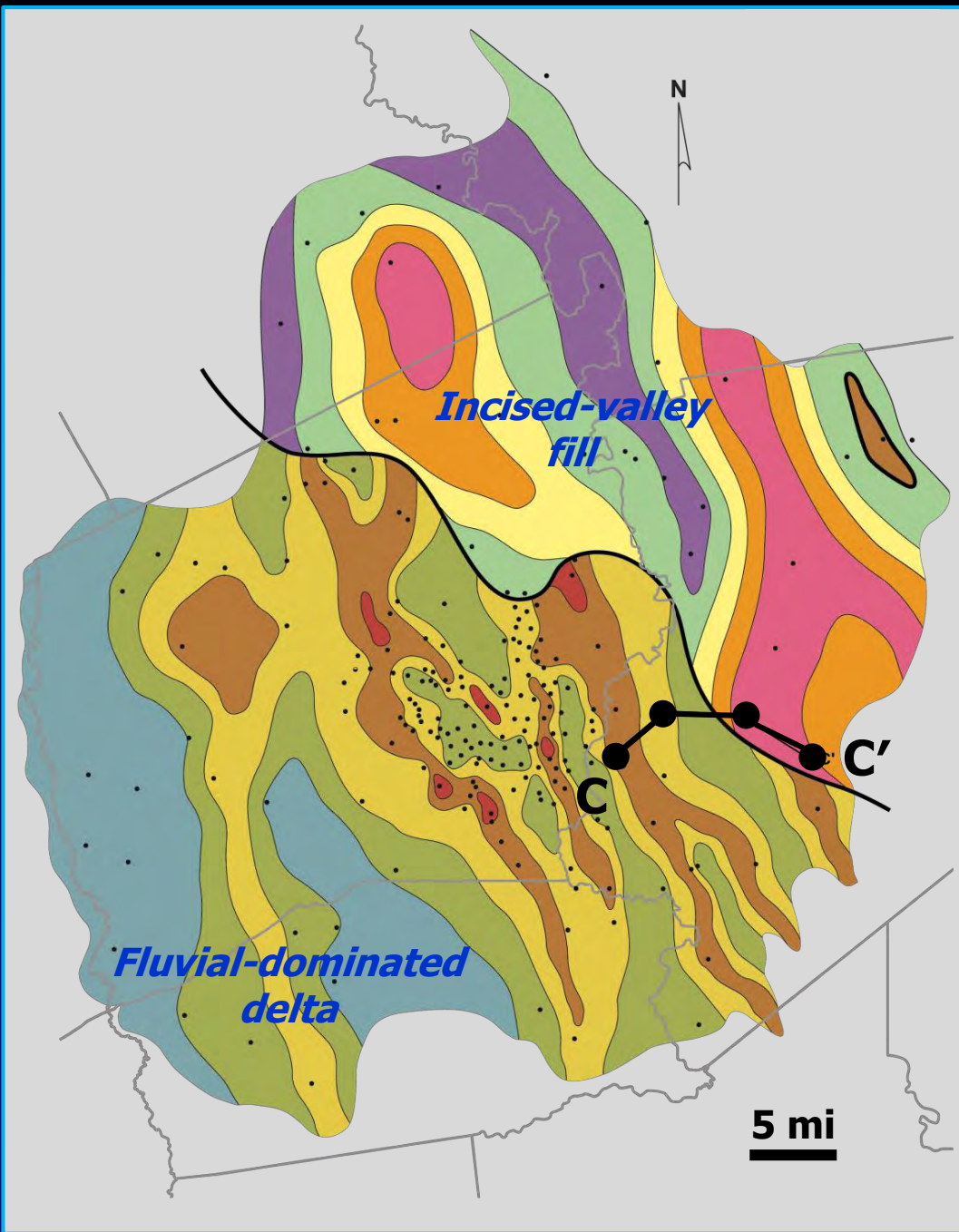
5 ft

BIM  
7848

2 in

BIM  
7862.3

BIM  
7873



# Gross sandstone: *S7 & S8*

## Incised-valley fill facies



*S8*

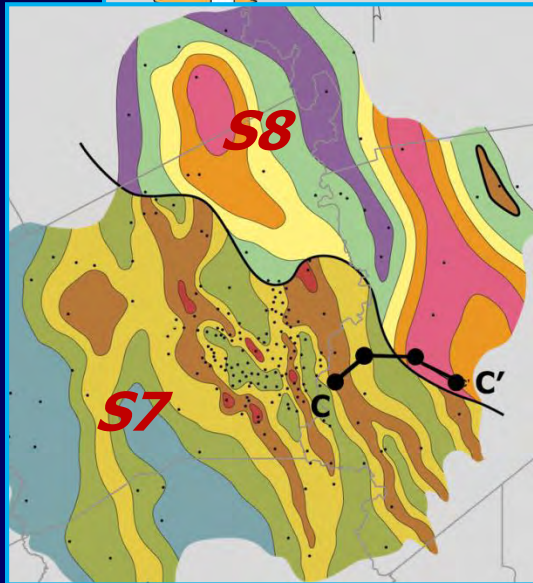
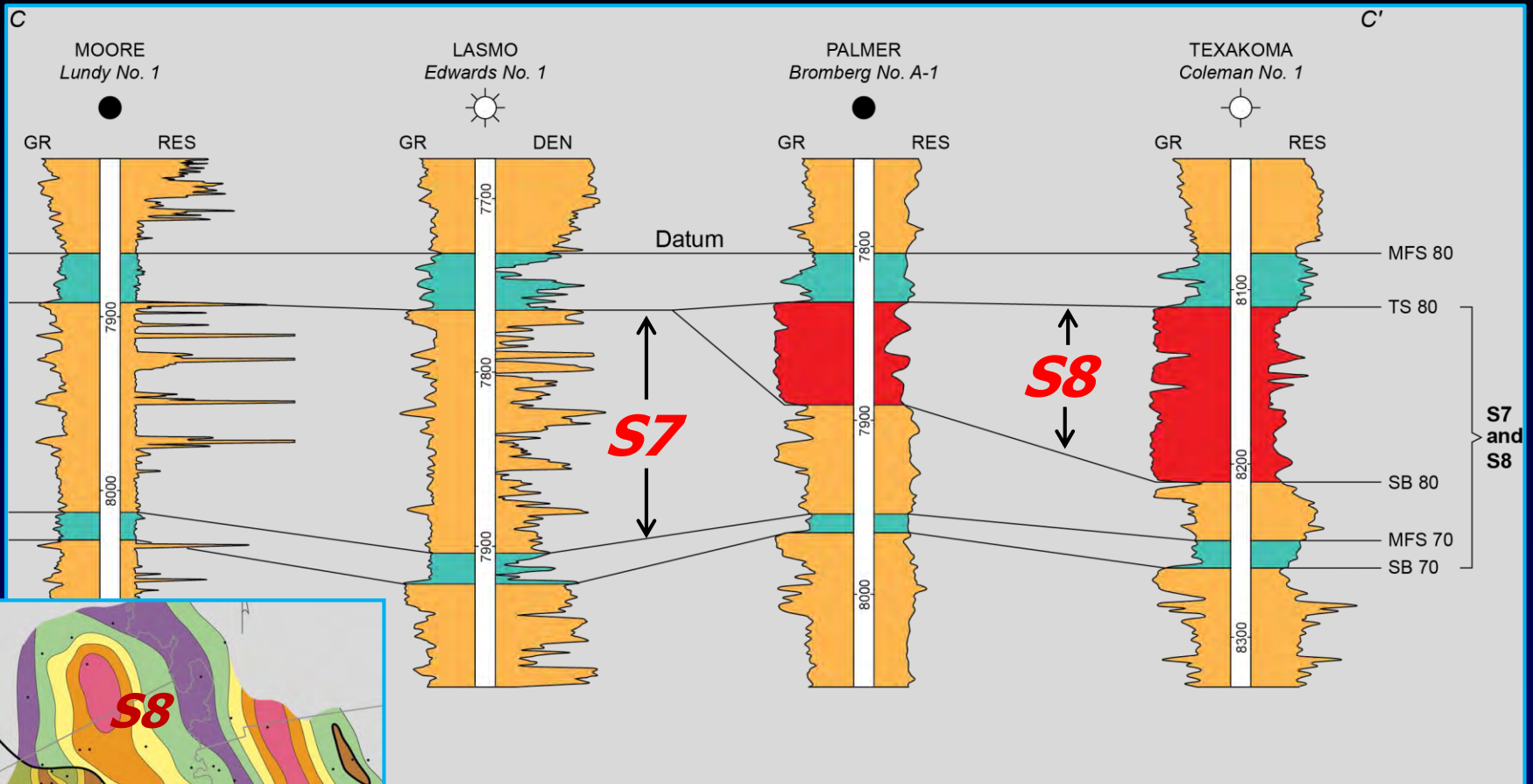
## Deltaic facies



*S7*

Contour interval = 20 ft

Valley-fill margin

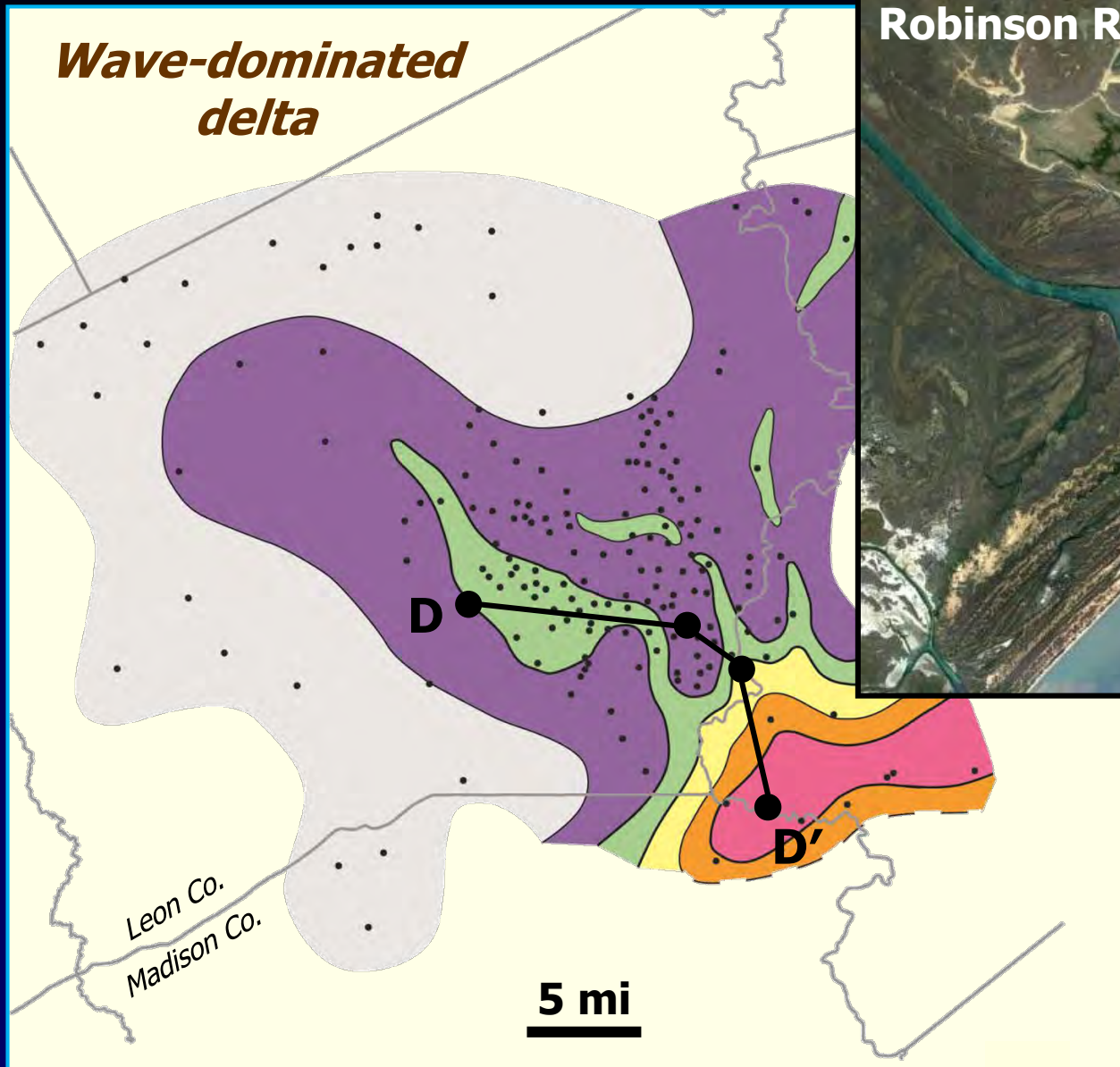
**C****C'**

### Systems tract

- Lowstand:  
incised-valley fill
- Transgressive
- Highstand



***Wave-dominated  
delta***



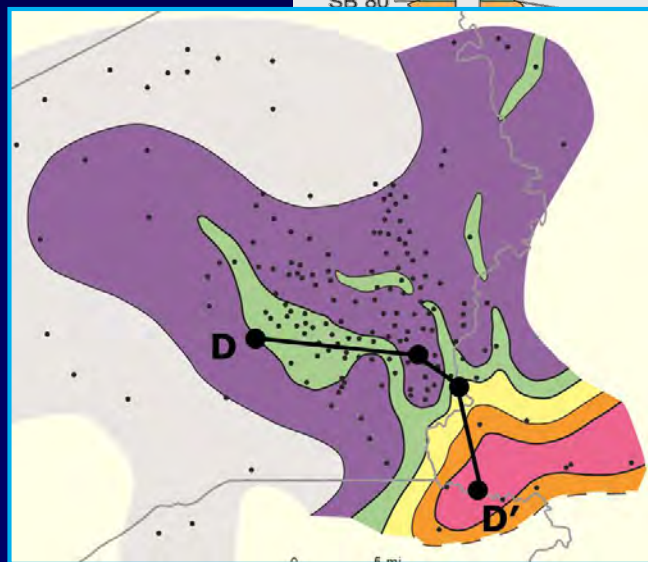
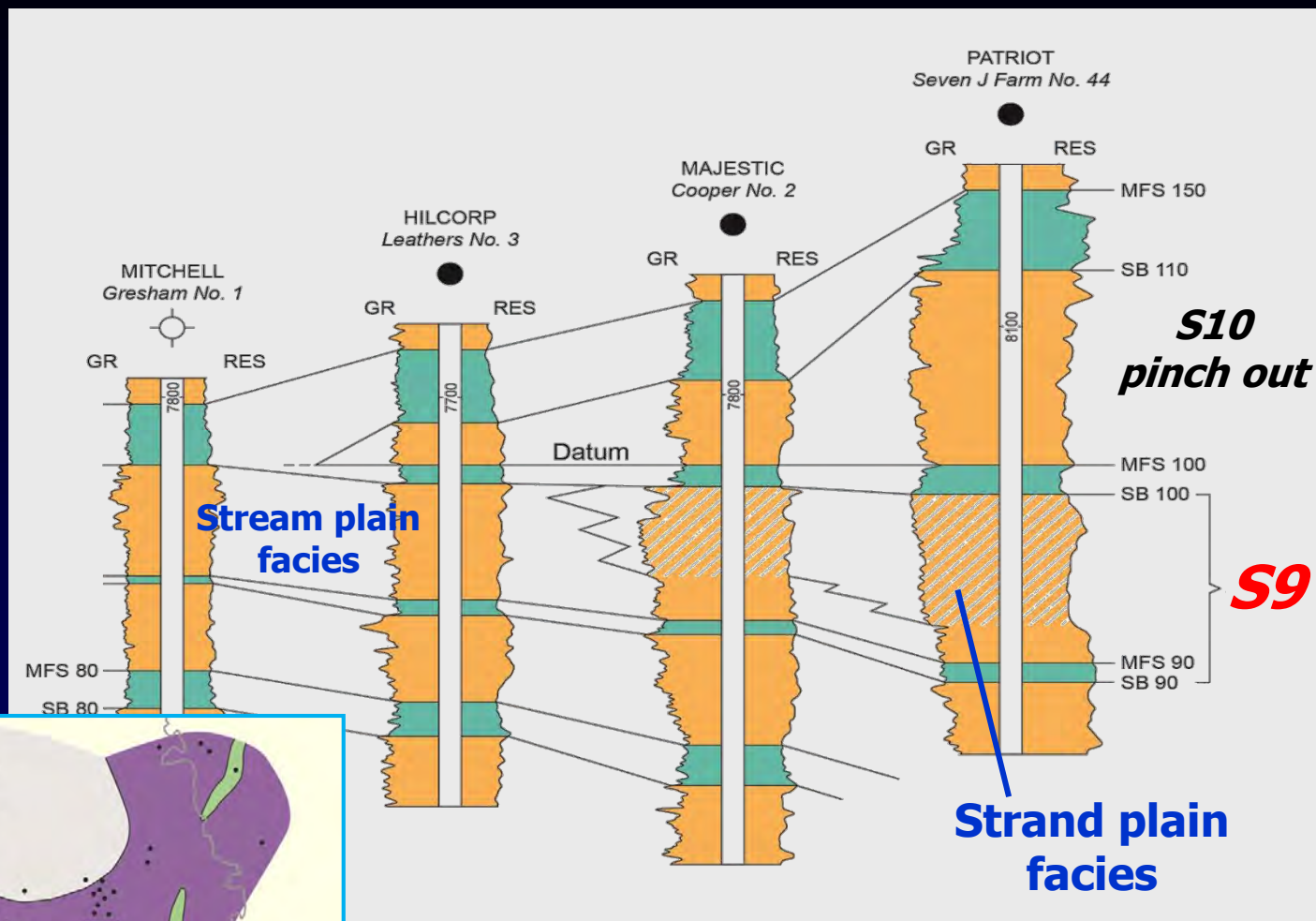
**Robinson River, Australia (NT)**



0

D

D'



### Systems tract

- Transgressive
- Highstand

## Summary

- Lithostratigraphic setting is complex, contributing to exploration challenges
- Regional trends of *Woodbine Group* in study area:
  - (1) Progressive westward depositional pinch out of sequences
  - (2) Overall decrease in thickness of sequences
  - (3) Grading to *Lower* and *Upper unit* mudrocks
- Sandstone-rich depositional systems:
  - (1) Fluvial- and wave-dominated delta systems
  - (2) Fluvial valley fills
- Sandstone facies include distributary channel, crevasse splay, delta-front, and small- & large-scale fluvial