

DISCOVERY THINKING A NEW EXPLORATION MODEL FOR STRATIGRAPHIC TRAPS, 1950's

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OUTLINE of TOPICS

- STRATIGRAPHIC CODES
- NEW EXPLORATION MODEL
 - ANALOGUES
 - SAN JUAN BASIN
 - API PROJECT 51 - SHORELINE SS.
- WAMSUTTER ARCH PLAY
 - GEOLOGY - SURFACE & SUBSURFACE
 - LAND WORK
 - SELLING THE DEAL
 - DISCOVERIES
- SUMMARY -- LESSONS LEARNED

1933 STRATIGRAPHIC CODE

TIME

ROCK UNITS

ERA

PERIOD ----- SYSTEM

EPOCH ----- STAGE

GROUP

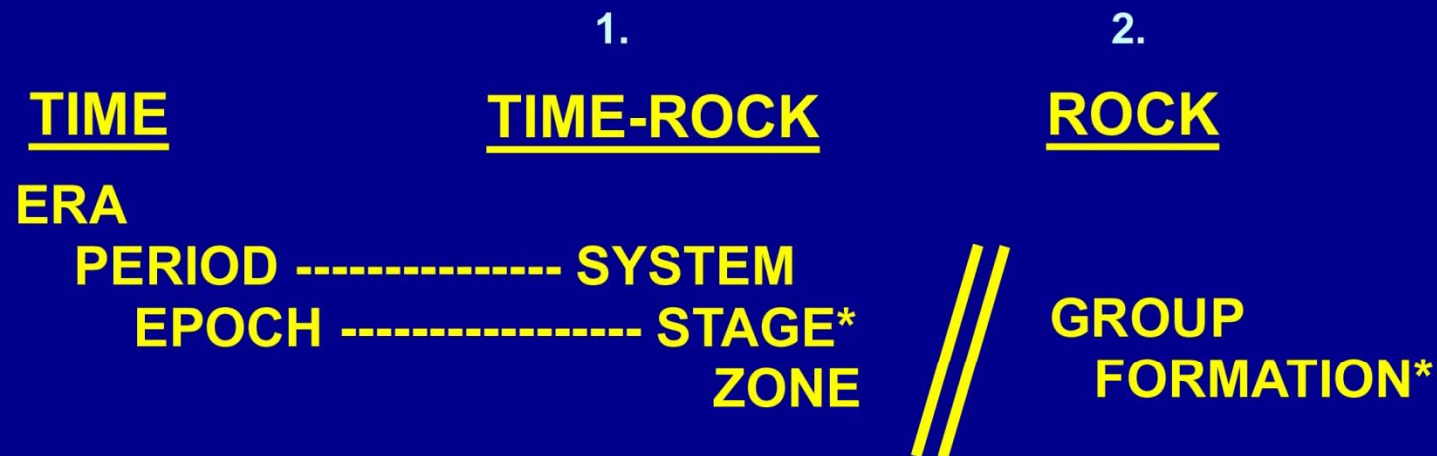
FORMATION*

EMPHASIS ON SURFACE GEOLOGIC MAPPING,
ROCK DESCRIPTION AND VERTICAL
ACCUMULATIONS

PROMOTES LAYER CAKE GEOLOGY

SCHENCK & MULLER ARTICLE -- 1941

DUAL CLASSIFICATION

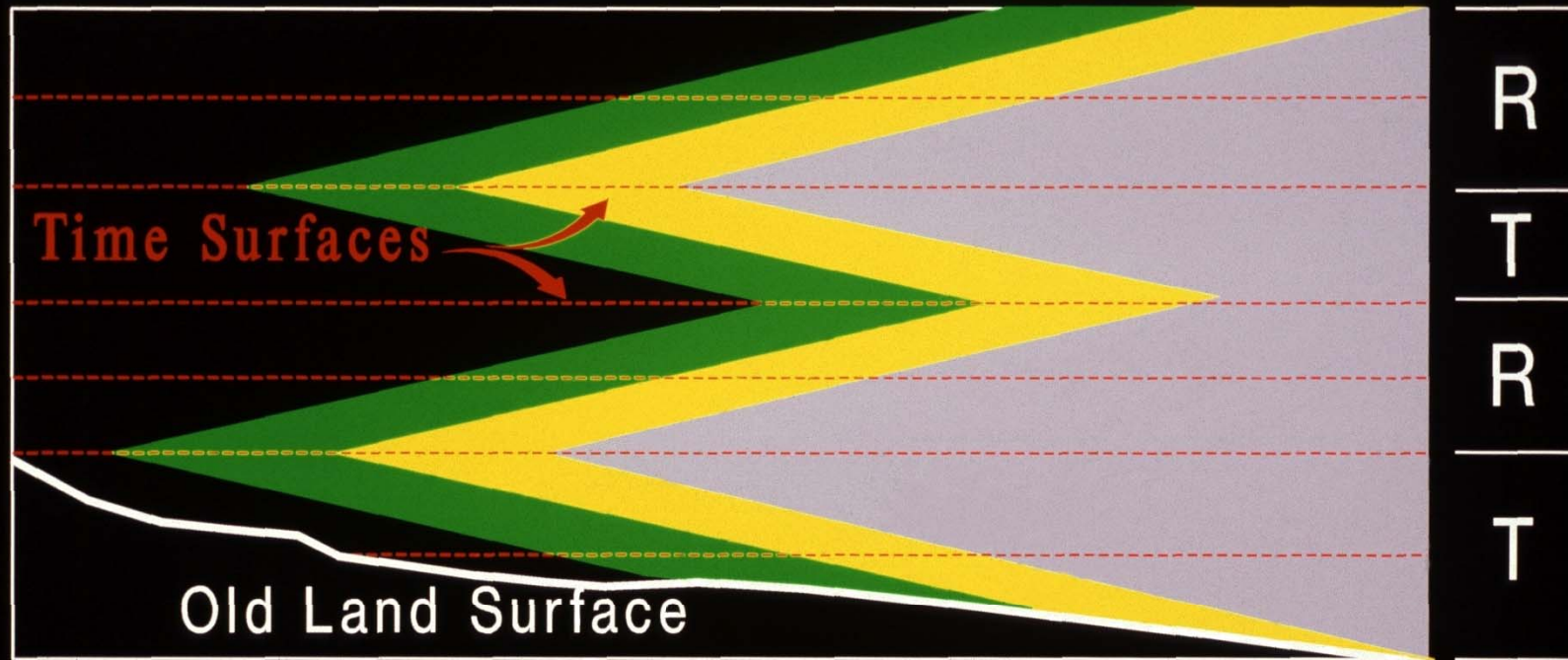


-
- INTEGRATES FACIES ANALYSIS:
 - DEF. – LOCAL LITHOLOGIC OR BIOLOGIC ASPECT OF TIME-ROCK UNIT
 - RECOGNITION OF TWO TYPES OF SURFACES: TIME AND FORMATION BOUNDARIES

* 1961 & LATER CODES FOLLOW ABOVE SCHEME

Landward

Seaward



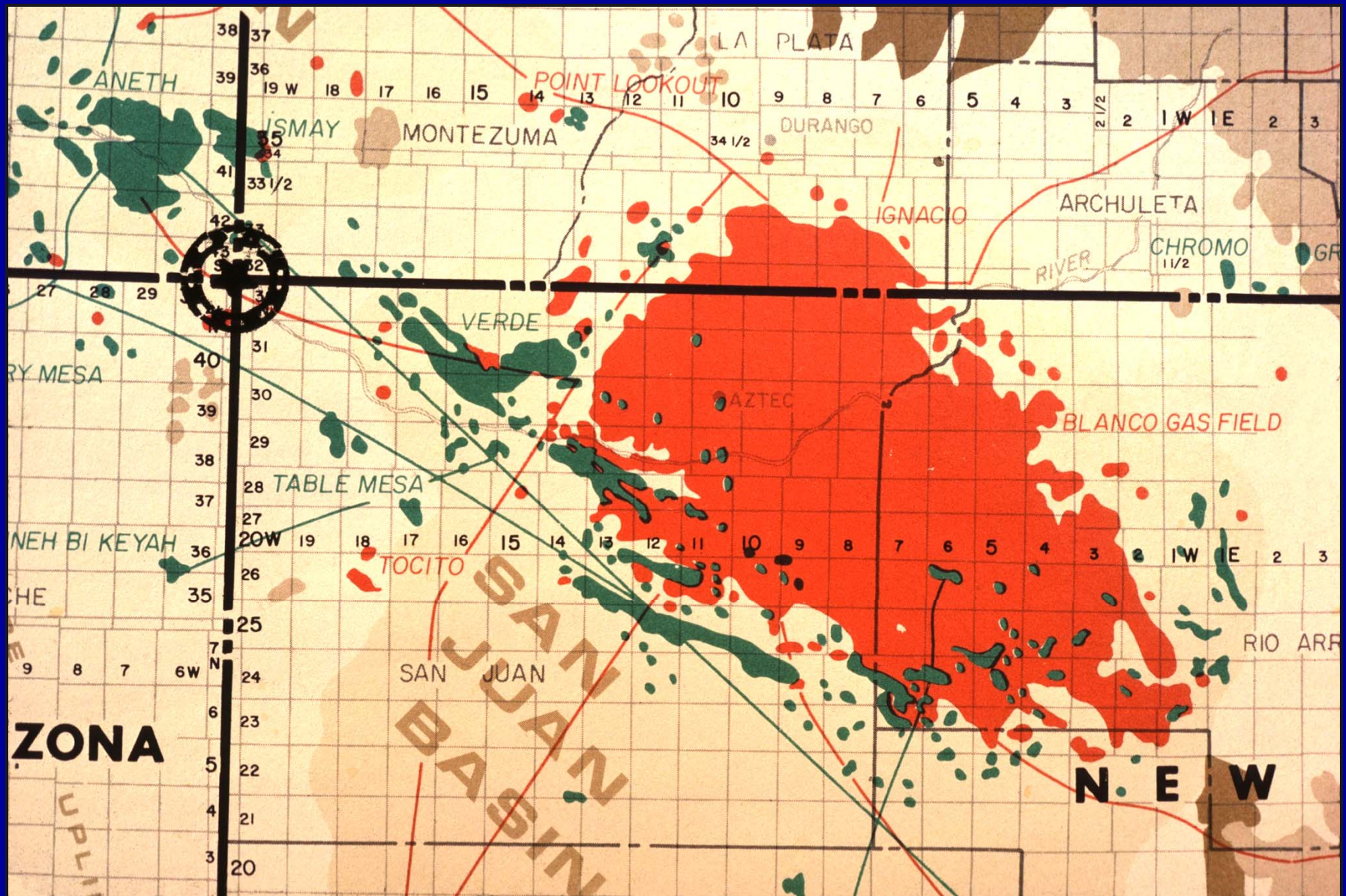
Flood Plain

Coastal

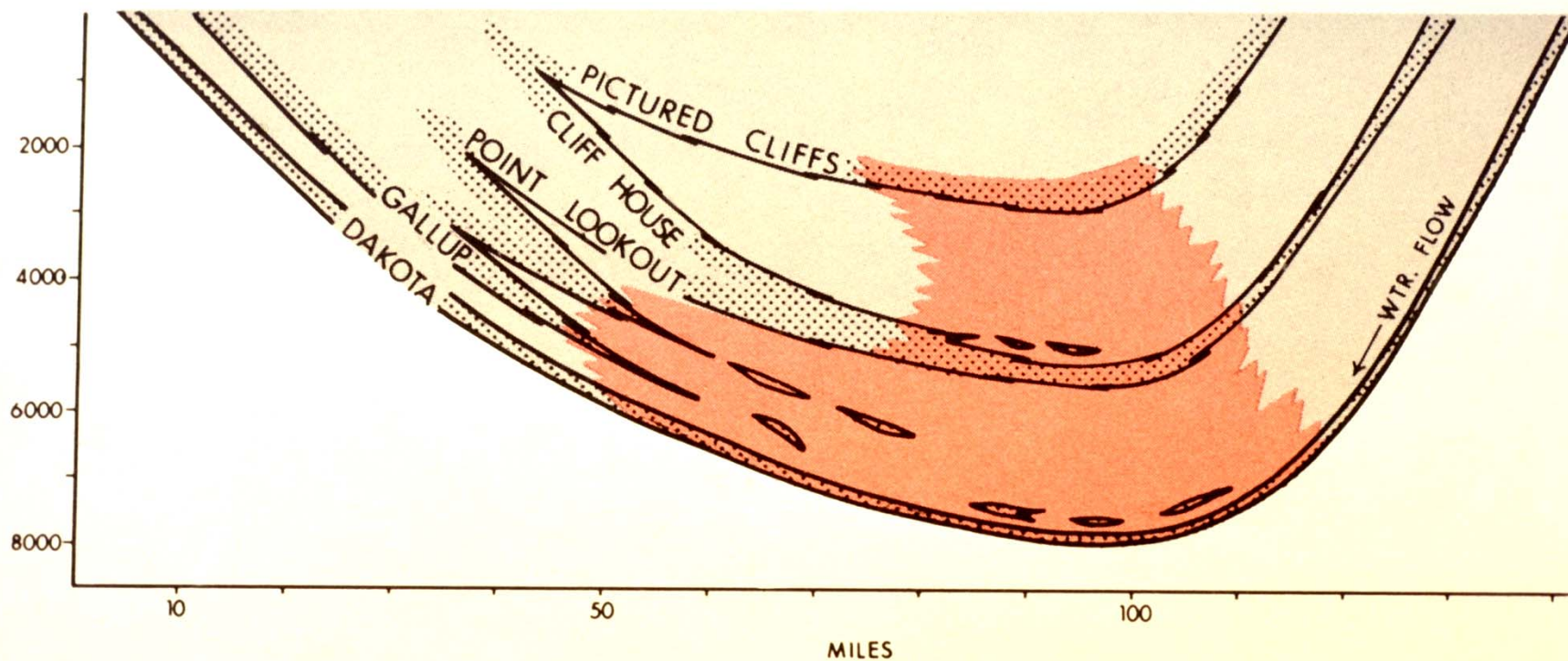
Near Shore

Marine

from Sears, et al, 1941

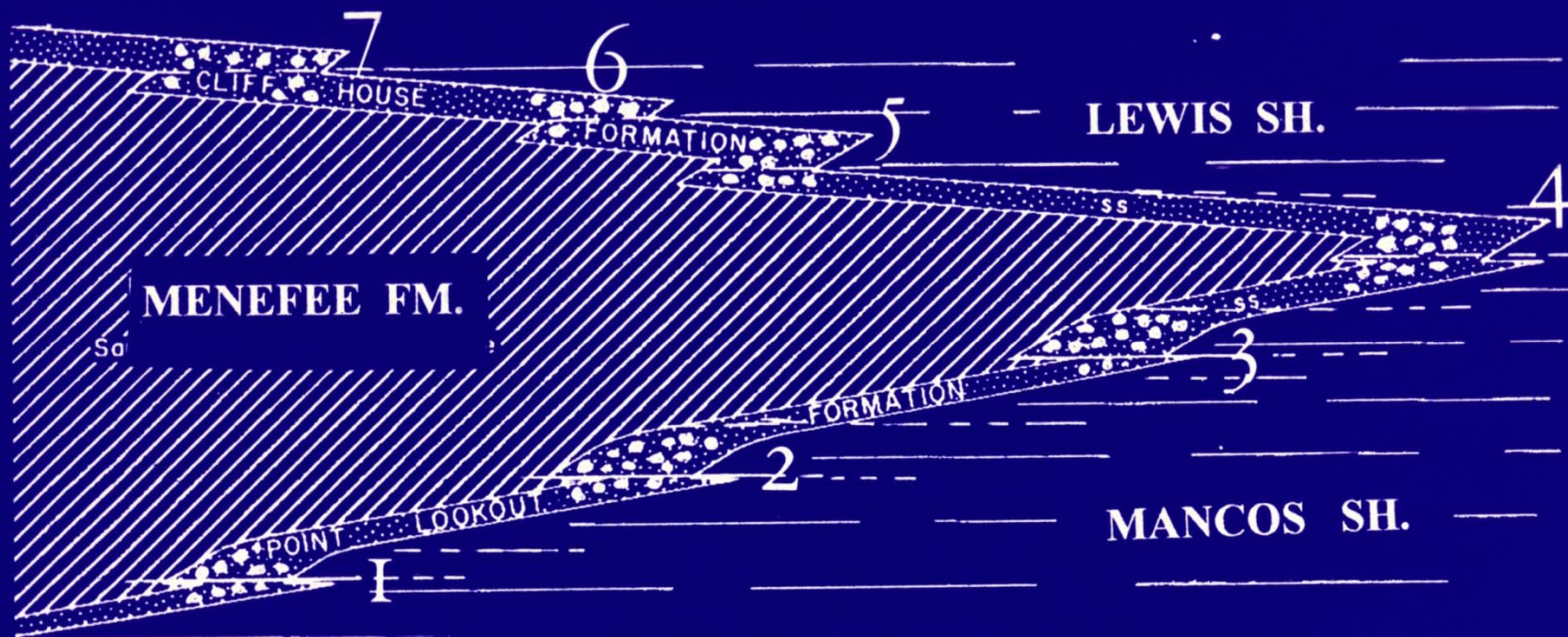


S.W.





SAN JUAN BASIN

TRAP AREA: 3600 sq.mi.
TOTAL GAS: 5000 ft.
AVERAGE NET PAY: 300 ft.
TOTAL RESERVES: 25 TCF



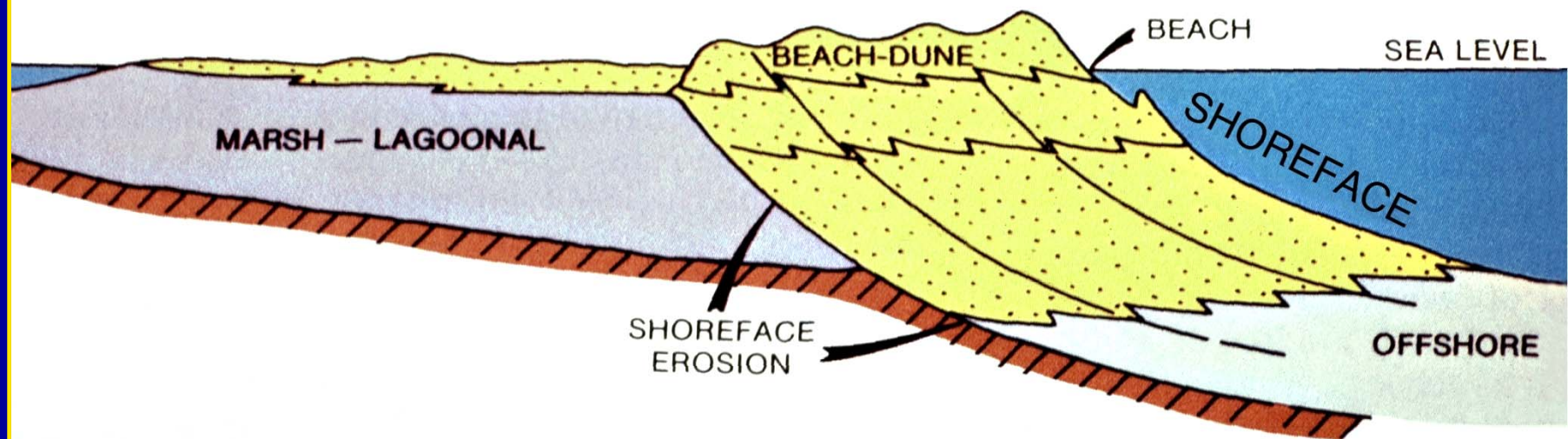
C. T. HOLLENSHEAD AND R. L. PRITCHARD

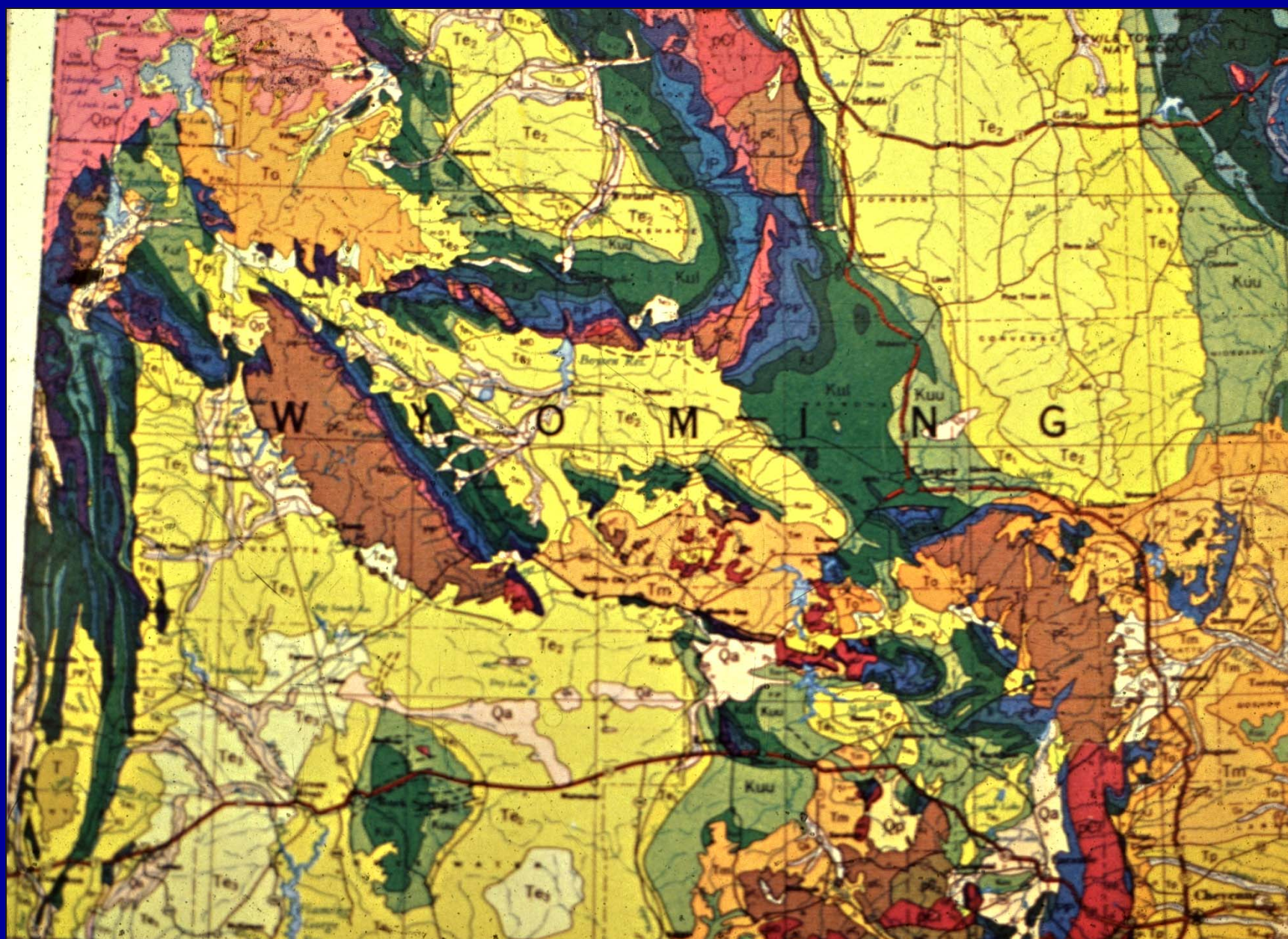


-  BARRIER ISLAND
-  TIDAL FLAT
-  TIDAL CHANNEL AND TIDAL DELTA
-  MARSH
-  LAGOON

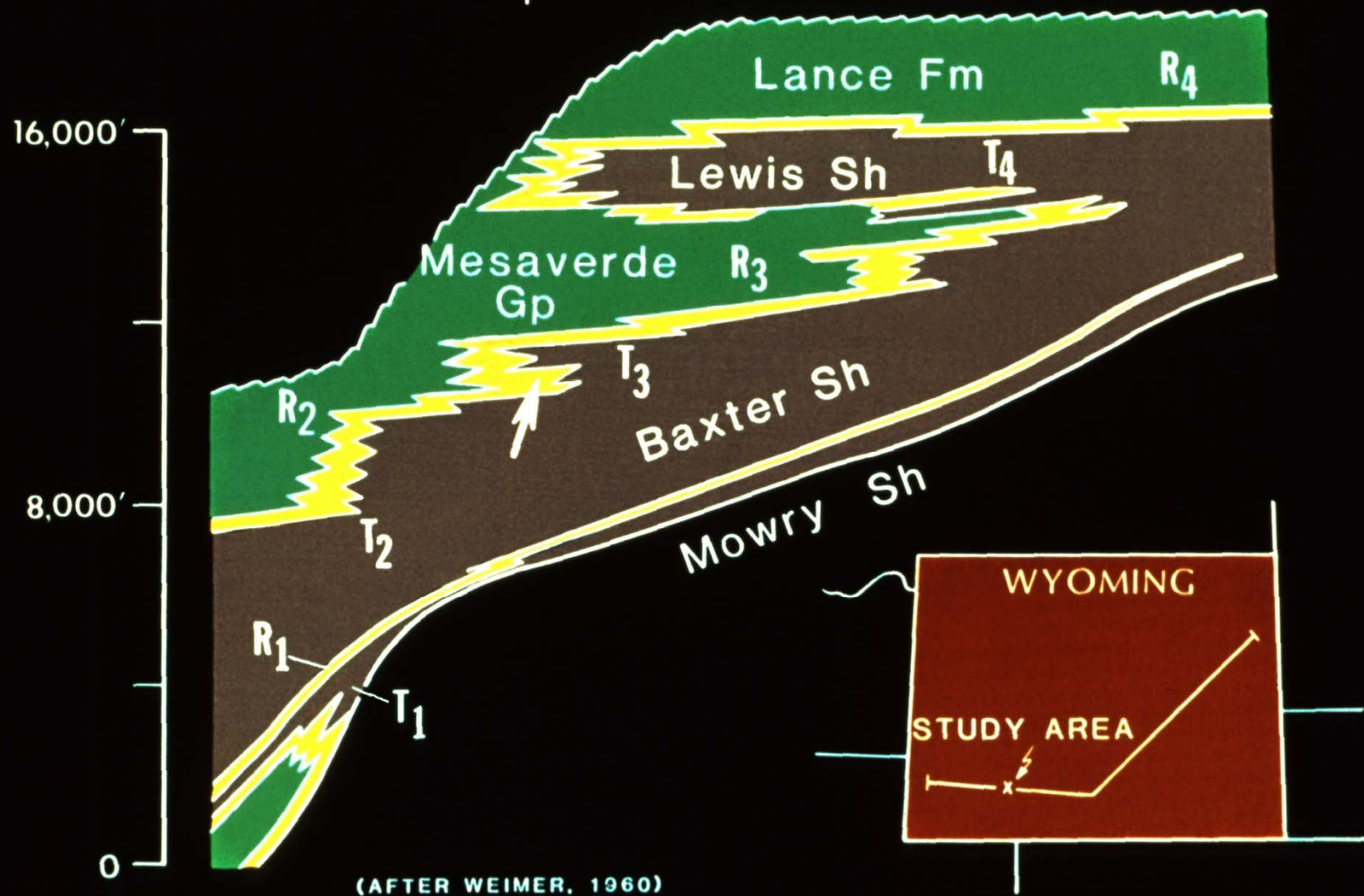
0 3 Mi
4.8 Km

PROGRADATION →



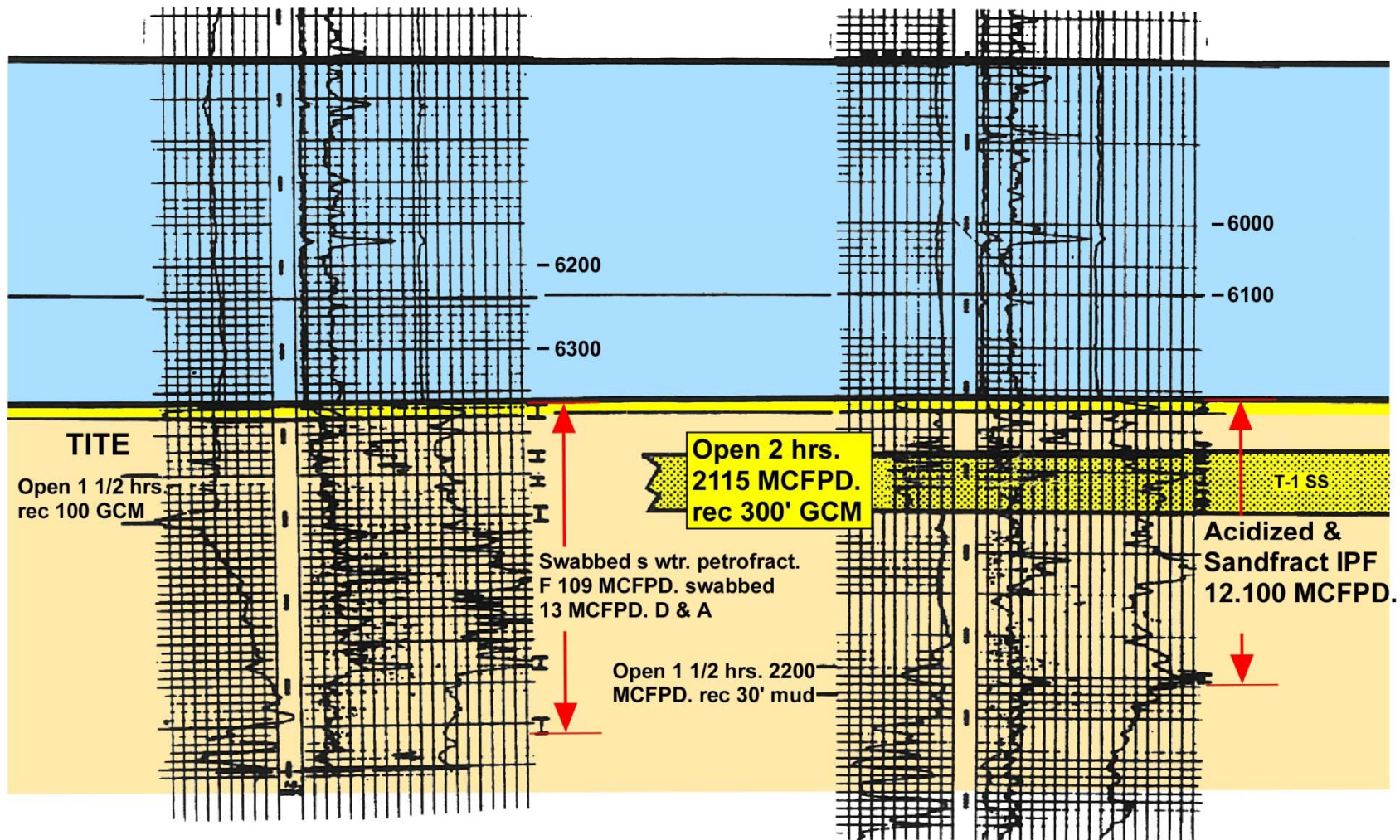


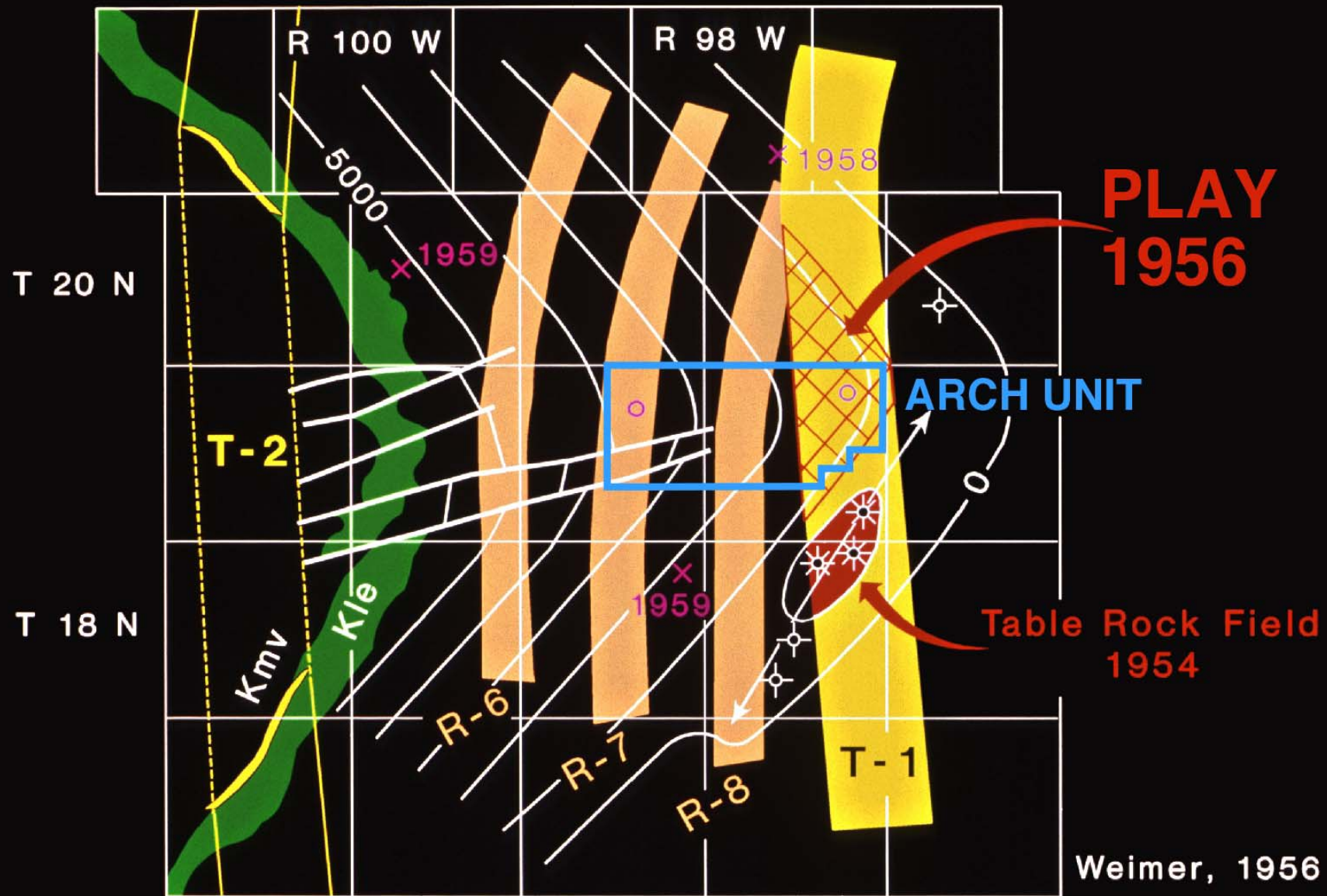
STUDY AREA

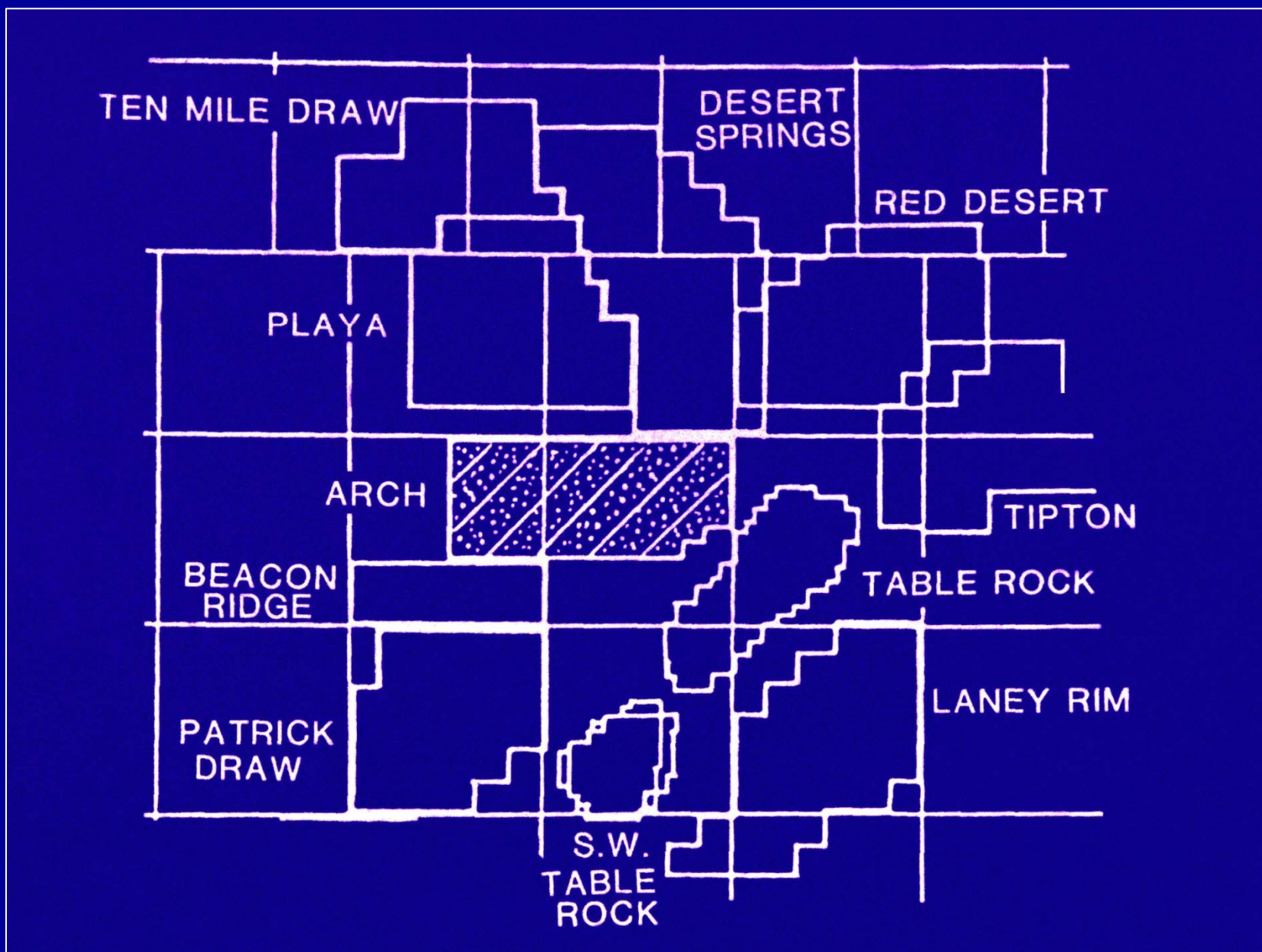


SW T. R. 2
X

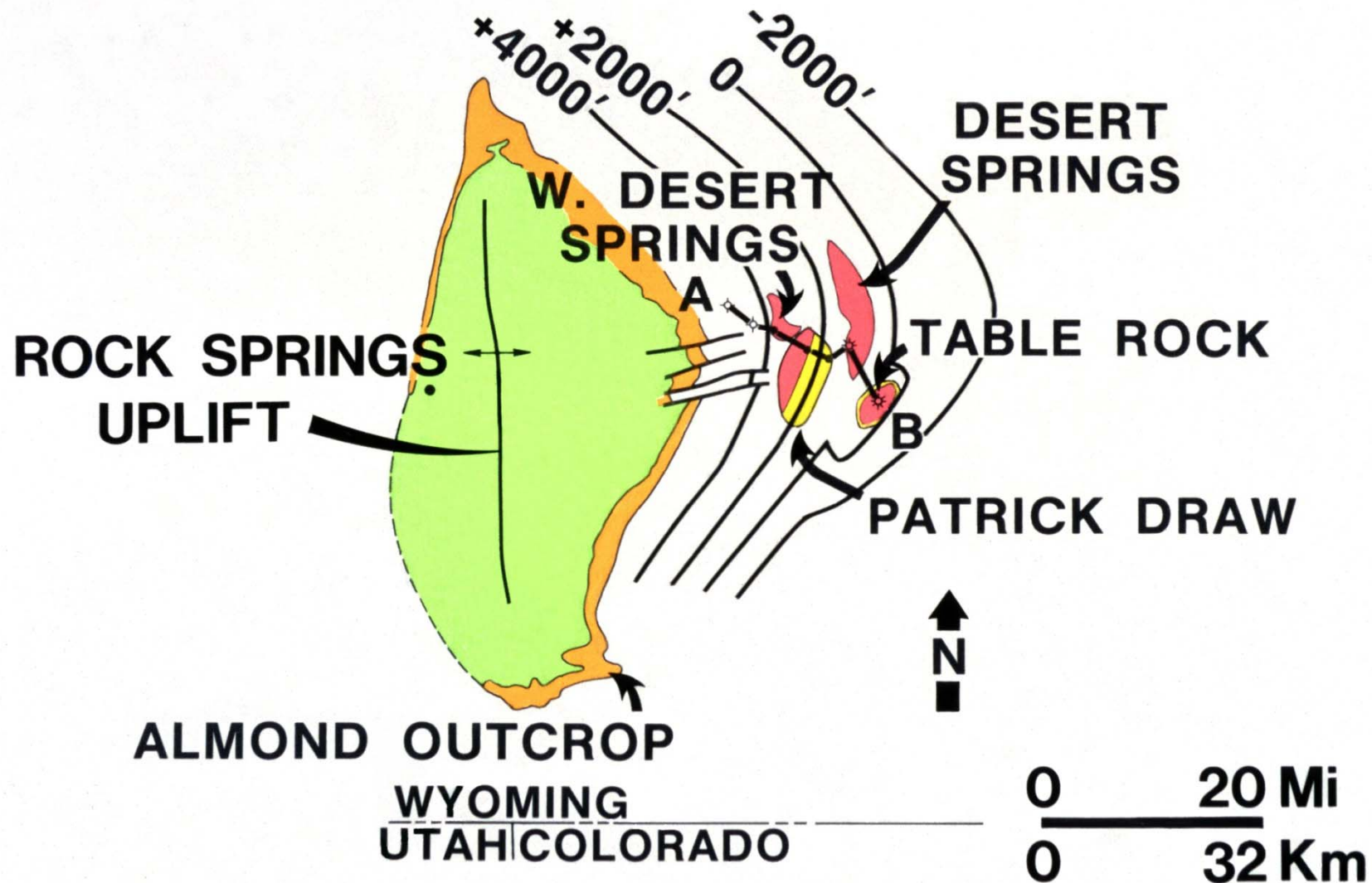
T. R. 6
Y











OUTCROP



W

**TABLE ROCK
FIELD**

**FORT
UNION**

E

A

B

**ALMOND
LEWIS**

EOCENE

PALEOC.

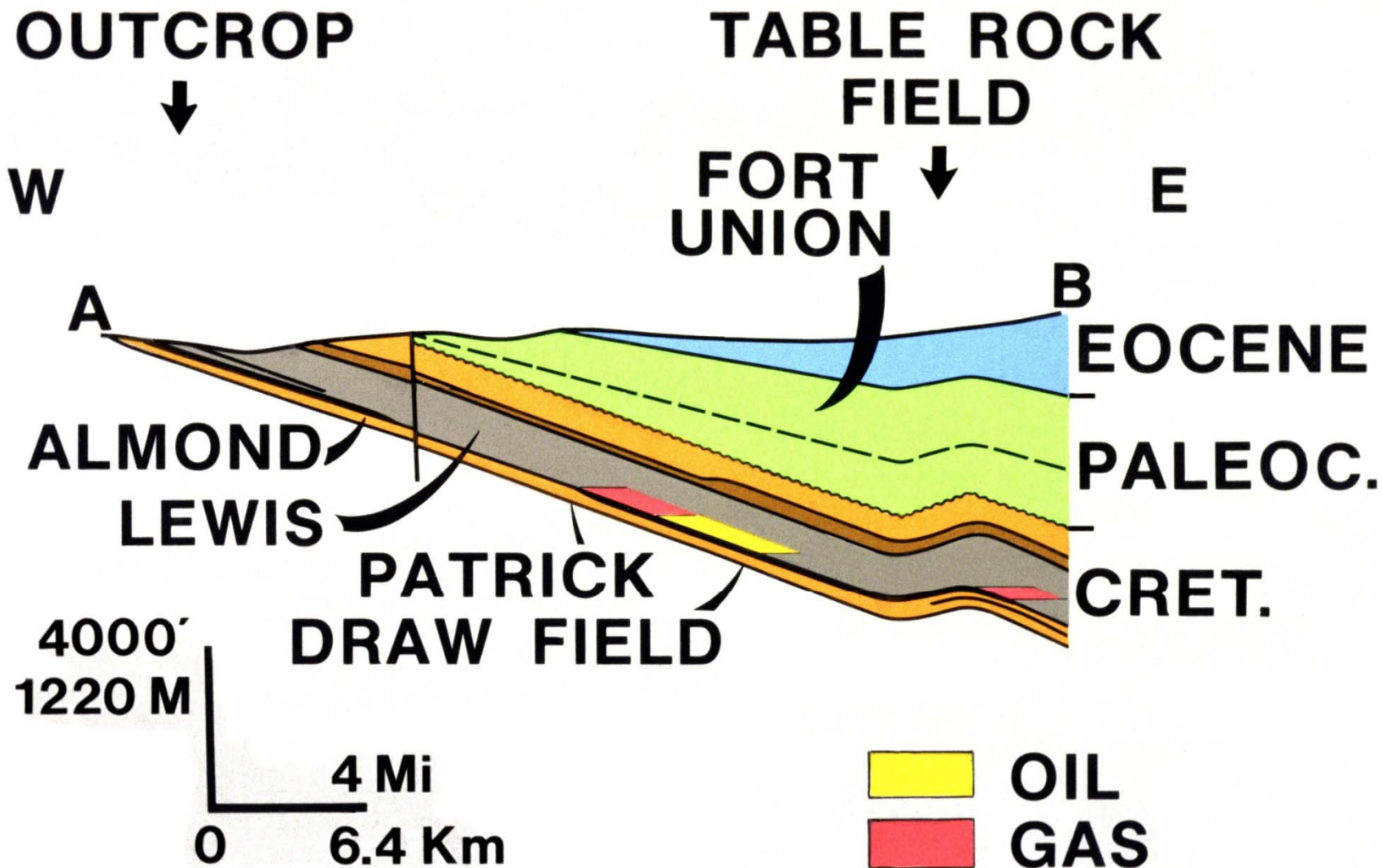
**PATRICK
DRAW FIELD**

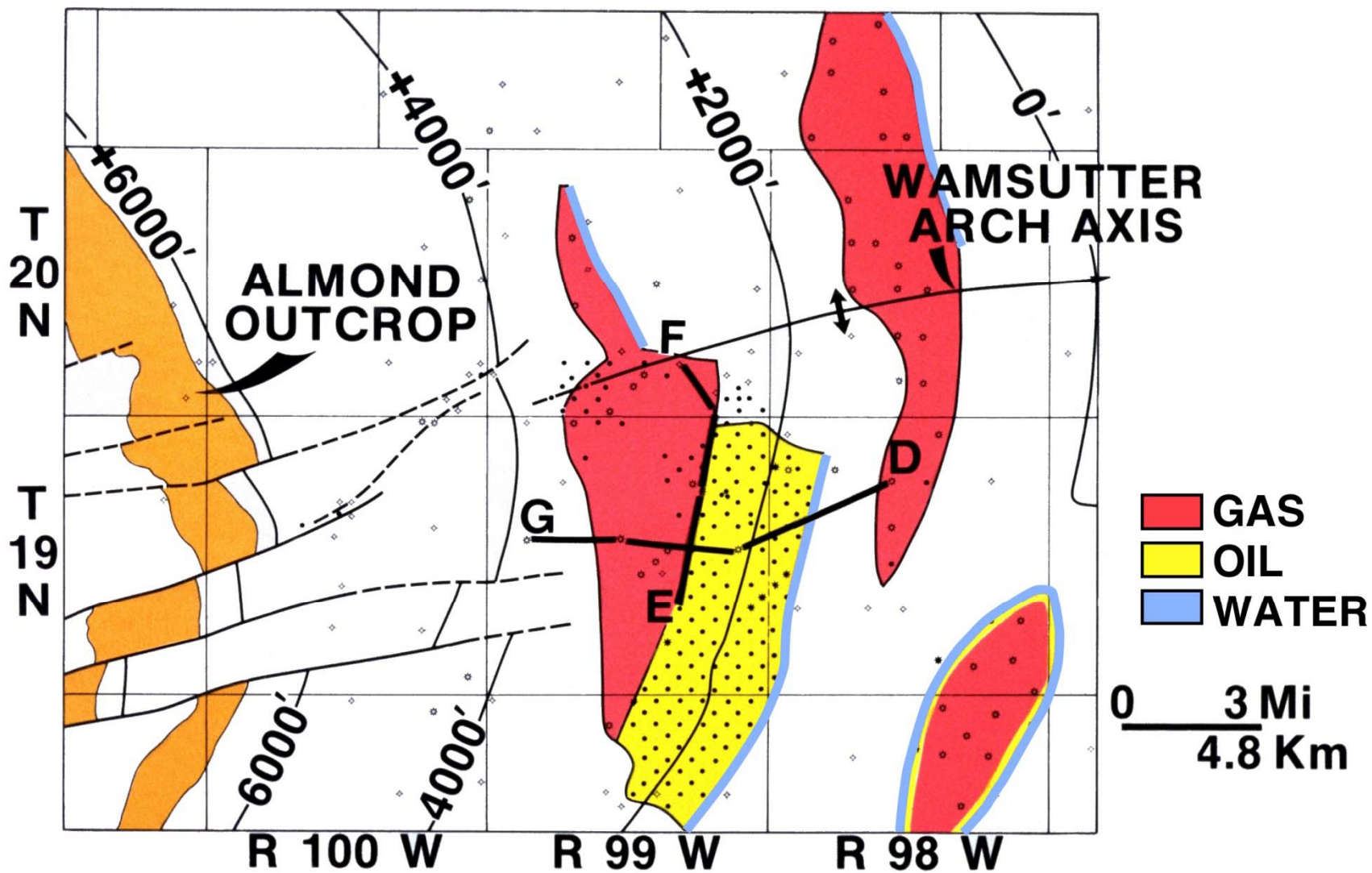
CRET.

**4000'
1220 M**

**0 4 Mi
6.4 Km**

**OIL
GAS**





PATRICK DRAW FIELD, WYOMING

DISCOVERY: 1959

OIL IN PLACE: 250 MILLION BBLS

**STRATIGRAPHIC AND STRUCTURAL TRAP;
EAST FLANK OF UPLIFT**

LENGTH: 8 MILES

WIDTH: 3 MILES

PRODUCING DEPTHS: 3500-6500 FEET

NET PAY: 20 FEET

POROSITY: 20% PERMEABILITY: 36 MD

WATER SATURATION: 30-50%

**ENVIRONMENT OF DEPOSITION:
MARINE SHORELINE SANDSTONE**

SUMMARY OF CONCEPTS IN 1950's EXPLORATION

- **K SHORELINE MOVEMENT WAS SPASMODIC**
- **STEPS IN THE SHORELINE SANDS FORM:**
 - **LINEAR BARRIER BAR RESERVOIR TRENDS**
 - **STRATIGRAPHIC TRAPS WHERE BARRIER BARS
ARE ENCLOSED BY SHALES**
- **ANALOGIES OF PRODUCING TO NON-PRODUCING
AREAS**

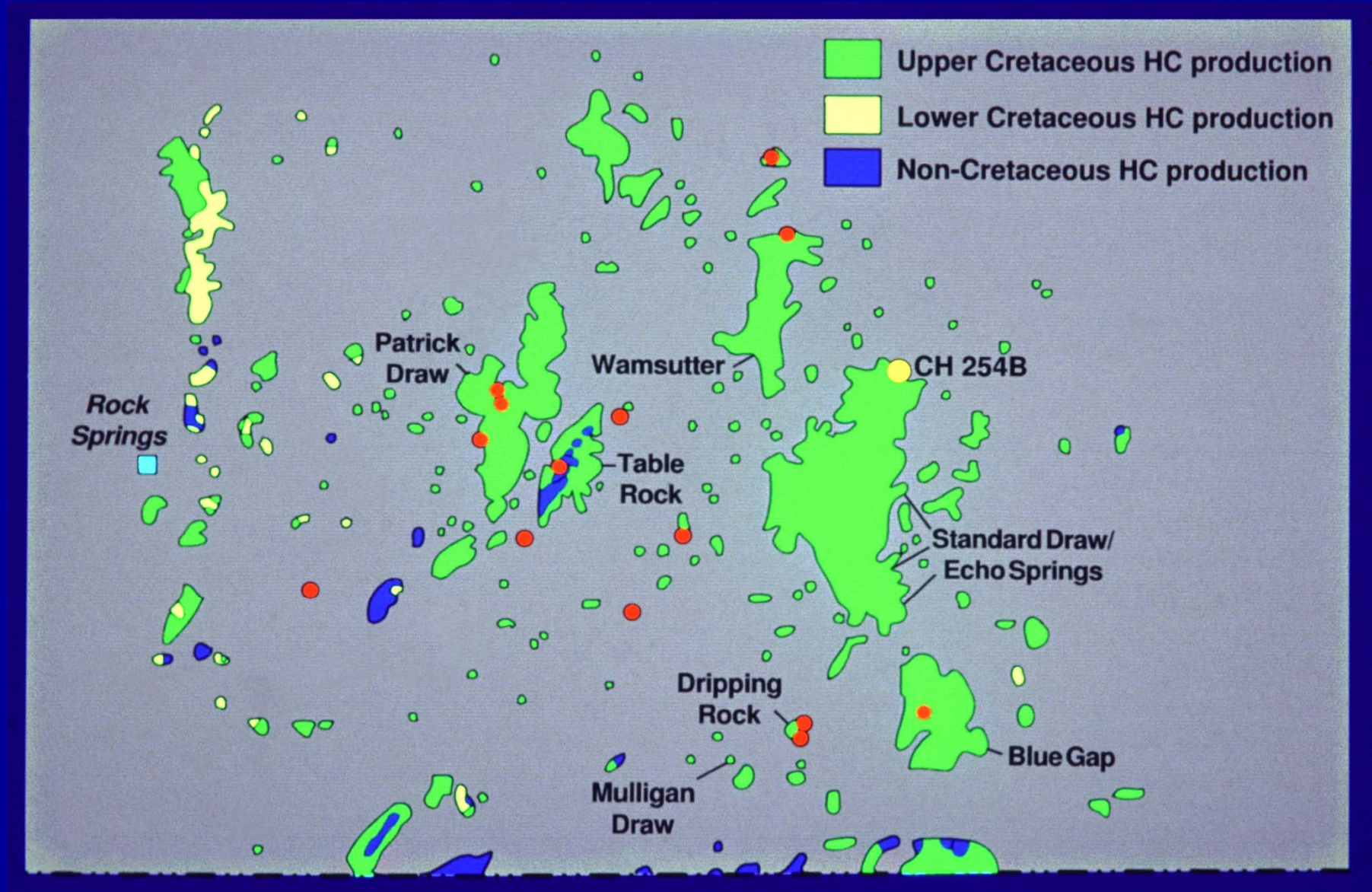
- **MAJOR STRUCTURAL ARCHES AS FAVORABLE EXPLORATION AREAS W/ REASONABLE Ø DEPTHS**
- **LAND AVAILABILITY AND MARKET OUTLETS ESSENTIAL TO DISCOVERIES**
- **FAVORABLE GOVERNMENT POLICIES**
- **ALWAYS HOPE FOR SURPRISES:**
 - **LARGER PRODUCING AREA THAN ENVISIONED**
 - **OIL INSTEAD OF GAS**

ATTRIBUTES FOR SUCCESSFUL PLAYS

- BE INNOVATIVE & CREATIVE
- CONTINUALLY INTEGRATE NEW INFORMATION INTO DATA BASE -- SEARCH FOR GUIDE POSTS
 - CHALLENGE DOGMA
 - NEW IDEAS ARE THE FUEL FOR EXPLORATION
- USE DISCOVERIES FOR COMPETITIVE ADVANTAGE

- ACCEPT HIGHER RISK IN VENTURES FOR BIGGER PAY-OFF
- ADOPT NEW TOOLS AND APPROACHES
- HAVE LUCK

(LUCK IS GEOLOGIC FACTORS UNKNOWN AT START OF DRILLING)



SUMMARY OF BASIN CENTER FIELDS

- **SOURCE ROCKS**
- **GENERATION – MATURATION**
- **MIGRATION**
- **TRAPS**
 - **SANDSTONE RESERVOIRS**
 - **FLUIDS & PRESSURES**
- **SEALS**
 - **TIMING**
- **WHAT HAS BEEN PRODUCED?**
- **WHAT IS LEFT?**
- **OBJECTIVE**

References

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