



# Liberia's Strategy Towards Energy Success: Potential and Prospects

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## Summary



Liberia has been around for some time now and the oil and gas sector in Liberia has developed from one point to another. There have been successes and failures, but we are determined to make it work. Therefore, we have developed the workings of our sector to an appreciable point where interested companies can come, invest and we can have a success story together.

In Liberia, the subsurface shows that there is a working petroleum system and the above ground is ready for business with stability, attractive terms and ease of business.



# Why Come to Liberia for Investment?



## 1. Seismic Data

Extensive 2D & 3D coverage in addition to legacy and well data:

- 34,000 km (2D)
- 24,500sq.km (3D)

## 2. Well Data

- Log & Laboratory Petrophysical Data
- Geochemical Data
- Pre-drill & End of Well Reports
- Biostratigraphy Reports
- Core, SWC & Cutting Data
- Image Log Data

## 3. Clear, uncomplicated, and predictable **regulatory regime**

- **Flexible** negotiations
- Unexplored terrain with **untapped potential** for success

## 4. Situated along the **West Africa Transform Margin**

- Two distinct hydrocarbon systems (**Early and Late Cretaceous**)
- **Traps types** within this system are confined to **stratigraphic channels** and fan systems



# Why Come to Liberia for Investment?



Liberia has made remarkable peace gains over the past 14 years. The election of President Joseph N. Boikie last year and the peaceful transition of governance, marked an important milestone of our country's growth in democracy.





# Offshore Resources Block Layout

## Our Basins

Our offshore is divided into two basins:

✓ 33 Offshore Blocks

✓ Liberia Basin (1 – 24)

✓ Harper Basin (25 – 33)

✓ A Total Area of 98,453.96 km<sup>2</sup>

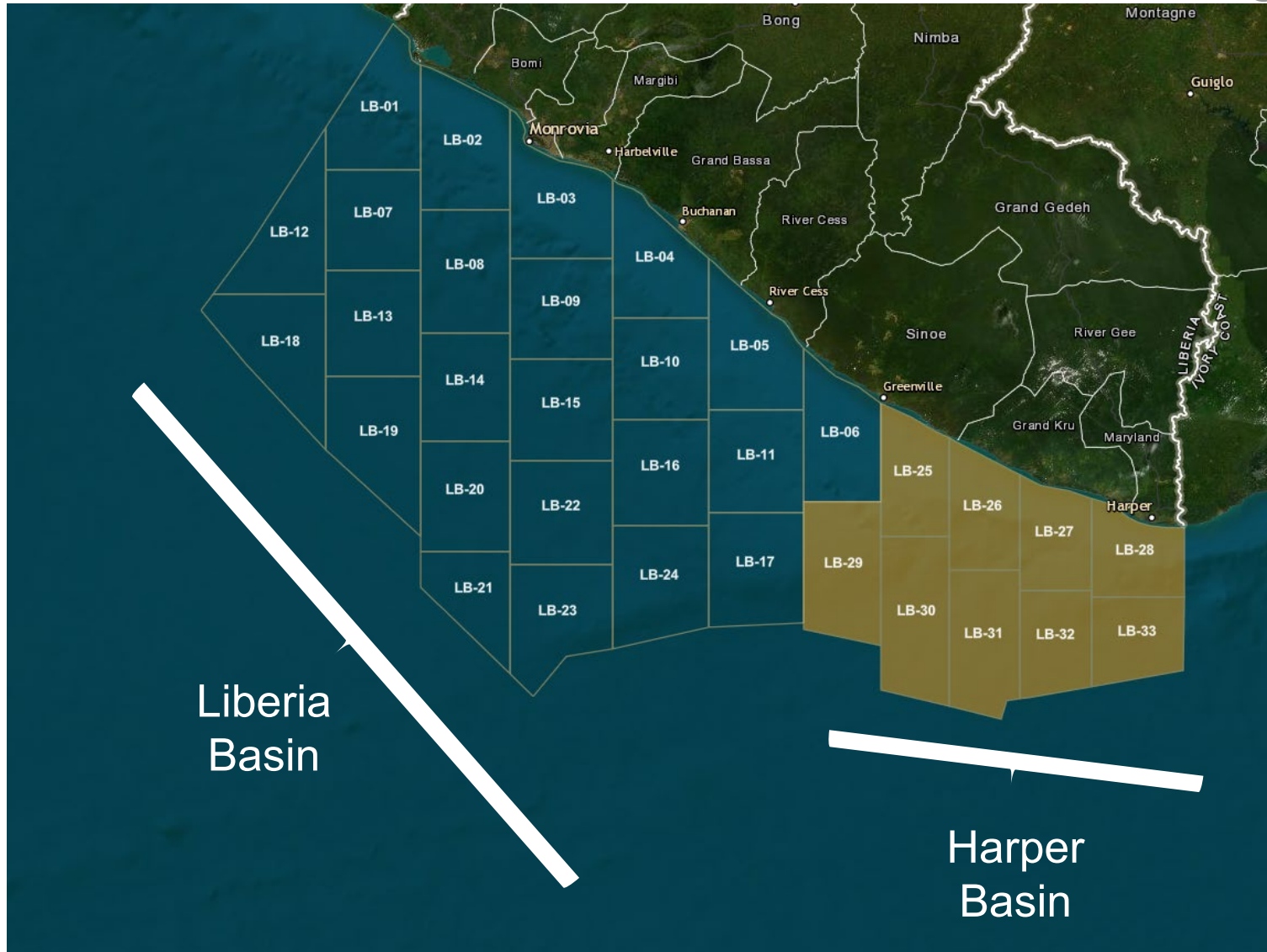


Figure 1: Map showing offshore Liberia

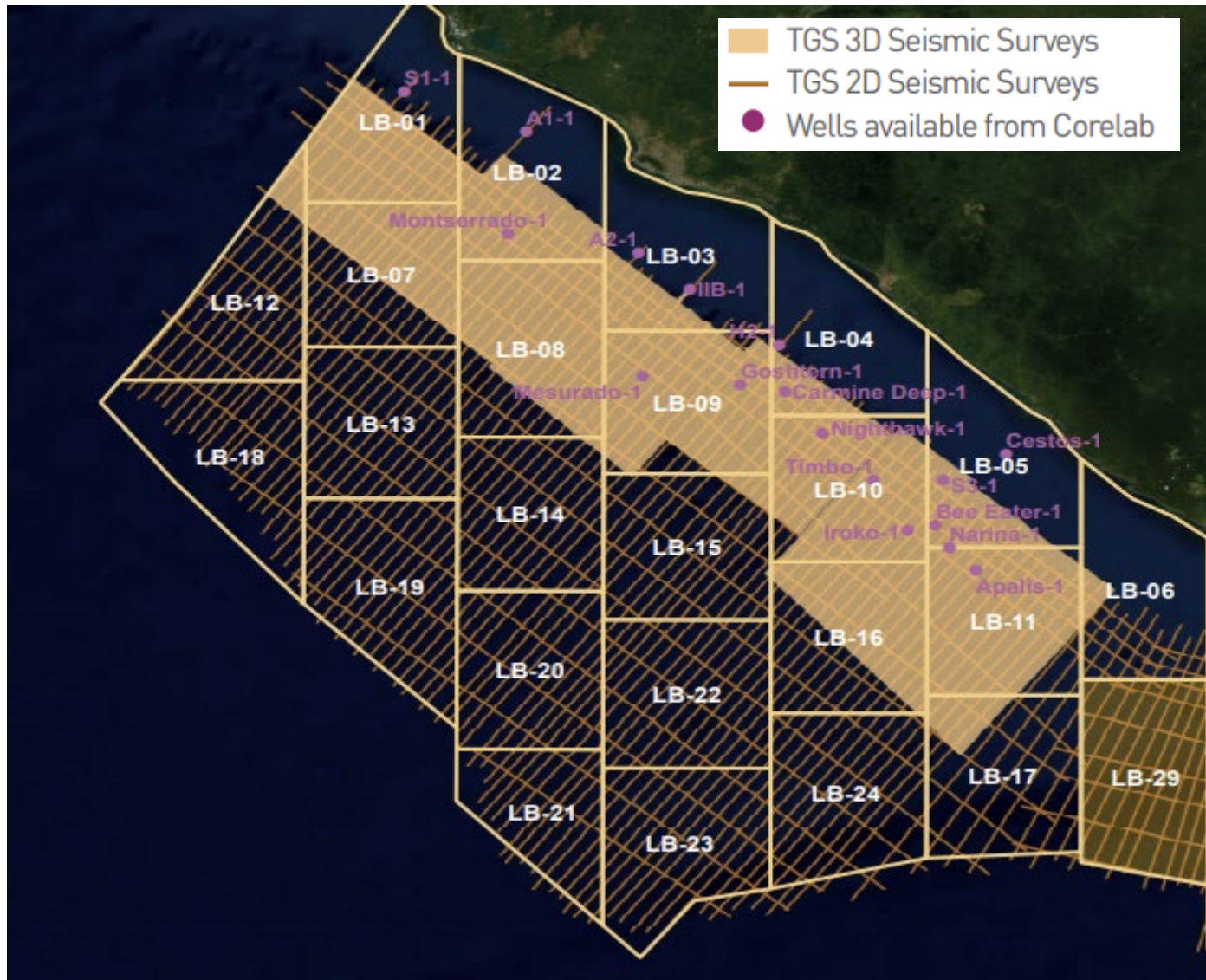


# Offshore Resources - The Liberia Basin



## The Liberia Basin

- Numerous Leads across the basin
- 17 Wells (including legacy Wells) drilled in the basin
- 3D, 2D and Well data available with quick and easy access to multi-client data with fees payable upon award. Data available through TGS and Core Lab
- Acreages can presently available and can be acquired Direct Negotiations



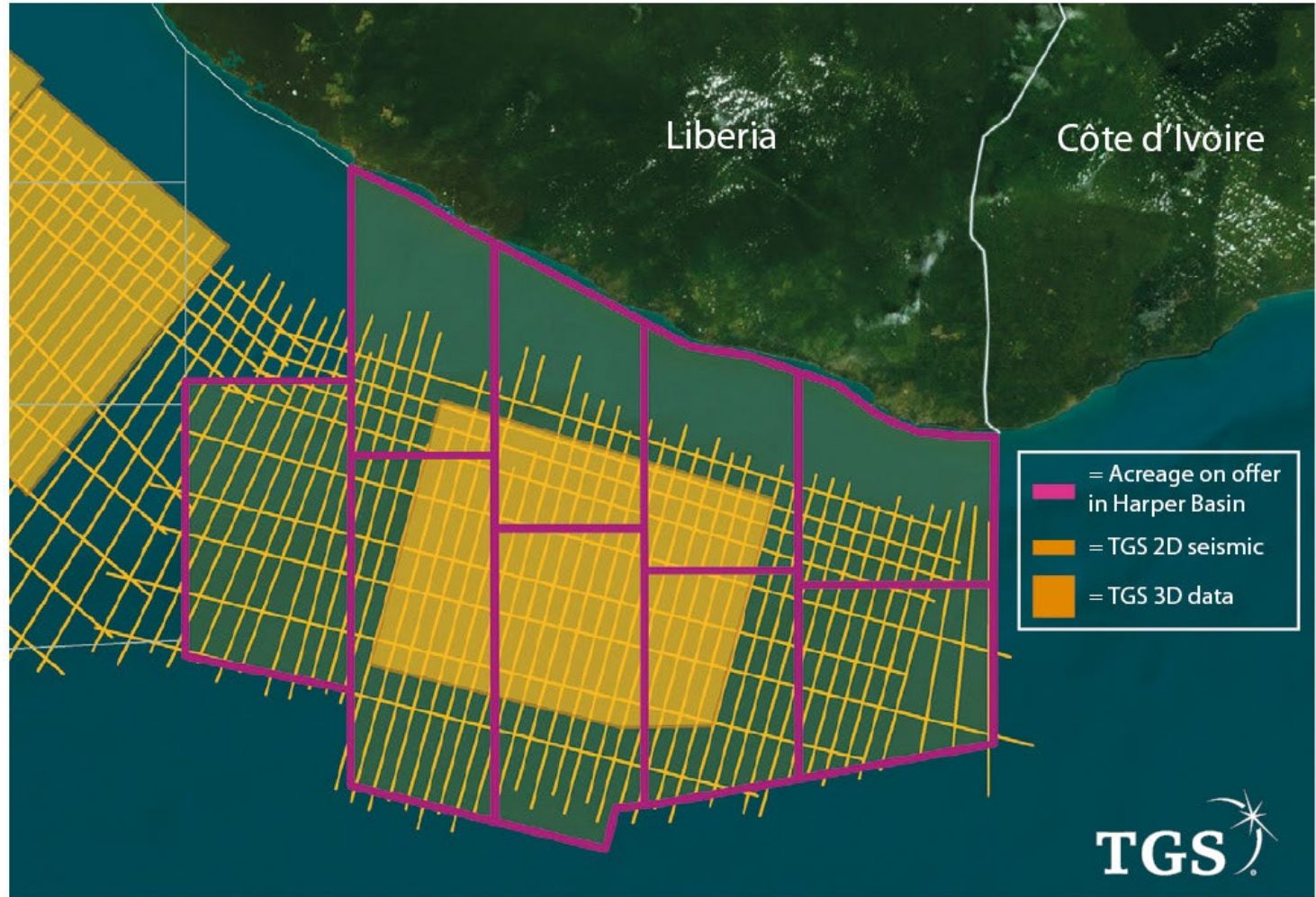
**Figure 2:** Map showing offshore, Liberia Basin



# Offshore Resources - The Harper Basin

## The Harper Basin

- All elements of an effective petroleum system interpreted in the basin
- More than 30 large leads (each more than 40 km<sup>2</sup>)
- 3D, 2D data available with quick and easy access through TGS



**Figure 3:** Map showing offshore, Harper Basin



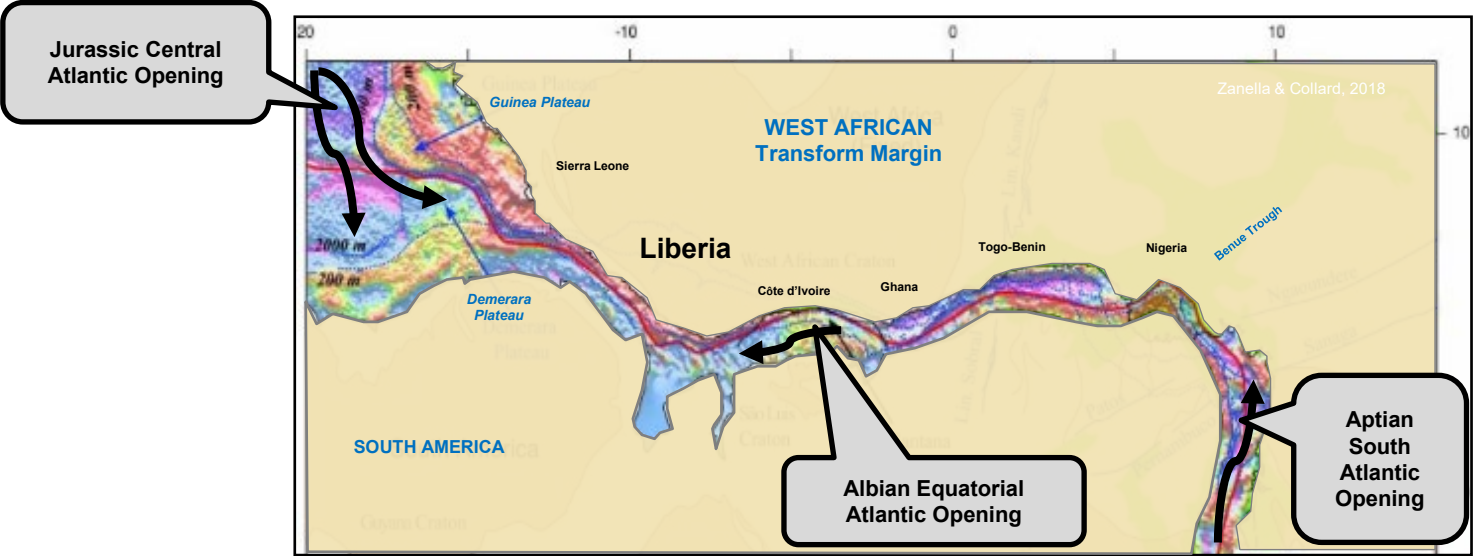


# Liberia Regional Setting



## Liberian Atlantic Margin

- Lies at western side of the West African Transform Margin (WATM)
- Early geological history related to Jurassic opening of the Central Atlantic Ocean
- Main phase of basin development is related to Albian opening of the Equatorial Atlantic Ocean
- Main reservoir targets are Albian and Upper Cretaceous sandstones – same as other basins on the West African Equatorial Transform Margin





# Our Data - Seismic

## 3D

24,500 km<sup>2</sup>

21,500 km<sup>2</sup> in Depth

## 2D

34,000 km

10,000 km in Depth

## 2D gravity/ magnetic

data:

24,408 km

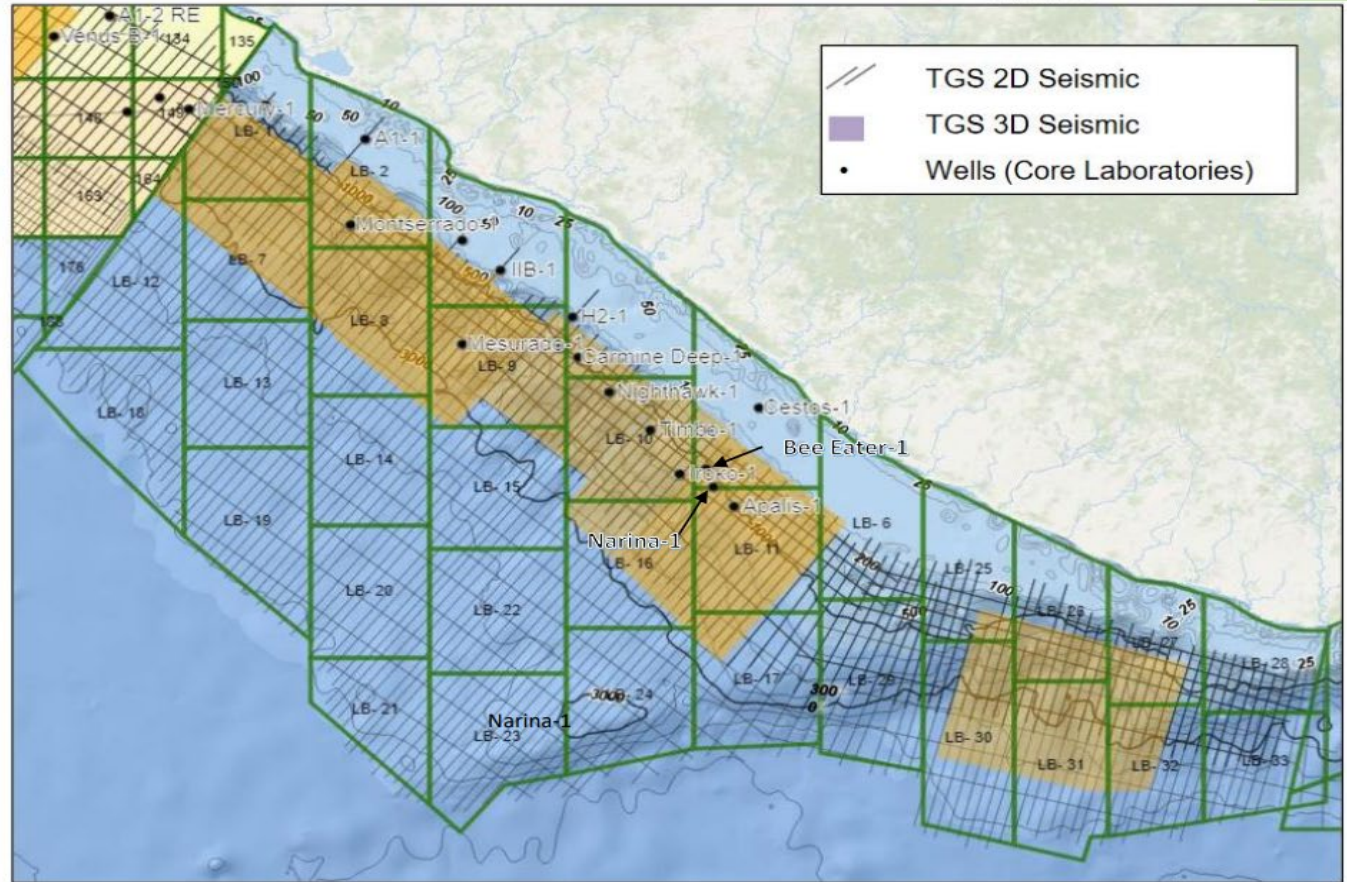


Figure 5: Map showing offshore Liberia with seismic distribution

Data available with TGS with business-friendly terms for licensing



# Our Data – Wells Outcome

## Available Data

### Well Data (Core Lab)

- Petrophysical Data
- Geochemical Reports
- End of Well reports (for all ten recent wells)
- Biostratigraphy Reports

- 17 wells drilled in two main campaigns:
  - Shelf Wells: 1971 to 1985 (7 wells)
  - Deep Water Wells: 2011 to 2016 (10 wells)

Legacy Block Name	Well Name	Operator	Year	Result
LB-19	A1-1	Union Carbide	1971	Dry - oil and gas shows
LB-16	A2-1	Union Carbide	1971	Dry - poor oil show
LB-15	11B-1	Chevron	1971	Dry - poor oil show
LB-10	Cestos 1	Frontier Petroleum	1971	Dry
LB-20	S/1-1	Amoco	1985	Dry
LB-14	H3-1	Amoco	1985	Dry - oil shows
LB-11	S/3-1	Amoco	1985	Dry - oil and gas shows
LB-15	Montserrado 1	Anadarko	2011	Uncommercial - Oil
LB-09	Apalis 1	European Hydrocarbons	2011	Dry - oil show
LB-13	Carmine Deep 1	Chevron	2012	Uncommercial - Oil
LB-11	Nighthawk 1	Chevron	2012	Dry - oil shows
LB-09	Namia 1	European Hydrocarbons	2012	Pre-commercial - Oil
LB-09	Bee Eater 1	European Hydrocarbons	2013	Uncommercial - Oil
LB-12	Goshtern 1	Chevron	2014	Dry
LB-10	Timbo 1	Anadarko	2014	Poor oil show
LB-10	Iroko 1	Anadarko	2014	Oil shows
LB-13	Mesurado 1	ExxonMobil	2016	Dry

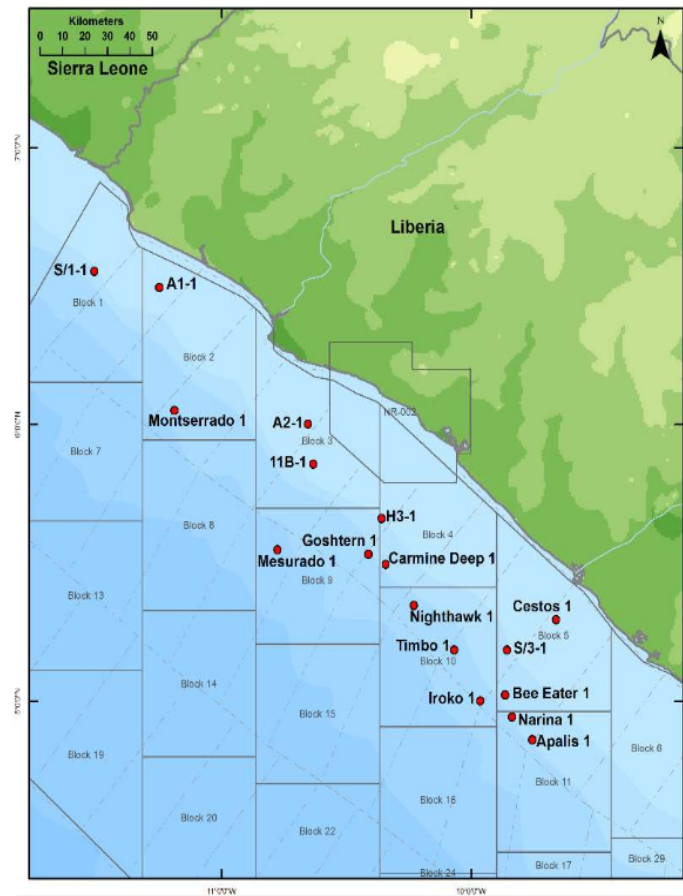
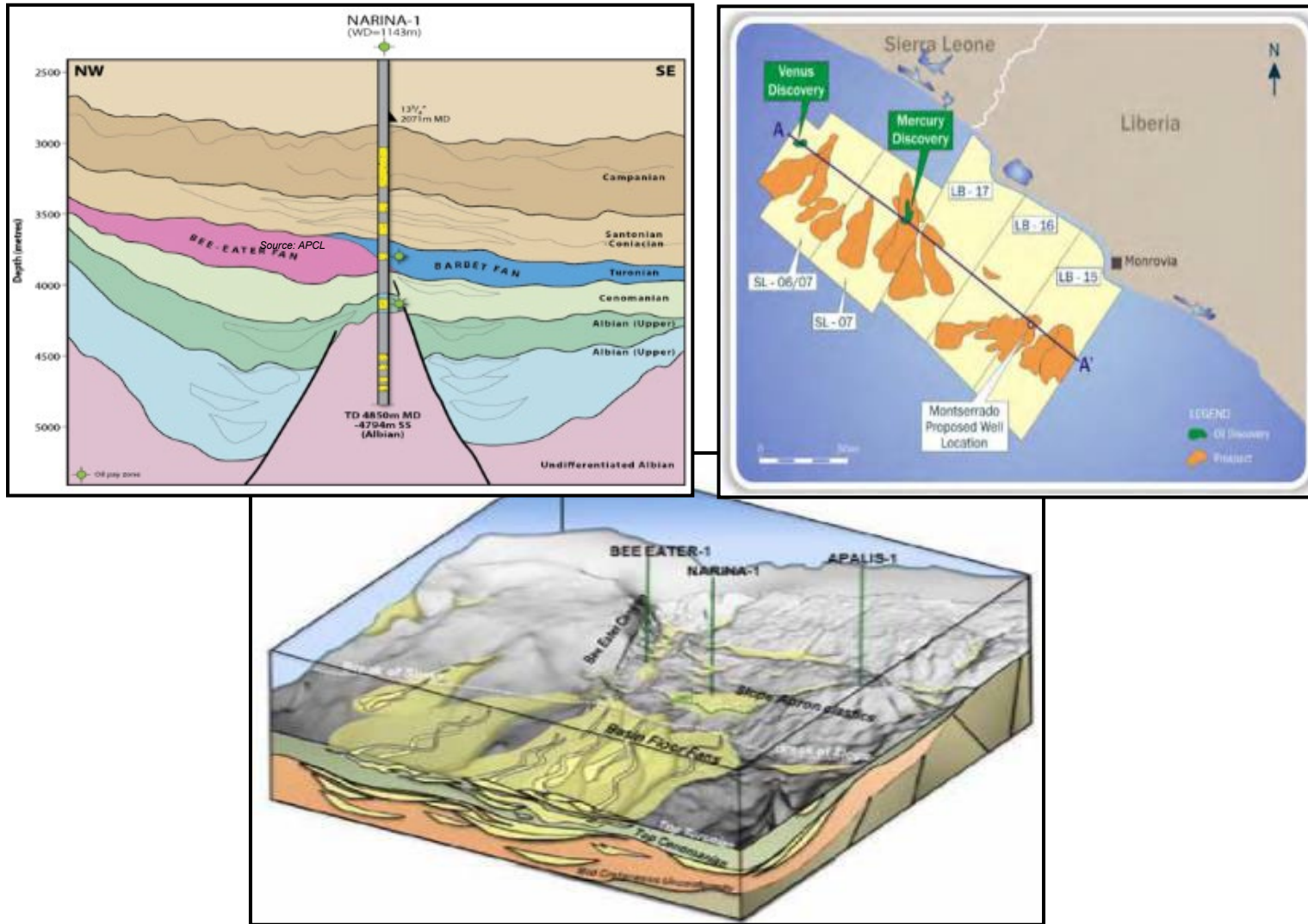


Figure 6: Map showing offshore Liberia with Well distribution

# Liberia Exploration History

## Reservoir Targets

- **Albian & older sandstones** in syn-rift structural traps (mainly shelfal & upper slope domain)
- **Cenomanian – Campanian turbidite sandstones** in stratigraphic / combination traps (mainly slope & deepwater basin areas)



**Figure 7** Map showing offshore Liberia depositional environment & Narina-1 Well



# Liberia Exploration History



## Results:

- **Hydrocarbon** presence at multiple stratigraphic levels
- **Reservoir** quality sandstones Albian to Campanian age
- Effective **source rocks** in Albian & Upper Cretaceous
- Effective **seal rocks**

## Lower Cretaceous Reservoirs:

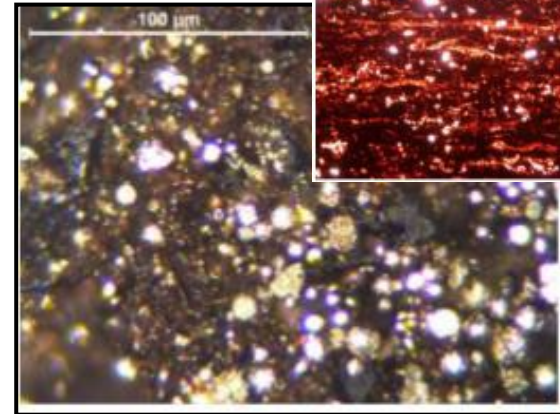
- **Narina-1/1z:** 11m Albian pay
- **Bee Eater-1:** 14m Albian Pay
- **IIB-1, H3-1, A1-1, A2-1, Apalis-1:**  
*oil shows in Albian sandstones*

## Upper Cretaceous Reservoirs:

- **Narina-1/1z:** 21m Upper Turonian pay
- **Montserrado-1:** 7m Turonian pay (in secondary objective)
- **Bee Eater-1:** non-commercial Turonian & Cenomanian pay
- **Nighthawk-1, Iroko-1 & Timbo-1:**  
*oil shows in Late Cretaceous sandstones*

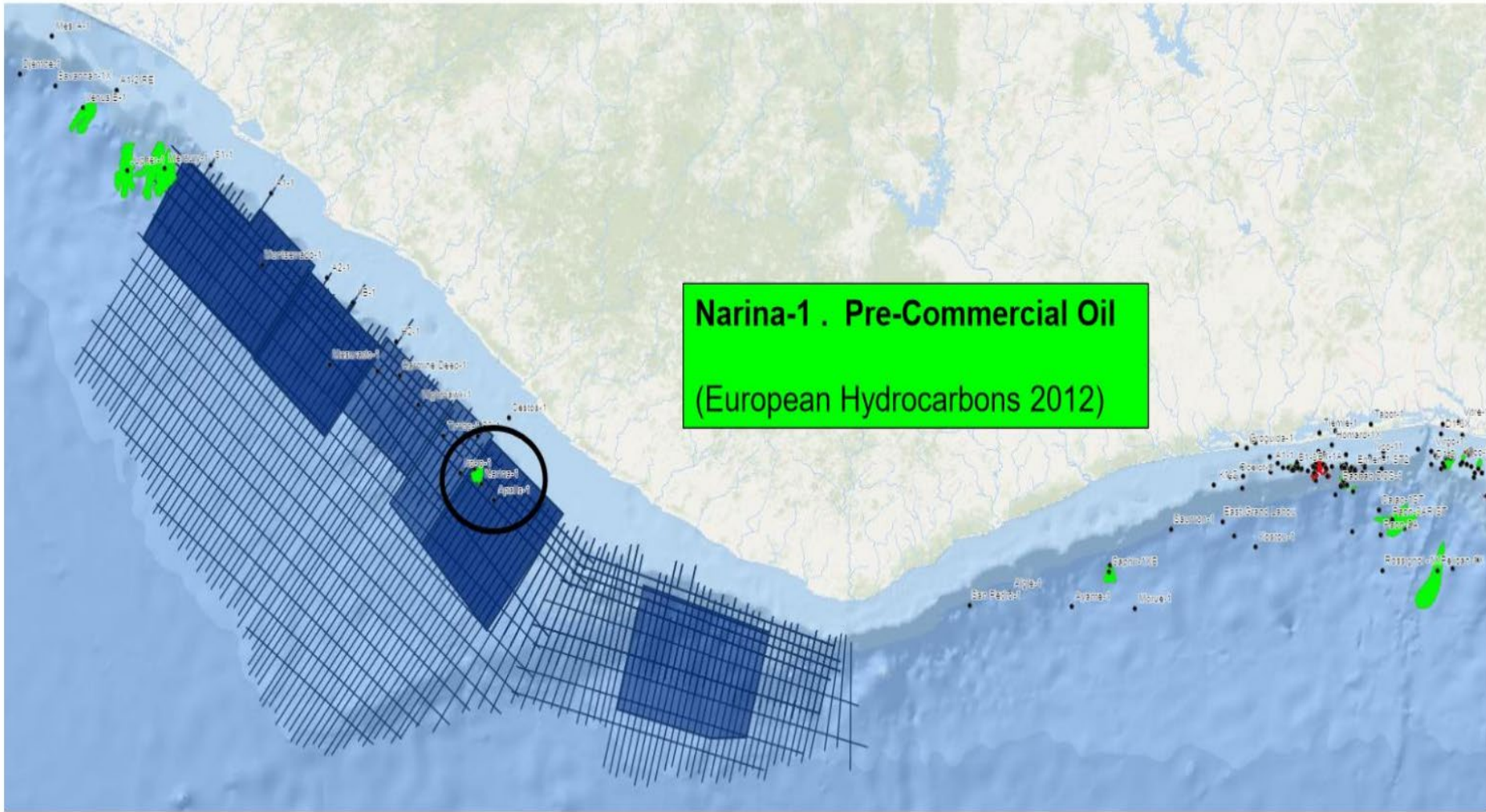
## Source Rocks:

- **Aptian-Albian:** Three or more oil-prone marine and lacustrine source rocks (Type II/III kerogen)
- **Cenomanian-Turonian:** organic-rich marine shales (Type II kerogen)



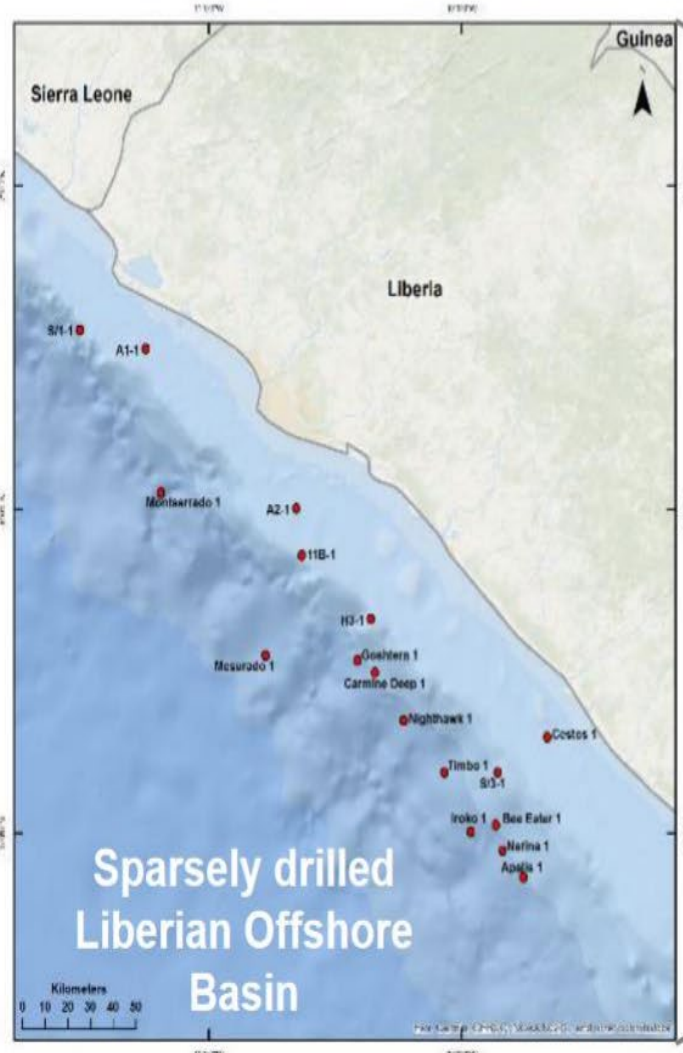


# Pre-Commercial Success, Narina-1

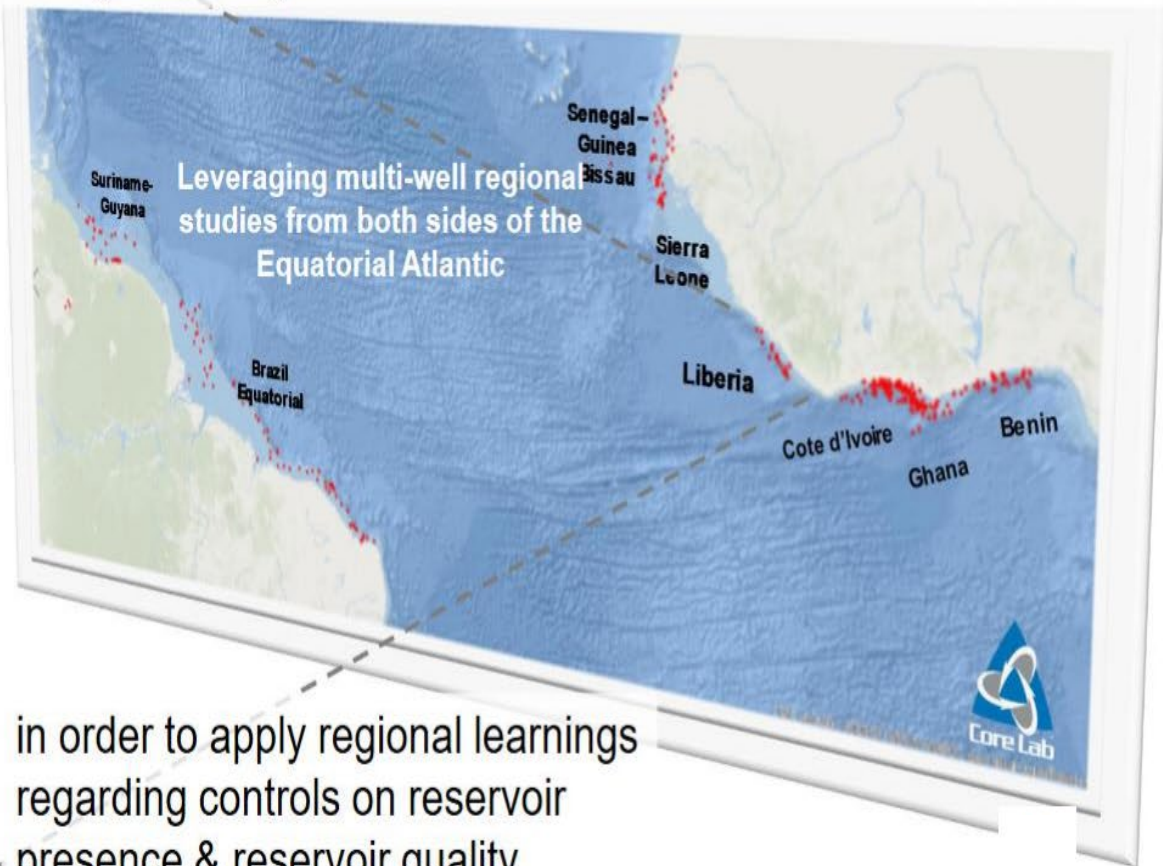




# Regional Knowledge for Future Exploration Success



Core Lab approach is to evaluate legacy Liberian well datasets in a greater regional context



in order to apply regional learnings regarding controls on reservoir presence & reservoir quality



# Future Exploration Success Harper Basin Albian?

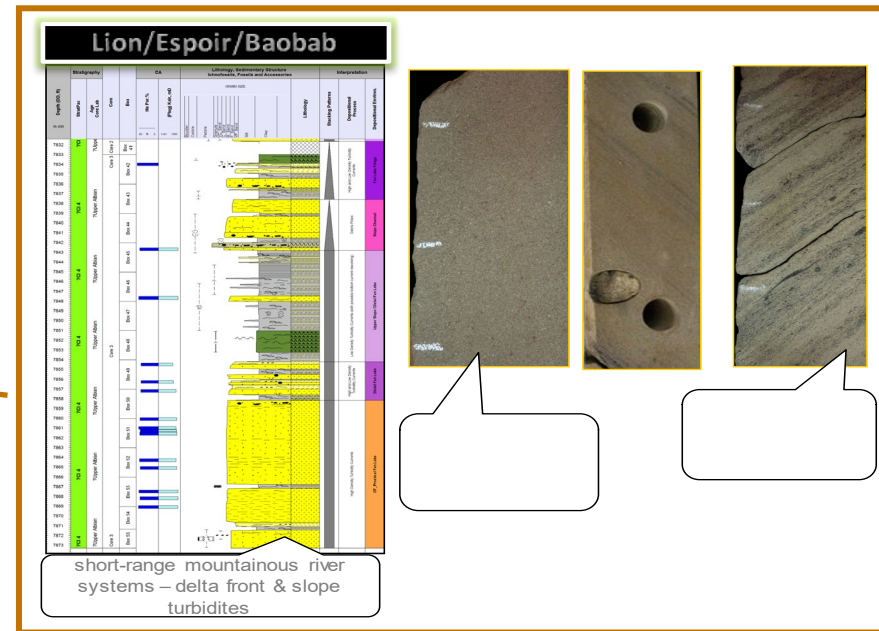
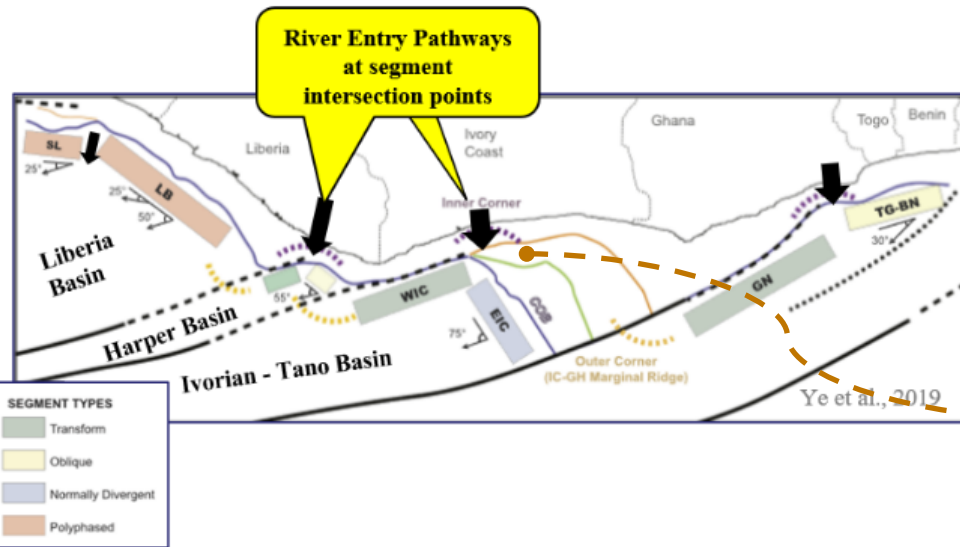
## Albian Analogue

### River Entry Points

Reservoir quality influenced by structural setting

### Ivorian Basin

Good to excellent reservoir quality in delta front sandstones (lobes & channels) sourced by hinterland river systems







# How to get into Our Basins



## Method of Entry

▪ All companies shall be pre-qualified to go through any of these options

▪ All agreements or Production Sharing Contracts shall be ratified by the Legislature

### License Round

A petroleum agreement can only be entered into after a public bidding round and only with pre-qualified bidders that participated in the round

Harper Basin

### Executive Allocation to NOCAL

The October 2019 Amendment of the New Petroleum Law of 2014 gives NOCAL the mandate to have direct talks with companies to get blocks after these blocks have been allocated to NOCAL by the President in consultation with the Legislature.

Liberia Basin

## Offshore Liberia

### Direct Negotiations

Here, the Authority may grant license to a company in special cases (e.g. Ultra-deep blocks) with approval from the President



# Where We Are Now

## Direct Negotiation

▪ The direct negotiation process commenced on **June 1st, 2021 and it is still open for ALL Companies.**

▪ The Direct Negotiation process is framed through a 5-phase process including prequalification as outlined in the information package

▪ package located on LPRAs website ([www.lpra.gov.lr](http://www.lpra.gov.lr))

The **Government of Liberia**, through the Liberia Petroleum Regulatory Authority (LPRAs, the Authority), working in collaboration with the National Oil Company of Liberia (NOCAL), announces its intention to open up 33 blocks within the offshore Liberia acreage, including the Harper and Liberia Geological Basins, for Direct Negotiations. Expressions are now solicited from reputable international oil and gas companies to be evaluated through standard criteria designed by the Authority as indicated in this Investment Information Package.

The **Direct Negotiation offers a new investment opportunity for IOCs** for myriad of reasons.

The investment information package contains information pertinent to following matters:

- ◊ *Available Acreage information*
- ◊ *Stages of Direct Negotiations*
- ◊ *Pre-qualification guidelines/requirements/Forms*
- ◊ *Fees (prequalification)*
- ◊ *Fiscal and legal terms*
- ◊ *Information on available geological and geophysical (G&G) data*

### Stages of Direct Negotiation

Direct Negotiation is framed through a 5-phase process. Interested investors are required to satisfactorily complete each phase before transitioning to the next phase. Essentially, LPRAs will notify the applicants about the successfully completion of each phase in order to progress. All approvals and requests to move to the next phase will be expressly communicated to the applicants.





## Our Agreement and Terms



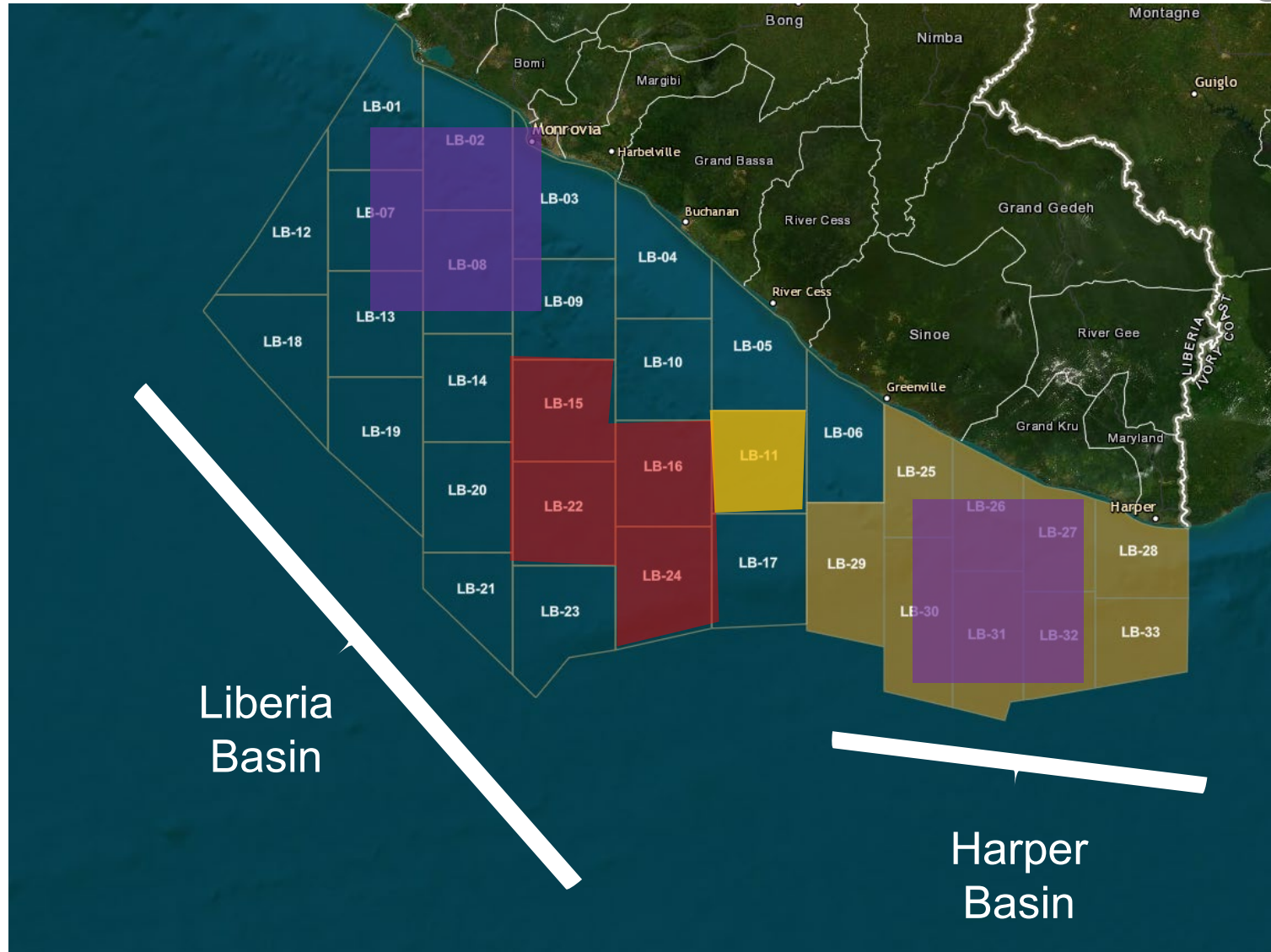
<b>Contract Type</b>	<b>Production Sharing Contract (PSC)</b>
Duration	9 Years divided in 3 exploration phases
Divisible into phases and subject to relinquishment at each progression	<b>Phase 1:</b> 3 years (extendable by 1 year), 25% relinquishment
	<b>Phase 2:</b> 2 years (extendable by 1 year), 25% relinquishment
	<b>Phase 3:</b> 2 years, 25% relinquishment



# Activity Map: Areas of Interest

## Interested Companies

- **ExxonMobil** started to look at our data some months back, now they have applied for pre-qualification to enter the Direct Negotiation process
- **Another Super-major** is presently reviewing data from the Haper and Liberia basins with intentions to go in the Direct Negotiation process as well
- **A smaller company** is looking at data from Block LB 11



## Opportunities Onshore

- ❑ The Mineral map shows sediments in the Cape Mount (Piso Basin) area and the Montserrado/Margi-bi (Robert/Bassa Basin) area
- ❑ Gravity and magnetic data confirmed sedimentary basins of about 5km thick
- ❑ Geological reconnaissance revealed oil seeps in Robert/Bassa Basin areas and it has a geological history and petroleum system analogous to the conjugate Guyana
- ❑ We are presently working to get companies to come in for reconnaissance and subsequently exploration

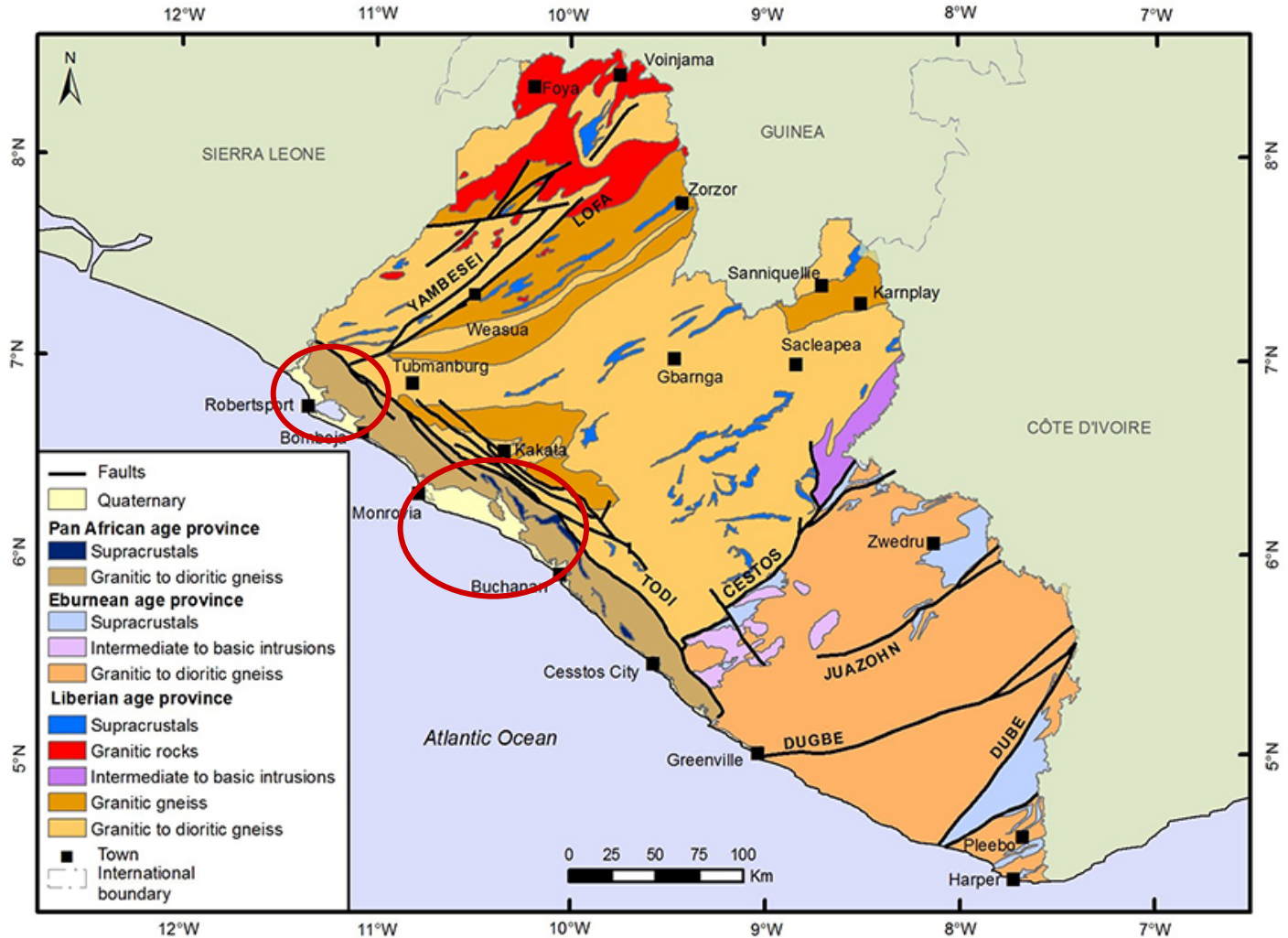


Figure 7: Geological Map of Liberia with areas for Hydrocarbon potential



# Other Opportunities – Shorebase and Tank Farm



Figure 7: Map showing Buchanan Port area with NOCAL's properties for future projects



## Conclusion



“Sierra Leone cannot compete with Guinea, and neither can Senegal with Nigeria... because we seek similar goals but in different domains. Our strengths and way to success therefore lie in our ability to collaborate through knowledge sharing, information sharing, technology and human resource transfer and financial investments in each other. Only then, can Africa attain that energy success we all aspire to.”

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