

The background of the slide is a vibrant blue image of water with ripples and reflections, creating a sense of movement and depth. The water is a deep cyan color, and the light reflects off the surface, creating white and lighter blue highlights.

A sustainable future for the Exumas

Water resources and water supply

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The early sources of water supply



**Natural sinkholes, karst features,
and ponds.**

Natural potholes used at The Ferry, Mt. Thompson, Gilbert Grant, and Steventon. Ponds and marsh areas with freshwater recorded in Forest, Ramsey and Mt. Thompson areas.



The early sources of water supply cont'd

Rainwater collection - Public and private facilities common.



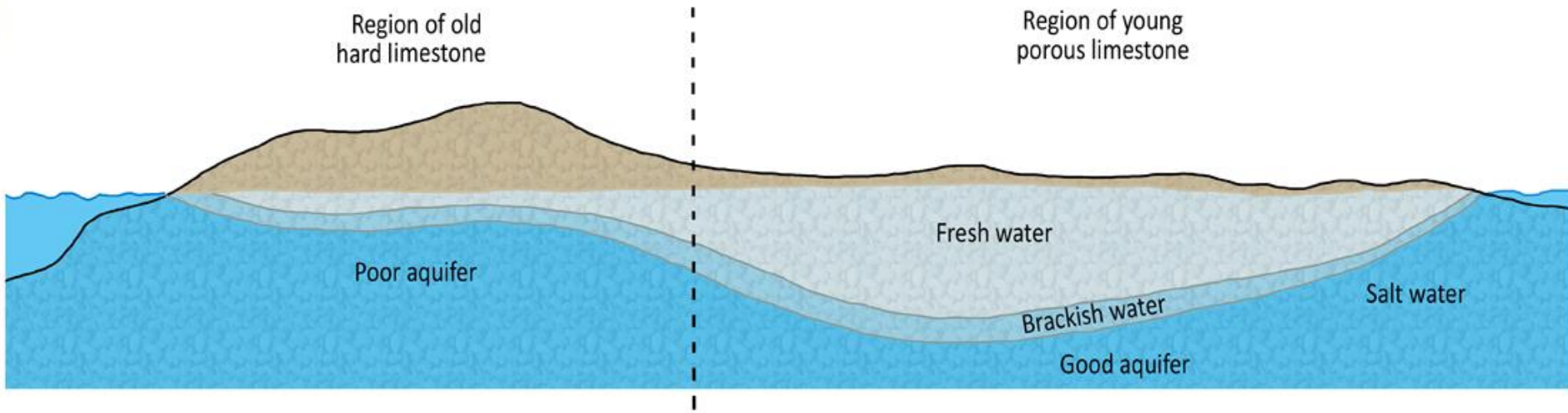
The early sources of water supply cont'd

Shallow dug wells - Common features of all old communities.



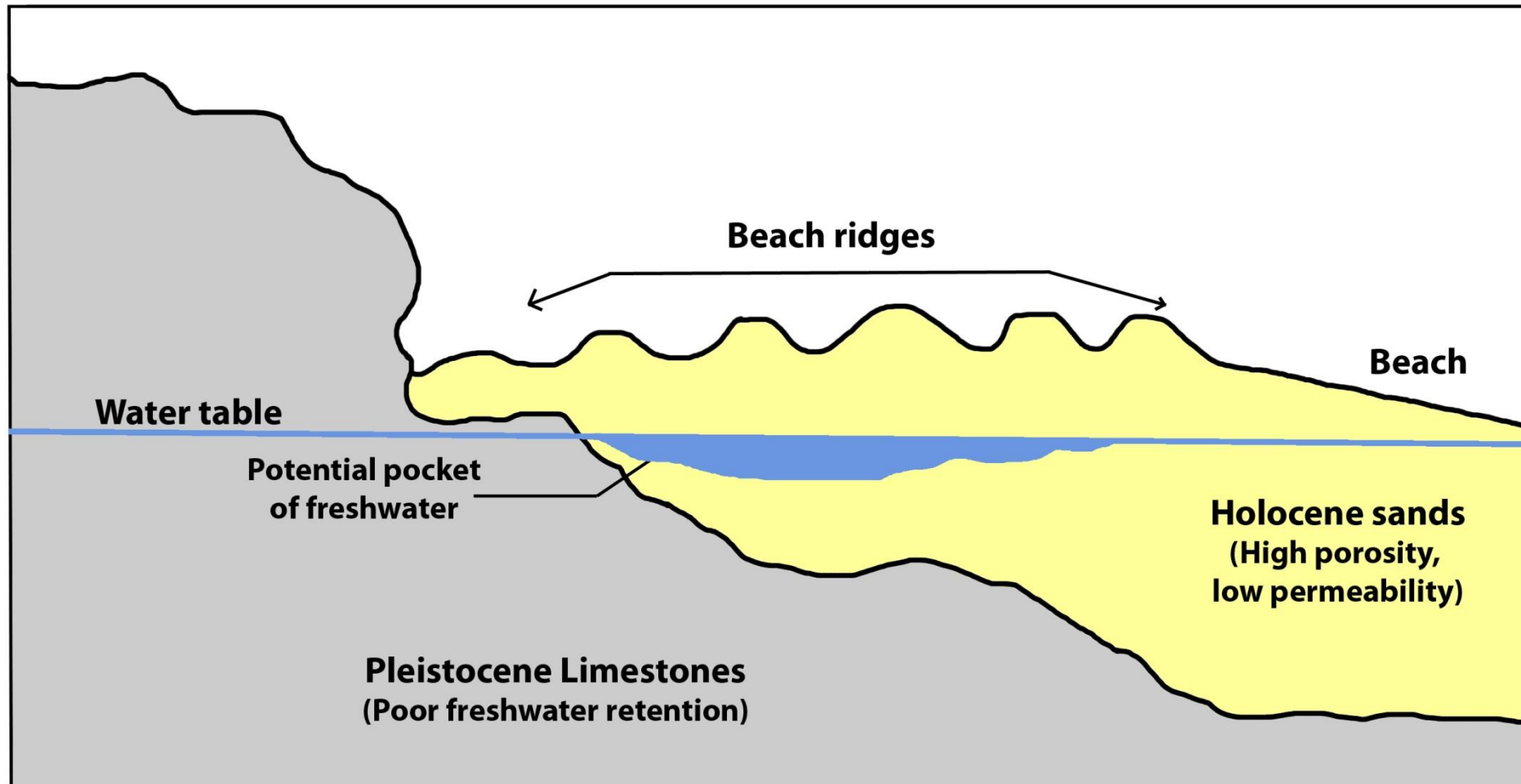
Natural resources exploited

Bahamian freshwater lens – Ghyben-Hertzberg Lens



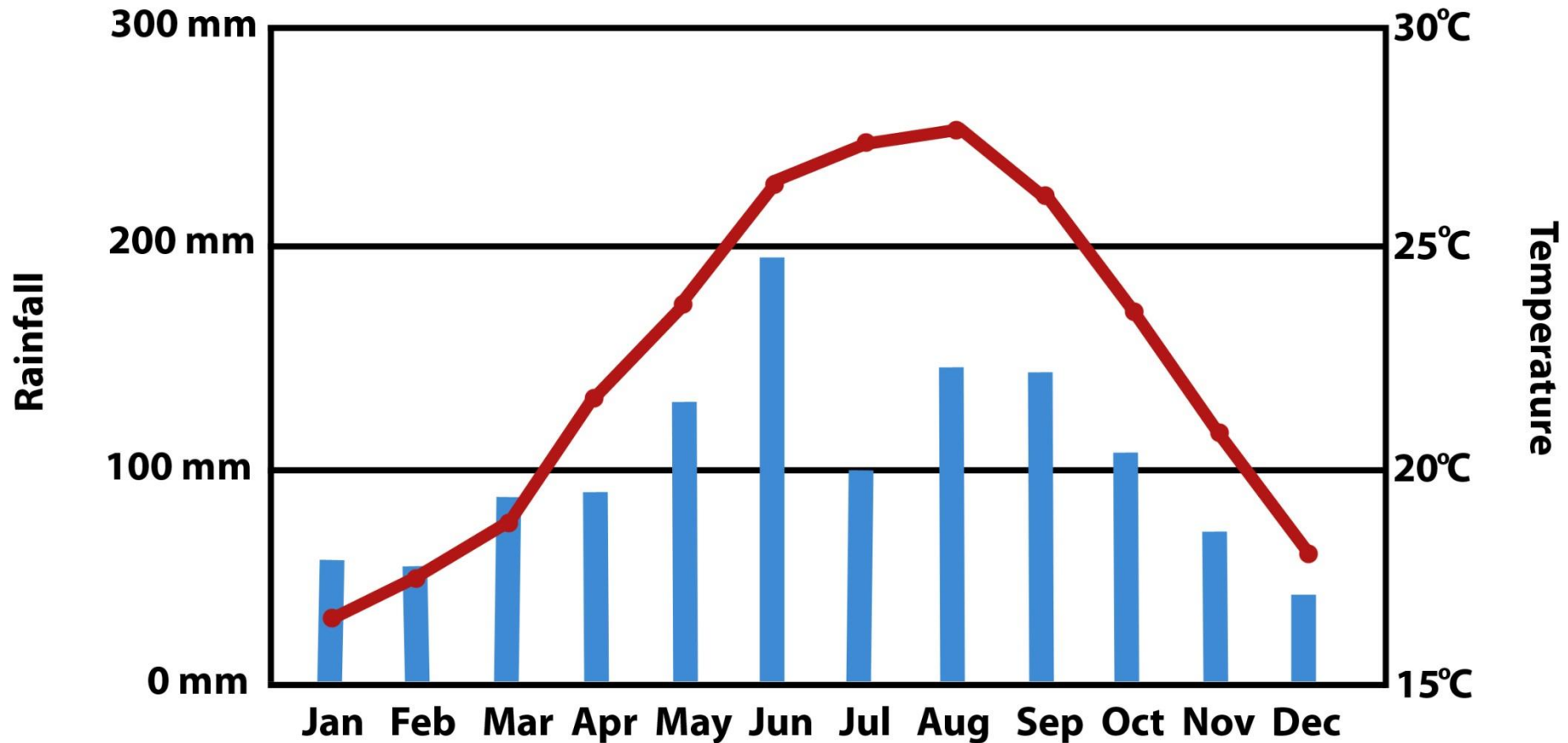
Natural resources exploited cont'd

Situation where a small pocket of freshwater can occur on a very small cay, or in an island with Holocene sands.



Natural resources exploited cont'd

Average monthly rainfall and temperature for Great Exuma, Bahamas from 1990-2009



Water resource investigations

Random well excavation

System applied for over 200 years. Often included locations where there was no hope of finding freshwater.

Subdivision and Government investigations

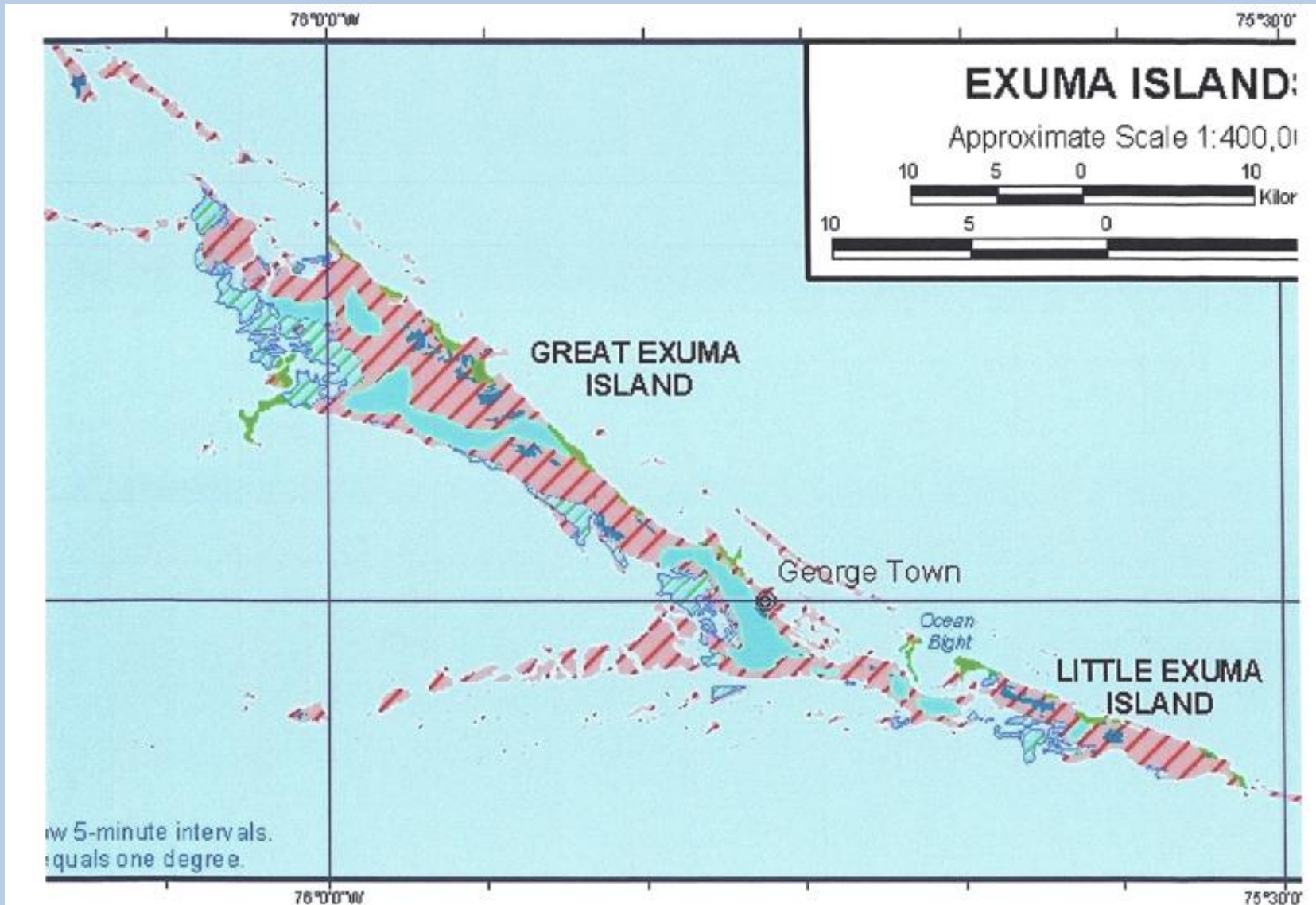
E.g. Tanner, 1966, in Exuma Sound property, and other small localized investigations. The MOW drilled sets of wells in the vicinity of various settlements with the intention of using them as wellfields.

The Bahamas Land Resources Survey

The first and only island-wide study carried out in 1972 and 1973.

Water resource investigations cont'd

The Bahamas Land Resources Survey - Exuma



Water resource investigations cont'd

The Bahamas Land Resources Survey - Exuma

Resident population in 1970 census: 3767, in 2000: 3571, in 2010: 7314
 Area in sq. miles: 112 (71680 acres)

Major freshwater lenses and other information*

Name of Area	Max. Lens Thickness (ft)	Average Thickness (ft)	Approx Acreage Lens > 20 ft	Approx. Vol. of water in M ³ Assuming 20% porosity where Lens > 20 ft
Rolleville to Curtis	36	20	797	3,932,000
Forest	47	25	2169	13,377,000
Georgetown	45	30	2802	20,737,000
Rolletown	30	20	598	2,950,000
Little Exuma	30	20	220	1,085,000
		TOTAL	6586	42,081,000

The maximum recommended abstraction rate is 440 gpd/acre.

*. 2,897,840 gallons per day are available.

Groundwater lenses of only Great and Little Exuma considered. There is no data on the other islands, presumably they have no lenses greater than 20 ft. thick.

Water resource investigations cont'd

The Bahamas Land Resources Survey

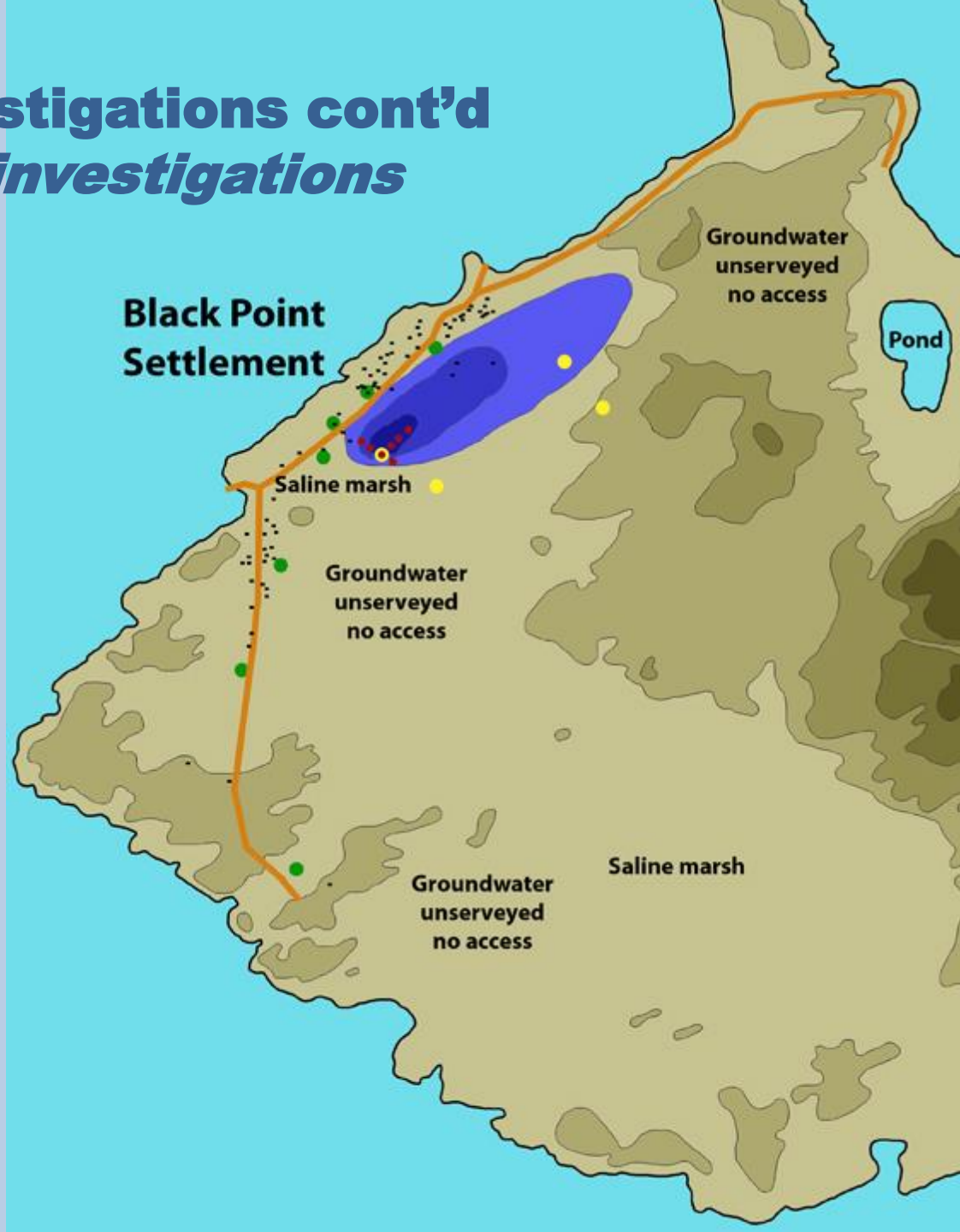
– comparing 13 Bahamian islands

Island	<u>Lens Area</u> Total Land Area	Rating	<u>Vol. of Water</u> In M ³ (x1000) Total Land Area	Rating	<u>Water Available</u> gpd	Rating
					Population (1970)	
Abaco	.28	4	2.97	3	12,162	2
Acklins	.167	5	.67	7	4,653	3
Andros	.367	2	4.67	1	23,733	1
Bimini	.068	10	.21	10	113	12
Cat Island	.154	6	1.36	5	2,557	5
Crooked Island	.1	8	.33	9	2,519	6
Eleuthera	.13	7	1.14	6	859	8
Exumas	.092	9	.58	8	769	10
Grand Bahama	.436	1	4.54	2	3,602	4
Great Inagua	.01	13	.02	13	772	9
Long Island	.032	12	.09	11	746	11
Mayaguana	.033	11	.08	12	1,111	7
New Providence	.34	3	2.35	4	94	13

Water resource investigations cont'd - *the subsequent investigations*

Black Point, Great Guana Cay

Investigated in 1980.



Water resource investigations cont'd

- the subsequent investigations

Staniel Cay

Investigated in 1981.

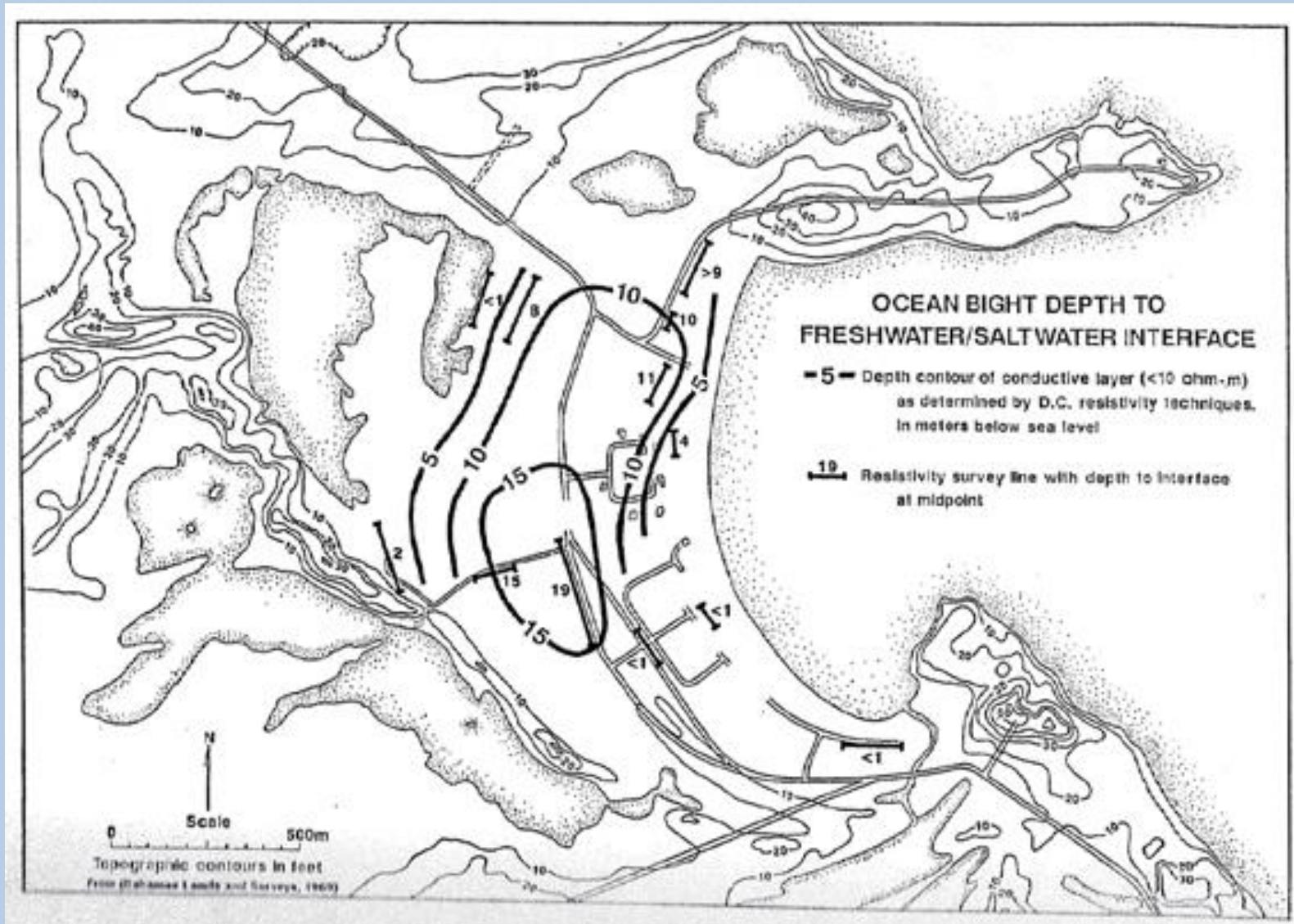
Lens generally < 10ft thick.

Barraterre

Investigated in 1982. Lens with max. thickness of 20ft located to the west side of settlement.

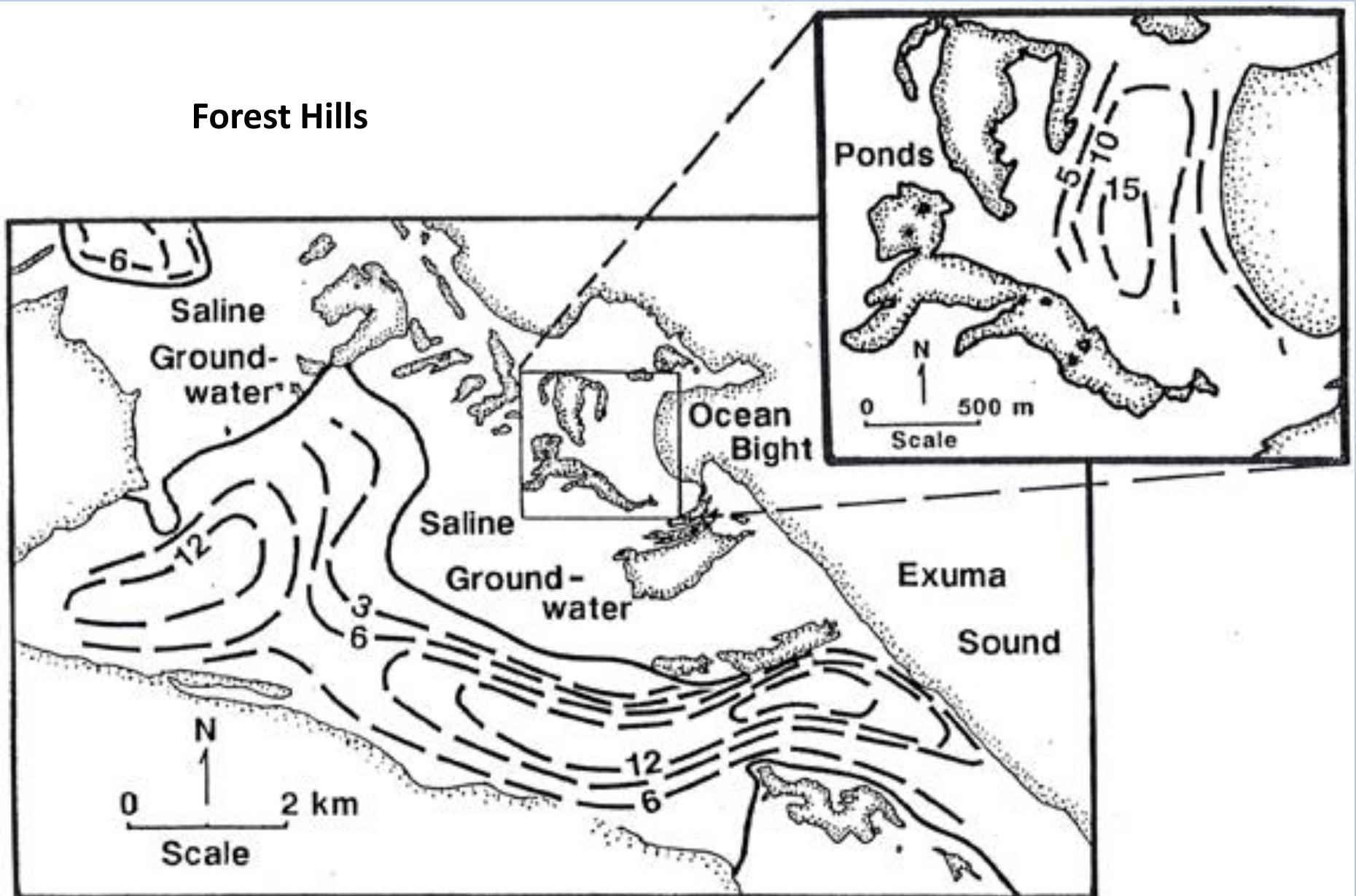
Water resource investigations cont'd

Ocean Bight - Unusual sand aquifer studied by various research projects.



Water resource investigations cont'd

Forest Hills



Historical record of resource utilization

Naval Base, George Town, Rolleville, and The Forest

The Base used a trench system and connected boreholes were used in the others. All no longer in use.

Mt. Thompson, Ramsey, Moss Town, Rolle Town, and Ocean Bight.

These all comprised connected boreholes except Ocean Bight where shallow pits were installed. All no longer in use.

Private developments and islands, like: Lee Stocking Island, Musha Cay, Sampson Cay, Highborne Cay, Cave Cay, and many others.

Generally all of these rely on use of R.O. and have done so for many years.

Historical record of resource utilization cont'd

Black Point, and the Exuma Cays (Staniel Cay, and Farmers Cay).

Initially dug wells and boreholes were used but all now converted to R.O. sources of supply. BP since 1998, FC since 1999, and SC since 2004.



More recent developments

George Town R.O. facility

In operation since 2004. Presently supplies approx 310,000 gpd. to communities as far north as Rolleville and south to Rolle Town.

Emerald Bay Development

Started in 2002. Can produce 1 million gpd. About 125,000 gpd sold to the W&SC to supply Steventon, Stuart Manor, and Rolleville.

Bock Cay, Norman's Cay, and other new water demands

All rely on R.O. sources.

Little Exuma

New R.O. system now being installed at Williams Town.

Planning for the future

Reliance on desalination technology

Natural water resources cannot meet present day demands. R.O. is presently the favoured technology, but it is important that alternate energy options be applied in the future and options need to be investigated.

Natural resource protection

National policy is to protect and conserve the natural resource. No generation has the right to destroy existing groundwater resources.

Climate change and sea level rise

These will have severe impacts on Exuma's water resources..

The “what if” scenario

One never knows if one will ever have to revert back to the use of natural resources so they must be conserved.

Any Questions?