General Geology and Foundation Conditions of Coastal Louisiana

Louisiana Coastal Protection and Restoration Project

2 March 2006

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US Army Engineer District, New Orleans
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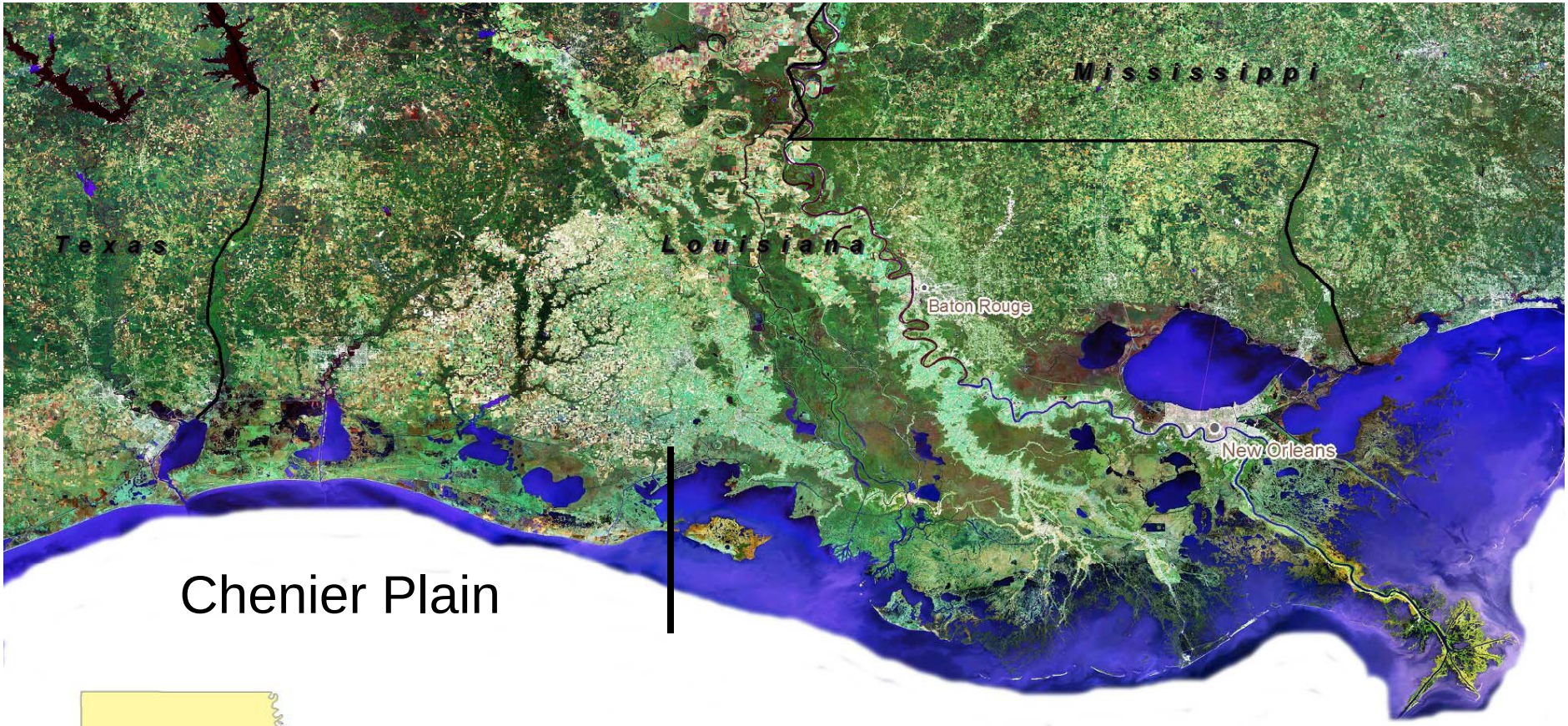
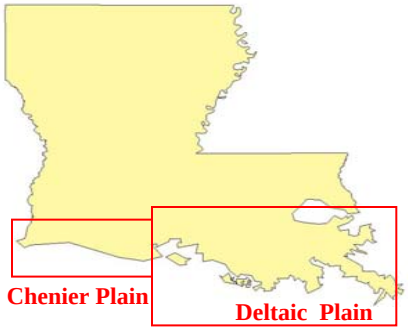
Coastal Plain Subdivisions

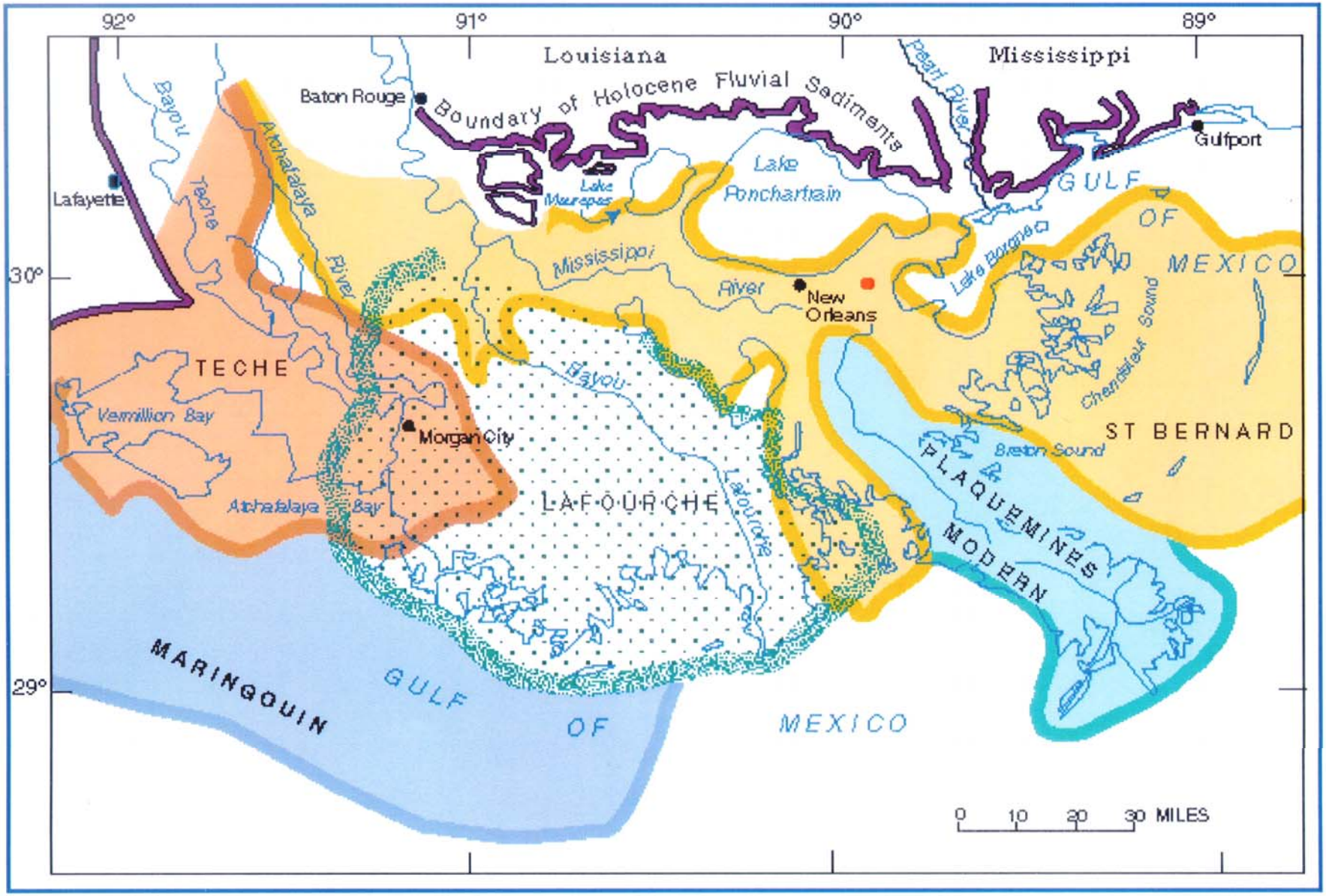


Chenier Plain

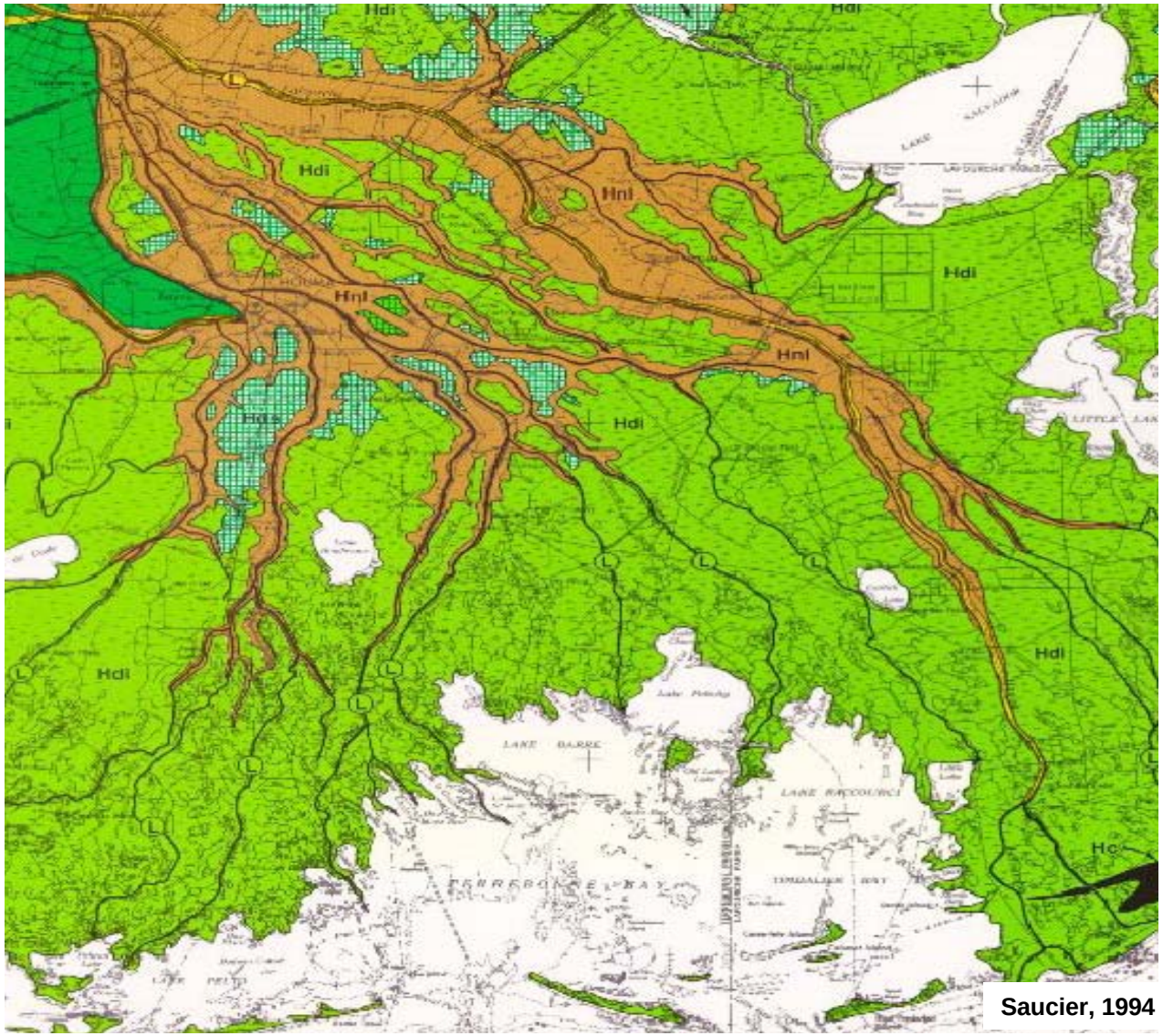
Deltaic Plain



Holocene Deltas

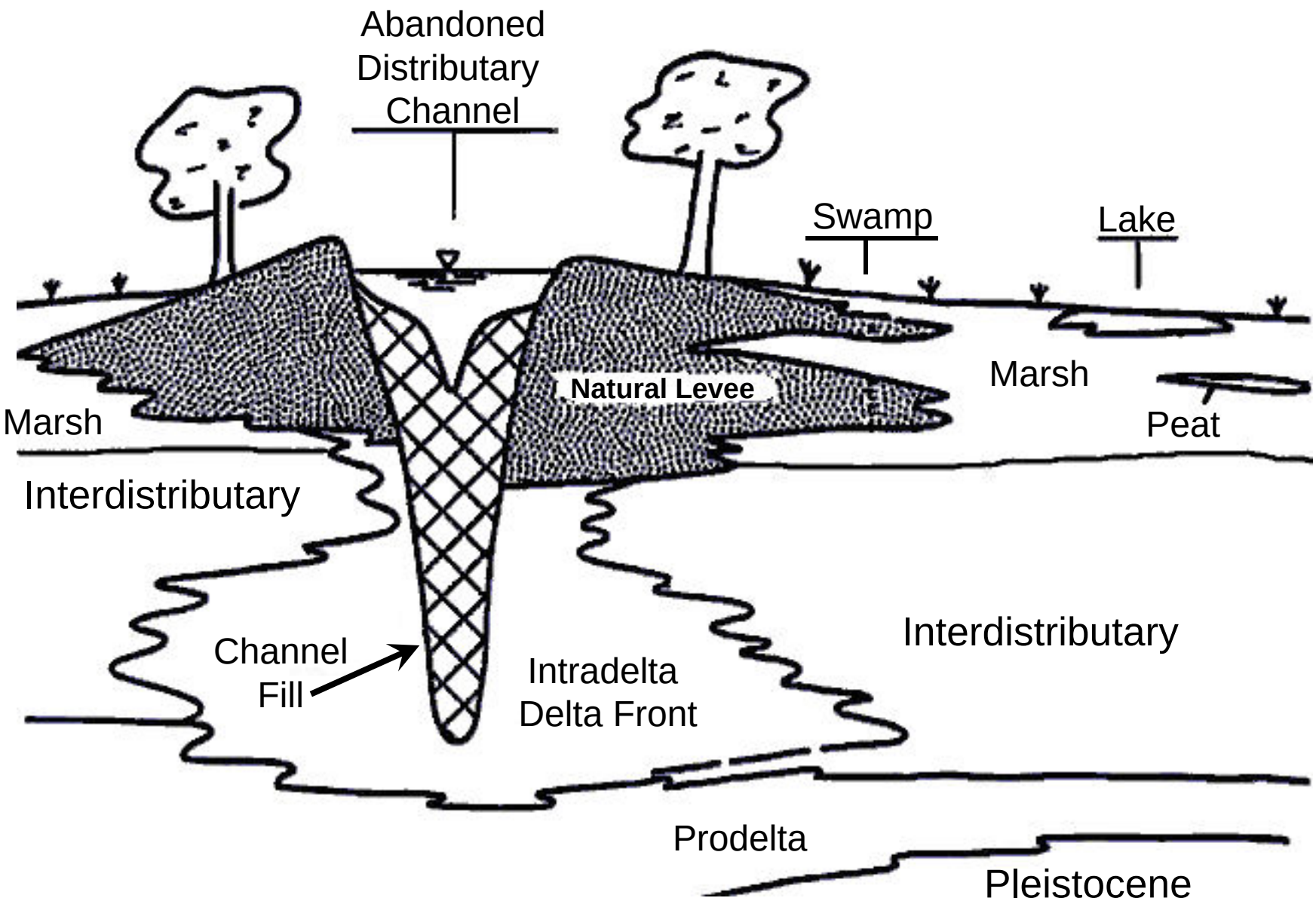


Lafourche Delta



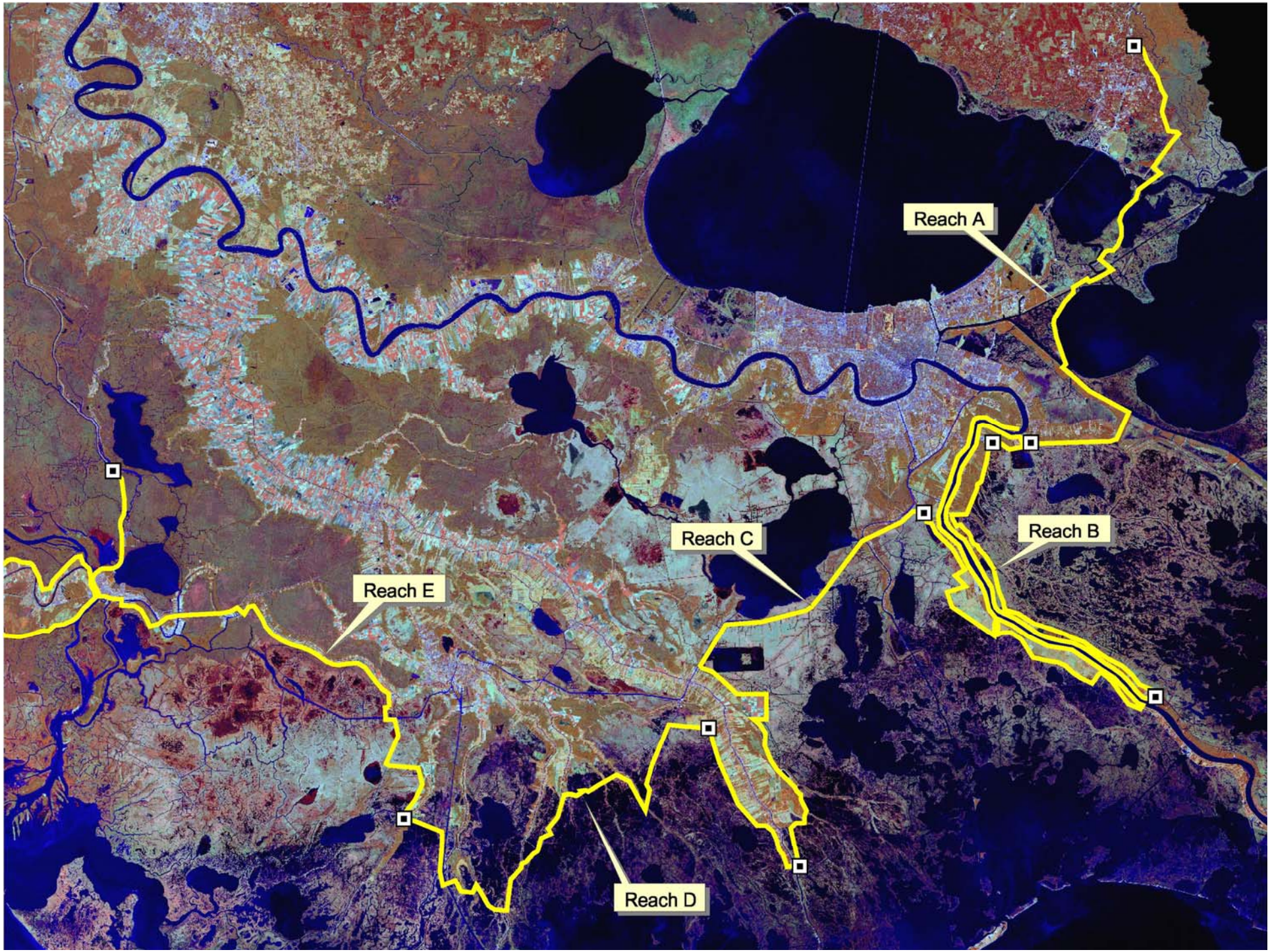
Saucier, 1994

Environments of Deposition



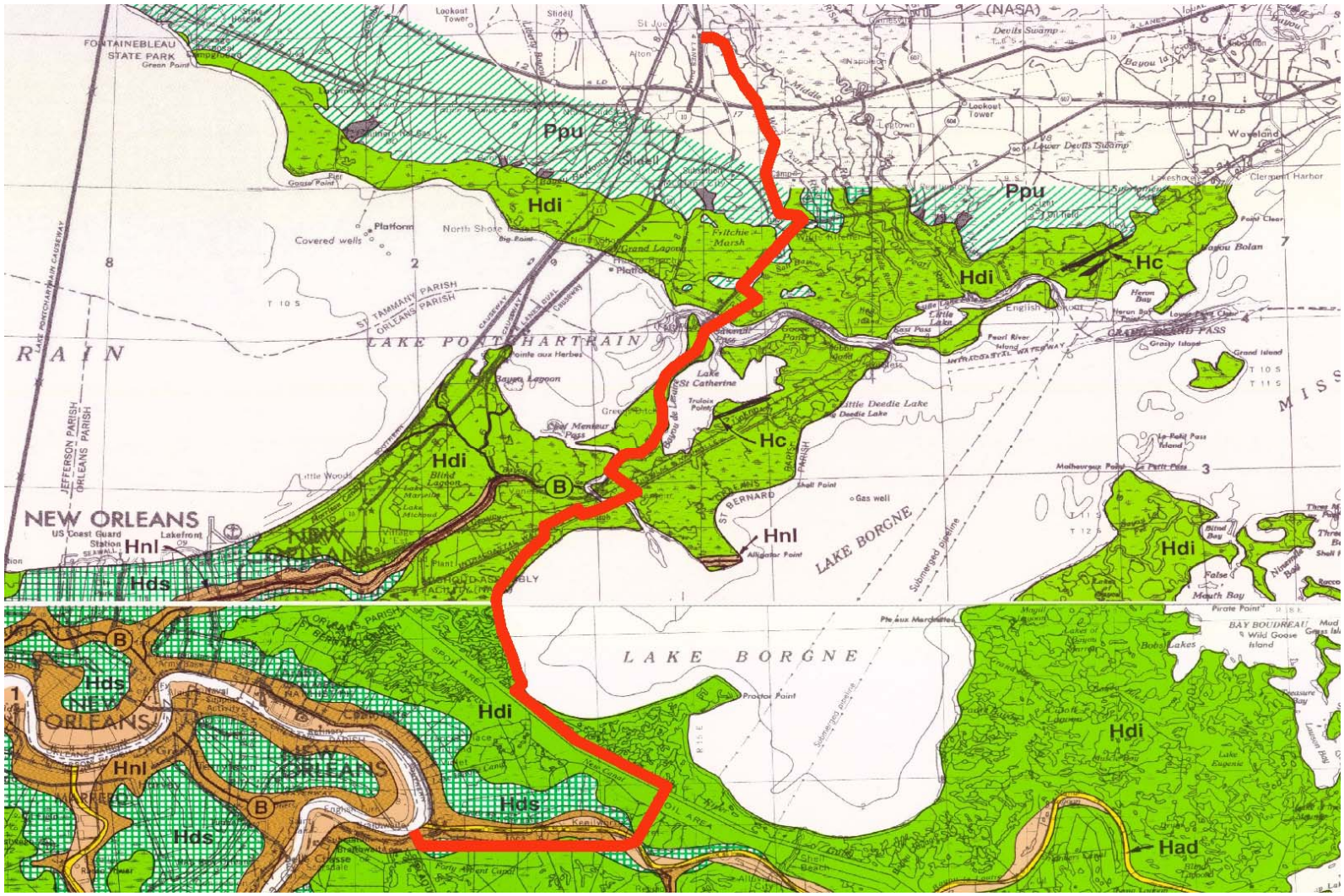
Engineering Properties of Major Depositional Environments

Environment	Percent Lithology (0 – 25 – 50 – 80 – 100)	Major Soil	Water Content % Dry Wt.	Cohesive Strength lbs/sq ft
Natural Levee		CH, CL, ML, SM	18 to 83	800 to 1200
Point Bar		ML, SM, SP	26 to 79	400 to 1000
Abandoned Course		CH, SP	ND	ND
Swamp		CH, CL	31 to 98	300 to 1200
Marsh		PT, CH	100 to +300	150 to 300
Intradelta		CH, ML, SM	24 to 132	ND
Interdistributary		CH, CL	24 to 113	200 to 500
Prodelta		CH	31 to 70	400 to 700
Nearshore Gulf		SP	Saturated	0
Beach		SP	Saturated	0
Substratum		SP	Saturated	0
Pleistocene		CH, CL	20 to 50	900 to 3500

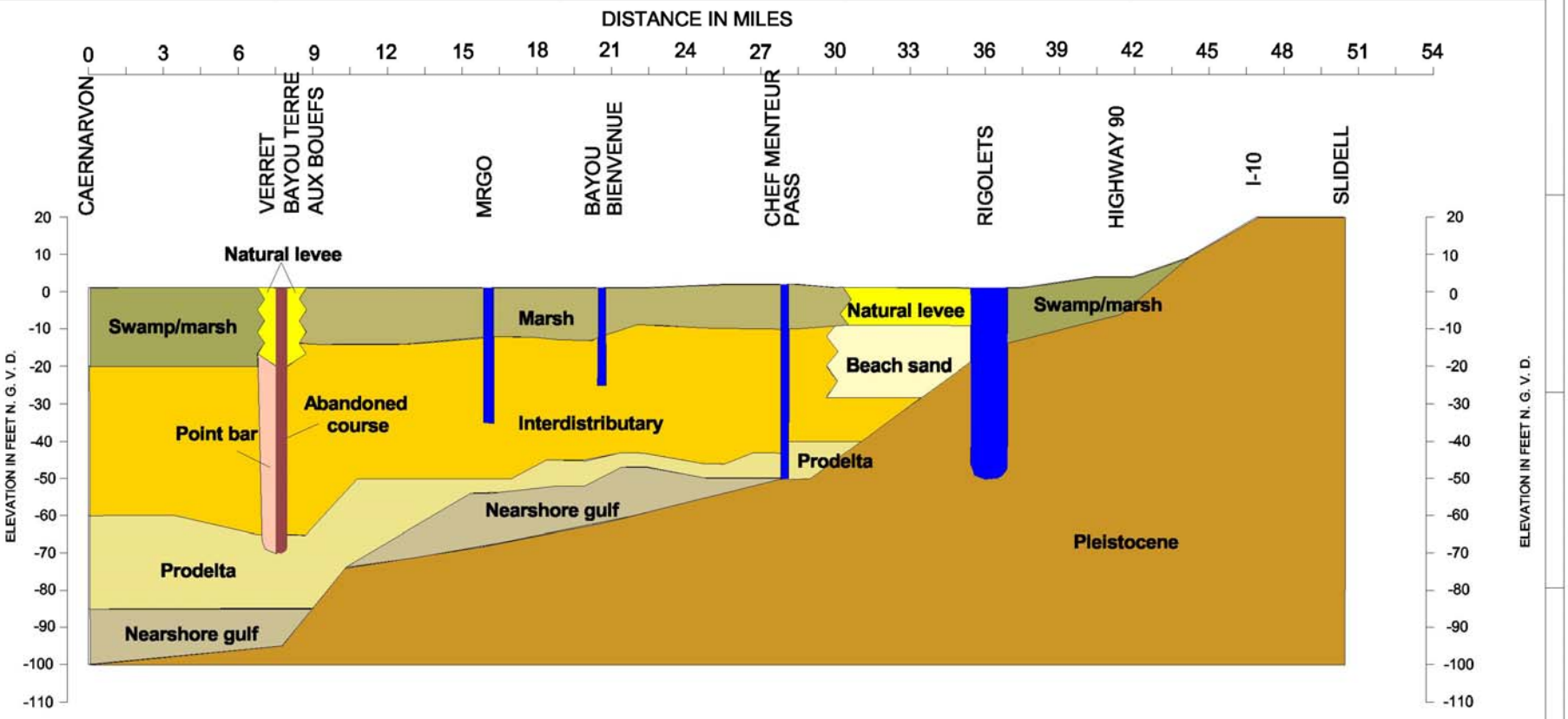

Reach A
Reach B
Reach C
Reach D
Reach E

Reach A
Slidell to Caernarvan

Reach A - General Geology

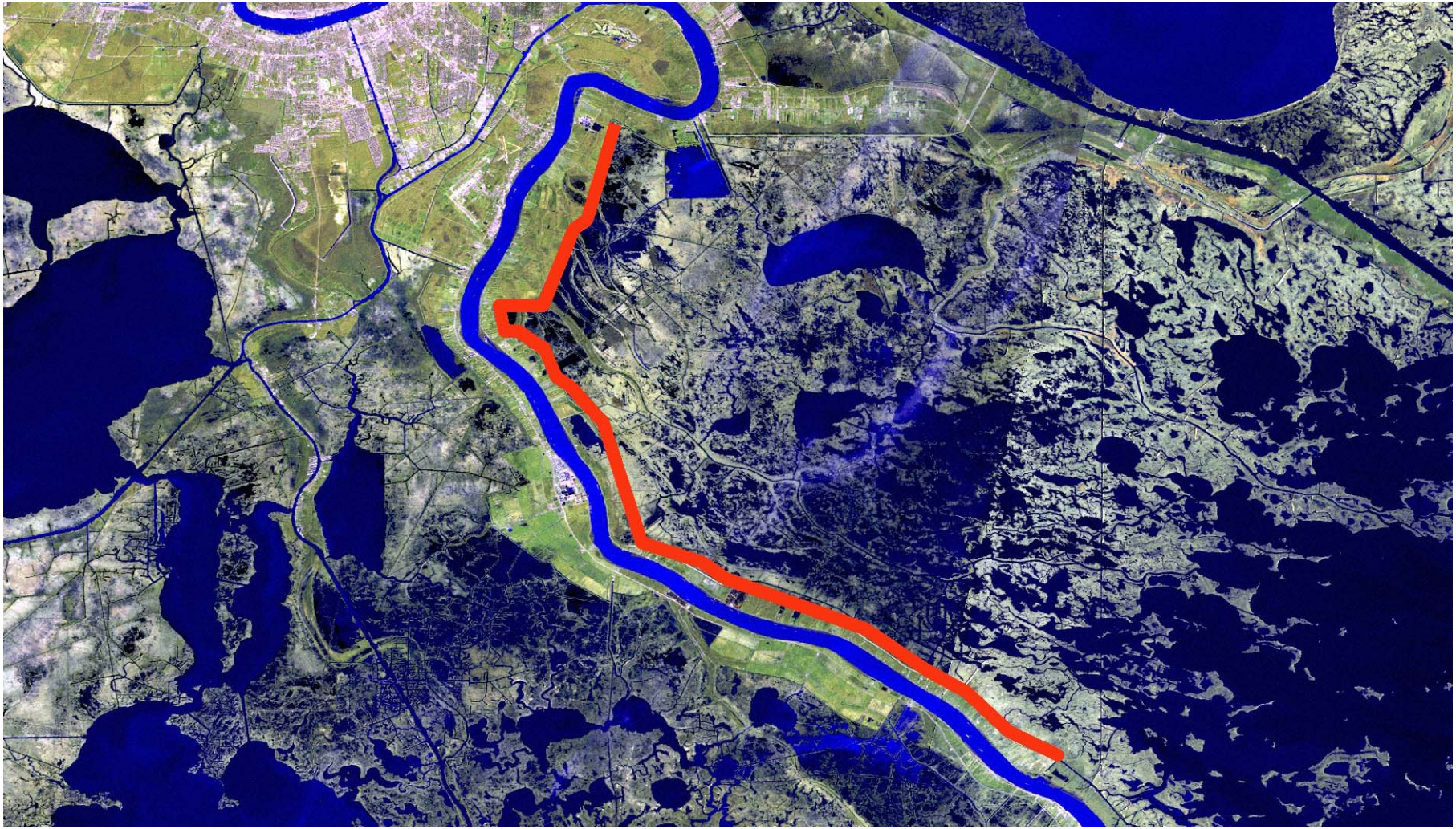


Saucier, 1994

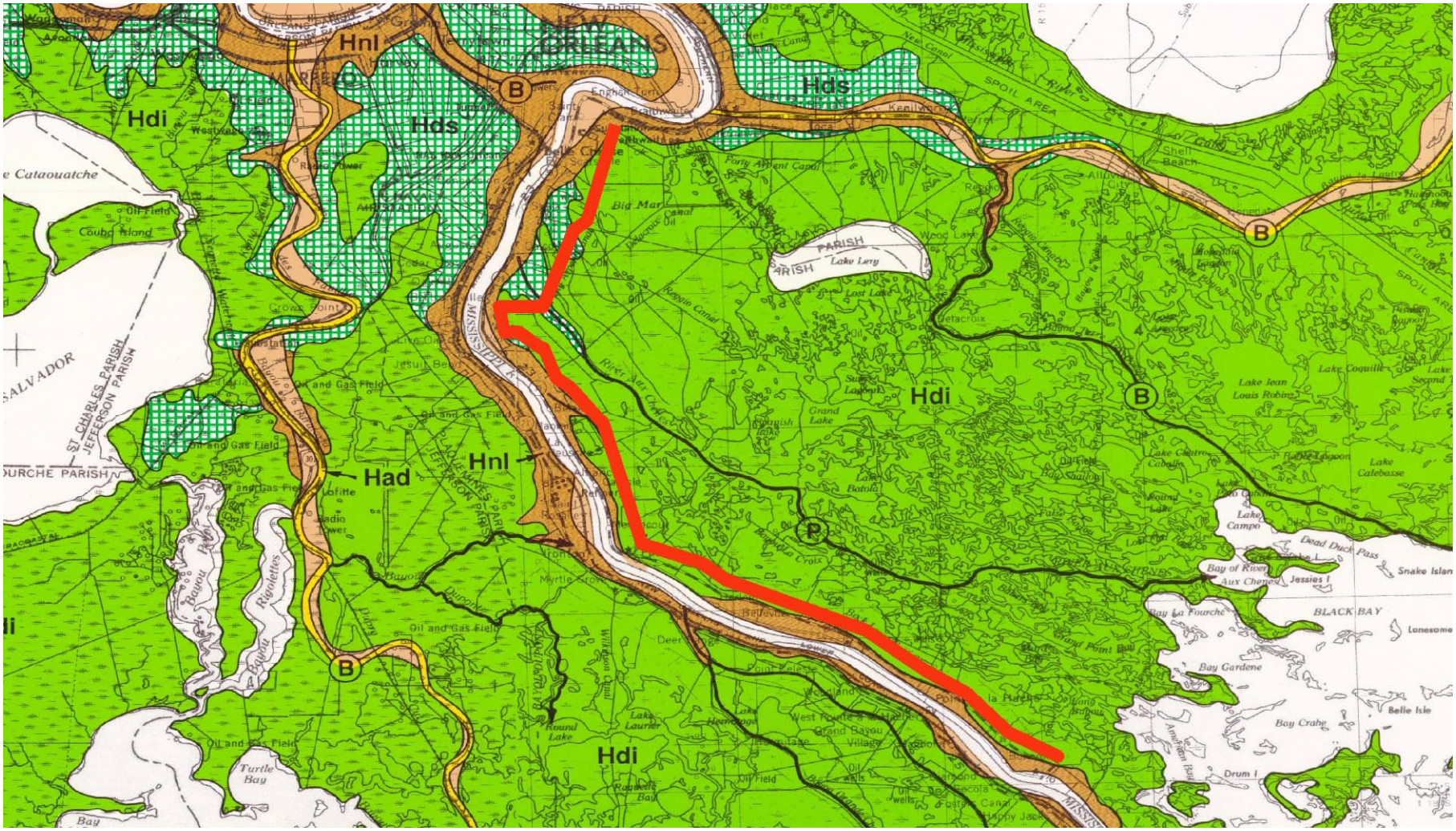

DISTANCE IN MILES
0
3
6
9
12
15
18
21
24
27
30
33
36
39
42
45
48
51
54
CAERNARVON
VERRET
BAYOU TERRE AUX BOUEFS
MRGO
BAYOU BIENVENUE
CHEF MENTEUR PASS
RIGOLETS
HIGHWAY 90
I-10
SLIDELL
ELEVATION IN FEET N. G. V. D.
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
Natural levee
Swamp/marsh
Marsh
Natural levee
Swamp/marsh
Beach sand
Point bar
Abandoned course
Interdistributary
Prodelta
Nearshore gulf
Prodelta
Nearshore gulf
Pleistocene

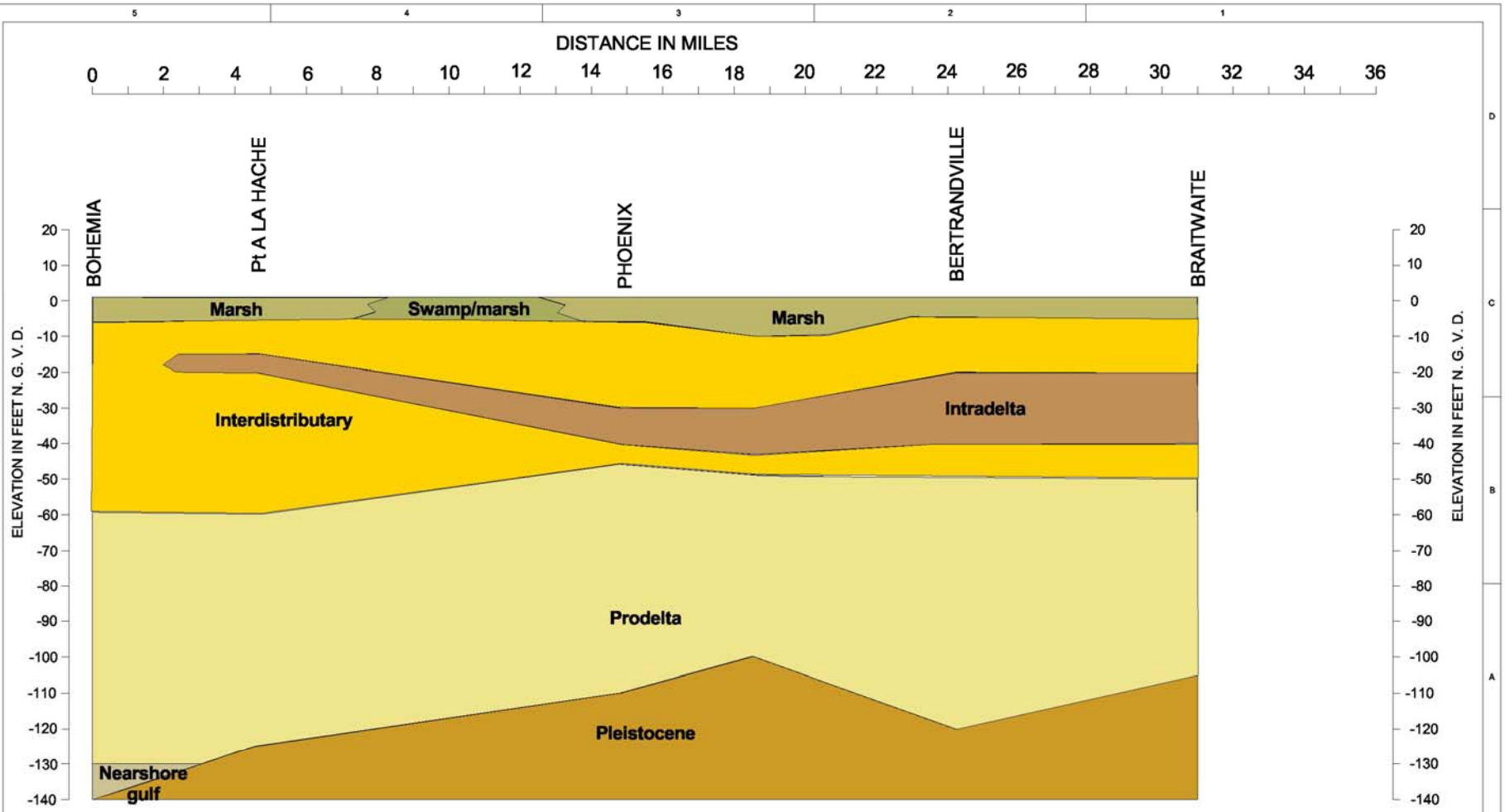
REACH A

Reach B
Braithwaite to Bohemia



Reach B – General Geology

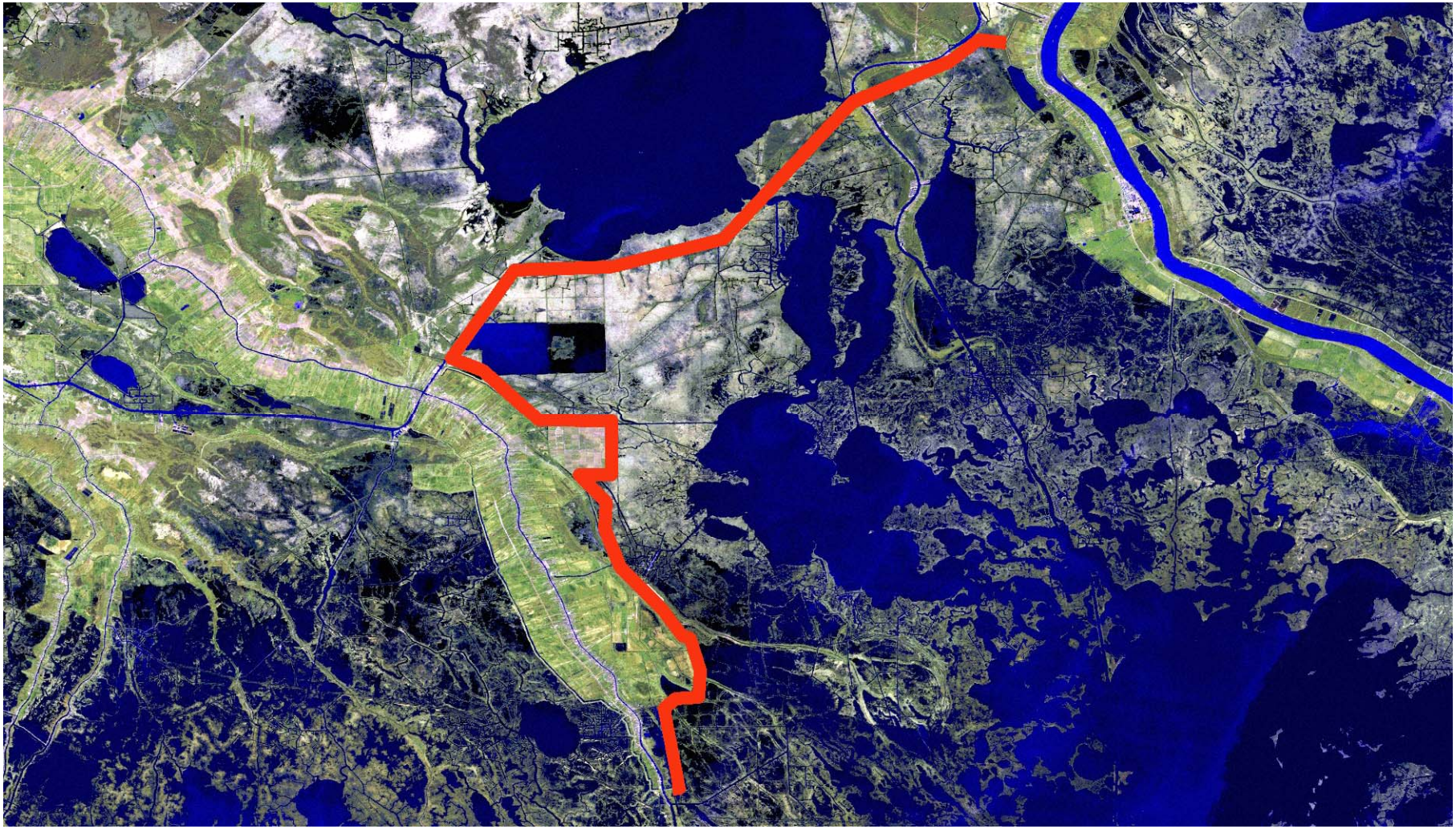

Hnl
Hds
Hdi
Had
B
P
Cataouatche
Coubo Island
Oil Field
Oil and Gas Field
ST CHARLES PARISH
JEFFERSON PARISH
SALVADOR
Lake Lery
Lake Coquille
Lake Campo
Dead Duck Pass
Jessies I
Bay of River Aux Chenes
Bay La Fourche
BLACK BAY
Bay Gardene
Bay Crabe
Belle Isle
Drum I
Turtle Bay
Round Lake
Lake Laurier
Lake Batola
Lake Calebasse
Lake Jean Louis Robinz
Grand Lake
Wood Lake
Lost Lake
Bayou Rigolettes
Bayou Lafourche
Bayou Terrebonne
Bayou Dupont
Bayou Croix
Bayou Petite Caillou
Bayou Grand Caillou
Bayou Cocodrie
Bayou Pelton
Bayou Point Au Chien
Bayou Grand Point
Bayou Point Bulle
Bayou Point Aux Chenes
Bayou Point Au Fer
Bayou Point Au Chien



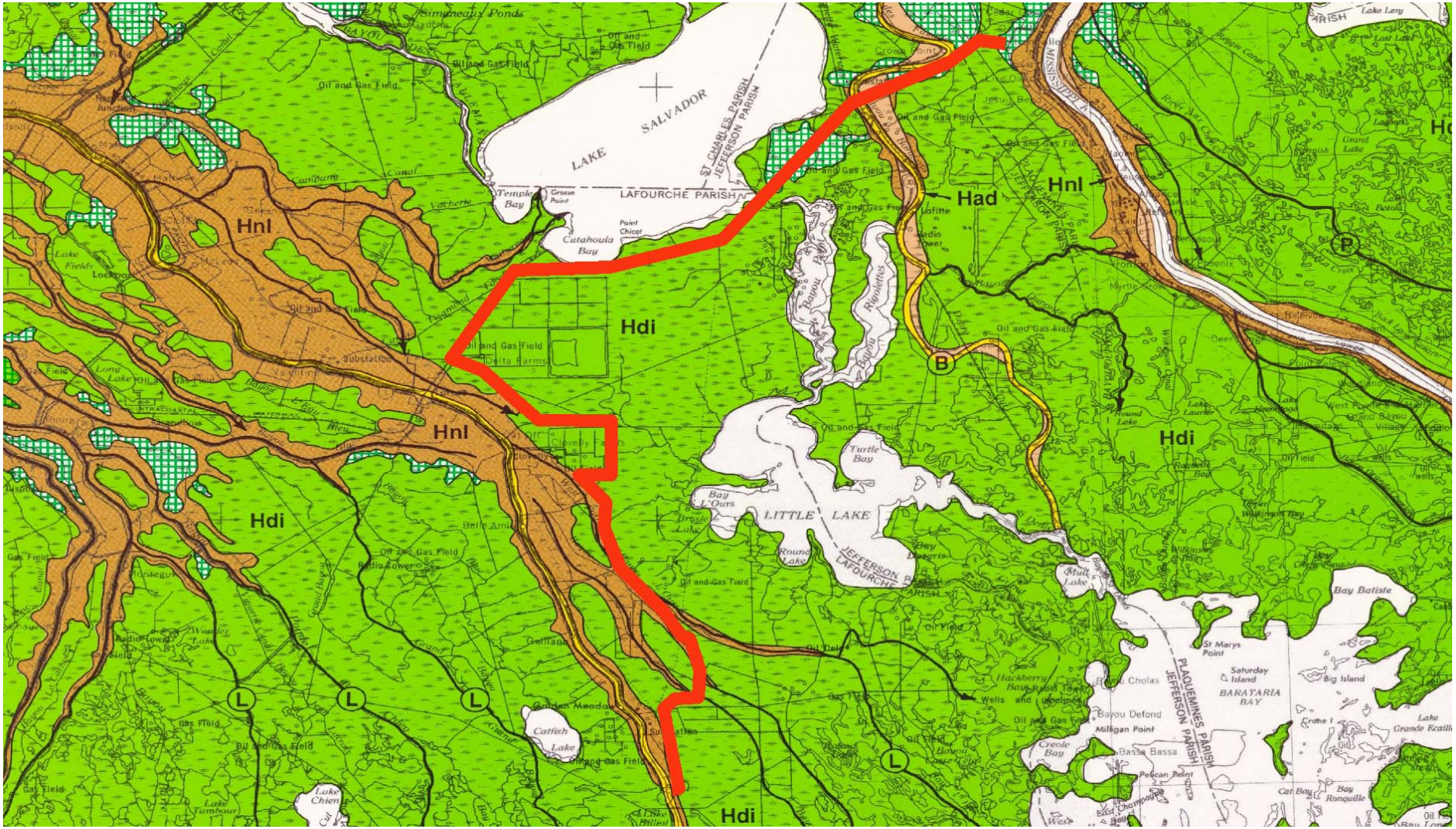
REACH B

PLATE

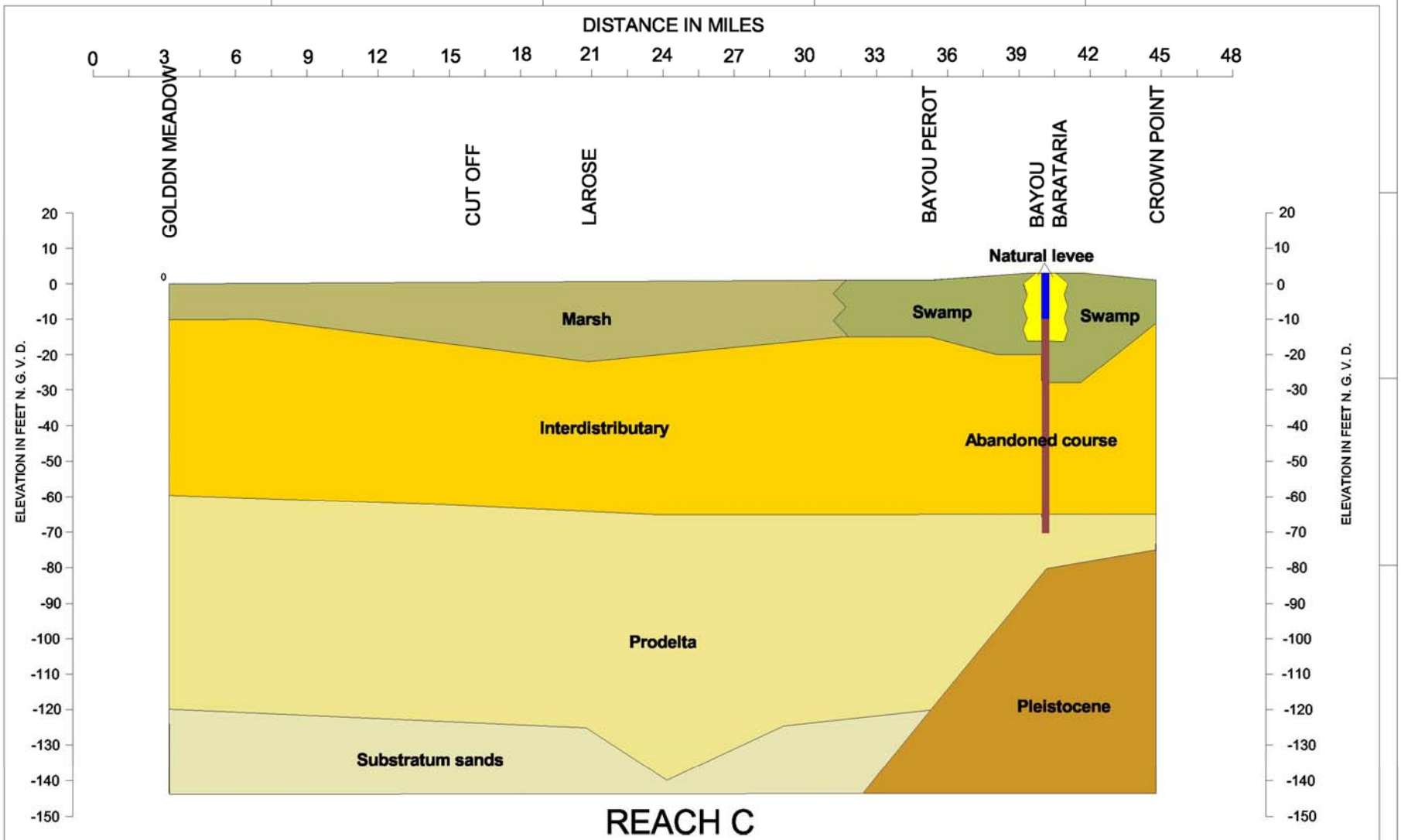
Reach C
Crown Point to Golden Meadow



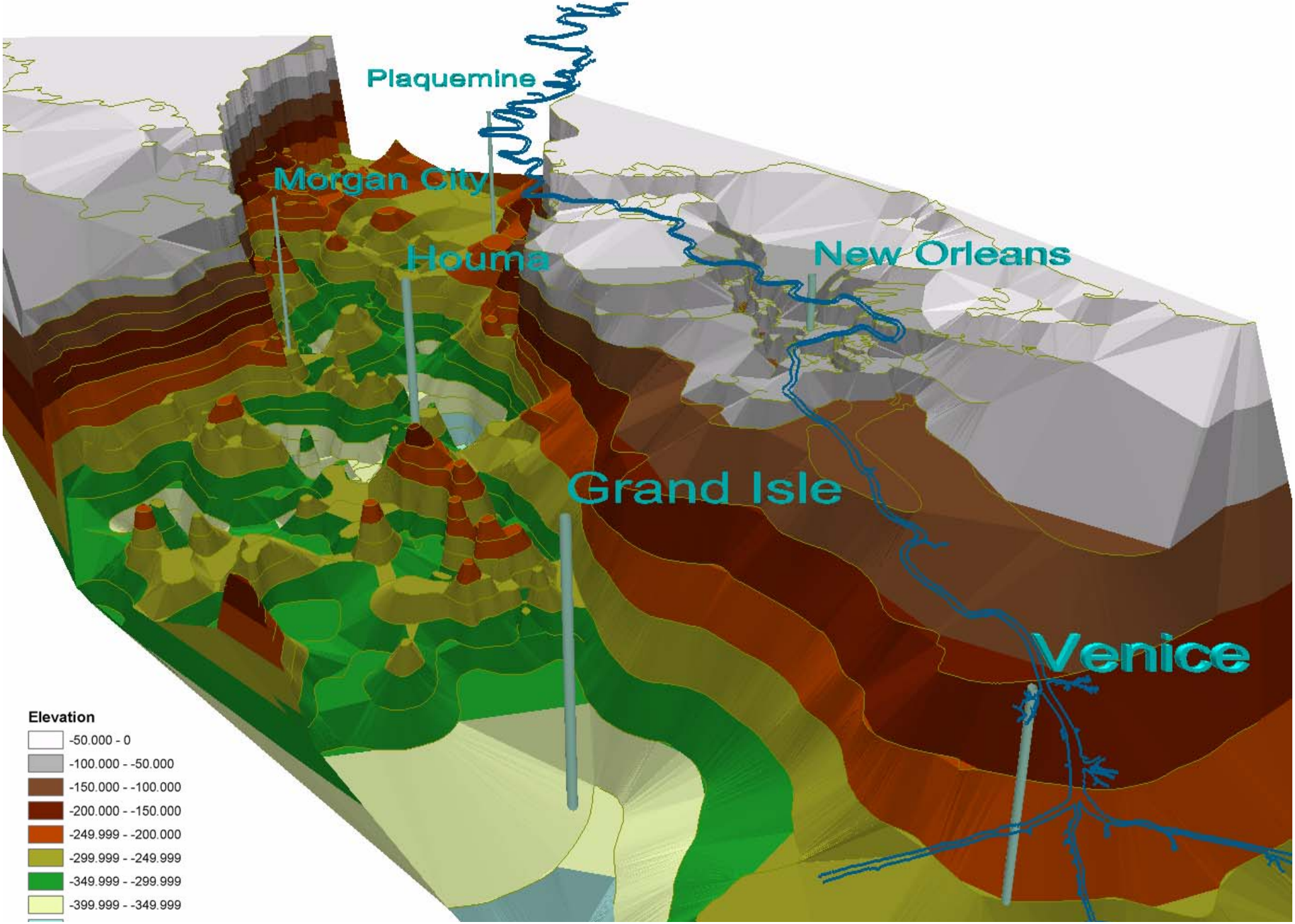
Reach C – General Geology



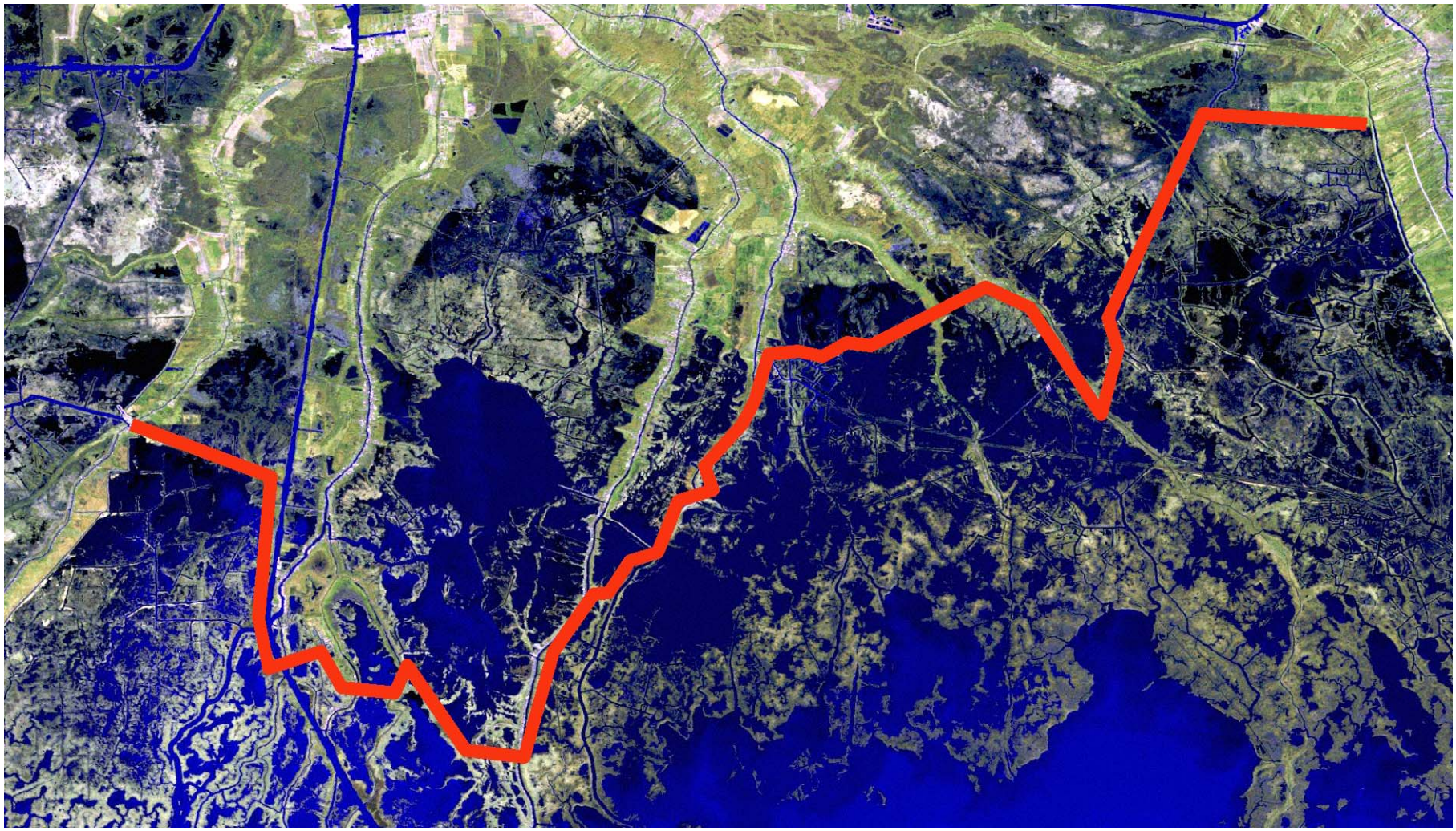
Saucier, 1994


DISTANCE IN MILES
0
3
6
9
12
15
18
21
24
27
30
33
36
39
42
45
48
GOLDDN MEADOW
CUT OFF
LAROSE
BAYOU PEROT
BAYOU BARATARIA
CROWN POINT
Natural levee
Marsh
Swamp
Swamp
Interdistributary
Abandoned course
Prodelta
Pleistocene
Substratum sands
ELEVATION IN FEET N. G. V. D.
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150

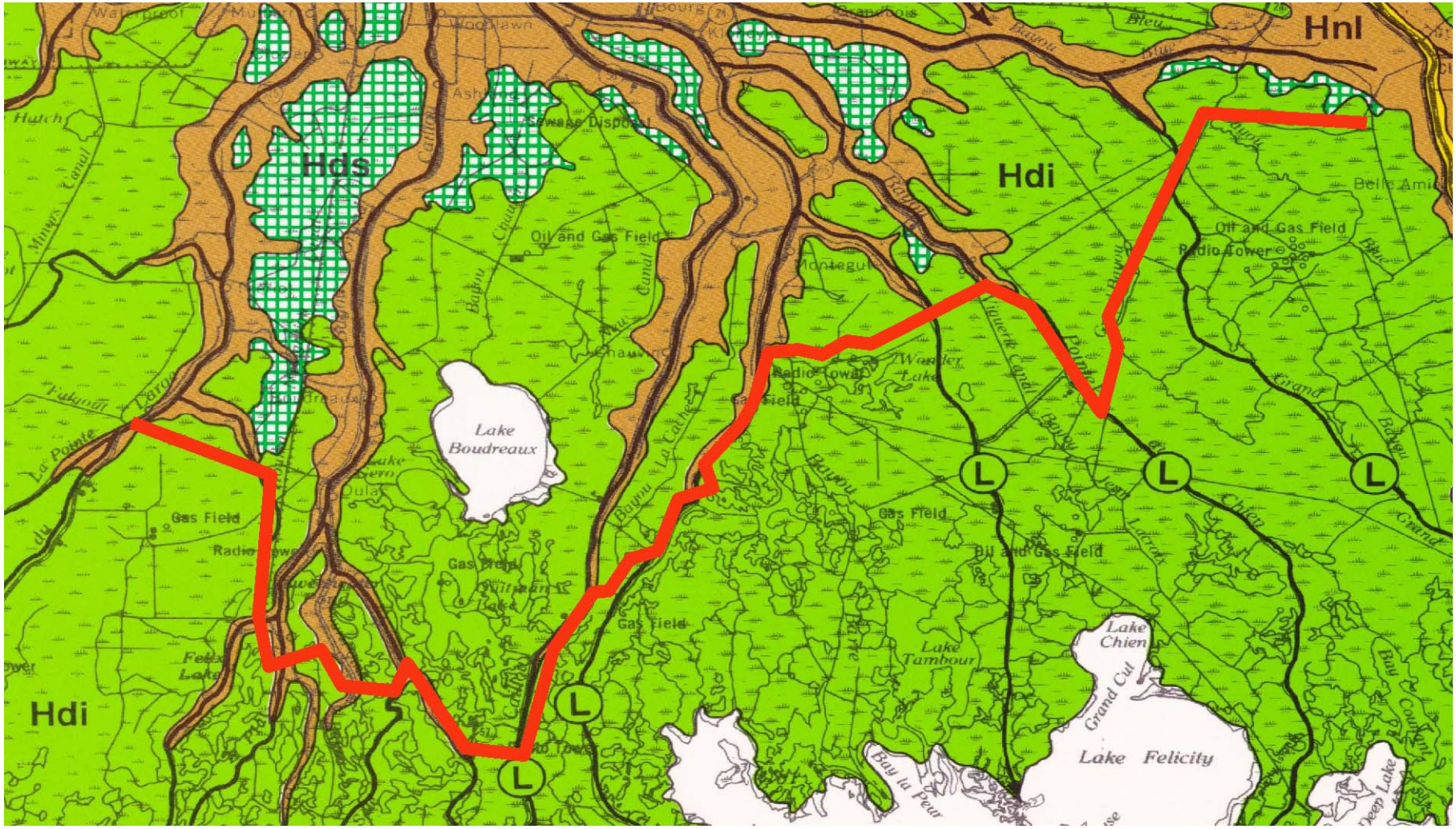
REACH C


Plaquemine
Morgan City
Houma
New Orleans
Grand Isle
Venice
Elevation
-50.000 - 0
-100.000 - -50.000
-150.000 - -100.000
-200.000 - -150.000
-249.999 - -200.000
-299.999 - -249.999
-349.999 - -299.999
-399.999 - -349.999

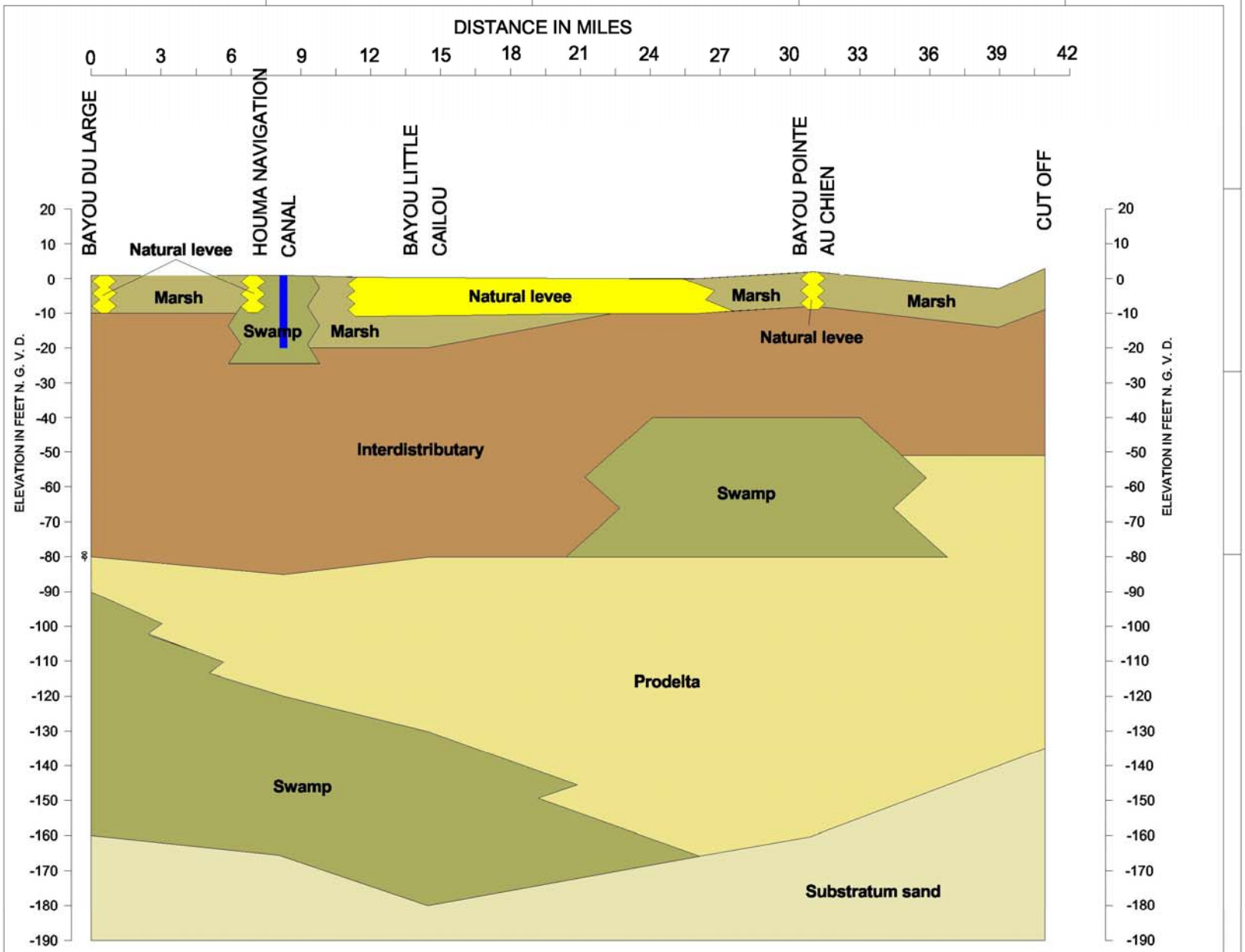
Reach D
Cutoff to Bayou du Large



Reach D – General Geology

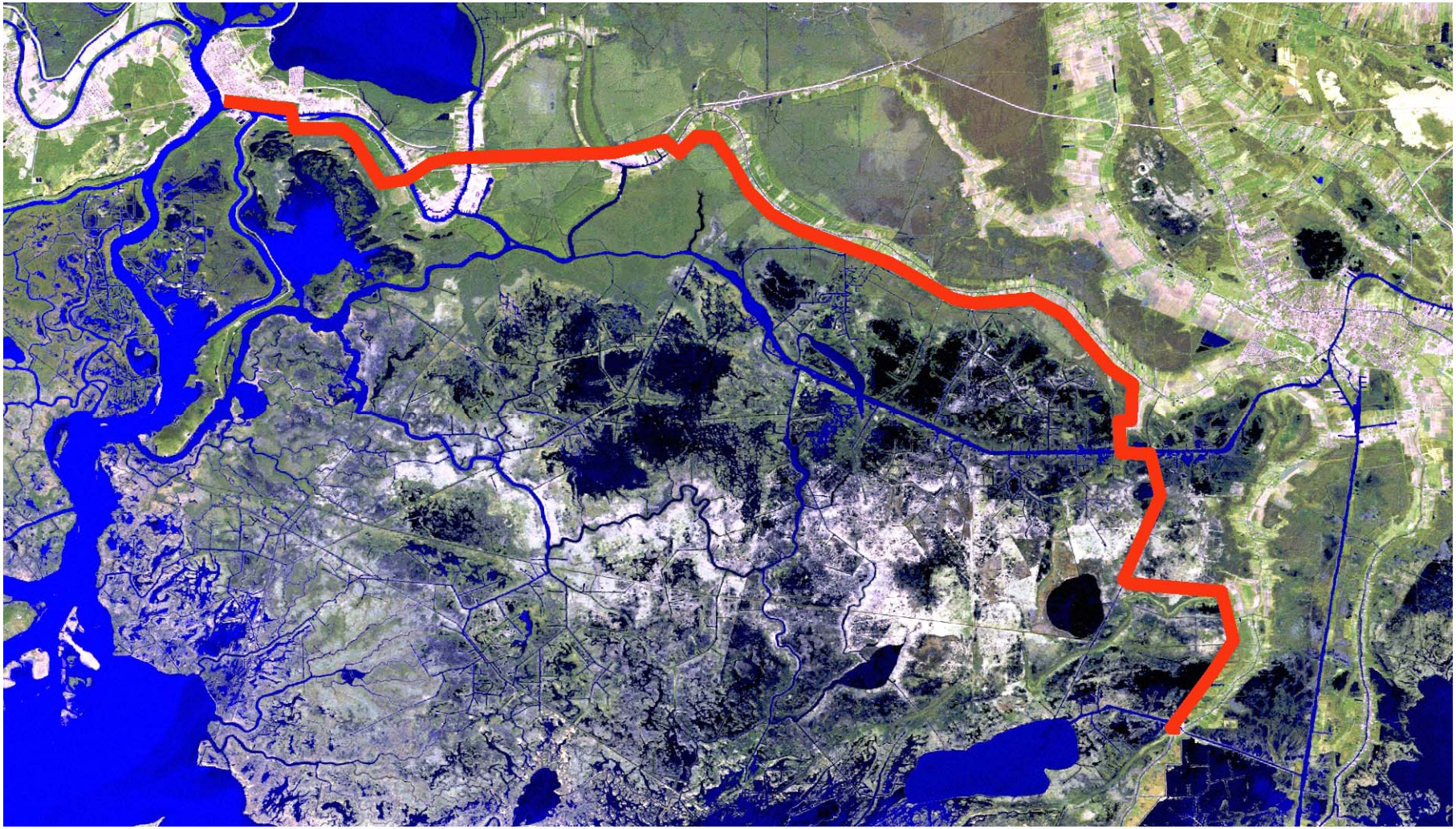


Saucier, 1994

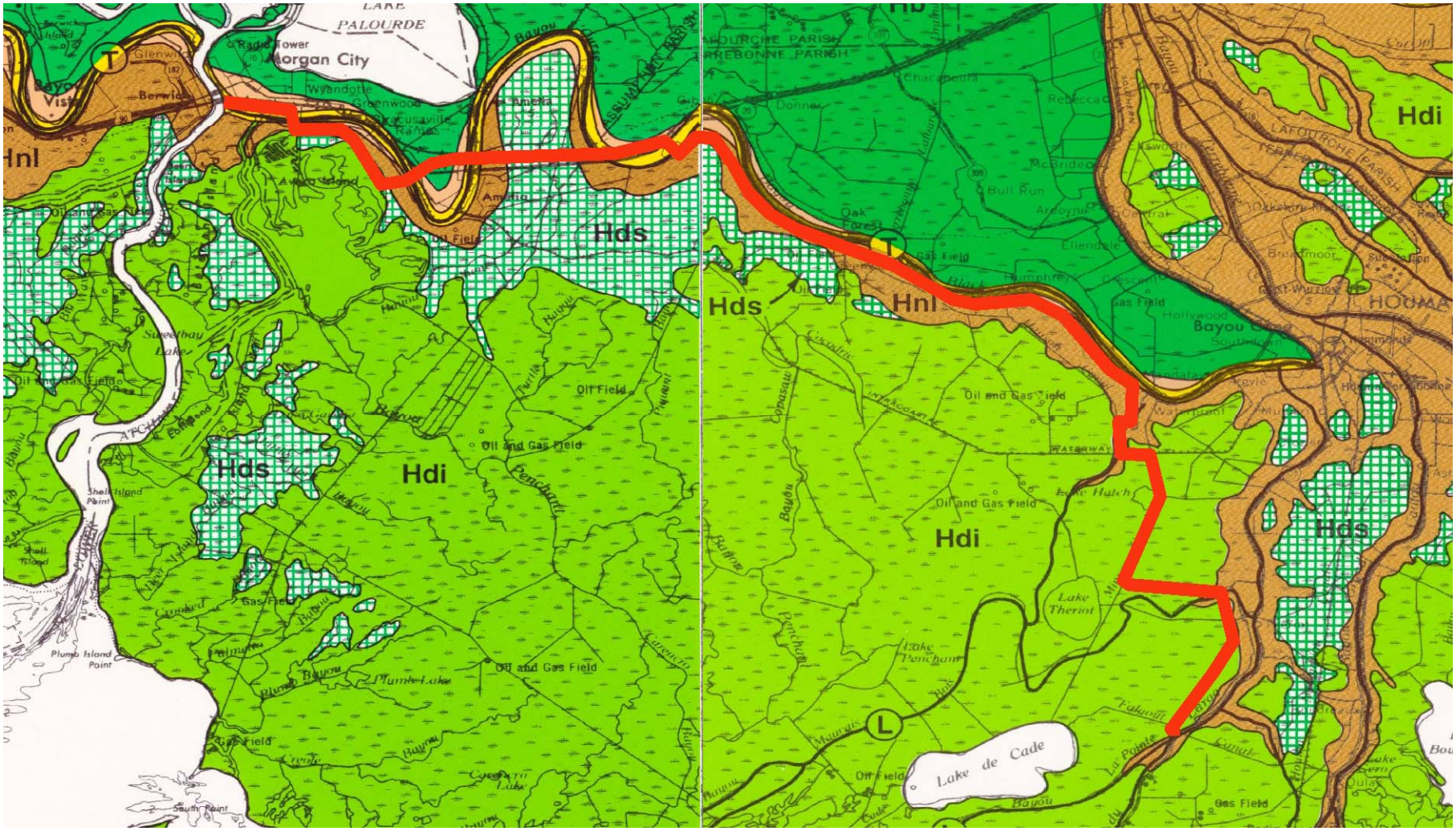

DISTANCE IN MILES
0
3
6
9
12
15
18
21
24
27
30
33
36
39
42
BAYOU DU LARGE
HOUMA NAVIGATION CANAL
BAYOU LITTLE CAILOU
BAYOU POINTE AU CHIEN
CUT OFF
ELEVATION IN FEET N. G. V. D.
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
Natural levee
Marsh
Swamp
Marsh
Natural levee
Marsh
Natural levee
Marsh
Interdistributary
Swamp
Prodelta
Swamp
Substratum sand

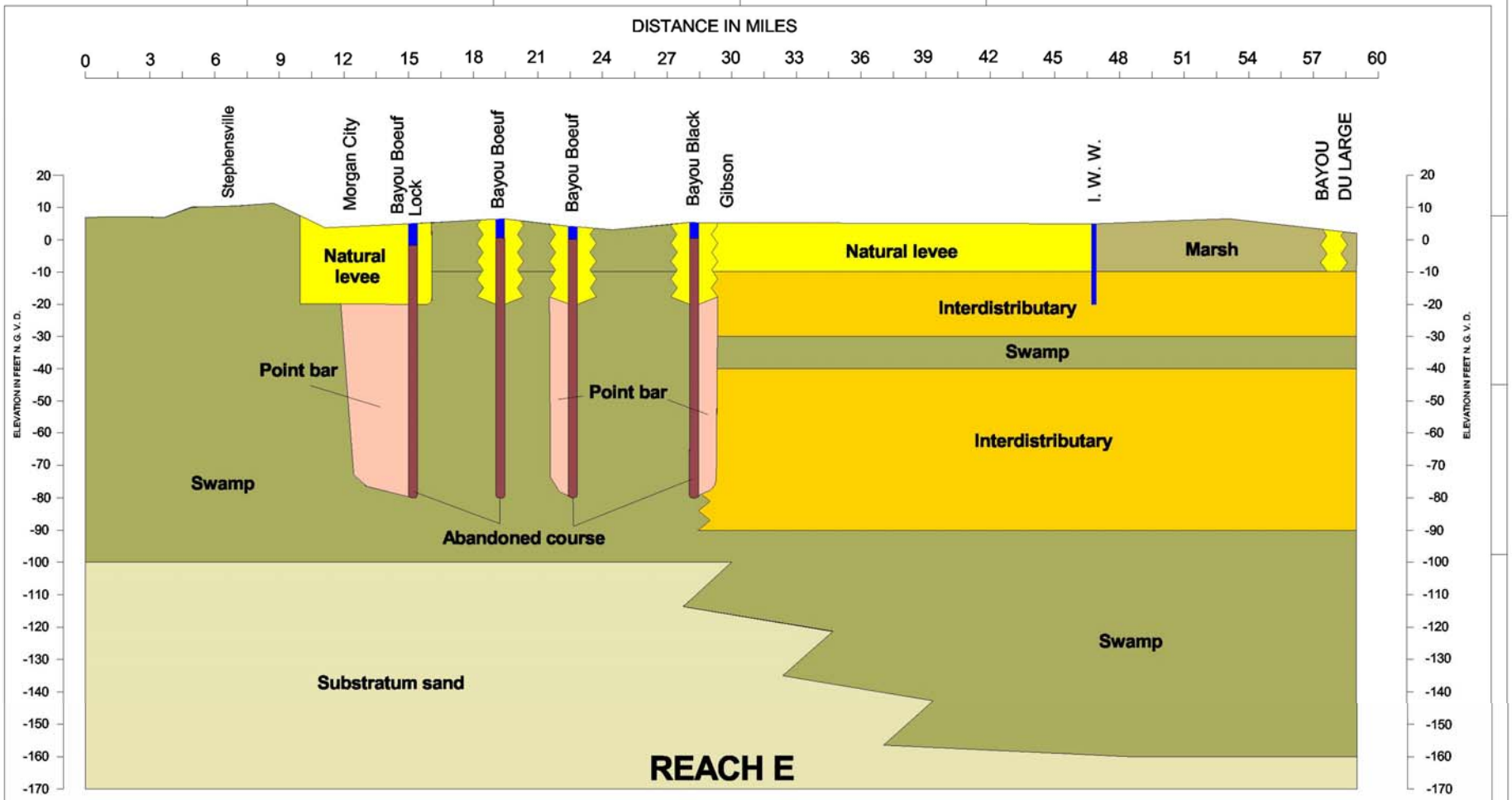
REACH D

Reach E
Bayou du Large to Morgan City

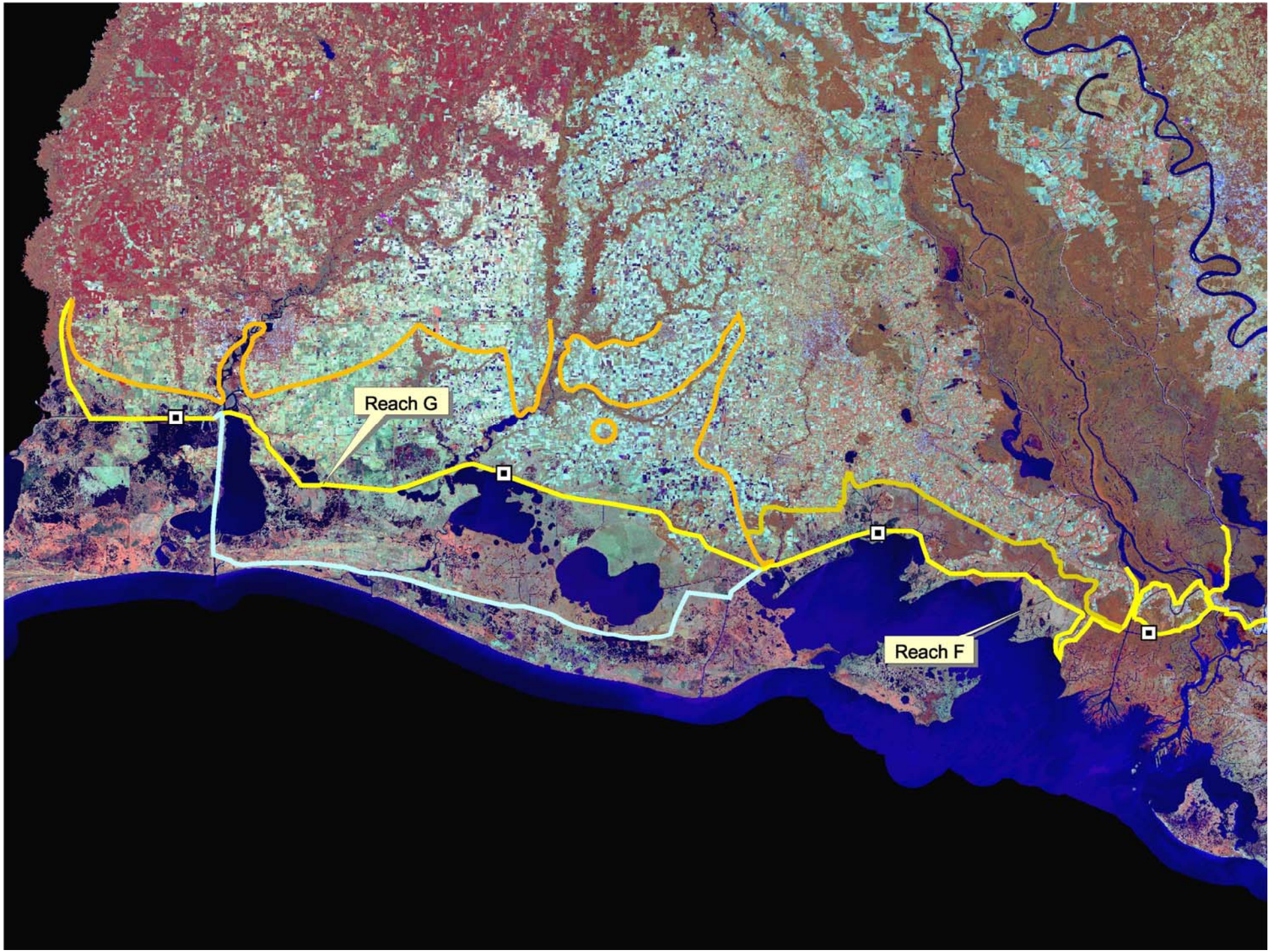


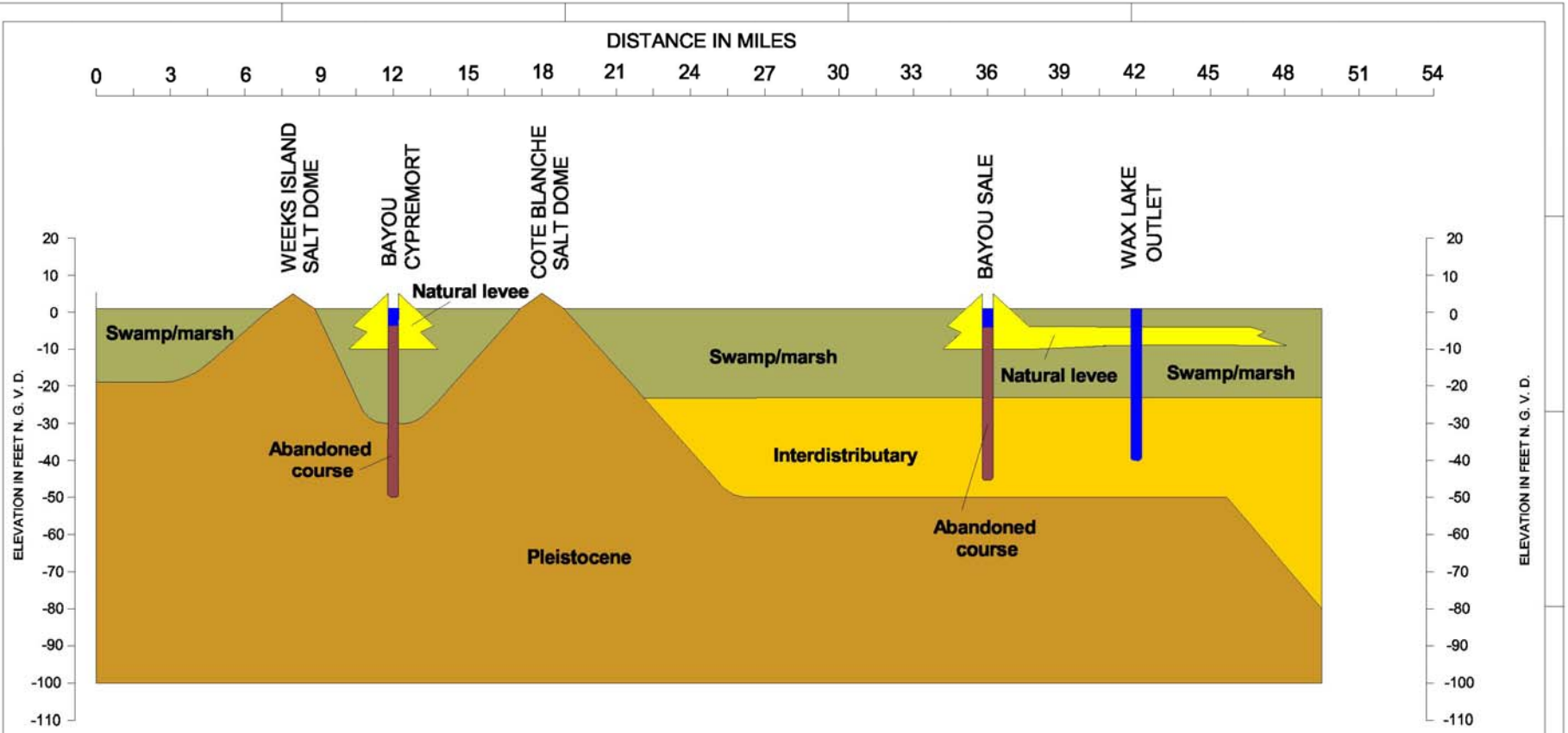
Reach E – General Geology


LAKE PALOURDE
Morgan City
Berwick
Hnl
Hds
Hdi
Oil and Gas Field
Oil Field
Gas Field
Lake Theriot
Lake de Cade
Lake Hutch
Lake Penchant
Plumb Lake
Sweetbay Lake
Shell Island Point
Plumb Island Point
South Point
Bayou Cocodrie
Bayou Penchant
Bayou Copasaw
Bayou Terrebonne
Bayou Black
Bayou Grand Caillou
Bayou Petite Caillou
Bayou Dularge
Bayou Cane
Bayou Pelton
Bayou Pelton Canal
Bayou Cane Canal
Bayou Dularge Canal
Bayou Terrebonne Canal
Bayou Black Canal
Bayou Grand Caillou Canal
Bayou Petite Caillou Canal
Bayou Cocodrie Canal
Bayou Penchant Canal
Bayou Copasaw Canal
Bayou Cocodrie Canal
Bayou Penchant Canal
Bayou Copasaw Canal
Bayou Cane Canal
Bayou Dularge Canal
Bayou Terrebonne Canal
Bayou Black Canal
Bayou Grand Caillou Canal
Bayou Petite Caillou Canal
Bayou Pelton Canal
Bayou Pelton
Bayou Cane
Bayou Dularge
Bayou Terrebonne
Bayou Black
Bayou Grand Caillou
Bayou Petite Caillou
Bayou Cocodrie
Bayou Penchant
Bayou Copasaw


DISTANCE IN MILES
0 3 6 9 12 15 18 21 24 27 30 33 36 39 42 45 48 51 54 57 60
Stephensville
Morgan City
Bayou Boeuf Lock
Bayou Boeuf
Bayou Boeuf
Bayou Black
Gibson
I. W. W.
BAYOU DU LARGE
ELEVATION IN FEET N. G. V. D.
20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170
Natural levee
Natural levee
Marsh
Interdistributary
Swamp
Point bar
Point bar
Interdistributary
Swamp
Abandoned course
Swamp
Substratum sand
REACH E

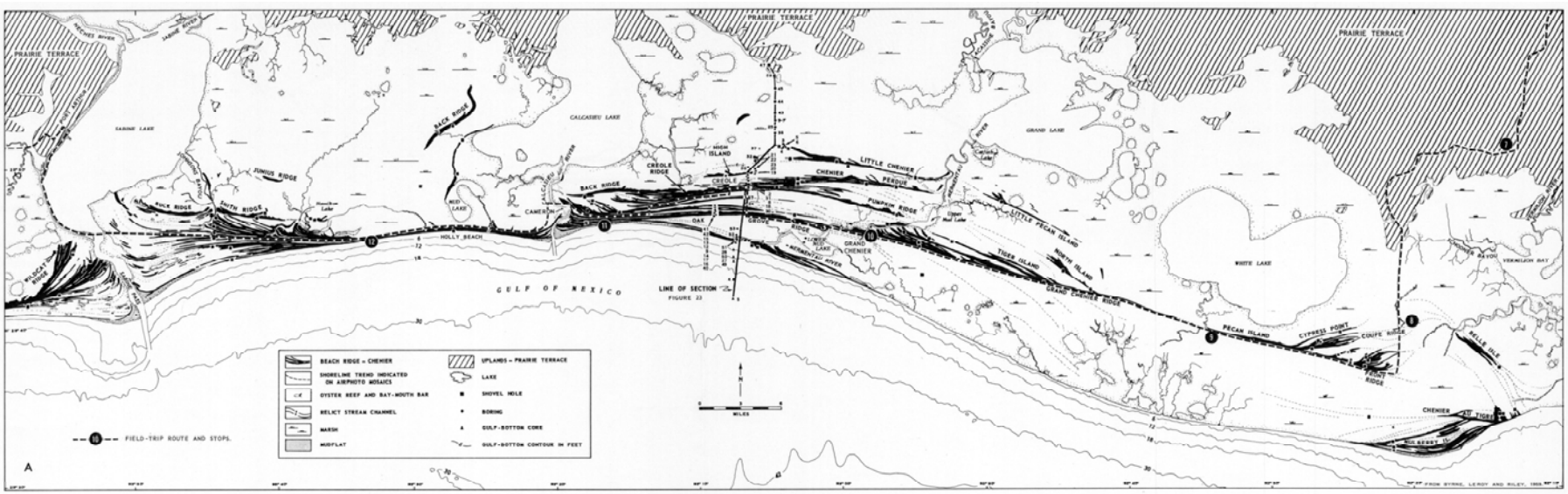
PLATE


Reach G
Reach F

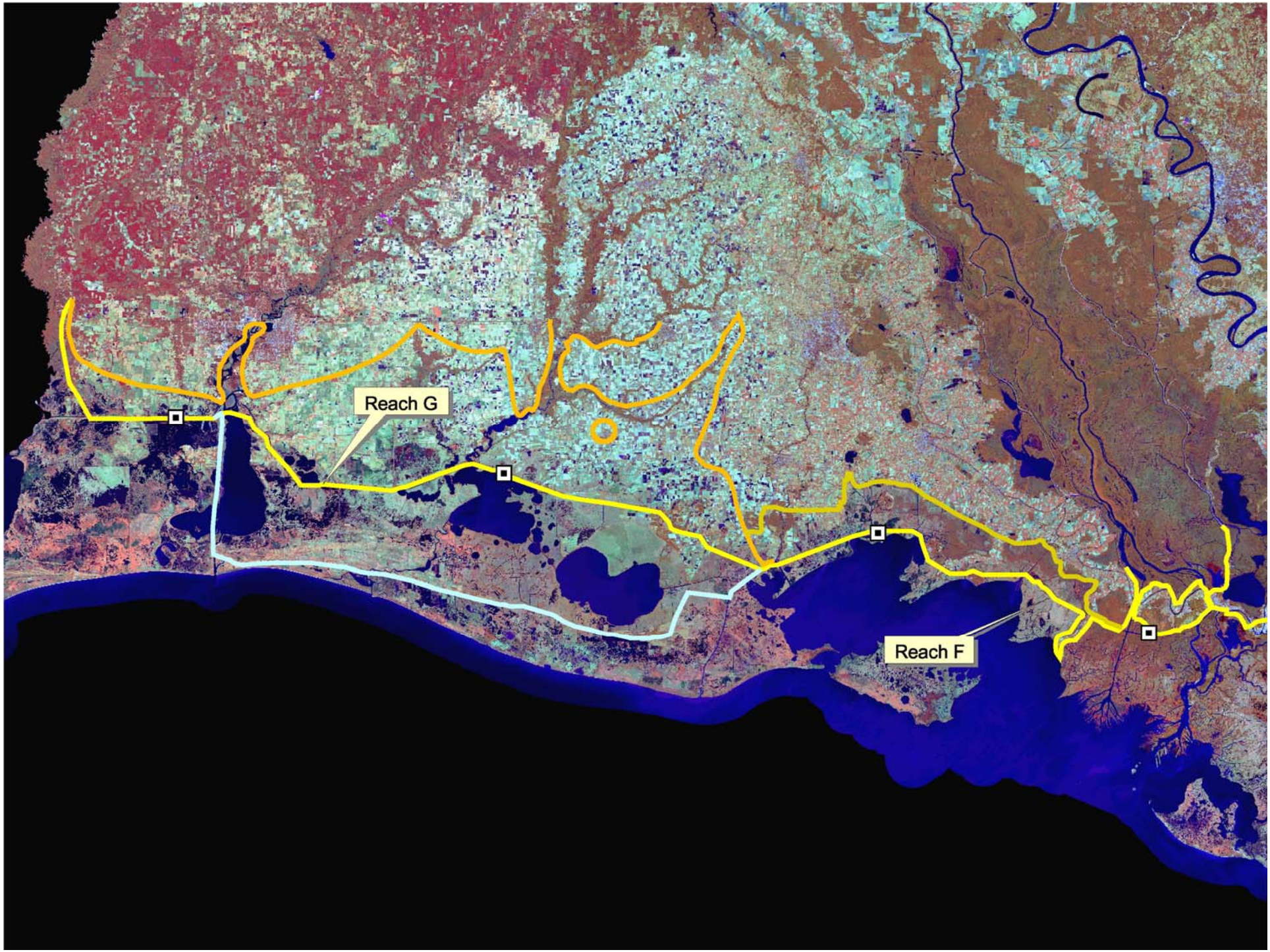

DISTANCE IN MILES
0
3
6
9
12
15
18
21
24
27
30
33
36
39
42
45
48
51
54
WEEKS ISLAND SALT DOME
BAYOU CYPREMORT
COTE BLANCHE SALT DOME
BAYOU SALE
WAX LAKE OUTLET
Natural levee
Swamp/marsh
Swamp/marsh
Natural levee
Swamp/marsh
Abandoned course
Interdistributary
Abandoned course
Pleistocene
ELEVATION IN FEET N. G. V. D.
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110

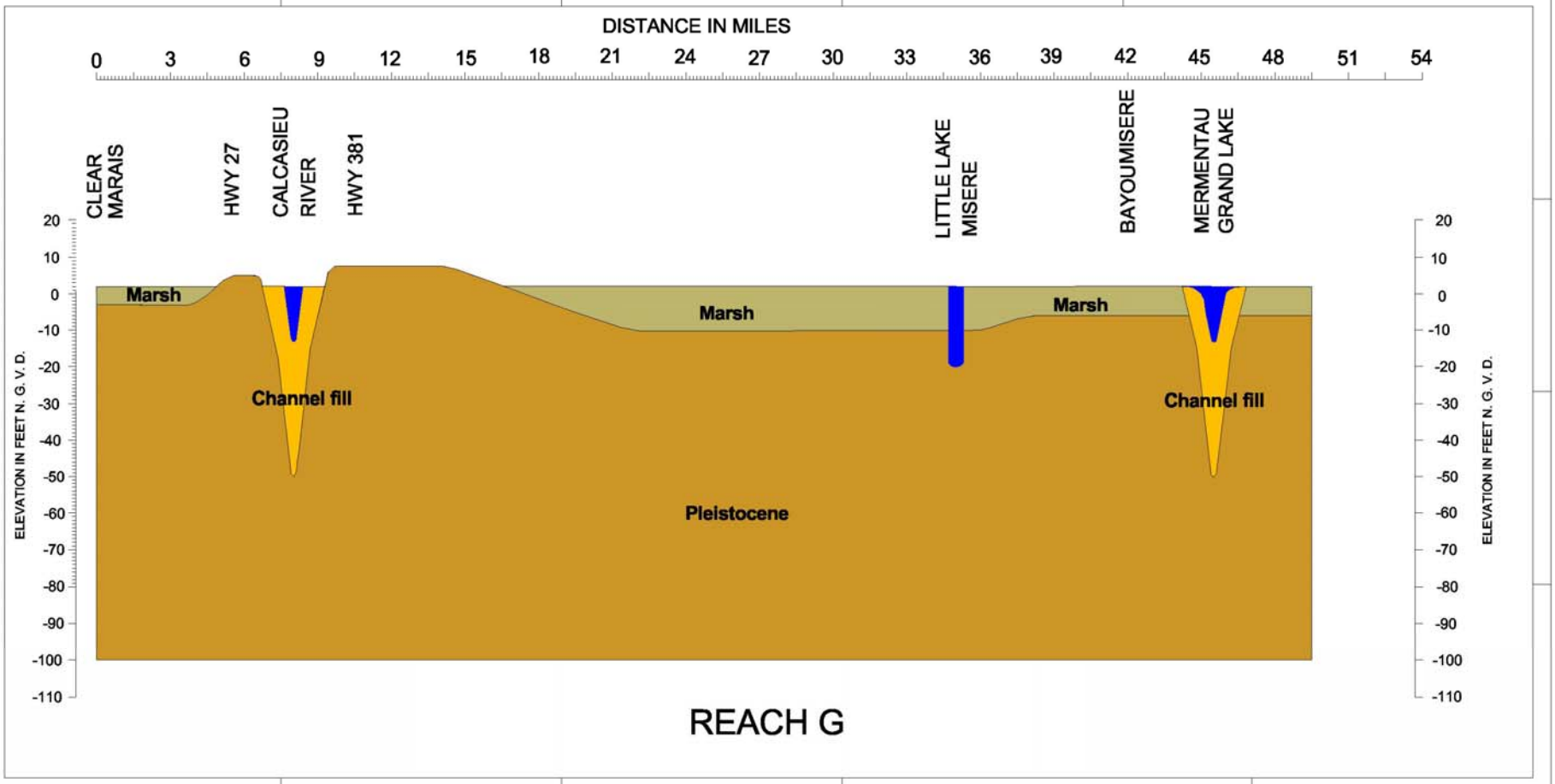
REACH F

Chenier Plain

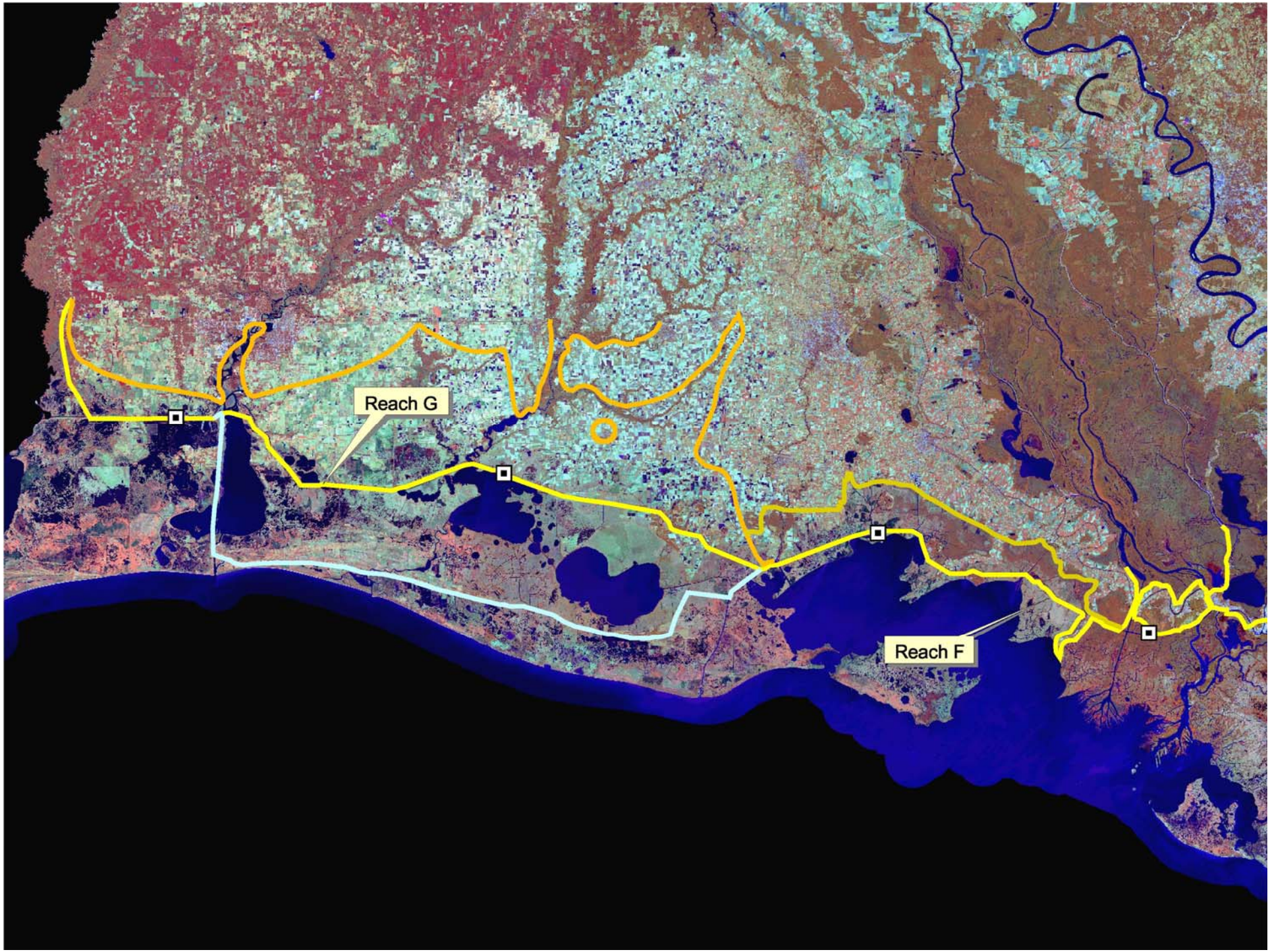


(Gould and McFarland, 1959)


Reach G
Reach F

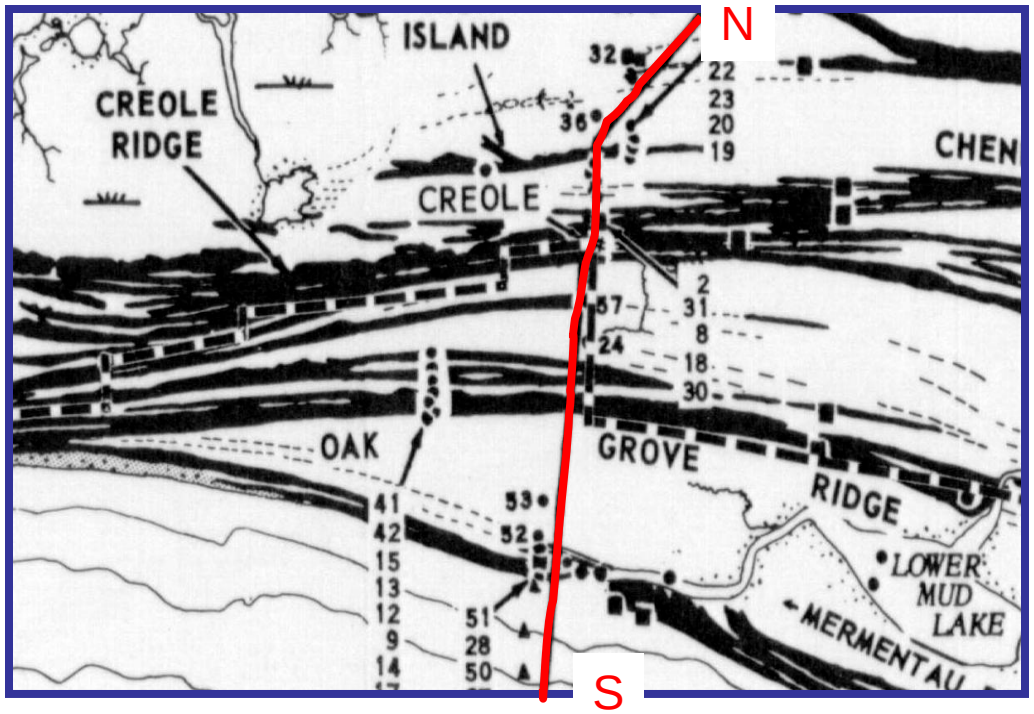

DISTANCE IN MILES
0
3
6
9
12
15
18
21
24
27
30
33
36
39
42
45
48
51
54
CLEAR MARAIS
HWY 27
CALCASIEU RIVER
HWY 381
LITTLE LAKE MISERE
BAYOUMISERE
MERMENTAU GRAND LAKE
ELEVATION IN FEET N. G. V. D.
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
Marsh
Marsh
Marsh
Channel fill
Channel fill
Pleistocene

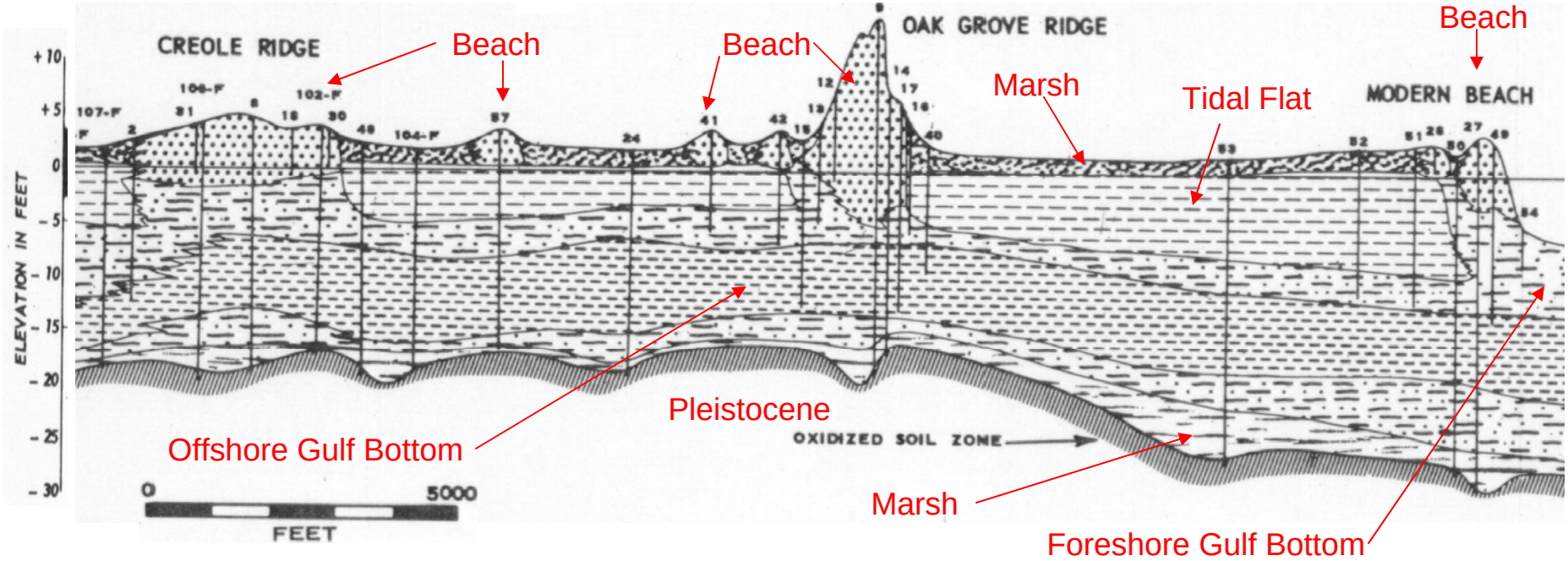
REACH G

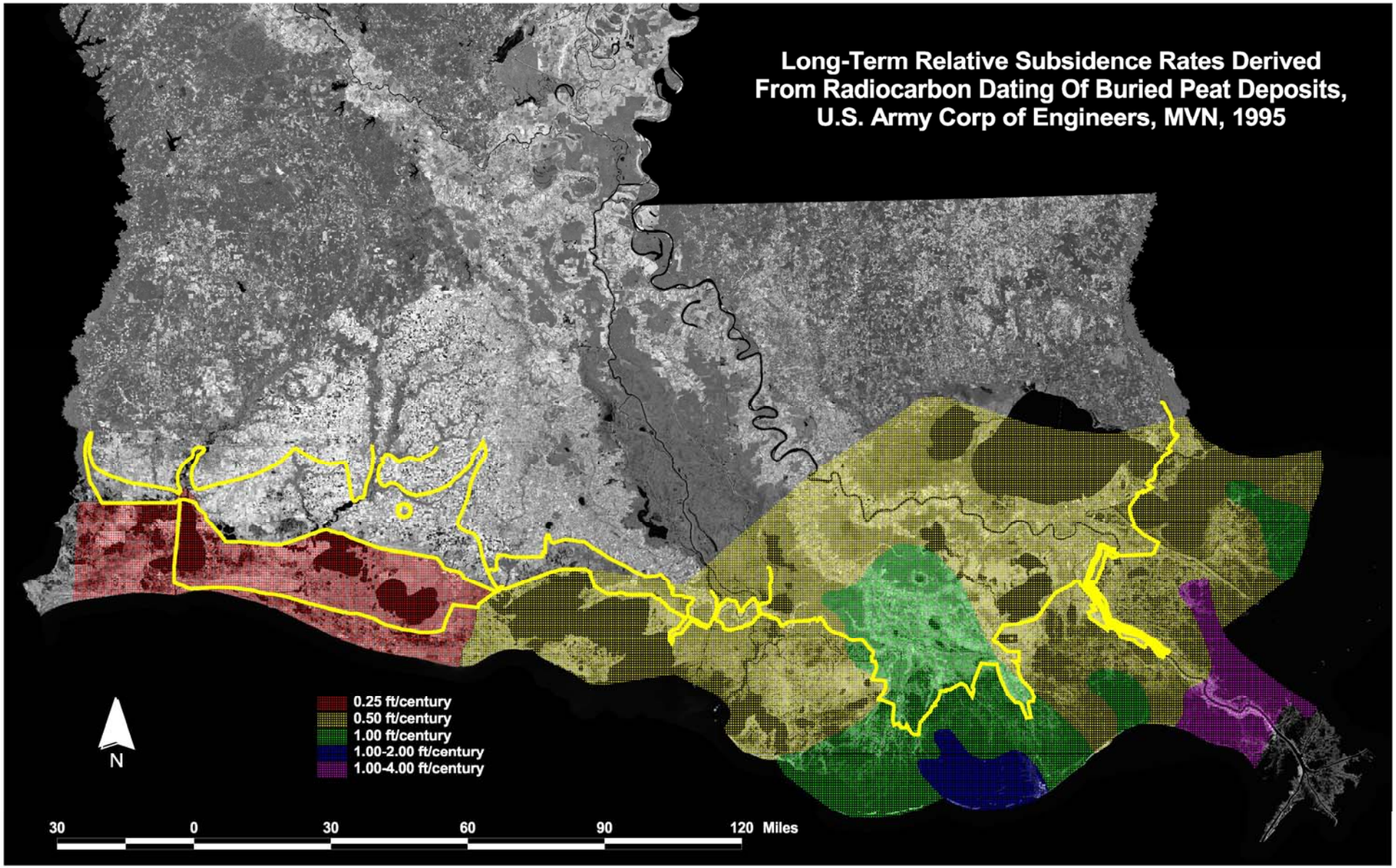

Reach G
Reach F

Chenier Plain Section

(Gould and McFarland, 1959)






Long-Term Relative Subsidence Rates Derived
From Radiocarbon Dating Of Buried Peat Deposits,
U.S. Army Corp of Engineers, MVN, 1995
0.25 ft/century
0.50 ft/century
1.00 ft/century
1.00-2.00 ft/century
1.00-4.00 ft/century
N
30
0
30
60
90
120 Miles