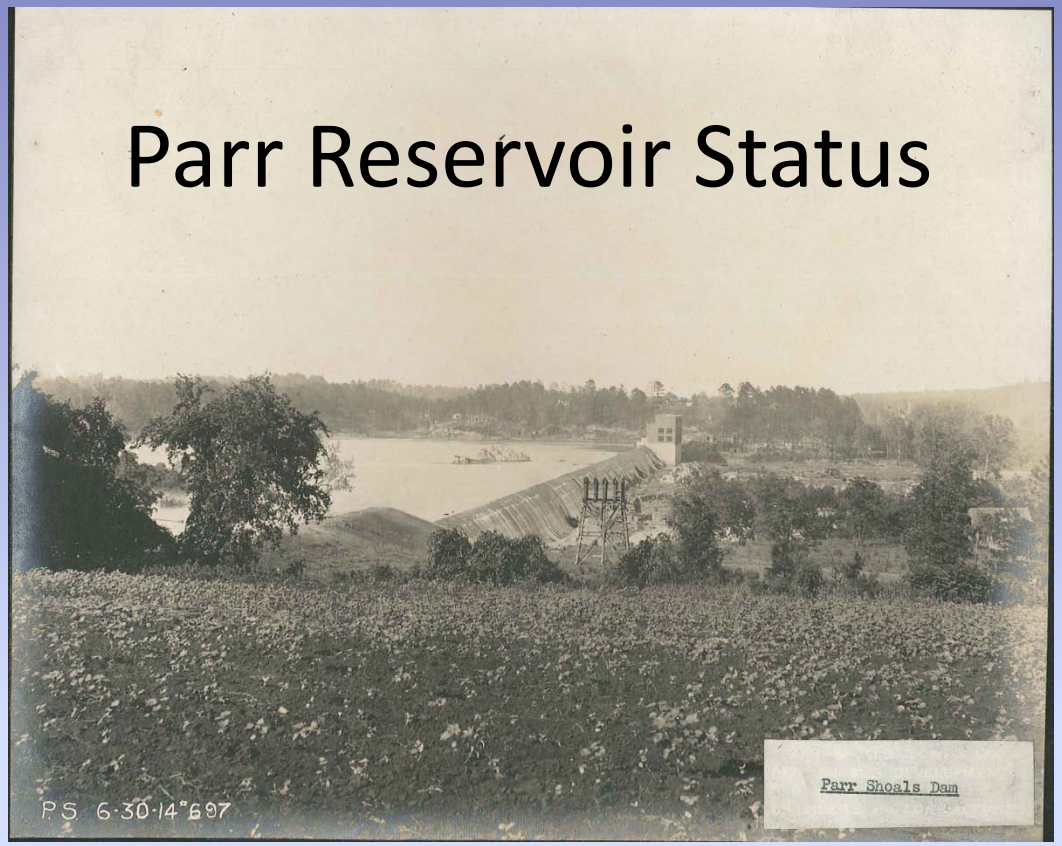
Parr-Fairfield Project Relicensing

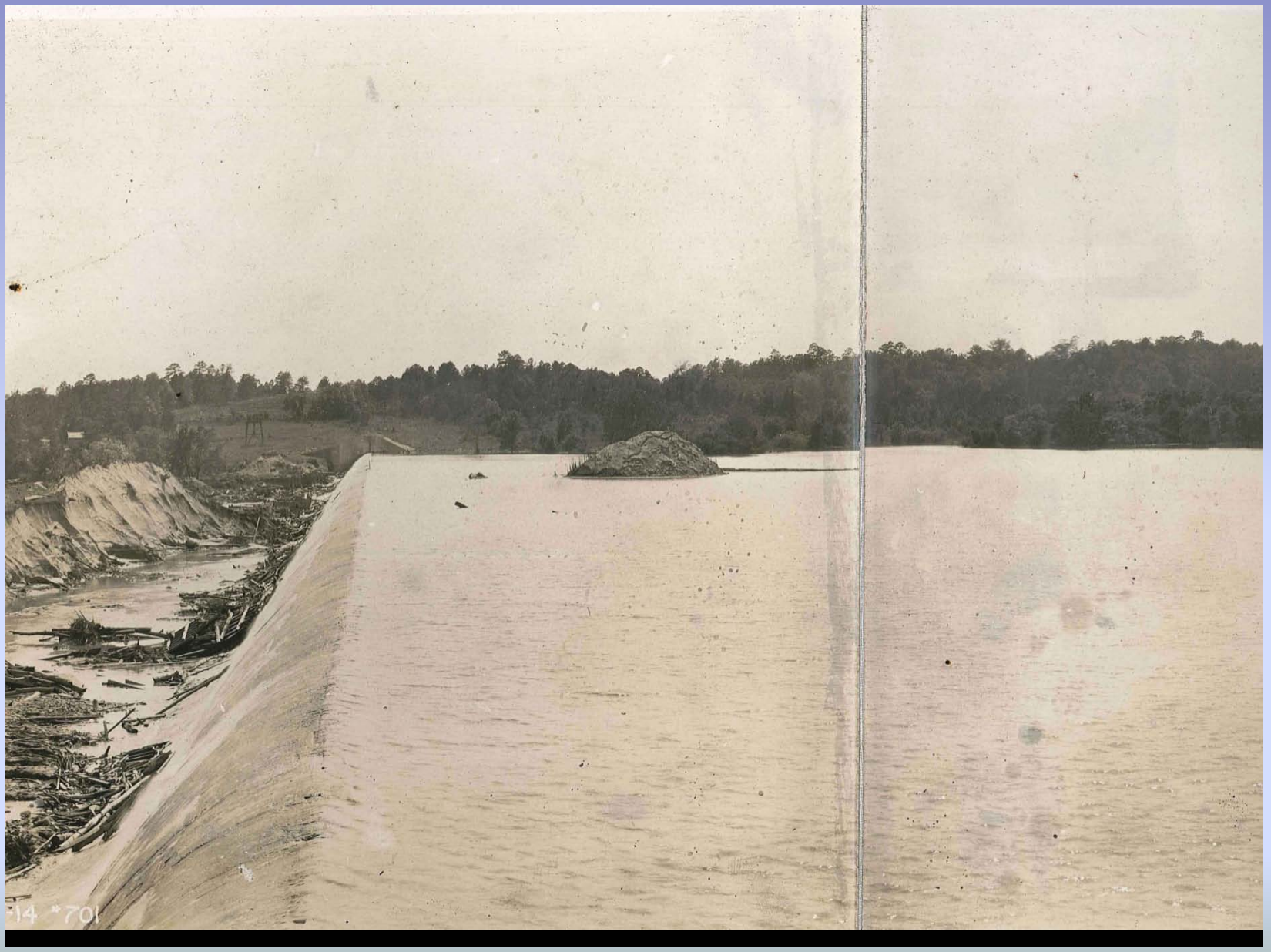
Parr Reservoir Status

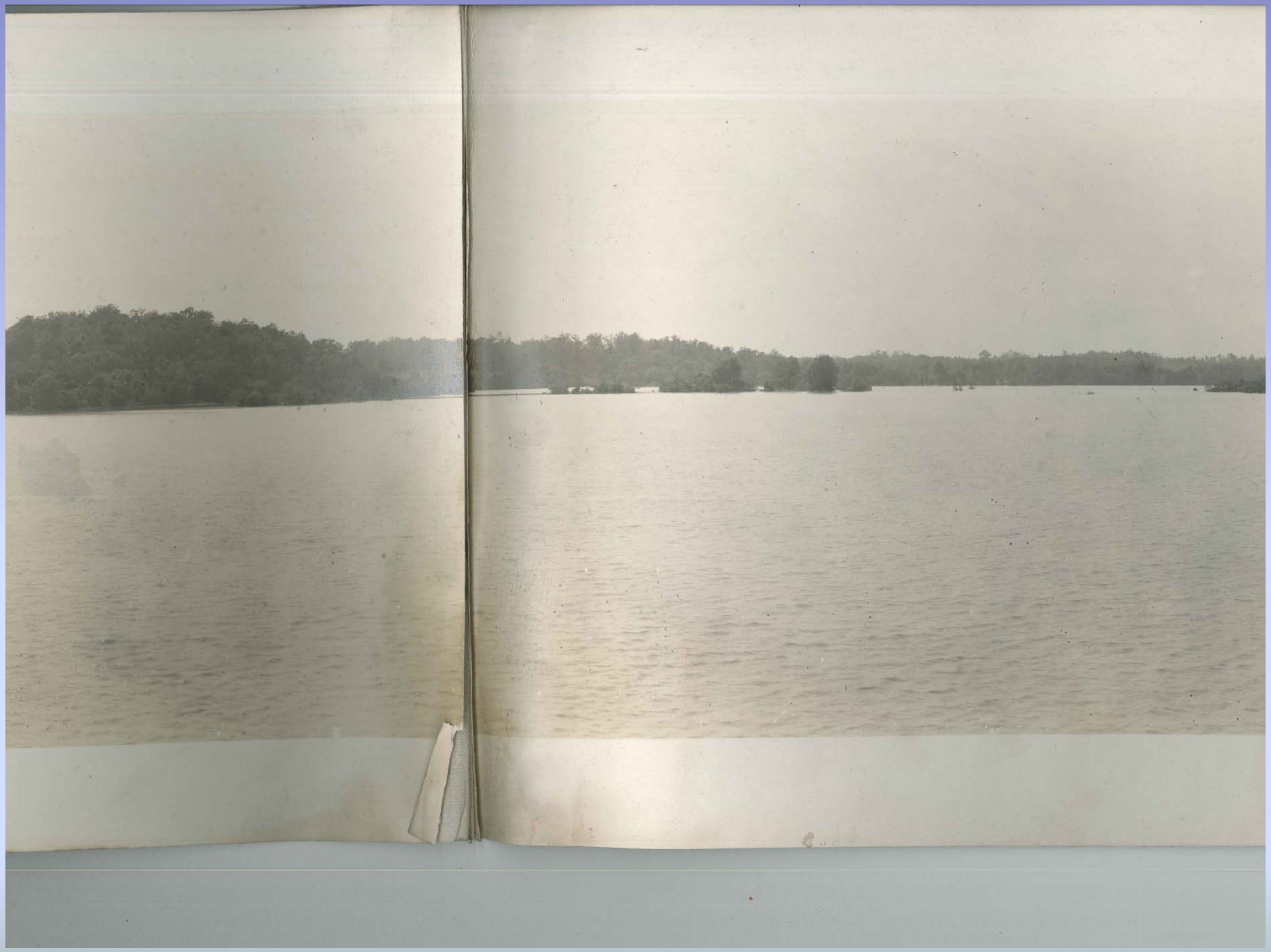


The Parr Reservoir includes islands and peninsulas established within the water body prior to initial construction. Throughout the different construction stages, reservoir water levels have risen as a result of initial reservoir construction and the installation of the crest gates. Current islands remain in the reservoir where peninsulas and prominent islands resided over the last century. It has been long believed storage capacity was affected by heavy sedimentation, but by analyzing a sediment survey conducted in 2008, along with historic and present day Parr Reservoir geography an enhanced understanding of the soil history and composition of the Reservoir bed may be achieved.

Project Construction


PARR SHOALS POWER CO.
PARR SHOALS DEVELOPMENT


14 *701



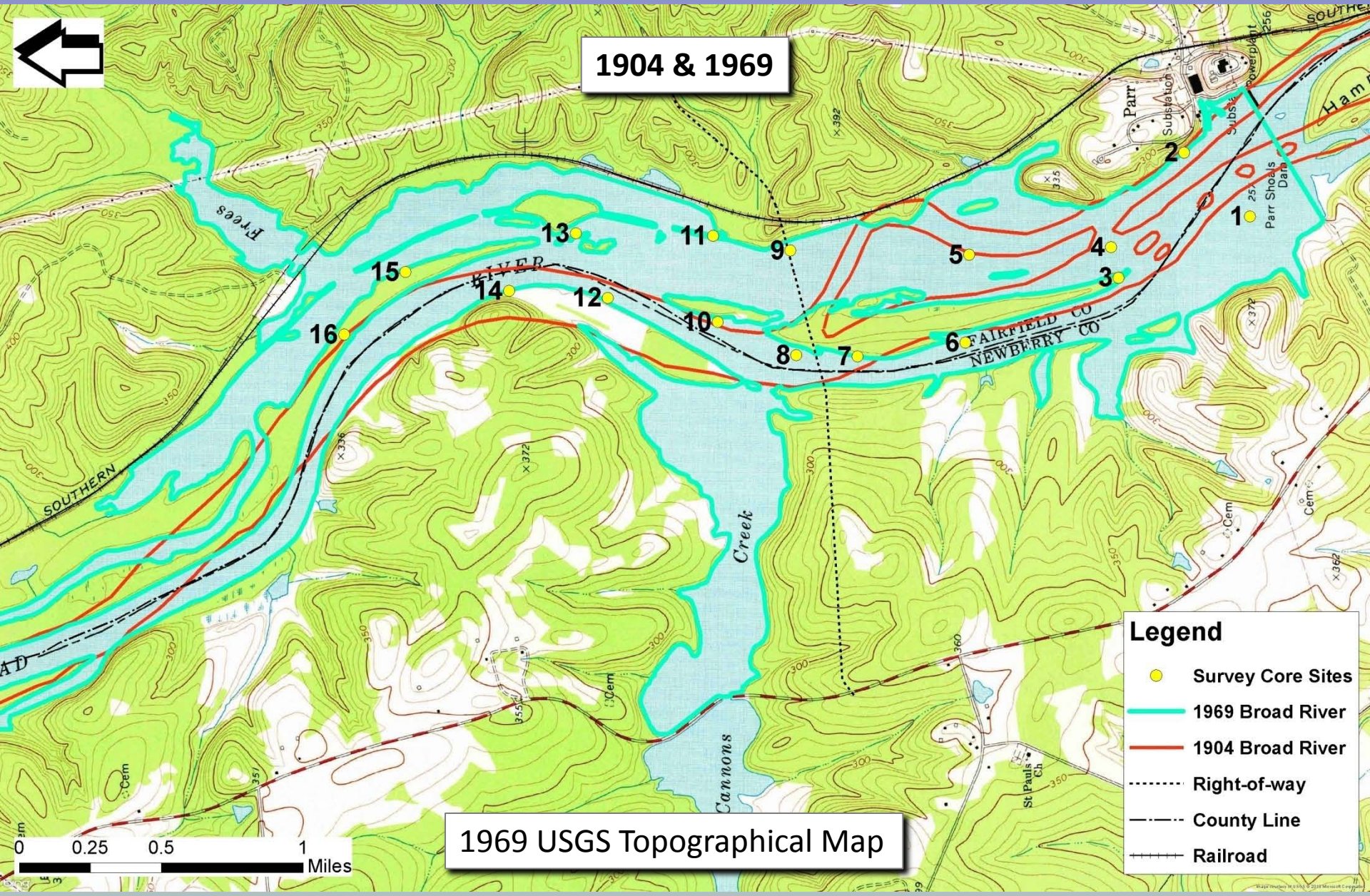
Geomorphology of the Broad River

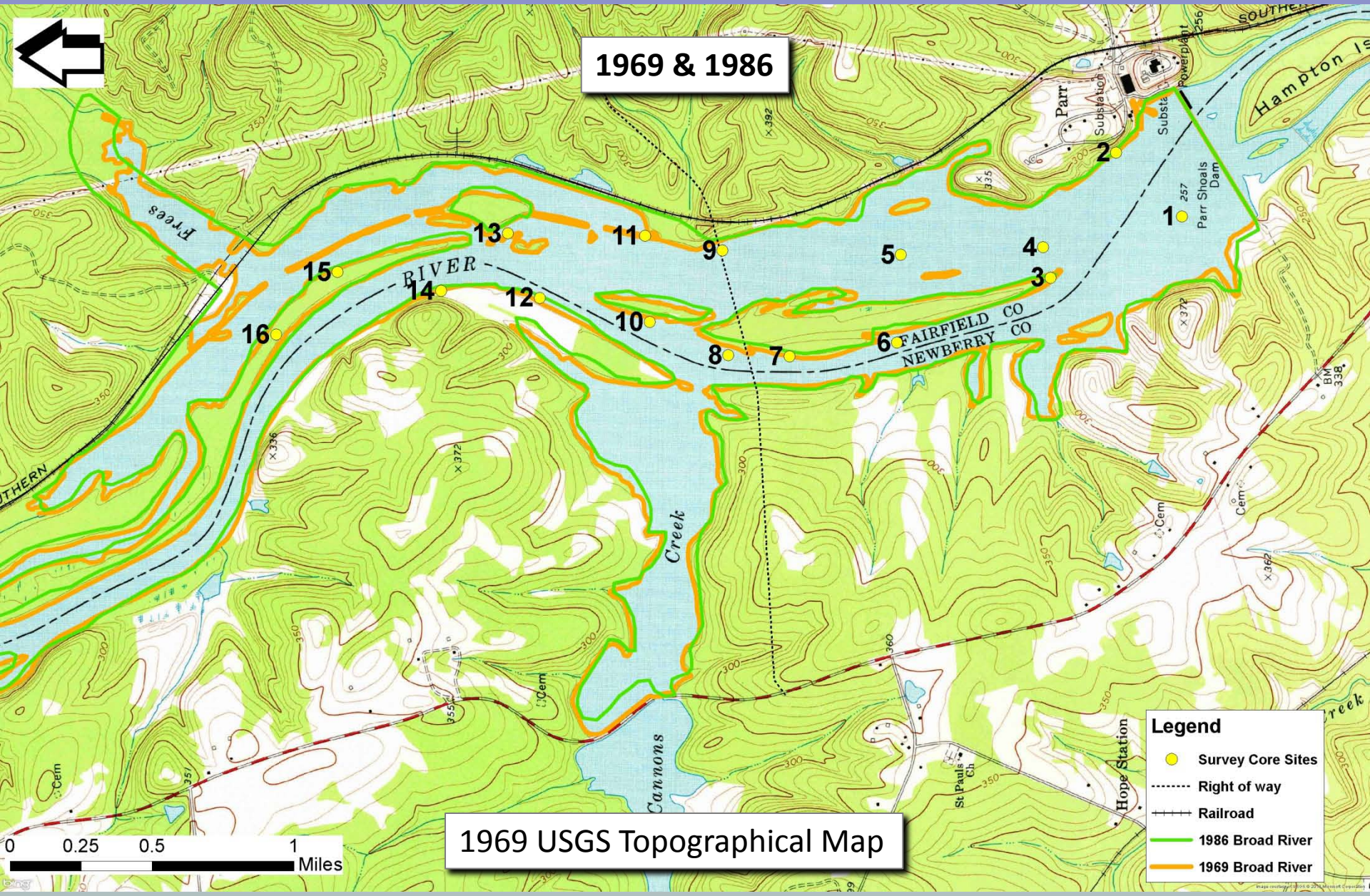
- 1904, 1969, 1986 USGS Topographical Maps
- Georeferenced in Esri ArcMap 10.1 using the latest Bing Aerial Maps
- Broad River and islands within Parr Reservoir digitized

Parr Reservoir Changes over Time

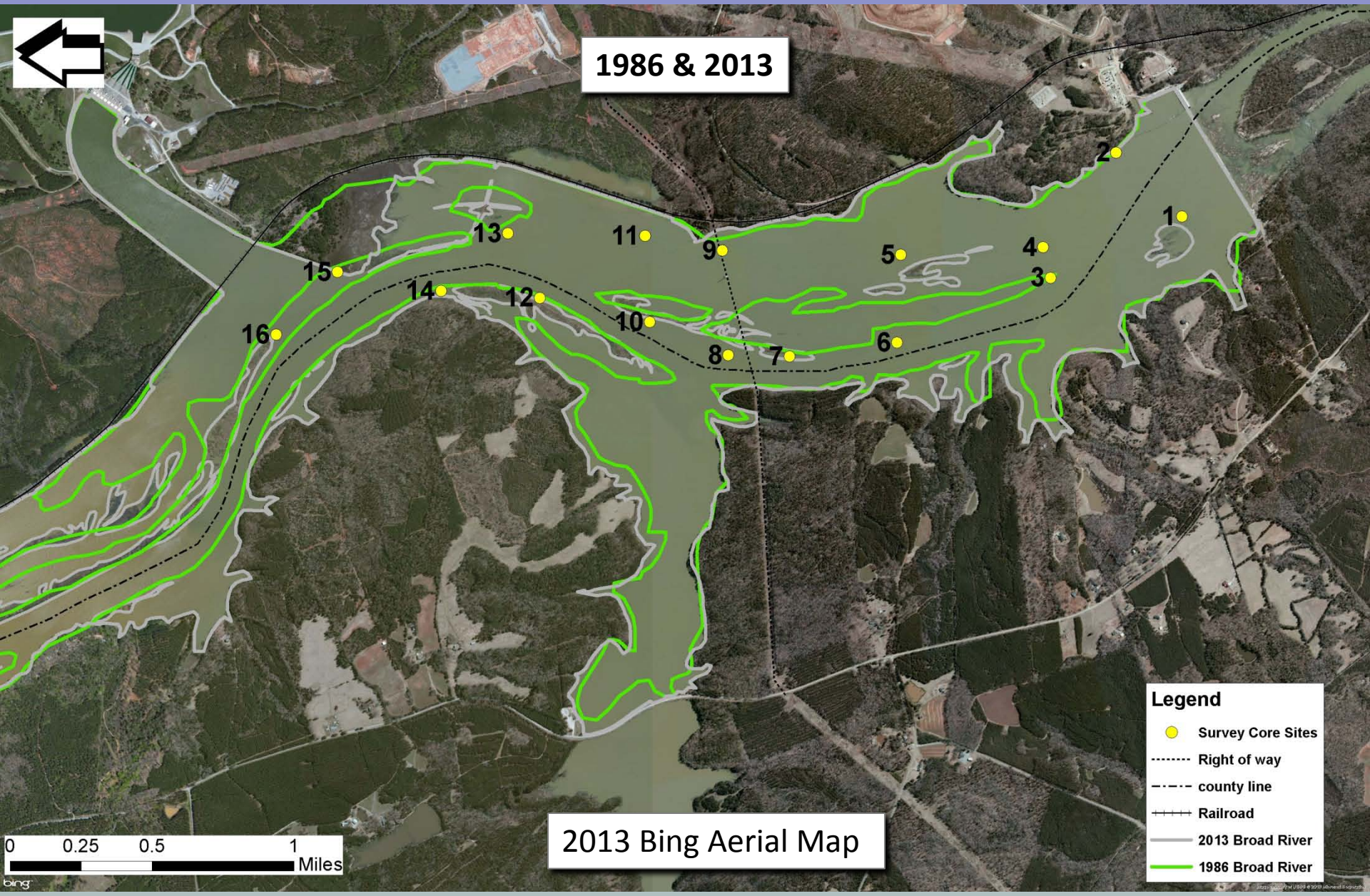
- 1904 map depicts the Broad River prior to construction of Parr Shoals Dam
- 1969 map depicts formation of Parr Reservoir
- 1986 map depicts Parr Reservoir after increased height of dam and inclusion of Monticello Reservoir
- 2013 map depicts the most recent aerial photography available

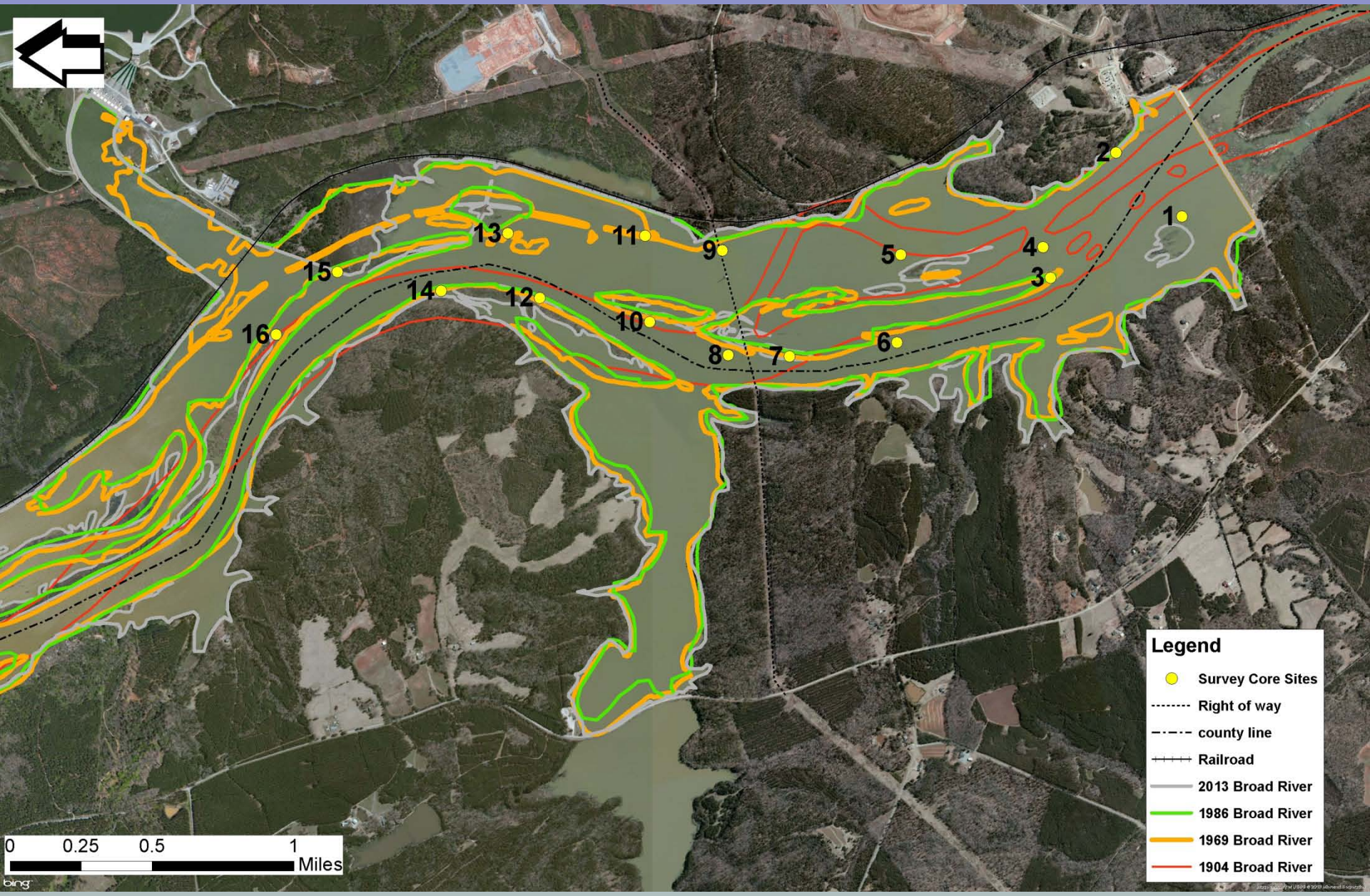
- Comparison Maps
  - 1904 & 1969
  - 1969 & 1986
  - 1986 & 2013
  - 1904, 1969, 1986 & 2013


1904 & 1969
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Parr Shoals Dam
Parr Substation
Powerplant
FAIRFIELD CO
NEWBERRY CO
SOUTHERN
Creek
Cannons
St Pauls Ch
Cem
0 0.25 0.5 1 Miles
Legend
Survey Core Sites
1969 Broad River
1904 Broad River
Right-of-way
County Line
Railroad
1969 USGS Topographical Map



1969 USGS Topographical Map

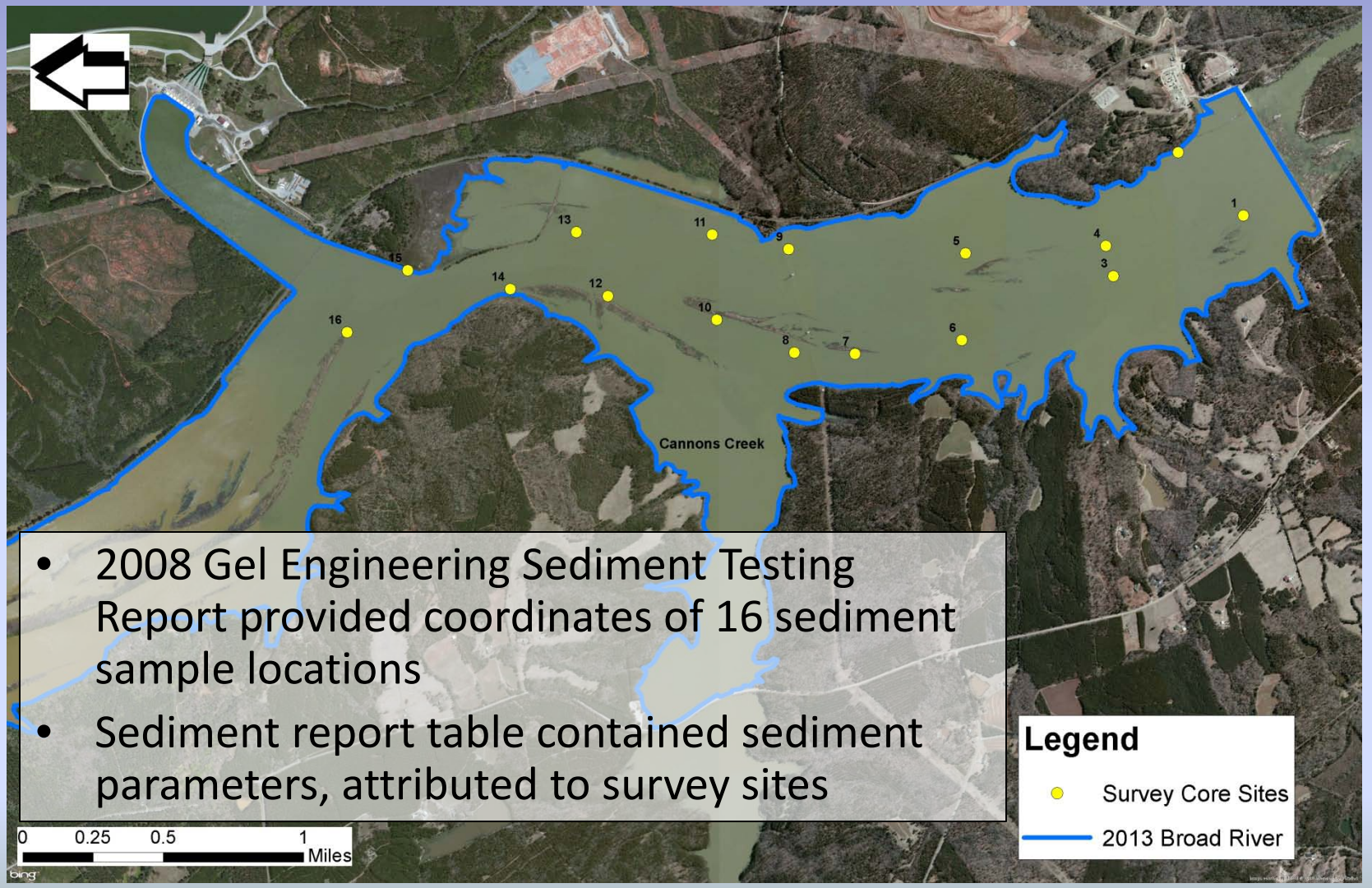

1986 & 2013
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Legend
Survey Core Sites
Right of way
county line
Railroad
2013 Broad River
1986 Broad River
0
0.25
0.5
1
Miles
2013 Bing Aerial Map


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Legend
Survey Core Sites
Right of way
county line
Railroad
2013 Broad River
1986 Broad River
1969 Broad River
1904 Broad River
0
0.25
0.5
1
Miles
bing

Residual Islands in Parr Reservoir

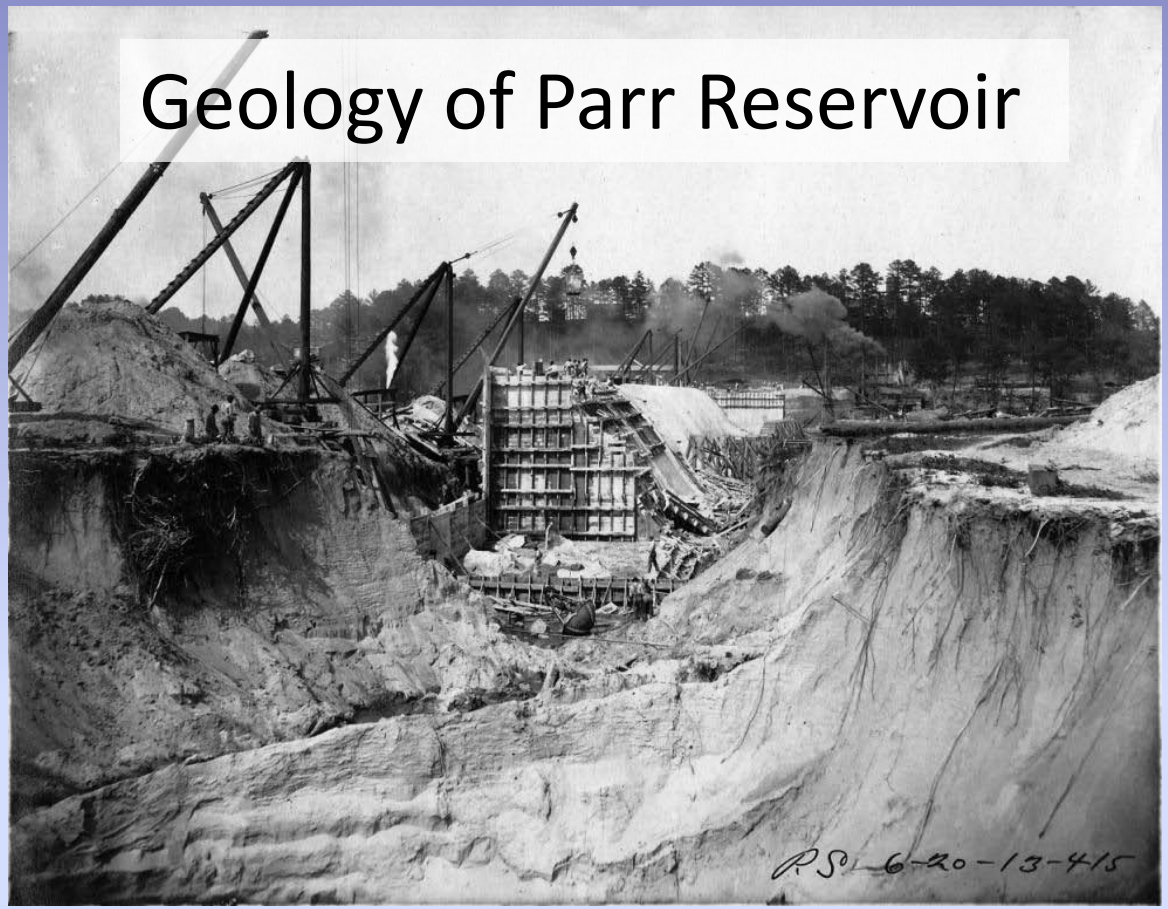
Residual Islands in Parr Reservoir

2008 Parr Reservoir Sediment Survey



- 2008 Gel Engineering Sediment Testing Report provided coordinates of 16 sediment sample locations
- Sediment report table contained sediment parameters, attributed to survey sites

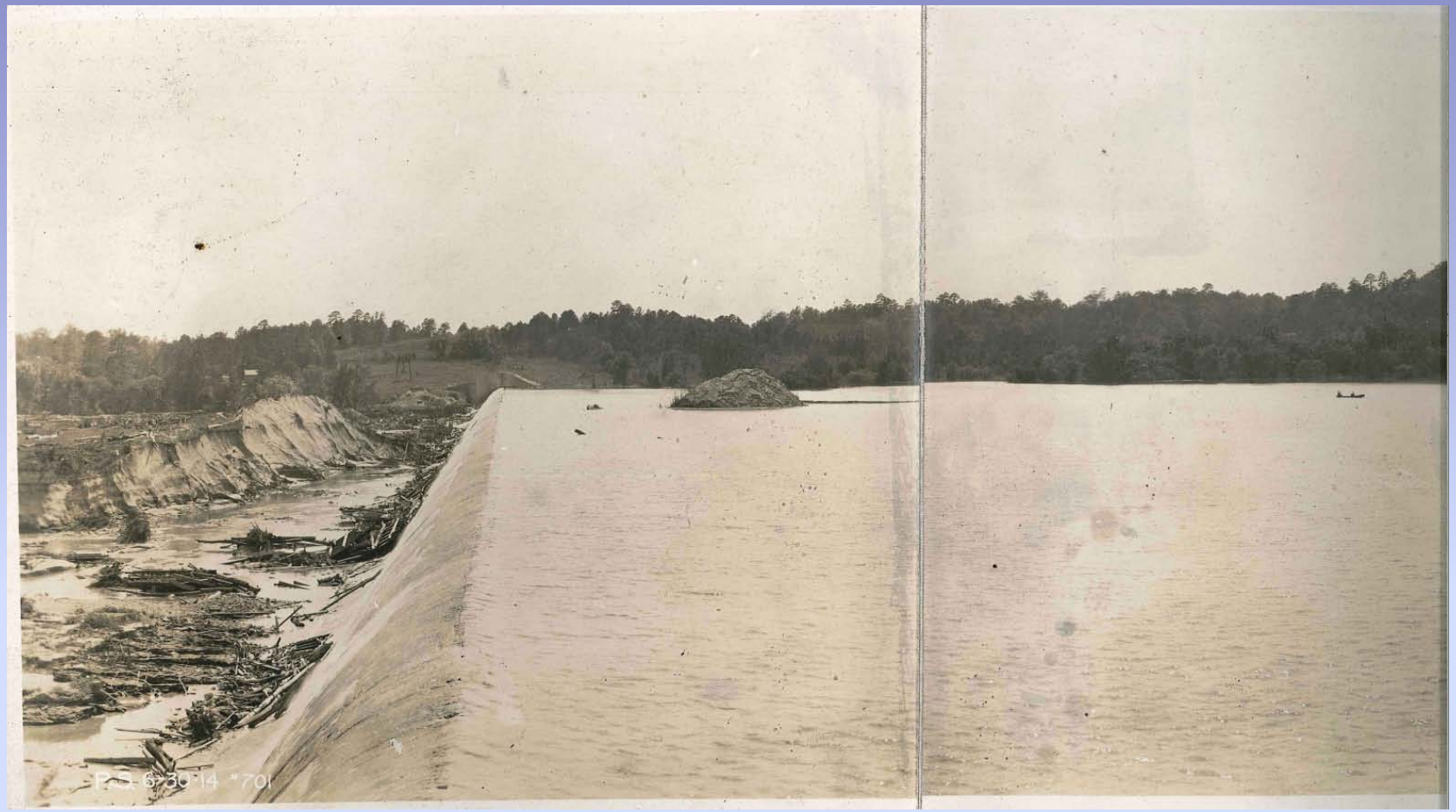
Geology of Parr Reservoir



Spatial Analysis, using IDW (Inverse Distance Weighted), interpolated the relative sediment concentrations of the three major sediment types within the survey area.

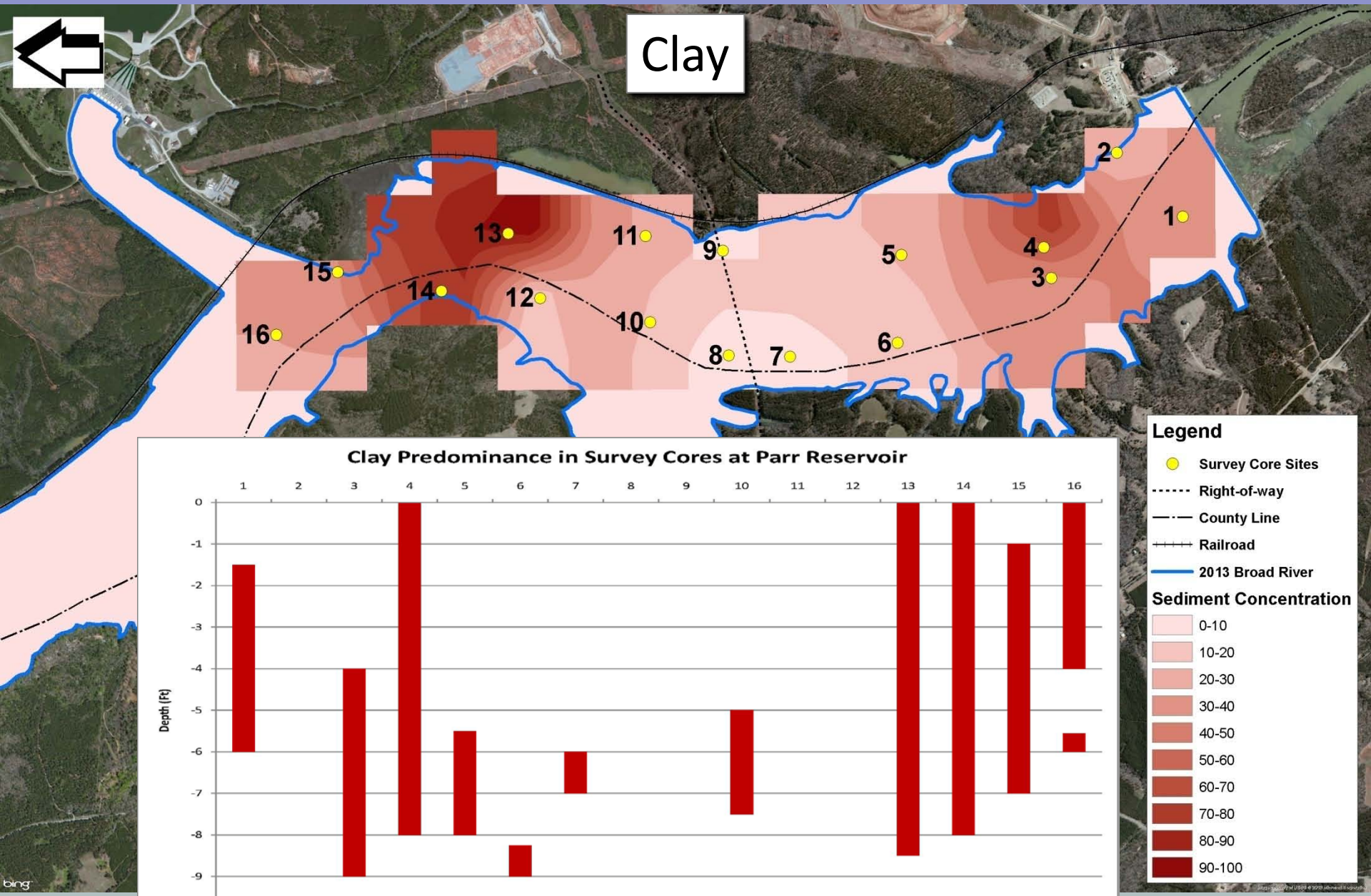
- Clay, Silt, and Sand (Gravel excluded)

- The spatial analysis of the core soil types provides a method of visual discernment of the different soil type accumulation or erosion.
- A visual demonstration provides comparison of soil types to local geographic features and/or human influences.
- Dam construction photos also provide a source of depiction for Parr Reservoir bathymetry and geology.

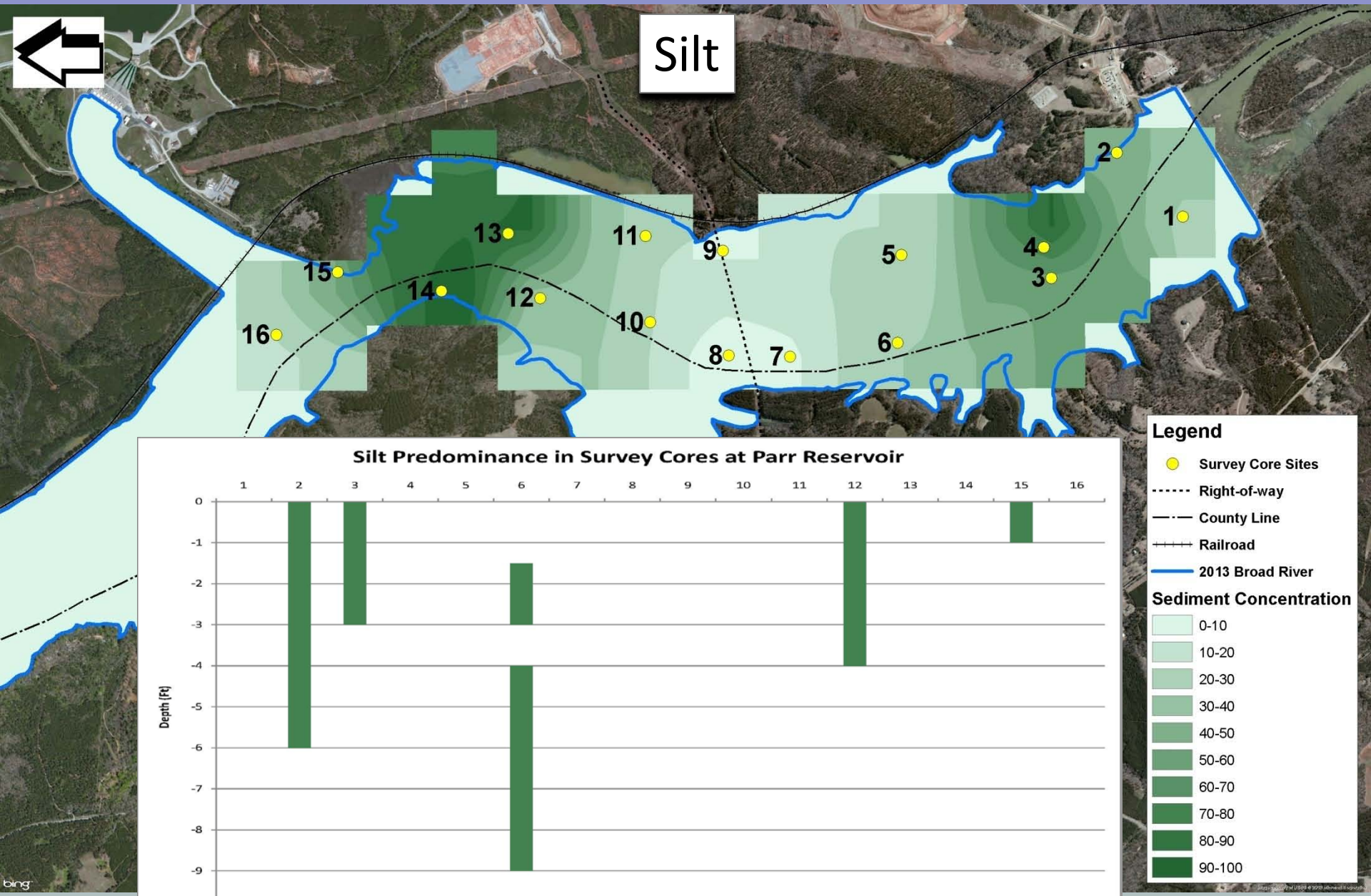


The highest concentration of sediment material, by depth per foot increments, are exhibited on a bar graph for each survey site.

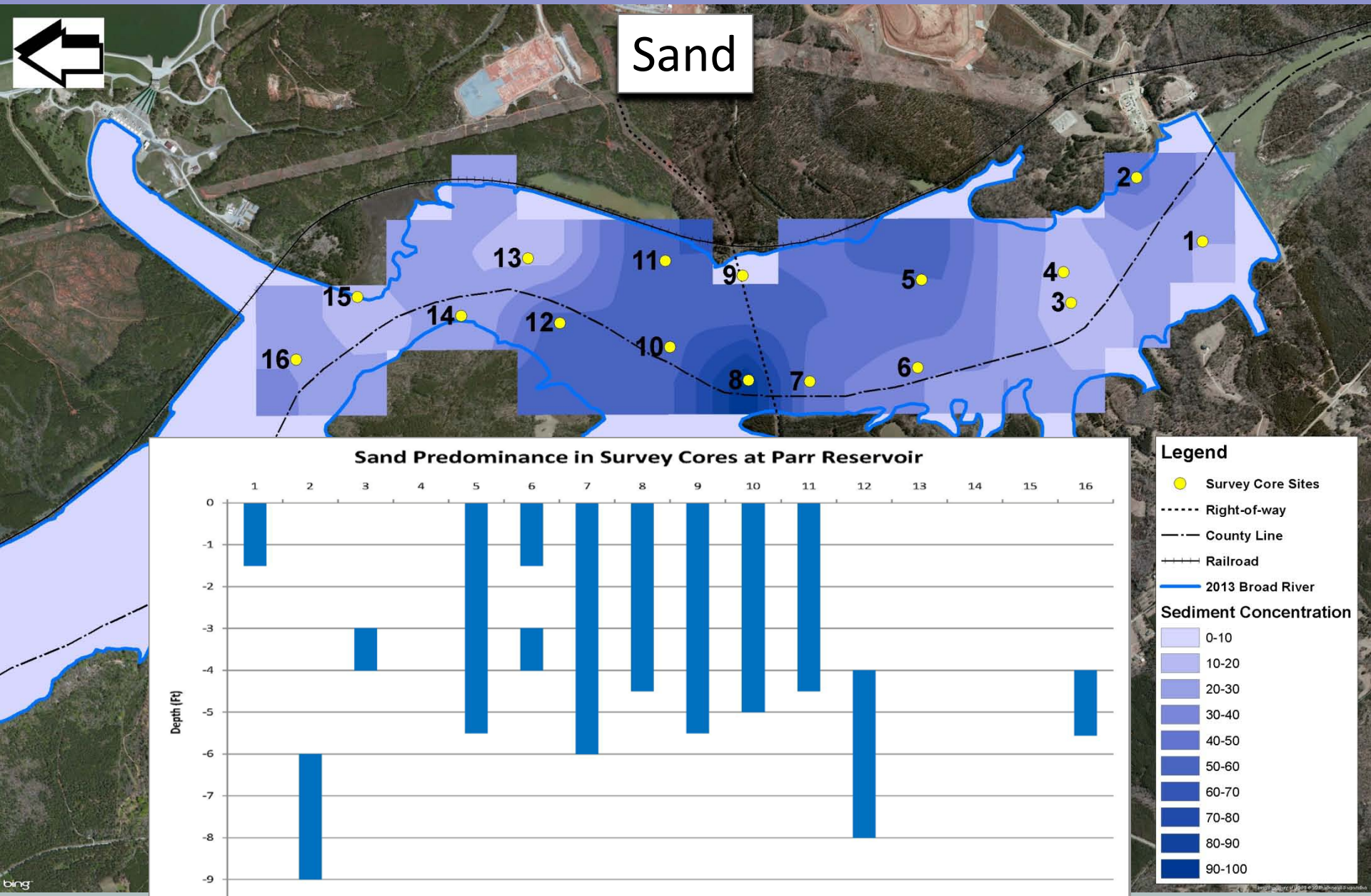
Clay


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Legend
Survey Core Sites
Right-of-way
County Line
Railroad
2013 Broad River
Sediment Concentration
0-10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
80-90
90-100

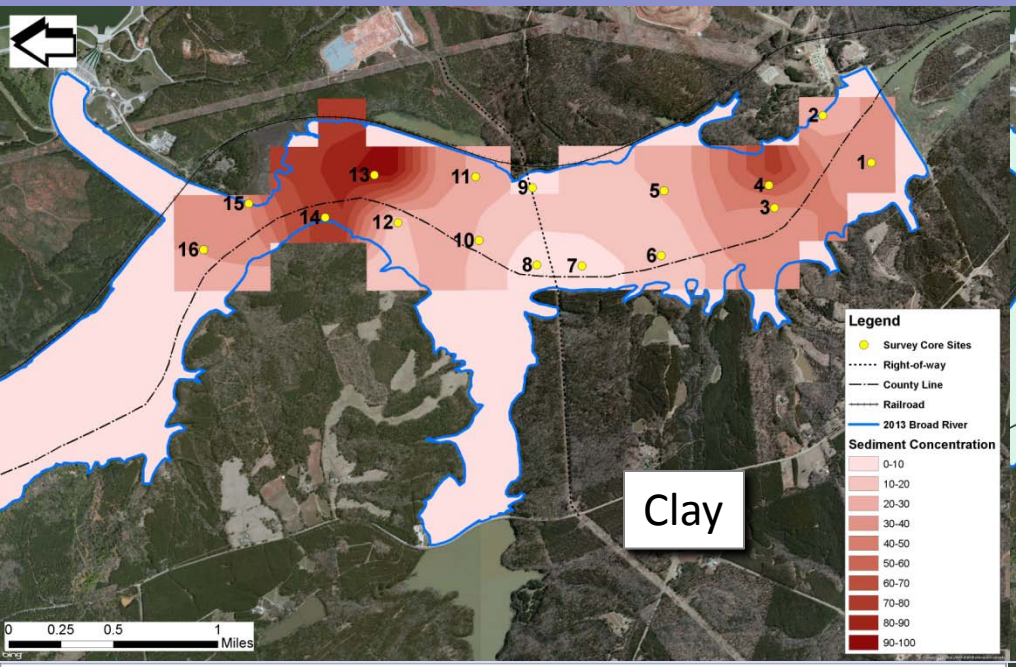
Clay Predominance in Survey Cores at Parr Reservoir
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
0 -1 -2 -3 -4 -5 -6 -7 -8 -9 -10
Depth (Ft)
Survey Cores

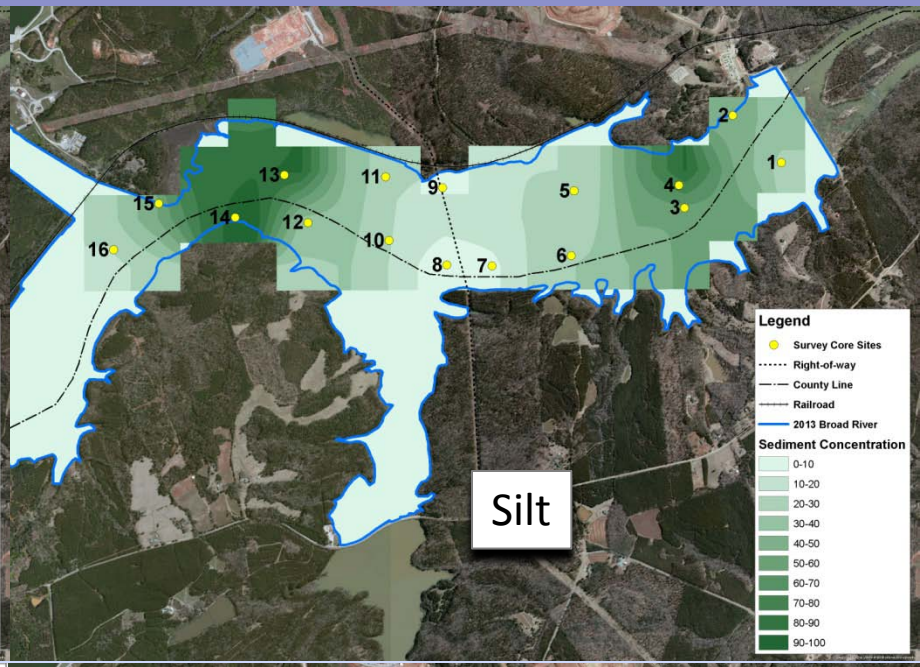

Silt
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Legend
Survey Core Sites
Right-of-way
County Line
Railroad
2013 Broad River
Sediment Concentration
0-10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
80-90
90-100
Silt Predominance in Survey Cores at Parr Reservoir
Depth (Ft)
Survey Cores
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

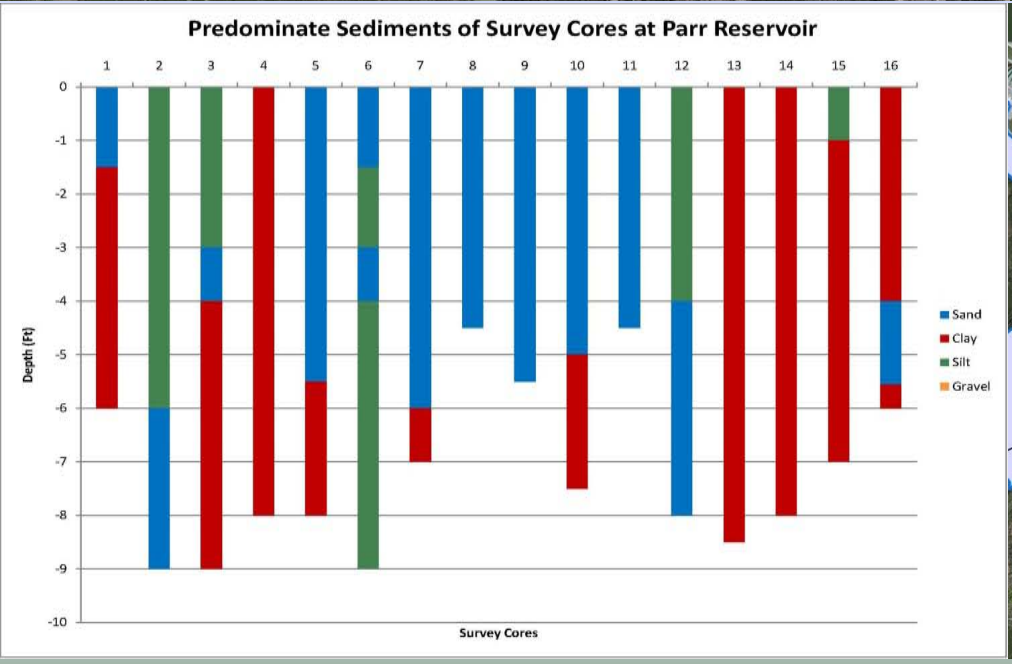
Sand

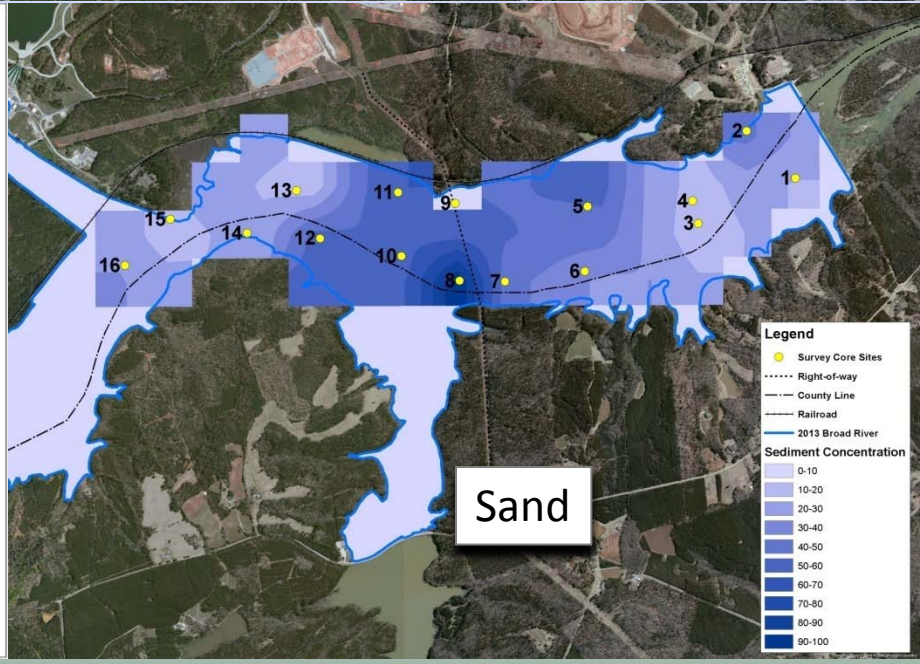

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Legend
Survey Core Sites
Right-of-way
County Line
Railroad
2013 Broad River
Sediment Concentration
0-10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
80-90
90-100

Sand Predominance in Survey Cores at Parr Reservoir
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
0 -1 -2 -3 -4 -5 -6 -7 -8 -9 -10
Depth (Ft)
Survey Cores


Clay
Legend
Survey Core Sites
Right-of-way
County Line
Railroad
2013 Broad River
Sediment Concentration
0-10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
80-90
90-100
0 0.25 0.5 1 Miles


Silt
Legend
Survey Core Sites
Right-of-way
County Line
Railroad
2013 Broad River
Sediment Concentration
0-10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
80-90
90-100


Predominate Sediments of Survey Cores at Parr Reservoir
Depth (Ft)
Survey Cores
Sand
Clay
Silt
Gravel


Sand
Legend
Survey Core Sites
Right-of-way
County Line
Railroad
2013 Broad River
Sediment Concentration
0-10
10-20
20-30
30-40
40-50
50-60
60-70
70-80
80-90
90-100

Findings

- Hampton Island was excavated down to bedrock during Parr Dam construction
- Historical photographs and data suggests no dredging of Parr Reservoir was conducted during construction
- Highest sand concentrations confined to the confluence of the Broad River and Cannon's Creek
- Highest and most extensive clay and silt concentrations can be traced to Monticello dredging activities and spoil area.

Findings

- Present day islands remain from pre-construction islands or peninsulas
- Minimal changes have occurred between 1969 and 1986 within Parr Reservoir
- 2008 sediment analysis suggests reservoir is in a state of “equilibrium” (what comes in goes out) with respect to sedimentation and confirms observations by SCE&G operators.