

# South Jersey Levee Inventory

USDA Natural Resources Conservation Service (NRCS)  
Somerset, New Jersey



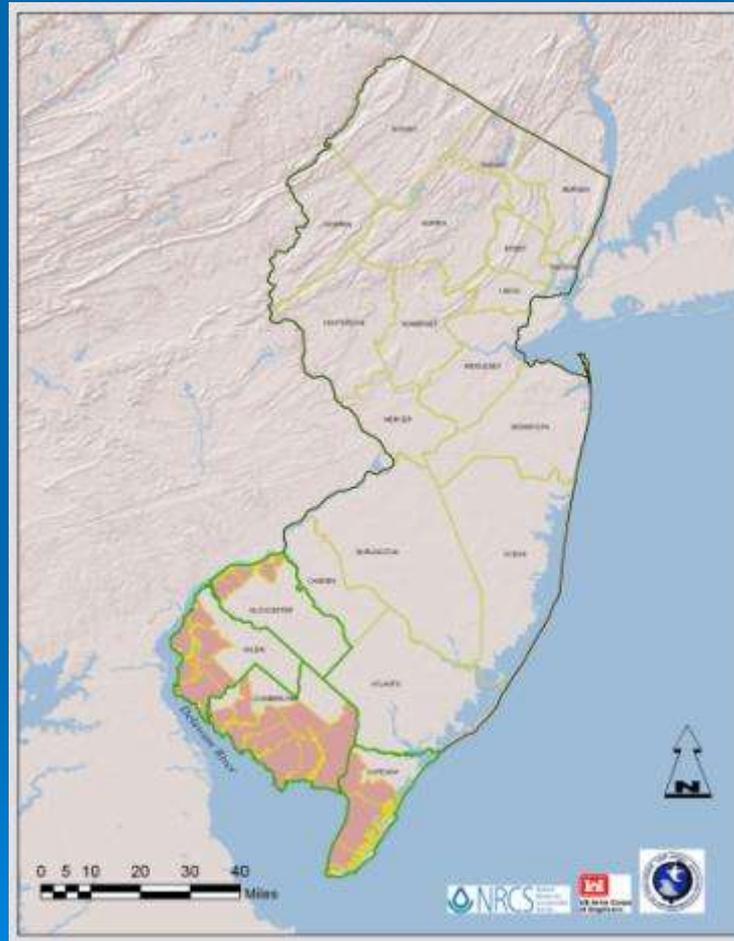
# Coordination

- NJDEP, USACE and NRCS are partners with the Delaware Estuary Levee Organization (DELO) on this initiative
- NJDEP Bureau of Dam Safety and Flood Control provided funding for the Levee Inventory to NRCS through the USACE Delaware River Comprehensive, New Jersey Interim Feasibility Study

# Levee Inventory Findings



# Levee Location - Municipalities



# Number of Levees by County and Municipality

County	Municipality
Cape May	Dennis Township
	Middle Township
	Lower Township
Cumberland	Commercial Township
	Downe Township
	Fairfield Township
	Greenwich Township
	Hopewell Township
	Lawrence Township
	Maurice River Township
	Millville City
	Stow Creek Township

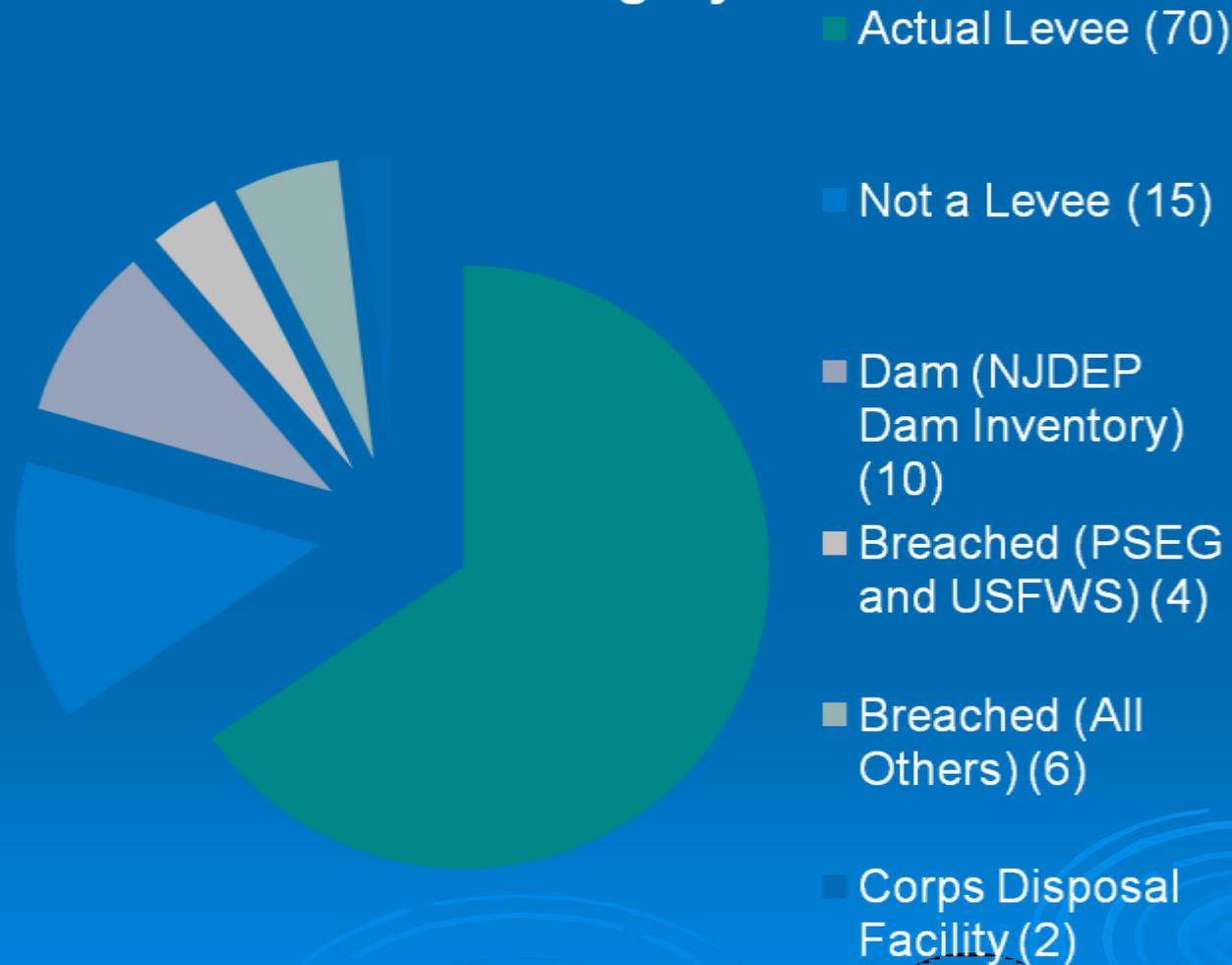
# Number of Levees by County and Municipality (Continued)

County	Municipality
Gloucester	Greenwich Township
	Logan Township
	West Deptford Township
Salem	Carneys Point Township
	Elsinboro Township
	Lower Alloway Creek Township
	Mannington Township
	Pennsville Township
	Quinton Township
	Salem City

# Aerial Photo Interpretation and Final Feature Category

Aerial Photo Interpretation of Original "Levees"	Dam (NJDEP Dam Inventory)	Not a Levee	Breached (PSEG and USFWS)	Breached (All Others)	Corps Disposal Facility (CDF)	Net Number of Levees Inventoried
107	10	15	4	6	2	70

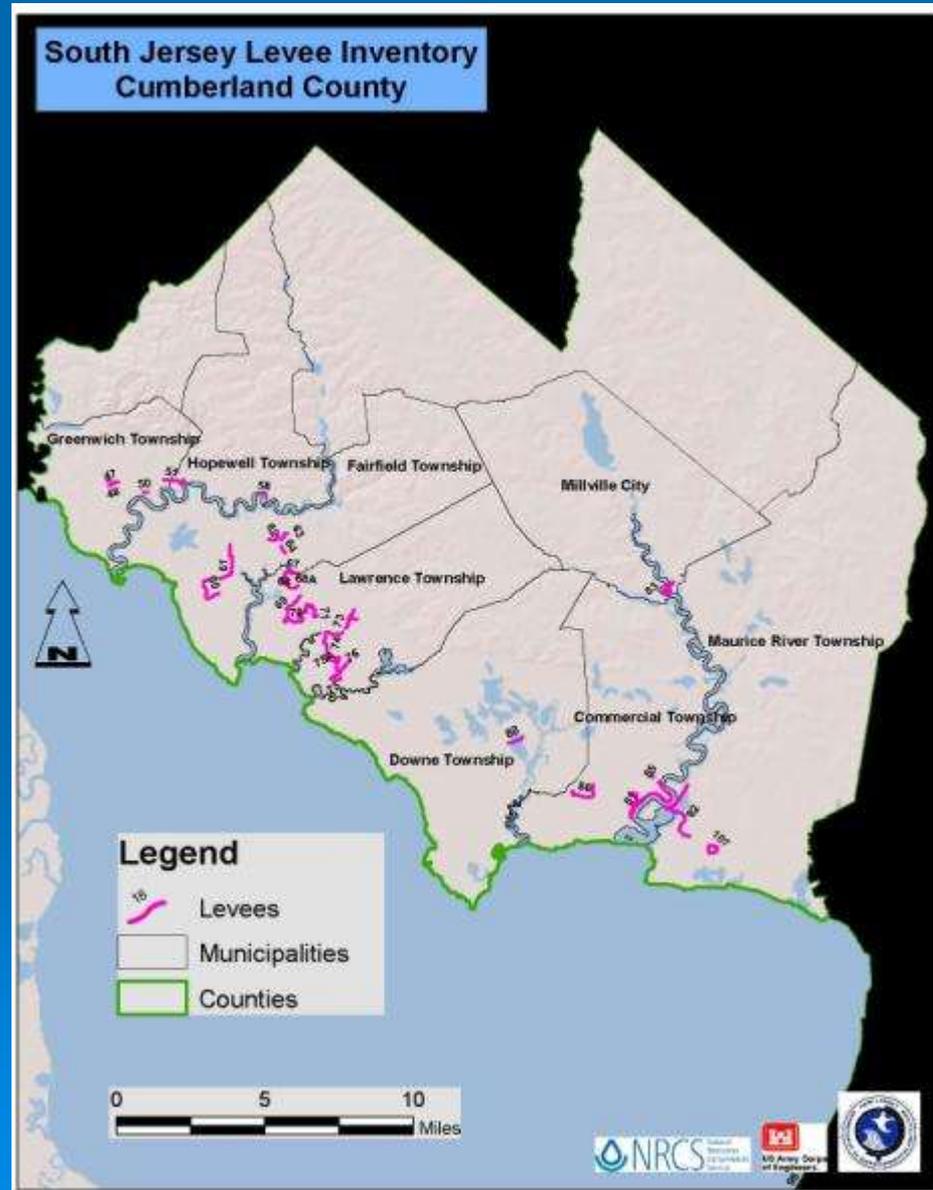
# Aerial Photo Interpretation of "Levees" (107) and Final Feature Category



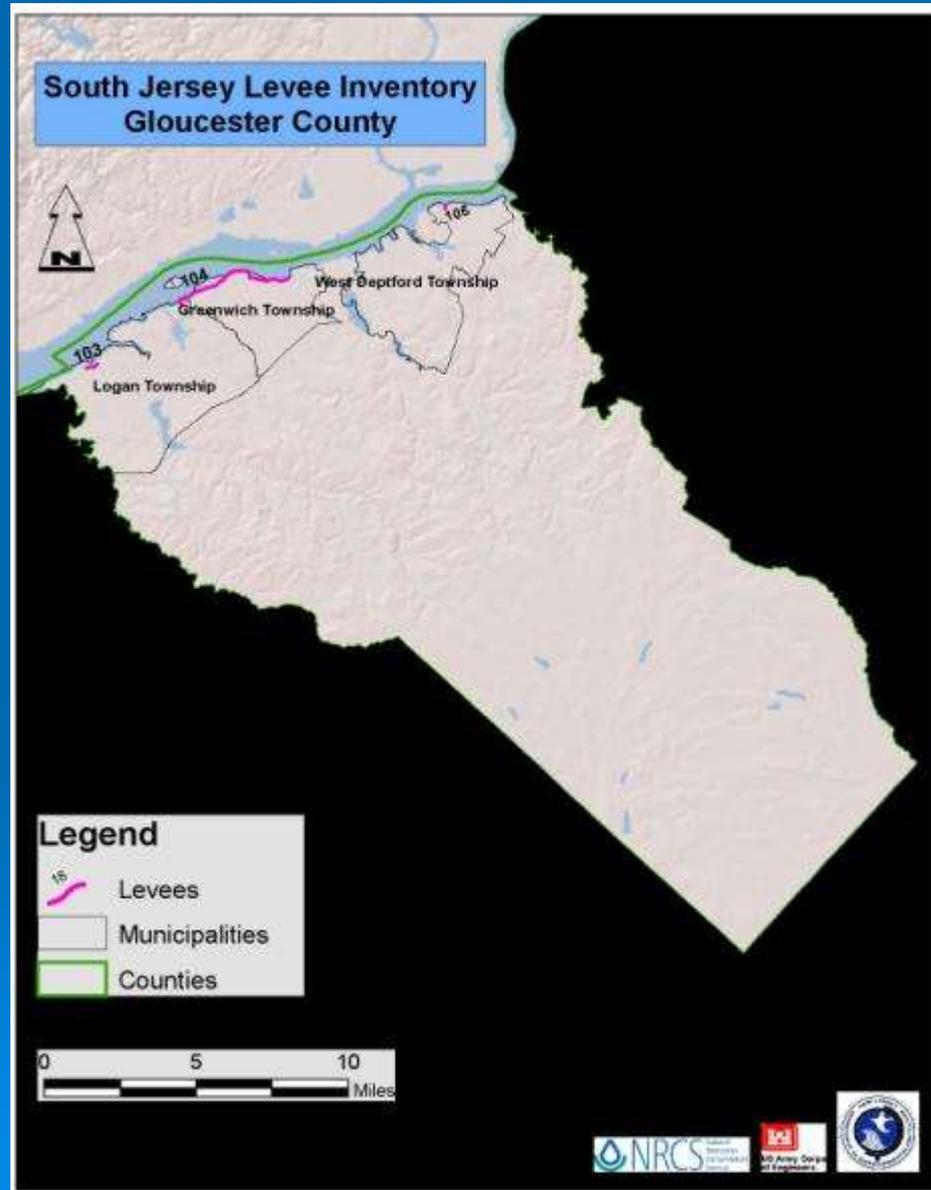
# Levee Locations in Cape May County



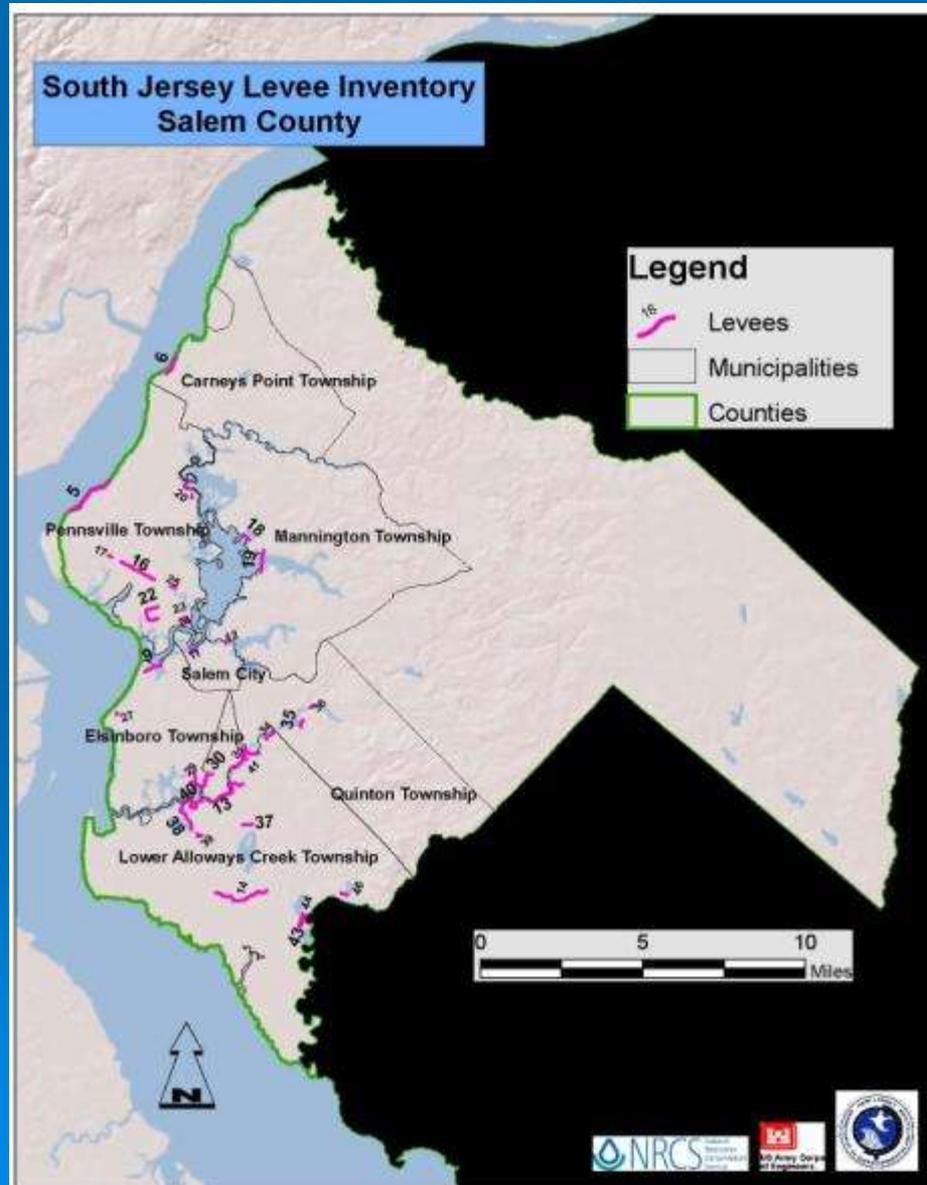
# Levee Locations in Cumberland County



# Levee Locations in Gloucester County



# Levee Locations in Salem County



# Levee Location by County

County	Cape May	Cumberland	Gloucester	Salem
Number of Levees	6	28	3	31
Percent of Levees	8.8	41.2	4.4	45.6

# Levee Location by County



# Levee Location by Municipality

Municipality	Number of Levees
Carneys Point Township	1
Commercial Township	3
Dennis Township	1
Downe Township	1
Elsinboro Township	4
Fairfield Township	5
Greenwich Township (Cumberland Co.)	4
Greenwich Township (Gloucester Co.)	1
Hopewell Township	1
Lawrence Township	11
Logan Township	1
Lower Township	2

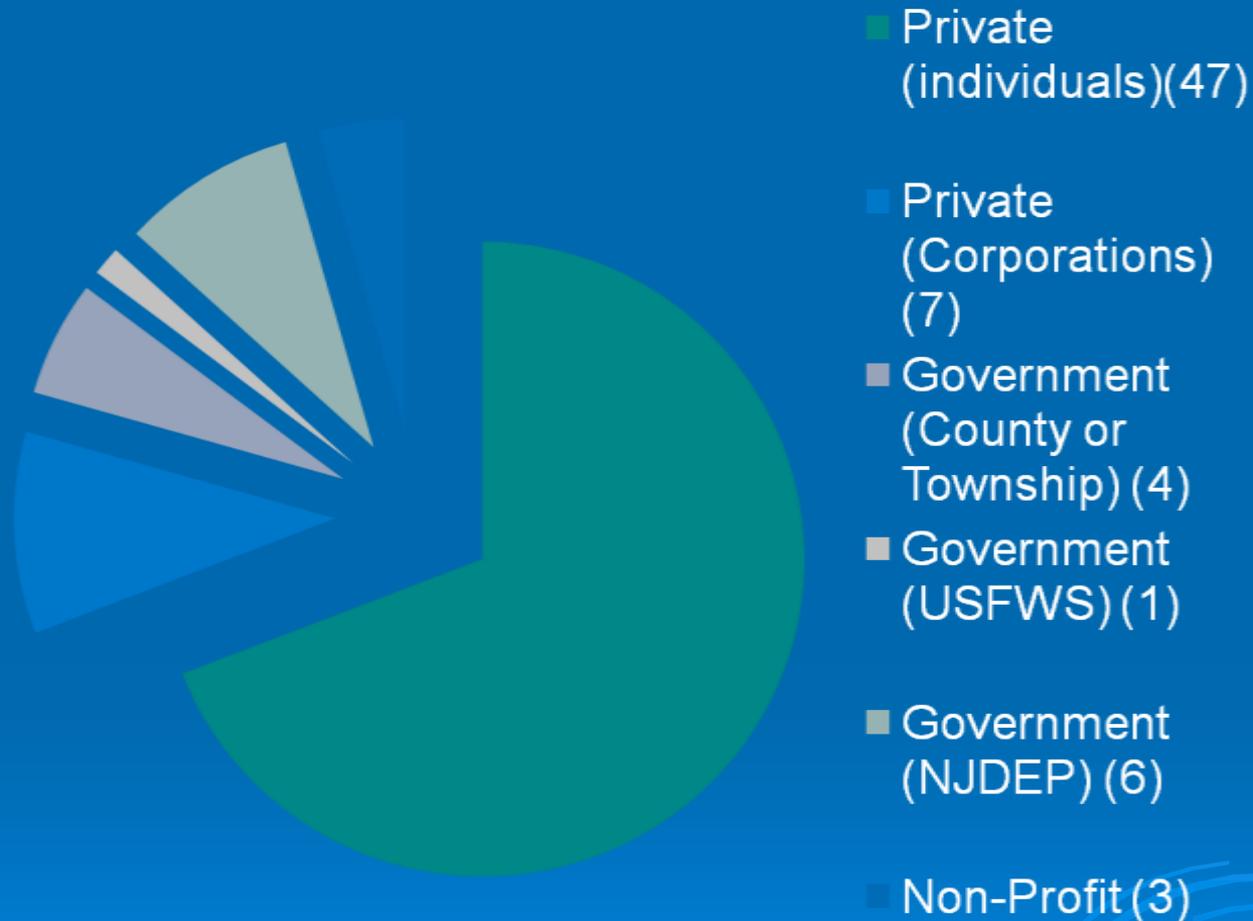
# Levee Location by Municipality (Continued)

Municipality	Number of Levees
Lower Alloways Creek Township	12
Mannington Township	2
Maurice River Township	2
Middle Township	3
Millville City	1
Pennsville Township	8
Quinton Township	2
Salem City	2
West Deptford Township	1

# Levee Ownership Types

	<b>Private (Individuals)</b>	<b>Private (Corporations)</b>	<b>Govmt. (County or Township)</b>	<b>Govmt. (USFWS)</b>	<b>Govmt. (NJDEP)</b>	<b>Non-Profit</b>
Number of Levees	47	7	4	1	6	3
Percent of Levees	69.1	10.3	5.9	1.5	8.8	4.4

# Levee Ownership



# Levee Length

Levee Number	Levee Name	Length (Feet)	County
5	Miles Creek	8830	Salem
6	Whooping John Creek	3363	Salem
9	Middle Neck	3810	Salem
11	Town Bank	1251	Salem
12	Fenwick Creek	672	Salem
13	Locust Island	8934	Salem
14	Silver Lake	9617	Salem
16	Supawna Meadow	6250	Salem
17	Lighthouse	624	Salem
18	Sunset Road	1584	Salem
19	County Route 540	3733	Salem
20	Beaver Dam	607	Salem

# Levee Length (Continued)

Levee Number	Levee Name	Length (Feet)	County
22	Supawna Meadows Private	5377	Salem
23	TV Towers	1489	Salem
24	TV Towers South	599	Salem
25	Harrisonville	907	Salem
29	Mason Point East	3128	Salem
30	Lower Alloways Creek	4282	Salem
31	Private Landowner	5422	Salem
34	Beasley Neck Road 2	2046	Salem
35	Beasley Neck Road 3	1290	Salem
36	Quinton	803	Salem
37	Moores Bank	1680	Salem
38	Private Landowner	1639	Salem

# Levee Length (Continued)

Levee Number	Levee Name	Length (Feet)	County
39	Grosscup	340	Salem
40	Hancocks Bridge Poplar	4785	Salem
41	County Hwy 623	4152	Salem
43	Long Bridge Outlier	2611	Salem
44	Long Bridge Road	2241	Salem
46	Buckhorn Road	1147	Salem
47	Pine Mount King	665	Cumberland
48	Pine Mount Bacons Neck Rd	2003	Cumberland
50	Market Street	856	Cumberland
51	Mill Creek (Union Bank)	4552	Cumberland
58	Pease Road	890	Cumberland
60	Sea Breeze Road	7014	Cumberland

# Levee Length (Continued)

Levee Number	Levee Name	Length (Feet)	County
61	Private Landowner	8050	Cumberland
62	Back Neck 1	1443	Cumberland
64	Rock Creek	1566	Cumberland
67	Private Landowner	5380	Cumberland
68	Private Landowner	1979	Cumberland
68A	Private Landowner	961	Cumberland
69	Sayres Neck North	4045	Cumberland
70	Sayres Neck South	12773	Cumberland
71	Sayres Neck Southeast	2170	Cumberland
73	Jones Island Road	5606	Cumberland
74	Bay Point Road	2937	Cumberland
75	Blizzard Neck Gut	9997	Cumberland

# Levee Length (Continued)

Levee Number	Levee Name	Length (Feet)	County
75A	Bay Point Road South	2937	Cumberland
76	Nancy Gut	2431	Cumberland
81	Port Norris	21459	Cumberland
82	Heislerville	14984	Cumberland
83	Private Landowner	5915	Cumberland
85	Port Norris North	488	Cumberland
86	Berrytown	6798	Cumberland
88	Maple Street	2809	Cumberland
91	Private Landowner	7909	Cape May
95	Fishing Creek	1321	Cape May
96	Shaws Meadow	599	Cape May
97	Cox Hall Creek	363	Cape May

# Levee Length (Continued)

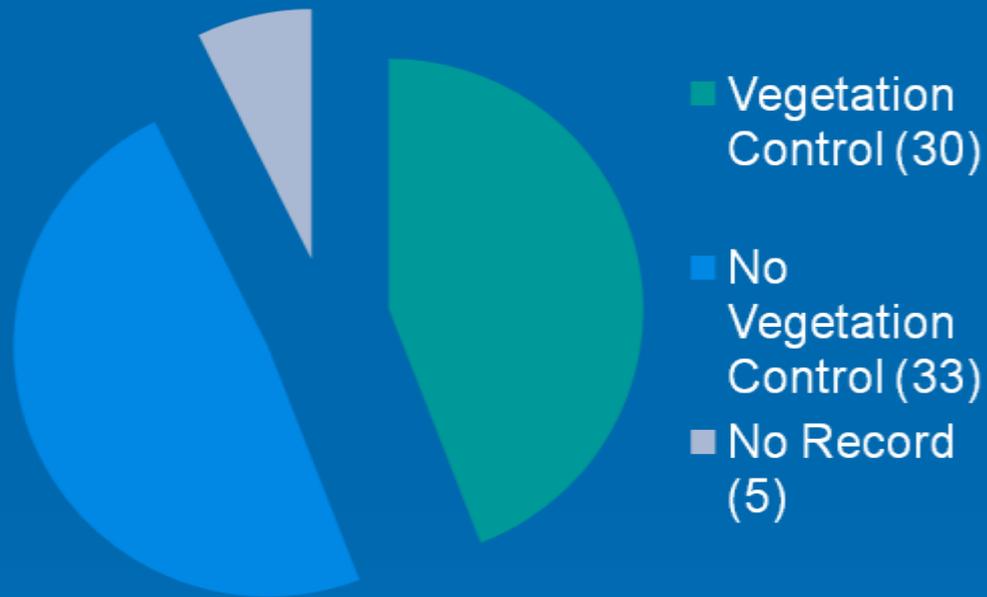
Levee Number	Levee Name	Length (Feet)	County
98	Sunray Beach	1311	Cape May
101	Private Landowner	19602	Cape May
103	Birch Creek	674	Gloucester
104	Repaupo Creek	22657	Gloucester
106	Red Bank	475	Gloucester

# Levee Vegetation Control

	<b>Vegetation Control</b>	<b>No Vegetation Control</b>	<b>No Record</b>
Number of Levees	30	33	5
Percent of Levees	44.1	48.5	7.4



## Levee Vegetation Control

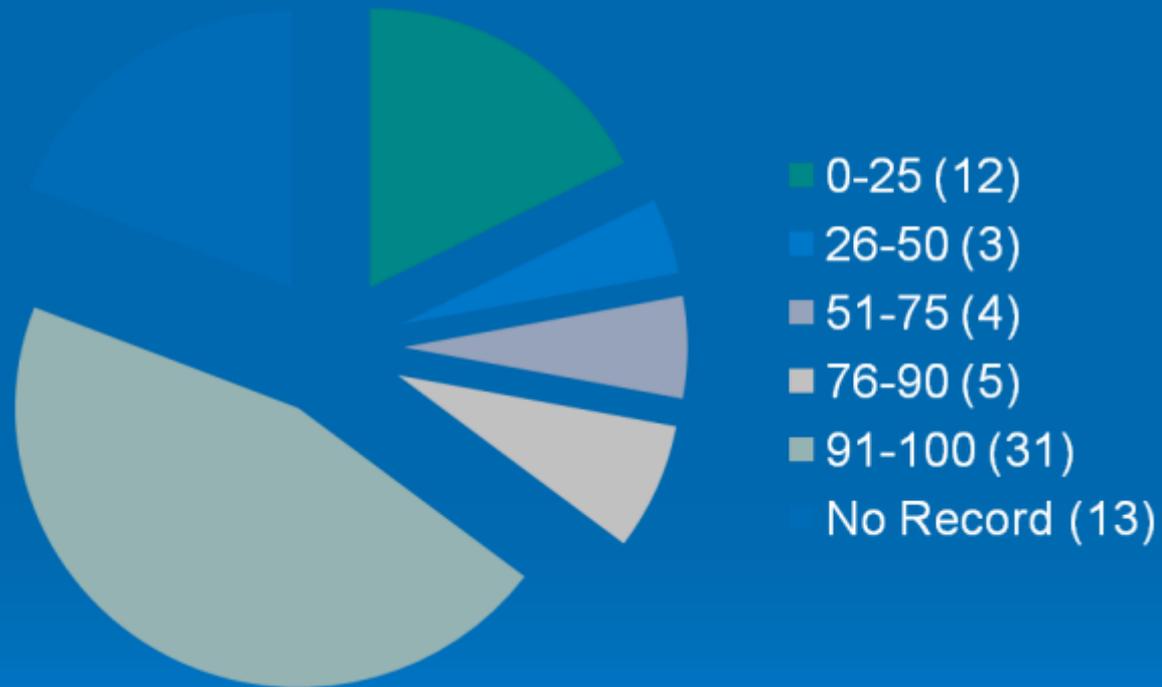


# Levee Percent Sod Cover

Percent Cover	0-25	26-50	51-75	76-90	91-100	No Record
Number of Levees	12	3	4	5	31	13
Percent of Levees	17.5	4.4	5.9	7.4	45.8	19.0



## Levee Percent Sod Cover

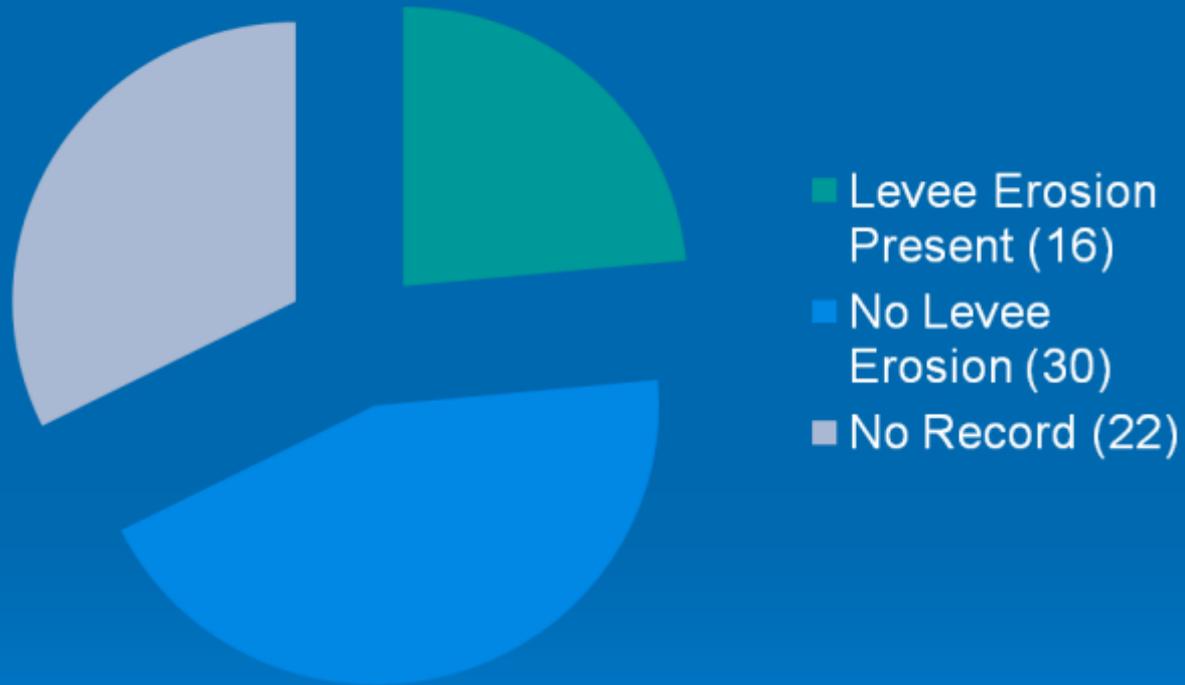


# Levee Erosion

	<b>Levee Erosion Present</b>	<b>No Levee Erosion</b>	<b>No Record</b>
Number of Levees	16	30	22
Percent of Levees	23.5	44.1	32.4



## Levee Erosion

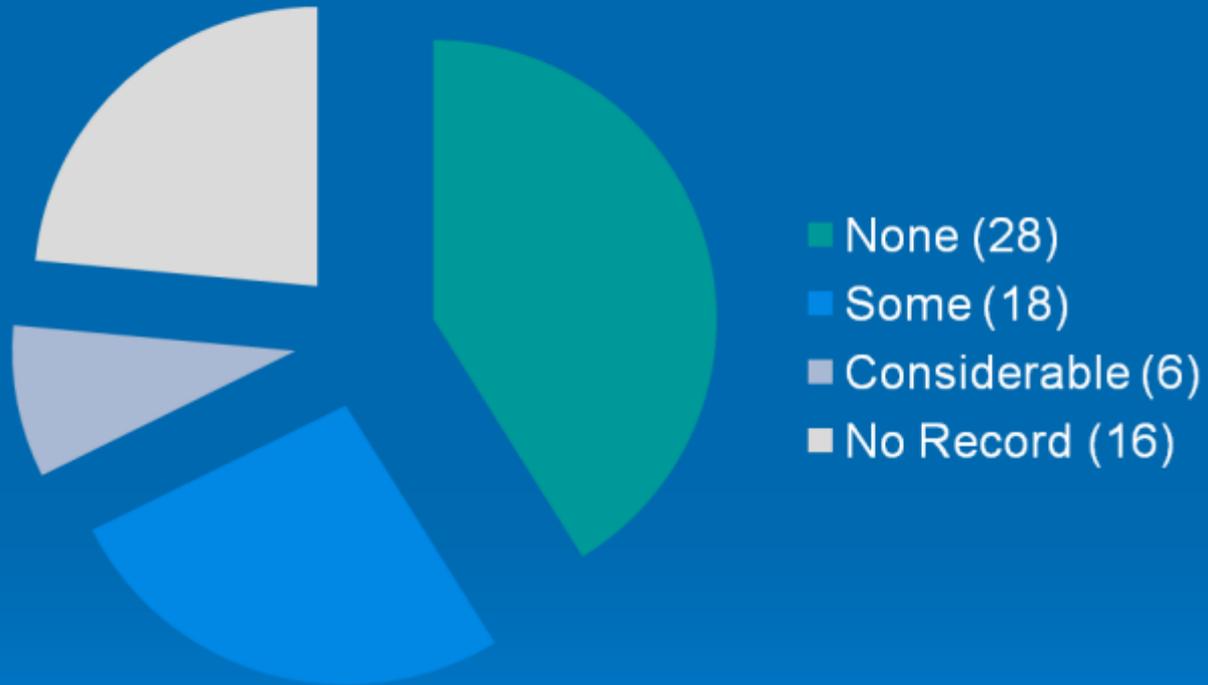


# Levee Slope Stability

	<b>None</b>	<b>Some</b>	<b>Considerable</b>	<b>No Record</b>
Number of Levees	28	18	6	16
Percent of Levees	41.2	26.5	8.8	23.5



## Levee Slope Stability

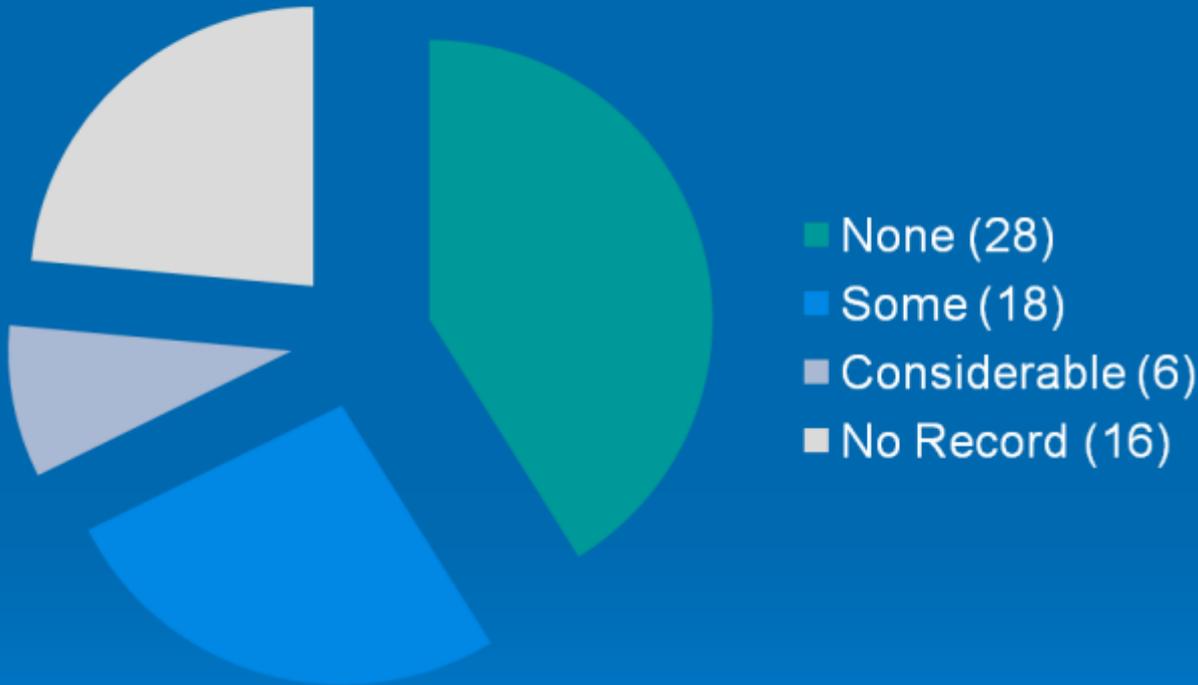


# Levee Settlement

	<b>None</b>	<b>Some</b>	<b>Conside rable</b>	<b>No Record</b>
Number of Levees	28	18	6	16
Percent of Levees	41.2	26.5	8.8	23.5



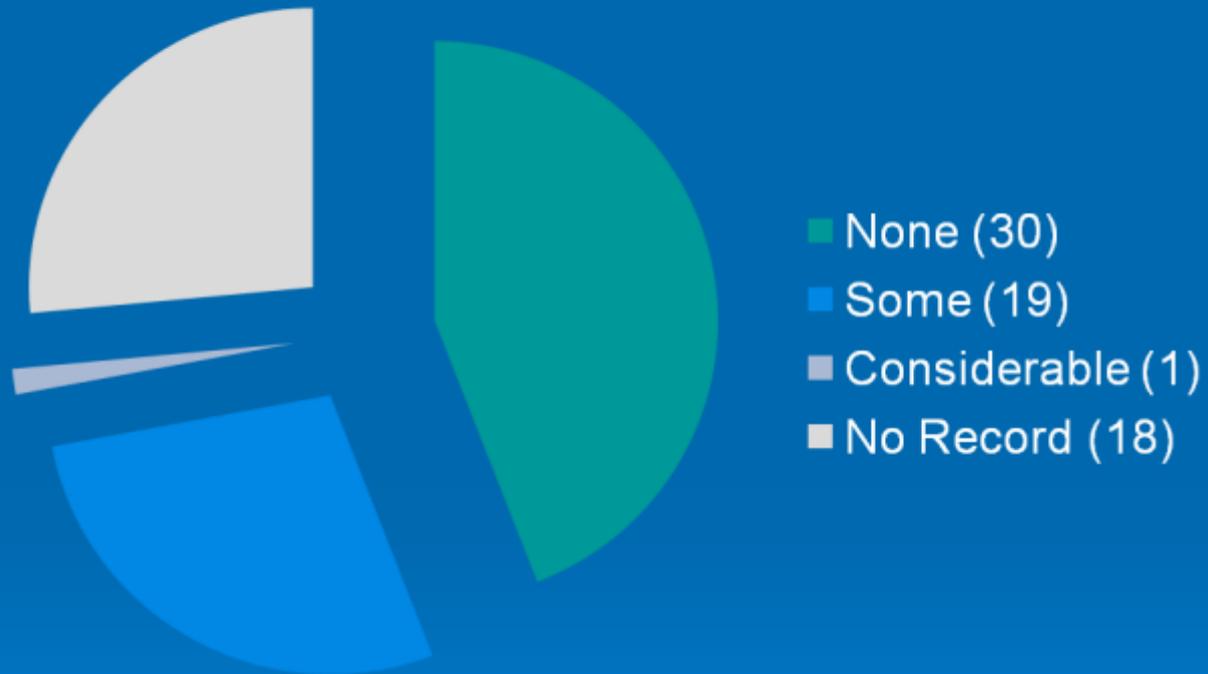
# Levee Settlement



# Levee Depression

	<b>None</b>	<b>Some</b>	<b>Considerable</b>	<b>No Record</b>
Number of Levees	30	19	1	18
Percent of Levees	44.1	27.9	1.5	26.5

## Levee Depression

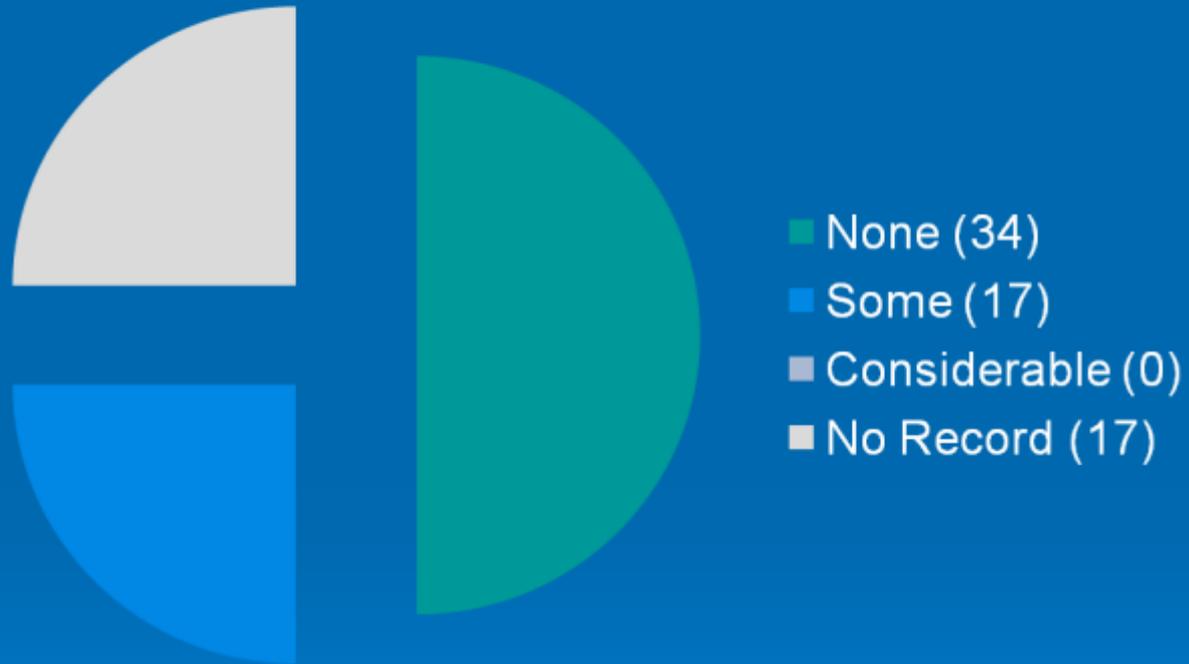


# Levee Cracking

	<b>None</b>	<b>Some</b>	<b>Considerable</b>	<b>No Record</b>
Number of Levees	34	17	0	17
Percent of Levees	50.0	25.0	0.0	25.0



## Levee Cracking

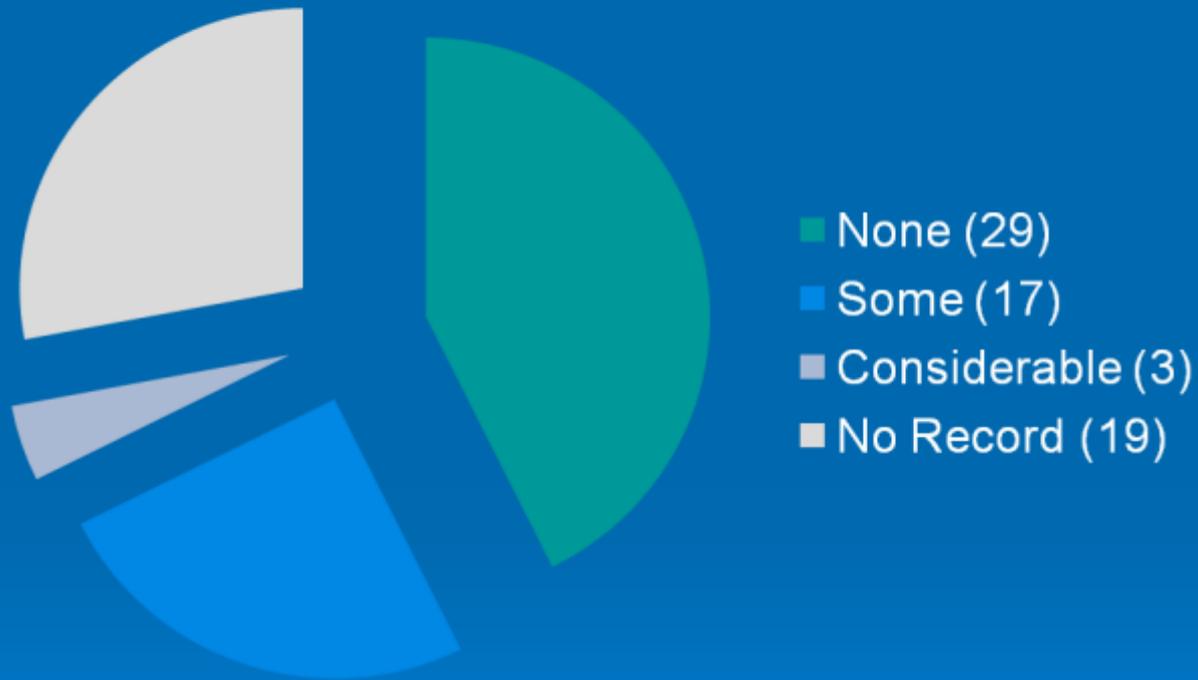


# Levee Burrowing Animal Presence

	<b>None</b>	<b>Some</b>	<b>Considerable</b>	<b>No Record</b>
Number of Levees	29	17	3	19
Percent of Levees	42.7	25.0	4.4	27.9



## Levee Burrowing Animal Presence

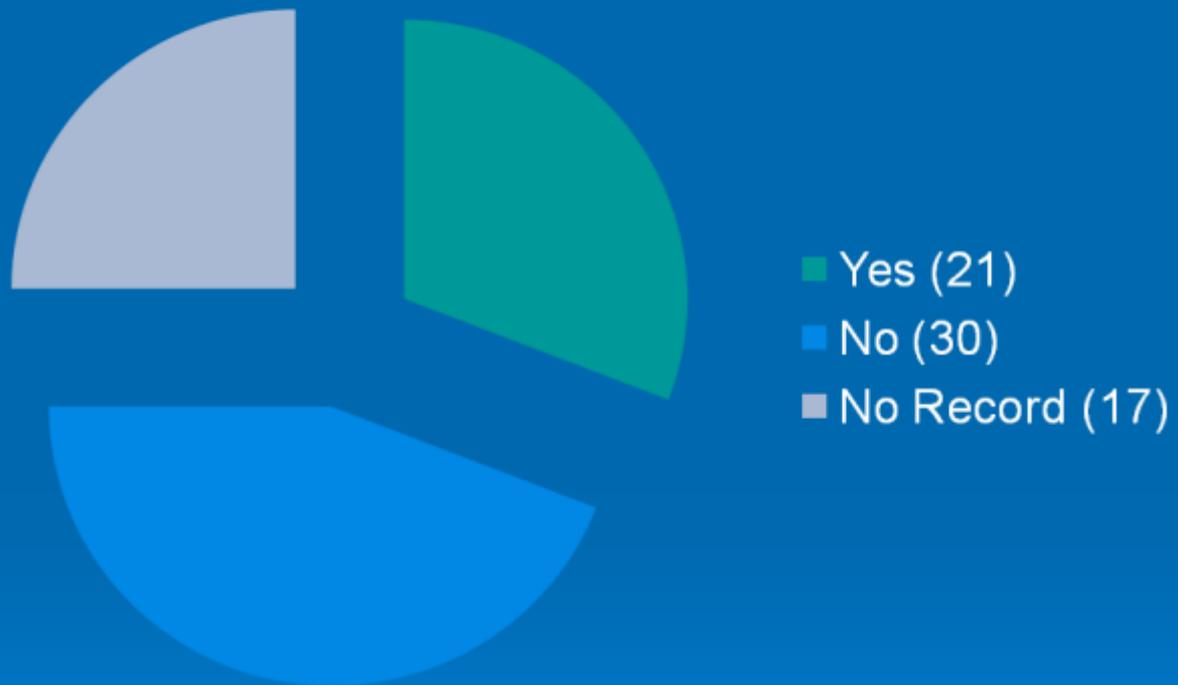


# Levee Rock Riprap Protection

	<b>Yes</b>	<b>No</b>	<b>No Record</b>
Number of Levees	21	30	17
Percent of Levees	30.9	44.1	25.0



## Levee Rock Riprap Protection

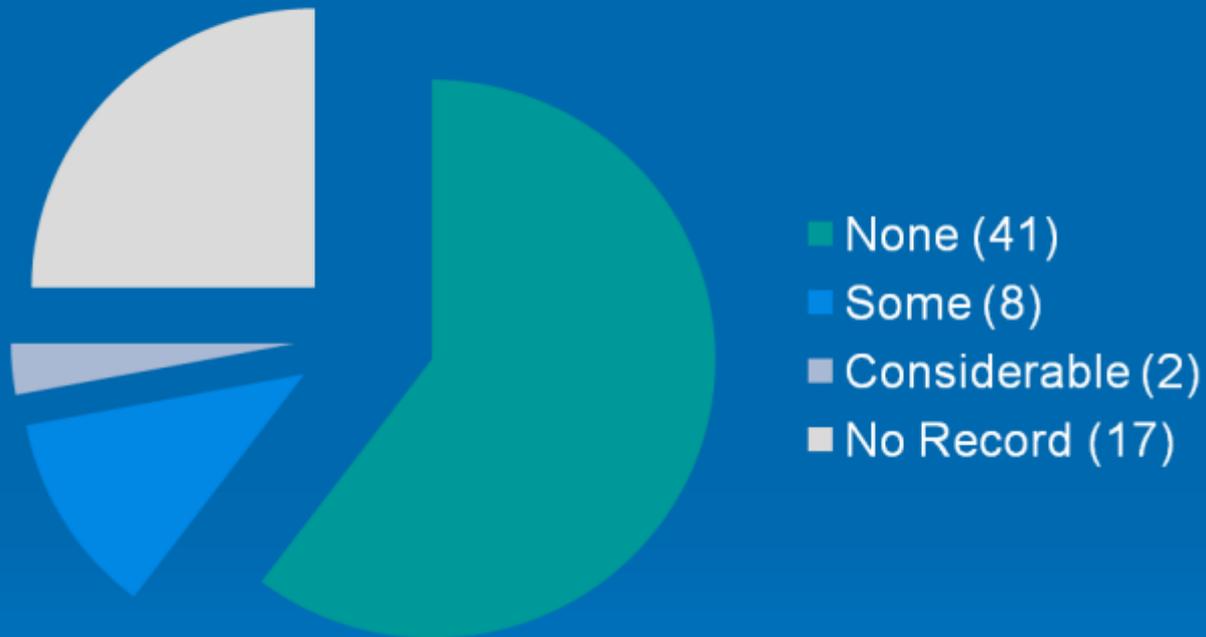


# Encroachment on Levees



	None	Some	Considerable	No Record
Number of Levees	41	8	2	17
Percent of Levees	60.3	11.8	2.9	25.0

## Encroachment on Levee



# Levee Outlets



# Rubber-sleeved Tidegate



# Improvised Wood Floodgate



# Valve-Type Floodgate



# Stainless Steel Floodgate



# Pump Station



# Flap-Type Floodgate



# Water Control Structure



# Pump Station



# Pump Station Outlet Pipe



# Cartographic Products

GIS staff was tasked with producing meaningful cartographic products to inform and illuminate the inventory process.

Digital surface models (DSMs) were produced from “all returns” raw LiDAR (.las) files using both Quick Terrain Modeler and ArcGIS.

DSMs were made 50 percent transparent, and draped over orthophotography.

# LiDAR Data Specs

South Jersey LiDAR collection – Cape May, Cumberland, Salem (below CAFRA):

1 meter nominal point spacing

15 cm. vertical accuracy, 95 percent CI

Elevations in meters.

Gloucester LiDAR collection:

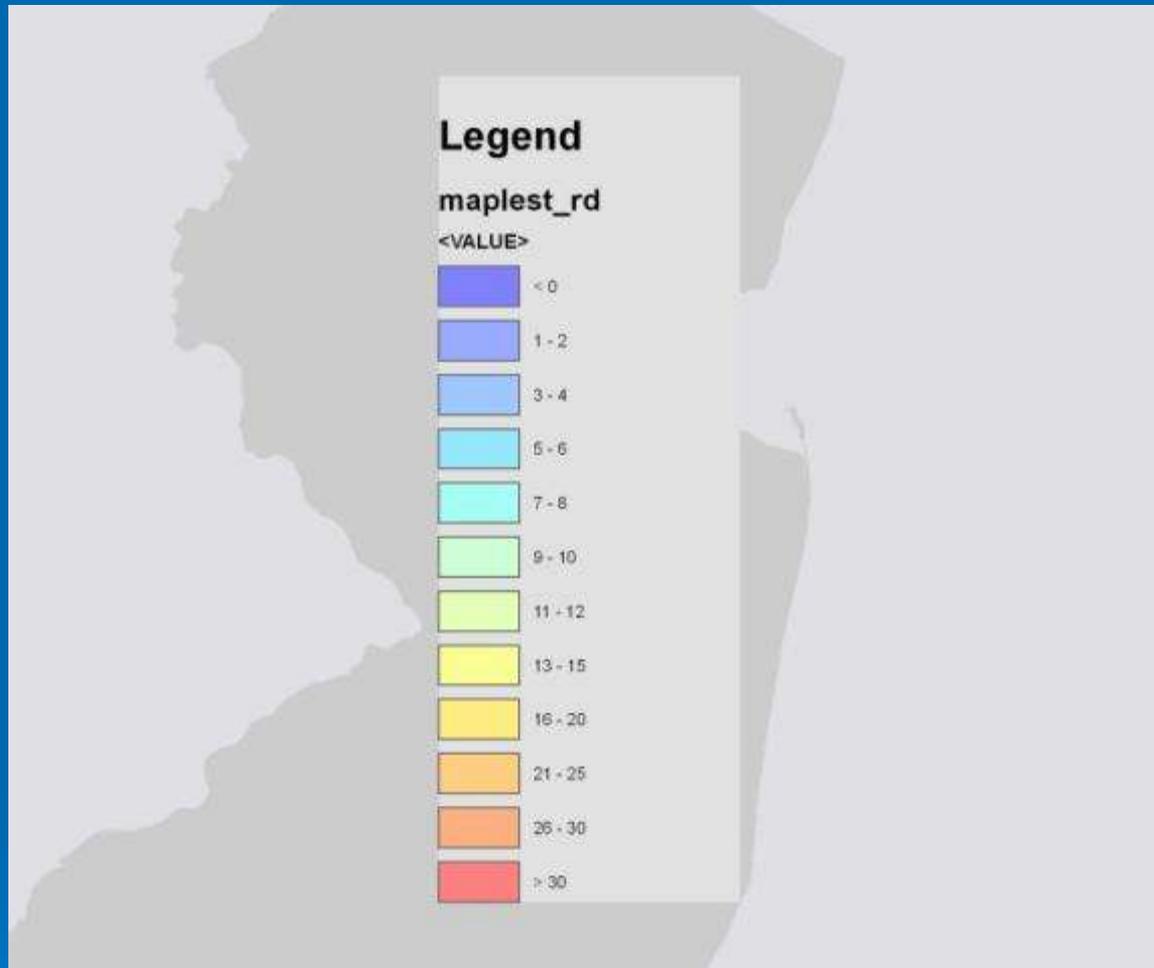
1.25 meter nominal point spacing

18 cm. vertical accuracy, 95 percent CI

Elevations in feet.

# Method

- Raw .LAS data tiles were imported into Quick Terrain Modeler as .QTT models.
- Exported as geotiffs with floating point elevation values. In ArcCatalog: “Calculate statistics” function was run on the geotiffs in order to flag “no data” areas as “-9999”.
- Geotiffs were then converted to Arc GRID format (South Jersey data were also converted to foot elevation values by applying the conversion for meters to feet in Raster Calculator).

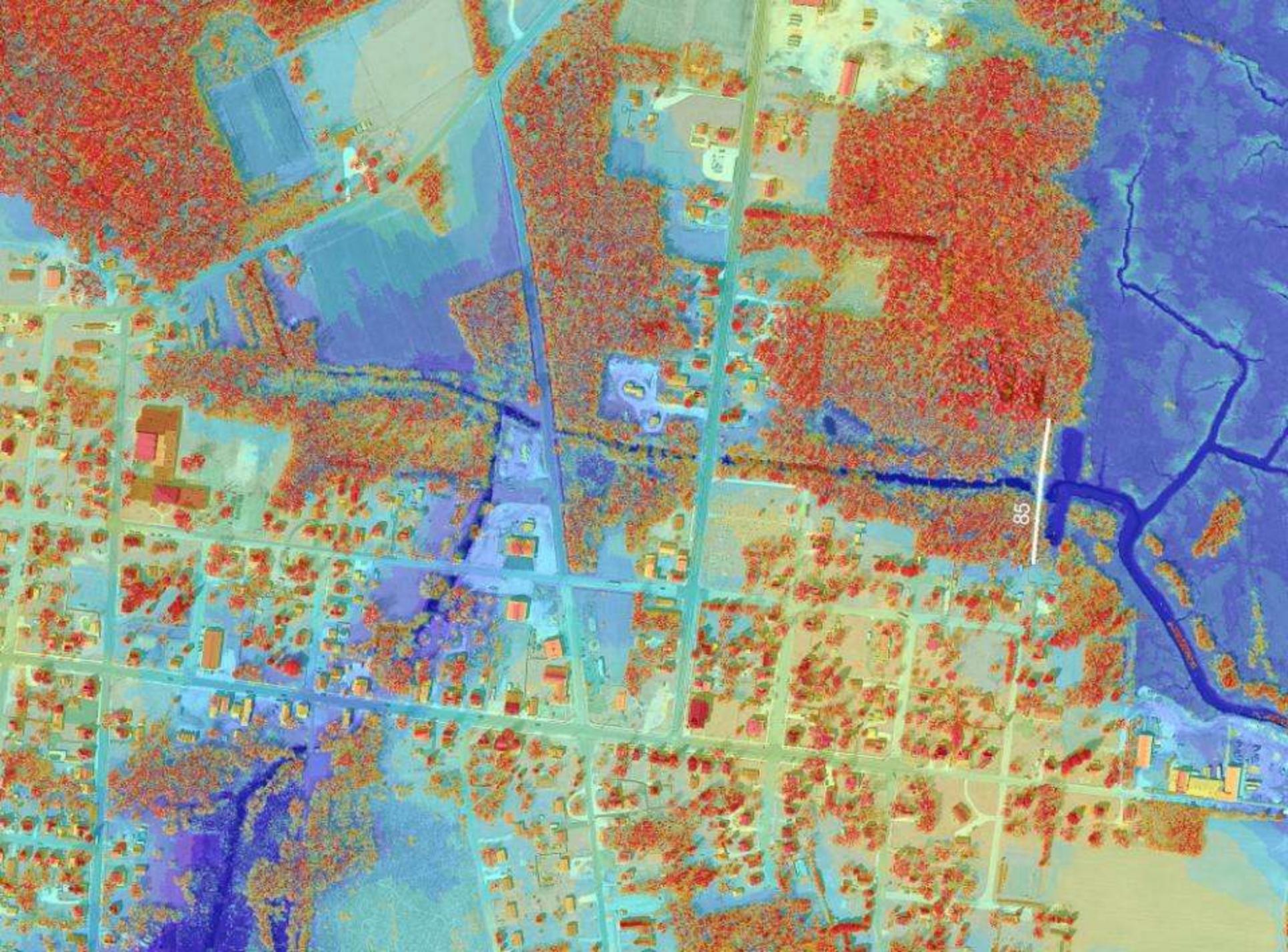


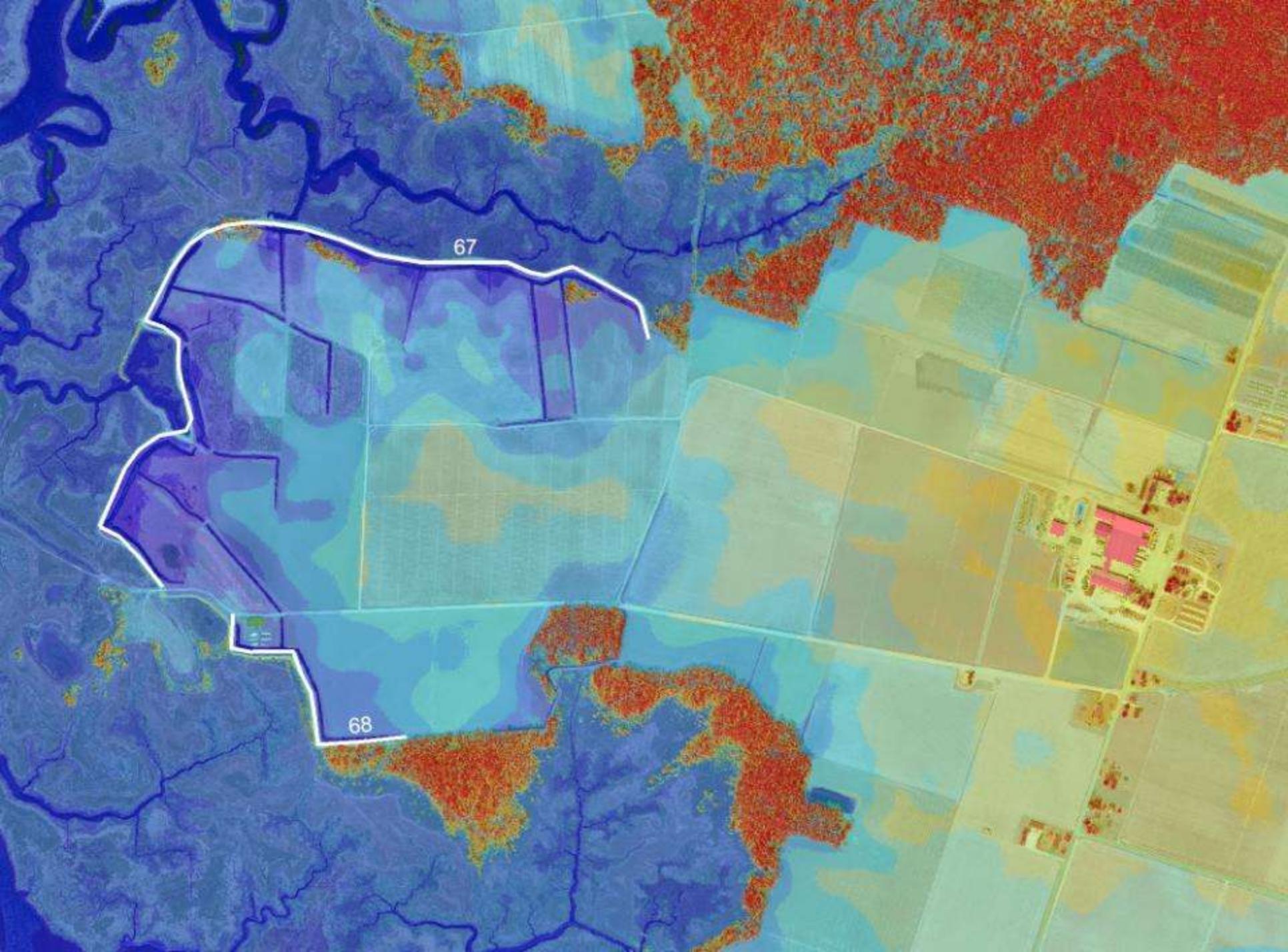
**Color legend was developed to show varying shades of blue up to and including 8 feet above sea level. This signals the viewer that any elevations shown in blue could be at risk in a breach or severe storm particularly since many levees top elevation is about 8 feet above sea level. Other colors chosen to accent treetops, roofs, and mid-range elevations.**



**Data allowed for production of raster grid with 4 foot resolution. Values were rounded down to the nearest foot. The goal was to produce a good visual product to be used for inventory purposes.**

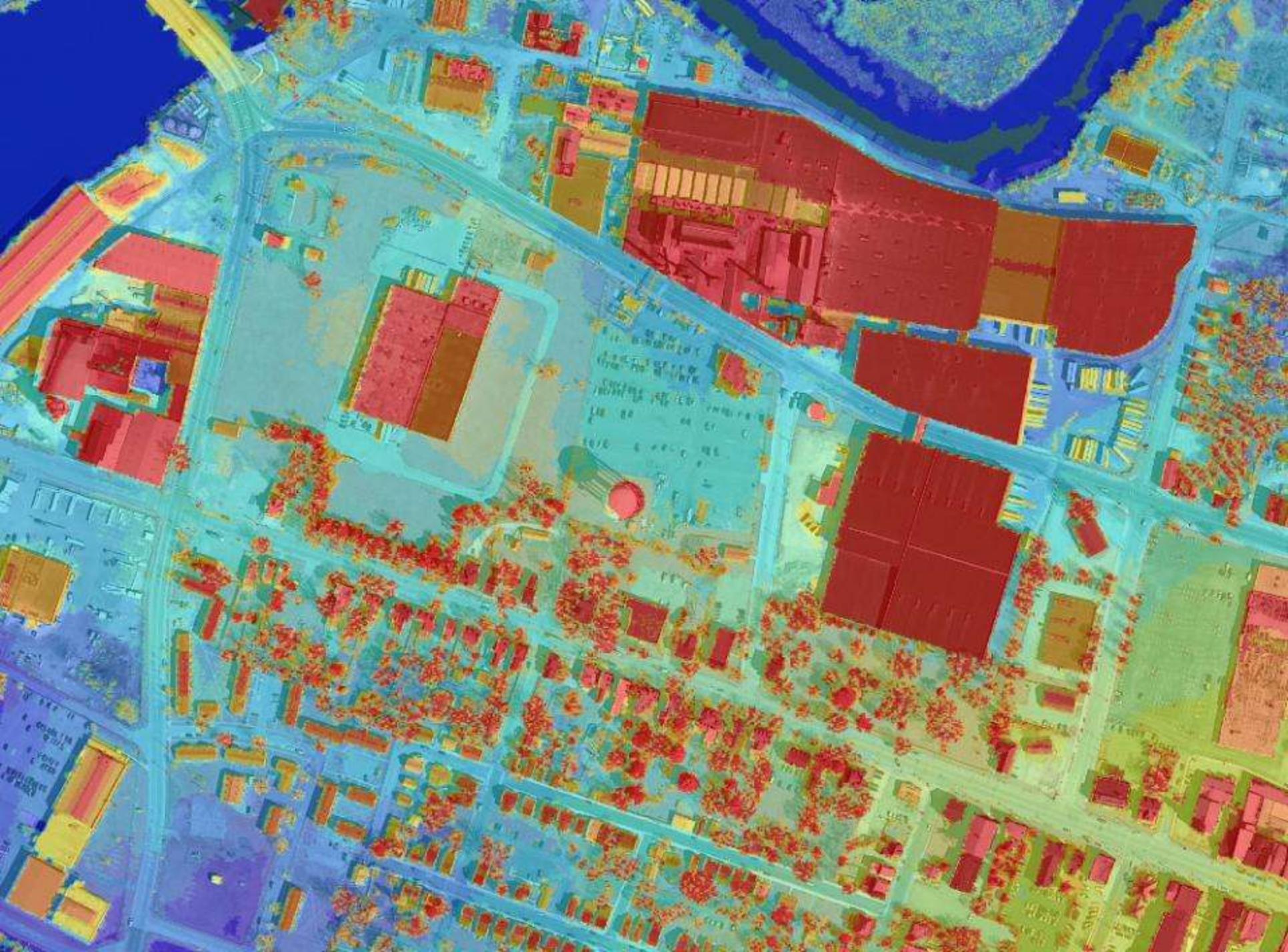






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# Conclusions

- Nearly 18 miles of levee were inventoried.
  - Nearly 70 percent of the levees are owned by private individuals
  - 86 percent of the levees inventoried were located in Salem and Cumberland Counties
  - Twenty two municipalities in the four counties studied have one or more levees
  - Nearly 50 percent of the levees have no vegetation control/management
- 

# Conclusions (Continued)

- Over 20 percent of the levees have less than 50 percent sod cover
- Nearly 24 percent of the levees inventoried had erosion
- Over 19 percent of the levees had unstable or moderately unstable slopes
- Over 35 percent of the levees had some or considerable settlement
- Over 29 percent of the levees had some or considerable depressions

# Conclusions (Continued)

- Some levee cracking was observed in 25 percent of the levees
  - Nearly 30 percent of the levees had burrowing animal presence
  - Riprap protection was observed on approximately 31 percent of the levees
  - Nearly 15 percent of the levees had encroachment by non-levee uses
- 

# Conclusions (Continued)

- For *six* (of the 68 levees) selected levee locations:
  1. Over 3000 homes, business and other structures were identified as being protected by levees.
  2. Over 14,000 acres of various land uses were determined to be protected by levees.

# Conclusions (Continued)

- **None** of the inventoried levees are accredited as providing sufficient flood control by the Federal Emergency Management Agency.
- **None** of the inventoried levees meet the requirements of the US Army Corps of Engineers for eligibility for their PL84-99 emergency assistance program in the event of levee failure.

# Questions?

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