

HDR



# CAW CAW DRAINAGE DISTRICT

Board of Commissioners Workshop  
January 26, 2016



# AGENDA

- 01 What is the Caw Caw Drainage District?
- 02 What is happening in the area?
- 03 What alternatives are available?
- 04 Can we make improvements or provide maintenance?
- 05 Summary
- 06 What can we do next?

# **PRESENTATION PURPOSE**

- To provide information based on relevant studies and data available to the HDR team
- To provide an overview and best estimates on impacts and costs related to today's available information

**01**

**WHAT IS THE CAW CAW  
DRAINAGE DISTRICT?**



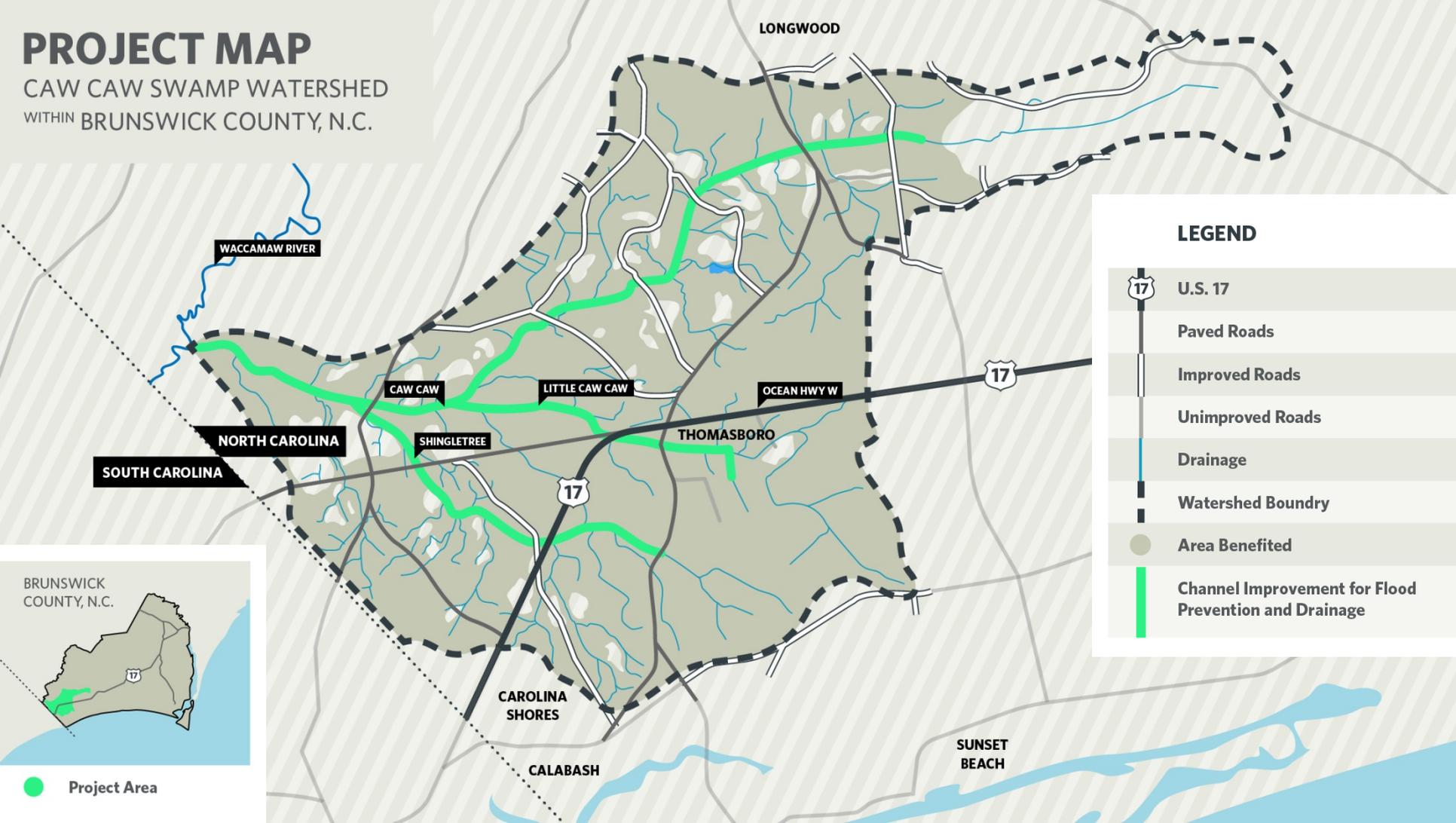
# BRUNSWICK COUNTY DRAINAGE DISTRICT NUMBER 1

Established in March 10, 1953 upon petition of property owners

- To locate and establish levees, drains or canals, and cause to be constructed, straightened, widened or deepened, any ditch, drain or watercourse for the purpose of draining and reclaiming wet, swamp or overflowed land for agricultural purposes.

# PROJECT MAP

CAW CAW SWAMP WATERSHED  
WITHIN BRUNSWICK COUNTY, N.C.



## LEGEND

-  U.S. 17
-  Paved Roads
-  Improved Roads
-  Unimproved Roads
-  Drainage
-  Watershed Boundry
-  Area Benefited
-  Channel Improvement for Flood Prevention and Drainage



 Project Area

# TIMELINE

1953

Planning for a farmland draining project began with the creation of the Caw Caw Drainage District 1

1964

Caw Caw Drainage District 2 formed

1967

Drainage ditches completed

1969-1970

Carolina Shores area ditches constructed to drain swampland

1975-1984

Carolina Shores subdivision construction begins (roads, home sites, and ditches)

\* This timeline was created with the best information accessible to the project team



# BRUNSWICK COUNTY DRAINAGE DISTRICT NUMBER 2

Caw Caw Swamp Drainage District Number 2 was formed around 1964

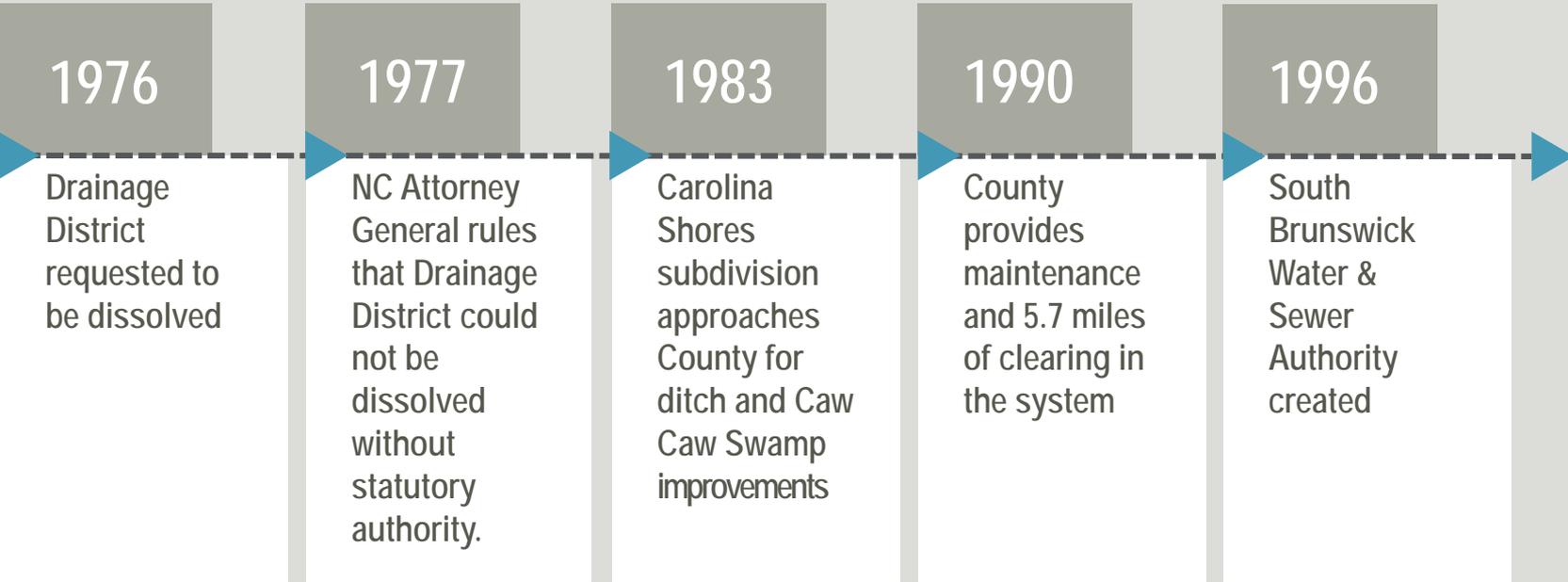
- Became Sponsoring Local Organization to facilitate a plan for works of improvement for the Caw Caw Swamp Watershed.
- Objectives included planning and application of conservation land treatment on individual farms, sufficient outlets for on-farm and small group drainage ditches and reduction of flood damage to cropland.

# FEDERAL/ STATE REQUIREMENTS

- The Caw Caw Canal is a jurisdictional body of water under the Clean Water Act
- All State and Federal water quality rules and regulations are applicable



# TIMELINE



\* This timeline was created with the best information accessible to the project team

# CHANNEL LENGTHS IN MILES

Caw Caw Swamp



Little Caw Caw Swamp



Shingletree Swamp



# TODAY'S OPERATION AND MAINTENANCE

May 2, 1966

- Operation and Maintenance Agreement established between United States Soil Conservation Service and Brunswick County Drainage District Number 1



- In 1976, Brunswick County passed a resolution to maintain the Drainage District
- The South Brunswick Water and Sewer Authority assumed maintenance activities of the district upon its formation.
- Around 2004, during SBWSA's dissolution, the County resumed operation and maintenance activities.



# 02 WHAT IS HAPPENING IN THE AREA?

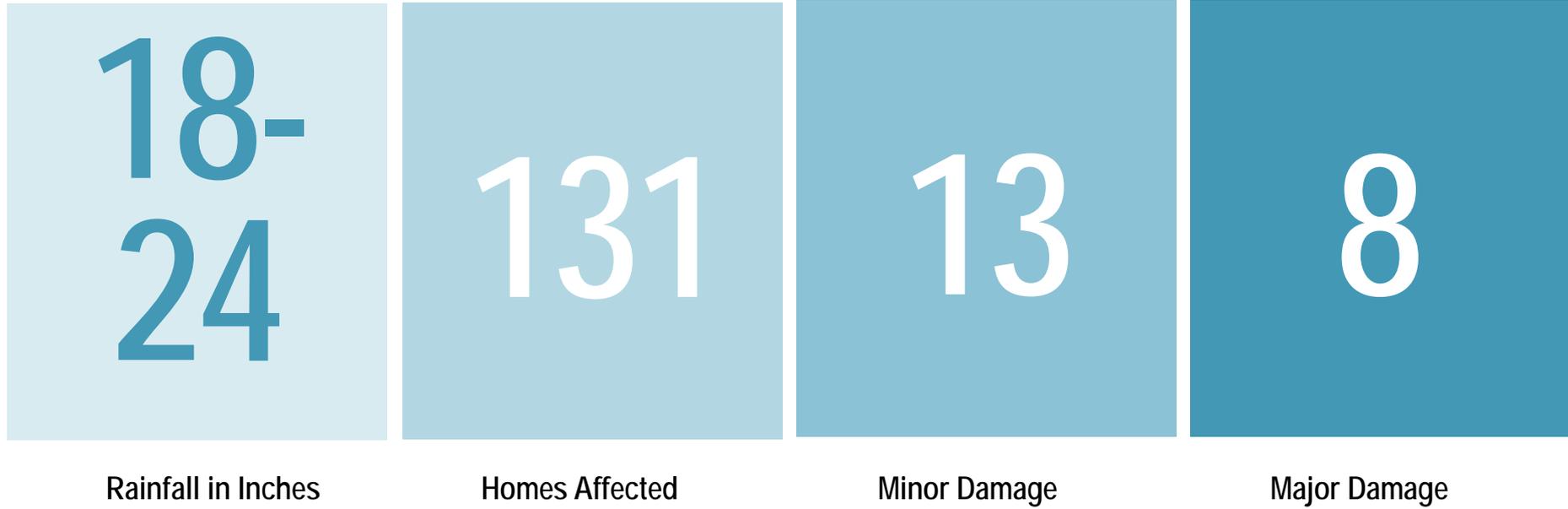
# THE CAW CAW DRAINAGE CANAL

- The design of the canal was based on a 5-year/24 hour storm event.
- The watershed is approximately 23,000 acres – that's 17,400 football fields
- Allowable maintenance activities have been performed by the County
- Sediment deposition and growth of vegetation has occurred
- Maintenance activities have been to mow grass on top of the bank and remove fallen debris



# CURRENT DESIGN = FLOODING DURING LARGE STORM EVENTS

October 2015 Storm Event



Home damage information reported to Brunswick County Emergency Services

# REPORTED DAMAGE LOCATIONS

CAW CAW SWAMP WATERSHED  
WITHIN BRUNSWICK COUNTY, N.C.

## LEGEND

Major Damage



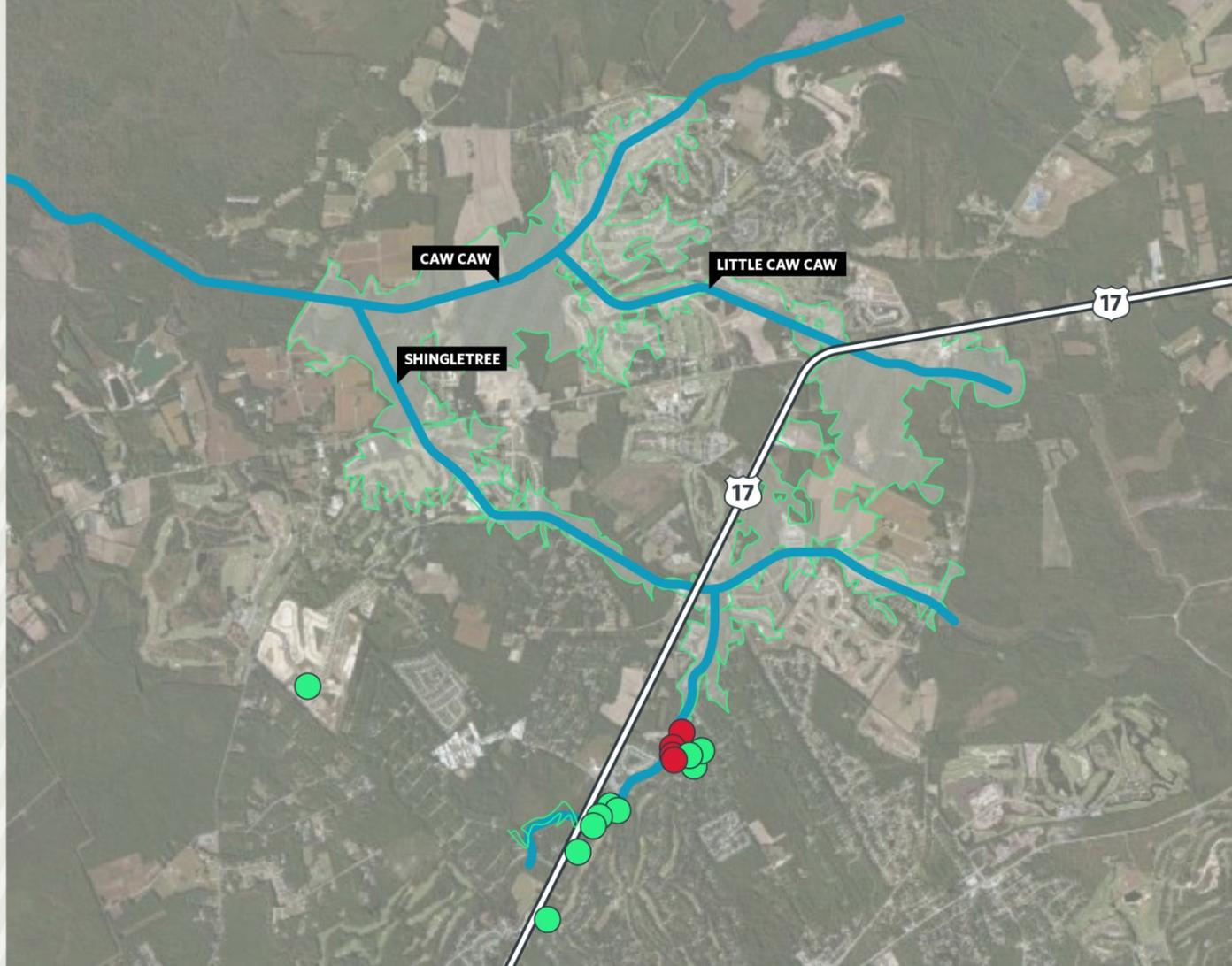
Minor Damage



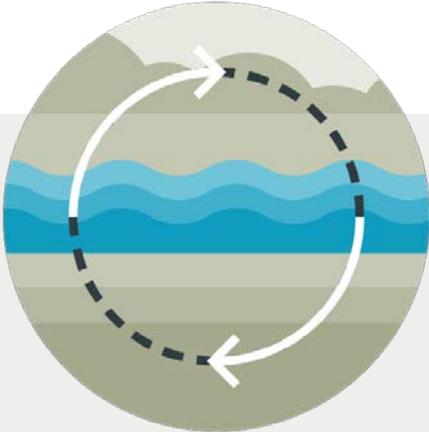
Channel



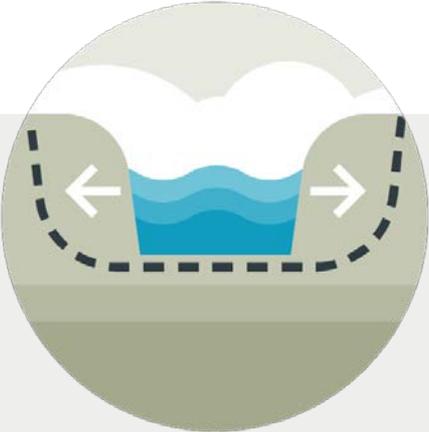
U.S. 17



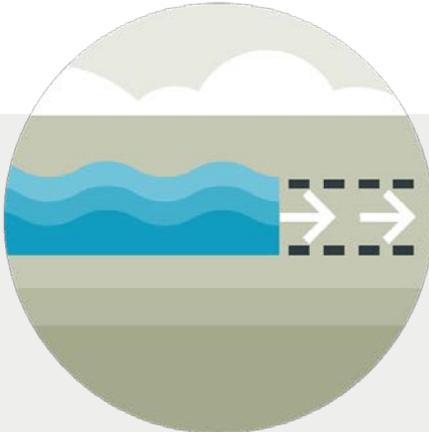
# COMMUNITY REQUESTS FOR IMPROVEMENTS



Clean and Restore



Widening the Channel

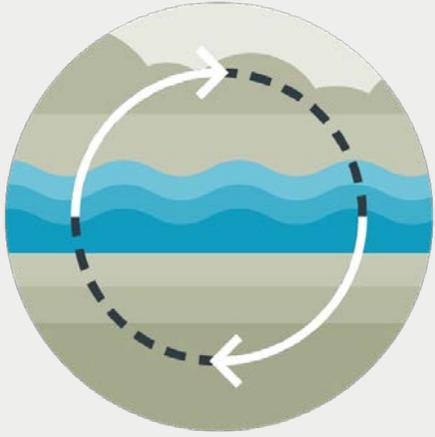


Extend to Waccamaw River

**03**

**WHAT ALTERNATIVES  
ARE AVAILABLE?**

# IMPLEMENTATION IMPLICATIONS



Clean and Restore

Work Effort	<ul style="list-style-type: none"><li>▪ Survey canals to determine and prioritize affected areas</li><li>▪ Prepare plans and permits</li><li>▪ Remove fallen debris and impediments to restore original design</li></ul>
Flooding Relief	<ul style="list-style-type: none"><li>▪ Reduce frequency of flooding throughout the canals.</li><li>▪ No noticeable difference during large flood events.</li></ul>
Easement and Acquisition	<ul style="list-style-type: none"><li>▪ Limited access to easements</li></ul>
Other	<ul style="list-style-type: none"><li>▪ Regulatory approvals are required</li></ul>
Time Frame	<ul style="list-style-type: none"><li>▪ Prioritization of effort – 3 months</li><li>▪ Construction 6-months to 2-years</li></ul>
Cost Range	<ul style="list-style-type: none"><li>▪ \$4-6 Million</li></ul>

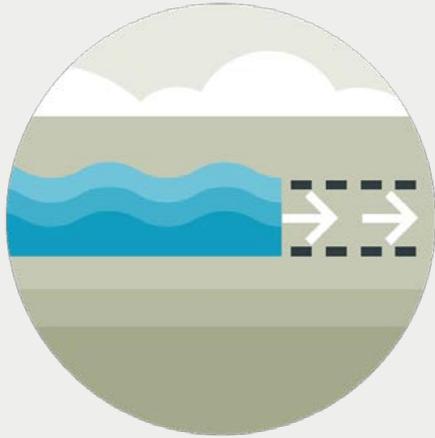
# IMPLEMENTATION IMPLICATIONS



Widen the Channel

Work Effort	<ul style="list-style-type: none"><li>▪ Survey canal corridors</li><li>▪ Modeling to establish optimum size and extent of effort</li><li>▪ Develop plans, easement acquisitions and permits</li><li>▪ Excavate and haul off material.</li></ul>
Flooding Relief	<ul style="list-style-type: none"><li>▪ Reduce frequency of flooding</li><li>▪ Likely won't eliminate flooding similar to events recently experienced.</li></ul>
Easement and Acquisition	<ul style="list-style-type: none"><li>▪ Will require significant land acquisition and easements from multiple property owners</li></ul>
Other	<ul style="list-style-type: none"><li>▪ FEMA CLOMR –Conditional Letter of Map Revision</li><li>▪ Increase maintenance effort</li></ul>
Time Frame	<ul style="list-style-type: none"><li>▪ Modeling and permitting – 1-2 years.</li><li>▪ Construction 1-4 years</li></ul>
Cost Range	<ul style="list-style-type: none"><li>▪ \$17-20 Million</li></ul>

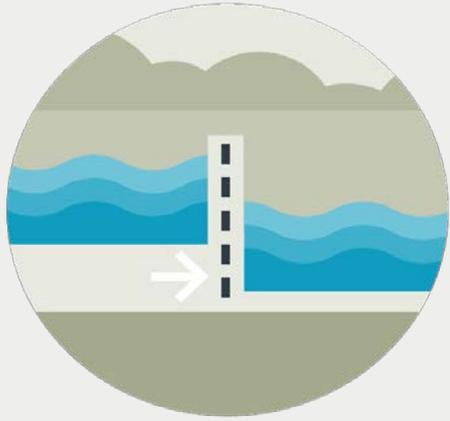
# IMPLEMENTATION IMPLICATIONS



Extend to Waccamaw River

Work Effort	<ul style="list-style-type: none"><li>▪ Geotechnical investigation for slope stability</li><li>▪ Develop plans, easement acquisitions and permits</li><li>▪ Excavation of canal to main river channel</li></ul>
Flooding Relief	<ul style="list-style-type: none"><li>▪ Negligible impact to performance of canals during large flood events.</li></ul>
Easement and Acquisition	<ul style="list-style-type: none"><li>▪ Land acquisition required</li></ul>
Other	<ul style="list-style-type: none"><li>▪ Difficult construction environment</li><li>▪ Difficult environmental permit</li></ul>
Time Frame	<ul style="list-style-type: none"><li>▪ 1-3 years for permitting</li><li>▪ 6 months construction</li></ul>
Cost Range	<ul style="list-style-type: none"><li>▪ \$1.5-2.5 Million</li></ul>

# IMPLEMENTATION IMPLICATIONS

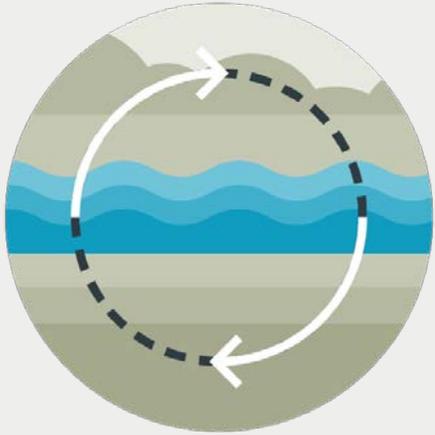


Flood Control Facilities

Work Effort	<ul style="list-style-type: none"><li>▪ Hydrologic and Hydraulic modeling required.</li><li>▪ Develop plans, easement acquisitions and permits</li><li>▪ Construction of embankment/control structure and clearing of land.</li></ul>
Flooding Relief	<ul style="list-style-type: none"><li>▪ Possible reduction of water surface elevations to acceptable levels during large flood events</li></ul>
Easement and Acquisition	<ul style="list-style-type: none"><li>▪ Substantial land required</li></ul>
Other	<ul style="list-style-type: none"><li>▪ FEMA CLOMR</li><li>▪ Additional maintenance requirements</li></ul>
Time Frame	<ul style="list-style-type: none"><li>▪ 1-year for alternative assessment</li><li>▪ 1-4 years for permitting.</li></ul>
Cost Range	<ul style="list-style-type: none"><li>▪ \$20-30 Million</li></ul>

# **04 CAN WE MAKE IMPROVEMENTS OR PROVIDE MAINTENANCE?**

# REGULATORY IMPLICATIONS



Clean and Restore

Federal (USACE)	General/Nationwide Permit
State (DWR)	401 General Water Quality Certification
Other	DCM Coastal Zone Consistency
Permitting Time Frame	1-3 months

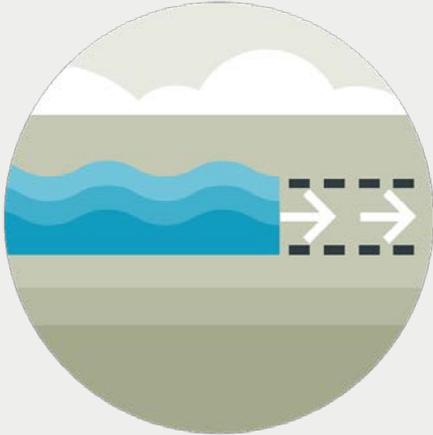
# REGULATORY IMPLICATIONS



Widen the Channel

Federal (USACE)	General/Nationwide Permit or Individual 404 Permit
State (DWR)	401 General or Individual Certification
Other	DCM Coastal Zone Consistency
Permitting Time Frame	3-6 months

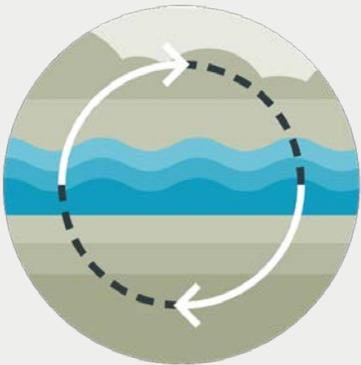
# REGULATORY IMPLICATIONS



Extend to Waccamaw River

Federal (USACE)	Individual 404 Permit
State (DWR)	Individual 401 Water Quality Certification
Other	DCM CAMA Permit or Coastal Zone Consistency
Permitting Time Frame	6-12 months

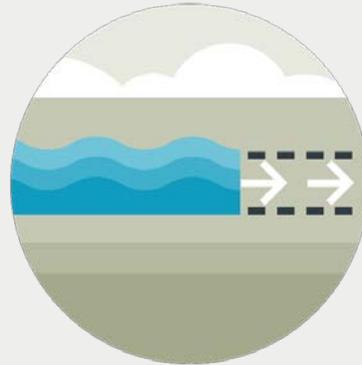
# 05 SUMMARY



Clean and Restore



Widening the Channel



Extend to Waccamaw River



Flood Control Facilities

Protect from 100-year Storm	NO	NO	NO	POSSIBLE
Cost Range	\$4-6 Million	\$17-20 Million	\$1.5-2.5 Million	\$20-30 Million
Regulatory Hurdles	Minimum	Medium	Maximum	Maximum
Easement & Land Acquisition	NO	YES	YES	YES

# 06 WHAT CAN WE DO NEXT?

# OPTIONS TO THINK ABOUT



**Continue current level of service**



**Make immediate improvements**

- Define new level of service
- Prioritize clean out activities
- Complete permitting requirements



**In-depth Analysis**

- Detailed model of all available alternatives, cost/ benefit analysis and evaluation of funding options
- Define the level of protection needed

HDR