North Carolina Coastal Habitat Protection Plan

JOINT COMMISSIONS MEETING
September 9, 2004

CHPP GOAL

"...long-term enhancement of coastal fisheries associated with each habitat." (G.S. 143B-279.8)

CHPP AND SCIENCE

- CHPP is a scientific document
- Began drafting 1999
- > 50 scientists met to provide guidance in February 2000
- Drafts reviewed and edited by dozens of scientists

Six Interdependent Fish Habitats Support North Carolina's Coastal Fisheries

1) Coastal **WETLANDS** border vital nursery areas and serve as the primary buffer between water and land-based impacts.

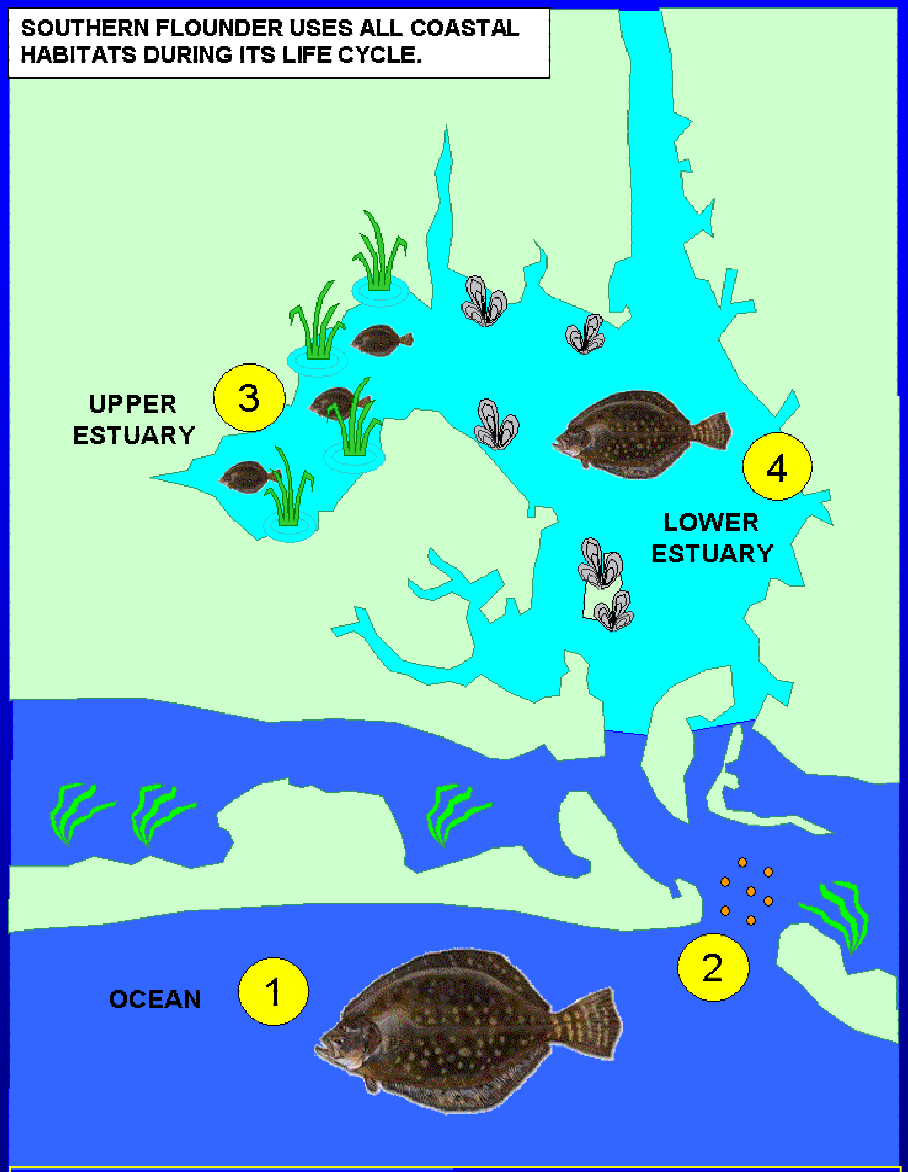
2) SOFT BOTTOM acts as a storage reservoir for nutrients, sediment, and chemicals, and provides crucial foraging areas for fish.

3) SHELL BOTTOM is especially important as a fish spawning and nursery area, as well as protecting nearby shorelines and sea grass beds from erosion.

4) SUBMERGED AQUATIC VEGETATION is an underwater garden for juvenile fish and small invertebrates and a barometer of water quality.

5) The complex structure of **HARD BOTTOM,** often covered by living organisms, supports a temperate-subtropical reef fish community and snapper–grouper fishery.

6) The **WATER COLUMN** is the basic habitat and the medium through which all other fish habitats are connected.



Most fish associate with **different habitats** at different life stages

Some fish depend strongly on **specific** habitat types

Because habitats are interdependent, all fish depend on the **total habitat system**

Because the habitats are interdependent…

Changes in one habitat
AFFECT the total habitat system

Relation of Fish Status to Habitat Conditions

- Difficult to attribute fish stock decline directly to habitat conditions, except for total habitat loss (such as dam on river)
  - Most fish use multiple habitats
  - Lack of historic habitat and fish stock data
- Recovery of depleted stocks is limited by habitat loss and degradation, which affects overall carrying capacity.

Relation of Fish Status to Habitat Conditions

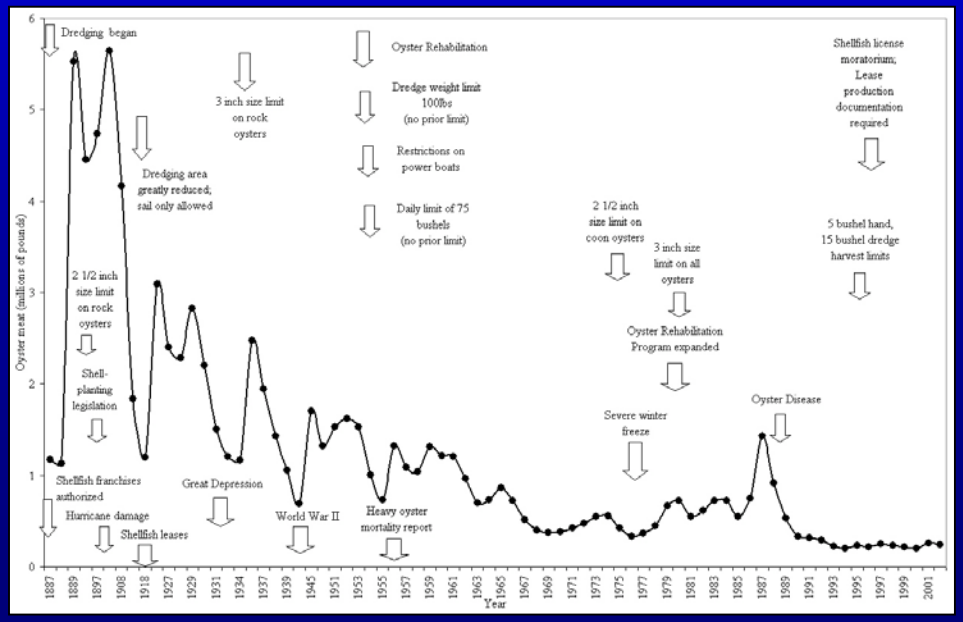
River herring – lack of recovery despite greatly reduced fishing effort

Sturgeon – lack of recovery despite total moratorium on harvest

Loss and Degradation of Shell Bottom

The Evidence

- Subtidal oyster reefs in Pamlico Sound system
  - Major losses due to oyster dredging late 1880s – early 1900s
  - Some displacement downstream due to flow and salinity changes and losses from harvesting, dredging, poor water quality
  - Not returning to previous levels [disease, bottom-disturbing fishing, greatly reduced cultch (surface for attachment)]
- Intertidal reefs more stable in southern coast.



Loss and Degradation of SAV

The Evidence

- Most SAV mapped during late 1980s and early 1990s
- Anecdotal records suggest significant decline (> 50%) of low-salinity SAV in western Pamlico Sound and tributaries since the 1970s
- High salinity grasses fairly stable (Outer Banks – Bogue Sound)
- Water clarity is key factor for SAV survival
- Sediment and nutrients in water column reduce water clarity
- Some recovery in Chowan since 1980s as discharges removed, BMPs implemented

Loss and Degradation of Wetlands

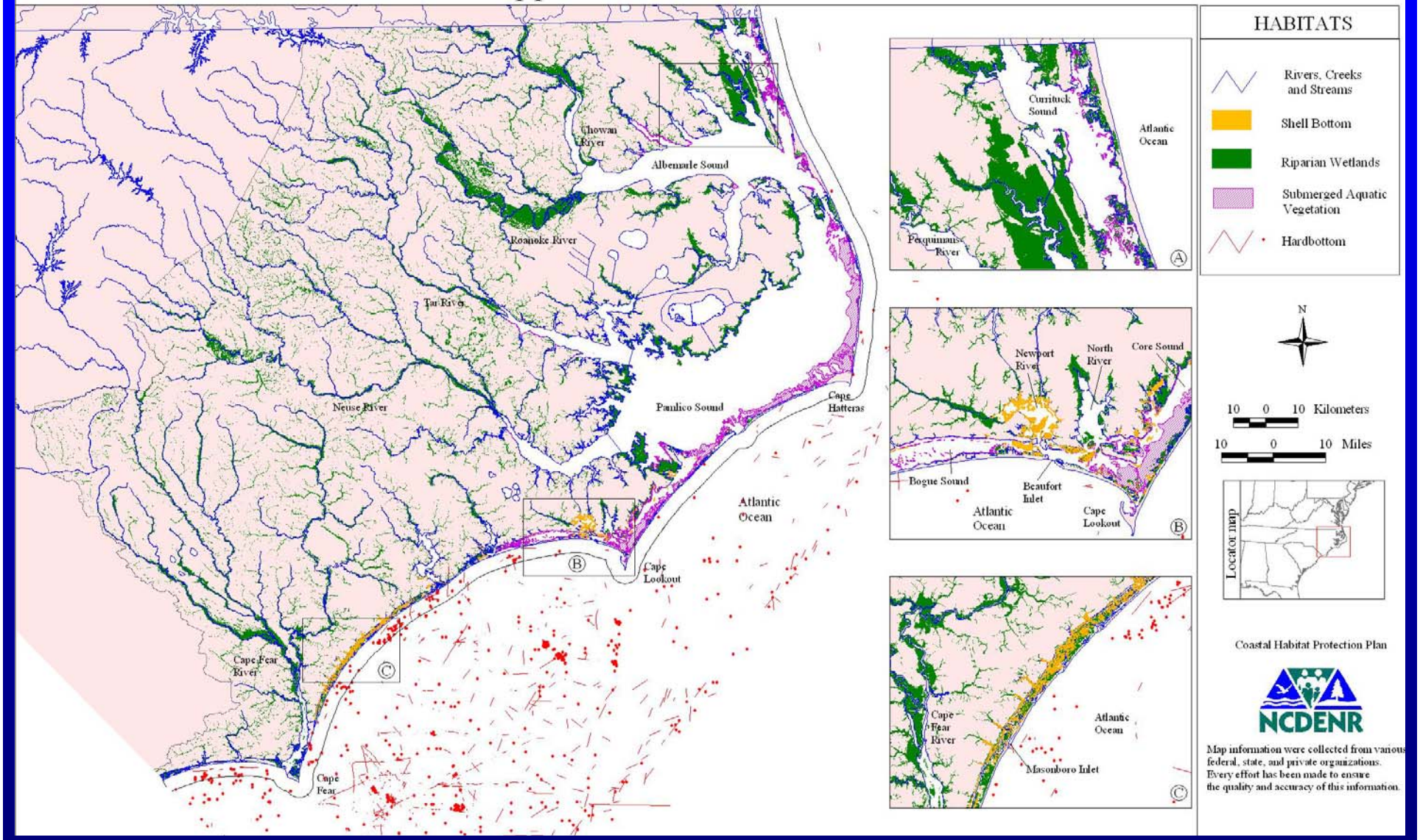
The Evidence

- Coastal wetlands mapped
  - Hydric soil maps - 1950s
  - Wetland types - 1994
- Estimated 50% loss since pre-colonial times
- Most wetlands losses occurred prior to 1970s
- Current rate of loss has greatly slowed due to regulation

Cleared and ditched 404 wetland (Photo by DWQ staff)

Coastal wetland proposed for filling (Photo by DCM staff)

General Location of Mapped Fish Habitats in Coastal North Carolina



Water Quality Degradation

The Evidence

Nationwide Trends

- EPA report (2002) indicated that > 30% of U.S. rivers and 50% of estuaries and lakes are too polluted for swimming or fish consumption.
- Numerous studies show correlation between increasing human population and water quality degradation; which is a challenge given population growth on the coast, and in river basins that flow to coast.

North Carolina Trends

- According to land cover data, between 1982 and 1997, urban/built-up land and roads increased in coastal river basins by 43-132%

Corolla, NC

Water Quality Degradation

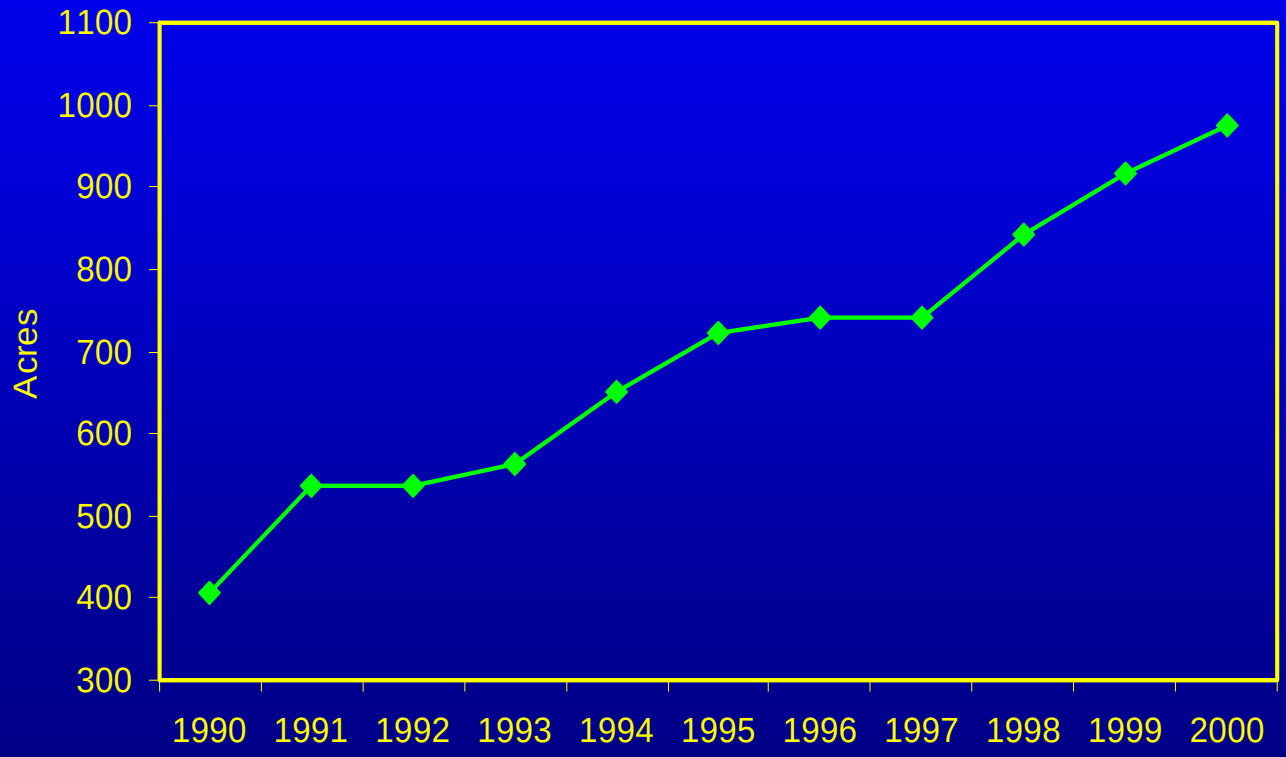
The Evidence

Impaired waters, increasing shellfish closures, and fish kills indicate that significant water quality problems exist in North Carolina.

Water Quality Degradation

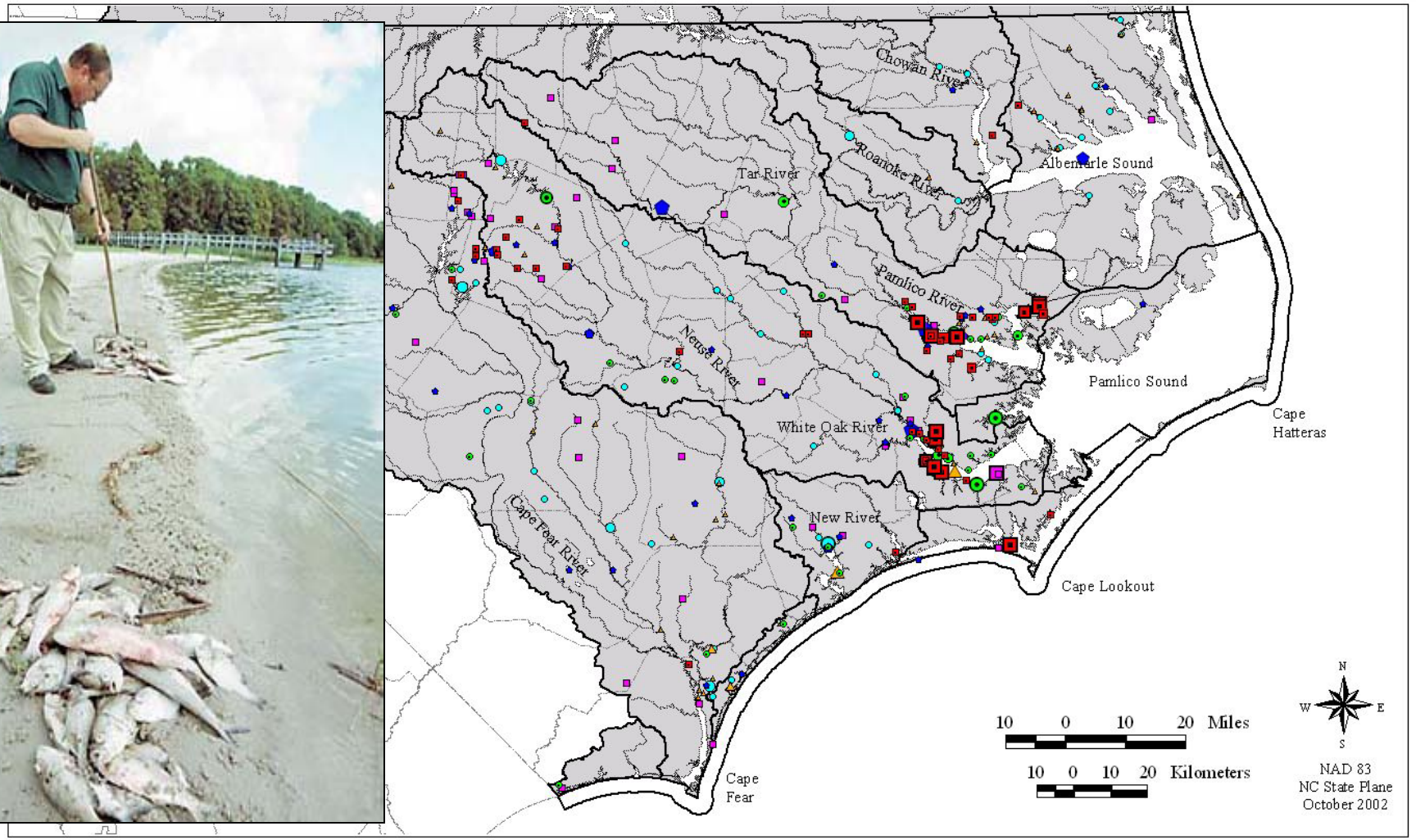
The Evidence

Shellfish Harvest Closures in Outstanding Resource Waters



Data Source: Shellfish closure areas from DEH Shellfish Sanitation and Recreational Water Quality Section

Observed Fish Kills



Map information were collected from various federal, state, and private organizations. Every effort has been made to ensure the quality and accuracy of this information.

NCDENR

Fish Kills: 1996-2001 — Management Units

Fish Kills 1996	Fish Kills 1997	Fish Kills 1998	Fish Kills 1999	Fish Kills 2000	Fish Kills 2001
0 - 4,999	0 - 4,999	0 - 4,999	0 - 4,999	0 - 4,999	0 - 4,999
5,000 - 9,999	5,000 - 9,999	5,000 - 9,999	5,000 - 9,999	5,000 - 9,999	5,000 - 9,999
10,000 - 19,999	10,000 - 19,999	10,000 - 19,999	10,000 - 19,999	10,000 - 19,999	10,000 - 19,999
20,000 - 49,999	20,000 - 49,999	20,000 - 49,999	20,000 - 49,999	20,000 - 49,999	20,000 - 49,999
50,000 - 100,000	50,000 - 500,000	50,000 - 300,000	50,000 - 1,000,000	50,000 - 152,000	50,000 - 161,780

Coastal Habitat Protection Plan

locator map

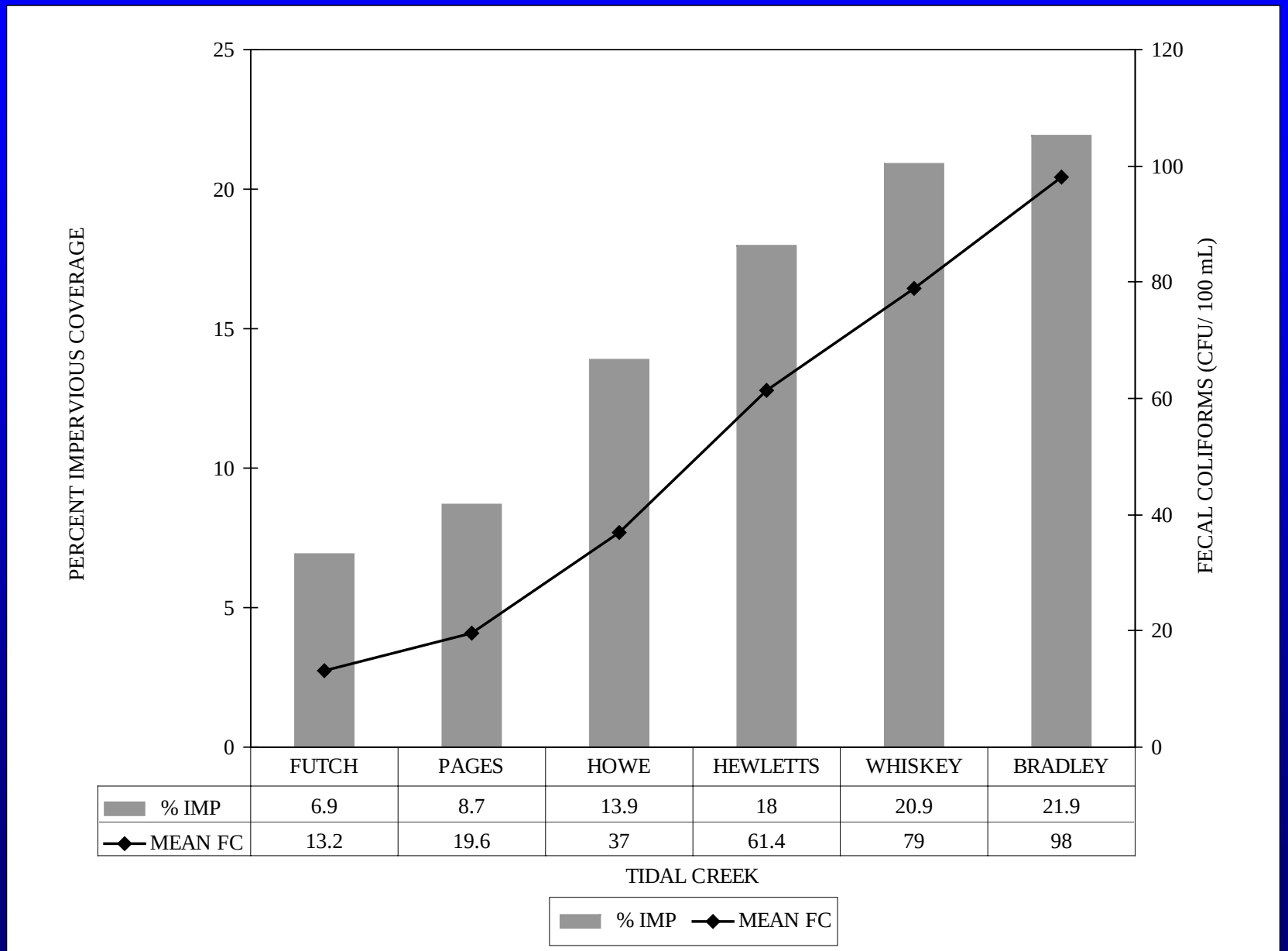
Effect of Storms vs. Human Activities

Post *Hurricane Floyd* flooding

Runoff from Impervious Surfaces

(Mostly from urban/suburban areas and road networks)

Impervious Surface and Fecal Contamination



Runoff from Land Disturbing Activities

(Mostly construction & agriculture)

Stormwater control – retention ponds

Use of engineered stormwater controls can offset some impacts from development without causing significant habitat impacts.

Photo by DWQ

Wastewater Storage/Discharge

(From Treatment Plants, Septic Tanks, and Animal Operations)

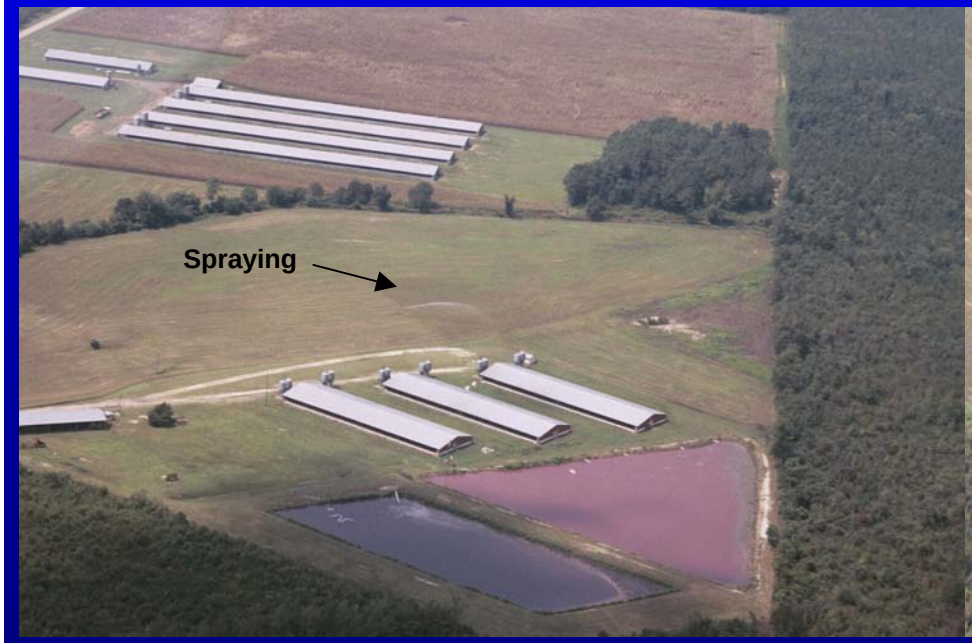
- Potential for inadequate treatment from wastewater treatment systems, increased loading of nutrients or other pollutants in surface waters
- Collection infrastructure spills

Wastewater pipe broke, discharged into Hewlett Creek (SA waters). Photo by DWQ

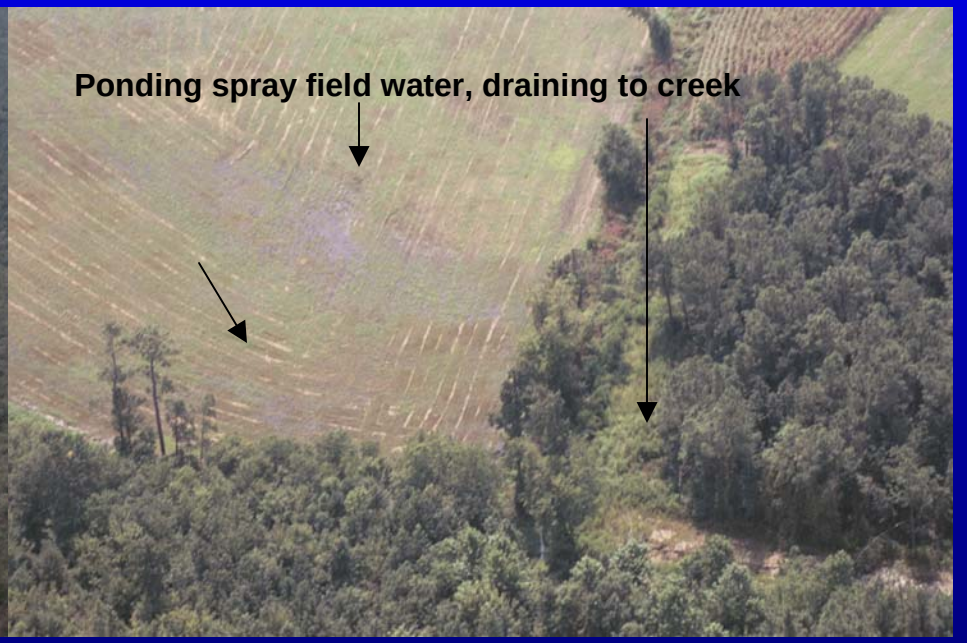
Wastewater Storage/Discharge

(From Treatment Plants, Septic Tanks, and Animal Operations)

- Row crop agriculture has declined in North Carolina in recent years
- Animal operations have greatly increased, especially in Coastal Plain
- Waste can enter streams from lagoon breaches, runoff from spray field
- Waste can enter groundwater and increase nitrogen in air



Animal operation - lagoon and spray field. (Photo by DWQ)



Saturated spray field. Spray effluent puddling on surface and draining to adjacent creek. (Photo by DWQ)

Shoreline Alteration

(Marinas and docks, estuarine shoreline stabilization, beach nourishment)

Fishing Practices and Boating Activity

- Clam kicking and oyster dredging dig up soft bottom and oysters, and increase turbidity; some SAV is within clam kicking areas
- Wakes from high speed boat operations erode fringing wetland vegetation, increase turbidity, destabilize shell bottom

Effects on the Total Habitat System can be Individually Small, but Cumulatively Large