GDS HYDROLOGY RESTORATION COLLABORATION

- 2007: Chris Lowie hired as GDS Refuge Manager
- Supt. Joy Greenwood, DISW staff, & NRP staff worked hard over past several years to establish a positive working relationship w/ Refuge Staff
- 2008: GDS approached DISW regarding installation of 2 wcs

- 2011: GDS invited DISW to be part of GDS Hydrology Analysis

  - Project Partners: Christopher Newport University (VA)
    NC Division of Water Quality
    NC Natural Heritage Program
    The Nature Conservancy (NC & VA)
    U.S. Fish & Wildlife Service, NC Coastal Program
    U.S. Fish & Wildlife Service, VA Partners for Fish & Wildlife
    U.S. Geological Survey, VA Water Science Center

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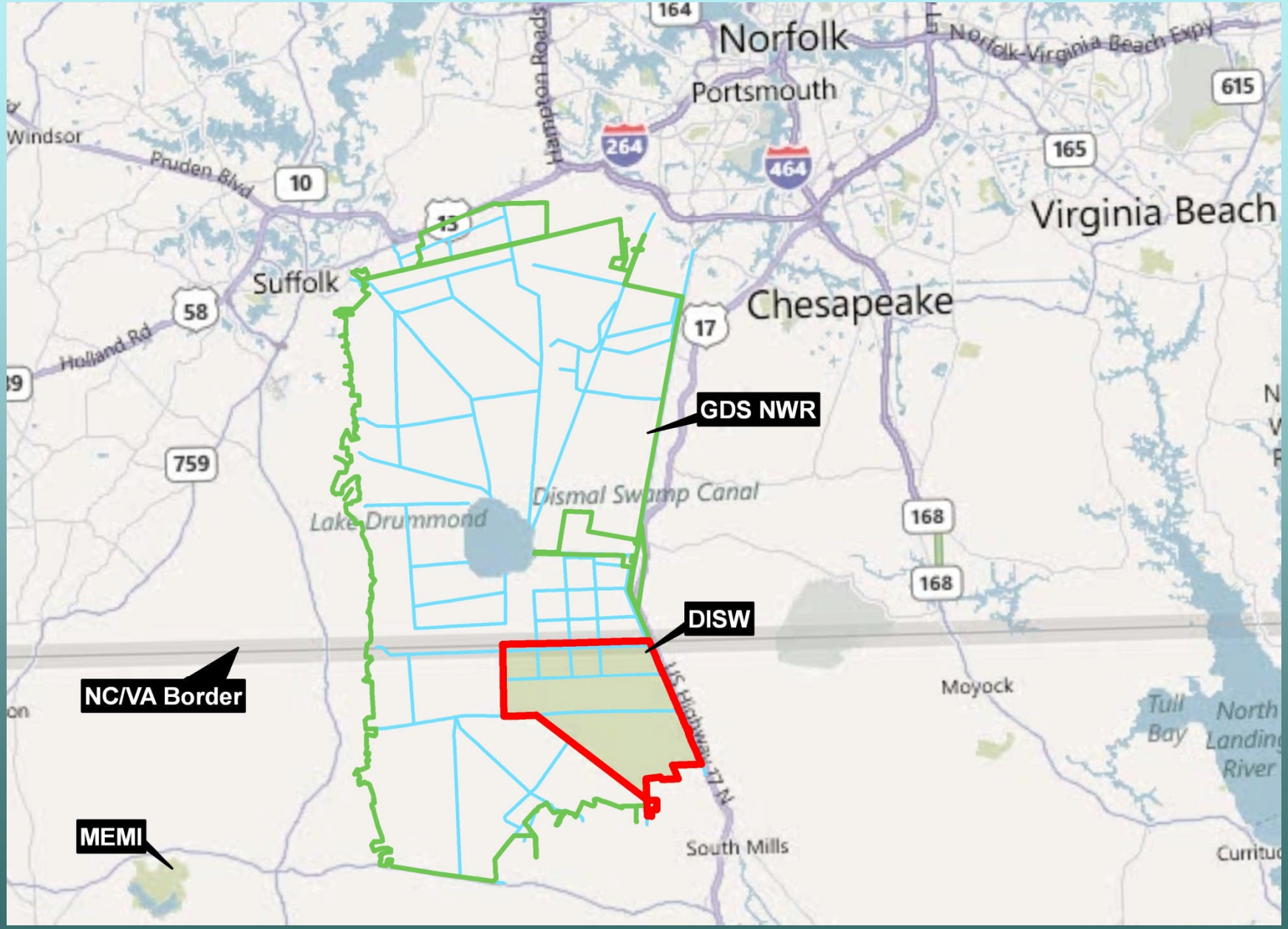
GDSHA Project Area



DISW Forested Wetland Decline

- Beginning in pre-Revolutionary times (~1775), ditches were dug across the swamp to drain the wetlands for agriculture, timber, and to provide navigational access.

- NC Natural Heritage Program 1994 DISW Biological Inventory Revealed Significant Changes in Forest Composition Since 1970's Vegetation Mapping. Evidence:
  - Increase in trees adapted to drier conditions (Red maple, Sweetgum, Tulip Poplar)
  - Dry/subsiding peat soils
  - Increase in catastrophic wildfires

- Drainage of Wetland Forests & Fire Suppression Cited For Decline in Forested Wetland Ecological Condition

Summer 2008 South 1 Fire

Summer 2011 Lateral West Fire

Partner Agency Research

- Ongoing USGS research at GDS NWR (DISW):
  - Installation of H_20 control structures in ditches to back H_20 up
  - Installation of H_20 monitoring stations to monitor H_20 levels
  - **Conclusion: Controlling H_20 levels in ditches can help raise g/w levels in swamp.**

- USFWS research at Pocosin Lakes NWR (PETT):
  - 1994 Hydrology & H_20 Management Study> 2006 Hydrology Restoration Plan
  - Installation of wcs & raising road beds to serve as levees
  - 2008 Evans Rd Fire: “Undrained wetlands and areas where hydrologic restoration work was complete did not burn…”
  - Restoration (Jan. 2010): 10,820 acres [Complete]
    6,700 acres [In Progress]
    8,300 acres [Future Need]

Benefits of Hydrologic Restoration

- Natural Resources
  - **Adaptive Management** – flexibility to deal w/ complex variables for maintenance/restoration of forested wetlands
  - Direct improvement on H_20 quality (Hg, N) in tributaries, rivers, & estuaries
  - Reduction in catastrophic wildfires; enhanced ability to conduct R_x fires
  - Climate change implications: C/N Sequestration, Refuge for SLR
    - C/N Sequestration Potential: 200lb/ac/yr; 6,500lb/ac/yr

- Human Resources/Operations
  - Reduction in staff time, resources for wildfire-fighting
  - Reduction in adverse air quality conditions
  - Reduced costs for restoration versus fighting wildfires:
    - **$140-$310/acre versus $2,050/acre (2008 GDS S1 Fire)**
  - Potential revenue generation with emerging C markets

Great Dismal Swamp Hydrology Analysis

- Benefits of Collaboration for DPR
  - CNU: Technical guidance re: Atlantic White Cedar Restoration
  - DWQ/GDS NWR/USGS: Technical expertise regarding H_20 monitoring
  - NHP: Technical guidance re: Forested Wetland Natural Community Maintenance/Management
  - TNC/USFWS: Grant funding opportunities
- Current Project Status
  - Received grant award with TNC to install several H_20 gauges along N portion of DISW
  - Applying to USFWS by Jan. 2012 for funding to install wcs's
  - Meeting with DWQ hydro-geologist next week to discuss assistance w/ g/w monitoring
  - Stakeholder Team meeting next Month (December)

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Faces of Collaboration