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Recurrent Flooding, Sea Level Rise, and the Relocation of At-Risk Communities: Case Studies from the Commonwealth of Virginia

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RECURRENT FLOODING, SEA LEVEL RISE, AND THE RELOCATION OF AT-RISK COMMUNITIES: CASE STUDIES FROM THE COMMONWEALTH OF VIRGINIA

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DEFINING RELOCATION

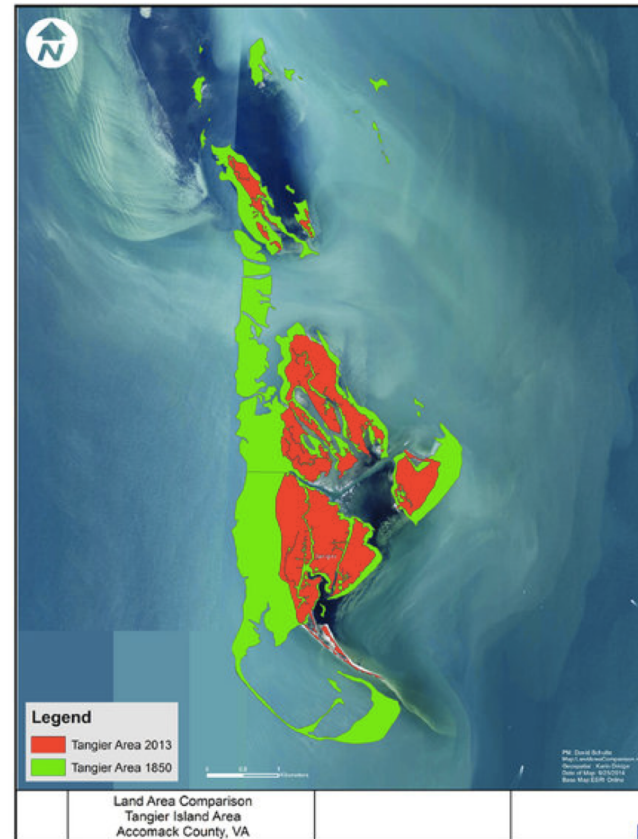
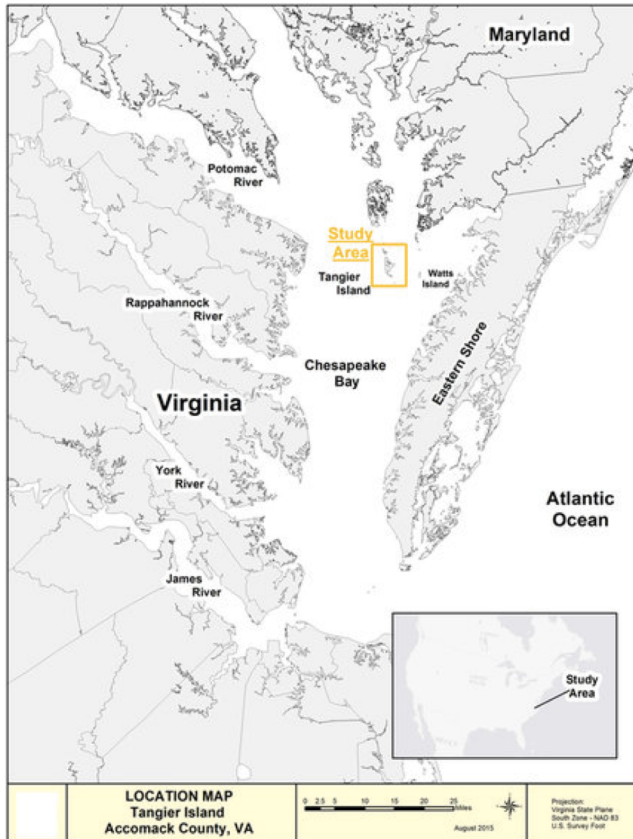
- Resilience to Relocation
- Relocating in Place
- Relocating Nearby
- Relocating at a Distance

RESILIENCE TO RELOCATION

- Methods employed by a community or locality to stave off more dramatic relocation phases. Resilience strategies can include both “soft” and “hard” infrastructure.
- Examples : nature-based solutions, living shorelines, regenerating and preserving wetlands, digging retention basins, dredge disposal projects, installing floodgates, or building sea walls.
- “Hard” infrastructure like sea walls, floodgates, and jetties are often extremely expensive and often take years of planning and construction before they can be implemented.

BACKGROUND CONSIDERATIONS

- Dillon Rule
 - Localities can only take action where the Virginia Assembly has enabled them to do so.
- Property Rights
 - Rights given to the person or persons who have a right to own the property through purchase or bequest
 - Absolute right for a property is rare in any society
 - Government takings
 - What is just compensation?
- National Flood Insurance Program (NFIP)
 - Encourage communities to adopt and enforce floodplain management regulations



RESILIENCE TO RELOCATION CASE STUDY: TANGIER

■ <https://theculturetrip.com/north-america/usa/virginia/articles/tangier-an-island-in-the-chesapeake-bay-is-disappearing/>

TANGIER

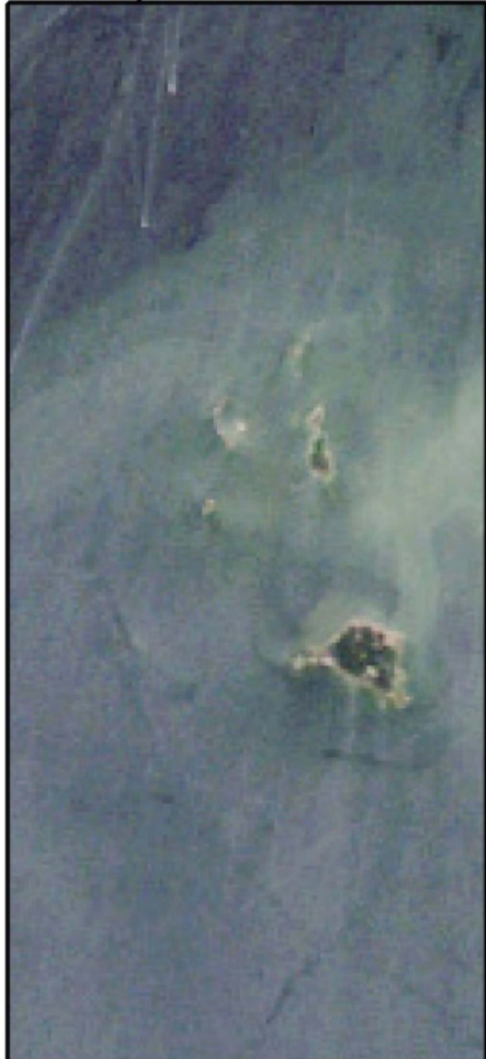
HOW MUCH ARE WE ABLE AND WILLING TO SPEND DEFENDING IT?

- Population: 722; strong history and culture
- Median Household Income: \$38,056
- Lost 2/3 of landmass since 1850; high-range sea level rise predictions show town may need to be abandoned in 25 years
- Seawall already extends one mile along western shore to protect airport
- USACE planning to build a jetty on northwestern side to preserve the navigation channel. Originally proposed 1990s. Estimated to begin 2018 if funding is secured.
- As of 2016, NFIP 78 policies on island (11 low-risk, not required)
 - 1982-2011, 87 total flood insurance claims, averaging \$10,705/claim

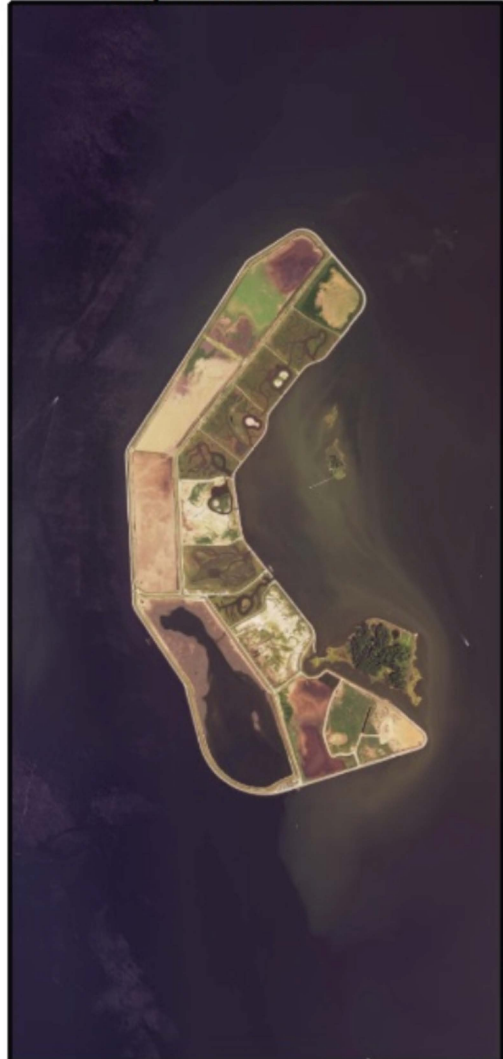
A POPLAR ISLAND-LIKE SOLUTION?

- Poplar Island, MD. Dredged material from Baltimore Harbor deposited to rebuild Poplar
 - Estimated cost: \$1.4 Billion (\$800,000/acre).
- USACE dredges Tangier's channels every five years.
- Project must be economically justified.
 - Other environmental impacts to be considered

Poplar Island 1997



Poplar Island 2015



Tangier Island 2013



Tangier Island w/ Example Cells

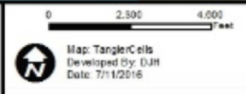


Tangier & Poplar Island Comparison

5

Example Cells

6



RELOCATING IN PLACE CASE STUDY: POQUOSON

- Small suburban city in Hampton Roads; About 4,770 housing units
- Population: 12,017; median household income: \$83,735
- About 600 homes have been elevated (~15%)
 - Nearly every home within a mile of waterfront marshes
 - Generally: older homes raised on brick or cinder block, new homes built one story off ground with garage underneath
- Filled in higher ground and rebuilt elementary school, fire station, sewer pump stations
- Plans to elevate one of the main roads into city by 10 feet (estimated cost: \$60 million)



FUNDING FOR ELEVATING HOMES

- 200 homes elevated using funds through NFIP Increased Cost of Compliance (ICC) coverage after Hurricane Isabel flooding in 2003
 - ICC provides up to \$30,000 to help cover cost of mitigation measures that will reduce flood risk
- Four grants from Community Development Block Grants and Hazard Mitigation Grant Program to elevate 70 homes from 2004-07
- City Manager's Office: "acquisition of flood-prone properties is not considered a viable alternative."

POQUOSON AND NFIP

- 3,266 NFIP policies by February 2014
 - 84% of insured were inside the 100-year flood plain
- 971 Repetitive Loss Properties (\$34 million)
 - At least two paid flood losses more than \$1,000 each in 10-year period Estimates 274 have been mitigated/elevated
- 35 Severe Repetitive Loss Properties (\$3 million)
 - Four or more claims payments of \$5,000 and cumulatively more than \$20,000



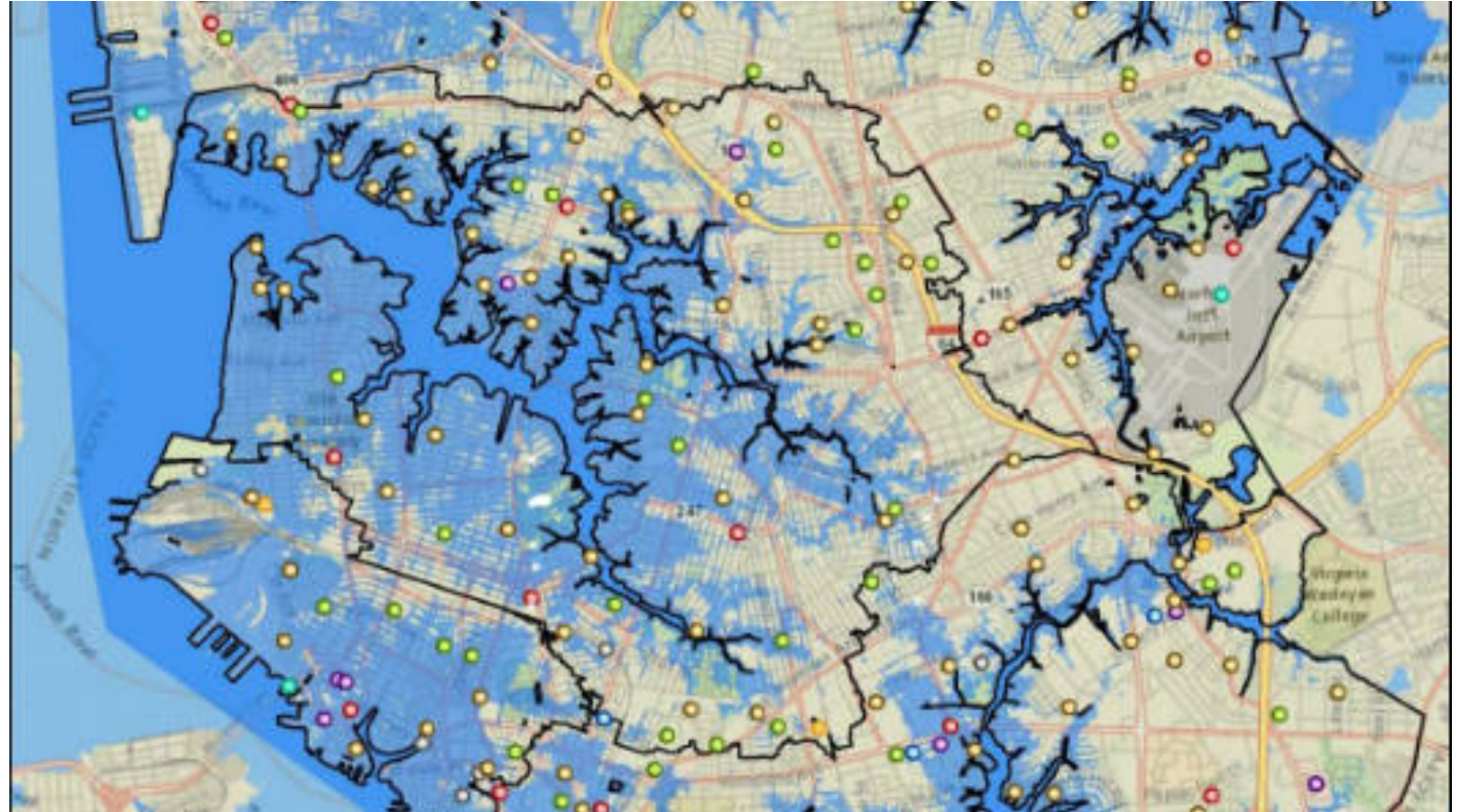
RELOCATING NEARBY CASE STUDY: NORFOLK

NORFOLK

- Population: 246,393
- One business owner says every time it floods it costs him \$5,000 to \$10,000
- Federal government has proposed \$1.8 billion to help protect Norfolk by installing floodwalls, storm surge barriers, and tidal gates

NORFOLK BY 2076

- Some estimates think waters around Norfolk will have risen anywhere from 11 inches to 3.3 feet if no steps are taken
 - Exacerbated by land subsidence



NORFOLK VISION 2100



- Long-term strategy to address the challenges of sea level rise
- Breaks city down into areas (Red, Yellow, Green, and Citywide)
 - Gives specific goals for each area based on the risk each region is in
- Some of it has taken effect, such as the Norfolk 2020
 - Plan to buy up land and redevelop it

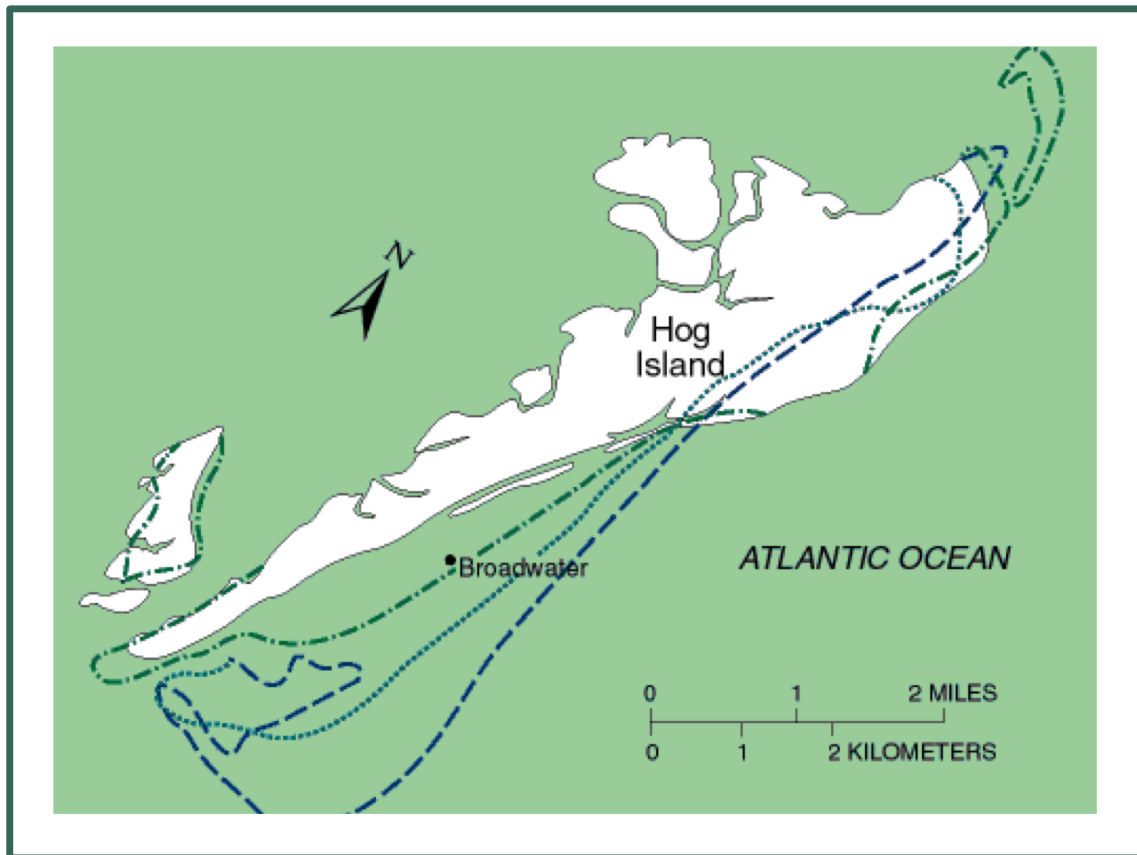
NORFOLK AND NFIP

- Norfolk is broken down into 7 zones
 - Range from 0.2% annual chance of flooding to areas affected by waves heights between 1.5 and 3 feet
- 4 of these zones require flood insurance
- A member of the Community Rating System (CRS)
 - Voluntary incentive program that “recognizes and encourages community floodplain management activities that exceed minimum NFIP requirements”
 - One of 25 Virginia communities with this recognition
- Class 8 CRS participate
 - Average of \$66 in savings on annual premiums (total of \$791,754 annual savings)

RELOCATING AT A DISTANCE CASE STUDIES

- Broadwater (VA)
- Shishmaref and Newton (AK)
- Isle de Jean Charles (LA)
- Sidney (NY)

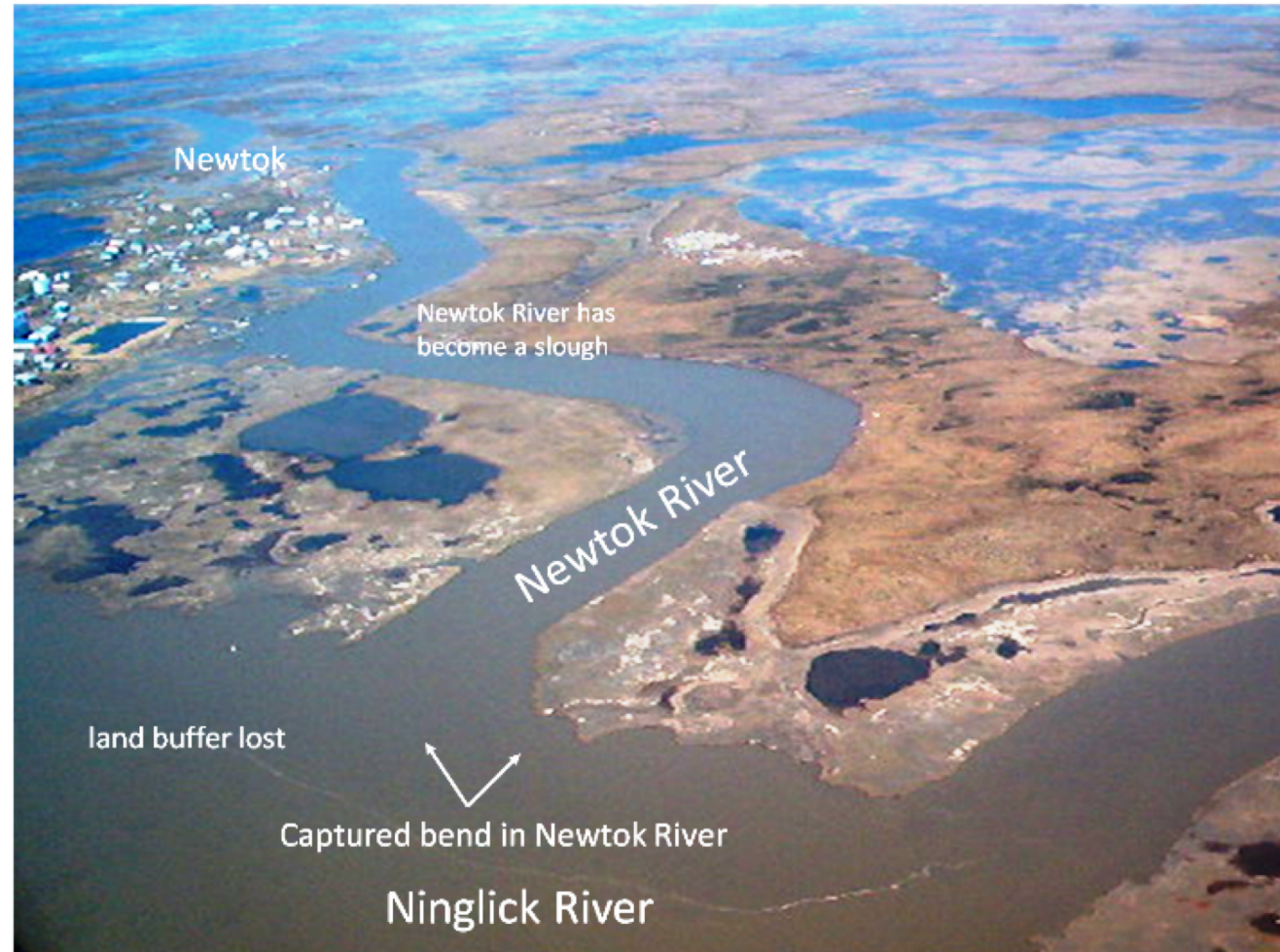
BROADWATER



- Once a popular hunting and fishing island
- Used to be at least 20 houses on the island, none remain today
- Attempted other forms of relocation before abandoning
 - Raised houses; floated houses on barges to higher grounds

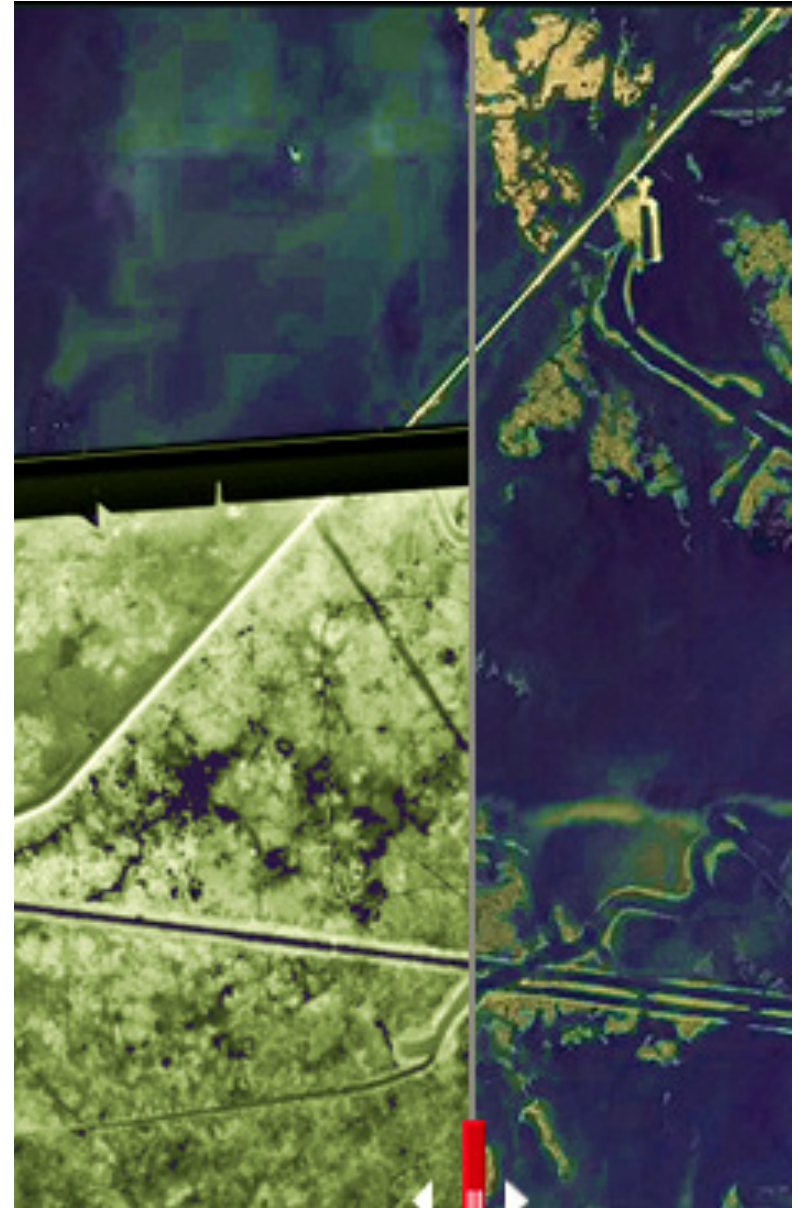
NEWTOK AND SHISHMAREF

- Faces up to 70 feet of land erosion per year
 - Expected to lose their source of drinking water this year
- Town of 450 wants to move to a location nine miles away
- Several villages have already constructed new houses
- Army Corps of Engineers estimates \$80 to \$130 million to relocate key infrastructure for each town
- Attempting to piece together a quilt of state and federal funding
- Asked for a disaster area declaration from the president, which would unlock necessary funding
 - FEMA has no policies in place for relocation



ISLE DE JEAN CHARLES

- Small community in South Louisiana
- Since 1955, the island has lost 98% of its land
- First community to receive federal tax dollars to help move an entire community relocating due to climate change
 - Received \$48 million from HUD
 - These federal funds have to be spent by 2022
- Choosing a location has been very difficult, potential receiving communities impose problems
- Also a concern of a lack of community
 - Want to reunite the more than 200 families that have scattered after leaving the island



ISLE DE JEAN CHARLES

SIDNEY

- 2011 flooding has impacted over 2,000 people
- Sidney began with plans to move the town to dry-land
 - As of now, has yet to remove more than a few dozen homes from the flood plain
- U.S. is “politically, financially, and emotionally” unprepared to re-create communities in a way that is organized and preserves the character and history
 - Things take time



WHAT CAN WE LEARN FROM ALL THESE CASE STUDIES?

- So many contributing factors come into play
 - Funding, receiving communities, property rights, etc.
- Planning ahead is a good thing
- Putting plans in place for procedures to deal with this can help speed up the process
- Funding is vital

- <https://law.wm.edu/academics/programs/jd/electives/clinics/vacoastal/reports/index.php>