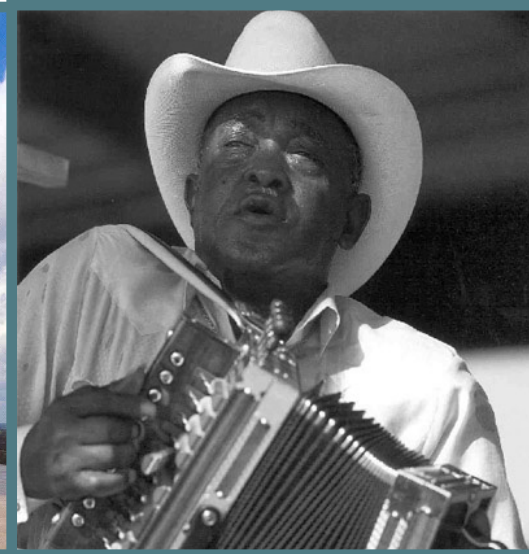


# The Multiple Lines of Defense Approach: Lessons Learned from Louisiana and the Netherlands



Natalie Snider, Science Director  
Coastal Resiliency Symposium  
May 26, 2010

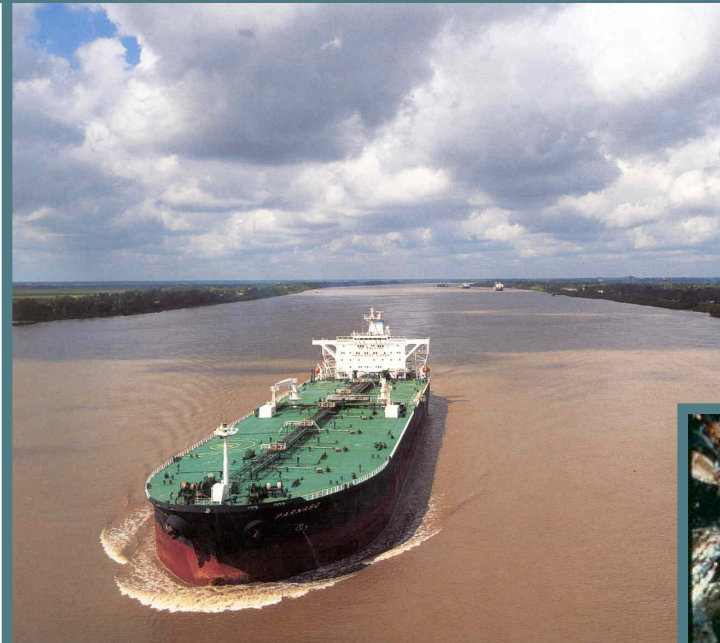
# Mission



## To Restore and Protect a Sustainable Coastal Louisiana



# Transformable



# Adaptive

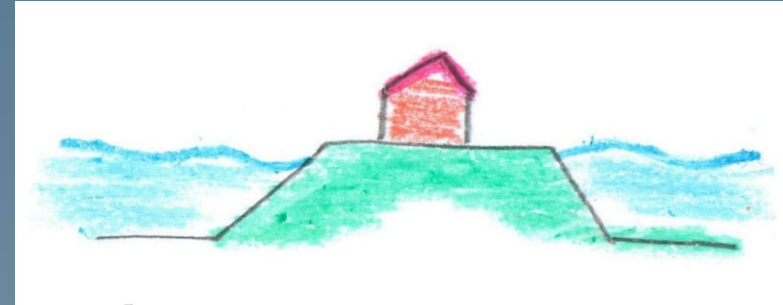


# Resilient

# History of Dutch Flood Protection



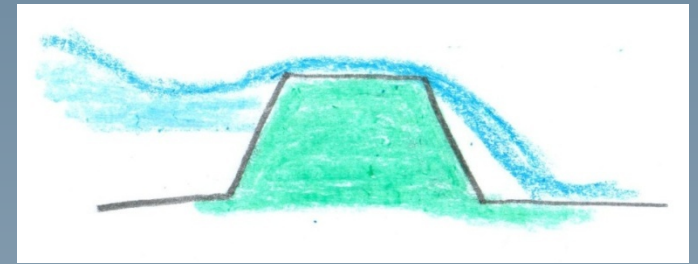
The Netherlands a loooooong time ago



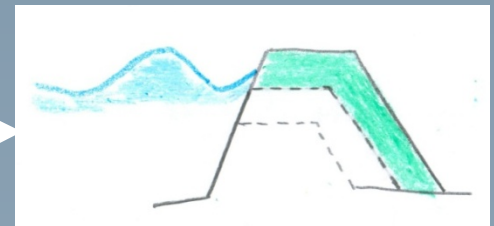
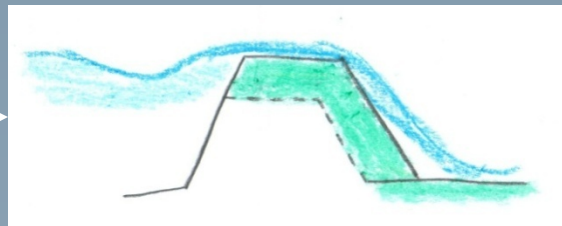
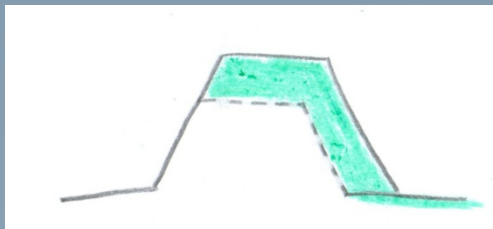
A little bit later



Again a bit later



BUT.....



Resilient Strategy????

Courtesy of Yvo Provoost, Rijkswaterstaat

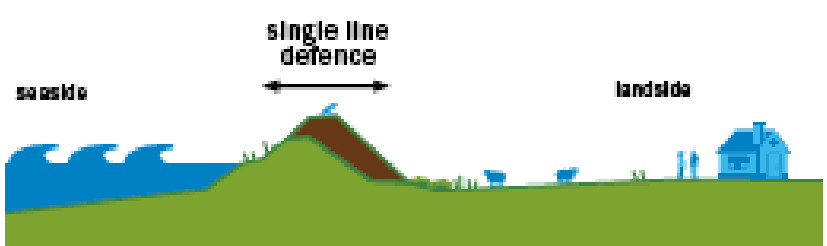
# Continuous Investments



**43 Foot Levee!!!!**



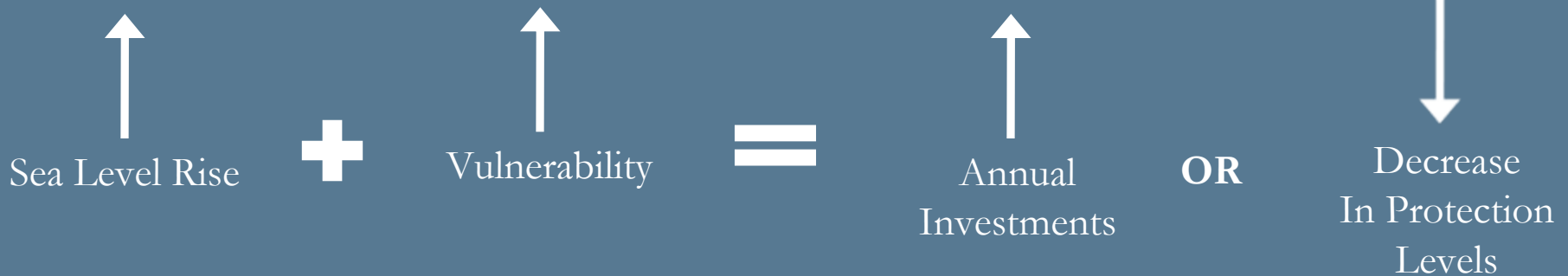
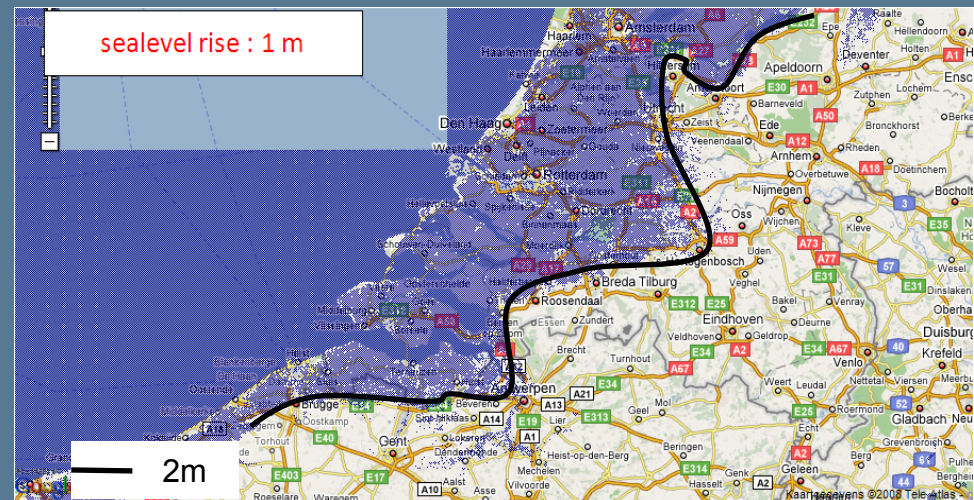
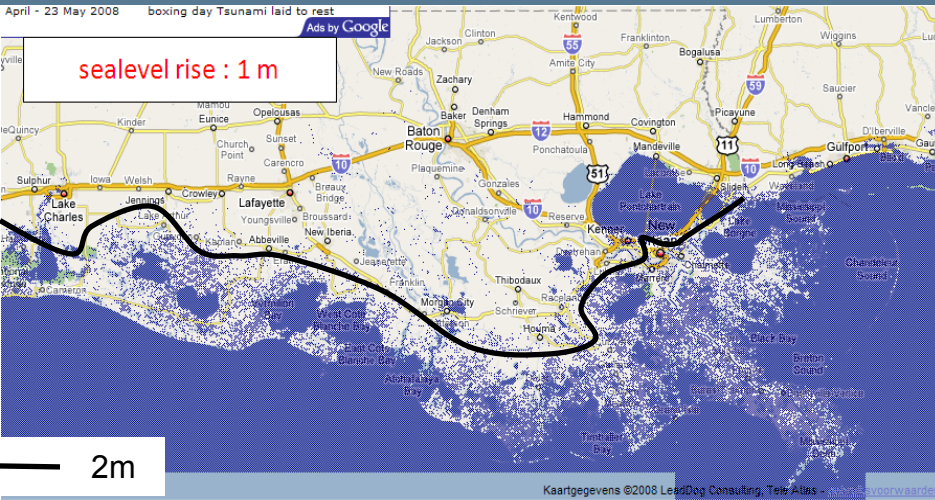
The aim is to move from a traditional single line defence





# Impact sea level rise

## Sea Level Rise Estimates



### Estimated Annual Costs

Time Period 2010 - 2050

€1.3 to 1.9 Billion

Time Period 2050 - 2100

€1.2 to 1.8 Billion

Equivalent to \$1.5 Billion to \$2.5 Billion per year



# Knowing the Risks

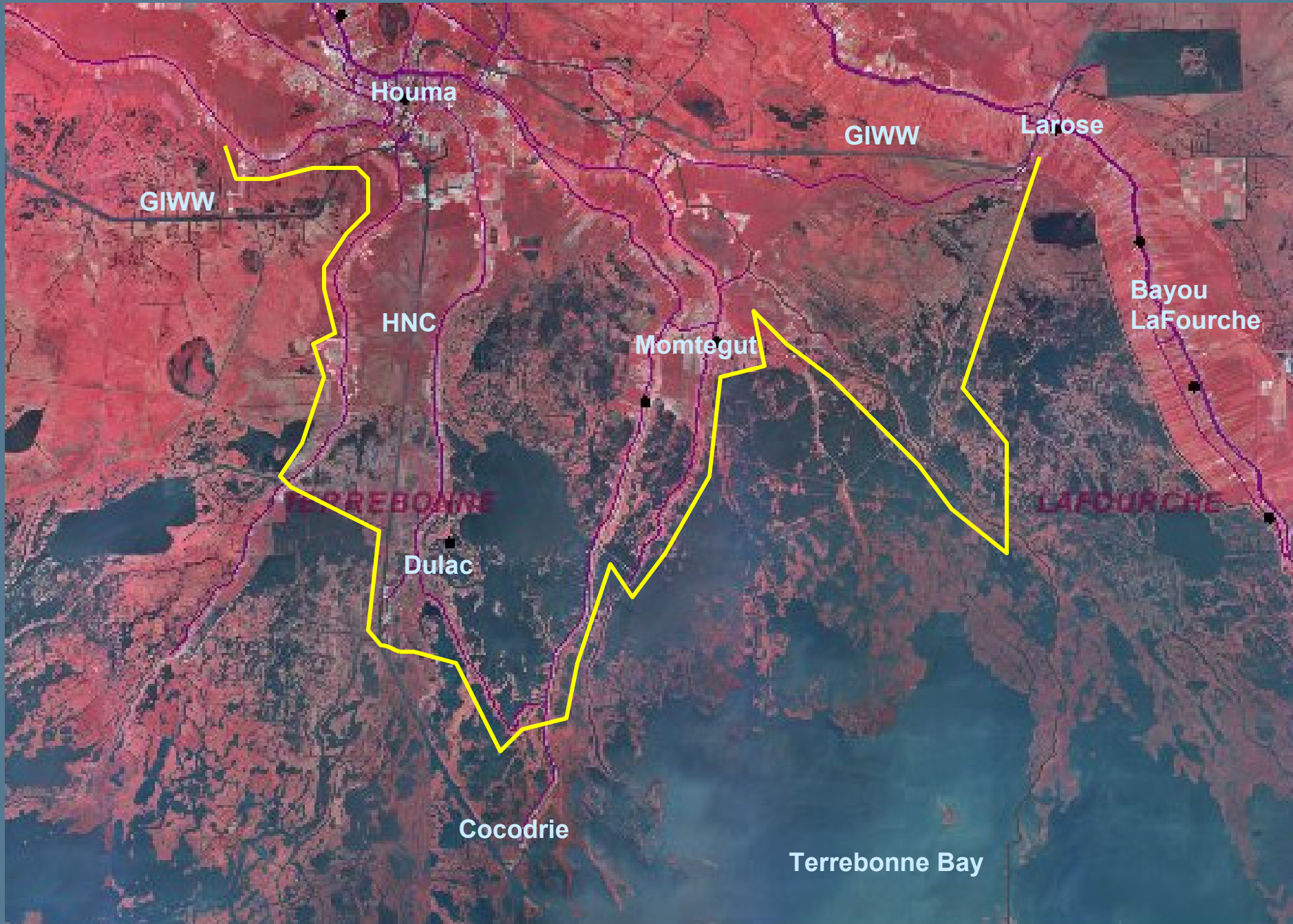


Sea level rise of 50 cm will render the Maeslantkering Storm Surge Barrier and the Oosterschelde Storm Surge Barrier insufficient

Chance of flooding in Rotterdam will increase ten fold

Max rise of 1.3 m by 2100 will increase the flood risk by more than 100 times





Houma

GIWW

Larose

GIWW

HNC

Montegut

Bayou  
LaFourche

TERREBOUNE

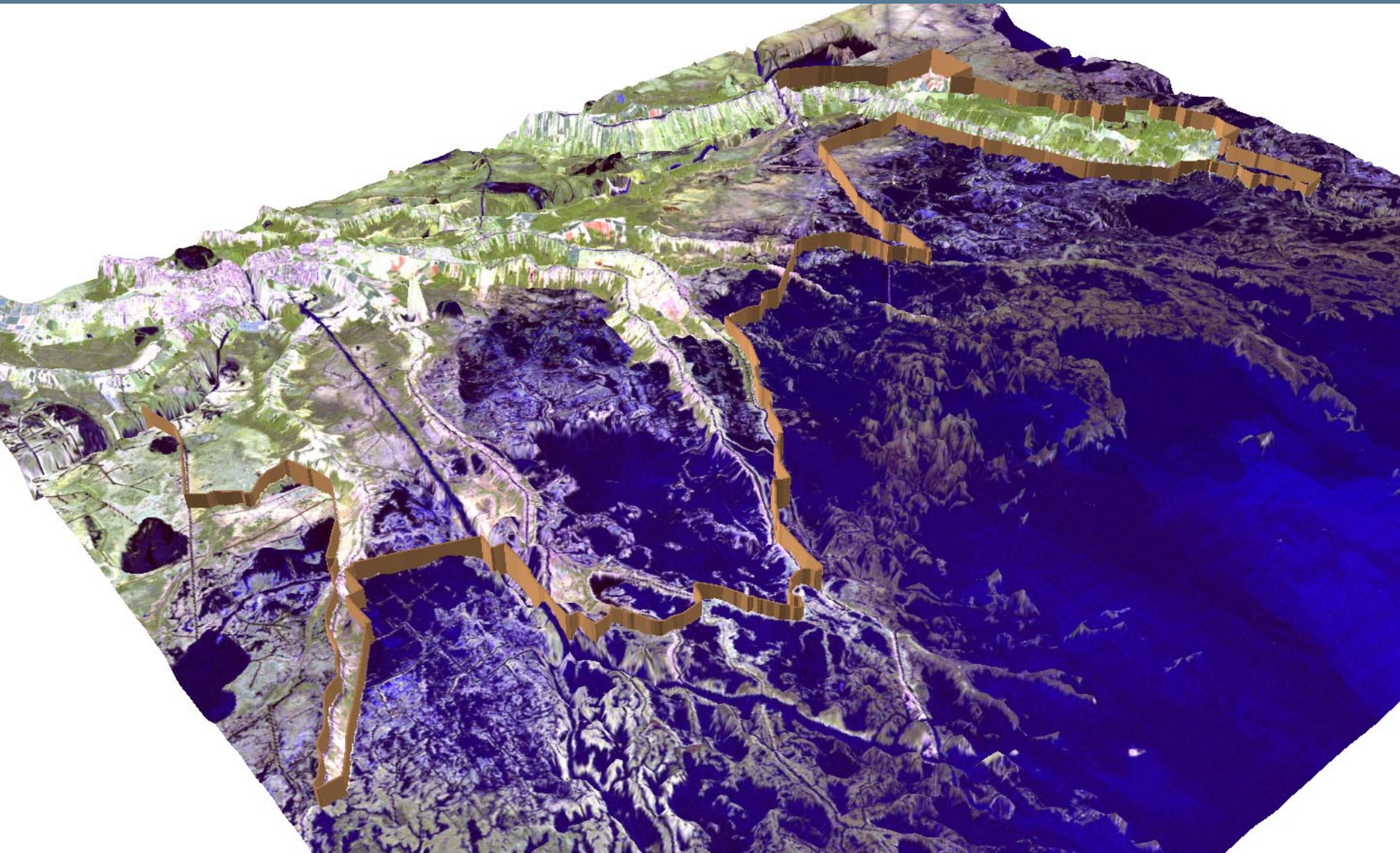
Dulac

LAFOURCHE

Cocodrie

Terrebonne Bay

# Proposed Morganza to the Gulf Levee Alignment



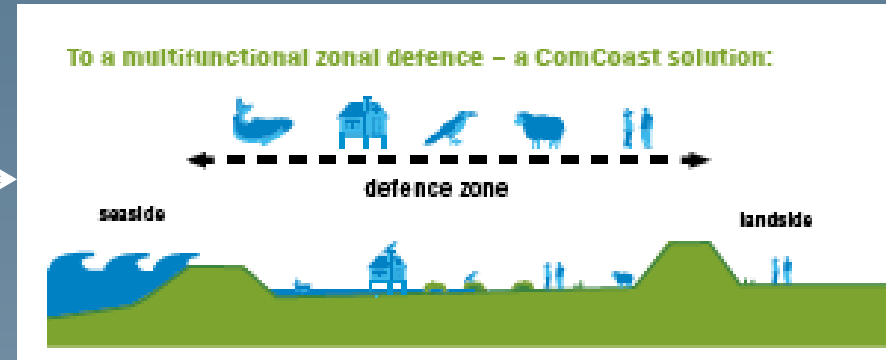
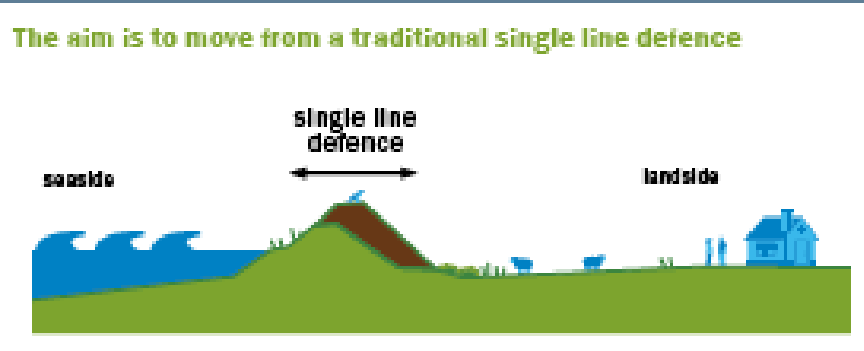
# Proposed Morganza to the Gulf Levee Alignment

- 1992 – Reconnaissance Study Authorized
- 1994 – Reconnaissance Study Completed
- 1995 – Feasibility Study Authorized
- 2002 – Local sponsor (Terrebonne Parish) passes ¼ cent sales tax to raise the cost share required
- 2002 – Feasibility Study Completed, Preferred Alternative Selected and Chief of Engineers Report submitted
- 2007 – Authorized in WRDA at \$912 million
- 2008 – Economic Analysis Conducted  
Post-Katrina re-evaluation escalated costs to between \$6.5 billion to \$10.5 billion (outside of the current authorization)
- 2009 – Re-Evaluation of Alternatives, expected to be completed in 2011

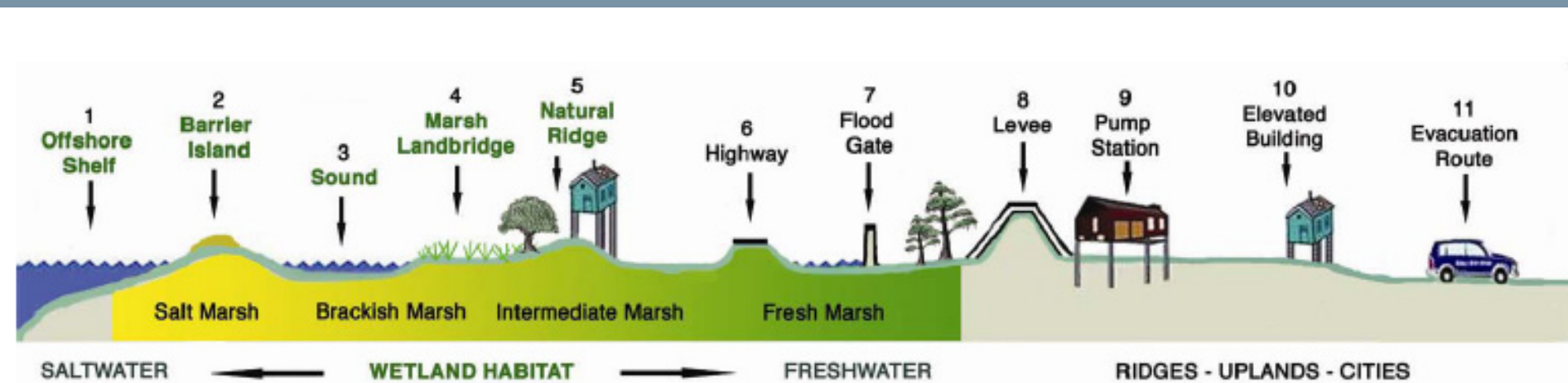


# Single versus Multiple Lines of Defense

## Dutch Model



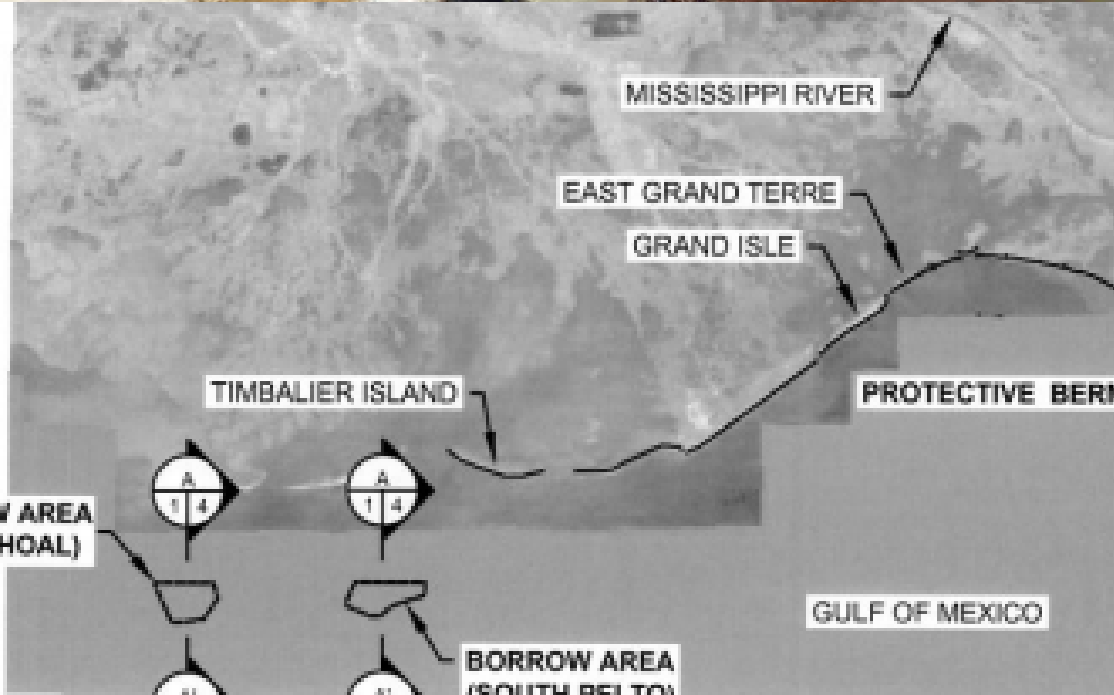
## Louisiana Model



A Common Future for Louisiana and the Netherlands



© RS Air Photo.com



NO  
1.

2

# Holly Beach (Pre-Rita)



# Holly Beach (Post-Rita)



18 Foot Storm Surge







# 22 Foot Storm Surge





Thank you!

