



A Dutch Perspective on Coastal Louisiana Flood Risk Reduction and Landscape Stabilization



Jos Dijkman (Deltares / Delft Hydraulics)

Dutch Perspective Project



What it is:

- Aimed at long term: 100 years ahead
- A reconnaissance level study, based on simple modeling
- Focus on technical aspects
- Within framework of LACPR

What it is **not**:

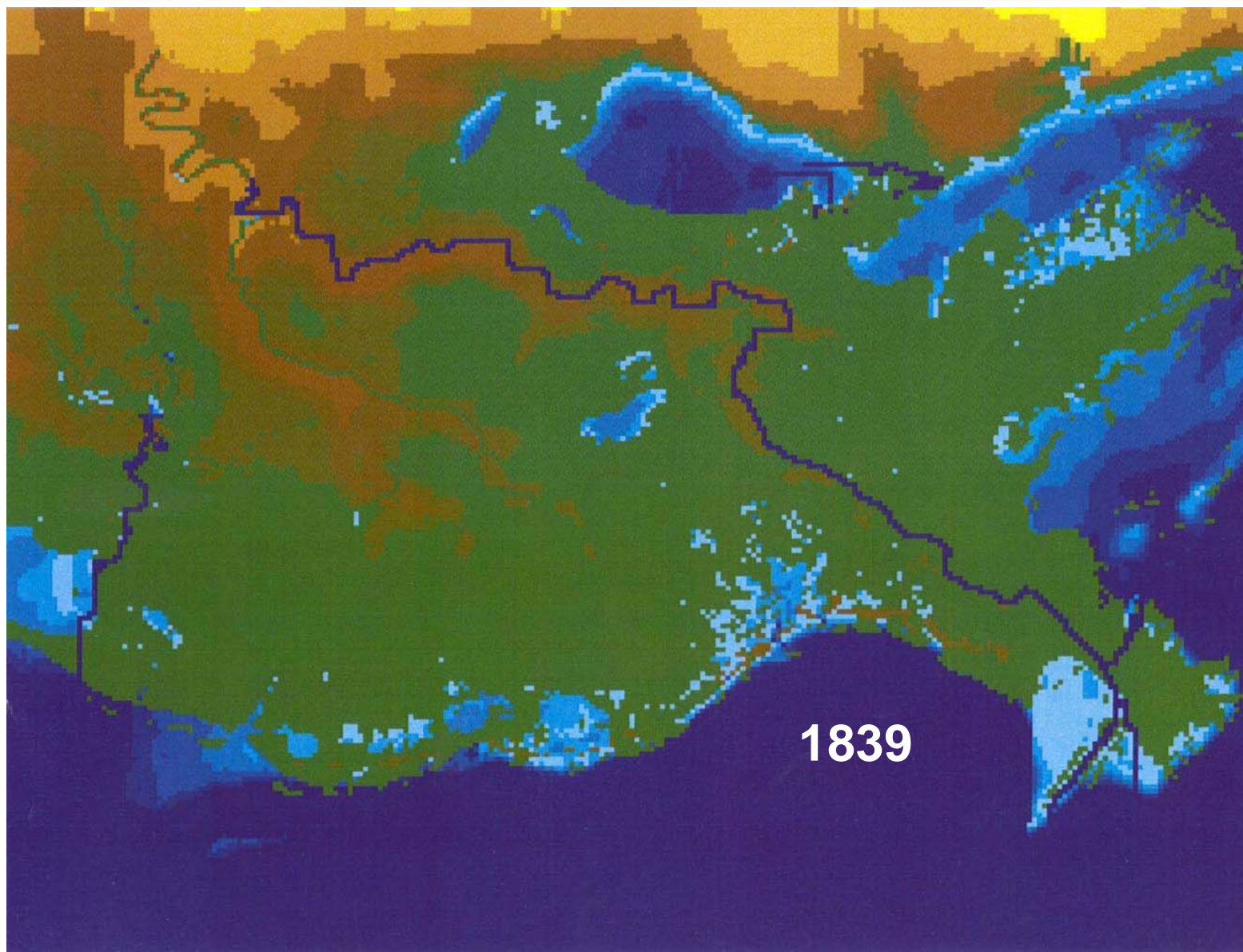
- Design report
- Discussed with stakeholders
- An alternative for IPET or LACPR

Project Objectives

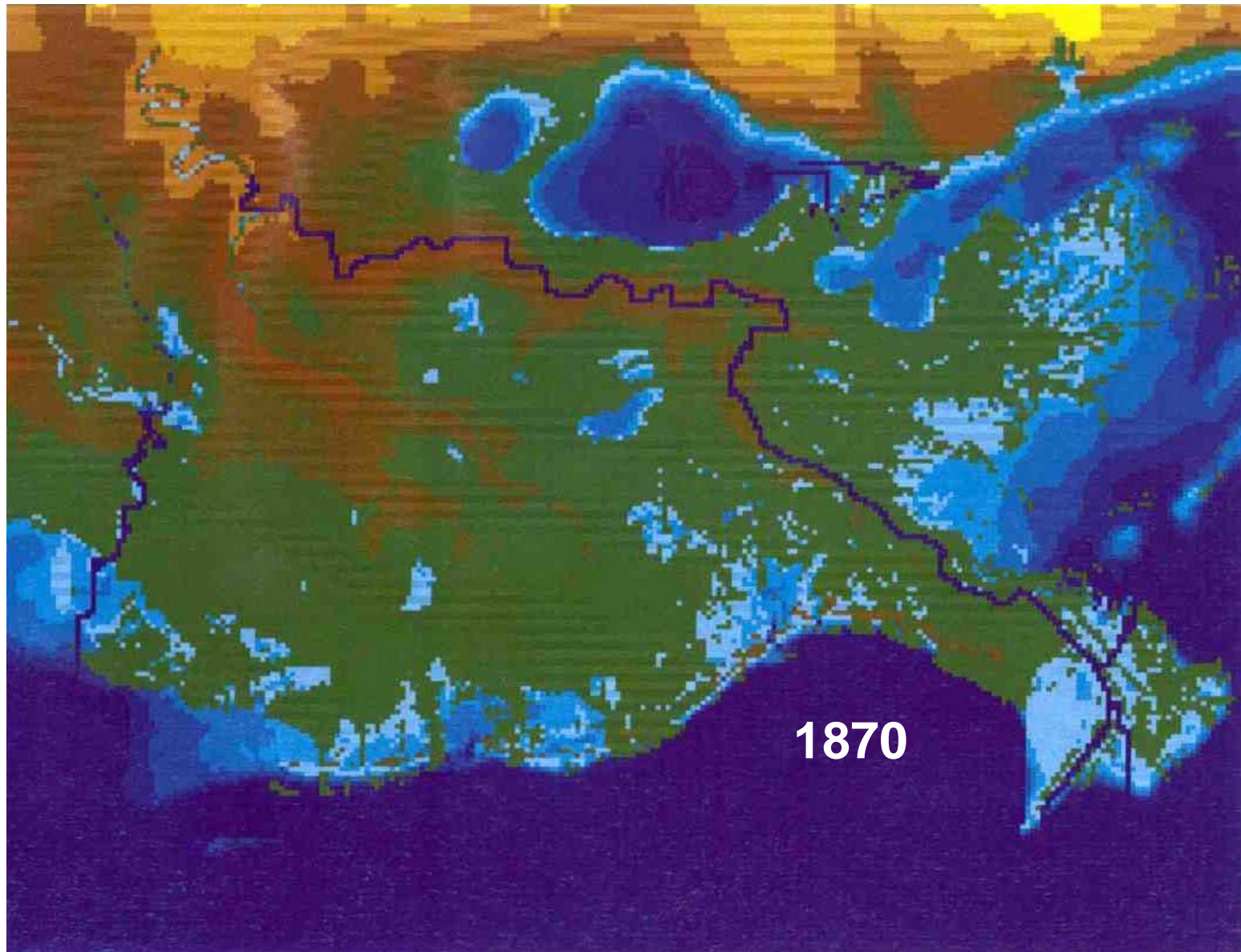


1. Flood Risk reduction
2. Landscape stabilization
3. (Enhance the local and regional economy)

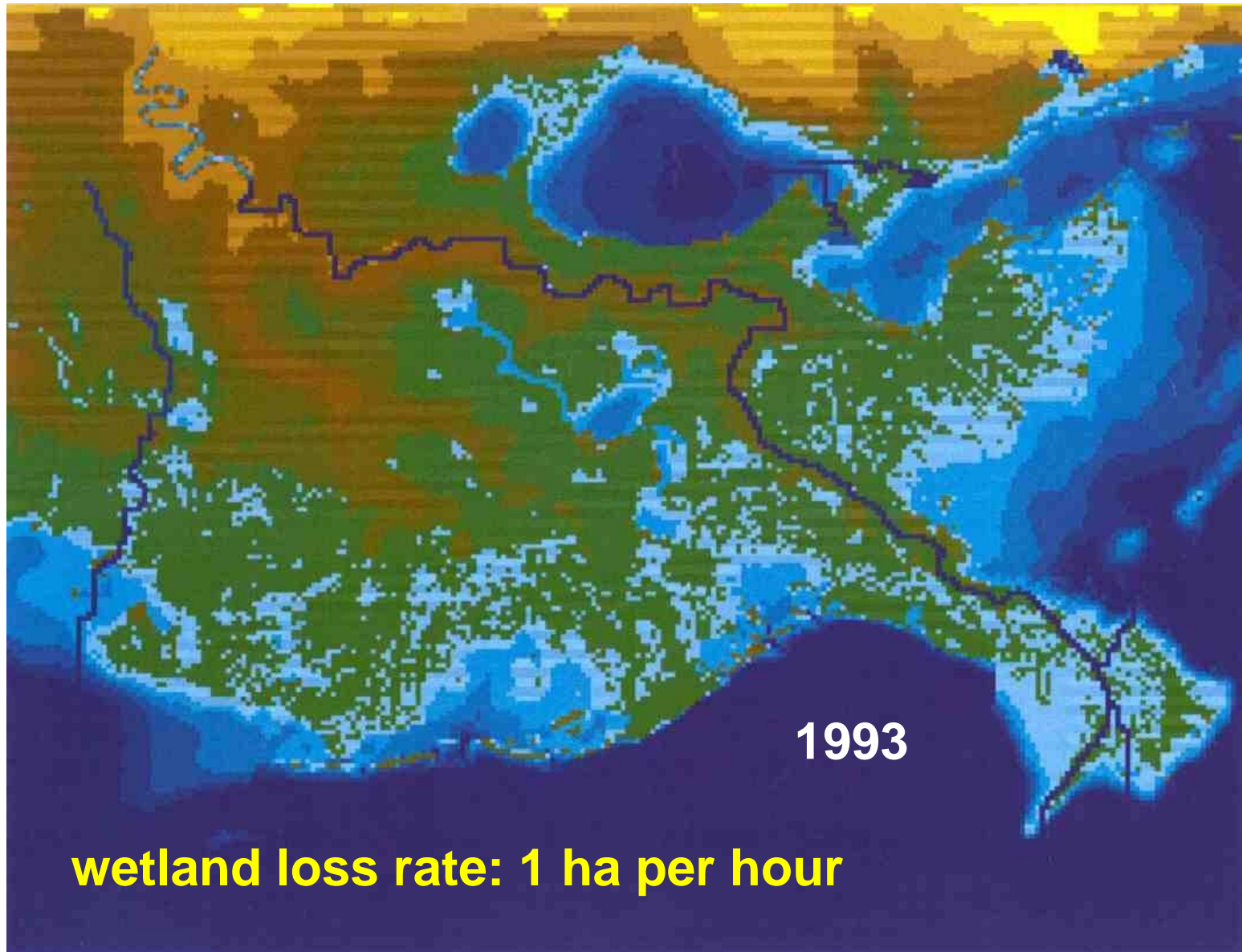
Past and Projected Wetland Loss



Past and Projected Wetland Loss



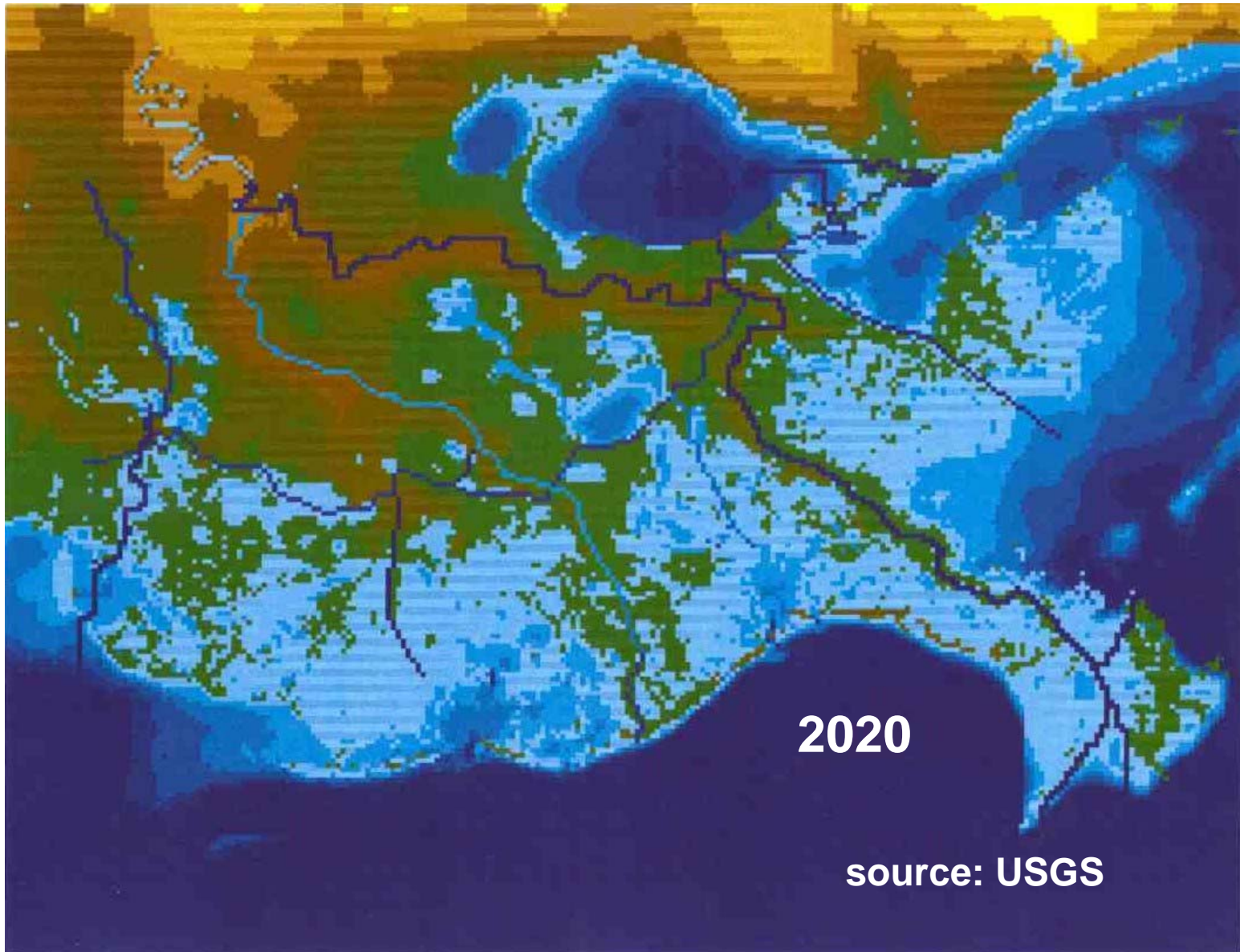
Past and Projected Wetland Loss



1993

wetland loss rate: 1 ha per hour

Past and Projected Wetland Loss



2020

source: USGS



Project Objectives



1. Flood Risk reduction
 2. Landscape stabilization
 3. (Enhance the local and regional economy)
- Focus: Metropolitan New Orleans and Mississippi Delta (LACPR planning units 1 + 2)



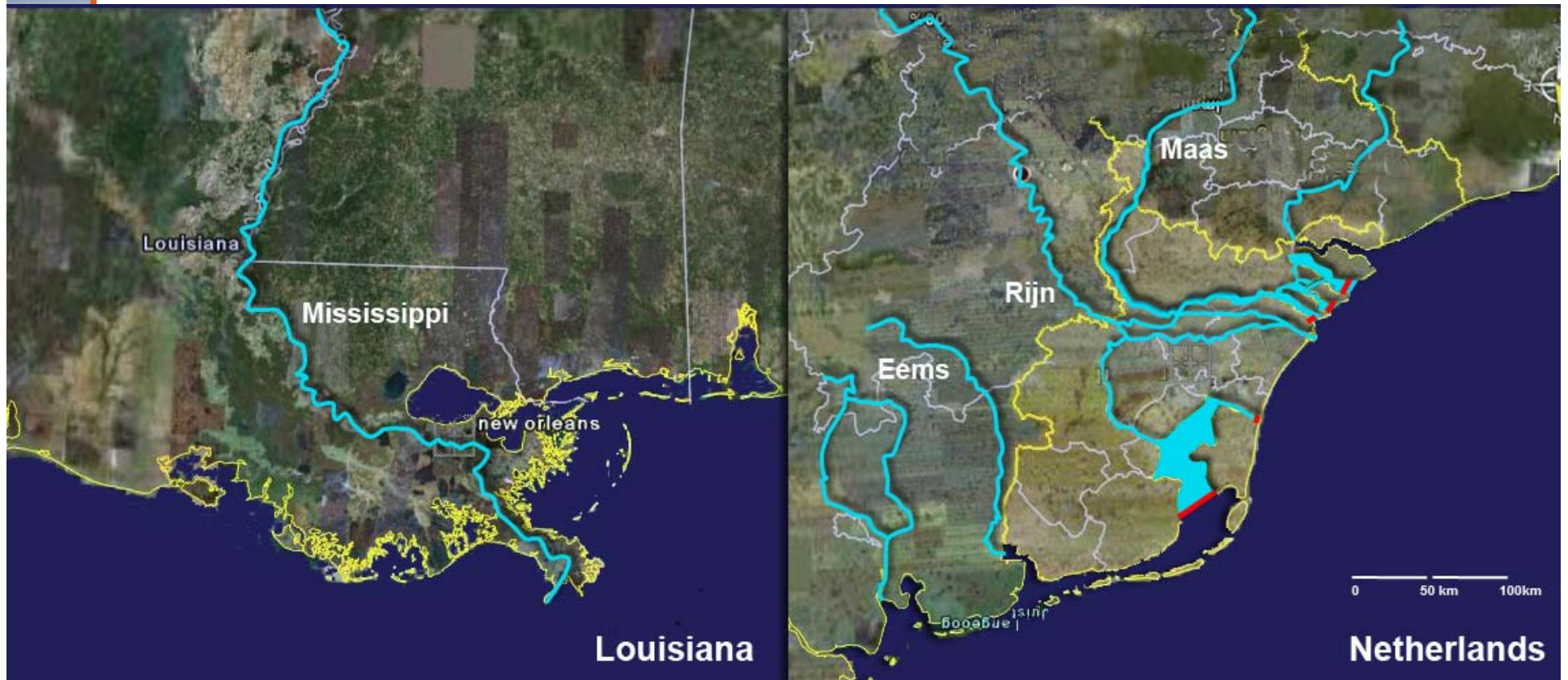
The NWP Project team



- Rijkswaterstaat
- Arcadis
- DHV
- HKV
- TNO
- Fugro
- Infram
- Geodelft
- Royal Haskoning
- Alkyon
- Delft Hydraulics (project lead)

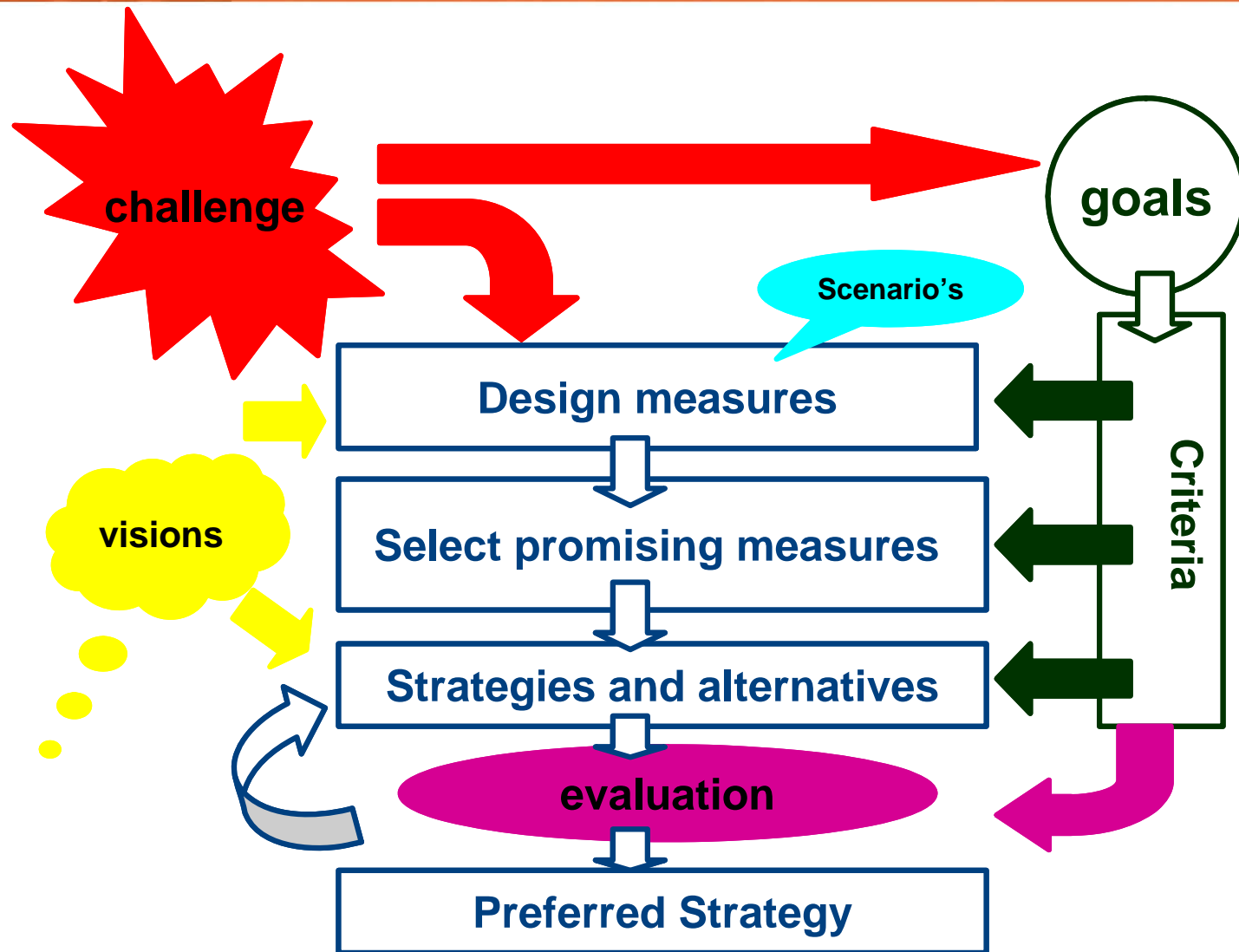


Comparison Louisiana - Netherlands **NWP**



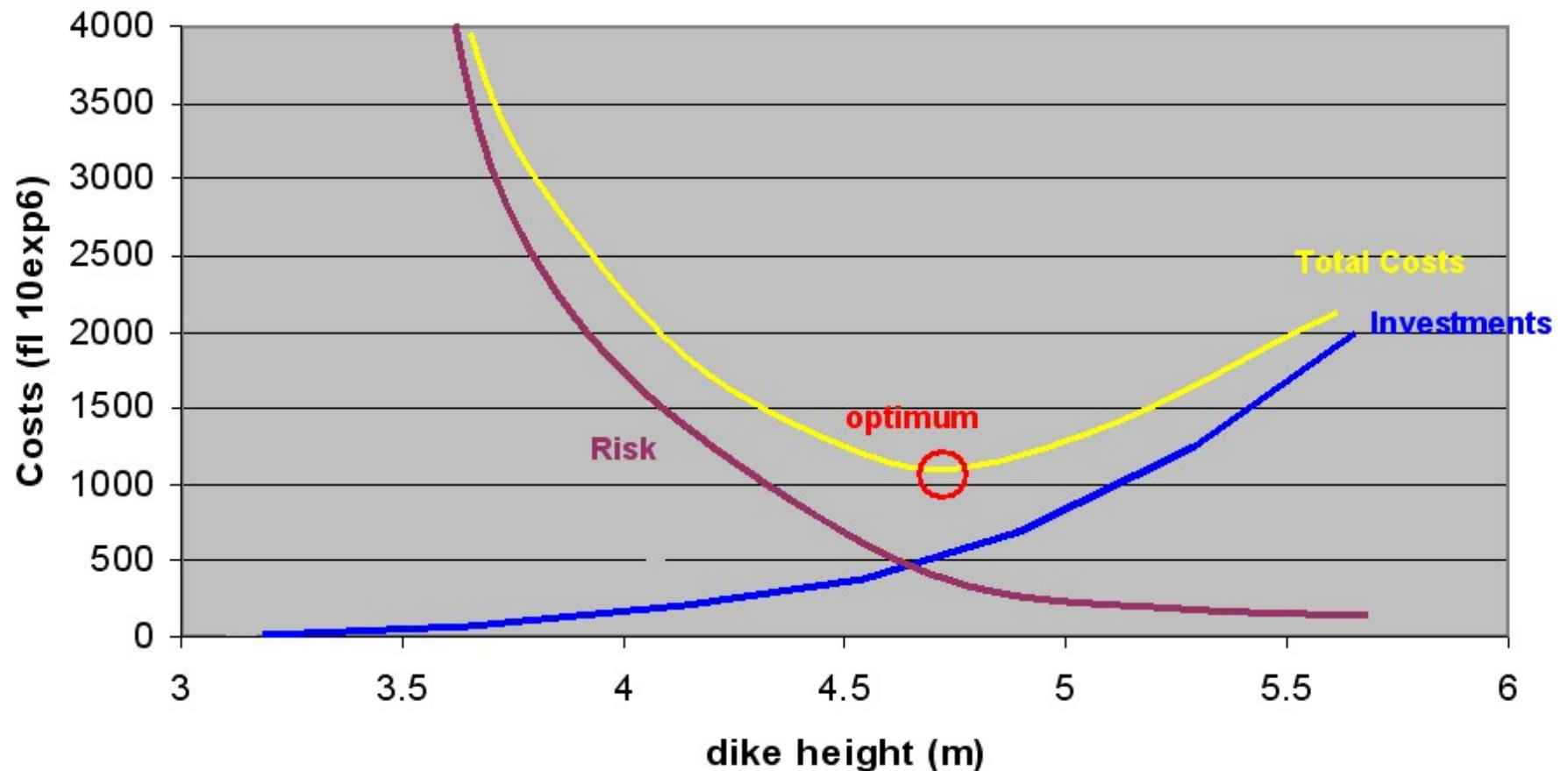


System Analysis



Risk and Safety

- Simplified approach, using realistic data (IPET/LACPR)
- Hurricanes only (no river flooding or local rainfall)
- Direct damages only (no loss of life or indirect damages)

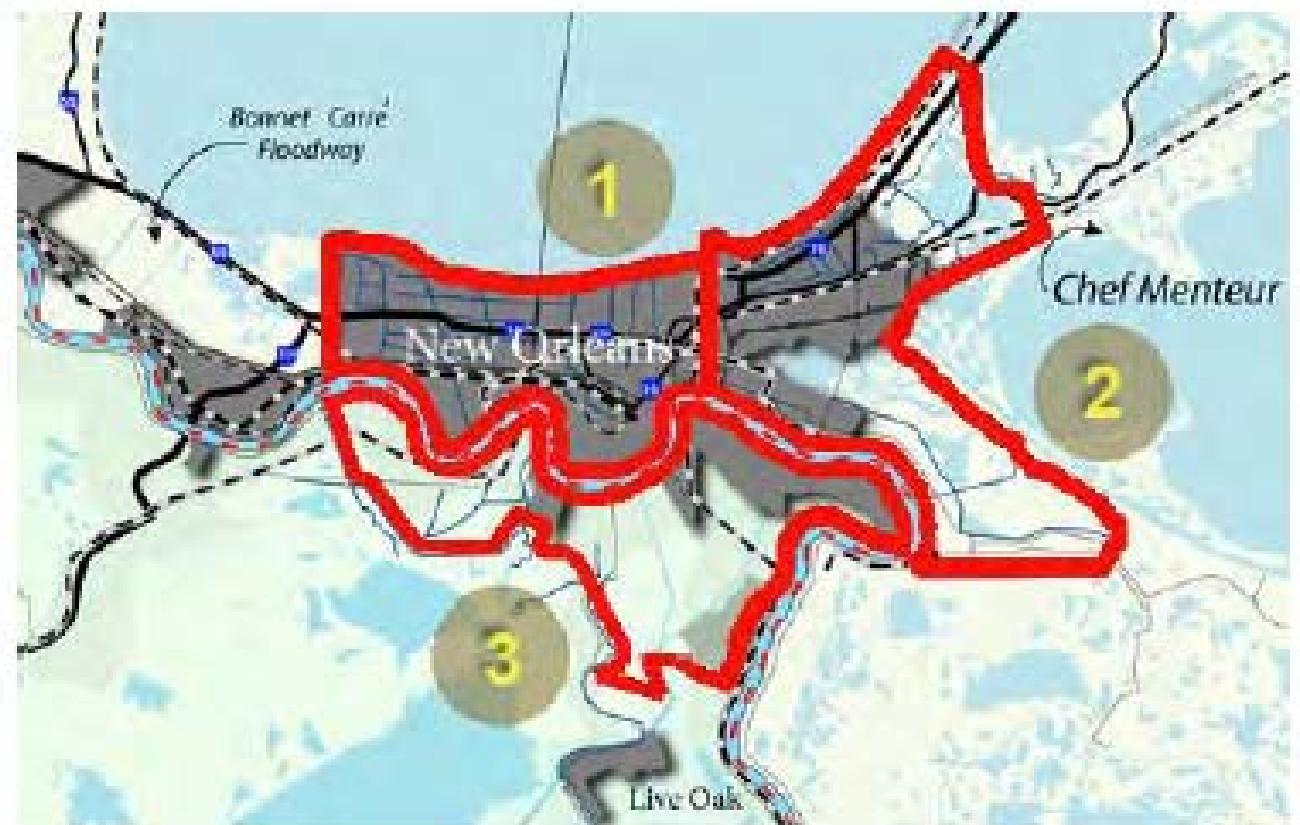


Risk and Safety



Three ring levee areas:

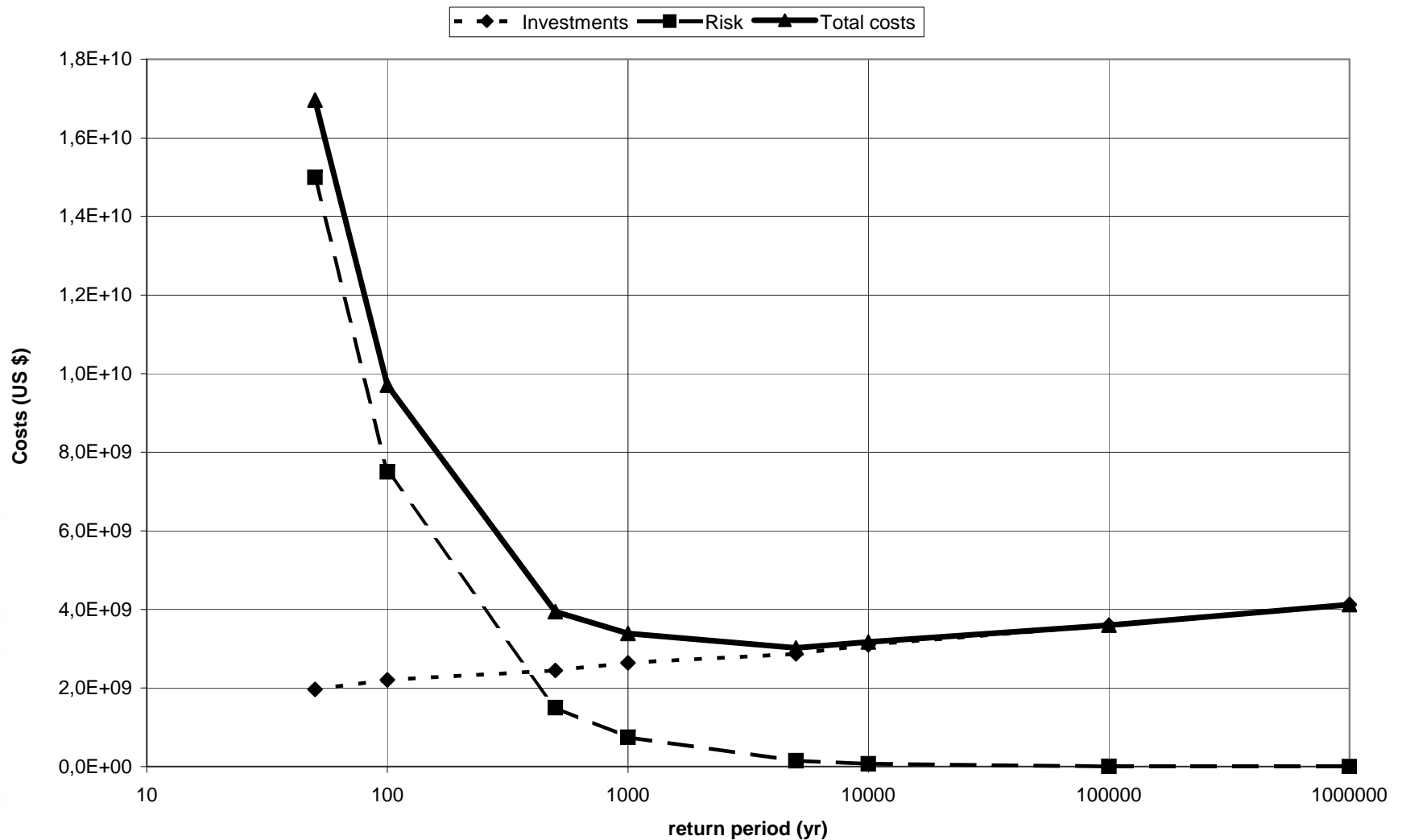
- 1 East bank NO: central part
- 2 East bank NO: eastern part
- 3 West bank NO



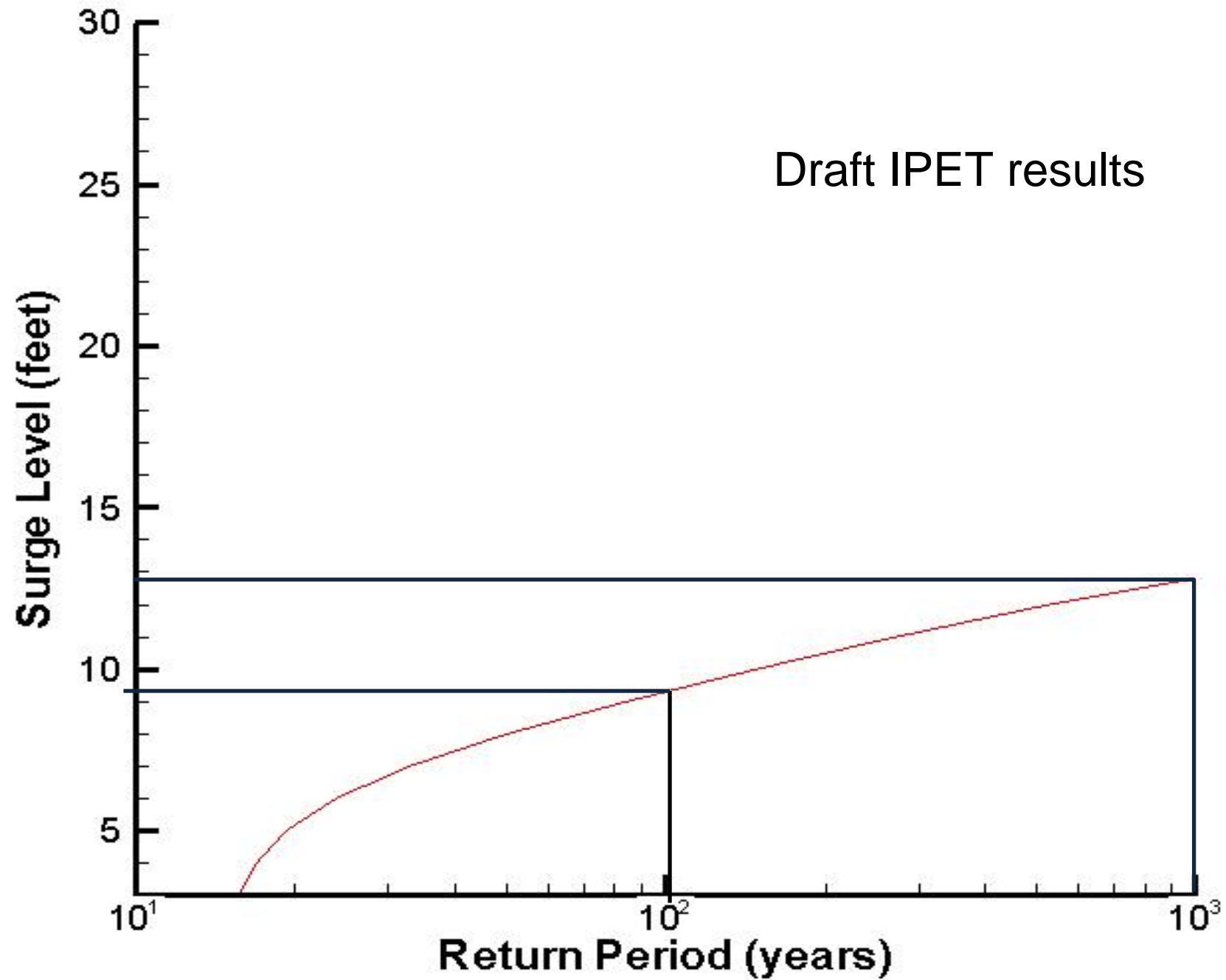
East bank: Central part (ring 1)



Optimal safety level: 1/5,000 per year



Draft IPET results



Sensitivity Analysis

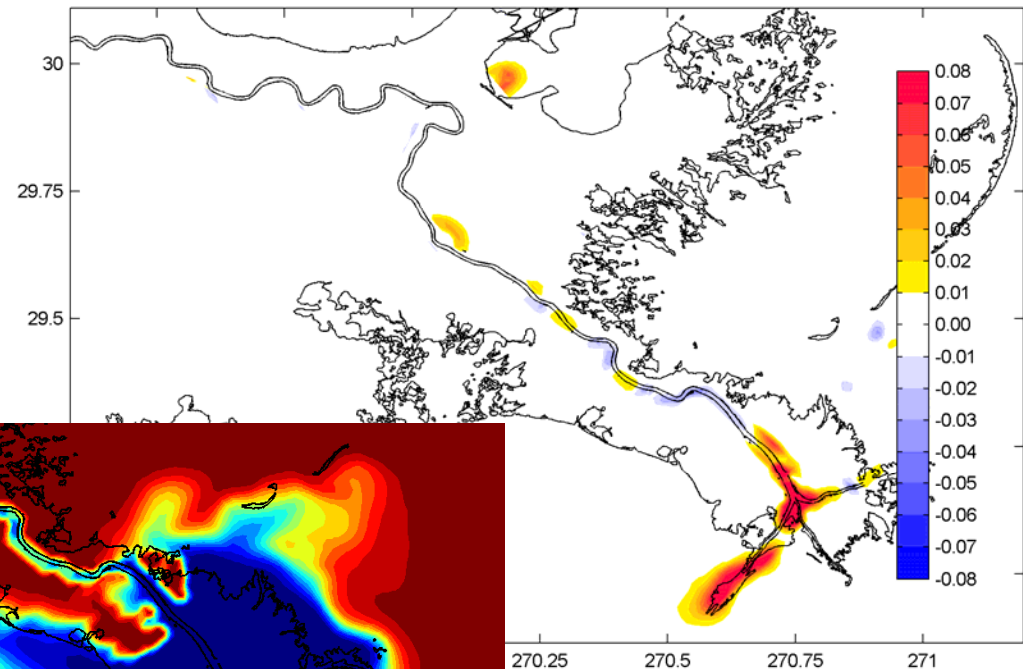
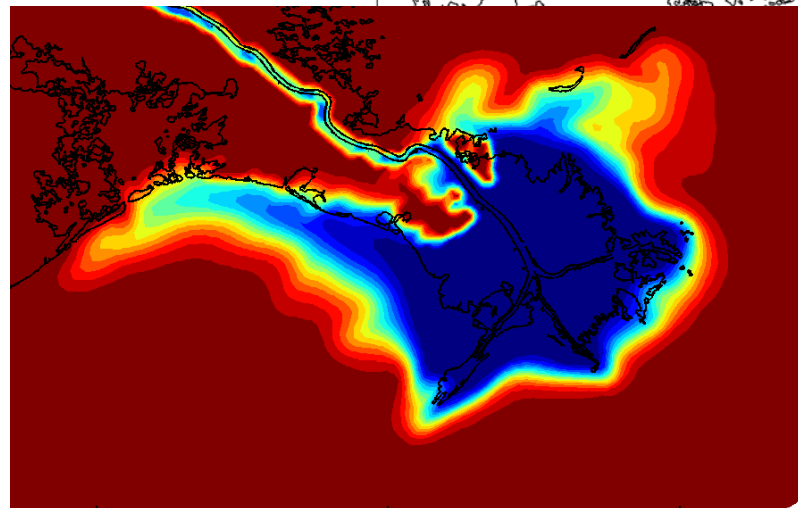
East bank NO Central (1)	Optimal safety standard
Base case	1/5000 per year
Flood Damage <ul style="list-style-type: none">•50% lower•100% higher	1/1000 per year 1/5000 per year
Net discount rate <ul style="list-style-type: none">•50% lower•100% higher	1/5000 per year 1/5000 per year
Investment costs <ul style="list-style-type: none">•50% lower•100% higher	1/5000 per year 1/5000 per year

- Safety level metropolitan New Orleans: 1/1000 per year or better from a cost optimization point of view
- Hardly sensitive for input changes
- Other perspectives (for example loss of life, social disruption, risk averse attitude) may lead to an even better safety standard (1/10,000 or better)

Other topics

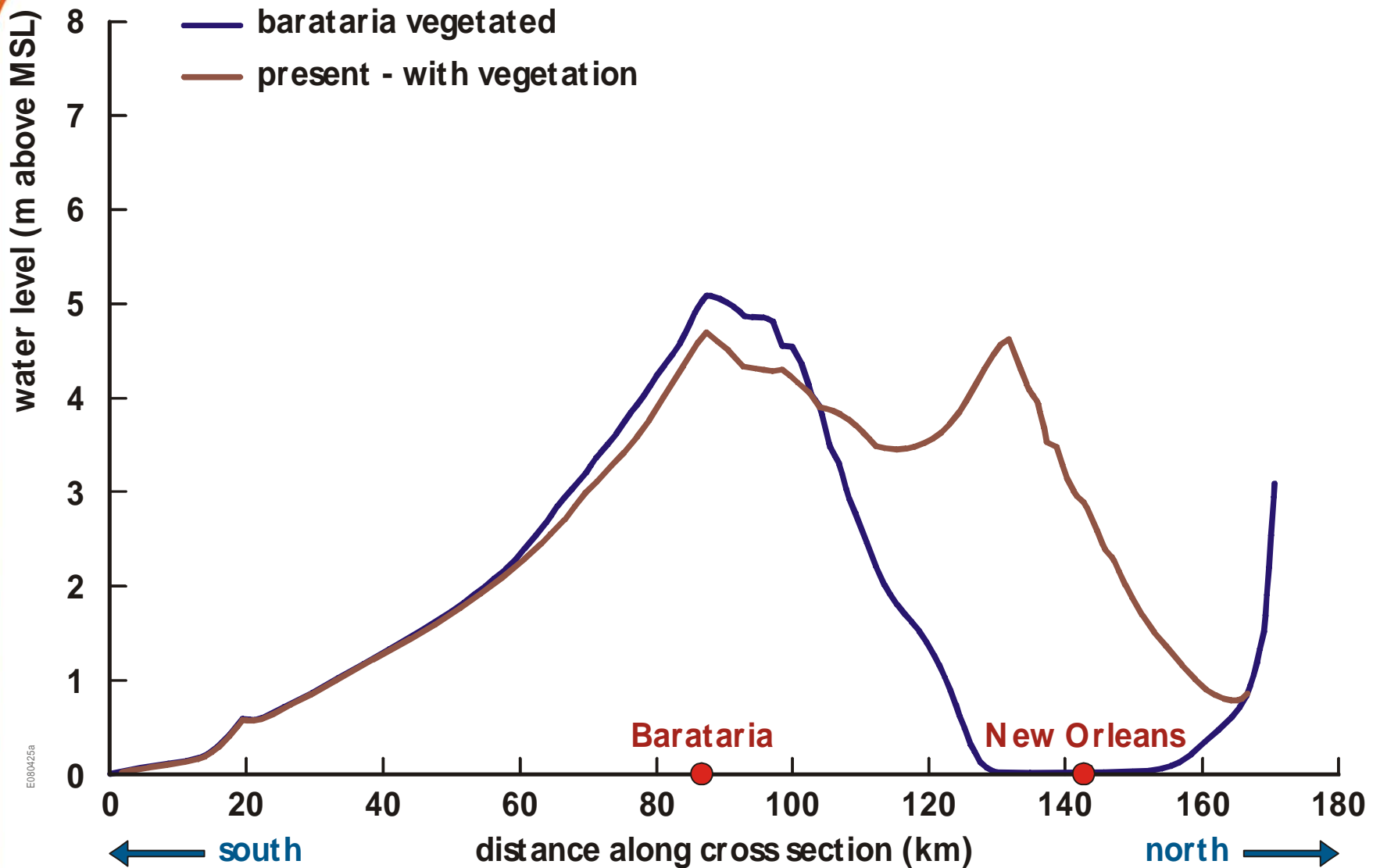
- Morphological effects

- Salinity

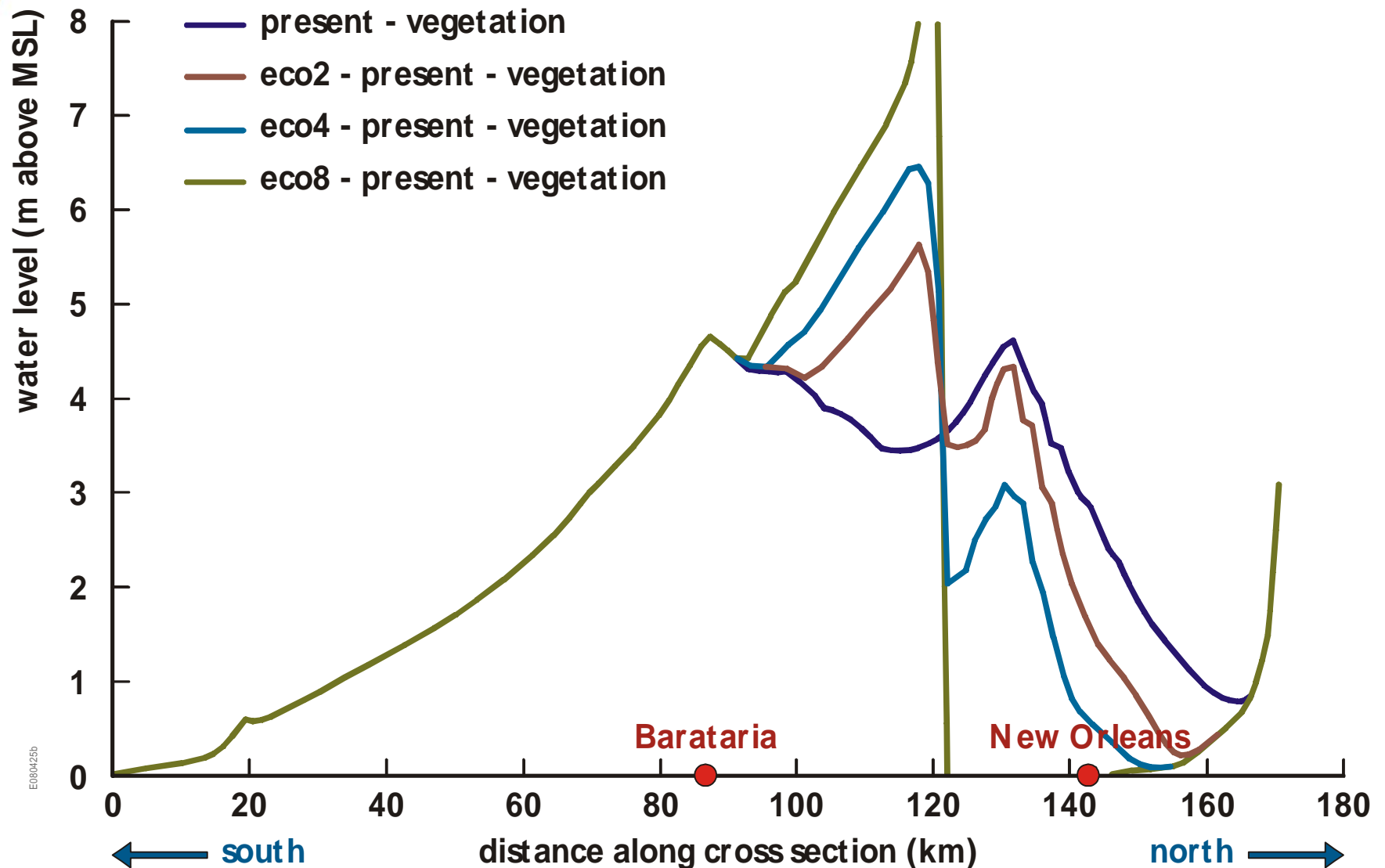


- Vegetation and levees

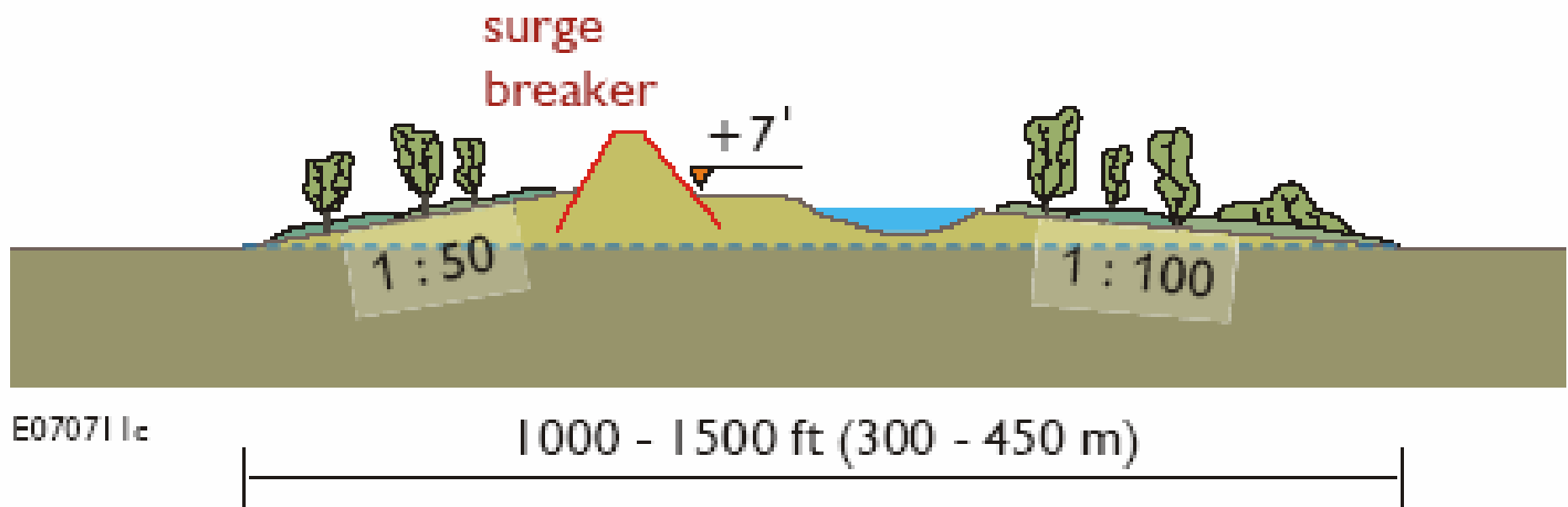
Effect of vegetation



Effect of levees

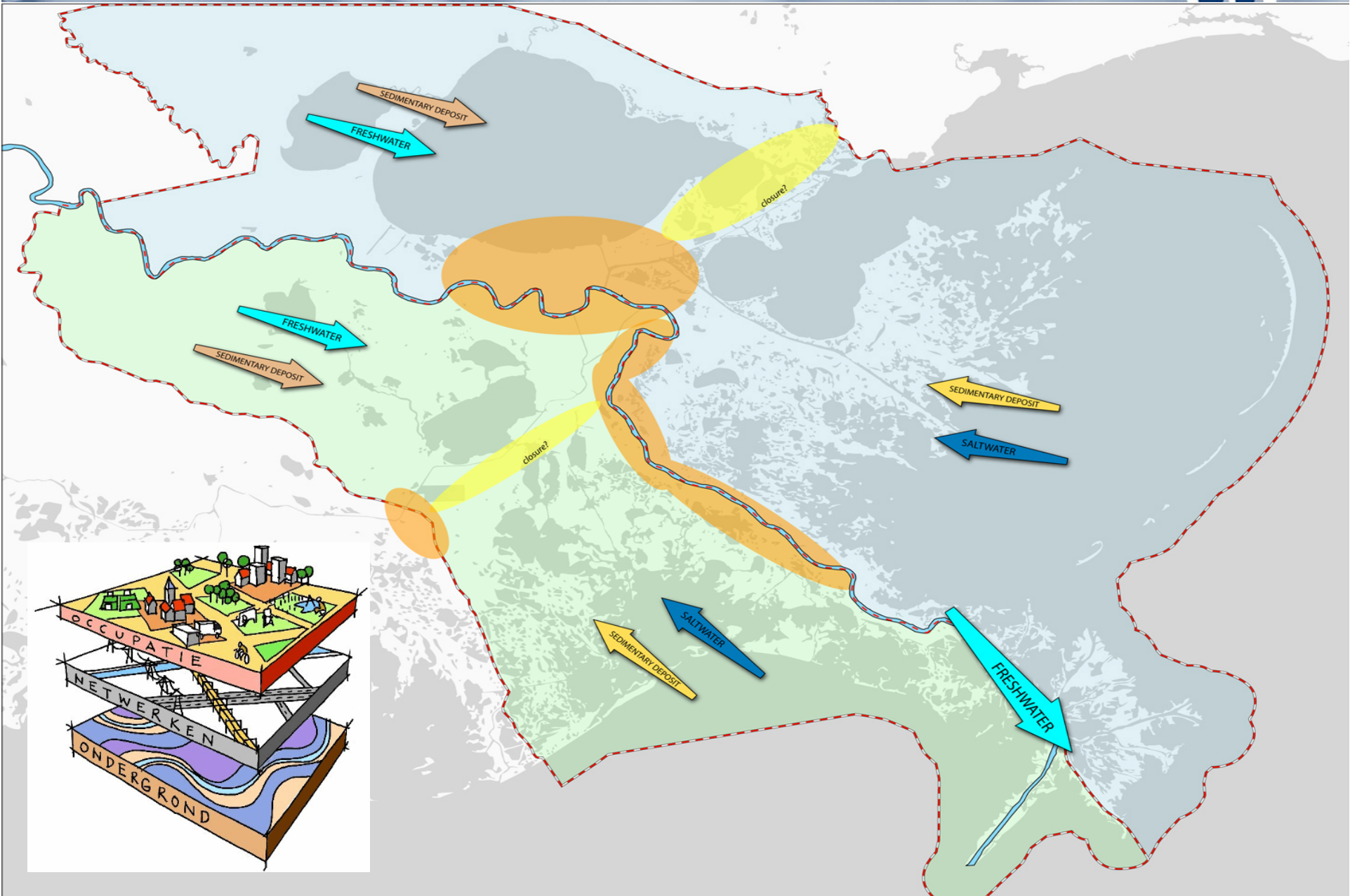


Ridge levee



Alternative Strategies

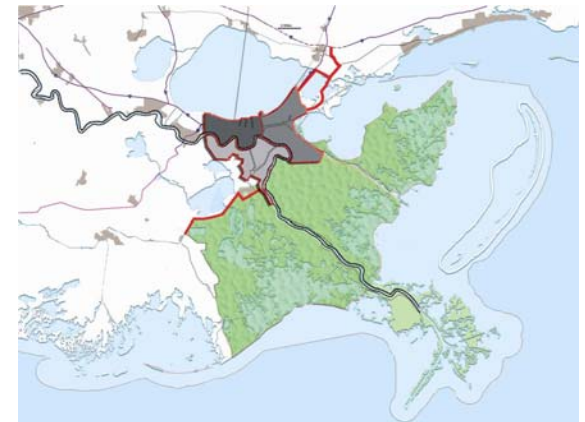
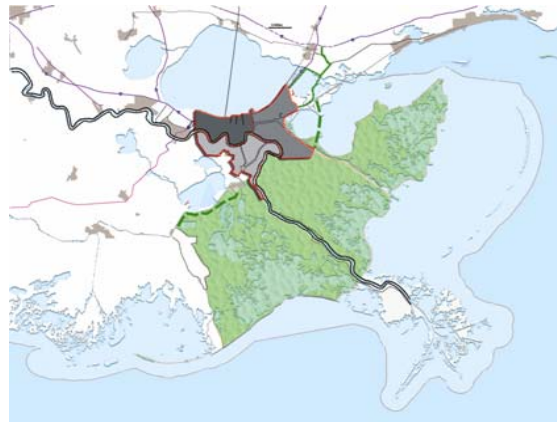
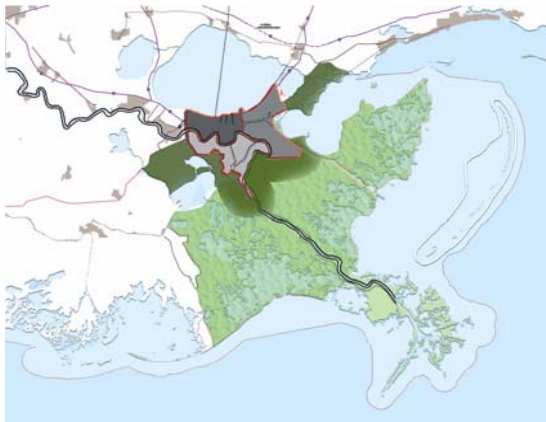
Alternative Strategies



Alternative Strategies



Protected City
17 B\$



**Open
Estuary System**
*Passive Surge
Reduction*

20 B\$

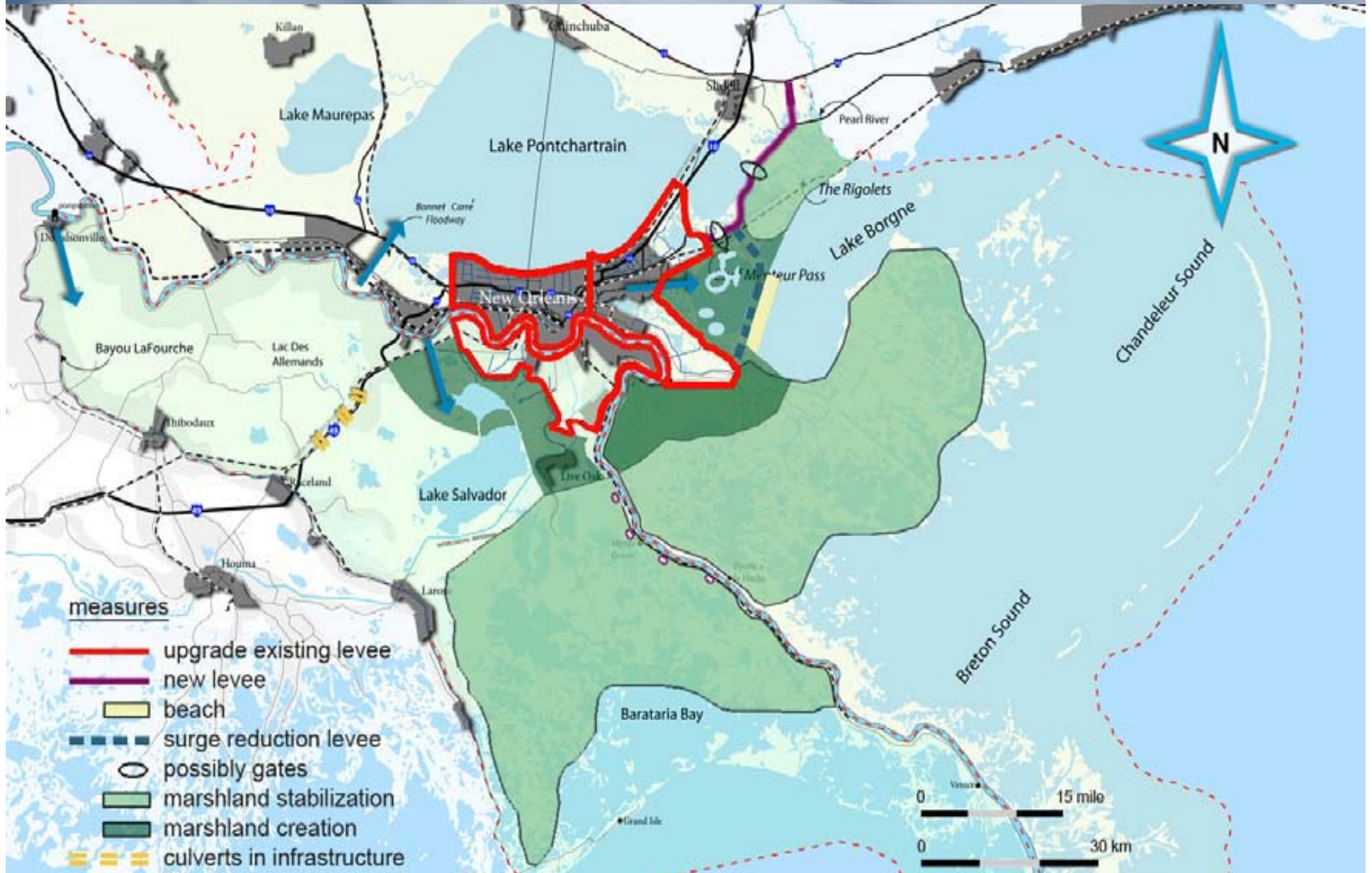
**Semi-open
Defense System**
*Enhanced Passive
Surge Reduction*

21 B\$

**Closed
Defense System**
*Active Surge
Reduction*

23 B\$

Preferred Strategy



Cost breakdown



Preferred strategy	NPV (M\$)
Ring levees New Orleans	9,585
Ring levees Plaquemines	1,485
Culverts in existing interstate/railway (5 in total)	68
Fresh water diversions (3 in total)	203
Marshland Stabilization Pontchartrain (750 sq. miles)	3,591
Marshland Stabilization Barataria (600 sq. miles)	2,835
Marshland Creation Pontchartrain (80 sq. miles)	810
Marshland Creation Barataria (60 sq. miles)	608
Marshland Creation Landbridge	675
Total (NPV)	19,860

Management and Maintenance



- Effective institutions required
- Laws and regulations
- Commitment (politics, partners and general public)
- Long term funding (re)construction
- Continued funding for maintenance

Suggestions re. levee construction



1. Levee construction

- work with locally available materials
- work with time (*soil cement columns*) (reduce life cycle costs)
- build levees that can safely deal with wave overtopping

2. Ridge levee

3. Overtopping erosion test (*Comcoast project*)



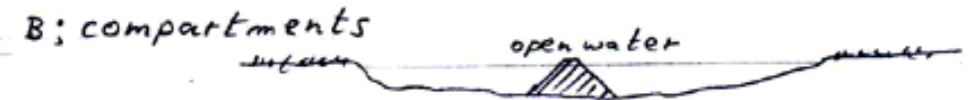
Pilot Projects

Fill knowledge gaps and gain experience re. wetland stabilization and creation ("learning by doing"):

- Canal plugging / filling



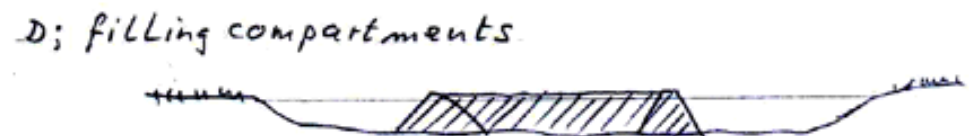
- Increase effect fresh water diversion



- Lake segmentation and land formation



- Accelerated natural marshland creation



Report download



- <http://stinet.dtic.mil/oai/oai?&verb=getRecord&metadataPrefix=html&identifier=ADA466919>
- internet search for: "Dutch Perspective", Louisiana, DTIC