Global Examples

Adapting to Rising Tides

Hans Brinker

Development of World Cities

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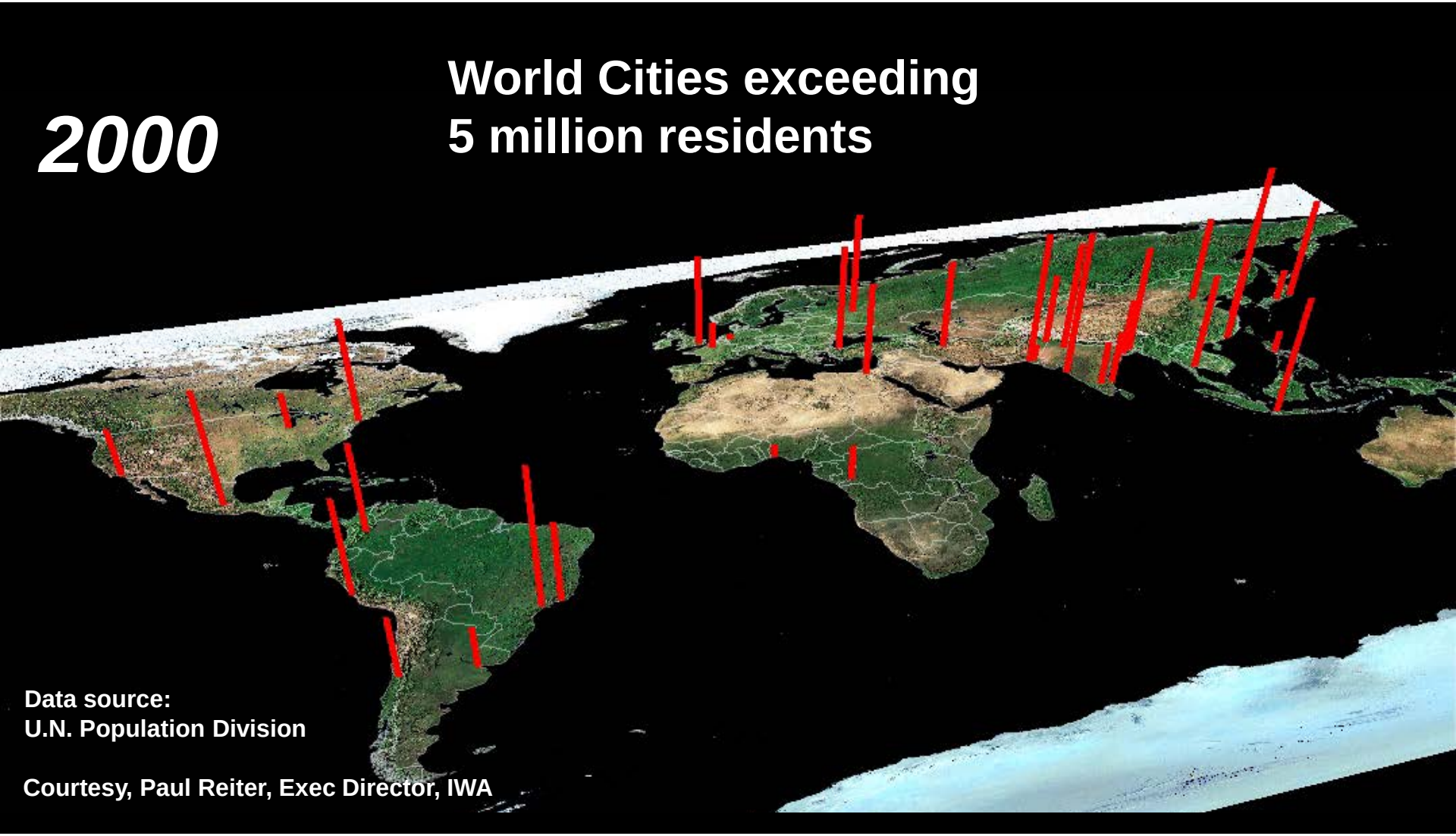
Development of World Cities



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Development of World Cities

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2050: Majority of World Population Will Live in Coastal Cities

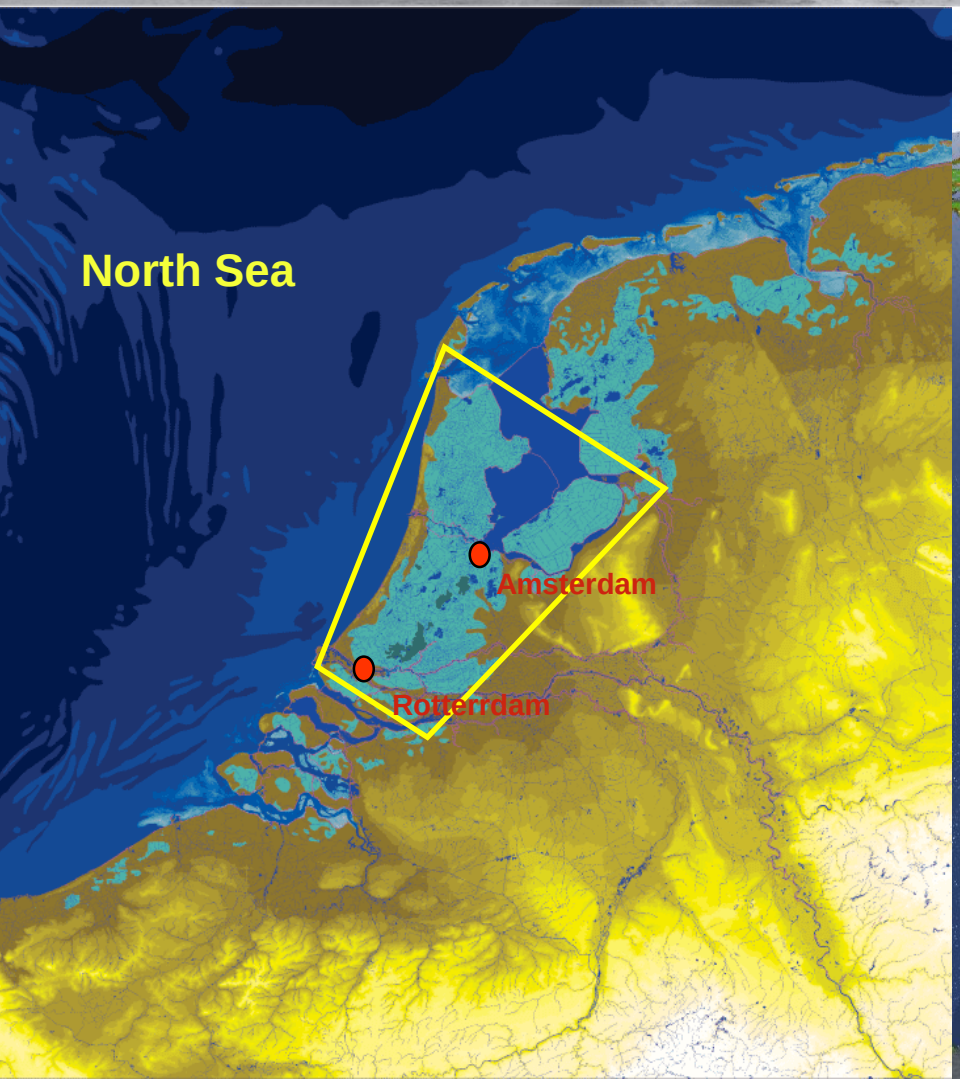
Jakarta: The BIGGEST challenge on Earth?

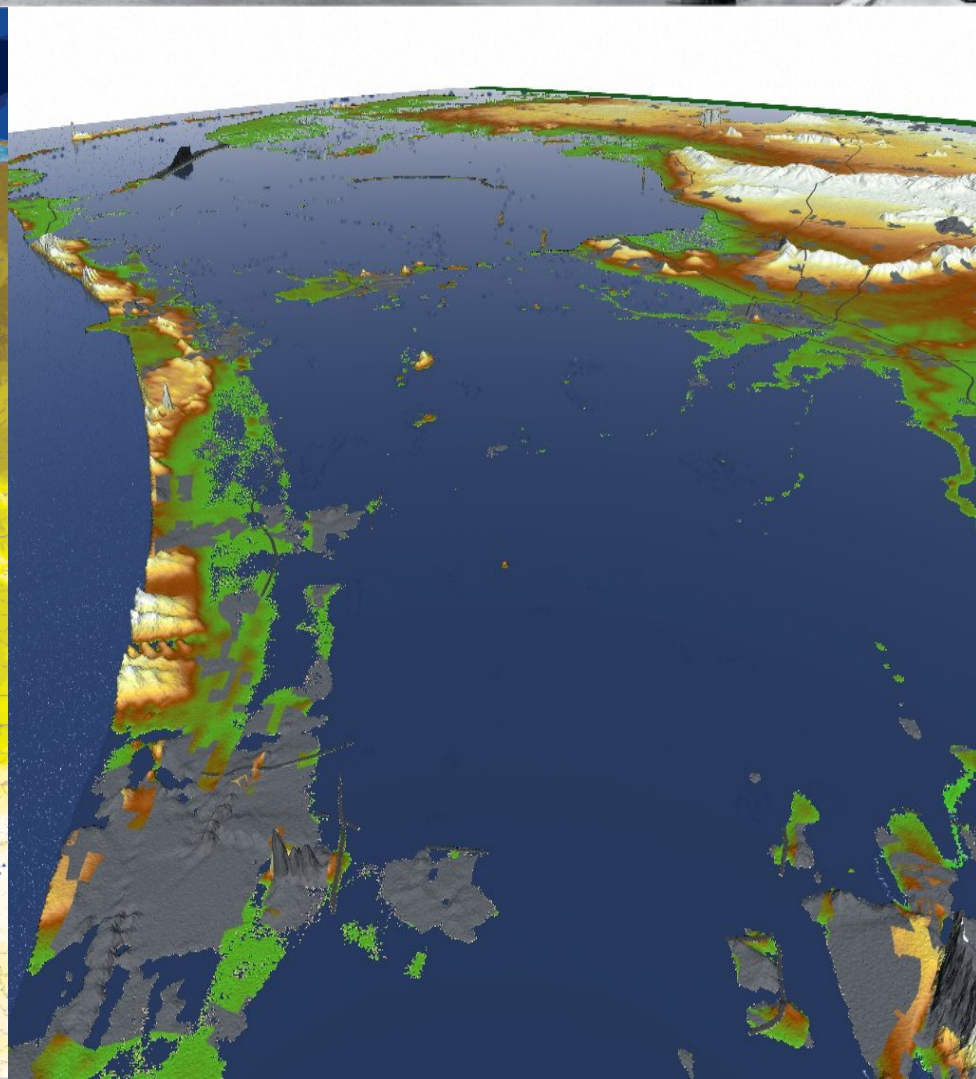
- 5 million people at risk
- Ports, industries, fisheries, infrastructure, etc
- Land subsidence 5-10 Inch/yr

Jakarta Coastal Master Plan

The Netherlands

If we do nothing.....





First Dutch Delta Plan

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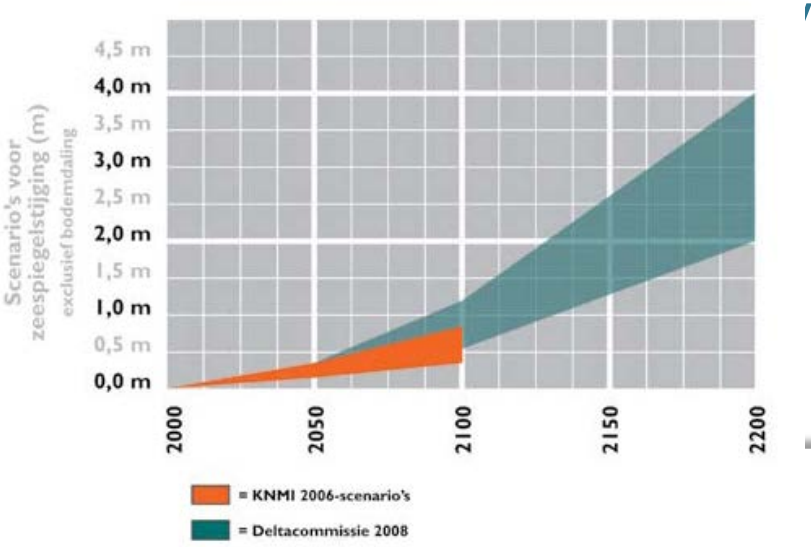
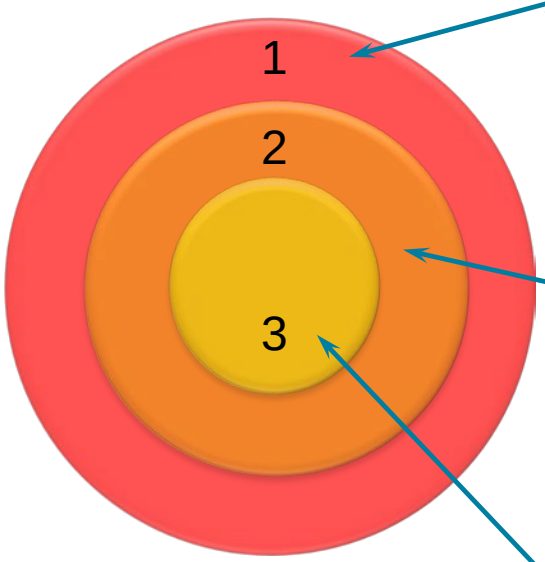
Second Dutch Delta Plan

- Adapting to future climate change
- National systems approach
- Living with Water
- Spatial planning, environment
- Long term vision 2100 – 2200



Multiple Lines of Defense Strategy



Outer Layer of Defense
Larger, engineered solutions such as barriers, beach fortification, sea gates, pump stations, offshore structures

Middle Layer of Defense
Transition zone, sustainable coastlines and waterways, barriers, marshes and multifunctional levees

Inner Layer of Defense
Local solutions designed to protect critical infrastructure and integrate water management and urban planning

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San Francisco Bay Conservation and Development Commission

Adapting to Rising Tides

San Francisco Bay

Water surface elevation from sea level rise and storm surge

Sea Level Rise Scenario	Daily Tide	Extreme Tide (Storm Surge) Levels						
	Water Level above MHHW	1-yr	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Existing Conditions	0	12	19	23	27	32	36	41
MHHW + 6-inch	6	18	25	29	33	38	42	47
MHHW + 12-inch	12	24	31	35	39	44	48	53
MHHW + 18-inch	18	30	37	41	45	50	54	59
MHHW + 24-inch	24	36	43	47	51	56	60	65
MHHW + 30-inch	30	42	49	53	57	62	66	71
MHHW + 36-inch	36	48	55	59	63	68	72	77
MHHW + 42-inch	42	54	61	65	69	74	78	83
MHHW + 48-inch	48	60	67	71	75	80	84	89
MHHW + 54-inch	54	66	73	77	81	86	90	95
MHHW + 60-inch	60	72	79	83	87	92	96	101
MHHW + 66-inch	66	78	85	89	93	98	102	107

Mid-Century

End-of-Century

(Water levels in inches)

Source: SFPUC

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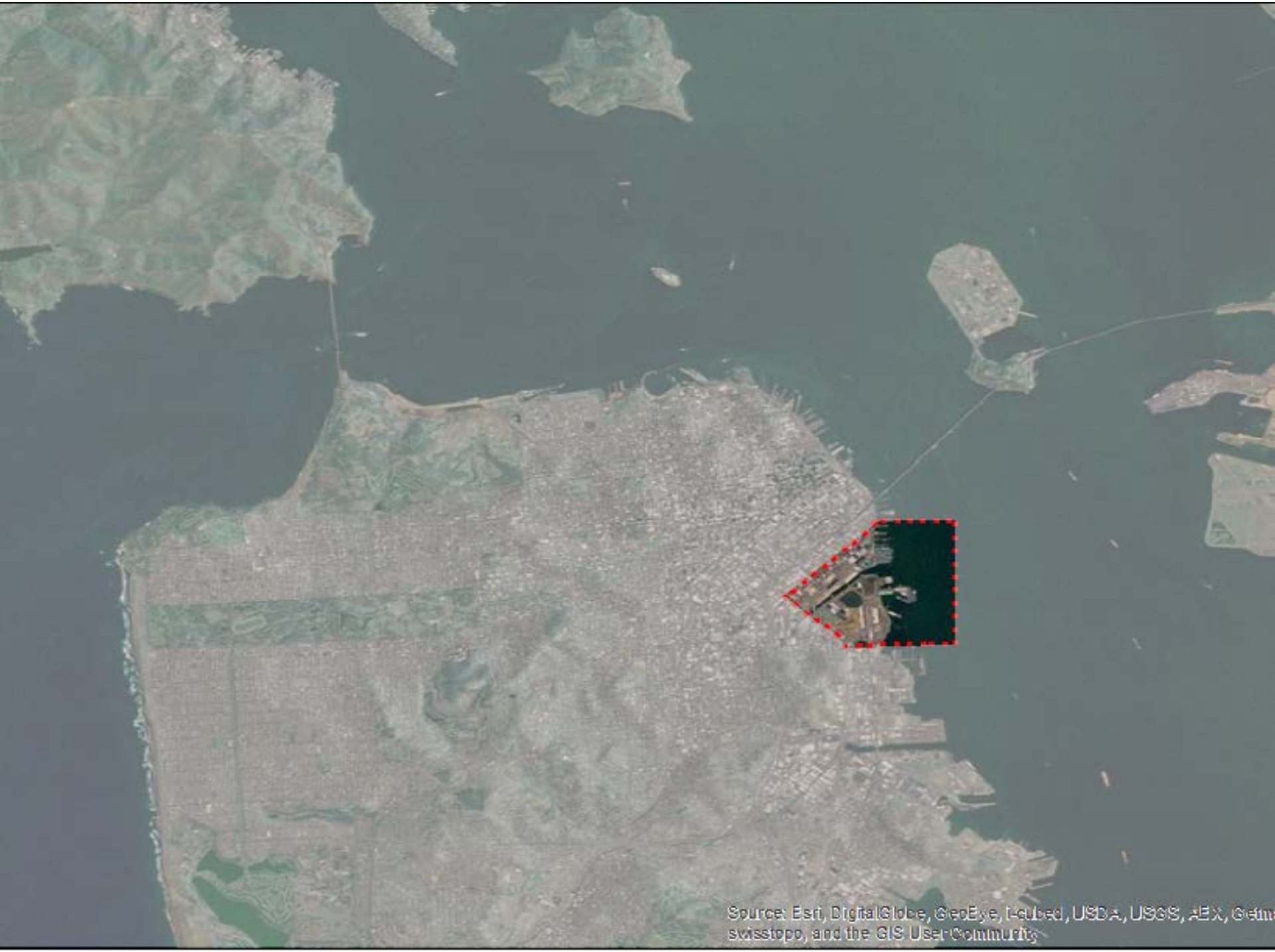
Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getm
swisstopo, and the GIS User Community

Potential Mid-Century Water Levels

Source: SFPUC

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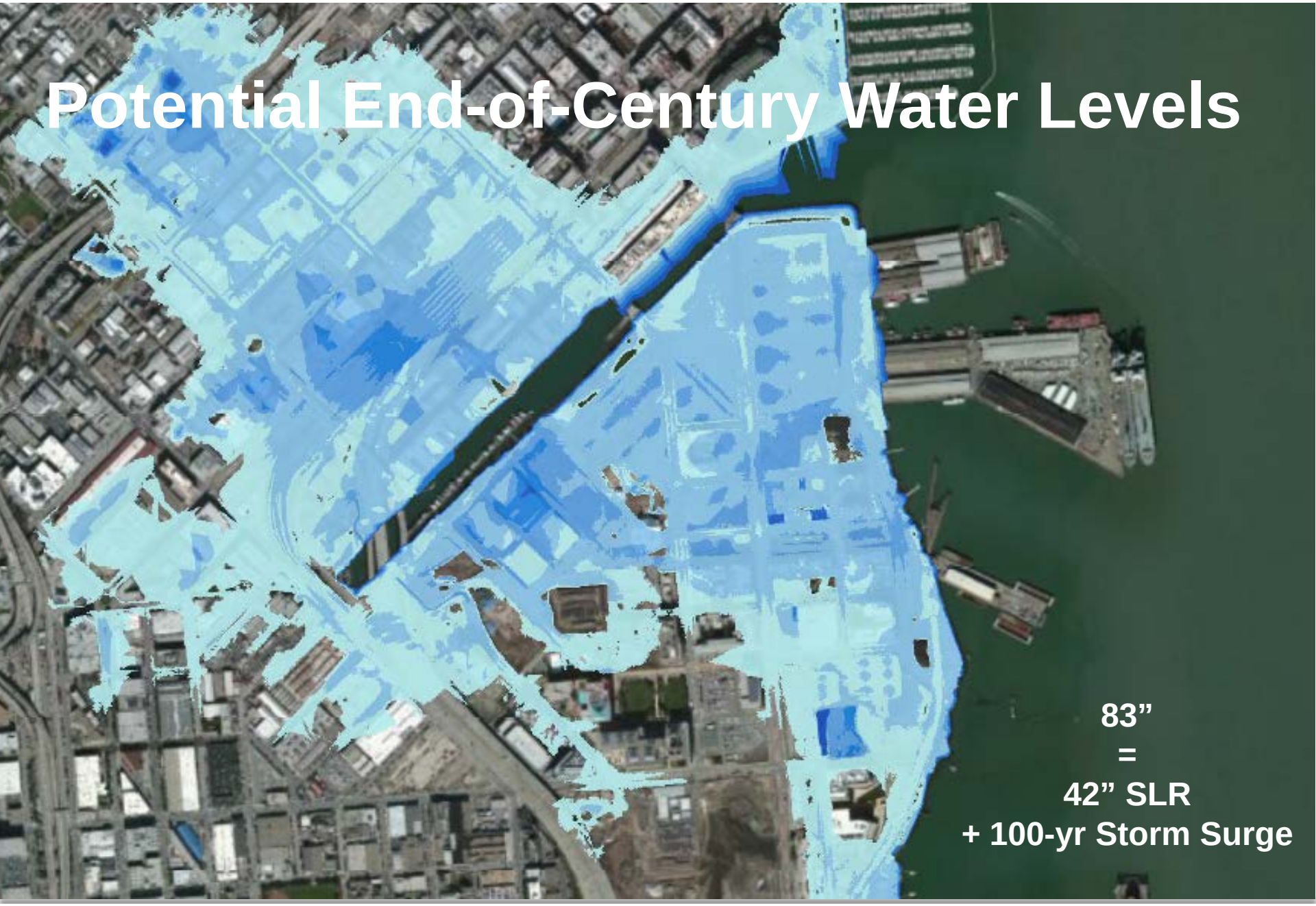
Potential End-of-Century Water Levels



Source: SFPUC

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New York – Post Sandy

Flood Proofing and Water Resiliency

Bay Park WTP, Nassau County

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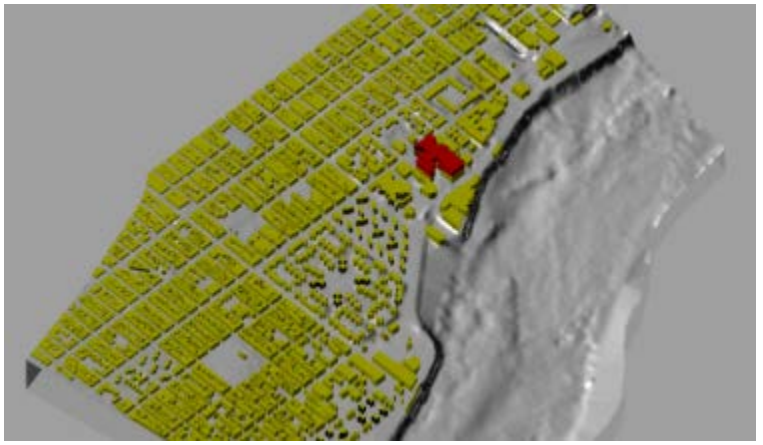
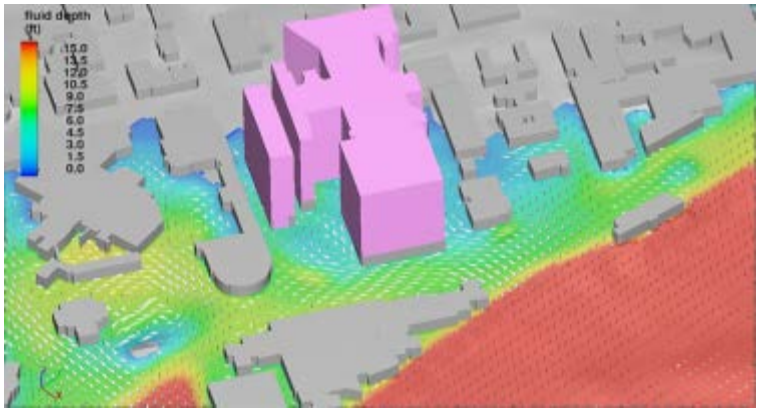
Flood Proofing and Water Resiliency

Downtown Buildings

FLOW – 3D OUPUT





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Flood Proofing and Water Resiliency

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Flood Protection New Orleans

Protection 100-yr Flood Construction □2006 – 2011 □Investment: $14.5 B

Lake Borgne Storm Surge Barrier

Seabrook Sector Gate

West Closure – Pump Station

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A Protected City…

But Where is the Water?

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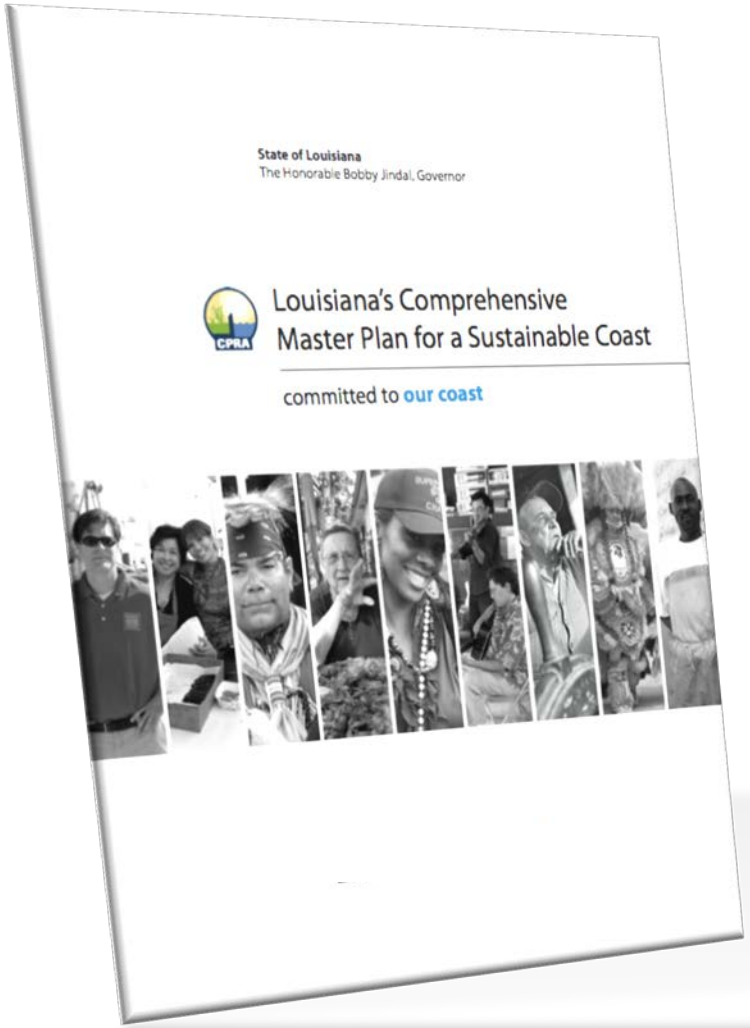
2012 Louisiana Coastal Master Plan



- $50 Billion
- Unanimously passed the Louisiana legislature in 2012
- Implementation underway
- Plan refinement for 2017

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Thank you

peter.wijsman@arcadis-us.com
415.244.2118

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