



# The Welikia Project:

*A Natural History Context for  
the Resilience of Jamaica Bay  
in New York City*

Eric W. Sanderson

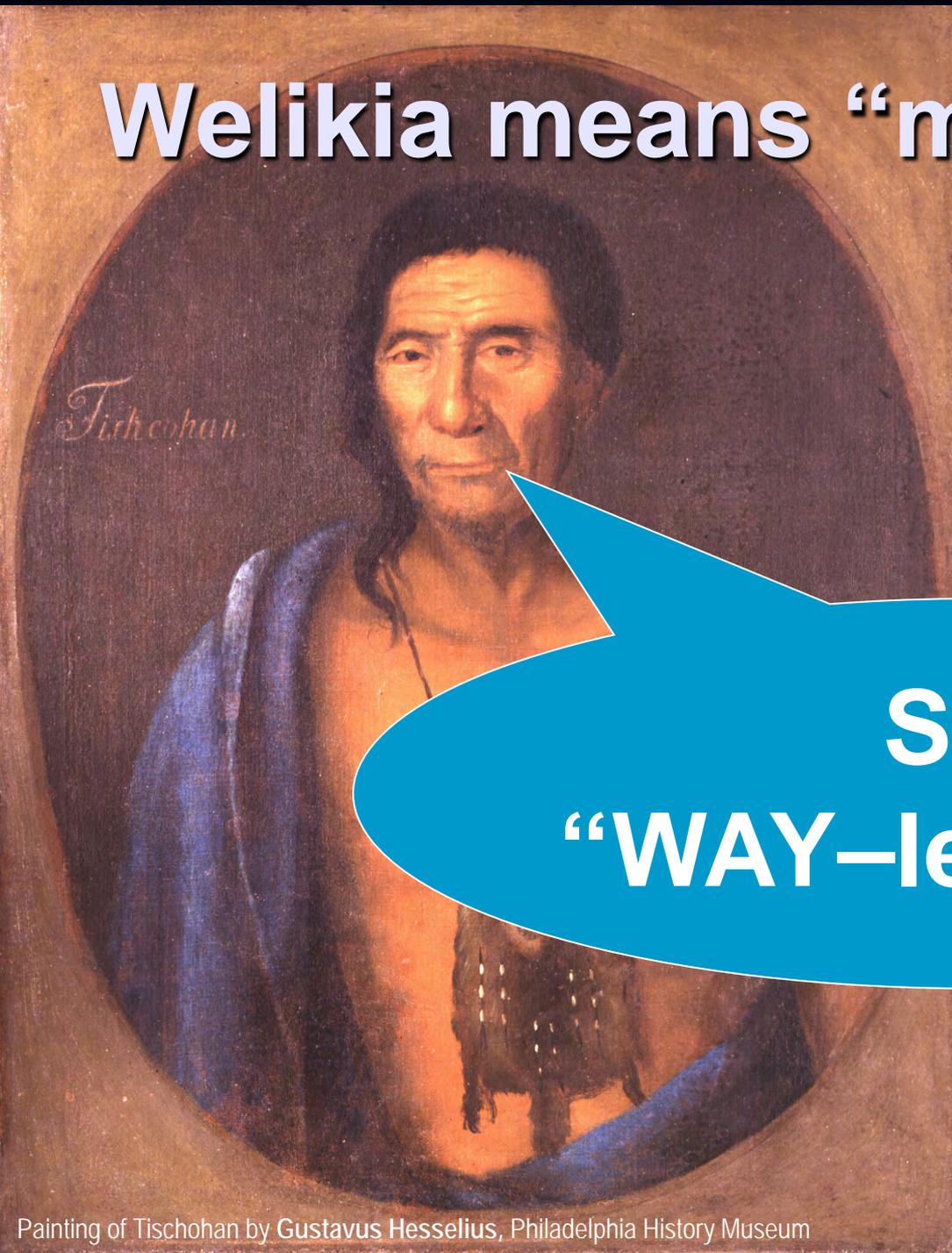
*Wildlife Conservation Society*

Urban Resilience in an Era of  
Climate Change Symposium

*October 17, 2013*



Welikia means “my good home”

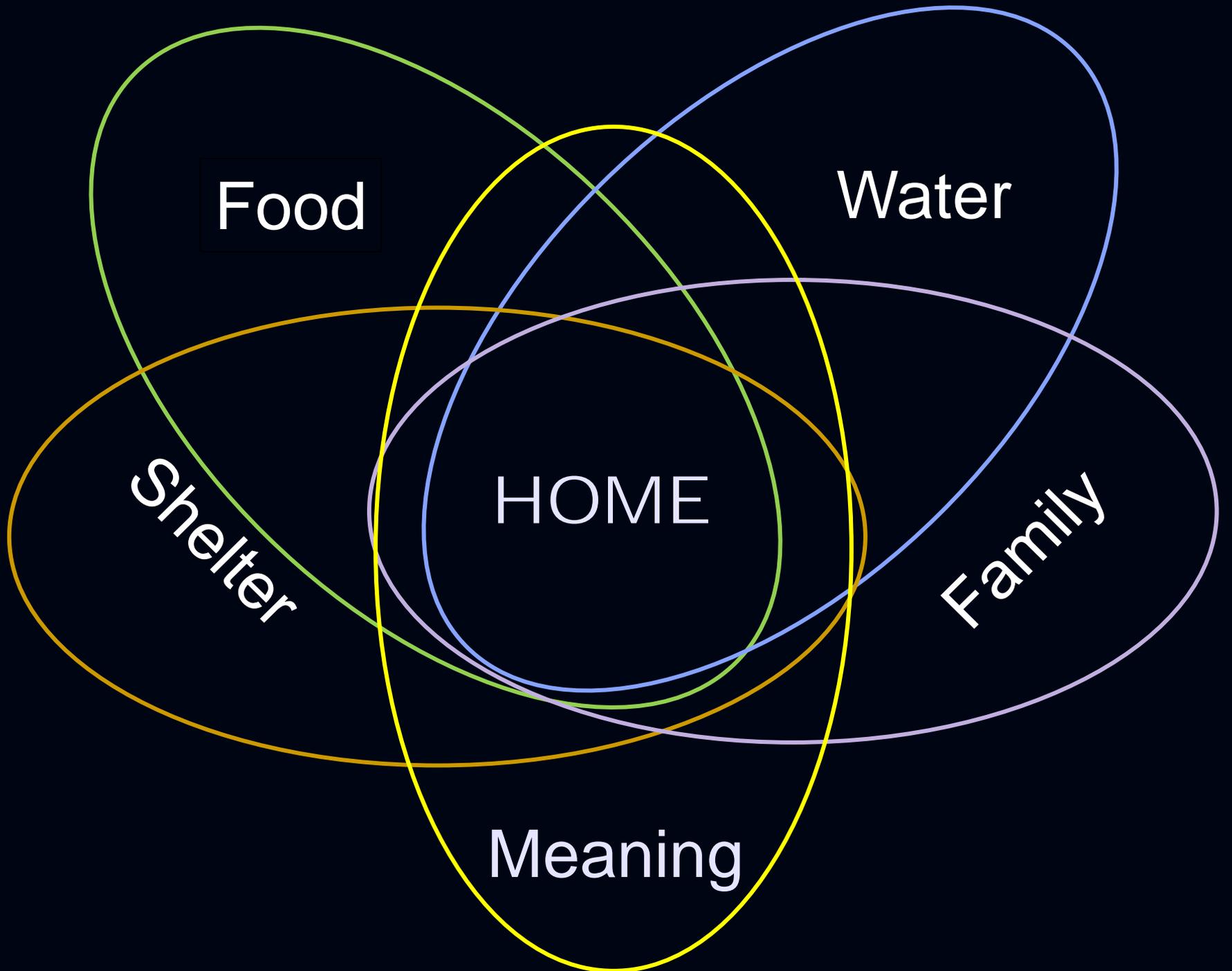


Say  
“WAY-lee-kee-a”



Painting of Tischohan by Gustavus Hesselius, Philadelphia History Museum

Photos: AMNH



Food

Water

Shelter

HOME

Family

Meaning



Image:  
Markley Boyer / WCS;  
Photo: Stephen Amiaga

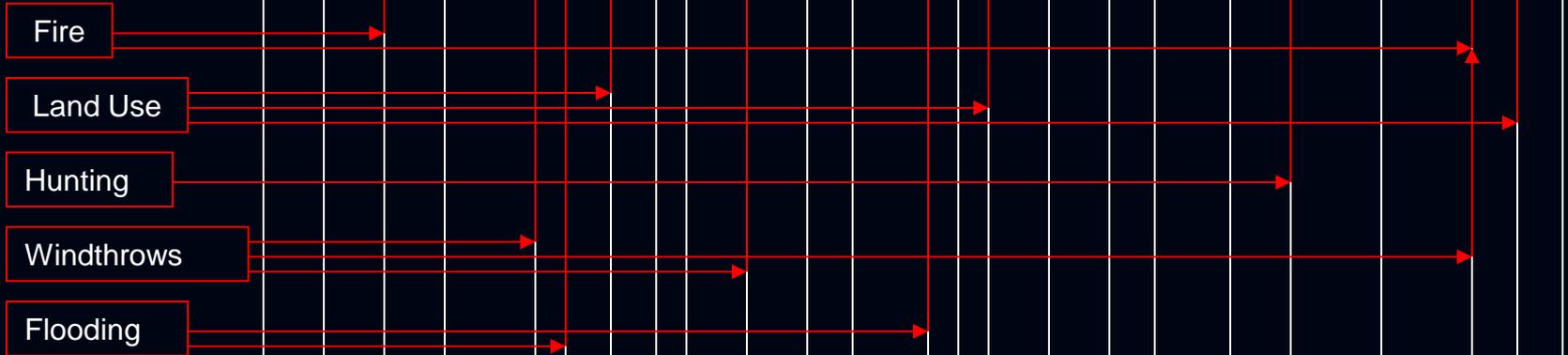


Map: The National Archives (UK), MR 463/1

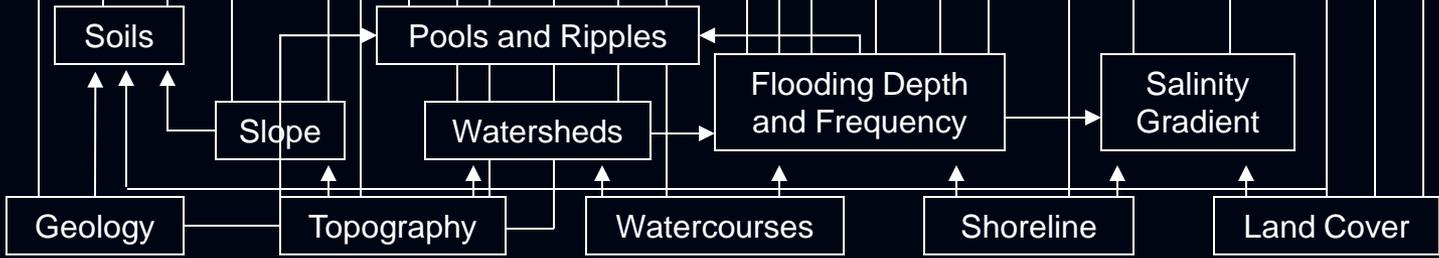
# Ecosystems



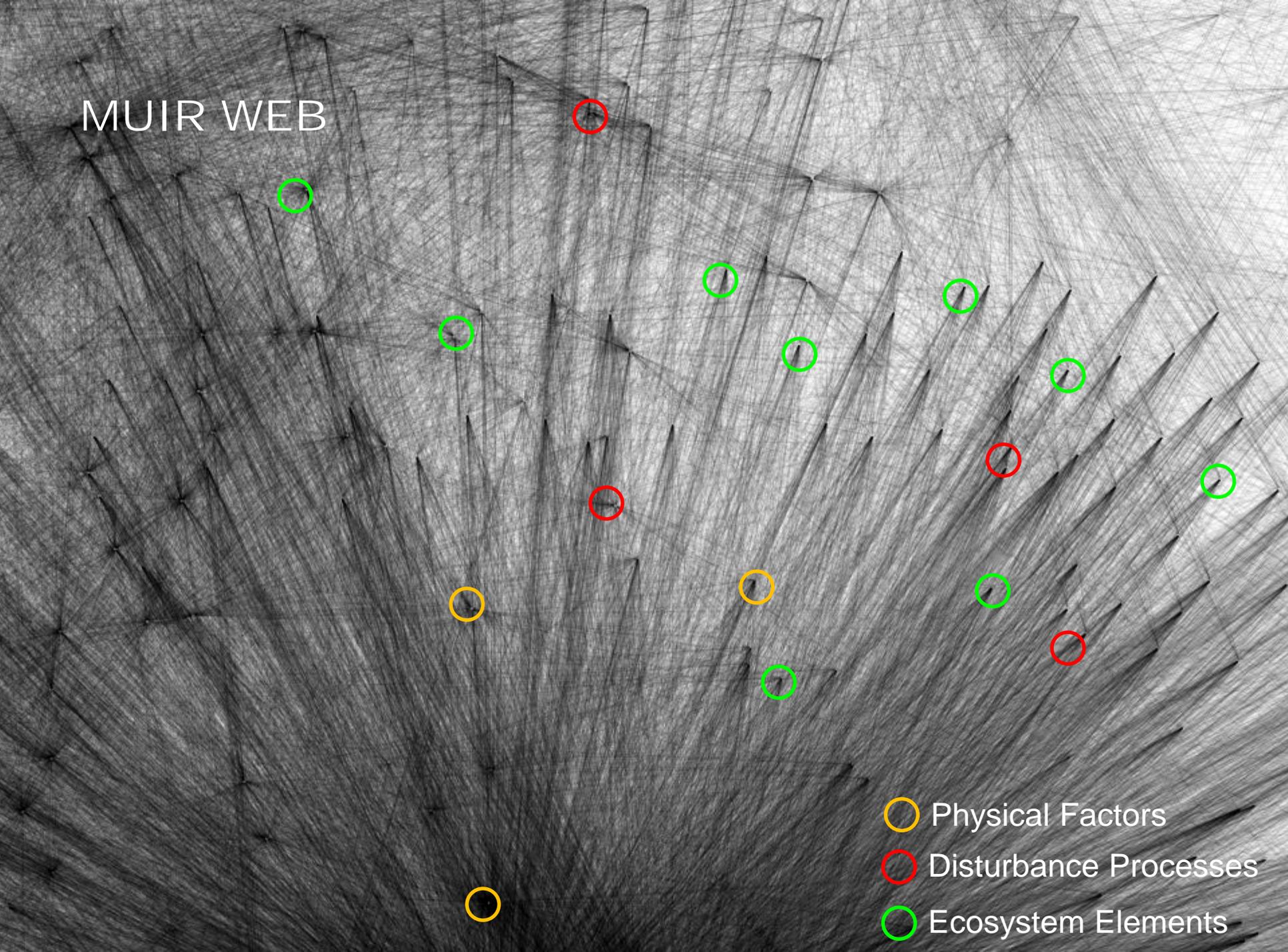
# Disturbance



# Physical Factors



# MUIR WEB



- Physical Factors
- Disturbance Processes
- Ecosystem Elements

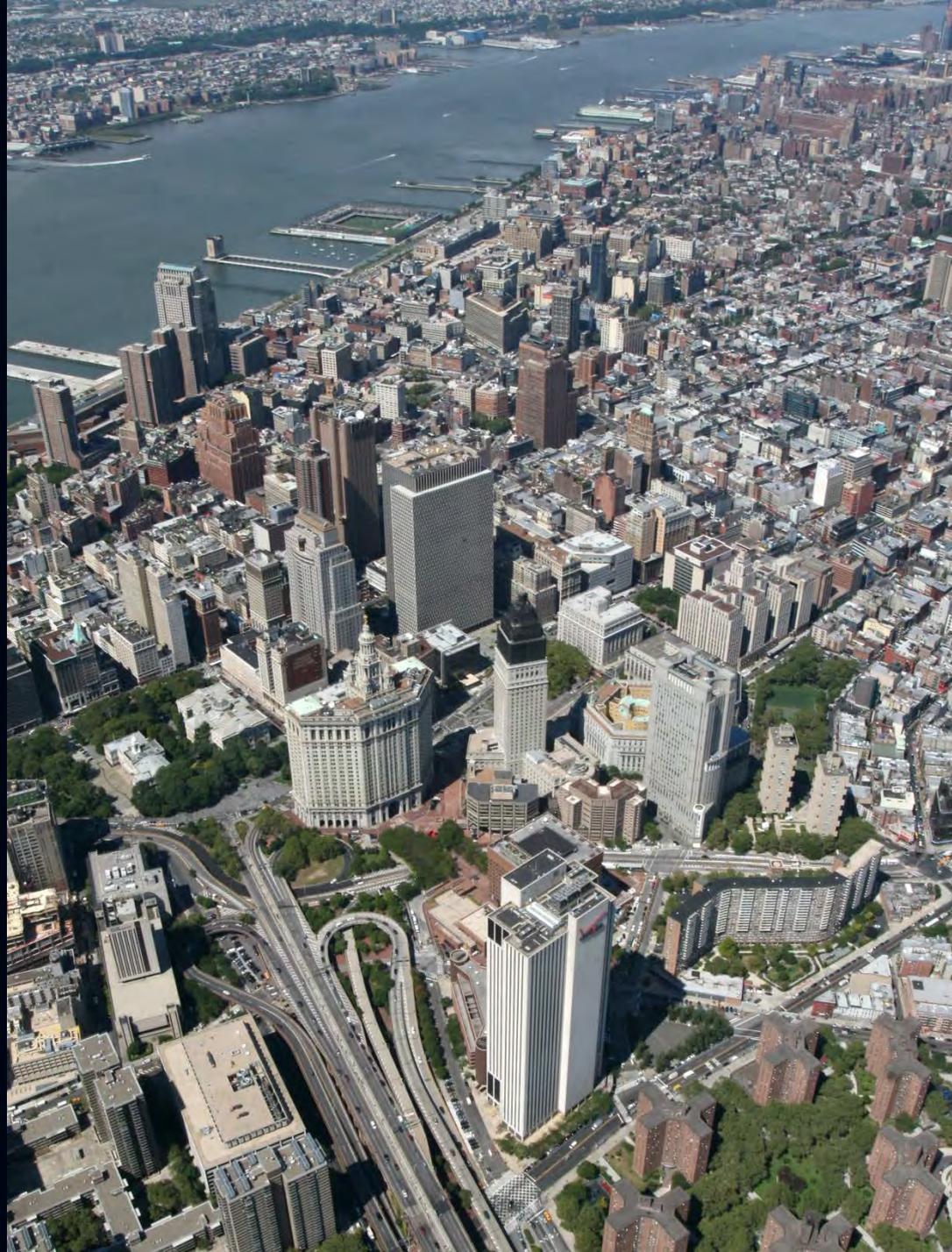


Image:  
Markley Boyer / WCS;  
Photo: Stephen Amiaga



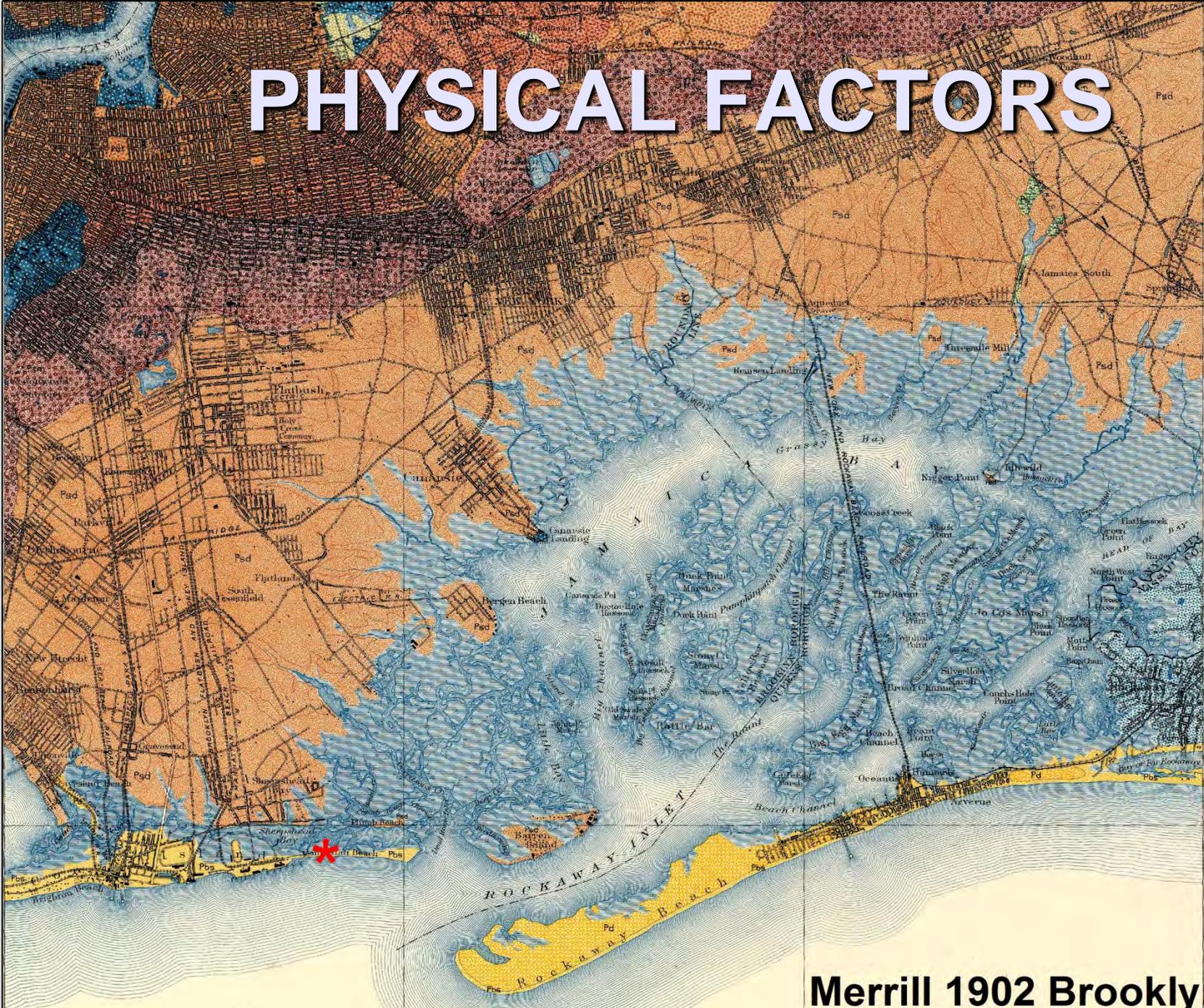
Manhattan

Queens

Brooklyn

JAMAICA BAY

# PHYSICAL FACTORS



**Swamp muck**  
(sand flats not included)

**Pbs**  
Recent beach sand and gravel

**Pd**  
Dunes and dune sand

**Pcm**  
Cape May Formation  
(gravel and sand of marine shallow water origin)

**Psd**  
Stratified drift  
(locally very thin, with occasional rock exposures)

**Pdt**  
Stratified drift and till  
(undifferentiated)

**Pr**  
Till  
(with occasional small rock exposures)

**Ptm**  
Terminal moraine  
(beds of thick drift with very irregular exposure)

**Epoch of Post-glacial Epoch**

**Epoch of Glacial Retreat**

**Epoch of Late Glacial Occupation**

**RESISTANCE**

⊗ s-g Sand and gravel pits

Letter symbols in parentheses indicate the formation which underlies swamp muck.

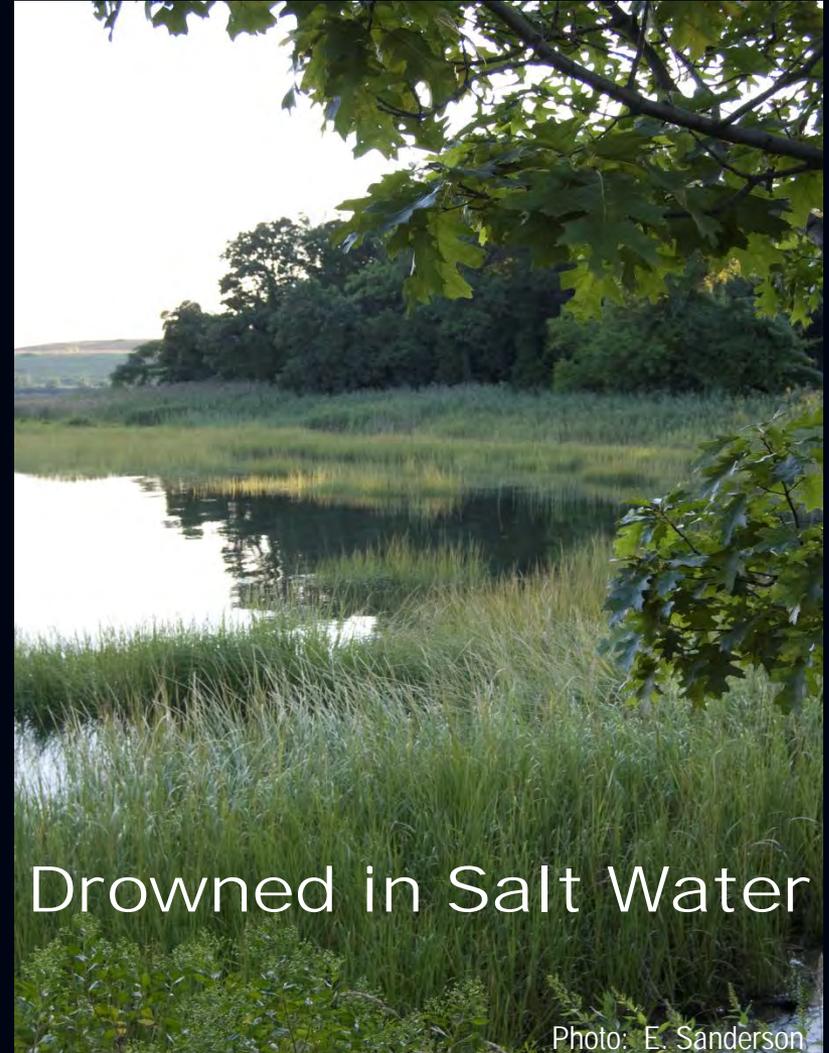
**Merrill 1902 Brooklyn Quad**  
Map: USGS

# PHYSICAL FACTORS

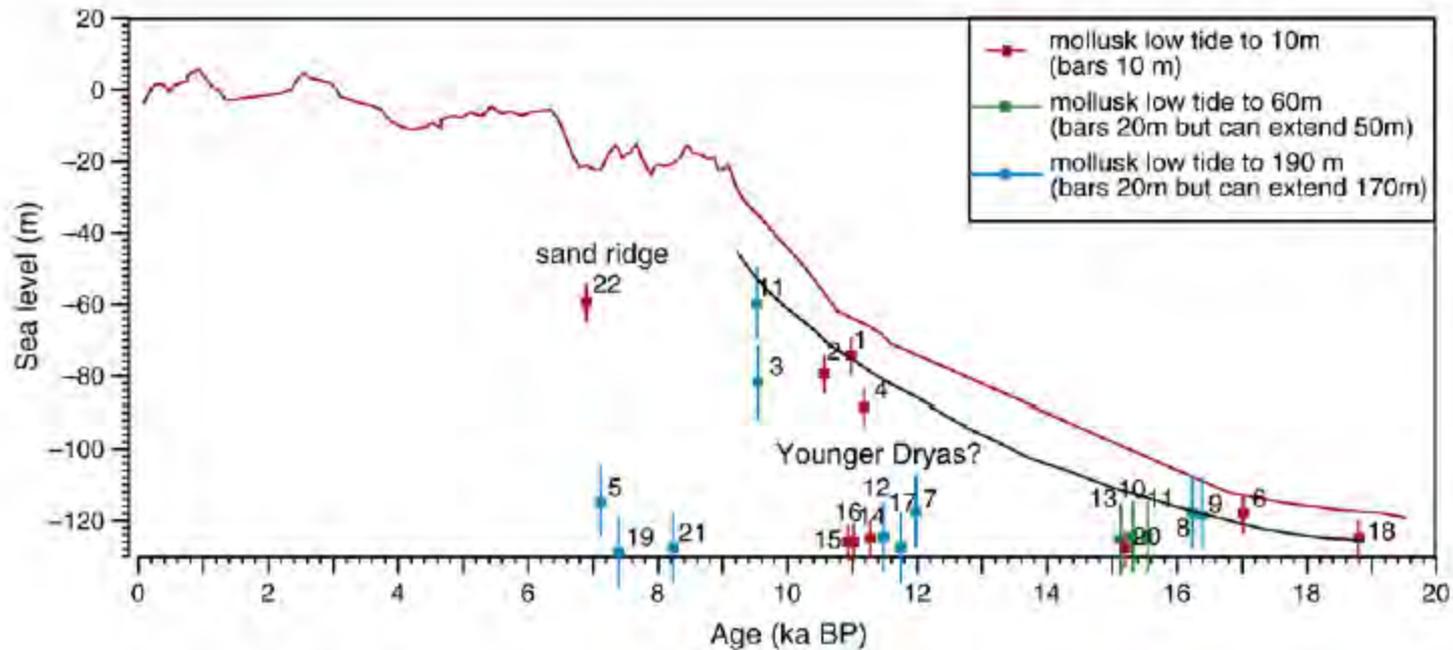


— US Coast Survey 1844  
**Digital Globe / ESRI 2013**

# DISTURBANCES



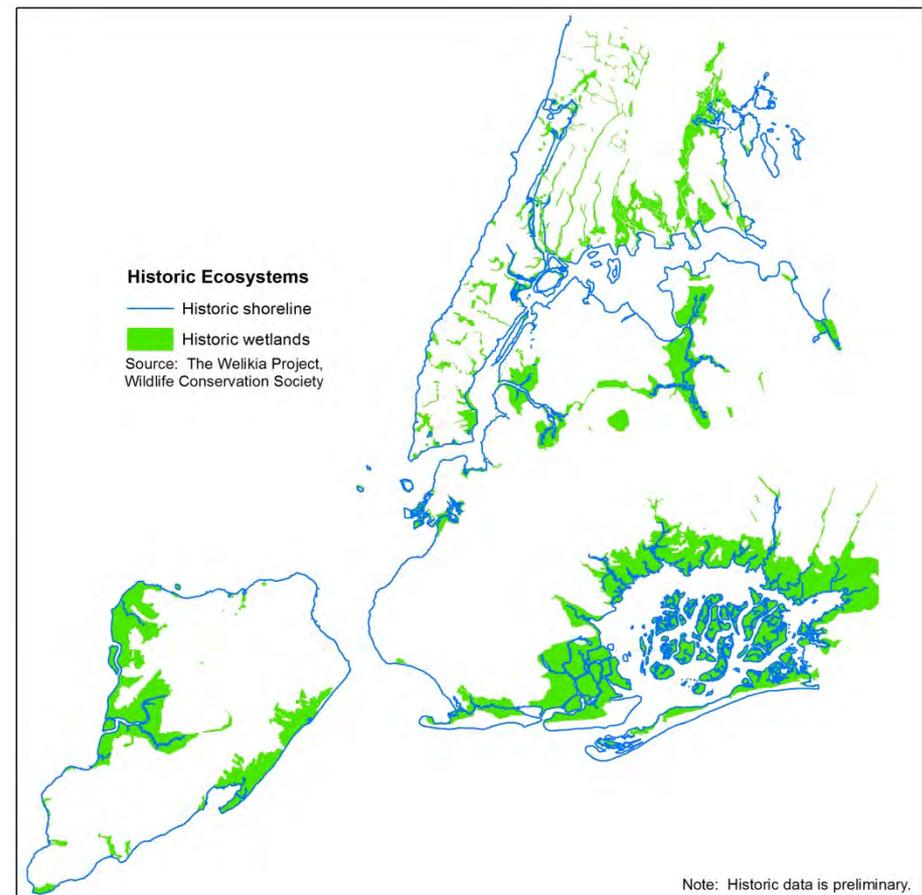
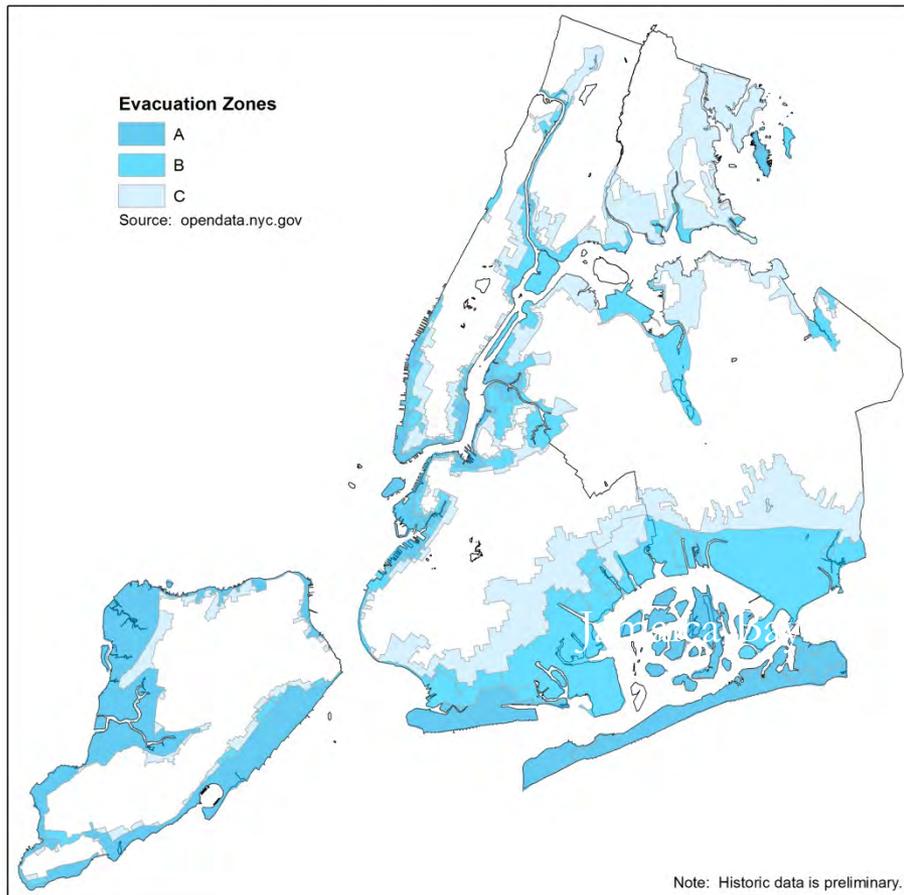
# DISTURBANCES



Sea level rise  
over the last  
20,000 years

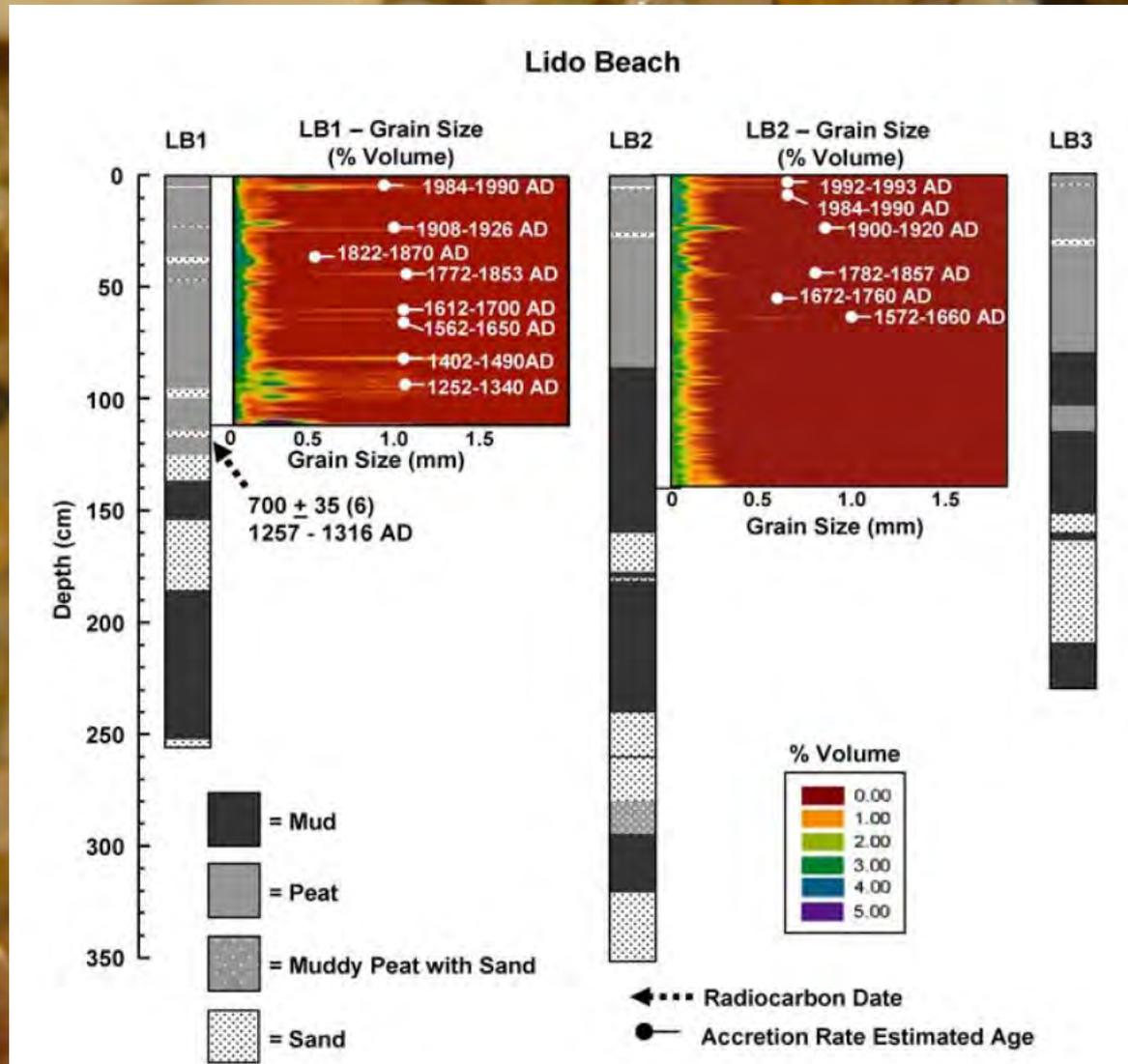
McHugh et al. 2010

# DISTURBANCES



Sandy ReFlooded Old Marshes

# DISTURBANCES



# ECOSYSTEMS



US Coast Survey 1844

Map: Library of Congress

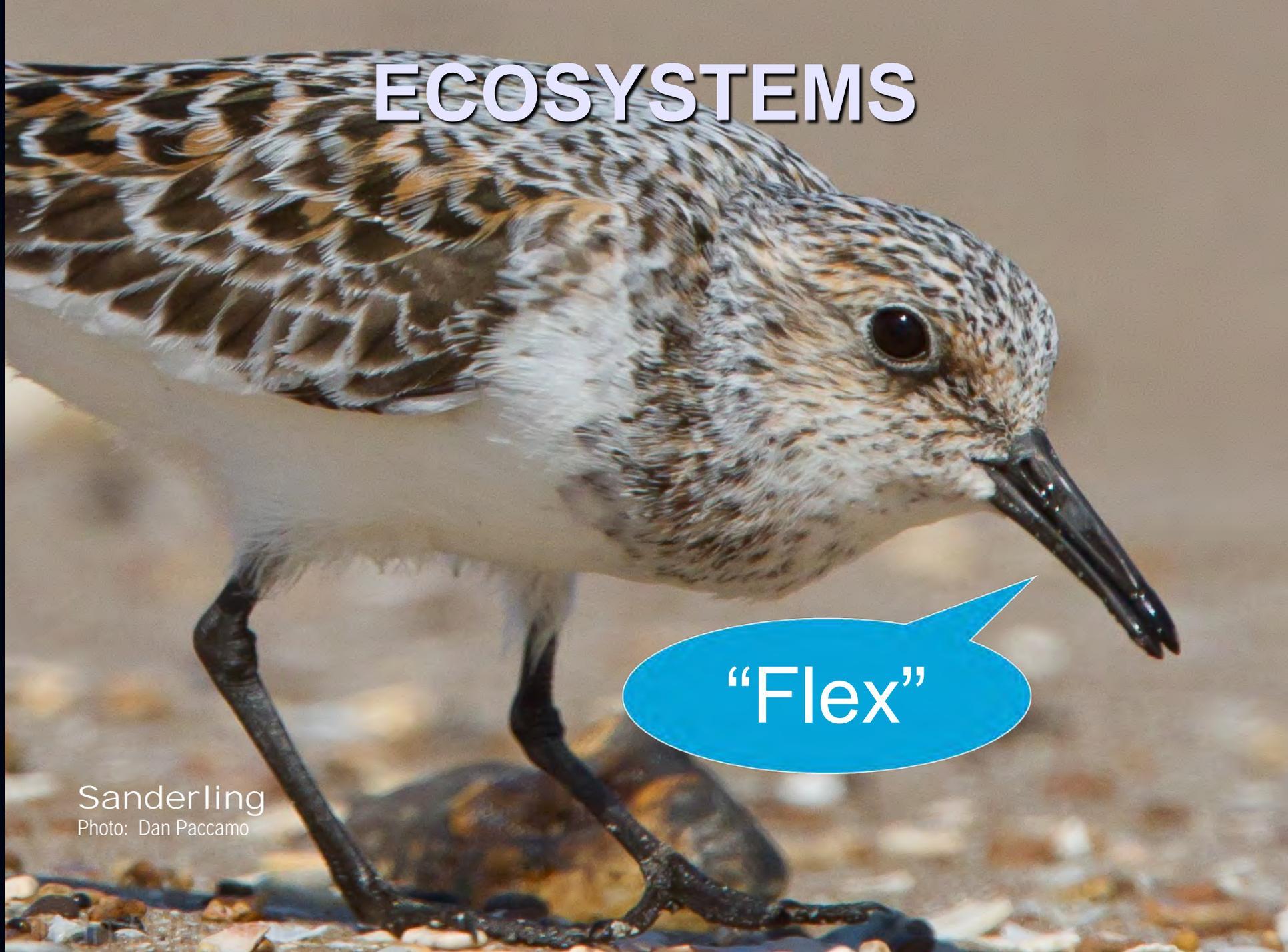
# ECOSYSTEMS

“Adapt”

Diamondback  
Terrapin

Photo: USDA/APHIS

# ECOSYSTEMS



“Flex”

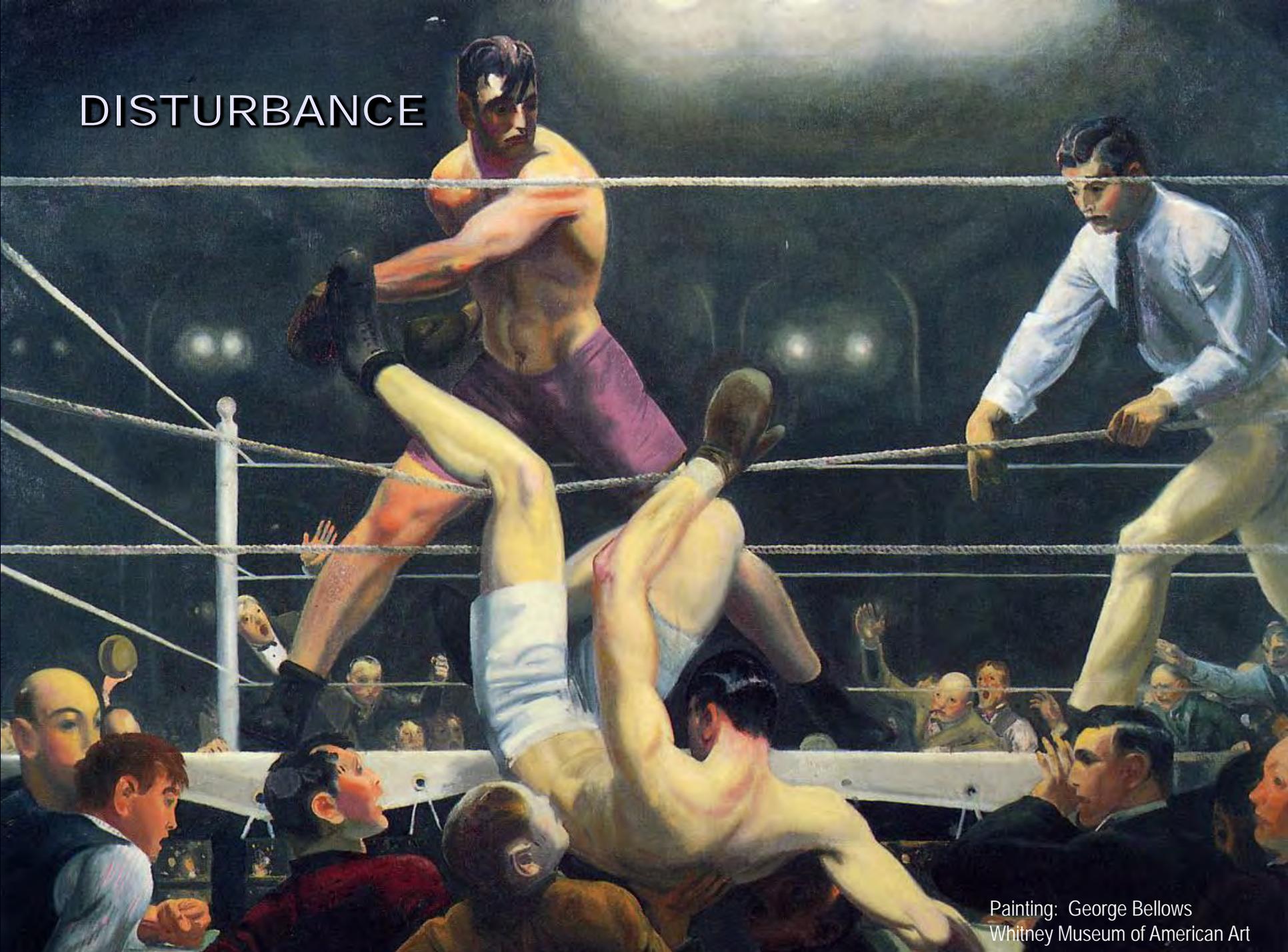
Sanderling  
Photo: Dan Paccamo

# ECOSYSTEMS

*Tickohan*

“Choose”

# DISTURBANCE



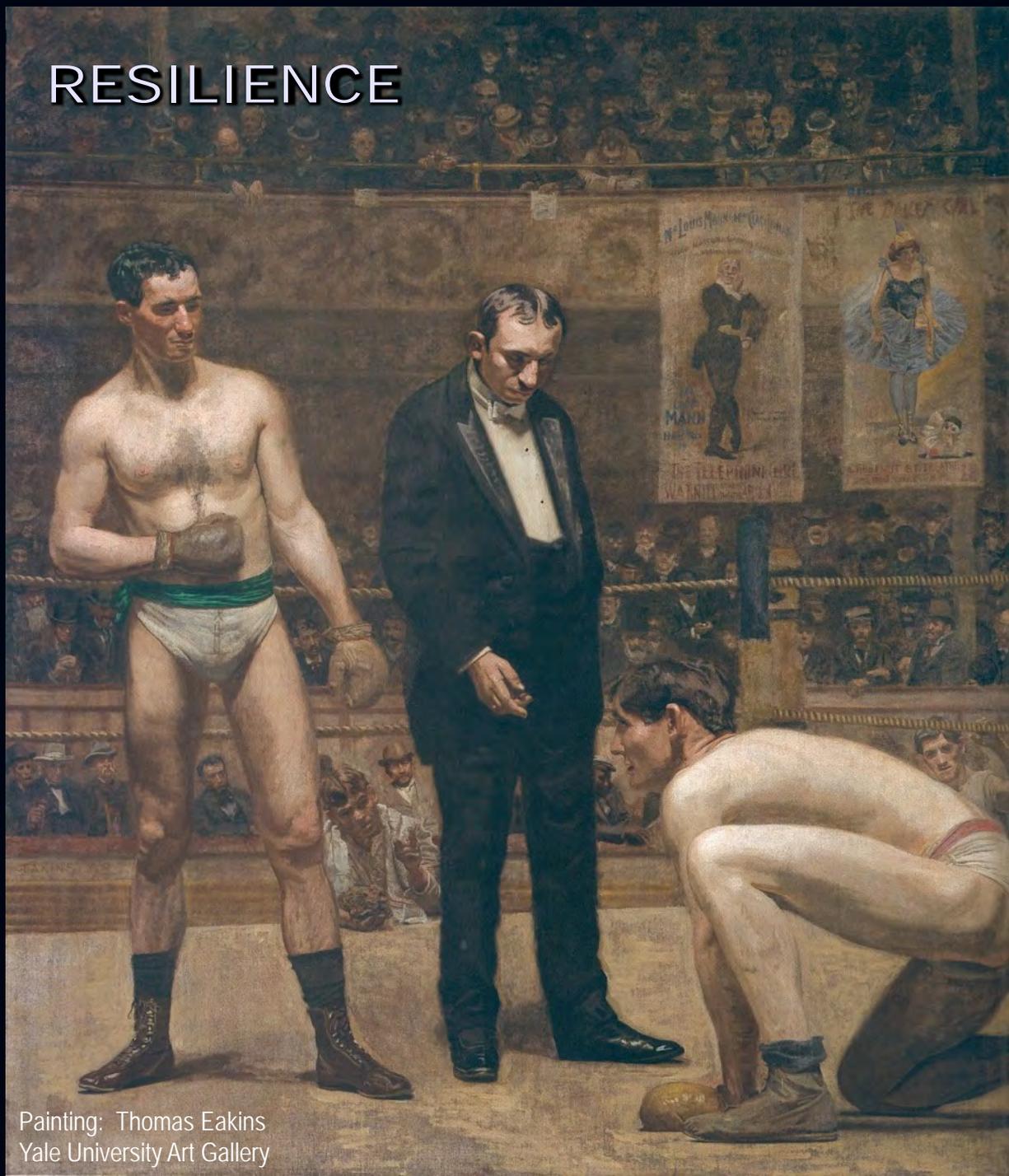
Painting: George Bellows  
Whitney Museum of American Art

# RESISTANCE



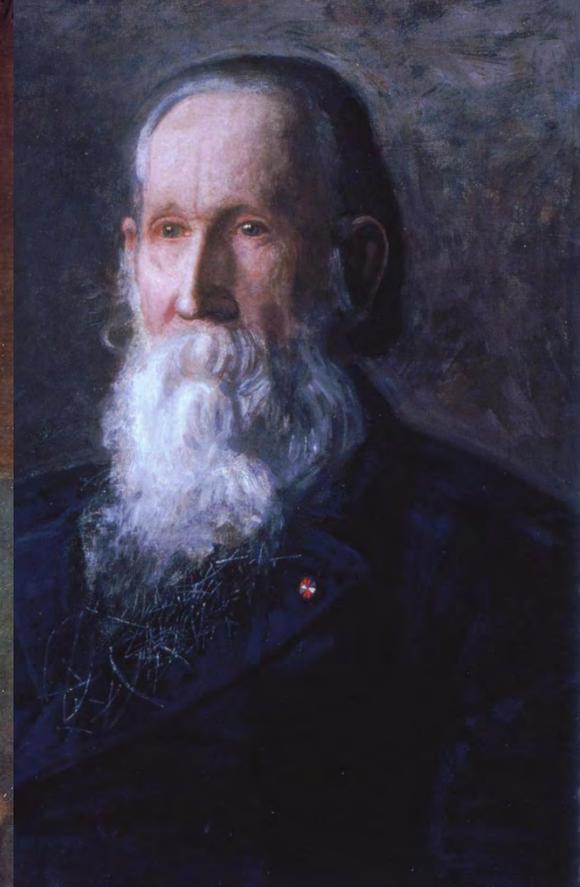
Painting: George Bellows  
Cleveland Museum of Art

# RESILIENCE



Painting: Thomas Eakins  
Yale University Art Gallery

# ADAPTIVE CAPACITY



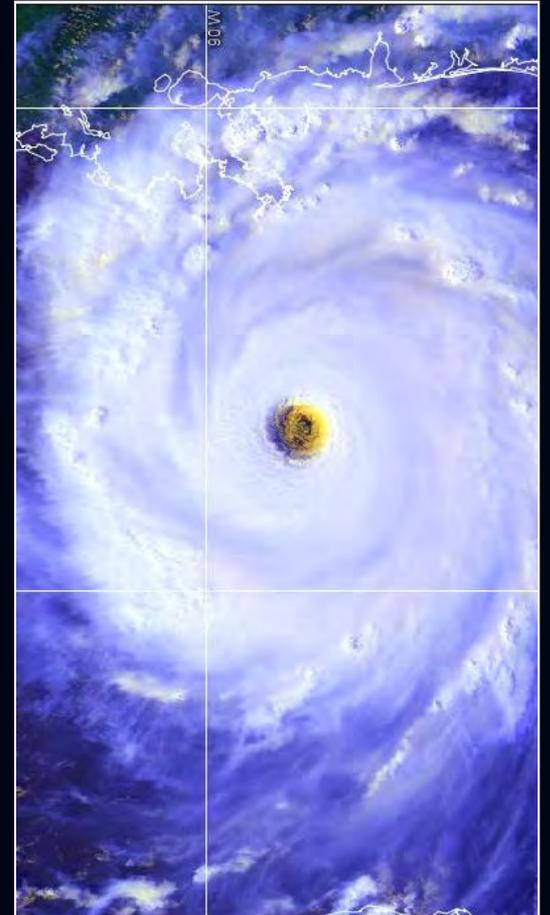
# CHOOSE:



ECOSYSTEMS



LIFESTYLE



CLIMATE

# RESPOND:

WATER

CARBON

BIODIVERSITY

POPULATION

# ENVISION:



Before



Now



Future



BEYOND MANHATTAN,  
VISIONS FOR THE FUTURE

testUser (Logout)



# THE FUTURE OF MANHATTAN

« CREATE NEW VISION

EXISTING VISIONS »

Winter 2013: MANNAHATTA2409.ORG

# ALL OF US:



Photo: E. Sanderson

