2019 National Wetlands Status and Trends Report

April 18, 2024

THE NATIONAL WETLANDS INVENTORY PROGRAM

Science-based information on wetlands and deepwater habitats to promote the understanding and conservation of the Nation's wetland resources through research, education, resource management, and policy development.

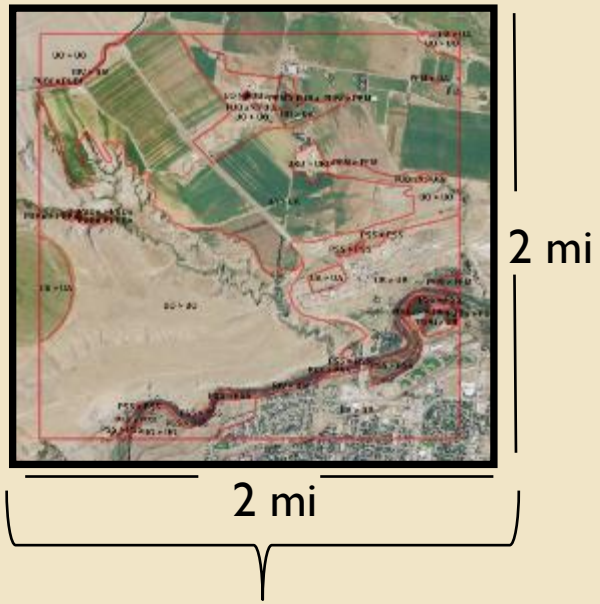
Who Are We?

Principal U.S. federal agency tasked with providing information to the American public on the extent and trends of U.S. wetlands

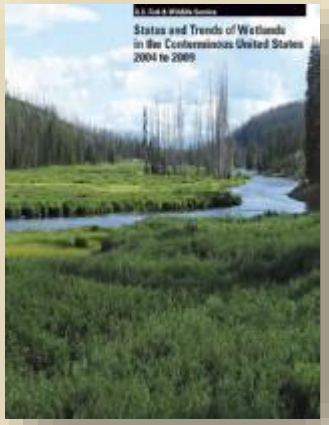
Emergency Wetlands Resources Act

- **Map U.S. wetlands** – **NWI Geospatial Dataset**
- **Provide decadal reports to Congress** – **Wetlands Status and Trends Reports**
  - These datasets are not interchangeable but are instead complementary.
  - Support a broad array of decision support needs

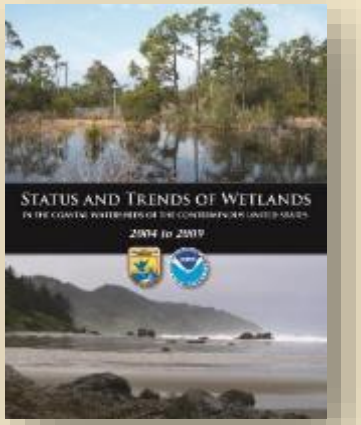
WETLANDS STATUS AND TRENDS



National 2004 to 2009



Coastal 2004 to 2009



Status and Trends Goal

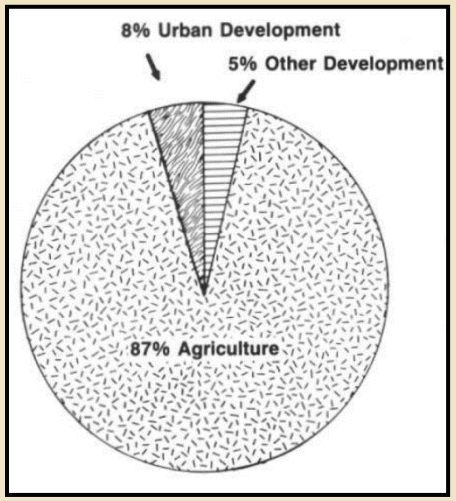
Provide Congress and the Nation with current information on the extent of U.S. wetlands and deepwater habitats and their change over time

Yardstick used to measure the results of billions of dollars worth of policy actions – including regulations, compensatory and voluntary restoration, and conservation – as well as the effects of other change drivers

Past national Wetlands Status and Trends reports include:

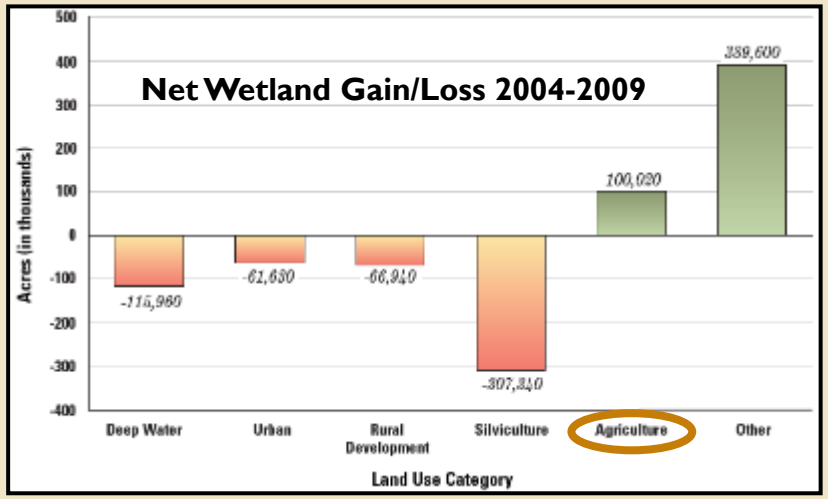
- 1950s through 1970s
- 1970s through 1980s
- 1986 through 1997
- 1998 through 2004
- 2004 through 2009

WETLANDS STATUS AND TRENDS



Wetland loss causes: 1950s-70s

Swampbuster



Generates Conservation Results!

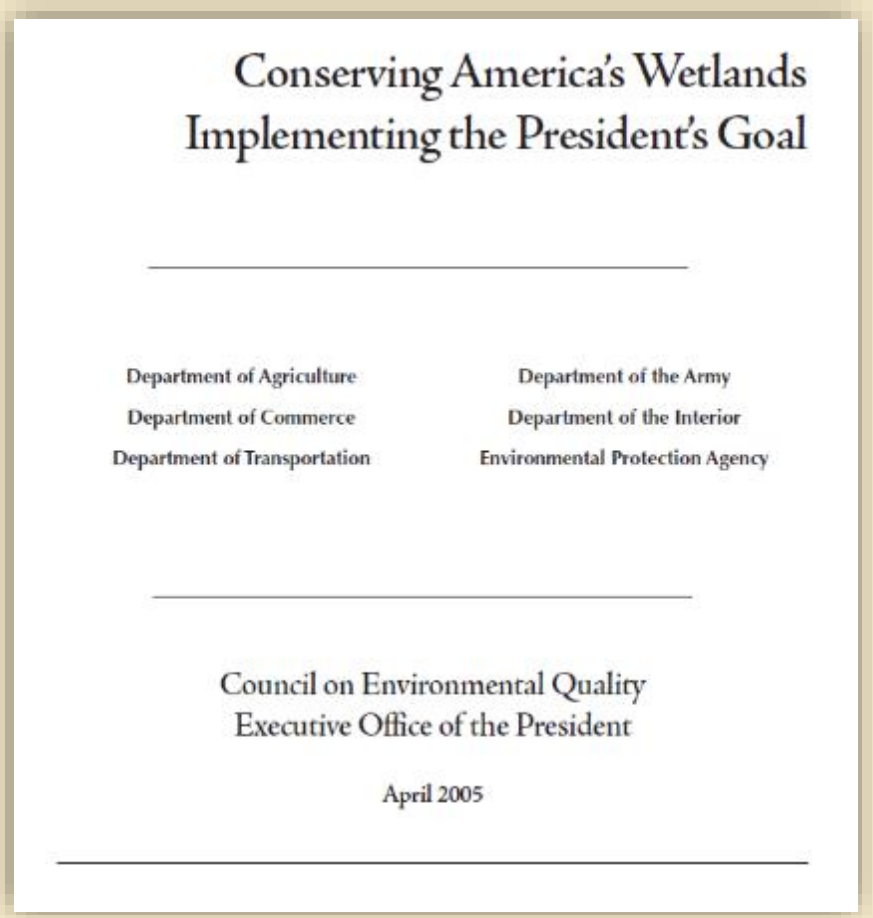
"The [1950s – 70s] report generated tremendous interest in wetlands…. [and] influenced all wetland policies forged by Congress throughout the decade…"

- Ann Vileisis, "Discovering the Unknown Landscape, A history of America's Wetlands"

S&T reports catalyzed highly effective conservation actions, including the Swampbuster Provision of the 1985 Food Security Act and Farm Bill Easement Programs.

- Agriculture went from the biggest driver of wetland loss to supporting a net gain in wetland area.

WETLANDS STATUS AND TRENDS



Conserving America's Wetlands
Implementing the President's Goal

Department of Agriculture
Department of Commerce
Department of Transportation
Department of the Army
Department of the Interior
Environmental Protection Agency

Council on Environmental Quality
Executive Office of the President

April 2005

Measures Policy Success!

Status and Trends has been used to determine the success of the federal "No Net Loss" policy – and most believe that it led to the formation of the policy itself.

Due in part to substantial wetland loss trends documented by Status and Trends, USACE added mitigation to the wetland permitting process.

- These policies and programs continue to have considerable conservation impacts today!

Effective policies are based on robust data!

INTERAGENCY COASTAL WETLANDS WORKGROUP

Purpose

The Interagency Coastal Wetlands Workgroup (ICWWG) helps to address coastal wetland loss, management, and restoration by bringing together seven federal agencies with programs and authorities that protect and manage coastal wetlands.

Background

Wetlands in coastal watersheds of the U.S. were lost at an average rate of 80,000 acres per year between 2004 and 2009. This is an increase from 59,000 acres per year between 1998 and 2004 as documented by the U.S. Fish and Wildlife Service (FWS) and the National Oceanic and Atmospheric Administration (NOAA) in two reports on the Status and Trends of Wetlands in the Coastal Watersheds. The ICWWG was formed in 2009 in response to these loss trends.

Coastal wetlands include saltwater and freshwater wetlands located in coastal watersheds, specifically USGS 8-digit watersheds that drain into the Atlantic, Pacific, or Gulf of Mexico.

Catalyst for Collaboration and Adaptive Management!

Status and Trends Coastal Watersheds reports led to the formation of the Interagency Coastal Wetlands Workgroup.

- Federal interagency group dedicated to reducing and reversing the trend of wetland loss in coastal watersheds

Status and Trends data are often cited by decision-makers working to enhance conservation approaches.

- **Joseph Riley (Charleston, SC mayor 1975 - 2016):** Everyone…must work…to make investments that consider future risk and leverage the power of mother-nature by deploying nature-based solutions alongside the built environment. …the U.S. lost more than 360,000 acres of wetlands in coastal watersheds from 2004 to 2009. Strengthening coastal ecosystems…by protecting existing natural areas and restoring degraded habitat is particularly beneficial to vulnerable communities.

-Time Magazine, March 30, 2017

Methods

Photointerpretation for two dates within 5,048 4mi^2 plots using ~1m imagery

- Stratified by Physiographic Province with more plots in wetter areas

13 wetland, 4 deepwater, and 5 upland classes

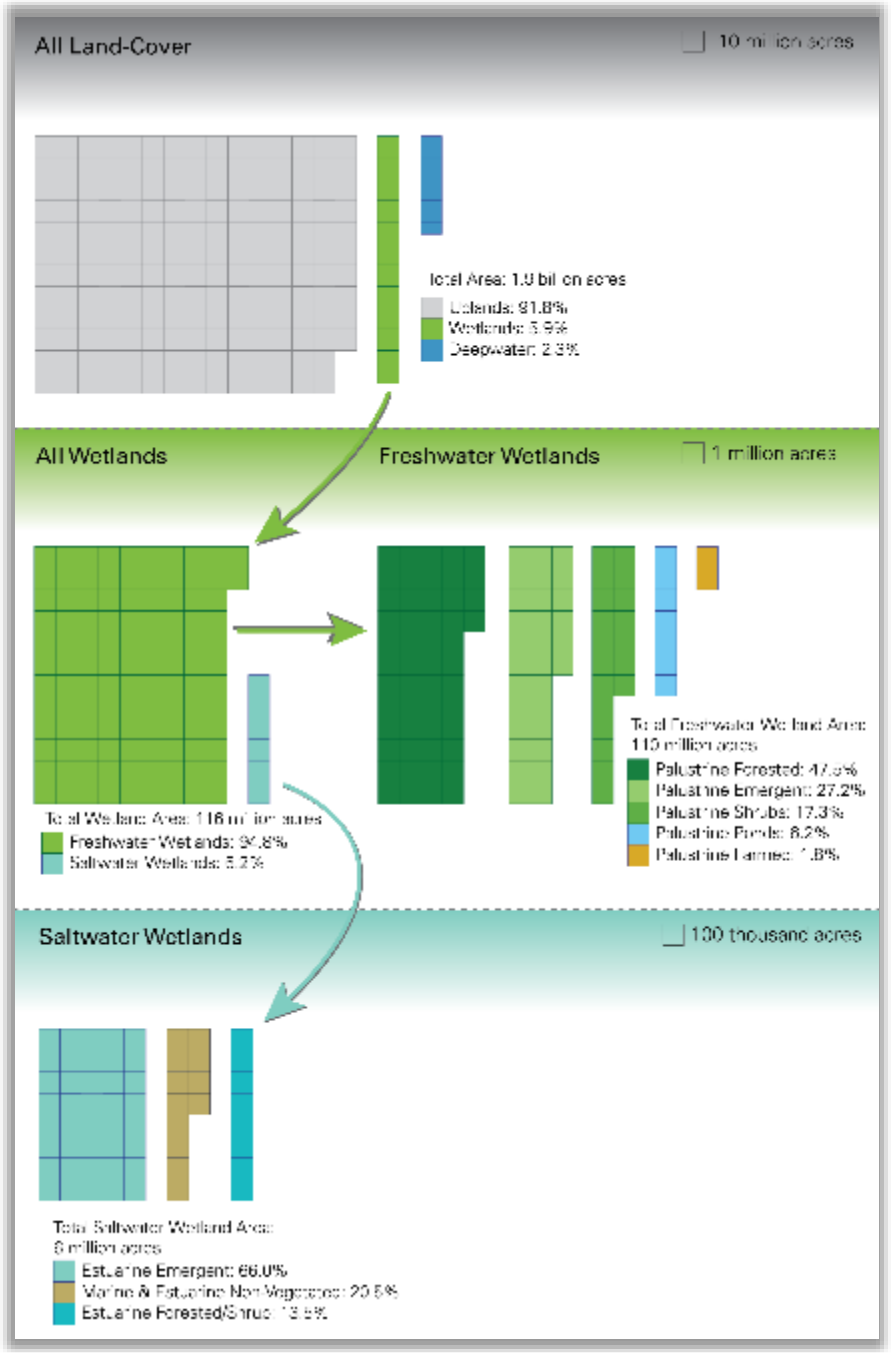
- Biological (not regulatory) wetland definition

Statistical analysis used to measure gain, loss, and conversion of wetland and deepwater area for specific time periods

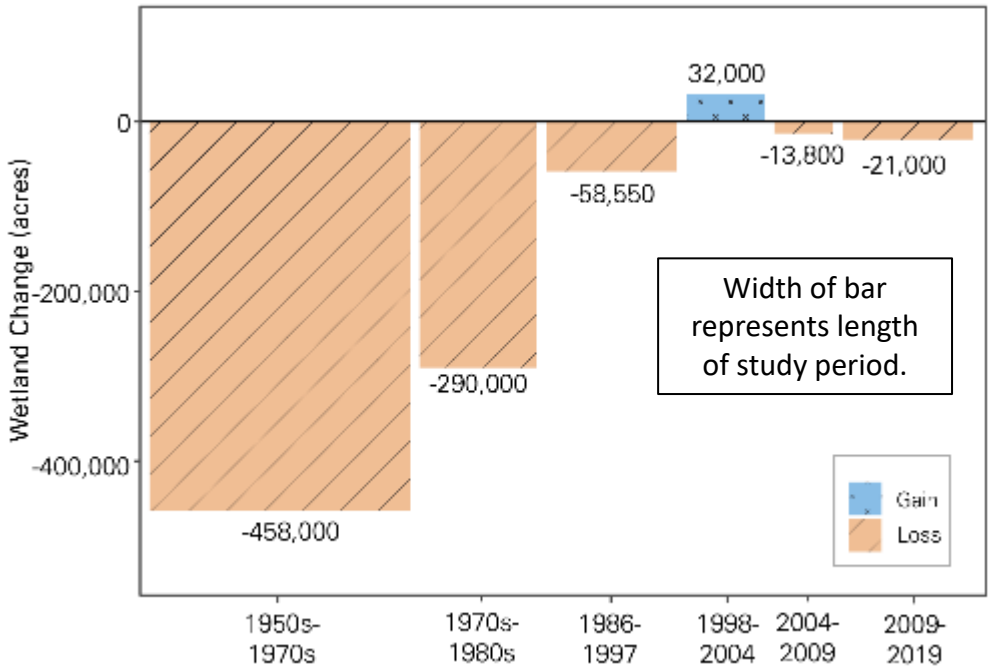
USDA NAIP Imagery from 2009 and 2019 used to detect change as part of the Wetlands Status and Trends study

2019 Area of Wetlands in the Conterminous U.S.

- **Wetlands occur in <6% of CONUS and the vast majority (95%) are freshwater.**
- **Most wetlands are vegetated (92% of freshwater and 80% of saltwater).**
- **Provision of ecosystem services is determined by wetland area and type.**
  - Wetland area impacts the magnitude of services provided.
  - Wetland type influences the variety of ecosystem services provided – e.g., flood mitigation versus water quality improvement.



Annual Wetland Net Loss or Gain Across Six Study Periods



Net wetland loss increased substantially (>50%) since last study period (2004 – 2009), thereby extending a long-term pattern of loss.

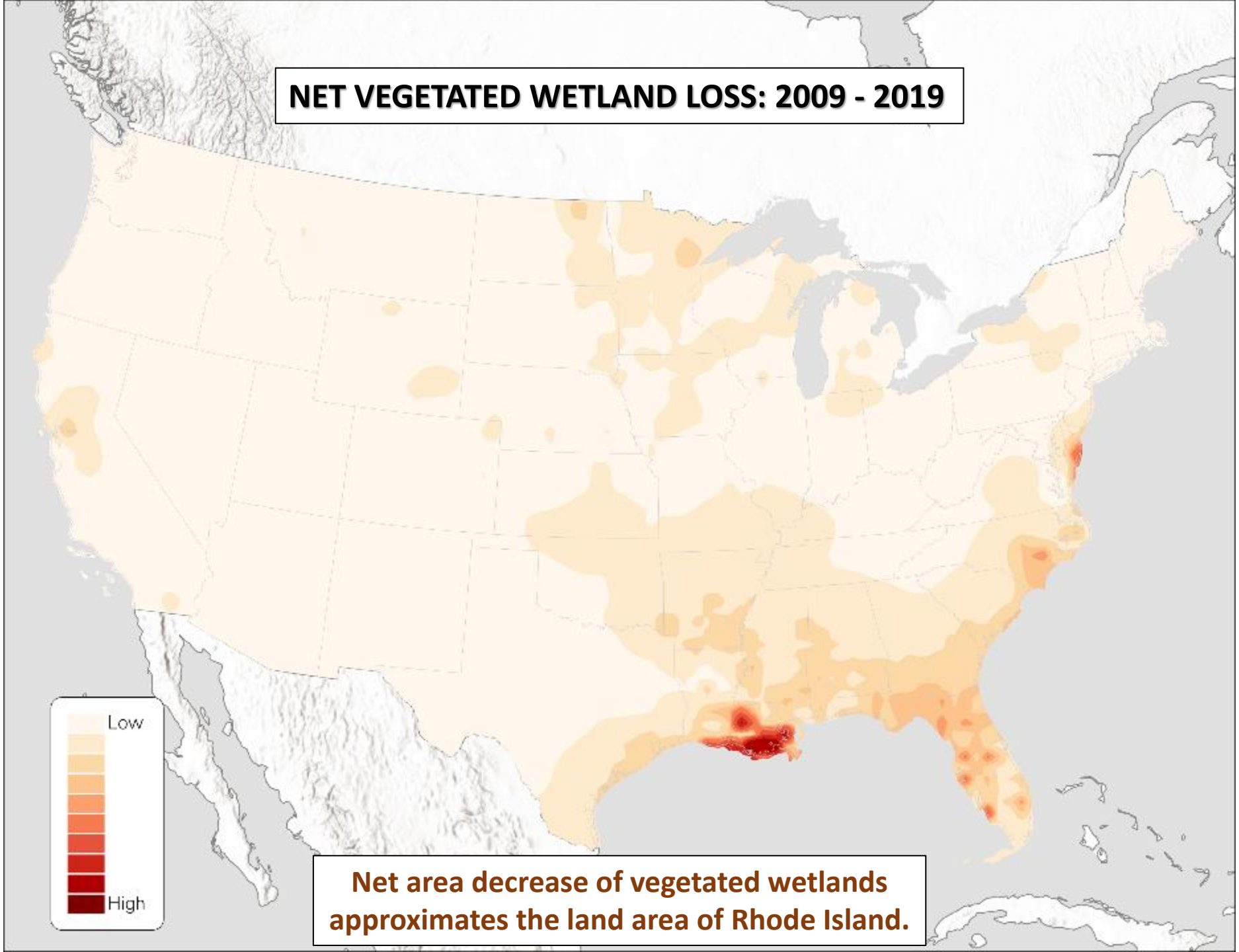
- Progress that had been made in slowing wetland loss has stopped and wetland loss rates are now increasing.
- Losses are smaller now than in the mid-1900s, but the effects of loss accumulate over time making remaining wetlands even more critical.

2009-19 Area and Change

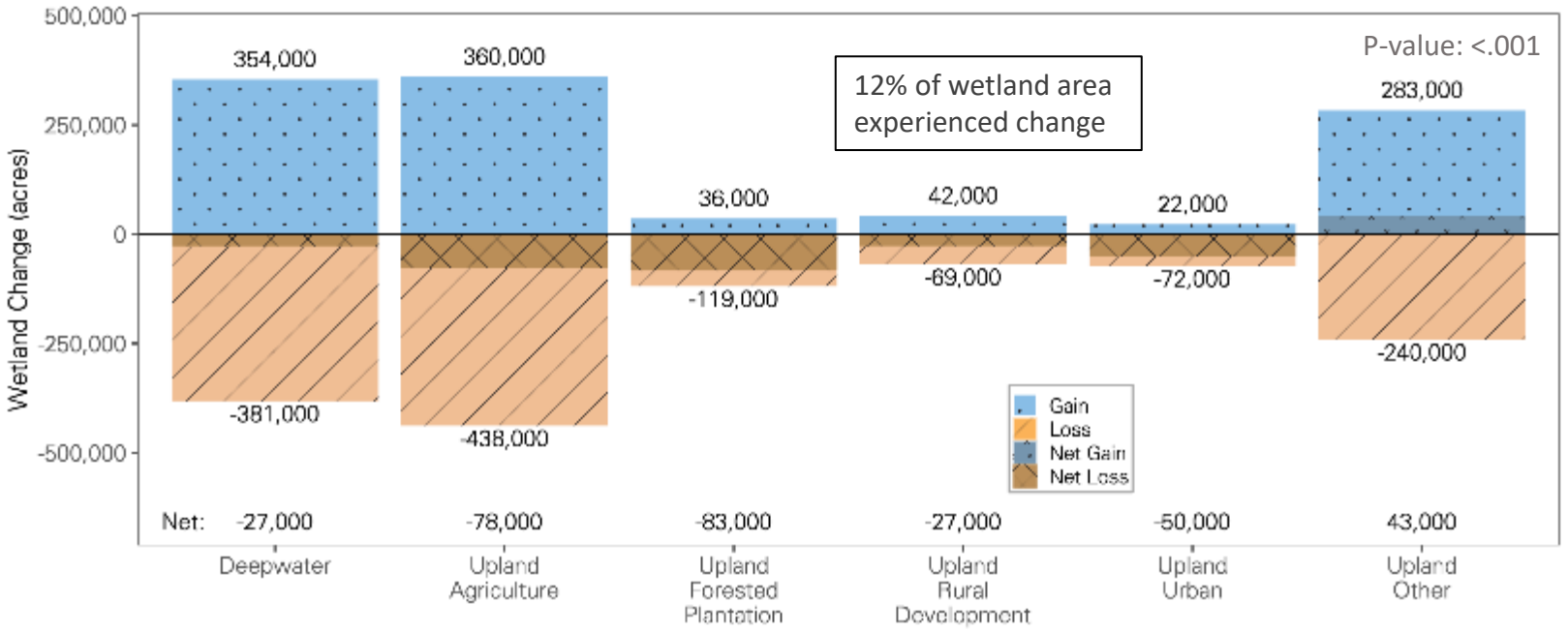
	Area, In Thousands of Acres							
Wetland/Deepwater Category	*Estimated Area, 2009*	*%CV*	*Estimated Area, 2019*	*%CV*	*Change, 2009-2019*	*%CV*	*%Change*	*Change P-Value*
Marine Intertidal	206	*13.7*	209	*13.5*	3	*75.7*	1.3%	0.187
Estuarine Intertidal Unconsolidated Shore	1,005	*11.7*	1,035	*11.3*	30	*41.4*	3.0%	0.016
Estuarine Intertidal Vegetated	4,880	*3.5*	4,817	*3.5*	-63	*17.8*	-1.3%	<.001
All Saltwater Wetlands	6,091	*2.1*	6,061	*2.2*	-30	*24.4*	-0.5%	<.001
Palustrine Ponds	6,421	*1.3*	6,876	*1.3*	455	*4.3*	7.1%	<.001
Palustrine Farmed	2,012	*23.4*	1,973	*24.0*	-40	*63.6*	-2.0%	0.116
Freshwater Vegetated	102,134	*1.7*	101,527	*1.7*	-607	*11.0*	-0.6%	<.001
-Palustrine Emergent	30,092	*7.8*	30,008	*7.8*	-84	*160.2*	-0.3%	0.533
-Palustrine Shrub	19,187	*4.9*	19,091	*5.0*	-97	*206.8*	-0.5%	0.629
-Palustrine Forested	52,854	*2.7*	52,428	*2.7*	-426	*42.1*	-0.8%	0.018
All Freshwater Wetlands	110,567	*0.9*	110,376	*0.9*	-191	*18.7*	-0.2%	<.001
All Non-Vegetated Wetlands	7,632	*1.1*	8,120	*1.0*	488	*3.4*	6.4%	<.001
All Vegetated Wetlands	107,014	*1.2*	106,344	*1.2*	-670	*7.6*	-0.6%	<.001
All Wetlands	116,658	*0.7*	116,437	*0.7*	-221	*34.3*	-0.2%	0.004
Lacustrine	17,068	*10.3*	17,227	*10.1*	159	*63.2*	0.9%	0.119
Riverine	7,435	*8.4*	7,402	*8.4*	-33	*155.1*	-0.4%	0.519
Estuarine Subtidal	19,987	*2.2*	20,043	*2.2*	56	*28.3*	0.3%	<.001
All Deepwater Habitats	44,490	*2.3*	44,672	*2.3*	182	*34.7*	0.4%	0.004

All wetland area decreases were from vegetated wetlands, whereas all increases were to non-vegetated wetlands (e.g., ponds).

- Vegetated wetland losses exceed the land area of Rhode Island.
- Non-vegetated increases obscure vegetated wetland decreases.


NET VEGETATED WETLAND LOSS: 2009 - 2019
Low
High
Net area decrease of vegetated wetlands approximates the land area of Rhode Island.

2009-19 Drivers of Net Wetland Loss or Gain



Wetlands were primarily lost to uplands but were also lost to deepwater.

- When gauging the effects of these changes, it is important to consider not only net – but gross change.

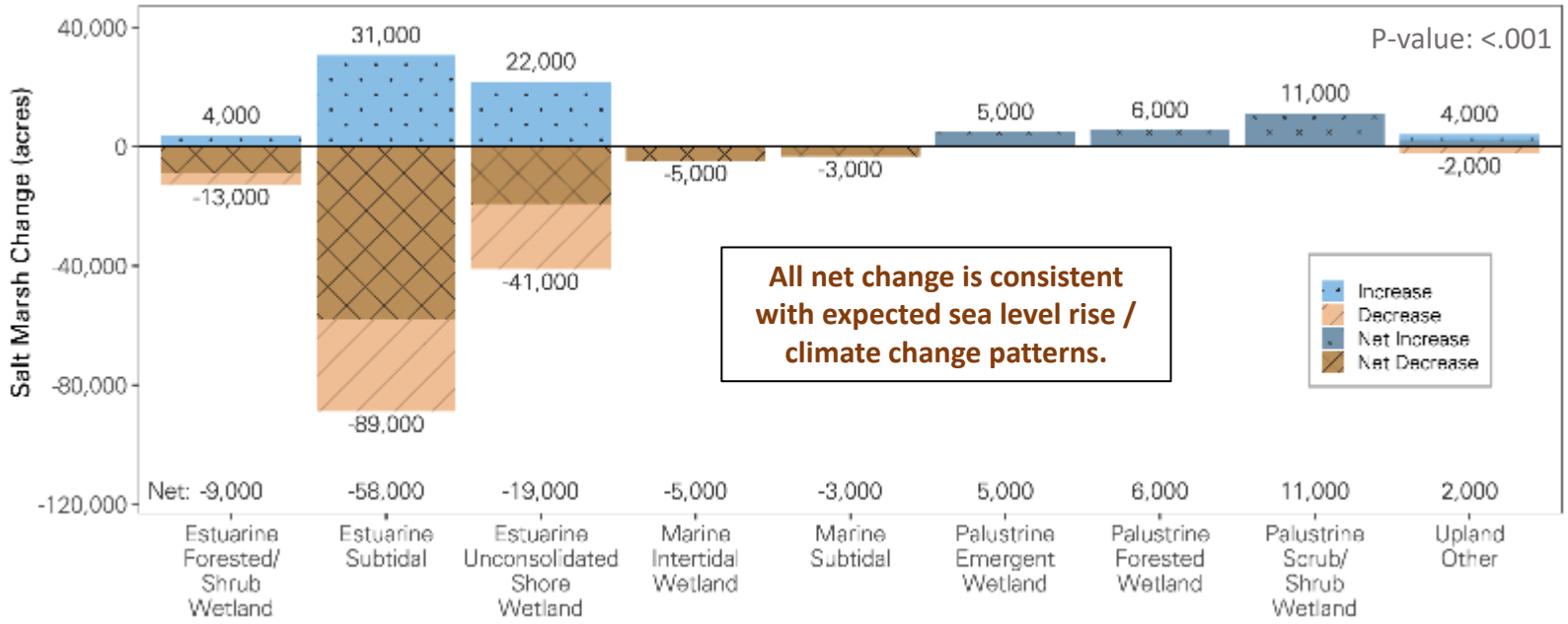

Cape Romain National Wildlife Refuge

2009-19 Saltwater Wetland Change

Wetland Category	*Area, In Thousands of Acres (%CV)*			*Change (In Percent)*	*% of Saltwater Wetlands*	*Change P-Value*
	Estimated Area, 2009	*Estimated Area, 2019*	*Change, 2009–2019*			
Marine Intertidal	206 (13.7)	209 (13.5)	2.7 (75.7)	1.3%	3.4%	0.187
Estuarine Intertidal Unconsolidated Shore	1,005 (11.7)	1,035 (11.3)	30.1 (30.1)	2.9%	17.1%	0.016
Marine and Estuarine Intertidal Non-Vegetated	1,211 (6.9)	1,244 (6.7)	32.8 (25.7)	2.6%	20.5%	0.000
Estuarine Emergent	4,070 (5.5)	4,000 (5.5)	-69.5 (25.5)	-1.7%	66.0%	0.000
Estuarine Forested/Shrub	810 (12.1)	816 (12.0)	6.7 (114.2)	0.8%	13.5%	0.381
Estuarine Intertidal Vegetated	4,880 (3.5)	4,817 (3.5)	-62.8 (17.8)	-1.3%	79.5%	0.000
All Estuarine and Marine Intertidal	6,091 (2.1)	6,061 (2.2)	-30.1 (24.4)	-0.5%		0.000

- **Area of saltwater wetlands (estuarine and marine) decreased overall.**
- **Area of salt marsh decreased substantially, while area of non-vegetated saltwater wetland increased.**
  - Net reduction in salt marsh is largest % habitat loss this study period.

2009-19 Salt Marsh Change Drivers



- **Salt marsh decrease was mostly associated with loss to deepwater, but also conversion to non-vegetated wetland.**
  - Non-vegetated increase may be temporary (transitioning to deepwater).
- **Salt marsh increase from freshwater wetlands and upland may indicate landward migration of salt marsh with sea level rise.**

Annual Saltwater Wetland Net Change Across Study Periods

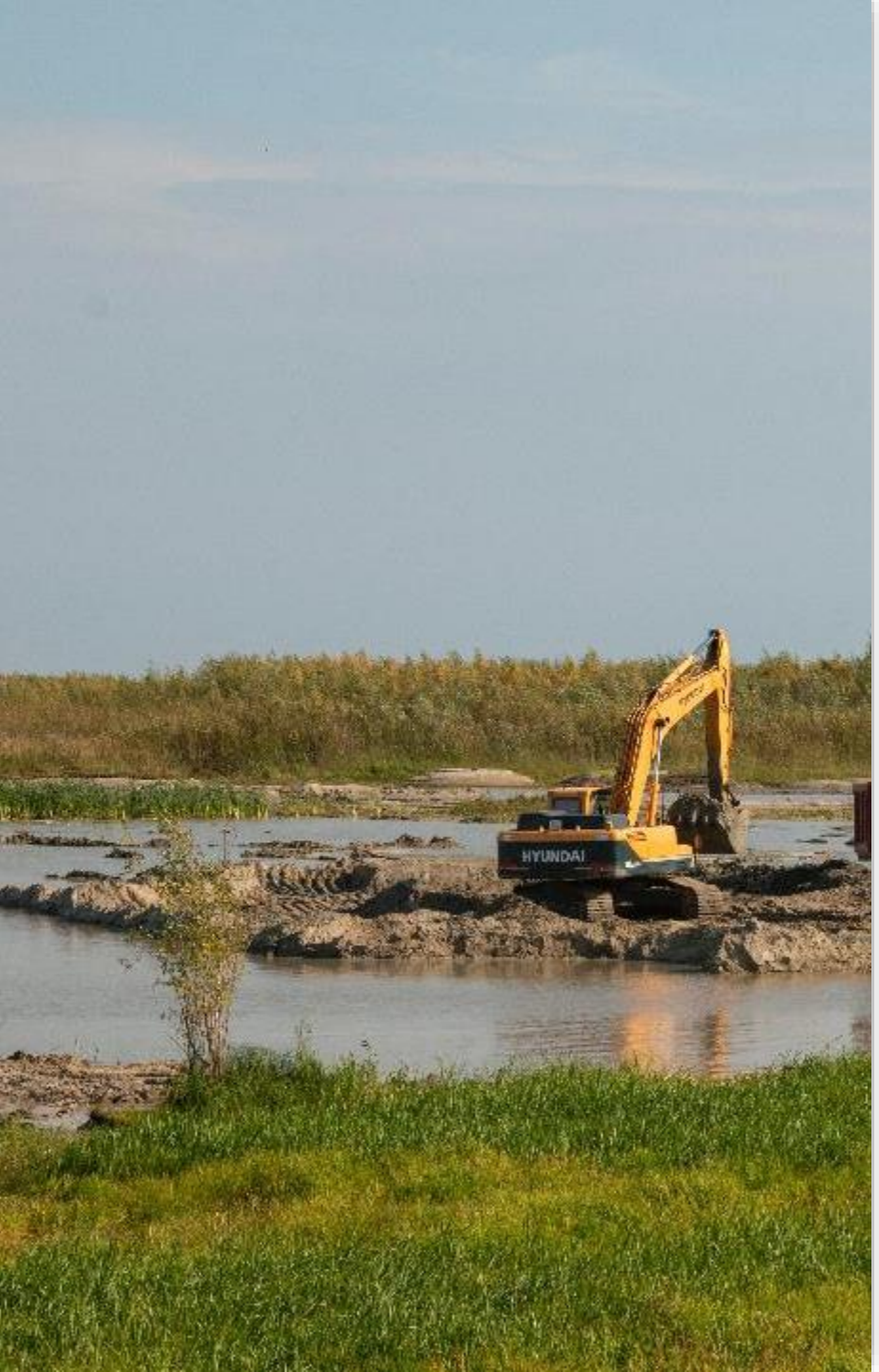
Pattern of decreasing salt marsh and increasing non-vegetated saltwater wetlands has been consistent for the last 70 years.

- **Highly significant, long-term pattern consistent with effects of climate change**

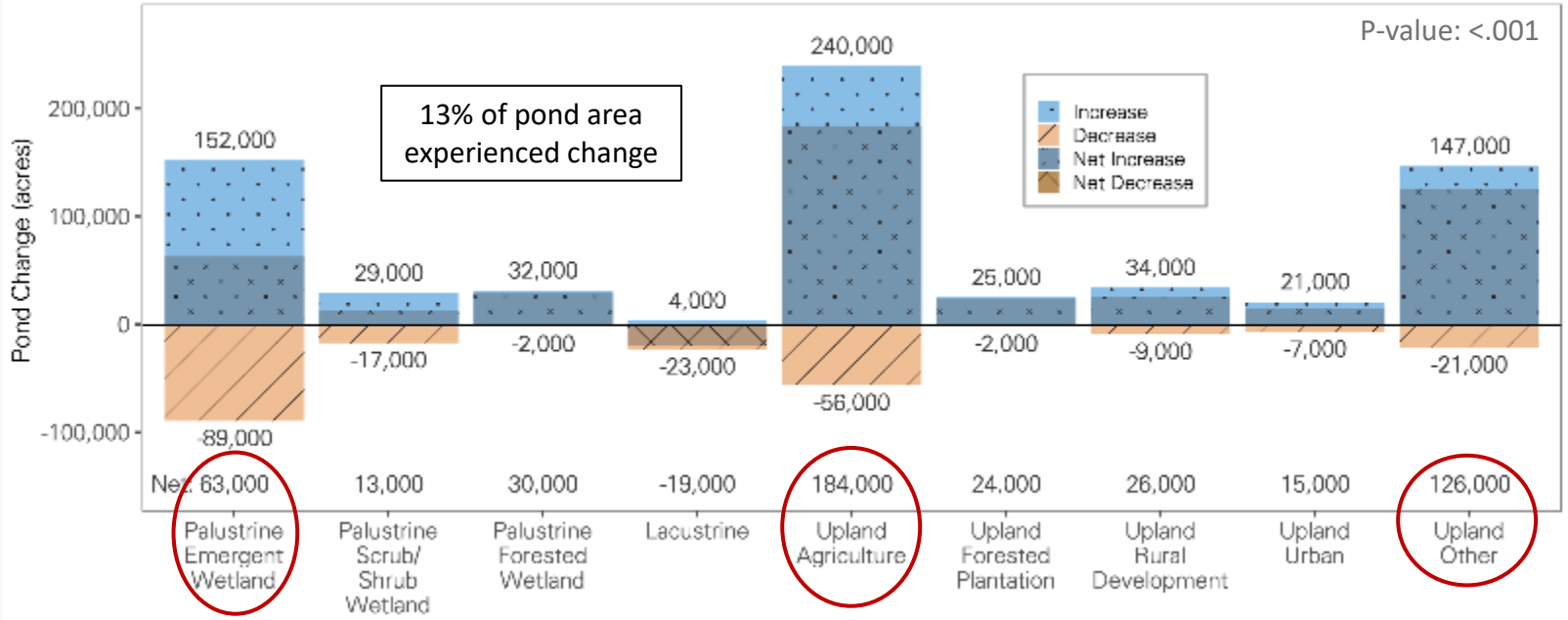
2009-19 Freshwater Wetland Change

- **Net annual freshwater vegetated wetland loss increased by ~50%.**
  - Palustrine forested wetlands demonstrated the largest reduction in habitat area of any single category (426K ac).
- **Net increase in ponds resulted in a 7% gain of that habitat.**
- **When considering all freshwater wetland change, pond gain obscures vegetated wetland loss.**

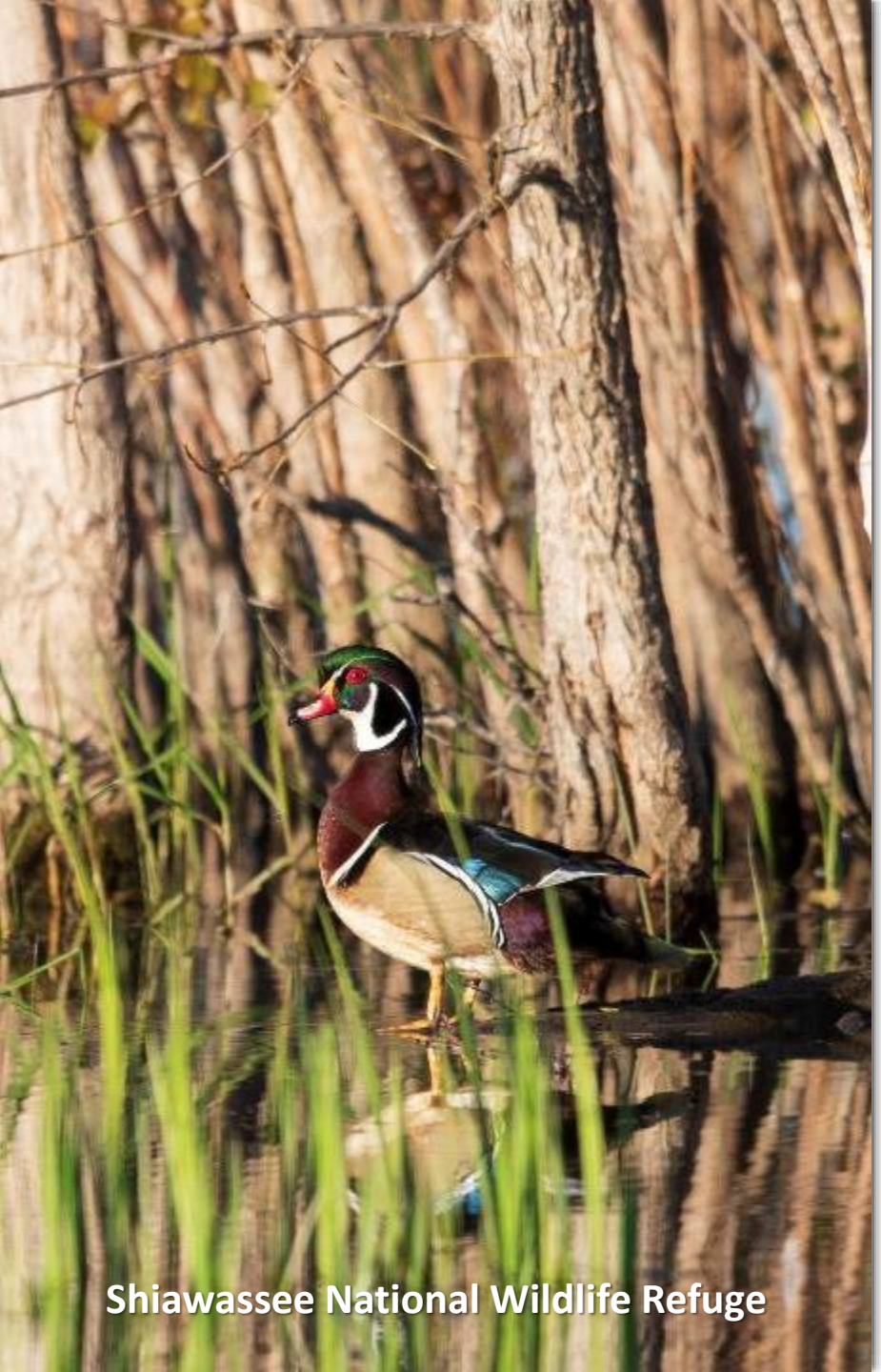
Wetland Category	*Area, In Thousands of Acres (%CV)*			*Change (In Percent)*	*% of Freshwater Wetlands*	*Change P-Value*
	Estimated Area, 2009	*Estimated Area, 2019*	*Change 2009-2019*			
Palustrine Emergent	30,092.4 (7.8)	30,008.2 (7.8)	-84.2 (160.2)	-0.3%	27.2%	0.9225
Palustrine Shrub	19,187.4 (4.9)	19,090.9 (5.0)	-96.5 (206.8)	-0.5%	17.3%	0.6180
Palustrine Forested	52,854.2 (2.7)	52,428.2 (2.7)	-426.0 (42.1)	-0.8%	47.5%	0.0176
Freshwater Vegetated Wetlands	102,134.1 (1.7)	101,527.3 (1.7)	-606.8 (11.0)	-0.3%	92.0%	0.0000
Aquaculture Ponds	159.0 (30.8)	153.8 (30.7)	-5.0 (166.8)	-3.1%	0.1%	0.5489
Agriculture Ponds	3,057.0 (3.9)	3,310.2 (3.9)	253.0 (12.9)	8.3%	3.0%	0.0000
Industrial Ponds	367.6 (11.8)	435.1 (10.8)	68.0 (24.6)	18.5%	0.4%	0.0000
Natural Ponds	1,838.7 (6.3)	1,887.6 (6.3)	49.0 (49.1)	2.7%	1.7%	0.0416
Urban Ponds	998.6 (6.8)	1,089.3 (6.5)	91.0 (13.5)	9.1%	1.0%	0.0000
Palustrine Ponds	6,420.9 (1.3)	6,876.1 (1.3)	455.2 (4.3)	7.1%	6.2%	0.0000
Palustrine Farmed	2,012 (23.4)	1,973 (24.0)	-39.6 (63.6)	-2.0%	1.8%	0.1160
All Freshwater Wetlands*	110,567.4 (0.9)	110,376.2 (0.9)	-191.2 (18.7)	-0.2%		0.0737



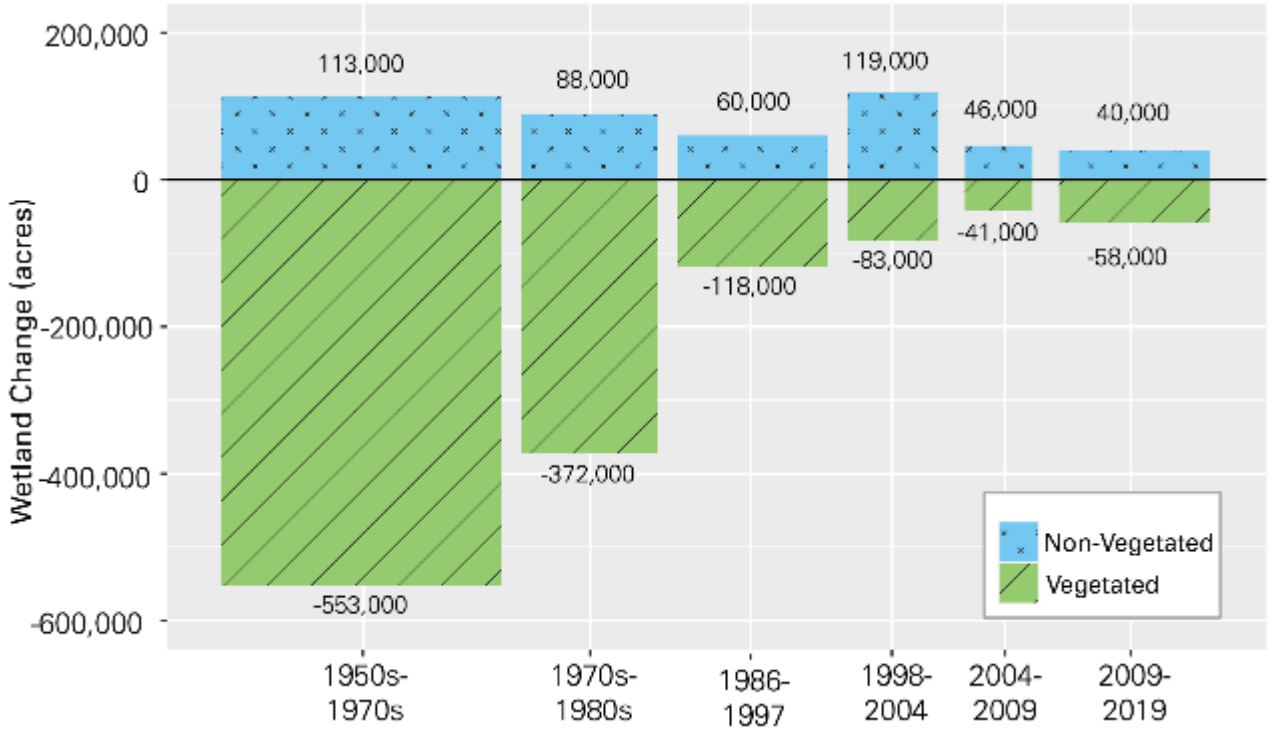
2009-19 Pond Change



- **Ponds are primarily being gained from uplands – especially upland agriculture and upland other.**
- **Increases in pond area are also associated with decreases in vegetated wetland classes, particularly freshwater marshes.**



Annual Freshwater Wetland Net Change Across Study Periods



The pattern of vegetated wetland loss and pond gain has been consistent for the past 70 years.

Discussion (1)

Effects of longstanding wetland loss are cumulative over space and time, fundamentally altering ecological processes.

- Decrease human safety, health, and economic prosperity
  - Increased susceptibility of people/infrastructure to natural disasters
  - Decreased food and water security and increased harmful algal blooms
  - Greater vulnerability to sea level rise
- Negatively impact fish, wildlife, and plant populations
  - Contribute to a growing list of threatened/endangered/extinct species
    - 61% of U.S. amphibian species are declining
    - In U.S., 50% of crayfish and 66% of freshwater mollusks are at risk of extinction (10% of freshwater mollusks extinct).
    - Half of locally extinct U.S. vascular plants live in wetlands.
  - Reduce populations of culturally, commercially, and recreationally valuable species, including fisheries and migratory birds.
    - Half of North American bird species and 80% of protected birds depend on wetlands.

Forested Wetland After Harvest

Discussion (2)

Vegetation loss is an important driver of ecologic deterioration.

- **Vegetated wetlands function differently than non-vegetated wetlands and often provide more ecosystem services.**
  - Build resilience to storms and sea level rise
  - Enhance water quality by trapping sediment, oxygenating the water column, and removing pollutants
  - Regulate climate by trapping carbon dioxide and storing carbon
  - Provide vital habitat for imperiled and commercially valuable species

Vegetated wetland loss evident in species population trends

- North American State of the Birds report:
  - ~1/3 of waterbirds experiencing population declines, including several that rely almost exclusively on vegetated wetlands (black and king rail)
  - “Tipping Point” species include the seaside and saltmarsh sparrows, as well as 1/3 of shorebirds.
  - Most species of diving/dabbling ducks that can use open water habitats are stable or increasing.

Discussion (3)

Impacts of wetland loss and alteration on ecosystem functioning and services may be difficult to reverse.

- Effects stem from wetland loss and replacement with other land uses – e.g., pollution from development and agriculture.
- Declines in wetland function may be punctuated by tipping points.
- Full impact of wetland loss may not be evident immediately.
- It may decades, centuries, or longer before restored wetlands function like natural wetlands.
- Dual approach of protection and restoration is needed to retain or augment important benefits that wetlands provide.

Report findings are a conservative estimate of the effects of human, climate, and other change drivers on ecosystem services.

- The reports do not assess changes in wetland condition.
  - Effects of disturbance on ecosystem function can be substantial.

Effects of wetland loss and conversion will likely be magnified by future climate and land-use/land-cover change.

Summary

- **Net wetland loss increased substantially (>50%) since the last Wetlands Status and Trends study period (2004 – 2009).**
  - Extends a long-term pattern of wetland loss in the contiguous U.S.
- **This loss is coupled with a shift towards decreasing biomass within remaining wetlands.**
- **These patterns have and will continue to negatively affect human health, safety, and prosperity, as well as conservation of fish, wildlife, and plants.**
- Conservation approaches must consider wetland area AND type to retain the full range of ecosystem functions/services.


Blackwater National Wildlife Refuge

Recommendation

To achieve no net loss of all wetlands, including vegetated wetlands, a strategic update is needed to America's approach to wetland conservation.

- Four foundational strategies were identified to help address wetland policy, management, and science gaps.

Ponds Illuminated by Sun Glint (Texas)

Strategies

Strategy 1: Achieve “No Net Loss” of wetlands and robust coordination with government and non-governmental partners

Strategy 2: Produce a contemporary NWI Geospatial Dataset and spatially explicit information on wetland function

Strategy 3: Develop, document, and implement enhanced wetland conservation and management approaches based on a holistic review of current and past actions

Strategy 4: Long-term commitment to adaptive conservation, management, and data collection strategies

Moosehorn National Wildlife Refuge

Recommended Strategy One

Strategy 1: Achieve "No Net Loss" of wetlands and robust coordination with government and non-governmental partners

- **Establish requirement to work effectively across and within government levels to achieve no net loss of wetlands, including vegetated wetlands**
  - Past policies (11990) mandated that individual agencies act, but holistic national coordination is not currently mandated nor occurring.
  - Mandate would enable creation of governance structure(s) and dedication of staff time, which have proved challenging in the past.
- Meaningful progress will also depend on sufficient resources and mechanisms to share or pool resources.

National Wetlands Inventory Dataset

Recommended Strategy Two

Strategy 2: Produce a contemporary NWI Geospatial Dataset and spatially explicit information on wetland function

- **The strategic conservation decision-making which will be required to achieve no net loss of wetlands is dependent on knowing the location, abundance, and types of wetlands.**
    - Dataset should be interoperable with other components of the U.S. NSDI to enable effective modeling of wetland functions and services.
- Information on wetland functions and services is increasingly being used to support decision-making and NWI is routinely used to help provide this.
    - National standards and resources to enhance and host wetland functional data are needed before this information can be most effectively used.


Salt Marsh Restoration

Recommended Strategy Three

Strategy 3: Develop and implement enhanced wetland conservation and management approaches based on a holistic review of current and past actions

- **To move forward most strategically, the coordination group (Strategy 1) must understand the effectiveness of current and past authorities, regulations, programs, and other actions relative to "No Net Loss."**
  - Need: thorough review that brings together experts across a wide range of disciplines and focus areas
    - Should include outcomes and why they occurred
    - A resource that outlines the various authorities and programs available to conserve wetlands at all government levels

Recommended Strategy Four

Strategy 4: Long-term commitment to adaptive conservation, management, and data collection strategies

- Current challenges highlight the need to improve our approaches over time through the adaptive management process.
- **Future Wetlands Status and Trends studies and other scientific data should be used to iteratively evaluate and reconsider approaches.**

Acknowledgements

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Questions?