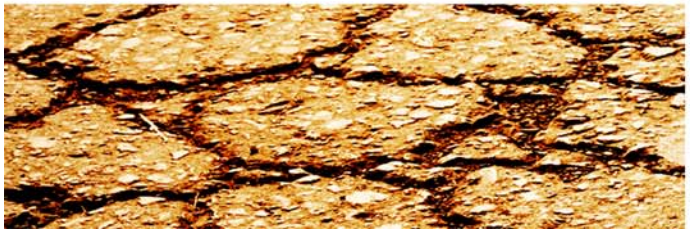
Federal Managers Responses to Climate Change

Francis J Reilly Jr.

LMI's Climate Change Guide and How It Affects You



Our Climate Change Resources

1. A Federal Leader's Guide to Climate Change

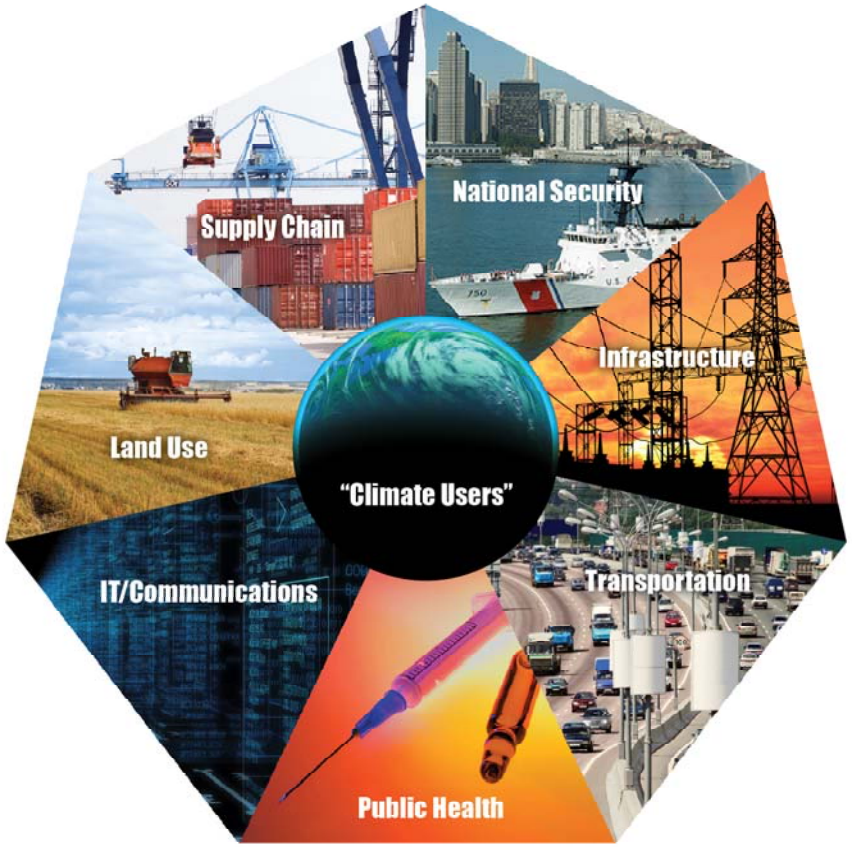
2. The Greenhouse Gas Protocol for the U.S. Public Sector

3. LMI Climate Change Knowledge Engine (LMI-CliCKE)

About LMI

- What we do
- Why is LMI doing this?
- Our efforts addressing climate change

A new concept: "The Climate User"



Climate Change Users

- Who are they?
- What are their drivers with climate change?
- What is their background in climate change?
- What else do they do?

Water and Climate Change: the challenges

- Precipitation changes
  - Increased flooding events
  - Decreased precipitation
  - Temporal changes in water availability
- Rising Sea level
  - Inundation – loss of fast land
  - Increasing salinity
- Secondary water damages
  - Loss of habitat
  - Loss of water retention

The Approach

- Ideas for managers to mitigate climate change
- Ideas for managers to adapt to the challenges

Five Mitigation Themes

Health	Information	Land Use	Infrastructure	Vehicles	Supply Chain	Security
• Plan Cooperatively						
• Seek financial benefits of reducing						
• Optimize on new metric						
• Take direct action						
• Conduct ongoing assessments						

Six Adaptation Themes

Health	Information	Land Use	Infrastructure	Vehicles	Supply Chain	Security
• Use Climate models						
• Identify specific threats						
• Assess risks of each						
• Plan cooperatively						
• Employ warning systems						

- Take direct action

Adaptation Potential

Health	Information	Land Use	Infrastructure	Vehicles	Supply Chain	Security
Anticipate acute events	Address climate risks	Improve coastal zoning	Assess climate risks	Change organizational thinking	Use risk management	Develop informative scenarios
Prepare warning systems	Use climate models	Manage water availability	Plan to adapt	Identify upcoming challenges	Prepare adaptation plans	Mandate prevention strategies
Anticipate chronic events	Leverage social media	*Improve* forest management	Implement warning systems	Assess your vulnerability	Assess adaptation risk	Wargame climate change
Address contamination threats	Innovate through crowd-sourcing	Change agricultural practices	Develop flood controls	Create adaptation plans	Adapt as planned	Assess capabilities and needs
Expect mental stress	Plan adaptation cooperatively	Expect increased salinity	Protect and harden	Increase modal flexibility	Adapt and learn	Develop warning systems

Operational Impacts

Health	Information	Land Use	Infrastructure	Vehicles	Supply Chain	Security
Anticipate acute events	Address climate risks	Improve coastal zoning	Assess climate risks	Change organizational thinking	Use risk management	Develop informative scenarios
Prepare warning systems	Use climate models	Manage water availability	Plan to adapt	Identify upcoming challenges	Prepare adaptation plans	Mandate conflict prevent strategies
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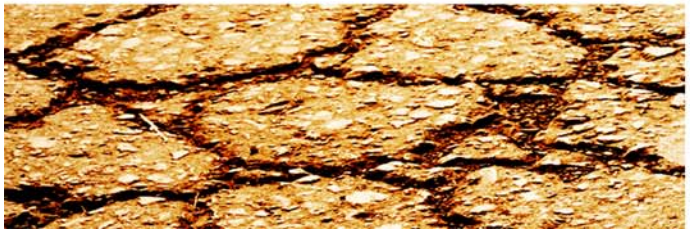
Infrastructure

Rich Skulte

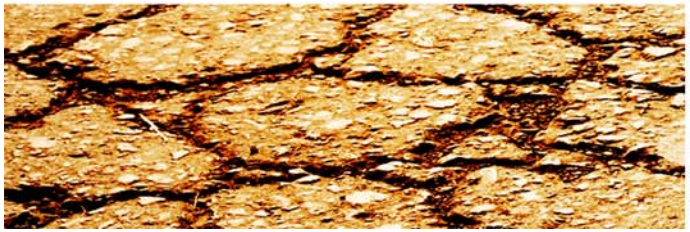


Adaptation Recommendations

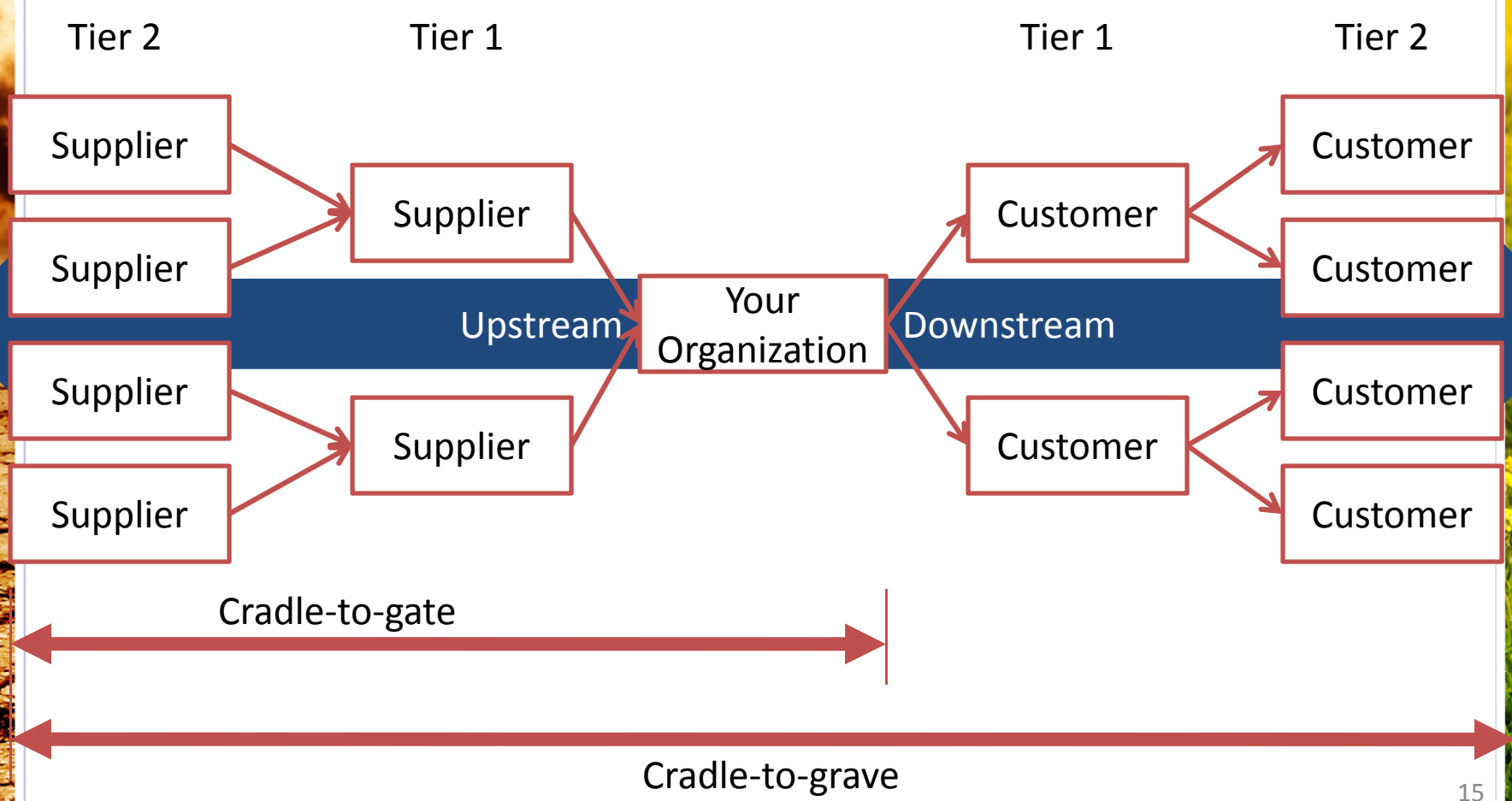
- Conduct a vulnerability assessment and risk analysis
- Develop a proactive adaptation plan
- Be current on adaptation and climate science
- Establish and communicate early warning systems and evacuation plans
- Develop flood control systems
- Improve infrastructure resilience through protection and hardening
- Adapt to sea level rise through land use and migration

Managing the Supply Chain

Taylor Wilkerson

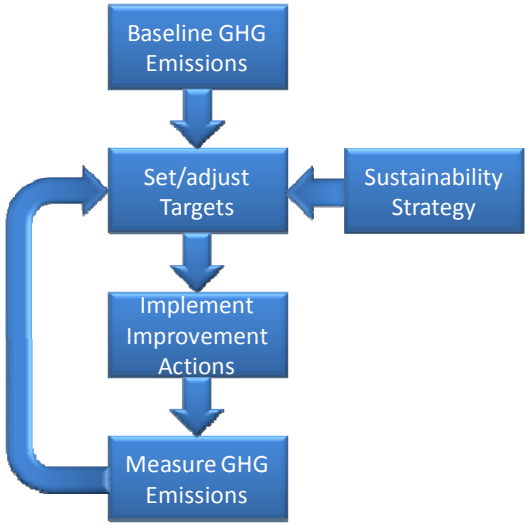


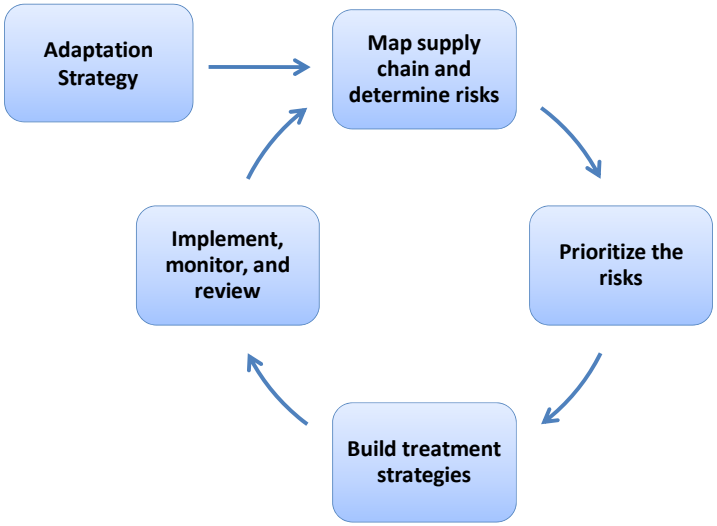
Define the Supply Chain Climate Change Strategy



Value of a Mitigation-Adaptation Approach

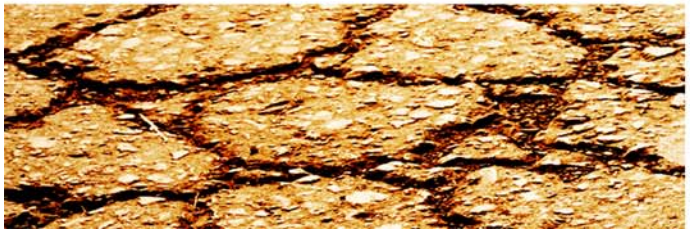
- Minimize the impacts of your supply chain today
- Risk management a proven method for addressing uncertainty
- Flexibility in the approach with changing risks
- Cost effective treatment of multiple risks





Climate Change and Transportation Management

Julian Bentley



Adaptation Strategies
Vulnerability of critical infrastructure

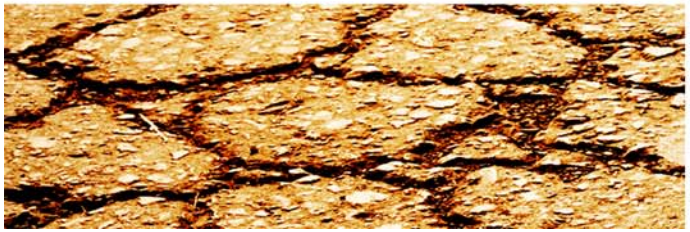
- Assess regional climate change impacts
- Inventory essential infrastructure in impacted areas
- Analyze adaptation options
- Prioritize based on criticality
- Implement adaptation strategies
- Evaluate effectiveness of strategies

Adaptation Strategies
Flexibility to Shift Between Modes

- Reduced reliability of infrastructure in impacted areas
- Provide flexibility to shift between transportation modes as needed
- Plan before its needed

Climate Change will Affect Land Use and Potentially Vice Versa

Frank Reilly



Who is my Climate User?

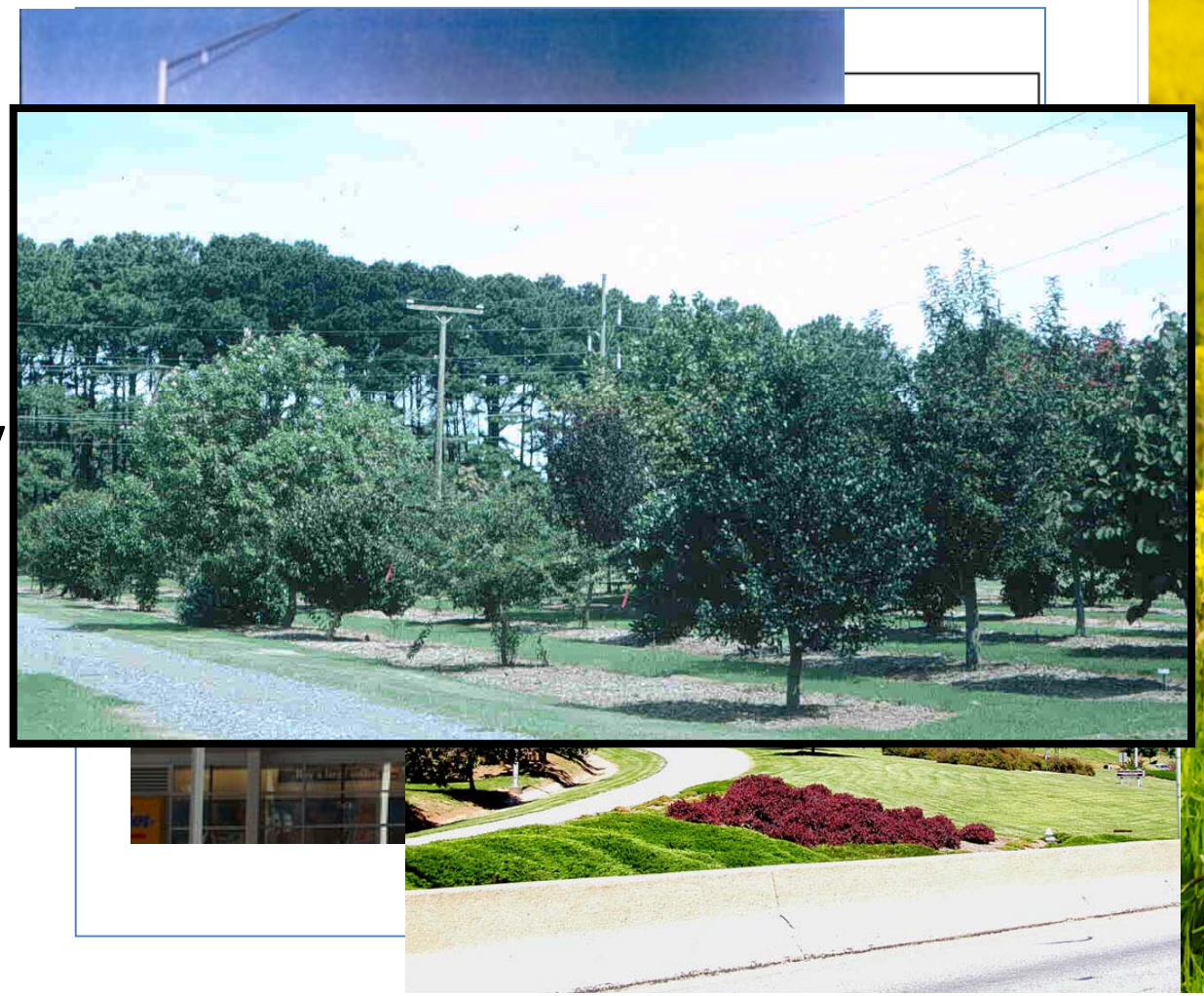
- Land Managers
  - BLM
  - Forestry Service/National Park Service
  - Military Installations
  - City planners
  - Private land managers/ Farmers and Livestock producers
  - And many more

Example – Climate Change means Global Warming

What they're Saying	What they're missing
• GHGs are increasing	• Local approach might work best • Federal Managers can preserve mission and mitigate
• Melting Icecaps and glaciers = sea level rise	• Saltwater intrusion into rivers and groundwater will damage crops and habitat
• Temperatures are rising	• Warmer winters don't kill pests • "release" of invasive species

Recommendation – Use a local approach to prove the concepts

- Challenge
  - No trusted world agents
  - Federal Government lacks authority
- Solution
  - Bottom-up approach
- Examples

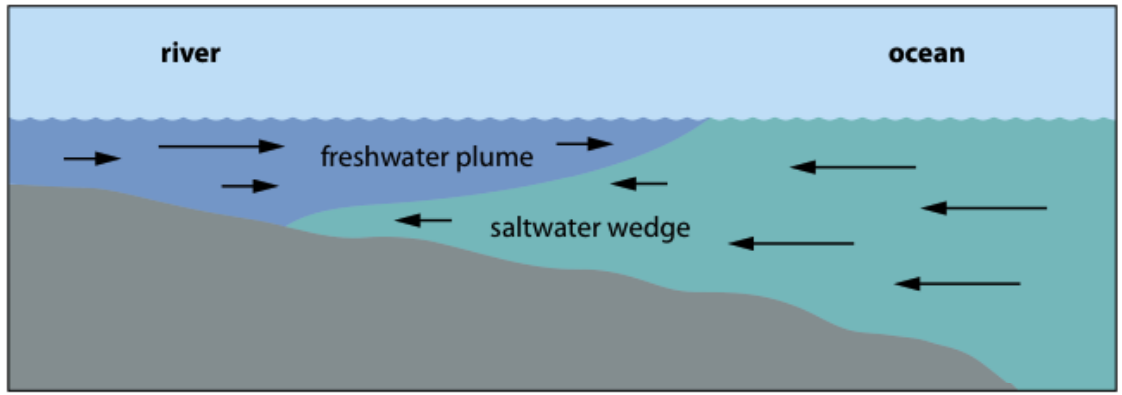


Recommendation – Use Federal Land Management to mitigate

Credit Source	Market Price per Unit	Reasonable Unit Production per Acre	Easement Duration	$ Income per Acre Minimum	$ Income per Acre Maximum
Carbon	$5-$30 metric ton	1 ton (depending on biological factors)	Per year – Many year lease required	$5.00	$30.00
Nitrogen	$11-$18 lb	1-20 lbs	Per year	$11.00	$360.00
Phosphorus	$2.10-$44.00 lb	0.20-1 lbs.	Per Year	$0.42	$44.00
Wetlands		$10K-$35K	Perpetual easement	$10,000.00	$35,000.00
Streams	$687.00 per linear foot	?	Perpetual Easement	$6870.00	$6870.00
Conservation Banking Services		$5K	Perpetual Easement	$5,000.00	$5,000.00
Total				$21,846.42	$109,134.00

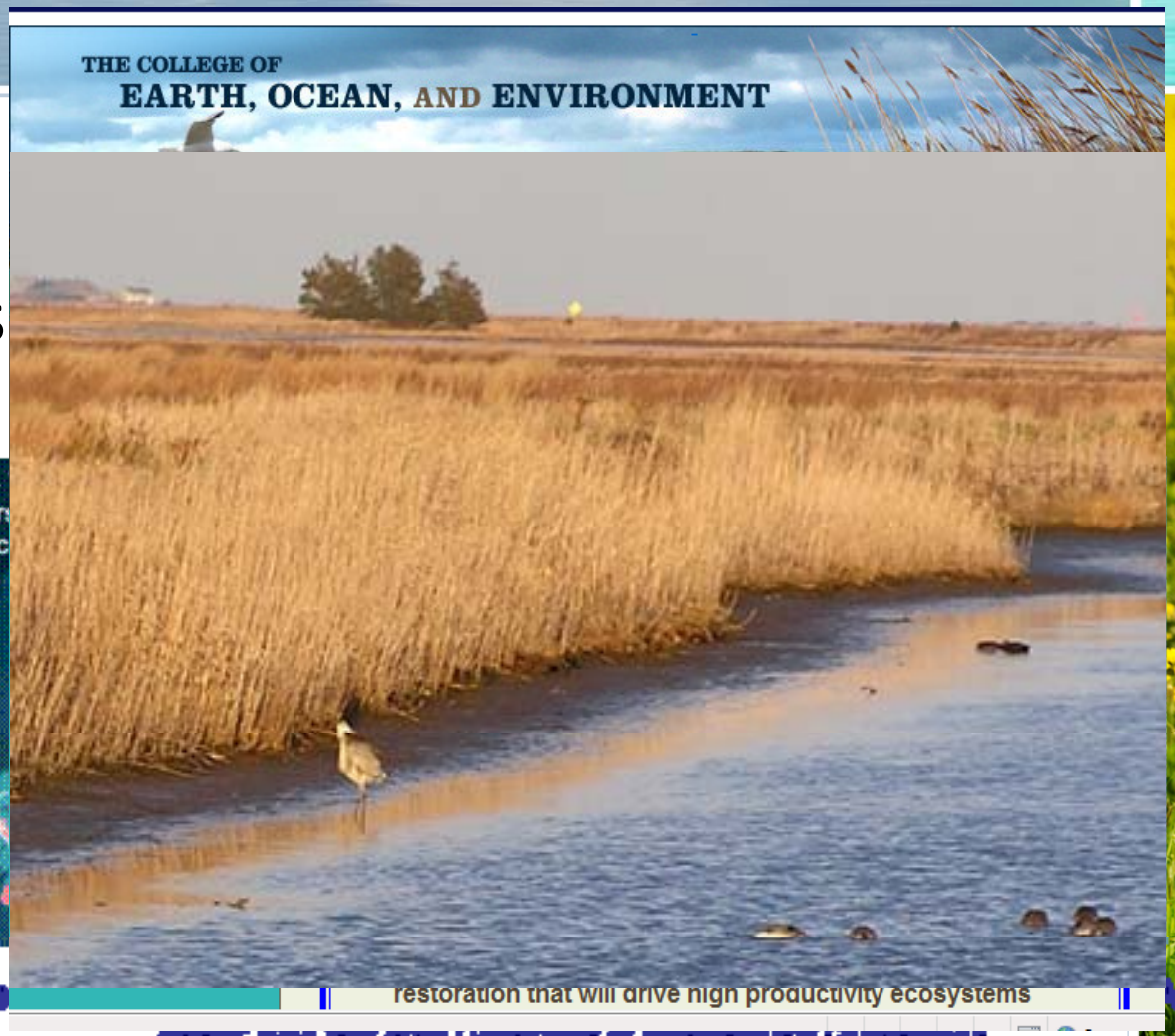
Recommendation Use engineering to stave off saltwater intrusion

- Challenge
  - Salt water wedge
  - Salts kill crops & habitat
- Solution
  - Engineering
- Examples



Recommendation – Use proper plantings to exploit

- Challenge
  - Salt kills crops and habitat
- Solution
  - Make plant choices
- Examples

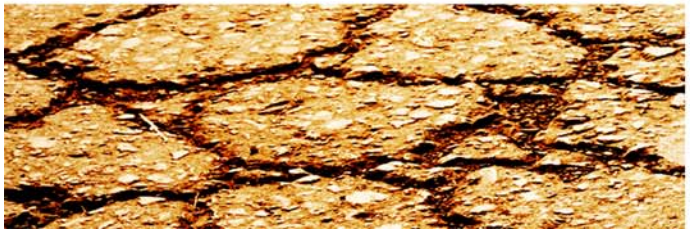


Figure

Recommendation –Joint Agency cooperation can help adapt to temperature changes

- Challenge
  - Higher winter temperatures allow pests
  - And invasives
- Solution
  - Get the best agents on the problems
- Examples

Questions and Discussion

For Follow Up…

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