

CARBON SEQUESTRATION: Creating Markets for Reversing Subsidence and “Growing” Wetlands



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outline



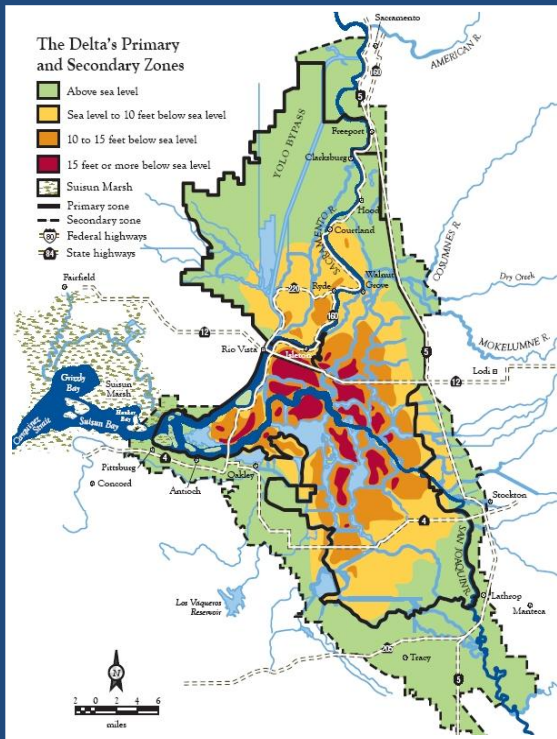
1. Defining Carbon Capture Wetland Farming
2. The market opportunity
3. Roadmap to implementation



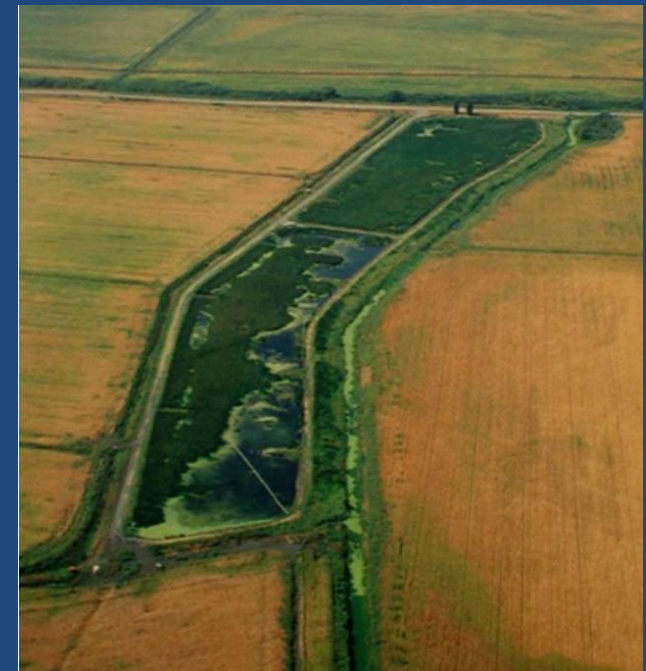
1. Carbon-Capture Wetland Farming



carbon wetland farming



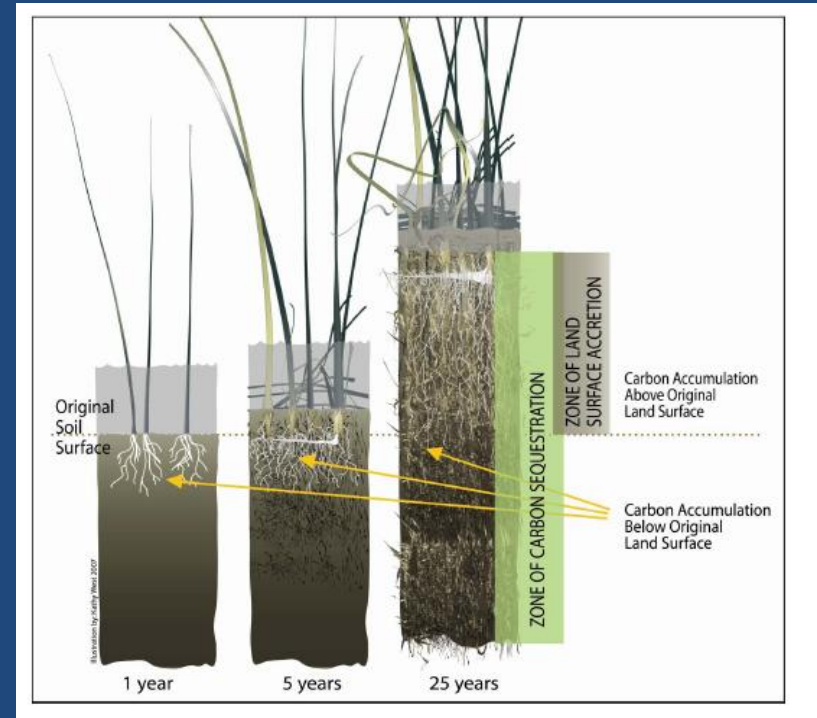
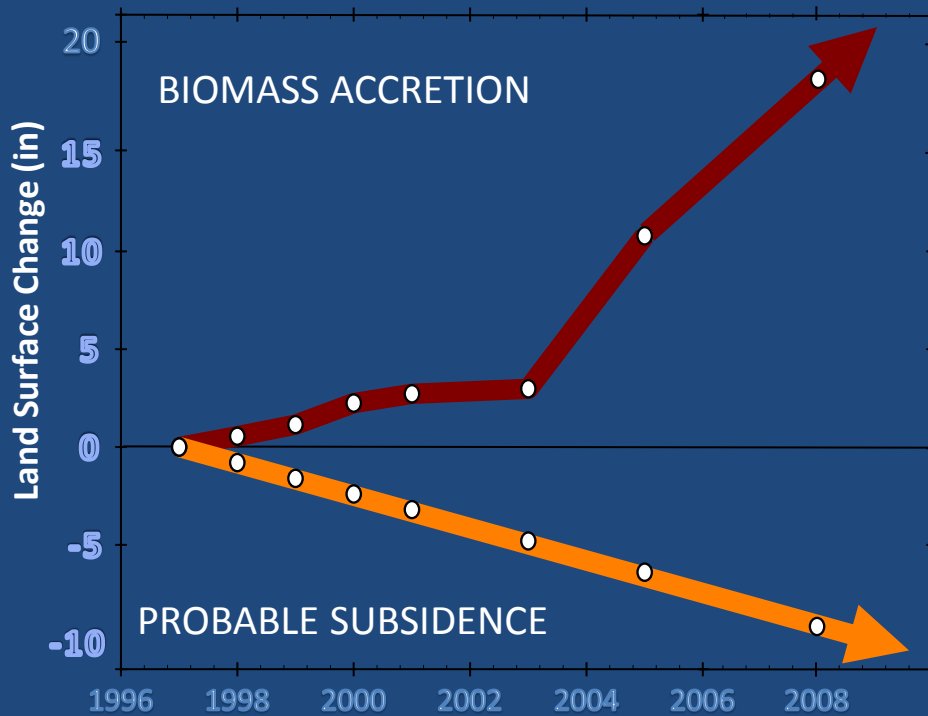
- Cannot restore wetlands on subsided lands
- Need to stabilize levees to protect water supply
- Large GHG emissions from oxidation of peat soils



Twitchell Island Pilot Wetland

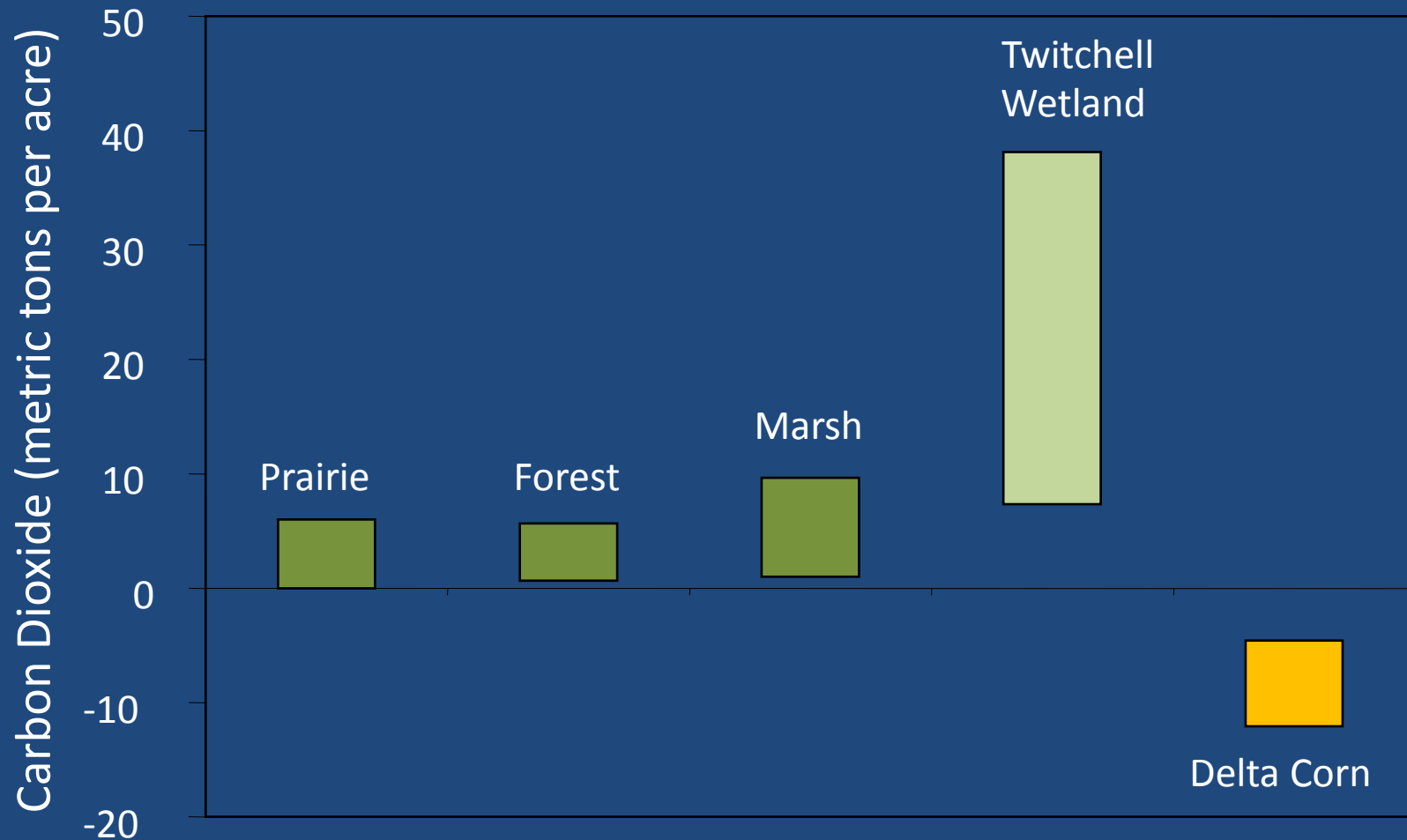
- Two 7 acre wetlands, established in 1997
- Continuously flooded, freshwater, non-tidal
- Highly managed

wetland performance



- Eliminate current CO₂ and N₂O emissions
- Replace lost peat soils, reverse subsidence, rebuild land surface
- Sequester ~25 MT CO₂ per acre-year

wetland productivity



2. The Market Opportunity



construction costs



Cost Category ¹	WETLAND SCENARIO (\$/ACRE) ²		
	LOW	MEDIUM	HIGH
Direct Costs	384	549	1,126
Cash Overhead ³	163	163	163
Non-Cash Overhead ³	59	59	59
TOTAL PER-ACRE ESTABLISHMENT COSTS	\$606	\$772	\$1,348

Cost Category ¹	WETLAND SCENARIO (\$/ACRE) ²		
	LOW	MEDIUM	HIGH
Direct Costs	20	31	51
Cash Overhead ³	138	138	138
Non-Cash Overhead ³	59	59	59
TOTAL PER-ACRE ANNUAL OPERATING COSTS	\$217	\$229	\$249

wetland production

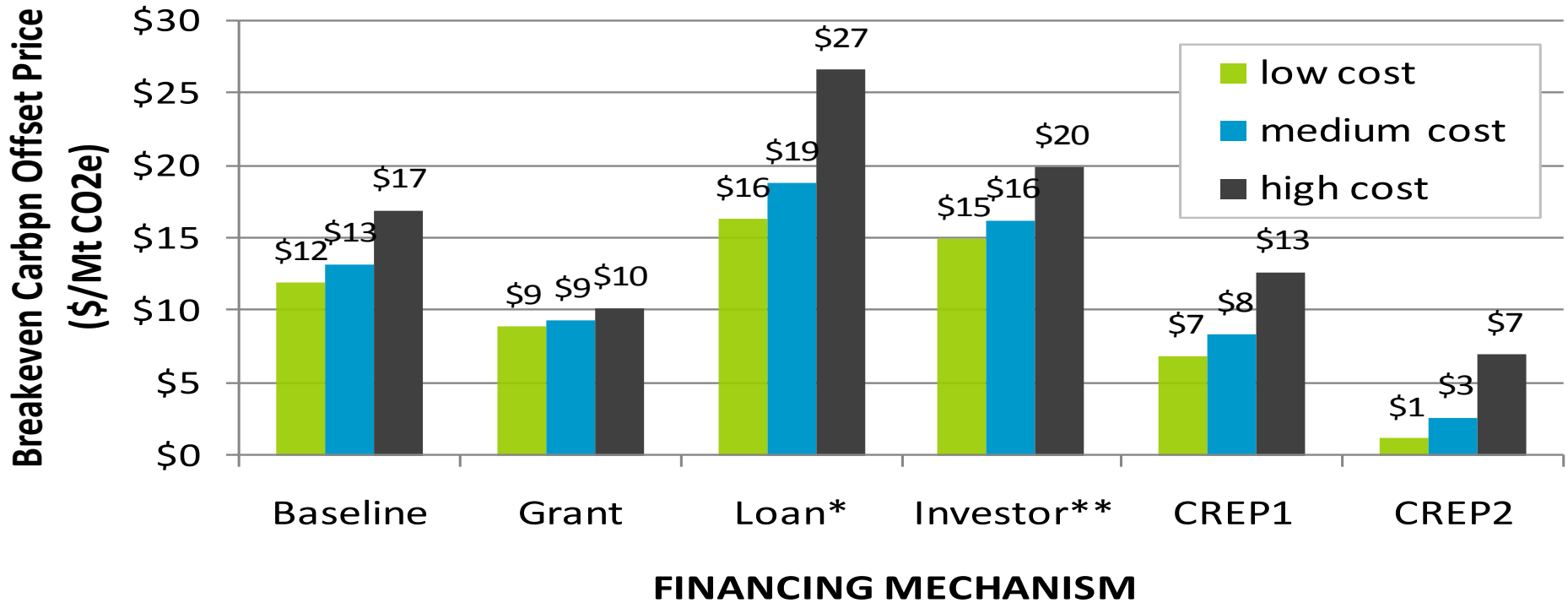


COST CATEGORY	10-year wetland production period		20-year wetland production period	
	LOW COST	HIGH COST	LOW COST	HIGH COST
TOTAL CARBON CREDITS PRODUCED PER ACRE (Mt CO₂e)				
Establishment, yr 1	0	0	0	0
Emission reductions: 100%, yr 2-5	50	50	50	50
Ramping-up production, yr 2-5	25	25	25	25
Full production, yr 6+	125	125	375	375
TOTAL CARBON CREDITS	200	200	450	450
PRODUCTION COSTS PER CARBON CREDIT (\$/Mt CO₂e)				
Establishment costs	\$3.03	\$6.74	\$1.35	\$3.00
Total Annual Operations (discounted to 2010)	\$8.87	\$10.15	\$7.57	\$8.67
TOTAL COST /CARBON CREDIT	\$11.90	\$16.89	\$8.92	\$11.66
TOTAL PER ACRE COST/YEAR	\$238	\$338	\$201	\$262

breakeven carbon price



Breakeven Price of Carbon over 10-year Production Period, by Financing Scenario and Wetland Carbon Offset Production Cost

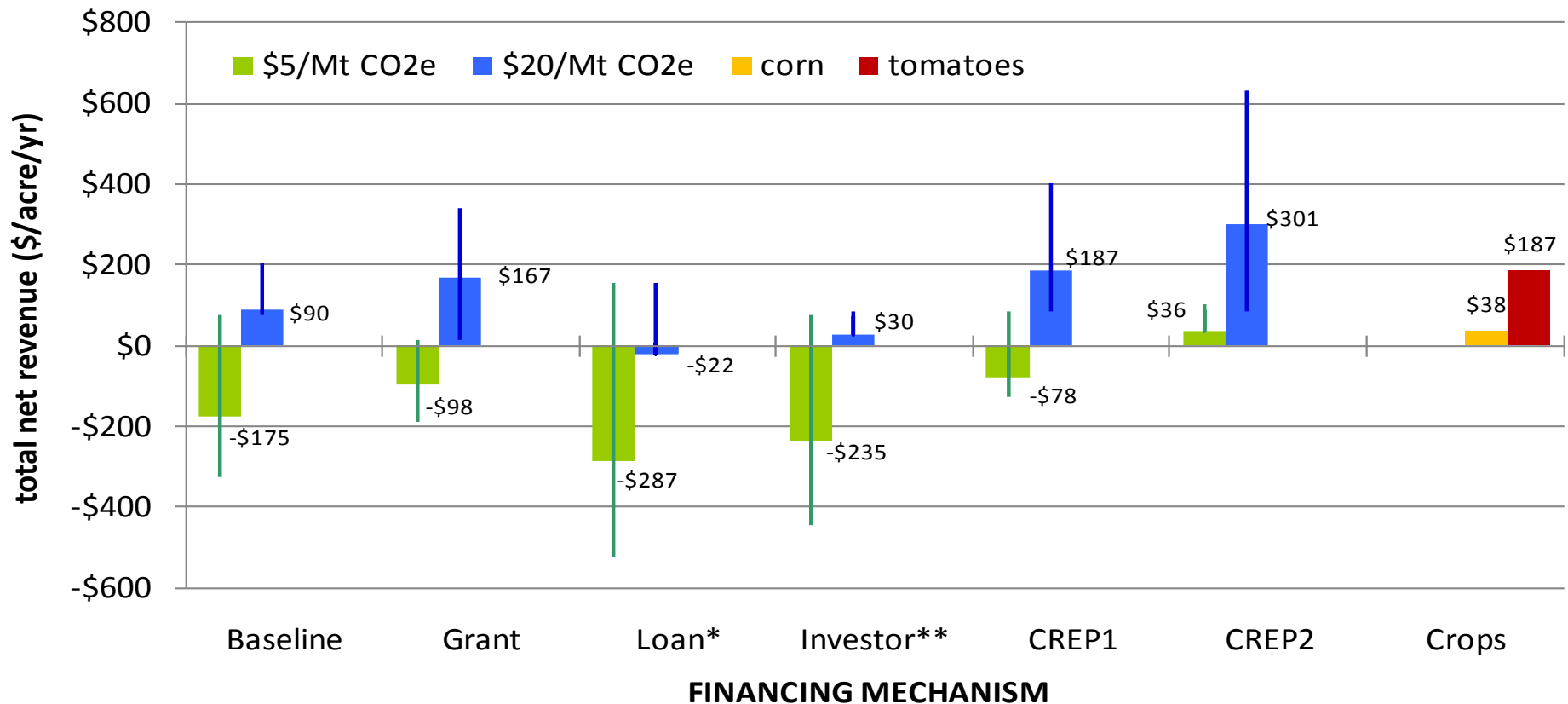


** includes 7.25% interest rate on bank loan*
*** excludes return on capital investment; see Figure 8-4 for return on investment outcomes based on varied carbon offset prices*

carbon vs. crops



**Total Annual Net Revenue Per Acre, Carbon vs. Crops
By Financing Scenario and Production Costs, 10 Year Period**



* includes 7.25% interest rate on bank loan

** excludes return on capital investment; see Figure 8-4 for return on investment outcomes based on varied carbon offset prices

1. Roadmap to Implementation



roadmap to implementation



Program Coordination Technical Advisory Committee

1

Proof of Concept

Regulatory Structures Formation

IMPLEMENT PROJECTS

A) Quantify Baseline *

2

GHG

MeHg and DOC/DBPP

* Applies also to LCA

B) Demo Projects

3

Quantify GHG emissions

Quantify MeHg, DOC/DBPP, & mosquito impacts

Design, construction, and operations alternatives

Quantify other ecosystem services

Verification protocols

4

Predictable and feasible regulatory compliance

5

Project Financing mechanisms

8

Technical Assistance Program

9

Production cost model refinement

6

Secure funding for these early actions

7

Details described by Action no. in Chap 10

Establish Policy Foundation

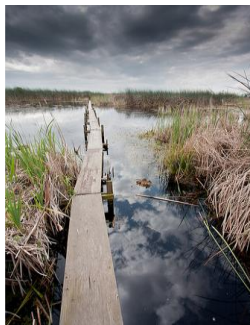
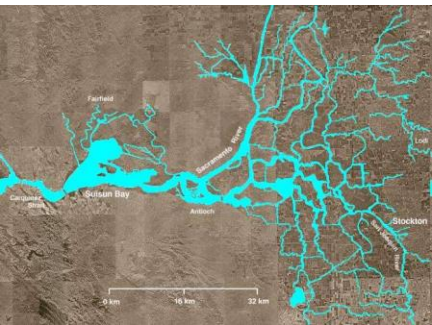
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Federal, State, or International laws and regulations support formation and functioning of regulatory carbon markets, environmental regulations, and funding mechanisms

multiple benefits



- Land accretion
- Climate mitigation/adaptation
- Water supply security
- Habitat



CARBON-CAPTURE WETLAND FARMING

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