

Ryan Calvert and Tom Loftus

The Wetland Restoration Fund



Call to Action: Historic Flooding in Houston

- Three "100 year" floods in the last five years
- Hurricane Harvey killed ~90 people,¹ damaged over 150 thousand properties,² left ~40 thousand families in need of temporary housing,³ and caused \$125 billion in damages⁴





Houston Floods Highlight Three Problems

- 1. Climate change and overdevelopment increasing flood risk
- 2. Minimal insurance coverage for households and businesses
- 3. Overdevelopment of natural wetlands accelerates species loss





Wetland Recovery Addresses All Three Problems

 According to the National Resource Council, wetland restoration is "the reestablishment of predisturbance aquatic functions and related physical, chemical and biological characteristics¹"

Challenge	Wetland Restoration
1. Climate change + wetland development	 Restores water absorbing ecosystem
=> increased flooding	 Sequesters carbon
2. Lack of flood insurance	 Removes at risk structures / people
	 Lowers premiums for adjacent customers
3. Species loss	 Restores habitat

• But is still underutilized: Since Allison, just 2,400 home buy outs versus >10,000 on 100-year floodplain²

The problem: raising money

"It's always a funding issue," Wade said. "We always have more [opportunities] than funds available.³"

Three Challenges Explain the Lack of Funding for Wetland Restoration

1. High cost to purchase and clean up properties

- Past projects focused on residential properties, which have a higher cost-benefit ratio than commercial
- \$342 million to buyout 3,100 Houston homes since 1985; current budget covers <10% of priority list.¹
- 2. Hard to monetize undeveloped land
- 3. Dispersed benefits that are hard to quantify





A Solution to the Financing Challenge



Buyout a high risk, low utilization commercial property and restore underlying wetland

Secure mitigation credits and recapitalize with a pay-forperformance security

Insurance companies and public sector capture flood damage savings



Allocation of Risk + Returns

	Required IRR	Sources of Return	Allocated Risk	Risk Mitigants
Equity Providers	5-25% (Forest Trends Report ¹)	 PFP payments Mitigation credits 	 Project execution Mitigation credit size Counterparty credit risk 	 Due diligence Covenants on operator Pay-as-you go equity High grade counterparties Counterparty credit insurance
PFP Counterparty	10% (Insurance Co ROA)	Avoided flood damage claims	 ▼ Flood risk modeling 	 Allocated risk consistent with core competencies Commitment expiration

The Case for Commercial Properties

	Commercial	Residential
Pros	 One property = material size Large exposures for PFP counterparty + does not benefit competitor customers Lot of potential sites 	 Cheaper to demolish Lot of existing public programs to partner with or model after Lot of potential sites
Cons	 More competition from redevelopers More expensive to demolish facilities Greater pollution liability risk 	 Need a lot of properties for material size If PFP counterparty will only work with its customers, unlikely to get contiguous block Highly political to buy out homes
Examples	 135 abandoned car factories in the US¹ ~36% of commercial properties in Detroit¹ Falstaff Brewery in Galveston 	 Harris County Home Buyout Program Snohomish County Home Buyout Program Blue Acres Home Buyout Program

Prefer commercial properties because PFP counterparties will not subsidize competitors' customers.

Motivation to Participate: Insurance Pay-For-Performance Counterparties

- ClimateWise group alone = 30+ insurance, reinsurance, and service providers committed to "[reducing] the impact of climate change¹"
- 2. Adjacent projects suggest appetite
 - Swiss Re insures a coral maintained by hotels in Mexico; pricing tied to upkeep of the reef²
 - United HealthCare gives customers \$1,500 credits to complete activities tracked by FitBit³
- 3. Value proposition of our solution
 - *Reduce Franchise Risk*: Land recovery buys out existing customers rather than prices them out
 - *Addressable Market*: Keeps premiums within budget for adjacent customers
 - *No Partial Savings Estimates*: Land restoration takes damages claims to \$0
 - *No Project Execution Risk*: PFP structure shifts project execution to capital markets



Economic versus insured catastrophe losses, 1970–2015



Figure 1: Source: Swiss Re Economic Research & Consulting, 2015.

Base Case Model

Base Case Assumptions

- 2,600 acres purchased
- \$57k per acre cost to acquire and restore land based on research from Michigan State's Center for Community and Economic Development (total capex of \$148 million)
- One year demolition and clean up period
- \$654 per year per acre in mitigation credit revenue (total credit revenue of \$1.7 million per year)
- PFP counterparty avoids 150% of restoration capex every five years based on loss avoidance studies quoted in the Houston Chronicle
- PFP counterparty pays out \$230 million at completion of the restoration project

Base Case Results

- PFP counterparty IRR = 14%
- Equity provider IRR = 16%





Beyond Houston: Scaling Up Wetland Restoration

More Than A Houston Problem

- US Global Change Research Program's Climate Science Special Report predicts 50-300% increases in heavy precipitation events due to climate change by the end of the century¹
- As of 2012, 50% of the world's wetlands had been lost due to human activity since 1900²
- Only 42% of Florida homes in "hazard zones" have flood insurance³
- Over 1/3 of endangered species rely on wetlands for survival⁴
- Over the past century, only about 600 wetland restoration efforts have been undertaken⁵



Price tag on wetlands

Wetlands in the United States alone provide \$23 billion worth a year of storm protection, says a study by The Economics of Ecosystems and Biodiversity (TEEB)

TEEB report on monetary value of wetland types

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"Dollars per hectare top end for prime lo	e per year, cations	1	time	-
tourism, fish nurseries, buffer against extremes	fish and other food, recreation, nutrient cycling	natural water reservoirs, waste treatment	biodiversity, raw materials, buffer against extremes	irrigation, water supply, tourism, waste treatment
Key assets				
\$14 - 1,195,478	\$248 - 79,580	5981 - 44,597	\$1,995 - 215,349	\$1,779 - 13,487
Value range*				

Introducing The Wetland Restoration Fund



Action Plan

1. Houston area pilot project

- Leverage existing network and initial research / conversations
- Deep bench of potential public sector partners

2. Establish The Wetland Restoration Fund ("WRF")

- Issue GP equity and manage restoration projects
- Capitalized by conservation finance capital markets, impact investors, traditional infrastructure investors

3. Expand geographic footprint along US Gulf Coast

- Leverage learnings from Houston pilot to restoration of the same ecosystem
- Houston area network should be relevant in adjacent geographies, especially in Texas and Louisiana
- 4. Expand geographic footprint to wetlands around the globe

The Team

Founding Members

- Ryan Calvert
 - Former senior project development officer managing a carbon project and distributing energy efficiency and renewable energy loans at XacBank in Ulaanbaatar, Mongolia
 - Pursuing an MBA/MS joint degree with a focus on energy and climate change
 - Undergraduate degree in economics from University of Pennsylvania

Tom Loftus

- Former analyst for Citibank energy lending group
- Pursuing an MBA with a focus on corporate finance and energy markets
- Undergraduate degree in mathematical economics from Rice University

Advisors

- Zach Knight, Co-Founder and Managing Partner, Blue Forest Conservation
- Alicia Seiger, Deputy Director, Steyer-Taylor Center for Energy Policy and Finance, Stanford University
- Kayode Atoba, Ph.D. Candidate, Center for Texas Beaches and Shores, Texas A&M University

Key Conversations

- Amory Lovins, Chief Scientist, Rocky Mountain Institute
- Houston Recovery Office
 - o Marvin Odum, Chief Recovery Officer
 - o David Benson, Assistant chief recovery officer
 - Niel Golightly, Chief of Staff

Appendix

Our Solution Addresses Financing Challenges

High cost to purchase and clean up properties



 Funding shifted from public sector to deeper capital markets - \$3.1 billion of conservation finance dry powder in 2016





- Combines parties interested in flood mitigation with those who are legally obligated to finance mitigation projects
- Monetizes flood damage savings for insurance companies

Hard to quantify and dispersed benefits



- Only expected damage claims savings and quantifiable credits used for pricing
- Other benefits (species conservation, CO2 sequestration) exist but not priced

Mitigation Credits

- <u>Mitigation Credits</u>: Unit of trade awarded by ecosystem regulators in exchange for the preservation of the ecosystem under consideration. Credits are then sold to businesses that need credits in order to disturb the ecosystem or to other entities interested in preservation.¹
- <u>Mitigation Bank</u>: The parcel of land in the relevant ecosystem that gets preserved. A certain number of mitigation credits will be assigned to a mitigation bank by the ecosystem regulator and will be released for sale over an establishment period (usually 10-12 years) subject to performance requirements.¹
- Credit sales (including prices) are bi-lateral negotiations between mitigation bank owner and credit purchaser

Ecosystem Regulator



The Market for Mitigation Credits

- 1. Large, liquid, and regulation protected market
 - \$3.6 billion in annual transaction volume¹
 - 2000% growth in mitigation bank transactions since 1995²
 - "Compensatory mitigation" required for "unavoidable adverse impacts" under the US Clean Water Act³
- 2. Credits support mitigation banking as a business







Sample Transaction: Pineywoods Mitigation Bank4

- 19,079 acre parcel; 13,000 approved as a bank
- \$85 million in potential credit revenues
- Located just outside Harvey flooding range





Motivation to Participate: Federal Government

- Houston Recovery Office estimates \$6 to \$1 PV to cost ratio for Harris County home buyouts
- Resiliency projects require maintenance and have a finite useful life
- Restored ecosystems have public good benefits (clean air, clean water, species preservation, etc)



"Dallas Rep. Hensarling pushing for overhaul of federal flood insurance program"

- The Dallas Morning News (August 2017)

"National Flood Insurance Is Underwater Because of Outdated Science"

- Scientific American (March 2018)

Federal Disaster Declarations, 1955-2014

The Market for Conservation Finance

Credit Suisse defines conservation finance as "a mechanism through which a financial investment into an ecosystem is made – directly or indirectly through an intermediary – that aims to conserve the values of the ecosystem for the long term."

Figure 11: Private Capital Committed across All Tracked Years, 2004–2015



Note: Based on responses by 98 private organizations that reported making conservation commitments.