



Managing Risk and Liability in Environmental Markets

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Objectives of this project

- To survey the different types of risks for buyers and sellers of environmental market credits
- To review the tools available for managing these risks
- To track liability for these risks and how it is held by buyers and sellers
- To compare and contrast how risks and liabilities are managed across these markets

Report for USDA Office of Environmental Markets

Thanks to: Katie Locklier, George Kelly, Christopher Galik, and Brian Murray

What problem are we solving?

“Institutional progress is hindered by actual and perceived sources of risk and uncertainty. Is WQT risky? Real progress is possible with improved understanding of actual and perceived risks and improved risk management”

- John powers EPA Office of Water
2nd National Water Quality Trading Conference
Pittsburgh, PA May 23-25, 2006

Overview

- Includes environmental markets of interest to farmers and foresters
 - Water quality trading (402, NPDES)
 - Carbon offsets (AB32 livestock, crops, forestry)
 - Wetland and species banking for compensatory mitigation (404)
 - Conservation banking for endangered or at risk species (7,10)
- Review risks and liability for buyers (regulated) and sellers (landowners) and those in the middle (project developers, aggregators)
- 5 types of risk assessed for each market



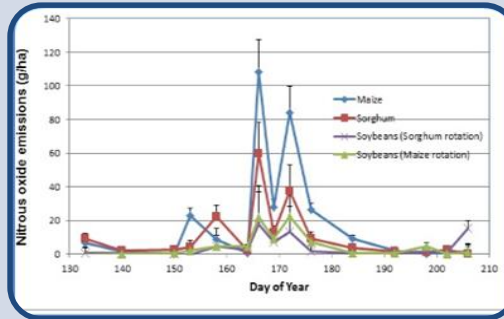
Annual
reductions
to
permanent
protection

Risk 1: Natural time lags and variability, and scientific uncertainty



Time Lag

Ex - Takes time for pollutant or temperature reductions to reach target water body or for trees to establish and store carbon or provide habitat



Variability

Ex – Nitrous oxide emissions from farms vary day to day and year to year based on timing of rainfall and freezes relative to fertilization and crop grown



Uncertainty

Ex- There is uncertainty in remote sensed data on forest carbon, and in water quality model predictions. There is also uncertainty whether restored streams, wetlands and habitat will replace lost functions

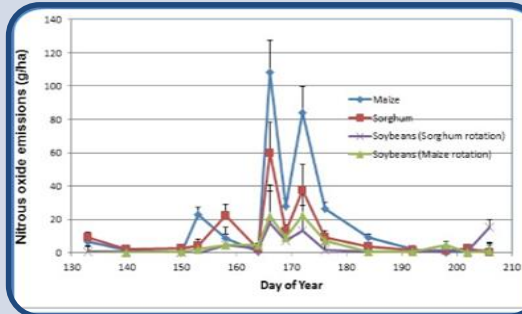
Risk 1: **Managing** natural time lags and variability, and scientific uncertainty



Time Lag

Incorporate time lags into estimates and predictions for water quality and carbon storage

Build establishment time into the design of compensatory mitigation



Variability

Measure projects periodically and incorporate variability into crediting

When not possible, use best available models to incorporate variability and use conservative crediting



Uncertainty

Improve models used
Use direct measurement (if good and cheap enough)

Use conservative crediting (discounting)
Focus on protection

Risk 2: Extreme Events



Risks

1) Short term impact

- Need to replace or restore activity (insurance)
- May lose credits for one season

2) Long term impacts

- For some activities (e.g. forest) replacement will take longer
- Credits lost for many years

3) Reversals

- Preservation/sequestration benefit lost
- May require replacement of credits as time for recovery too long

Managing the risk

- Building resilient projects (built into standards, protocols, certification)
- Verifying projects to ensure damages taken into account in crediting system
- Contract periods (long term)
- Endowments and long term bonds for banks
- Buffer pools to replace lost functions and credits
- Private insurance

Risk 3: Behavioral Uncertainty



Risks

Project maintenance or mismanagement result in reduced benefits or credits



Managing the risk

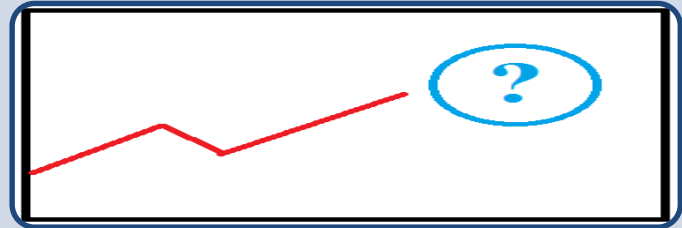
- Verification
- Monitoring
- Certification
- Easements
- Long term contracts
- Some liability remains with manager or project developer
- Portfolios of projects
- Projects with less safeguards sell for lower cost

Risk 4&5: Regulatory and Market Risk



Regulatory

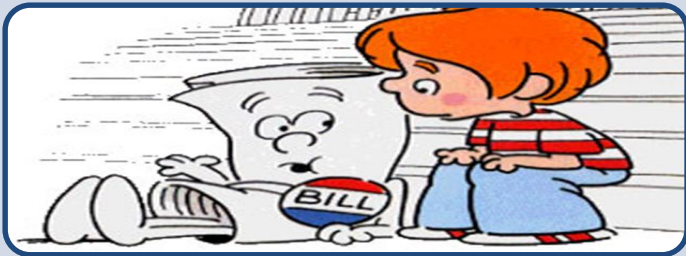
Questions about whether credits will get approved, and whether the rules and requirements for credits will change.



Market

Questions about supply relative to demand and the impact on future prices

Risk 4&5: **Managing** Regulatory and Market Risk

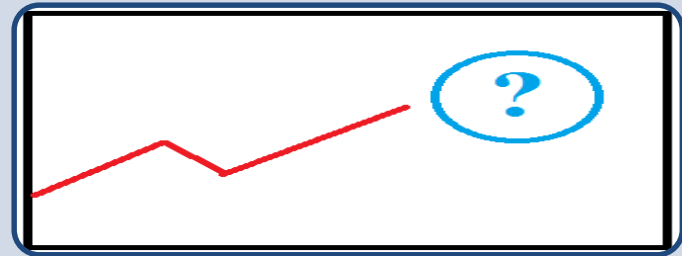


Regulatory

Demand side – low cost or short term contracts, hedge with alternative plans, allow banking of credits

Supply side –voluntary market buyers and contract period guarantees sufficient for ROI

Clear rules on project types and specifications allowed



Market

Same as regulatory

Regulators can set floor and ceiling prices, can help forecast demand, and try to match potential supply to potential demand in design of programs.

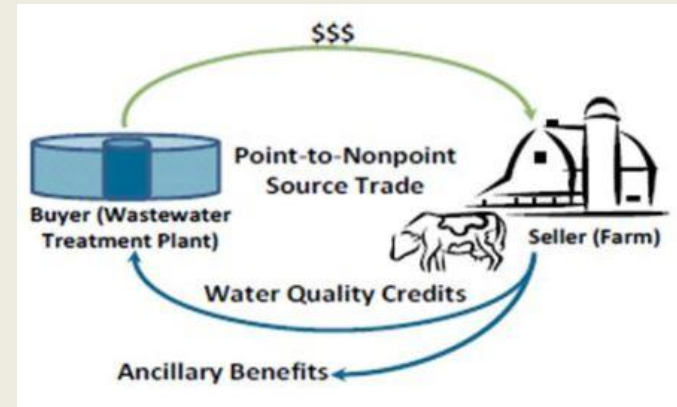
Can also have a pathway for voluntary (early action credits) and consider forward contracts.

Mechanisms for Managing Risk

Mechanism	WQT	C offsets	Compensatory Mitigation	Conservation Banking
Liability sharing with project	Sometimes transfers to aggregator	Often transfers to aggregator or project	Transfers to bank	Transfers to bank
Portfolio (aggregators)	Y	Y	Y	Y
Verification/monitoring	New projects and annually	New projects and periodically	New projects and for 5-10 yrs after	New projects and for designated monitoring period
Easement/certification		For forest carbon projects	Y	Y
Endowments/bonds			Y	Y
Market support/guarantees	Sometimes voluntary credits, demand forecast	Voluntary credits, demand forecast	Demand forecast (DOT)	Demand forecast
Private insurance		Under development for CA	Exists but not used	

Liability: WQT

- Regulated entity (buyer) liable by regulation
 - Must meet NPDES permit requirements
- Liability sometimes shared or transferred in purchase contract
- If credits/benefits lost or do not materialize
 - Credits only sold once verified
 - Annual production reduces risk
 - If sold credits are lost or damaged seller/aggregator has to fix project, provide other credits or compensate buyer
 - If insufficient supply buyer must make up difference
- If program fails to meet objectives
 - Can measure top down (sample water body) – but less so bottom up (at site)
 - If not meeting objectives, regulators can reset permits and ratchet down requirements

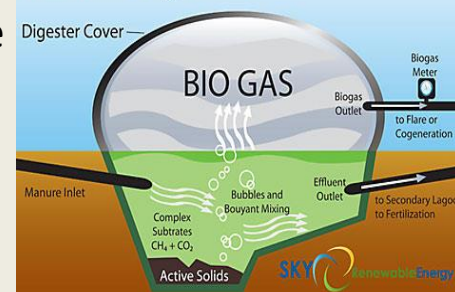


Liability: GHG Offsets

- Regulated entity (buyer) liable by CA regulation
 - Must meet required reductions (through actions or purchase of credits)
- Liability often shared or transferred in purchase contract
 - Aggregator/project often takes on some or all liability
 - Long term contracts, certification, and easements are required for forest projects and reversal risk covered by buffer pool
- If credits/benefits lost or do not materialize
 - For annual emission or sequestration, credits are not sold until reductions are realized, so buyer goes elsewhere for credits
 - For unintentional reversals of stored C buffer is used
 - For intentional reversals seller/aggregator has to make up difference
- If program fails to meet objectives
 - Can measure bottom up (except ag emissions)
 - Can't measure top down (global signal to noise; and counterfactual)



Anaerobic Digestion



Liability: Compensatory Mitigation

- Regulated entity initially liable
 - Must obtain permit to damage wetland or stream under CWA 404
- Liability is shared or transferred in purchase contract
 - Banks take on all liability
 - Banks hold endowments and bonds for monitoring and maintenance
- If credits/benefits lost or do not materialize
 - Failure to meet requirements during project establishment and extreme events are most likely causes of failure to produce credits
 - Buyer can go elsewhere
 - If credits already sold – bond used to restore site
- If program fails to meet objectives (no net loss)
 - Can measure area; function more difficult
 - New rules and regulations at federal and local levels if public cares



Liability: Conservation Banking



- Regulated entity initially liable
 - Must obtain permit for “take” under ESA sec 7 and 10
- Liability transferred in purchase contract
 - Bank or partners (land trust) takes on liability
 - Banks or partners use endowments and bonds for monitoring and maintenance
- If credits do not materialize
 - Banks are usually preservation with easements, no risky establishment phase
- If program fails to meet objectives for species protection
 - Provisions for dispute resolutions in agreements – variable in nature

Observations

- Most often risk and liability is held by middle men (aggregators/banks) which are designed to manage this risk
- WQT
 - Low risk for buyers with verification required before credit sale
 - Demand risk for sellers in developing markets
 - Potential to monitor outcomes and to adjust to achieve objectives
- Carbon
 - Risks and liability vary by project type
 - forest C projects have led to a variety of management mechanisms (buffer, certification, easement, 100 yr)
 - Bottom up measurement means higher project accountability req. and transaction costs
- Compensatory Mitigation and Species
 - Banks must be able to handle significant up front risk
 - Long term monitoring and management is supported by bonds or endowments, but there is little remaining risk to buyer or seller after sale of established credits.