Ecosystem Services Valuation at Dow

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The problem: Dow’s Seadrift site needed to increase the level of water treatment to meet EPA effluent guidelines for suspended solids.

The solution: Dow converted 110 acres of an existing treatment pond into a constructed wetlands for the purpose of naturally treating these suspended solids.

The benefits: Recently, Dow conducted an economic and full life cycle analysis. The net present value of the savings totals more than $200 million and the area serves as great habitat for fish, alligators, raccoons, bobcats, deer and a large number of birds. The wetland also requires no electricity, greatly reducing fossil fuel energy use.

Ecosystem Services Valuation at Dow: From Seadrift to the present

Seadrift Constructed Wetland
- NPV of cost savings = $280MM

Nature is valuable
- Collaboration with TNC
- Revising business decision-making processes
- New tools
- Publications

Green Infrastructure Projects
Conservation Monetization
Triggers for action – why nature?

CEO level support

• ...By integrating the value of biodiversity and ecosystem services into their strategic plans, companies can incorporate sustainability as an adjective into everything they do, delivering positive growth for enterprise and planet alike. – Andrew Liveris, Chairman and CEO, The Dow Chemical Company

Site Fit

• Ample land, right characteristics – reforestation in Freeport possible because of owned land in the right place

Co – Benefits

• Trees in the Houston area don’t just help with air quality, they provide habitat for important species and shade to help with cooling and water retention

Cost Savings

• Seadrift NPV remarkable – what else is out there?
The Freeport Pilot demonstrated ways that investing in nature could also help Dow reduce costs or avoid risk. It focused on:

- Improving air quality through reforestation
- Mitigating coastal hazards with natural infrastructure
- Preventing disruption to freshwater supply
Improving Air Quality

Canopy removes $O_3$ and $NO_2$ (and PM, $SO_2$, CO)

But is reforestation cost-competitive?

Can be cost-competitive with conventional control options

Has wide application potential across US

Provides co-benefits for people and nature that conventional controls do not

Peer reviewed paper published in PNAS in September, describing science behind concept

http://www.pnas.org/content/111/40/E4204.full.pdf+html
Mitigating Coastal Hazards

Which option will best prevent the costs associated with a strong storm?

Coastal Habitat

Levee

Or a combined system:

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Net Present Value

Infrastructure Scenario

- Recreation
- Carbon Sequestration
- Public Protection
- Private Protection

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Dow
Preventing Freshwater Supply Disruption

Floodplain Restoration - Reservoir Reallocation

- Cost-Competitive

(Sentra Woods 2009) (Dlanor Smada 2012)

Municipal Rebate Program

- Cost-Competitive

(Dan Hwoang Nguyen 2007)

Land Cover Management

Coastal Marsh Water Treatment

Irrigation Efficiency Program

- Cost-Competitive

(Docent Joyce 2013) (CIMMT 2010)
The SVAA pilot looked at how Dow can plan its agricultural land use to maximize profit while improving biodiversity and water quality.

Model inputs

- Agricultural Expansion Plan & Production Costs
- Forest Code Regulations
- Biodiversity (Habitat suitability, connectivity)
- Ecosystem Service Supply

Are used to derive scenarios

- Optimize Production (&meet legal req’ts)
- Optimize Production & Biodiversity
- Optimize Production & Ecosystem Services
- Optimize All of the Inputs

That will inform siting decisions

- Production Priority
- Biodiversity Priority
- Water Qual Priority
- Trade-Offs
Moving beyond the pilot sites: The Ecosystem Service Identification & Inventory Tool (ESII)

The ESII Tool:

- designed by team comprised of Dow, TNC, and EcoMetrix Solutions Group (ESG) members
- uses ecological attributes to identify and quantify ecosystem services at a site.
- translates these services into **economic benefits** to the business by providing data in units of measure that engineers and finance staff can put into their own valuation models.

Eight Initial Ecosystem Services

- air quality regulation
- climate regulation
- erosion control
- flood hazard mitigation
- water quality control
- water quantity control
- water provisioning
- aesthetics
ESII Tool Progress to Date

Phase 1: Proof of Concept
- Q3 2013: Scoping, Method dev’t
- Q4 2013: Pilot testing, Phase 1 Report

Phase 2: Development
- Q1 – Q2 2014: Phase 2 Scope, VOC, Model / Method Validation
- Q3 – Q4 2014: Testing, Software scoping, Case studies
Conservation Monetization: Deriving Value from a Natural Land Management Strategy

Acquire

Design
Low Impact Development, Sustainable Site Design

Divest
Conservation Sale or Donation (title or easement)

Operate
Natural Landscaping, Wildlife Tax Assessments

Redevelop
Marketable Conservation Credits

Retire
Natural Remediation Strategies
Several ways to derive economic value from conservation of property

- Sale to a conservation organization or government agency
- Sale to wetland or habitat banker
- Sale to sustainable timber
- Donation tax credits
An example project: Croydon Woods

• ~ 80 acres of wetland forest adjacent to our Bristol – Croydon manufacturing facility.
• Nearing finalization of proposed sale to local land trust (The Heritage Conservancy) for conservation in perpetuity.
• At least 7 rare and endangered species present.
• Conserved land will provide benefits to the site in the form of ecosystem services: valuation case study to come!