Natural Land Management: A Property Management Strategy to Enhance Ecological Value

Gregory R. Biddinger, Ph.D.
ExxonMobil Biomedical Sciences Inc.
Overview

- Started With Serendipity
- Natural Land Management Overview
- Examples / Applications
- Opportunities – greening brownfields
Facilities are Part of the Natural Landscape

- Industrial facilities are often part of natural landscapes
- Some landscapes are more human dominated than others
- There are opportunities to utilize that landscape to our advantage
- Type or size of facility and property are not constraints
Billings Refinery Nesting Program – *Wild Life at Work*

- In 1998 a pair of Osprey decided to use the refinery safety flare as a nesting site.
- Worked with US F&W to build nesting platforms
- Over a 2 years moved nesting outside the process area.
- First breeding osprey in the county, Northern most pair in region
- WHC Certification – 2003, 2005
- Next Step: Corporate Lands for Learning
Billings Refinery Gravel Pit Restoration

- Positive relations with regulators through WHC *Wildlife at Work* program paid dividends
- Billings faced with "borrow" pit closure.
- Pit in floodplain of Yellowstone
- Already claimed as a pond
- Petitioned closure as fisheries
- Instead of re-grading and filling they widened and deepened to better pond
- For same cost got a pond in their WHC certified habitat and also prepared area for native grass plantings.
- Will be part of Corporate lands for learning – Nature trail area
Habitat at Work – Billings Refinery
Regulatory Application - Dredge Material Island
Designing A Bird Island

MAP
SCALE: 1" = 200'

MUD FLAT

ORIGINAL SHORE LINE

ST. MARY'S ISLAND

RESTORED AREA
~8.5 AC.

150' SETBACK

SHOREBIRD
NESTING AREA
~2.25 AC.

RIP-RAP SHOAL

15' x 35' CIRCUMFERENCE GEOTUBE w/ CONCRETE MATS

X-SECTION A-A'
SCALE: 1" = 66.7'

EXISTING BEACH

RESTORED BEACH

MUD FLAT

NATURAL GROUND

ARMORED GEOTUBE

Nesting Area
Regulatory and Ecological Success - St. Mary’s Island

- EM Pipeline Company required to reposition pipelines in Houston Ship Channel
- Willingness to create nesting habitat facilitated permit process
- Wildlife Habitat Council provided monitoring at 40% lower cost
- Year 1 = 577 pairs of 4 T&E species nested. Y2 = 650 pairs, Y3 = 1136 pairs, Y4 (2005) holding constant
- Wildlife Habitat Council certification (9/03); Recertified in 2005
- Positive Media Coverage
Property Life Cycle – Land Management Opportunities

- Acquire
  - Sustainable Design
  - Hold or Donate for Conservation

- Operate
  - Natural Landscaping
  - Wildlife Property Tax

- Divest
  - Institutional Controls on Future uses
  - Marketable Conservation Credits

- Retire
  - Natural Remediation Strategies

- Redevelop
What is Natural Land Management?

- Business strategy to achieve sustainable land management throughout the life cycle of a property
  - Intended to be part of traditional property management processes
- Relies on technical approaches, legal opportunities and regulatory mechanisms to achieve greater wildlife value at lower cost
- Operating properties – Mowed lawns to natural landscapes
  - Reduce O&M costs (e.g. lawn mowing, property taxes)
  - Protection from condemnation (expropriation by municipality)
- Surplus properties – remediation – restoration - reuse
  - Redevelop for conservation use
  - Natural remediation technologies -
    - Monitored Natural Attenuation, Phyto-technologies
- Redevelopment strategies
  - Mixed use - Integrating green zones for recreation and conservation to increase adjacent property value
  - Conservation easements to reduce future-use liabilities
  - Conservation Divestment: residential/commercial are not viable
- Ecological services markets to generate revenue

*Natural Land Management = Triple Bottom Line*
Naturalized Facility Buffers for Water Management

- Successful strategy to create safety and security buffers has resulted in growing acreage and associated costs
- Location of manufacturing complex provides opportunities to consider NLM approaches
- Buffers can be integrated into water management
  - Stormwater control and retention
  - Wetlands credits
  - Groundwater recharge
Greenbelt Property Pilot Sites

- Tracts with no current residents seems like best place to start
- Refinery Property: ~20 Acres consisting of Tracts 1E, 1F, 6 & 11
- Chemical Plant Property: ~30 Acres consisting of Tracts 3B, 3C & 3E
## Value Generation Strategies - Water Management

### Strategies
- Integrate native and sustainable landscapes into site design and management
  - Rainwater gardens
  - Vegetated "Bio" swales
  - Green roof
  - Native vegetation buffers
  - Treatment wetland
- Consider opportunities to enhance or create water features which can create marketable ecosystem service
  - Wetlands banking
  - Flood control credits
  - Endangered species banking
- If wetland or open space features are to be keep in this service for long periods then explore tax reduction strategies
  - Revised Property Tax as wildlife use
  - Institutional controls or development rights transfer (Conservation easements)
- Conservation partnerships

### Values
- Lower / No water demand
- Rainwater management
- Enhance ground water recharge
- Reduced flow to sewers
- Reduced offsite impacts
- Increased wildlife habitat
- Tradable eco-service credits
  - Wetlands, Flood control, CO2
- Control future use
- Increase open space
- Income tax deduction
- Improved external relationships
LEED Rating for Landscapes

- Collaboration to develop “Green Building” standard for landscapes designs
- US Green Business Council plans to add to LEED program in 2011
- Focus on sustainable design practices and maximizing ecosystem services from the landscape
- Score categories
- Site selection
  - Design
  - Ecological components
  - Human health components
  - Construction / Materials
  - O&M

http://www.sustainablesites.org/

LEED = Leadership in Energy and Environmental Design
Examples of Sustainable Landscape Practices

- **Protect and restore existing hydrologic functions**
  Avoid development and disturbance near streams and wetlands, and in sites with high risk of flooding. Plant native or appropriate non-native vegetation, re-grade soils where necessary, and use soft engineering techniques to restore the functions of floodplains, and riparian and wetland buffers.

- **Manage and clean water on-site**
  Design a site to capture, slow, and treat stormwater runoff by reducing impervious surfaces, harvesting rainwater, and directing remaining stormwater runoff to soil- and vegetation-based water treatment methods, such as vegetated bioretention facilities, rain gardens, wetlands, green roofs, and bioswales. Maintain and restore vegetation to ensure water can percolate into the soil or groundwater.
Examples of Sustainable Landscape Practices

- Design stormwater features to be accessible to site users. Integrate multifunctional stormwater management features into site design to improve both water quality and aesthetics. Stormwater management features can provide calming views, spaces for restoration, and even opportunities for play and interaction with water.

- Design the site to minimize or eliminate use of potable water for irrigation. Use native and appropriate non-native vegetation adapted to site conditions, climate, and design intent. Group plants with similar water needs to maximize irrigation efficiency. Climate-based controllers for irrigation systems can also be used to lower water consumption. In addition, non-potable water can be collected and used for irrigation from sources such as rainwater from rooftops, graywater, air conditioner condensate, or stormwater basins.
De Pue Superfund Site – Green Technologies

Gyp-Stack cover converted from Kentucky Blue Grass to native tall grass prairie.
Lower maintenance costs and higher ecological value.

Forest can be improved for regulatory offsets

Engineered wetlands will be constructed to provide treatment of groundwater from Gyp stack to meet regulatory limits.

Expected Outcome: Achieve remedial goals while enhancing ecological service
Progress on Prairie at DePue

- Tested concept on 1/3 of landfill cover
- Initial response has been good
- 3rd growing season in spring 2009
- At point of decision on need to manage with fire
- Next step - convert Tall Grass Fescue to Native Prairie
Redevelopment – Incentives Make a Difference

Retired Oil Field

Conservation Target

Greening Brownfields = Increased property value

- Market data indicates public willing to pay higher price for land near “Green or Open Space”
- IEDC (2001) – Study of 25 redeveloped brownfields that included green space for recreational uses.
  - Property adjacent to Greened areas increased in value 2-4X
- The Proximate Principle (2004 2nd Ed.)
  - Makes the case for cities investing capital in parks to build property value and tax revenues
  - Determine impact on property value – Local specific
  - Use drivers differ in urban and suburban areas
  - Proximity to heavily used city parks can negative
- New businesses forming (last 5 years) combining limited high-end development and marketable conservation services
- Conservation Investment groups very active in northwest US/CA
  - Ecotrust (www.ecotrust.org)
  - Alberta Ecotrust Foundation (www.albertaecotrust.com)
    - ExxonMobil Canada Limited – 2005 “Visionary Partner”
Projecting Value of Greening Brownfields

- **Need:** Approaches to identify and quantify Ecosystem Services. Tool to allow projections of both monetary and non-monetary values under alternatives use scenarios

- **Benefit:** Developers better understand value of adding or maintaining green or open space in their designs
Protect Tomorrow. Today.

Photos this slide: Cliff Meinhardt
Contact Information

Gregory R. Biddinger, Ph.D.
ExxonMobil Biomedical Sciences, Inc.
CORP-EMB-4155F
800 Bell St
Houston, TX 77002

Desk -713-656-4978
Fax - 713-656-1512
Cell - 713-201-7231
E - gregory.r.biddinger@exxonmobil.com