

Ecosystem Services Demonstration Project:

Tampa Bay, FL

7/14/2009

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or



Tampa Bay

Desalinization Plant

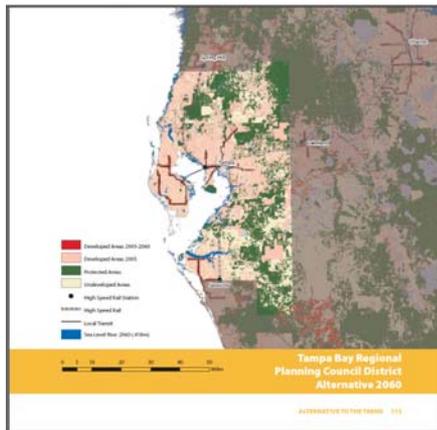
Hillsborough River

Floodplain Forest

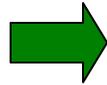


Tampa Bay Traffic

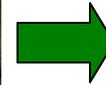
Introduction



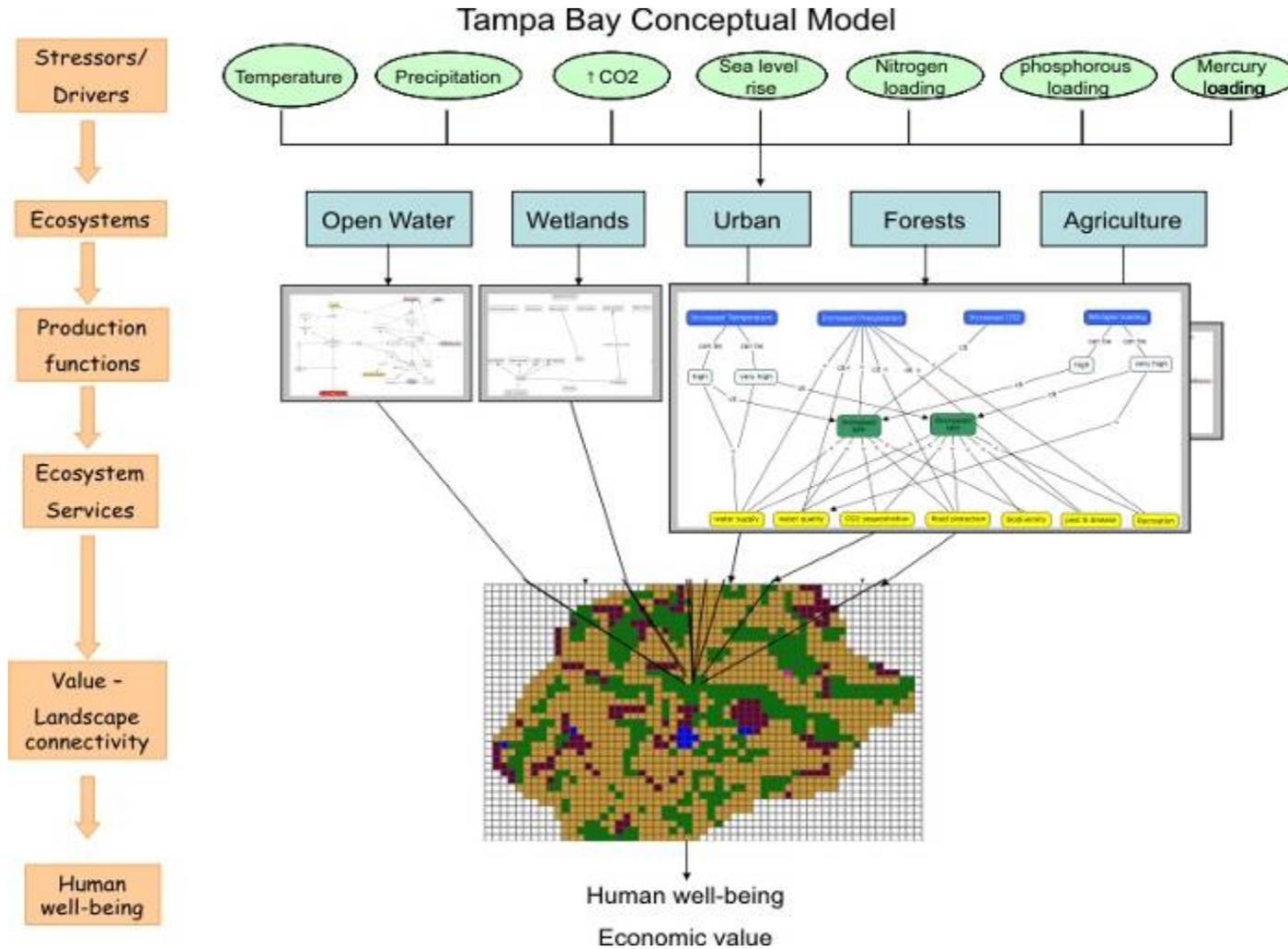
Alternative Futures



Ecosystem Services



Benefits



Functions, Services, and, Benefits



Functions and Intermediate Services

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Final Service

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Use

=

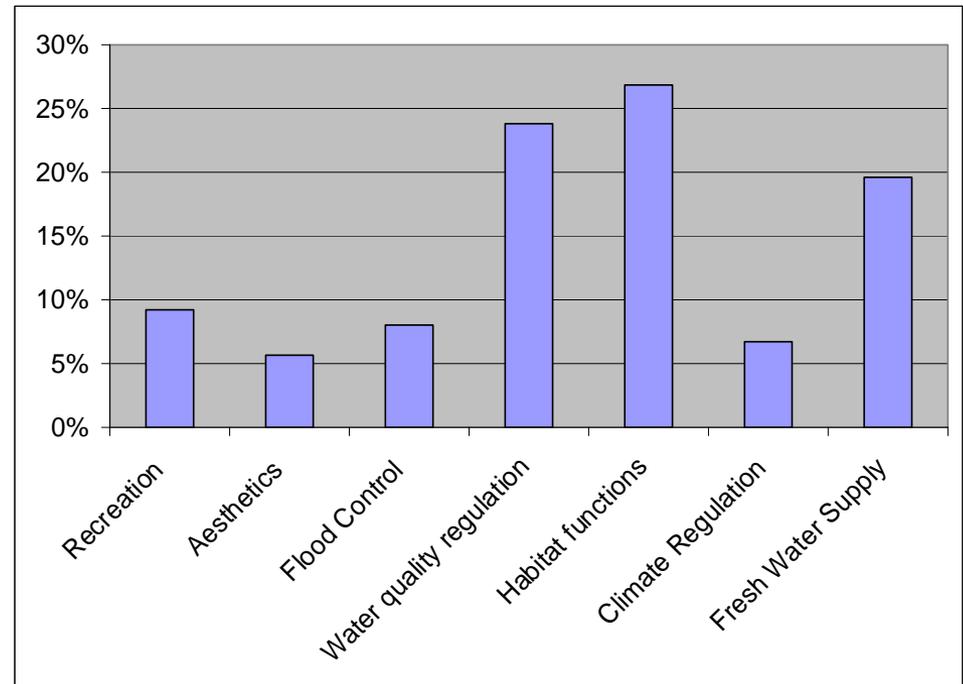


Benefit

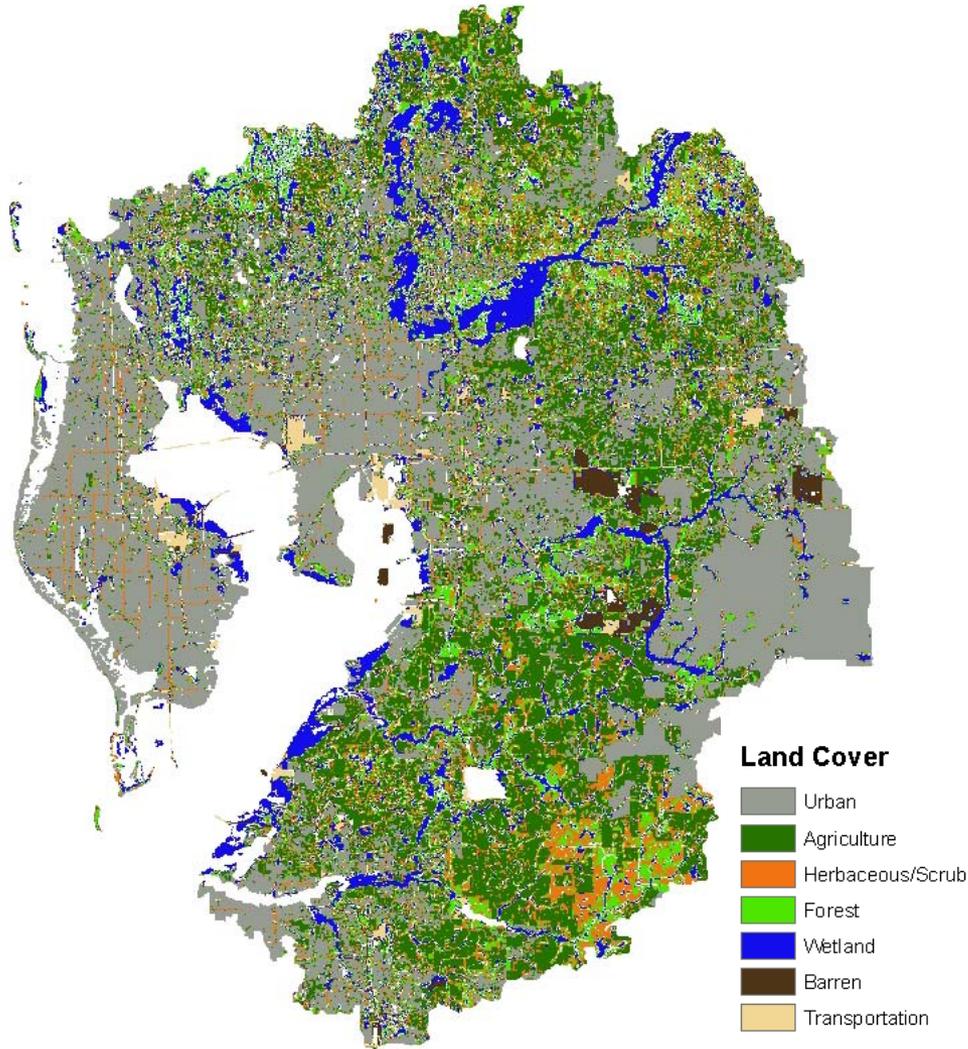
Project Adjustments and Refinement

Research Focus Prioritization

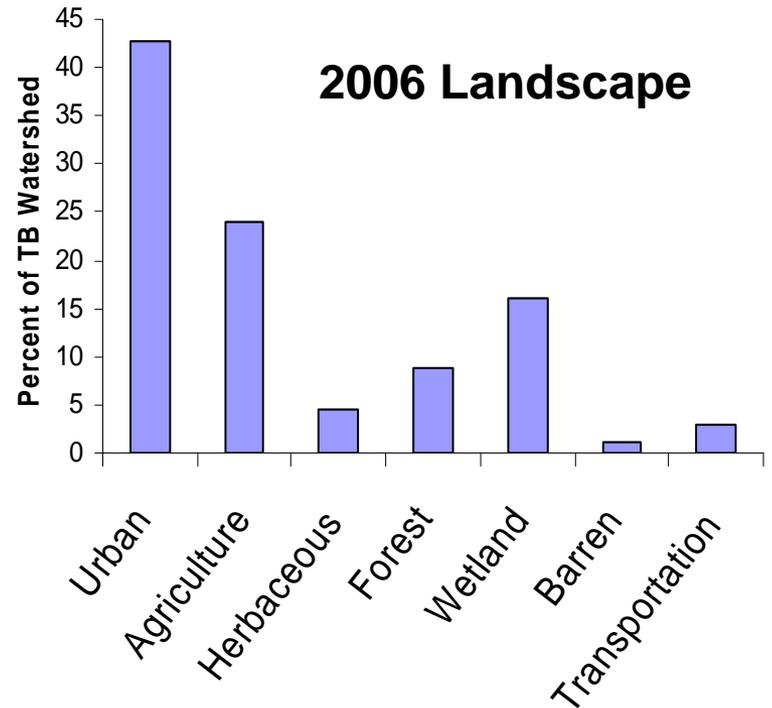
- Technical advisory group
 - Steering committee and local expert input
- Economic value
 - Collaboration with Economist = Initial valuation index
- Local needs
 - Workshop with stakeholder representatives
 - Identified priority management questions to address with research
- State of the science
 - Bibliometric analysis of knowledge gaps for important and valued ecosystem services



Jordan et al. Submitted. Accounting for Natural Resources and Environmental Sustainability: Linking Ecosystem Services to Human Well-Being



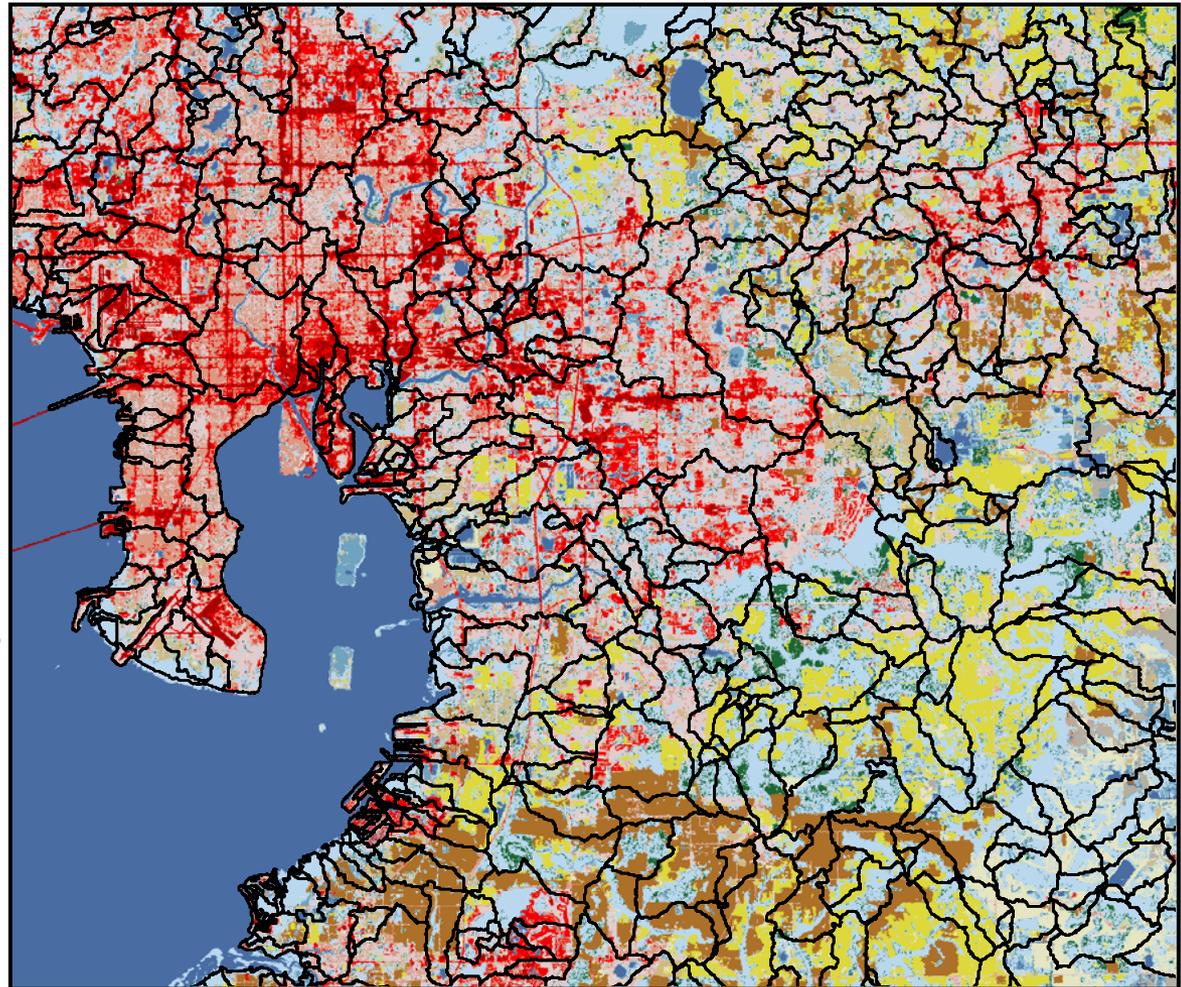
Tampa Bay – Landscape Characteristics



ES Spatial Accounting Units

NHD+ Basins

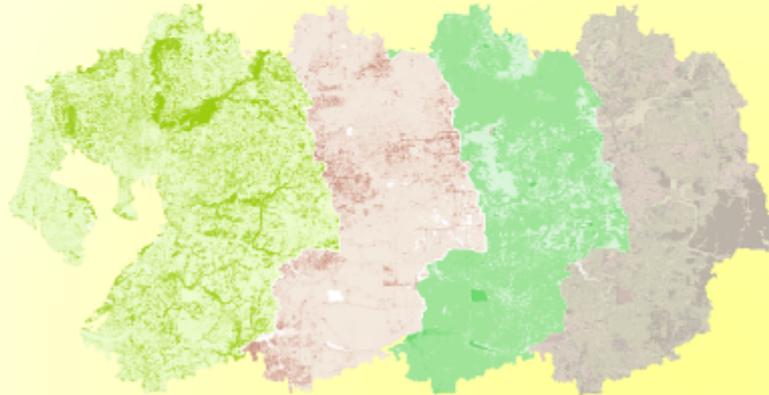
- Neighborhood scale
- Linked to larger hydro-network
- Ancillary info available



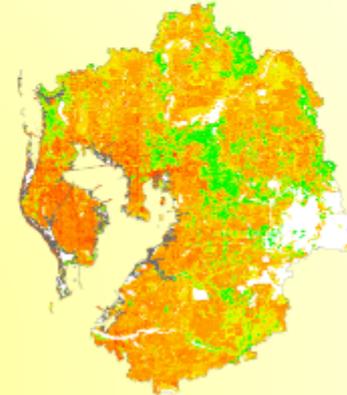
Mapping Changes In Stormwater Mitigation Ecosystem Services

Joe Reistetter Marc Russell
 US EPA - Gulf Ecology Division - Landscape Ecology

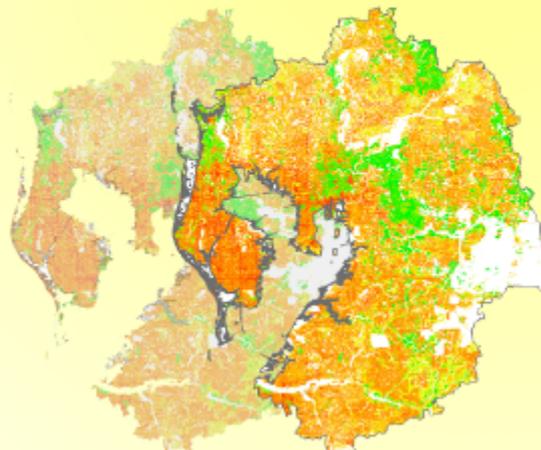
Tree Canopy Density Percent Imperviousness Soil Type Land Cover / Land Use



Estimated Stormwater Runoff
 (Stormwater Mitigation Ecosystem Services)



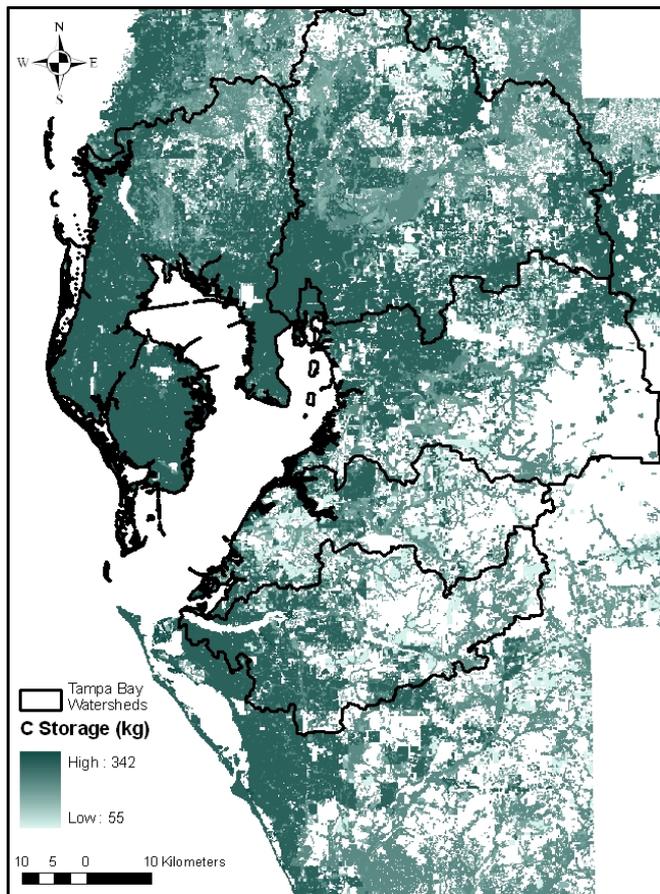
Estimated Stormwater Mitigation Ecosystem Services
 1995 2002



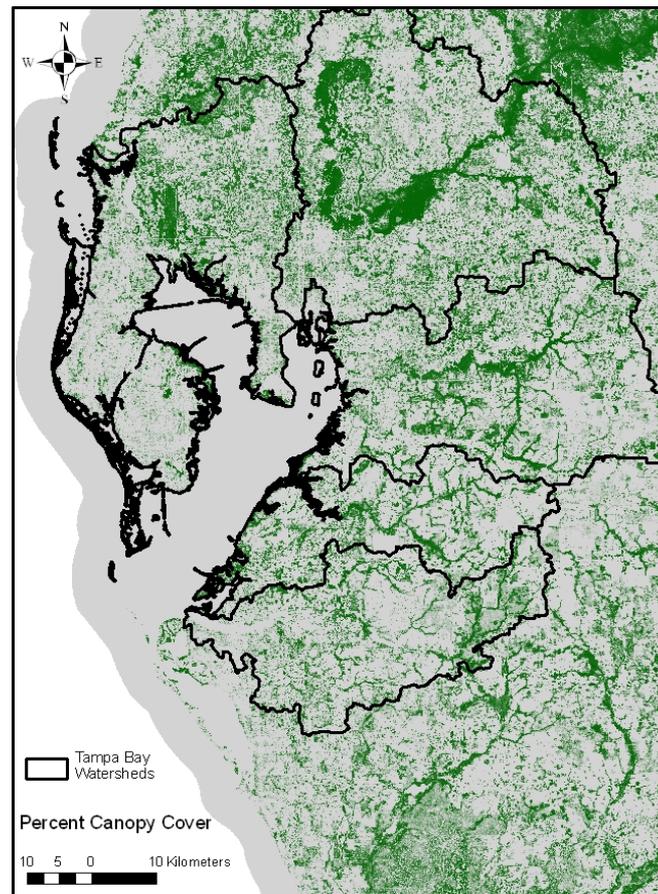
Change in Estimated Stormwater Mitigation Ecosystem Services



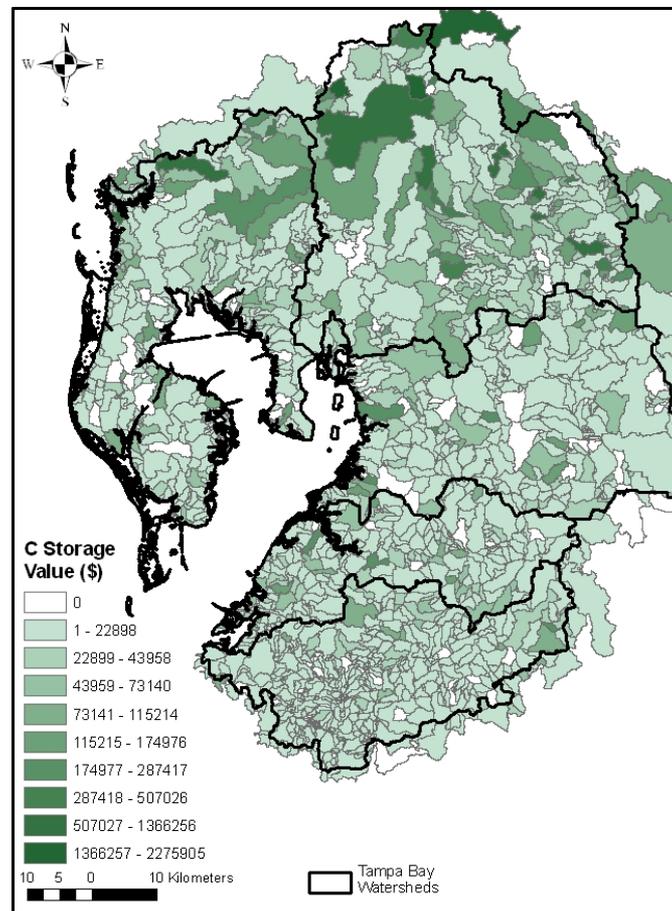
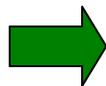
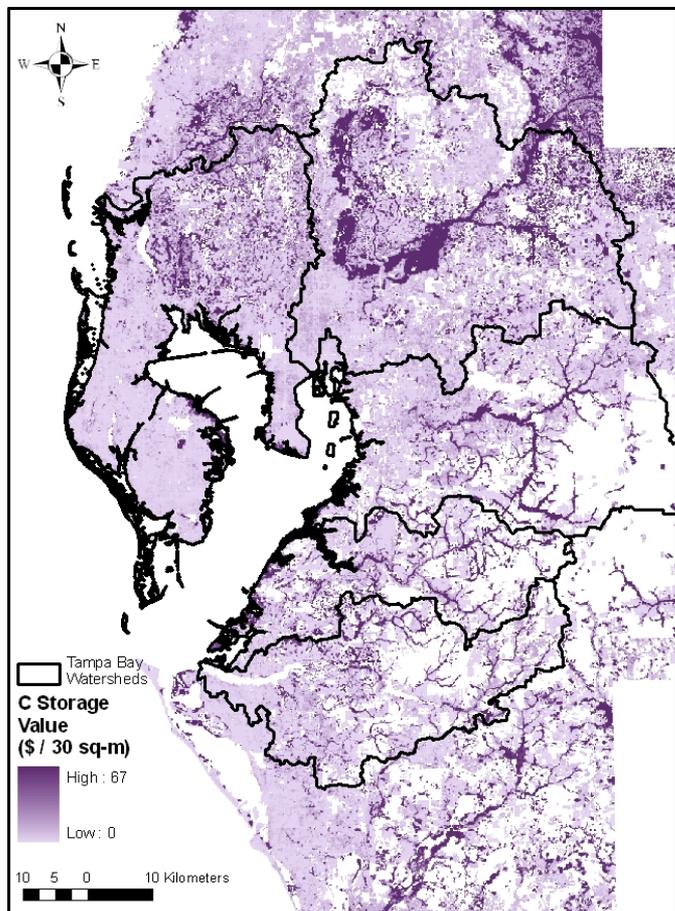
Carbon Storage Bank



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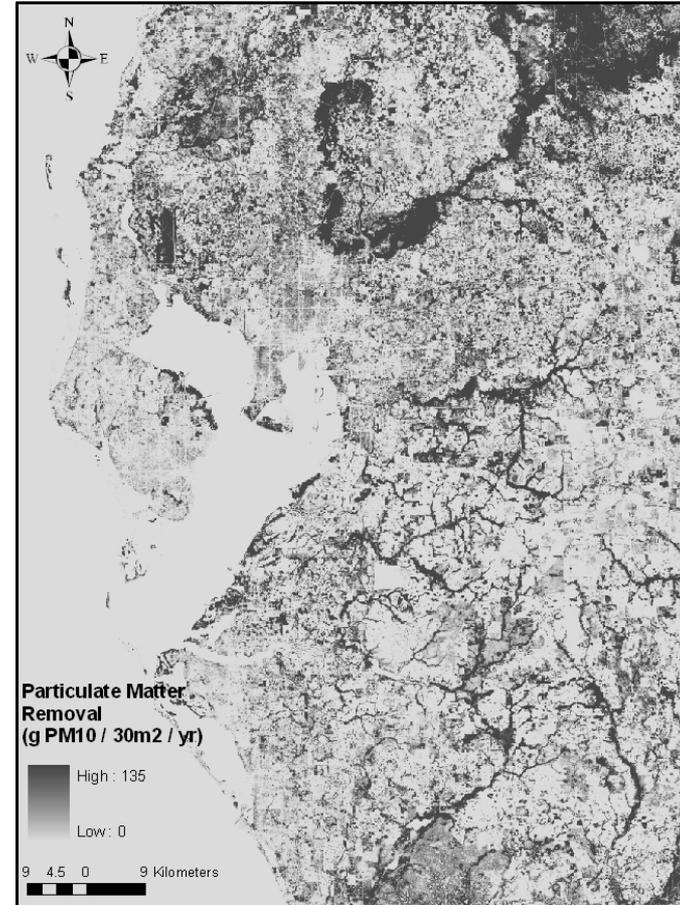
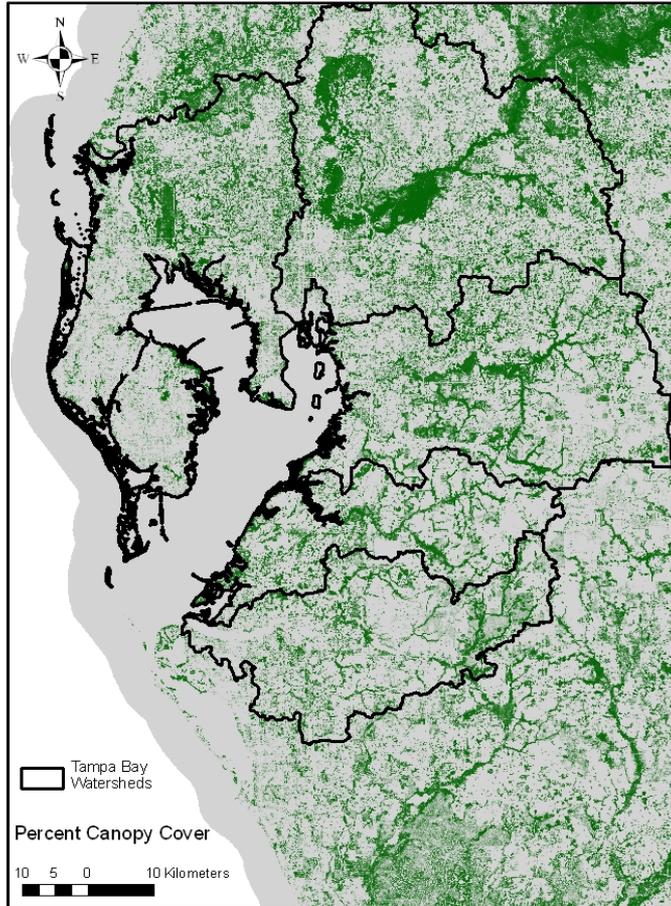


Reduce potential C storage using percent canopy cover



Apply value from Chicago Carbon Exchange (\$15 / ton C) and apportion to NHD+ basins (Total = \$1.8 billion)

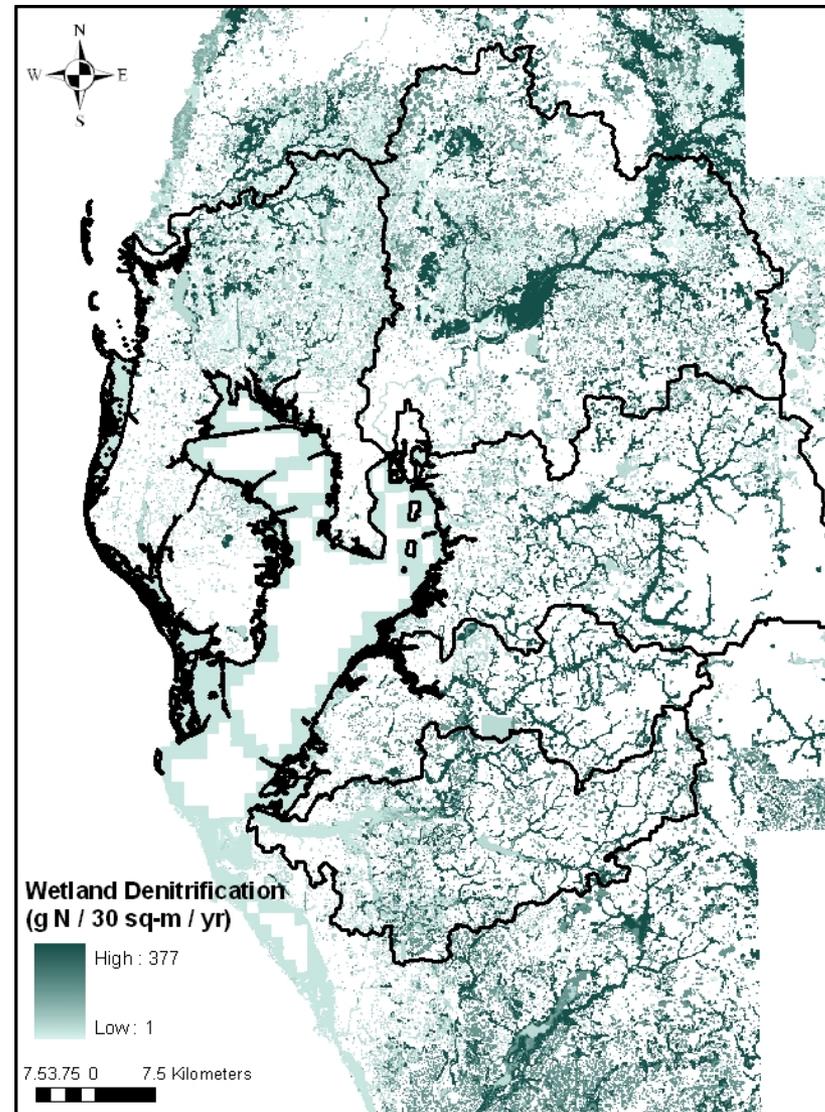
Particulate Matter Removal

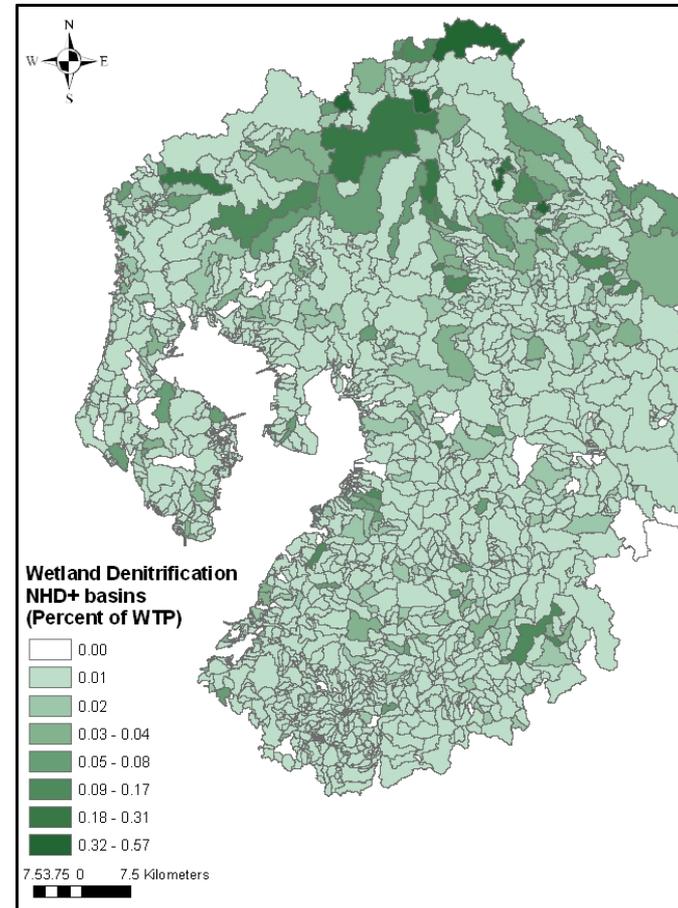
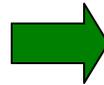
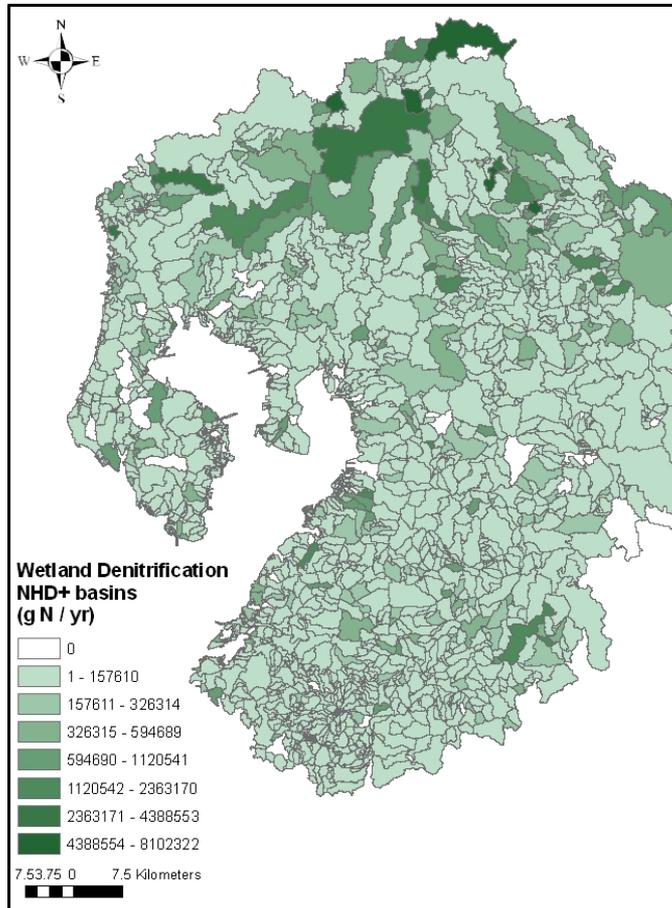


Improves human well-being: direct health benefit
 Attainment of PM standards = \$14-55 Billion worth of
 nationwide health benefits

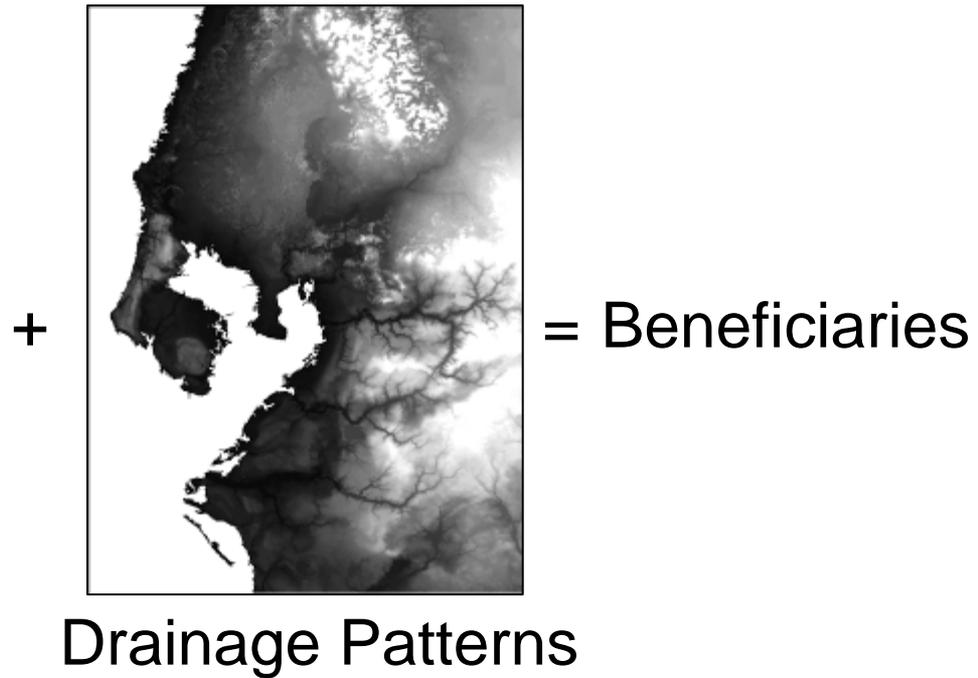
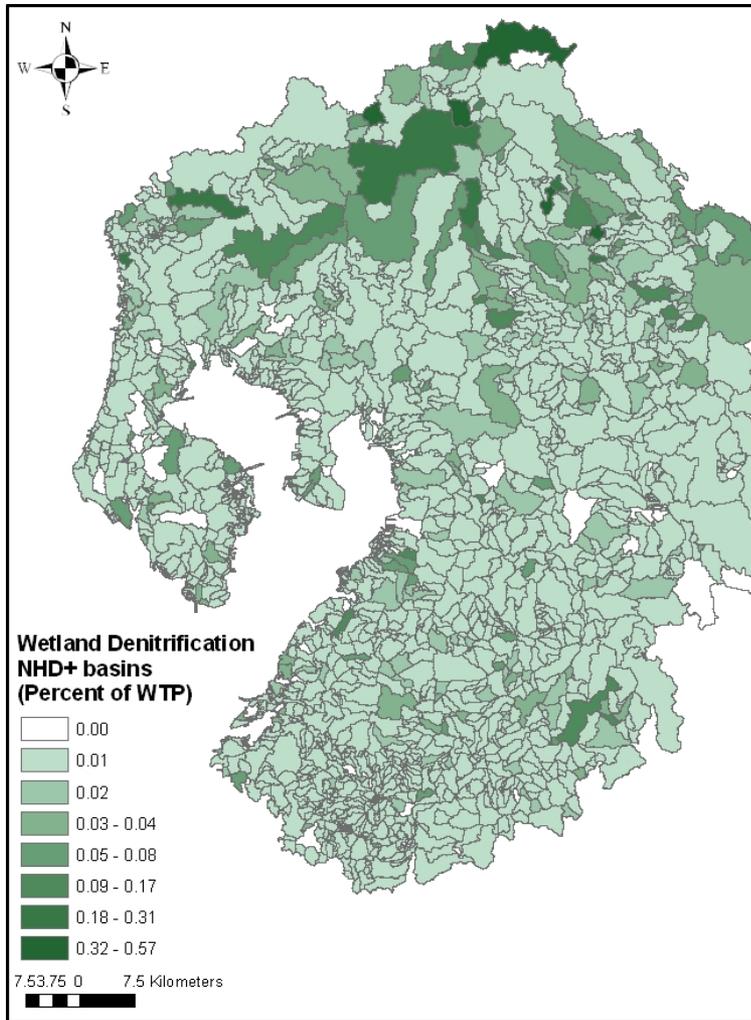
Denitrification

- Freshwater wetlands provide large potential for nitrogen removal.
- Mostly located upstream of urbanized areas near the coast.
- Future wetland losses may result in increased requirements for waste water treatment to maintain water quality criteria.

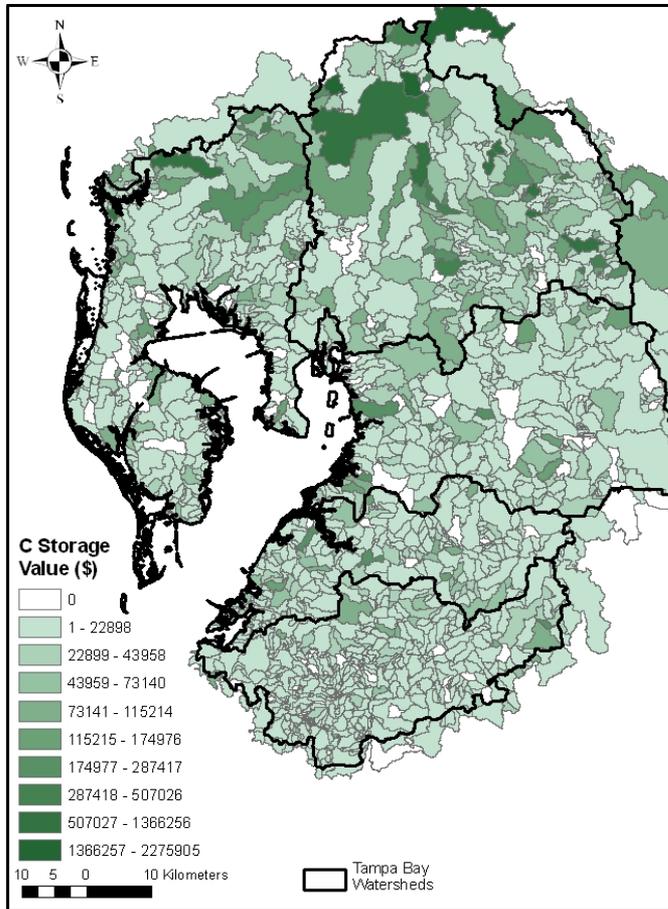




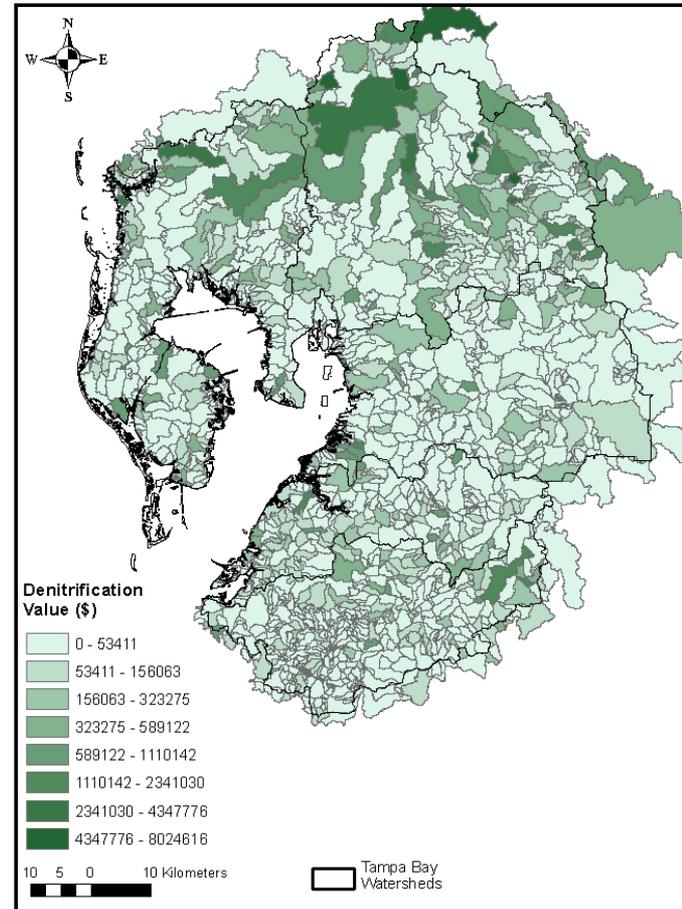
Hotspots of denitrification potential still exist in the Tampa Bay region, with some NHD basins providing more than half the removal capacity of an existing WTP.



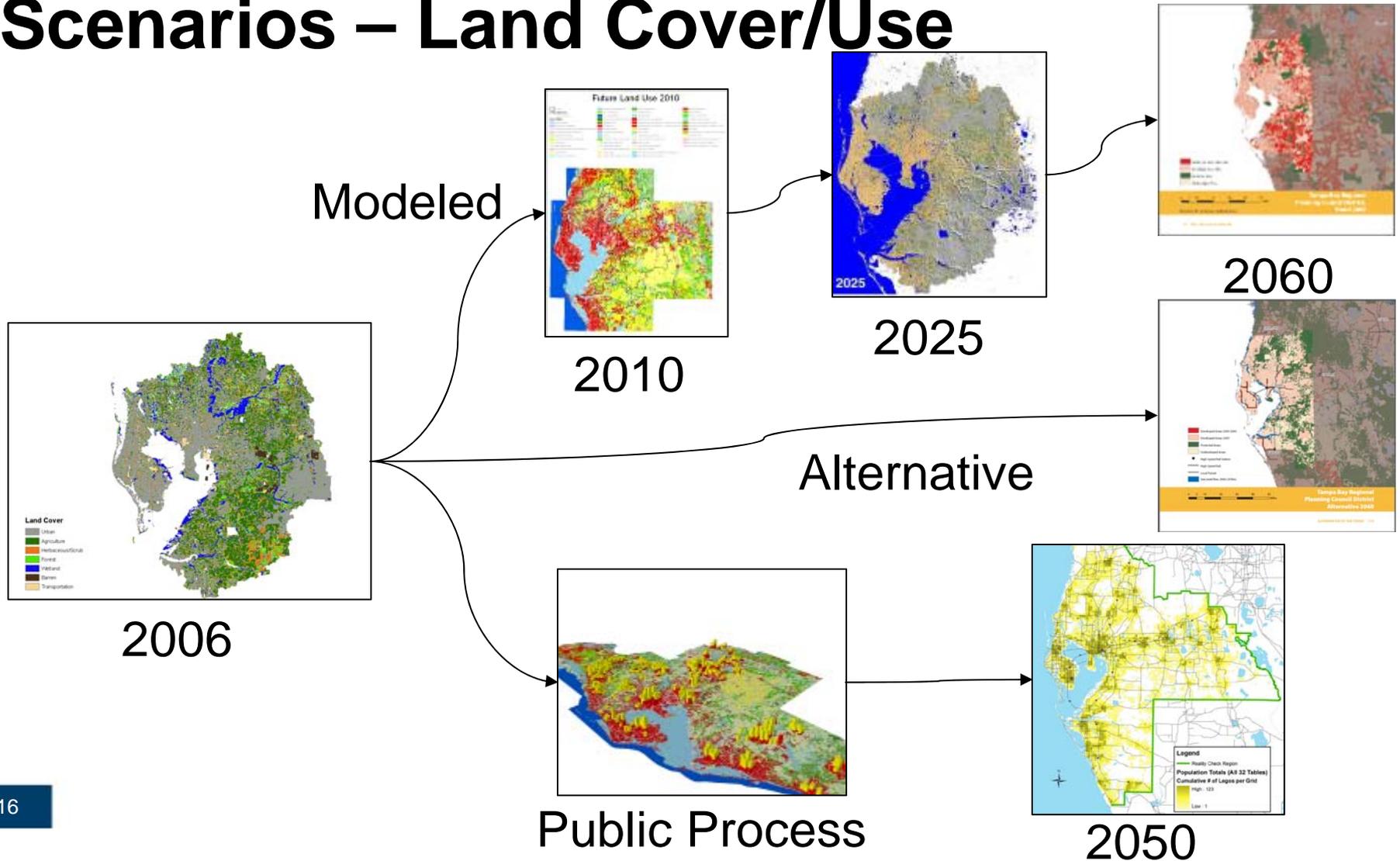
Bundled Services Example



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Scenarios – Land Cover/Use





Skyway bridge across bay

Questions?



Hillsborough River Cypress



Downtown Tampa



Little Manatee River



Alafia Banks Spoonbills

Knowledge gaps and research proposals.

- 1) USGS National Climate Change and Wildlife Science Center
 - Nitrogen removal process rates under stressor gradients.
 - Hydrology, redox potential of soils, and temperature
 - Habitat support for biodiversity/valued species.
- 2) Urban Long Term Research Area (ULTRA-EX) - NSF/USFS
 - Nitrogen removal in riparian and mangrove buffers under urban stressor gradients.
 - Impervious surface, nitrogen loading
 - Social behavior/values in managing private land riparian buffers.
- 3) Gulf of Mexico Alliance (GOMA)
 - Urban lawn N isotope tracking
 - Social behavior, fertilizer ordinances, and regional impacts
- 4) ESRP – Nitrogen
 - Coupled wetland rapid condition assessment methods with nitrogen removal rate measurements under stressor gradients.
 - Landscape Development Intensity index (LDI), nutrient loads
 - Ecosystem nitrogen connectivity (stable isotopes/hydrological modeling) from upland forest through wetlands and into seagrass beds.

Wetland Site Selection Database

- HUC12 sub-watersheds in the Tampa Bay watershed were mapped using the 2006 Florida Land Use, Land Cover Classification System (FLUCCS)
- 4 wetland classes (National Wetlands Inventory defined)
 - Estuarine emergent
 - Estuarine shrub-scrub
 - Palustrine emergent
 - Palustrine forested /shrub-scrub
- 3 landscape classes (Landscape Development Intensity index)
 - $LDI < 3.5$ = High agriculture land use
 - $LDI 3.5 - 5$ = Mixed land use
 - $LDI > 5$ = High urban / developed land use
- This stratified-random survey design provides 120 potential research sites

