Ecosystem Services Research
Mobile Bay Watershed

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Linking ecosystems and
the goods and services they produce
to the well-being of people
Δ Ecosystems  ⇆ Δ FEGS produced  ⇆ Δ Well-being of people

- Ecological production functions (EPFs) [ecological processes on previous slides]
  - Models to estimate production of ecosystem goods & services
  - Link changes in stressors or management decisions to changes in FEGS
- Ecosystem benefits functions (EBFs)
  - Models to estimate the value of FEGS to beneficiaries; effects on well-being
  - Benefits expressed as $, physical or mental health outcomes, spiritual meaning, or combinations thereof
Research Task - Coordinated Case Studies

Process

- Coordinated application of common tools and approaches to decision support across multiple case study sites.

Coastal Gulf of Mexico
Rich Fulford

San Juan, Puerto Rico
Susan Yee

Pacific Northwest
Bob McKane

Great Lakes AOC
Joel Hoffman

Southern Plains
Tim Canfield
Stakeholder engagement
Stakeholder engagement

**Access to water/open spaces for recreation and vistas (Human Uses)**

**Heritage/Culture** This is a new value aimed at protecting the legacy of the coast.

**Beaches and Shorelines** protection, economy, beauty (Habitat Management)

**Resiliency** The capacity of human and natural physical systems to rebound from unforeseen events: protecting beauty (Human Uses/Habitat Management)

**Fish** habitats, abundance, livelihood (Living Resources)

**Water Quality** Whether drinkable, fishable or swimmable, the public places high value on quality rivers, creeks, and bays (Water Quality)
FEGS Scoping Tool

- Stakeholder Prioritization
- Beneficiary Profile
- Key Attribute Identification
What is the FEGS Scoping Tool?

• A tool designed for community decision-makers use at an early project scoping stage of decision-making to help them identify and prioritize the stakeholders, beneficiaries, and environmental attributes of a particular decision/decision context

• These relevant and meaningful environmental attributes can then be used to evaluate decision alternatives

• Designed for use by a wide range of decision makers making a decision with an environmental component

• Only does one thing, but does it does this thing regardless of context
Structured Decision-Making Process

- Clarify the decision context
- Define objectives
- Develop alternatives
- Evaluate trade-offs
- Select preferred alternative
- Estimate consequences
- Implement, monitor, and review

**FEBS Scoping Tool**

**Key environmental attributes**
Quantifying Ecosystem Services
Various spatial datasets make up a database used within H2O to produce Ecosystem Goods and Services maps and compare change scenarios.
Visualizing Ecosystem Land Management Assessments VELMA
**Land Cover**

National Land Cover Dataset
- 30m resolution
- 2016 Version Out soon

NEP 1m Resolution
- Waiting for data file
- Impact of time step?
Soil Data

SURRGO – USDA
Primary Soil Types
- Silty Clay Loam
- Silt Loam
- Sandy Loam
- Loamy Sand

What is the impact of the water table on the model?
Climate Data

NOAA Climate Data Sites
DayMet Model Data to fill in missing data
Daphne 4.2 Recording errors
• Seems to have 2 day delay
• 2014 average 1800mm
• 2014 Daphne 4.2 2400mm

Davis Weather Gauge Data
• City of Daphne
• 2015 and 2016 data
Change in Land Cover of Daphne, AL from 2001 to 2011

Deforestation
- Forest
- Forest to Urban
- Forest to Grassland
- Forest to Other

Urbanization
- Urban
- Forest to Urban
- Other to Urban

Lawns and Golf Courses
- Grassland
- Forest to Grassland
- Other to Grassland

NAD 1983 UTM Zone 16N Transverse Mercator

by Michael Stavely 28 April 2017
Analysis site
D’Olive watershed

Calibration sites
Juniper Creek
Fish River
Fowl River
Little Biloxi River
Our Questions Next Steps

- What are the high priority Ecosystem Services in Mobile Bay sub-watersheds?

- How do these high priority ES combine with other services to affect human well-being?

- How do changes in land use/cover through time affect benefits of in-stream restoration activities?

Next steps
- Complete data gathering for tools (SE and EPF)
- Complete model calibration (VELMA)
- Schedule Demo webinar for tools (Mar-Apr)
- Coordinate with NEP SAC on high priority sites for tool implementation