

# The Benefits of Restoration in Urbanizing Watersheds: Developing Value Indicators and Understanding Social Barriers and Opportunities

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## BACKGROUND:

- Existing tools to compare restoration sites focus on bio-physical attributes, and may be too complicated for local managers.
- Our value indicators can help managers to evaluate wetland services and benefits.

## Inform restoration decisions and implementation

- Limited information exists about barriers and opportunities in restoration efforts.
- Even the best projects sometimes fail if the public is not effectively engaged in the decision process.

## Develop Ecosystem Benefits Indicators

### Objective:

- Develop a systematic approach to compiling a set of benefit indicators that is grounded in economic theory and uses readily-available data.

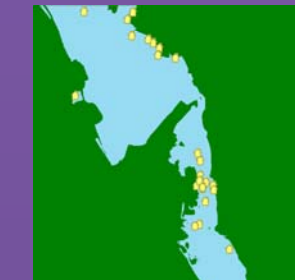
### Indicator development process; flood reduction example:

#### 1. Functional assessment



- Where is flooding reduced?
- With existing wetlands, 7.4km<sup>2</sup> (7.5%) of the modeled\*\* area floods [■]
  - Without existing wetlands 7.7 km<sup>2</sup> of the area would flood [■ indicates additional flood areas]

#### 2. Assessment of complements



- Is existing infrastructure at risk?
- 127 houses [🏠] in flooded area

#### 3. Assessment of beneficiaries



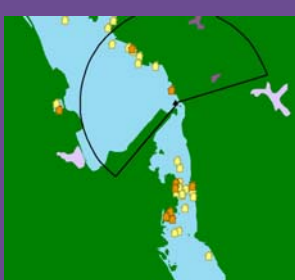
- How many houses are protected from flooding by existing wetlands?
- 28 houses [🏠] are protected by existing wetlands

#### 4. Assessment of demand and preferences



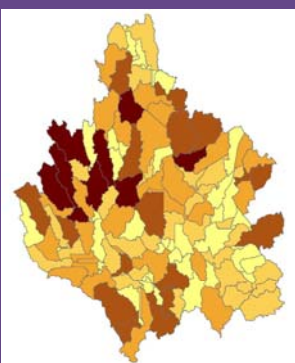
- How are significant floods (> 1ft) affected by wetlands?
- 19 houses [🏠] have flood depth reduced to <1ft

#### 5. Assessment of substitutes

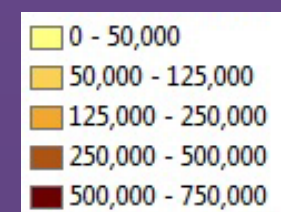


- How many houses benefit from existing gray infrastructure substitutes?
- Wetlands [🌿] <0.5km upstream from a dam [▲] will typically not provide additional flood protection to houses below the dam. A dam will typically not substitute flood protection for wetlands [🌿] >0.5 km upstream.

#### 6. Assessment of scarcity



- Supply - What areas have greater volume of wetlands? vs. Demand - What areas would benefit most from restoration?



Volume (m<sup>3</sup>) of wetlands in sub-basin

#### 7. Assessment of temporal reliability

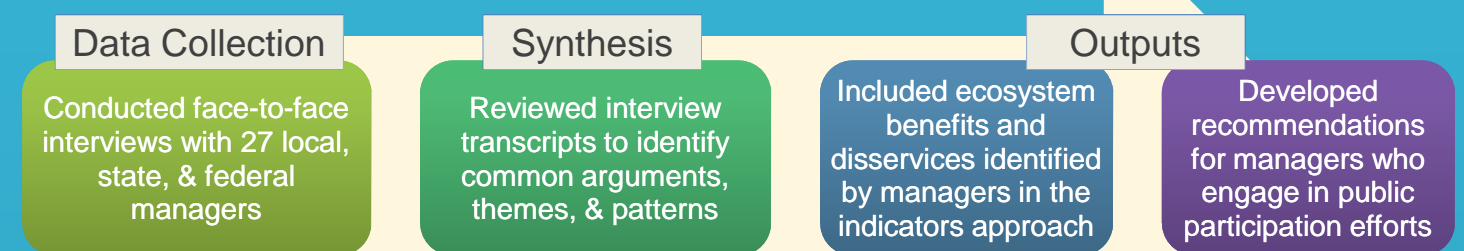
How sure are we that flood reduction benefits will continue?

\*\* Model was based on rainfall and flow matching the second largest storm on record (October 2005; record dates back 75 years to 1941).

## Understand Opportunities and Barriers

### Objectives:

- Identify public opportunities for and barriers to urban restoration
- Develop a framework for deliberate design of public engagement, based on desired ecological, stakeholder, and learning outcomes.



### Data Collection

The most common terms from interviews with 27 local, state, and regional land managers when discussing urban restoration issues.

### Synthesis

#### Opportunities:

- Close-knit network of managers
- Shared history of successful restoration projects

#### Challenges:

- Competing versions of restoration targets
- Limited and sporadic funding for construction, monitoring, and adaptive management



#### Public interaction:

- Perceived lack of public knowledge about hydrology and restoration
- Perceived lack of public value for restoration or non-human benefits of projects
- Frustrating and contentious public meetings

## Outputs

#### Ecosystem Benefits Indicators:

- We are producing a step-by-step guidebook to applying this approach.
- It will include indicator checklists, spreadsheet and mapping tools, and suggestions for data sources.

#### Opportunities and barriers:

- From the interviews, we developed a list of benefits and disservices from ecological restoration.
- We summarized opportunities/barriers to urban restoration.
- We developed a framework for public engagement.

#### Overall:

- We are applying marketing methods to help develop and promote methods that managers can use.

## Takeaways

#### Indicators:

- This approach allows users to evaluate and compare benefits of restoration without estimating dollar values, using readily available data.

#### Opportunities and barriers:

- Understanding communication styles in public participation helps managers more successfully implement projects.

#### Overall:

- Considering the human element when developing and evaluating restoration efforts is critical for improved decision-making and successful implementation.