Incorporating Ecosystem Services at the Urban Scale

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Objective: Learn about ES in urban areas

- Contacted over 20 cities of various sizes, from different regions
- Cross-section of planners, NGOs, environmental or sustainability professionals and academics
- Talked with practitioners from 10 cities (August, 2013):
  - Austin, TX
  - Bloomington, IN
  - Denver, CO
  - Knoxville, TN
  - Minneapolis, MN
  - Philadelphia, PA
  - Portland, OR
  - Seattle, WA
  - Tampa, FL
  - Washington, DC

Objective: Learn Stuff

- Ecosystem services identified and managed in urban areas
- Challenges to implementation
- Benefits of ecosystem services approaches
- Future needs

Source: Metro Vancouver, 2014

Are Ecosystem Based Approaches Being Used?

- Yes!
  - 9 out of 10 cities self-identified as taking an ecosystem services approach in their cities.
    - Other sustainability initiatives were considered higher priority in Denver (more later)
- But it should be mentioned..
  - Ecosystem services as a term isn't popular
    - Green infrastructure
    - Green city
    - Green space
    - Urban forest
    - Natural benefits
    - Low impact development

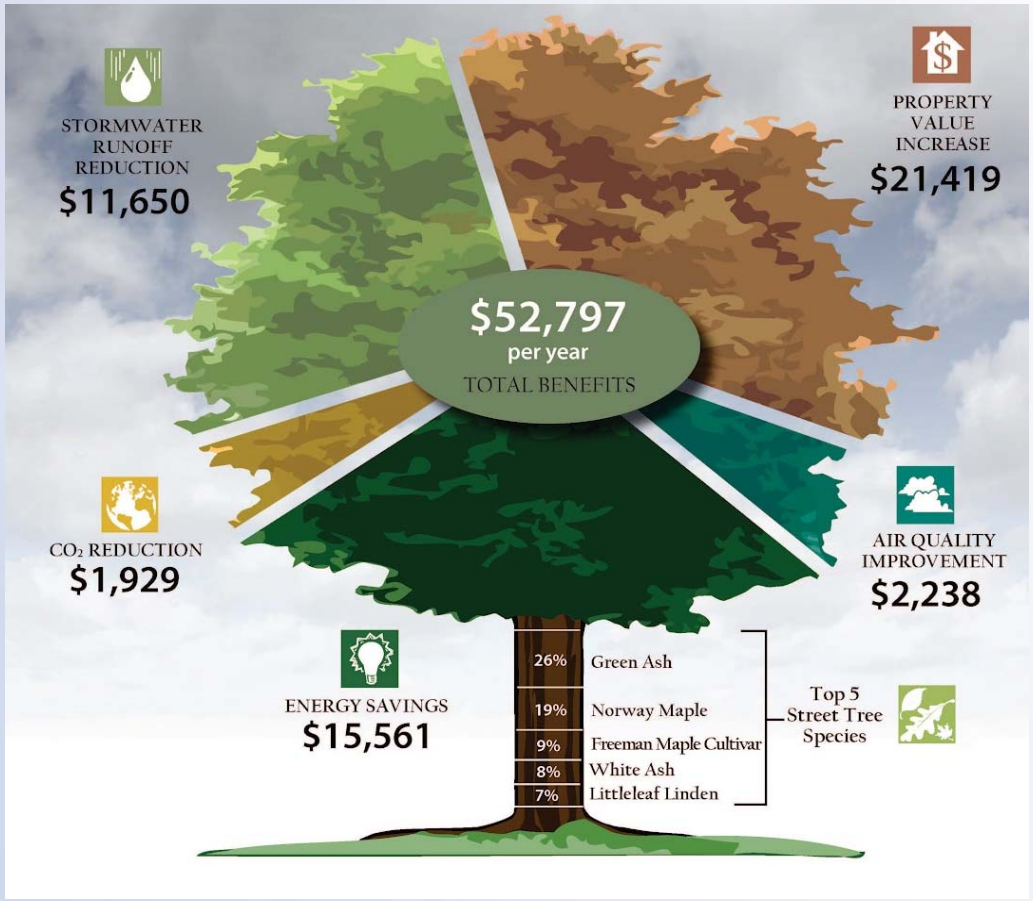
What kinds of ecosystem services are recognized and assessed?

- All cities recognized water quality, water quantity, air quality, carbon storage, climate regulation, erosion, species diversity, aesthetics as important services from natural elements
- Eight cities prioritized management of water quality and quantity by tracking indicators, such as:
  - Number of trees
  - Green roofs
  - Biofiltration practices

Austin, Bloomington, Knoxville, Minneapolis, Philadelphia, Portland, Seattle, Washington

Quantifying Ecosystem Services

- Cities have used the USFS iTree application
  - Austin
  - Bloomington
  - Knoxville
  - Philadelphia
  - Portland***
  - Seattle
  - Tampa
  - Washington, DC



Village of Bellevue, 2012

Other Indicators and Services

- **Austin**: fire cycle regulation, aquifer recharge zone protection
- **Bloomington**: green space, homes with proximity to parks, food production and foraging, and riparian land
- **Denver:** water provisioning and water filtration
- **Minneapolis**: invasive species prevention, wetlands, rain gardens
- **Philadelphia**: recreation, aesthetics, homes with proximity to parks
- **Portland**: endangered species protection conveyance, infiltration, water quality, fish passage
- **Seattle**: food production and foraging, property values, decreased crime rates, increased shopping
- **Washington, DC**: trash reductions, wetlands

Has the approach made a difference?

- Yes! Especially when they can be quantified.
  - **Knoxville**: created an urban forestry management program and hired an urban forester based on the results of iTree.
  - **Seattle**: used valuation results to justify urban forestry funding to the mayor and has helped shaped urban forestry management plans
  - **Minneapolis**: gaining more funding and opportunities as people become familiar with the value of natural practices

Washington, DC (Popville, 2014)

Has the public responded well?

- In general, yes.
- Helps promote cities as a great place to live
- Some tradeoffs
  - Concrete jungle vs. the occasional snake (or feral pig)
  - Green lawns vs. tall grasses

Tampa: “Folks have either never heard of ecosystem services or they exaggerate them. As it catches on, it has been a great opportunity for scientists to talk with the public.”

Knoxville (City of Knoxville, 2014)

Are there challenges or opportunities?

- Opportunities:
  - Funding justifications
  - Ability to prioritize action items
  - Involvement in management plans
- Challenges:
  - Five cities (Austin, Bloomington, Portland, Seattle and Tampa) remarked on the cost and level of effort to quantify ecosystem service values
  - Three cities (Portland, Seattle and Tampa) discussed uncertainty in ecosystem service values
  - iTree doesn't cover wetlands, green roofs, etc.
  - Public health and social benefits aren't very well represented
  - Local, state and national permitting issues

Philadelphia

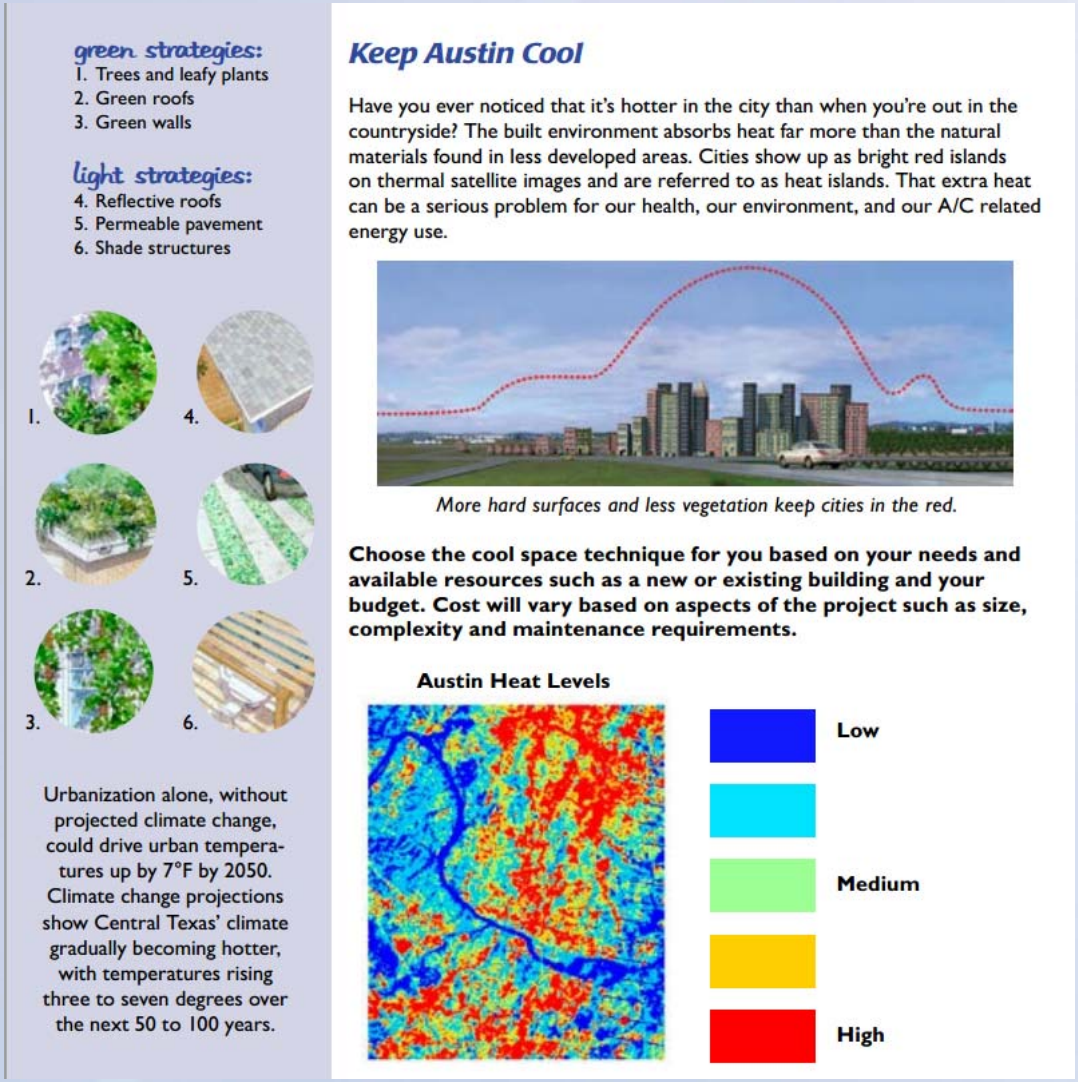
Community members participated in a depaving project to improve stormwater management at **GOLD STAR PARK** in South Philadelphia.

Philadelphia Water Department's **RAIN CHECK** program provides de-paving at a reduced cost to residences in the combined sewer area. Through Rain Check, PWD and homeowners share the costs of stormwater infrastructure that helps reduce the strain on the sewer system and also beautifies properties.

If an ecosystem services approach is not being applied, is there a specific reason?

- Denver:
  - Trees aren't a natural ecosystem in Denver
  - Most water quantity and quality regulation needs to occur miles from Denver, creating funding and regulatory issues
  - Water laws are too restrictive for many BMPs

Lessons Learned



green strategies:
1. Trees and leafy plants
2. Green roofs
3. Green walls

light strategies:
4. Reflective roofs
5. Permeable pavement
6. Shade structures

1. 4. 2. 5. 3. 6.

Urbanization alone, without projected climate change, could drive urban temperatures up by 7°F by 2050. Climate change projections show Central Texas' climate gradually becoming hotter, with temperatures rising three to seven degrees over the next 50 to 100 years.

Keep Austin Cool

Have you ever noticed that it's hotter in the city than when you're out in the countryside? The built environment absorbs heat far more than the natural materials found in less developed areas. Cities show up as bright red islands on thermal satellite images and are referred to as heat islands. That extra heat can be a serious problem for our health, our environment, and our A/C related energy use.

More hard surfaces and less vegetation keep cities in the red.

Choose the cool space technique for you based on your needs and available resources such as a new or existing building and your budget. Cost will vary based on aspects of the project such as size, complexity and maintenance requirements.

Austin Heat Levels

Low
Medium
High

- Ecosystem services is a great concept with terrible urban street cred
  - Terminology can be a barrier to implementation and acceptances
  - What constitutes an ecosystem?
  - Should managed systems be considered for ecosystem services approaches?
- The benefit links between protecting/enhancing ecosystems and water quality/quantity are well understood and commonly applied

Lessons Learned

Minneapolis (MCCSO, 2012)

- The approach is most effective when indicators are tracked and values are assigned
- Tools to quantify ecosystem services are effective, but incomplete, cost and labor intensive
  - Need better framework for evaluating green elements beyond trees
  - Variation in climates should be better considered
  - Reduce cost and level of effort required for more detailed results

Thank you!!

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Questions?

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