Nature & Health :: From Evidence to Economic Value

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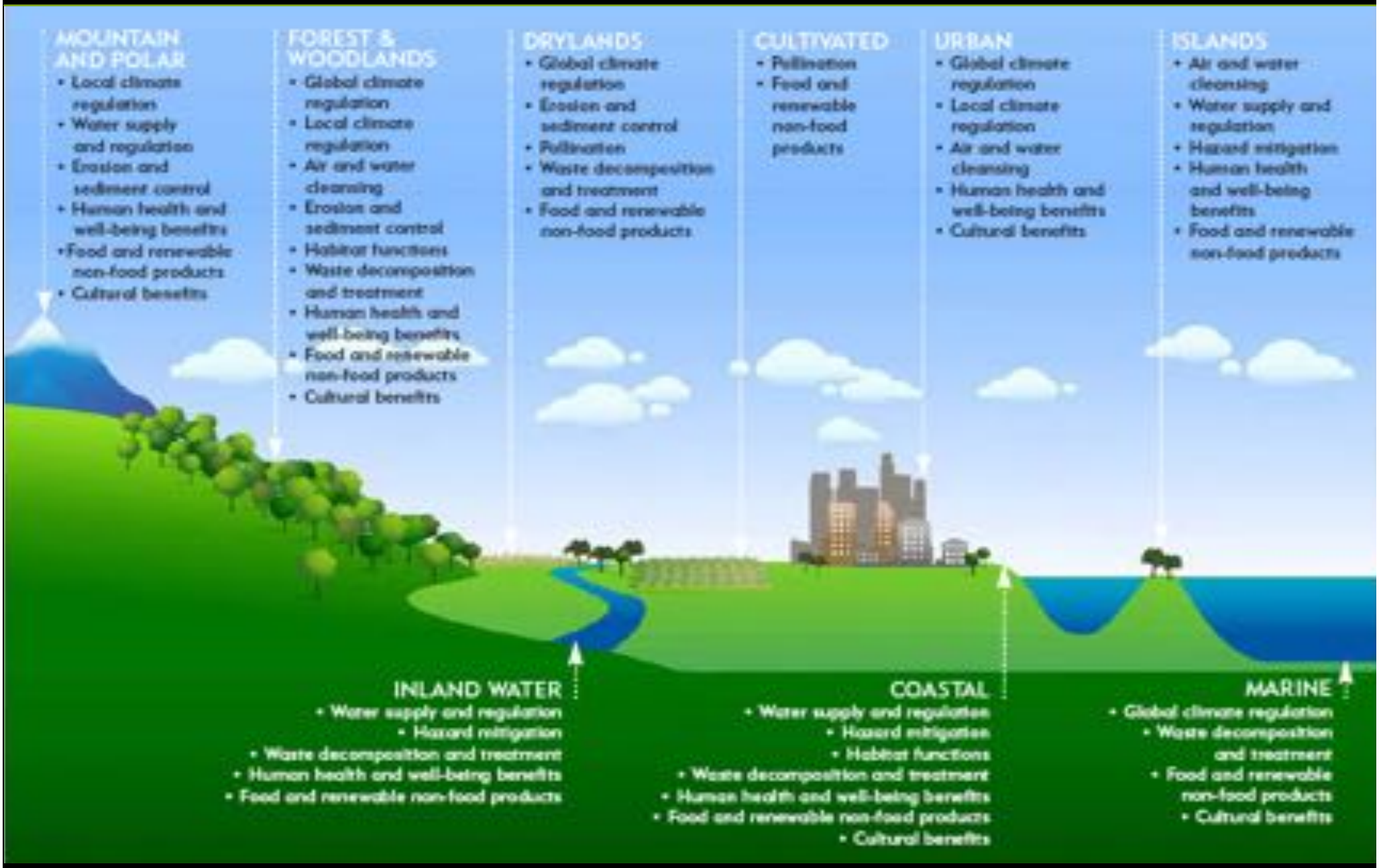
Ecosystem Services

Millennium Ecosystem Assessment

2005

Landscape Gradient: *Ecosystem Services*



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Forest Economics

Community Economics

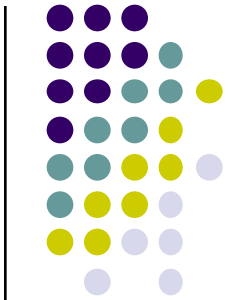
place
real estate value
retail behavior
rather than product supply/demand

Yard & Street Trees

Value Increase	*Condition*
2%	mature yard trees (greater than 9-inch dbh)
3%	larger street trees (up to 100’ away)
3-5%	trees in front yard landscaping
6-9%	good tree cover in a neighborhood
10-15%	mature trees in high-income neighborhoods

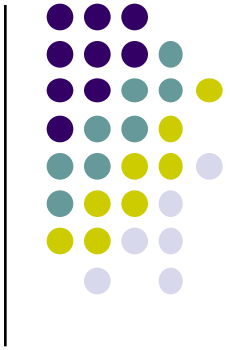
multiple studies:
Green Cities: Good Health > Local Economics

Tree Retention In Development



Value Increase	***Condition***
18%	building lots with substantial mature tree cover
22%	tree-covered undeveloped acreage
19-35%	lots bordering suburban wooded preserves
37%	open land that is two-thirds wooded

Parks & Open Space
proximate principle



Value Increase	*Condition*
10%	inner city home located within 1/4 mile of a park
17%	home near cleaned-up vacant lot
20%	home adjacent to or fronting a passive park area
32%	residential development adjacent to greenbelts

Local Government Benefits

Civic Investment – Public Goods

like schools, emergency response, roads

- street trees average positive effect on house values
- added up across Portland, Oregon
- yields a total value of $1.35 billion
- potentially increasing annual property tax revenues $15.3 million

Donovan & Butry. 2010
Landscape and Urban Planning

Community Economics

retail behavior
indirect economic measures

Trees & Retail Environments Research

Wolf, K.L. 2005. Business District Streetscapes, Trees, and Consumer Response. Journal of Forestry 103, 8: 396-400.

Trees & Shopper Environments Research

- Research Questions •
  - trees and visual quality?
  - trees and consumer behavior?
  - trees and product pricing?

- **Methods:**
  - **mail out/in surveys**
  - **national or local sample**
  - **residents/nearby city residents**

partners: U of Washington, NGOs, business organizations
funded by USDA Forest Service

Image Categories (sorted by ratings)

Scale : 1=not at all, 5=like very much, 26 images

Pocket Parks
mean 3.72
(highest)

Full Canopy
mean 3.63

Enclosed Sidewalk
3.32

Intermittent Trees
2.78

No Trees
mean 1.65
(lowest)

(high - 3.72)

1. Place Perceptions

- Place Character
- Interaction with Merchants
- Quality of Products

2. Patronage Behavior

- travel time, travel distance
- duration & frequency of visits
- willingness to pay for parking

3. Product Pricing

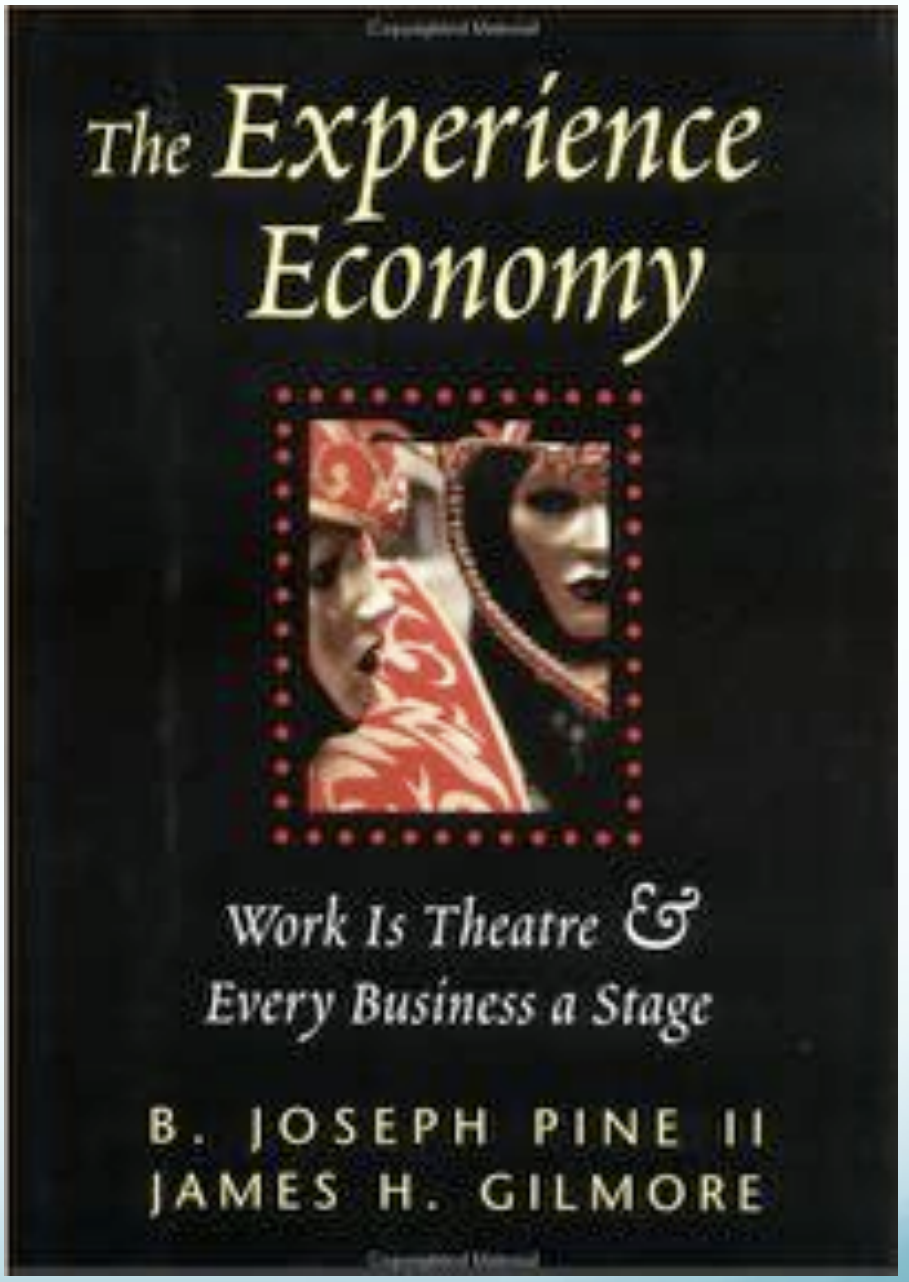
- higher willingness to pay for all types of goods
- higher in districts with trees – 9-12%

Place Marketing

Relationship Marketing

retail & place marketing

"Companies stage an experience when they engage customers in a memorable way."



Trees as Place-Makers

the Chenoggye freeway in Seoul
~ 1970-2005

Chenoggyeon – 8.4 km, $900 M

initial public criticism!

The High Line :: June 2009

- between 2003 and 2011
- nearby property values increased 103% (despite the deep recession)
- $2 billion was invested in nearby properties development

ALPHA

Awaji Landscape Planning & Horticulture Academy

typical
retail street
in urban Japan

Namba Parks, Osaka

view from nearby hotel

interior
retail space

ground level

small plazas
retail entry

up-close nature experiences

place of respite

Namba Parks

retail success & nature experience benefits

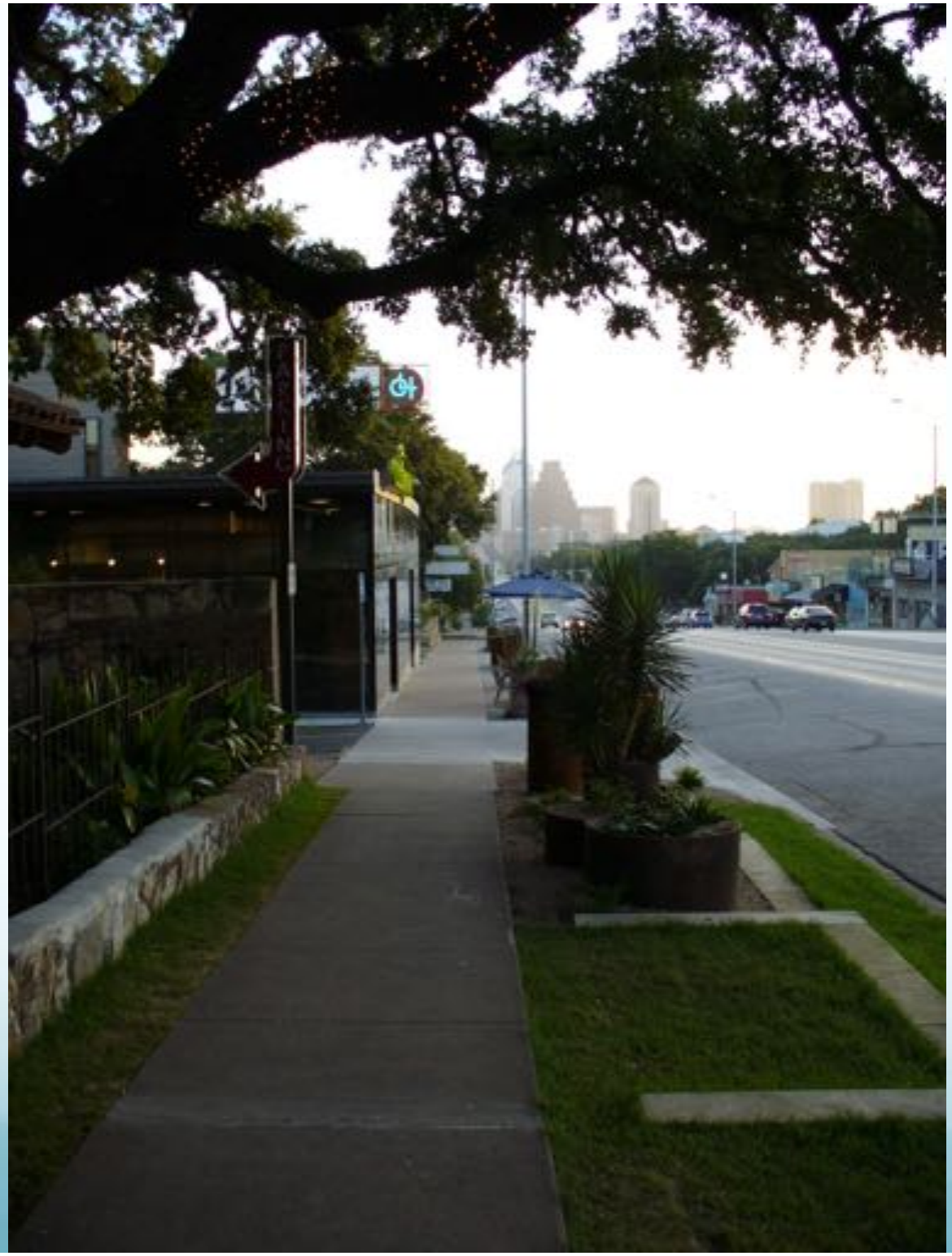
lessons learned?

social spaces

small rooms

variety within unity

BAINBRIDGE BA
outdoor rooms
social spaces
sense of welcoming



Austin, TX

South Congress Avenue redevelopment district

public xeriscape

shared design & management

identity

affordable materials

message of renewal

Public Health Economics

avoided costs
reduced costs
income potential

Community Building
Local Economics
Place Attachment & Meaning
Crime & Fear
Safe Streets
Active Living
Reduced Risk
Wellness & Physiology
Healing & Therapy
Mental Health & Function
Work & Learning
Culture & Equity
Lifecycle & Gender

Local Economics

RSS Feed Print

Trees in cities are not grown and managed for products that can be bought and sold on markets, but they do provide many intangible services and functions! This article serves two purposes. First, it introduces valuation methods that are used to convert intangible benefits to dollar sums.[1,2] Then, it shows how nonmarket valuations can support local decision-making.

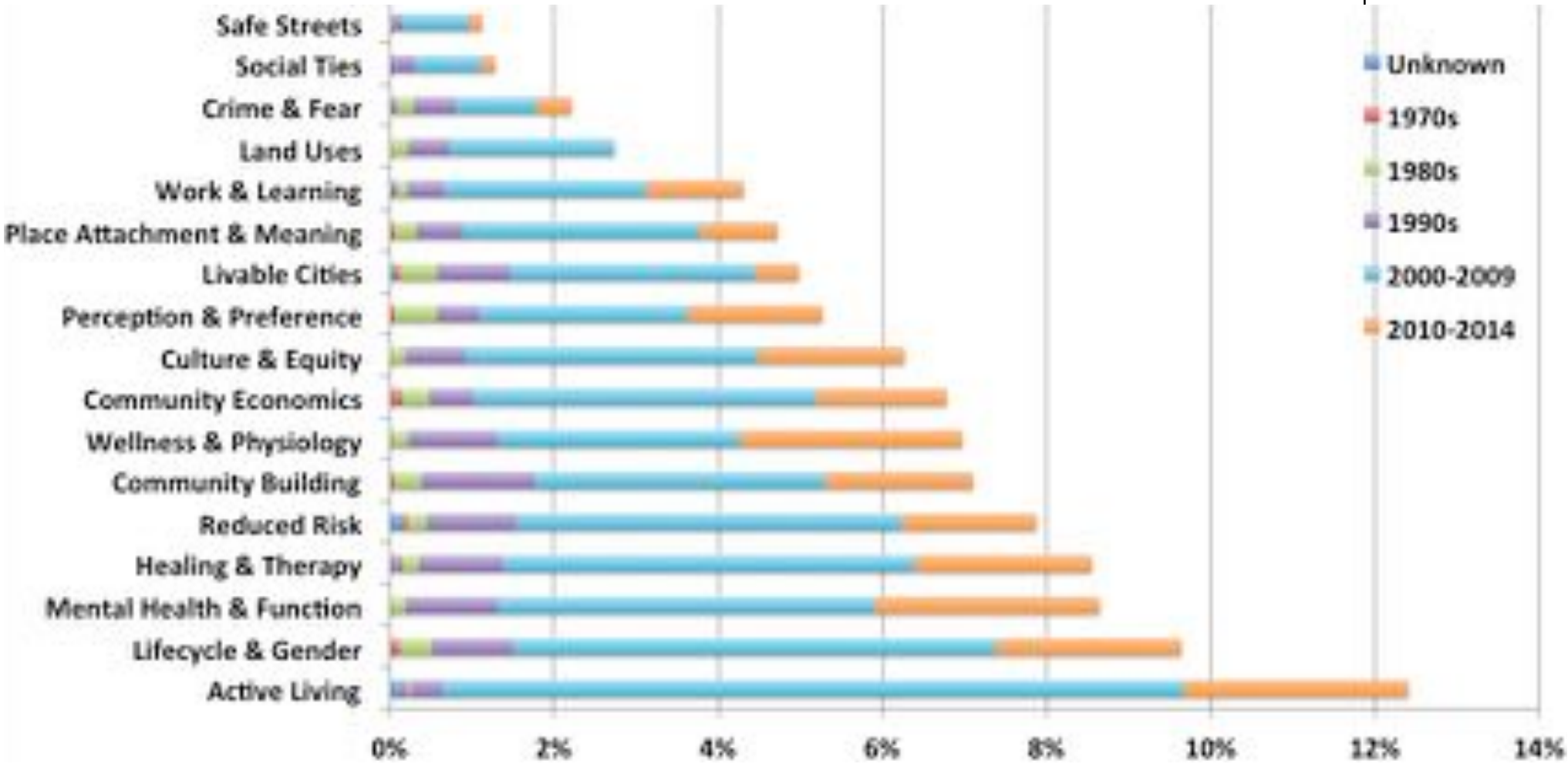
Fast Facts

- The presence of larger trees in yards and as street trees can add from 3% to 15% to home values throughout neighborhoods.
- Averaging the market effect of street trees on all house values across Portland, Oregon yields a total value of $1.35 billion, potentially increasing annual property tax revenues $15.3 million.[9]
- A study found 7% higher rental rates for commercial offices having high quality landscapes.[14]
- Shoppers claim that they will spend 9% to 12% more for goods and services in central business districts having high quality tree canopy.[34]
- Shoppers indicate that they will travel greater distance and a longer time to visit a district having high quality trees, and spend more time there once they arrive.[34]

street trees boost market value of houses, providing tax revenue for communities

Green Cities: Good Health > 3,000 article database

Step 1: Evidence screening



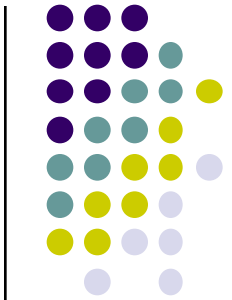
Metro Nature & Health Evidence Framework

Synthesis of 40 years of peer-reviewed literature

Wolf, K.L., A.S.T. Robbins. 2015. Metro nature, environmental health, and economic value. Environmental Health Perspectives 123, 5:390-8.

Elements of Economic Valuation

Step 1: Screen Benefits Research



- What are the benefits?
- Who experiences nature and gets benefits?
- What is the green condition or situation that provides benefits?
- Scale of value question (i.e., community, province/state, nation)
- What are the costs/income gained/lost associated with these benefits?

i-Tree™

Eco (UFORE)

Streets (STRATUM)

Hydro

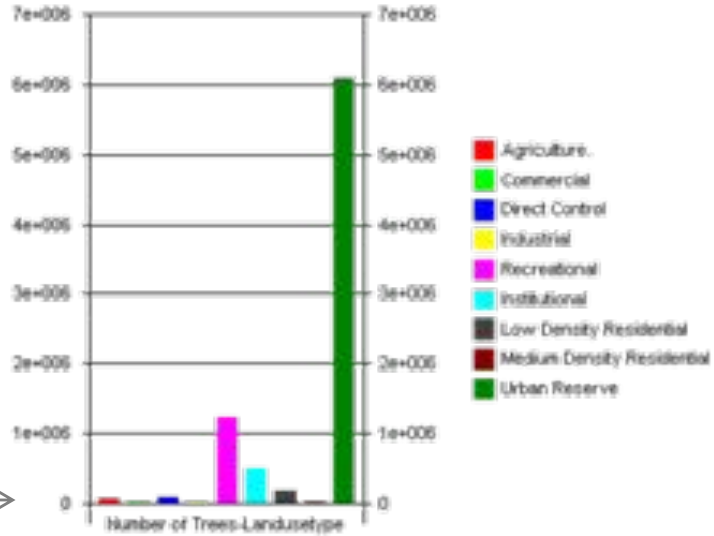
Vue

tools provided by USDA Forest Service

STRUCTURE

FUNCTION

VALUE

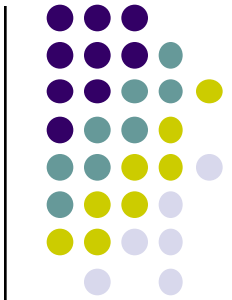


MANAGEMENT

photo credits: Seattle i-Tree Training by Al Zelaya

Valuation Strategies

Step 2: Benefits Transfer and Value



- factor income
- avoided or replacement cost
- burden of illness
- hedonic pricing
- stated preference/contingent valuation
- revealed preference (e.g., travel cost)
- quality adjusted life years
- benefit/cost

Valuation Sources

Step 3: Benefits Focus for Valuation

Benefit	Metro Nature	Outcome
Newborn Birth Weight	increased tree canopy cover near mothers' homes	fewer small for gestational age babies
Attention Deficit Hyperactivity Disorder	greener play areas vs built outdoor or indoor settings	reduced symptoms potentially reducing medication
School Performance	green views from classrooms and cafeteria	reduced dropout rate - average annual income
Crime Reduction	trees and lawn in outdoor common areas	reduced violent and non-violent incidence and costs
Cardiovascular Disease	presence of residential tree canopy	reduced incidence or severity of cardiovascular disease
Alzheimer's Disease	wander garden in care facility	reduced medications for patients

Potential Annual Cost Savings and Increased Income Associated with Human Health and Well-being Benefits Derived from Metro Nature

Benefit (geographic scope)	Minimum ($)	Maximum ($)
Newborn Health (U.S.)	5.3	5.3
Attention Deficit Hyperactivity Disorder (U.S.)	383.5	1,917.7
Schools (U.S.)	20.4	1,262.9
Crime (U.S.)	340.6	899.4
Cardiovascular Disease (U.K., U.S.)	1,220.0	1,220.0
Alzheimer's Disease (U.S.)	724.6	1,449.2
Totals	**2,694.4**	**6,754.5**

Millions of U.S. Dollars (2012)

Wolf, K.L., M.K. Measells, S.C. Grado, A.S.T. Robbins. 2015. Economic values of metro nature health benefits: A life course approach. Urban Forestry and Urban Greening.

Summary

- Urban forest/urban green heterogeneity = Metro nature
- Human health & well-being benefits
  (Research portal: Green Cities: Good Health)
- Benefits subset = substantial annual economic value
- Future needs – consistent interface of health benefit measures and nature element measures

www.naturewithin.info