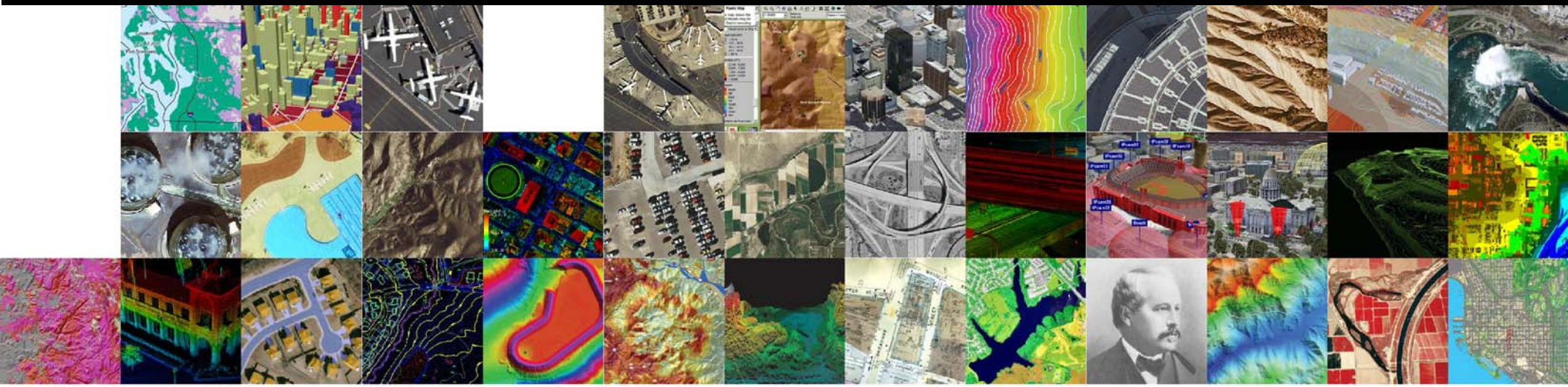
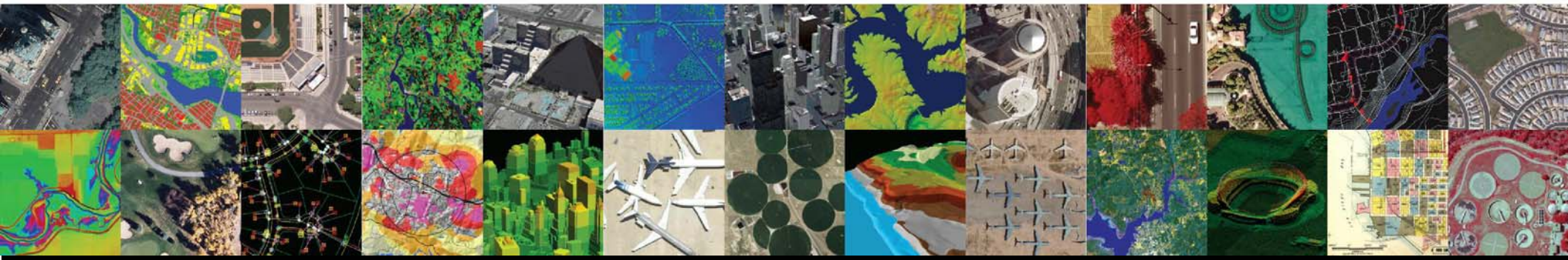


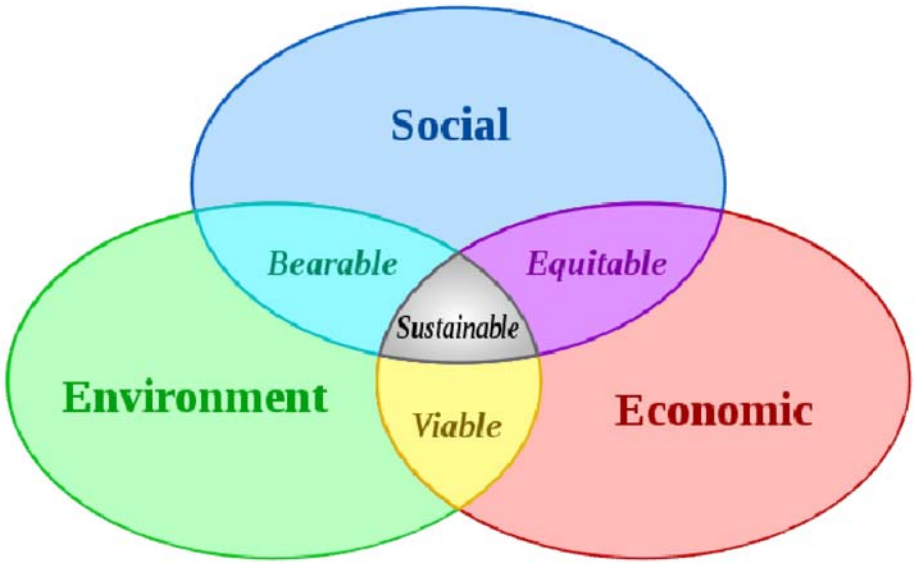


What is Urban Sustainability?

"Sustainable development is development that meets the needs of the present without compromising the ability of future generation to meet their own needs".

Brundtland Commission of the UN 3/20/87

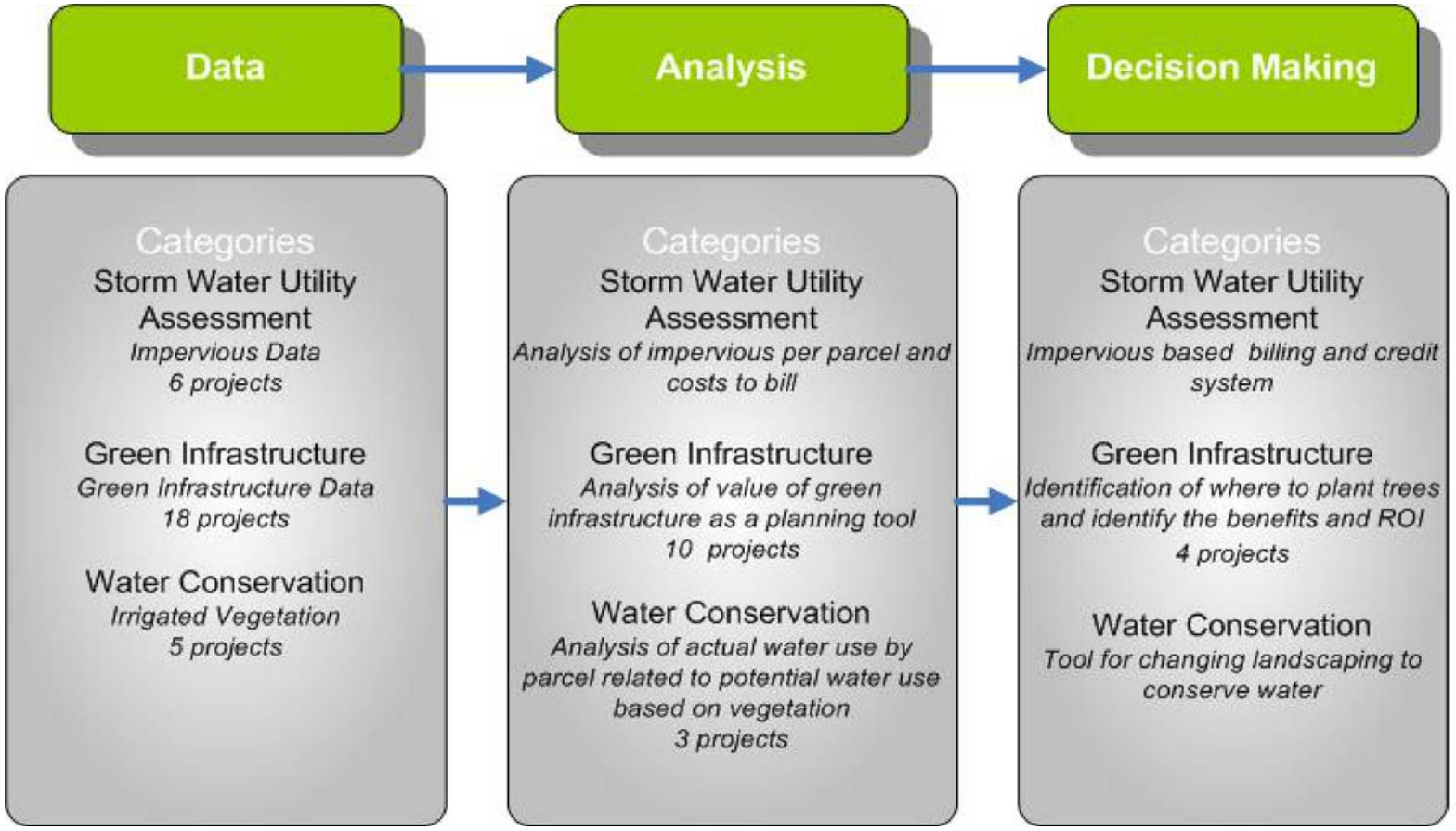
Rural sustainable development costs very little if implemented during the areas transitions from rural to suburban to urban.



Urban Sustainability

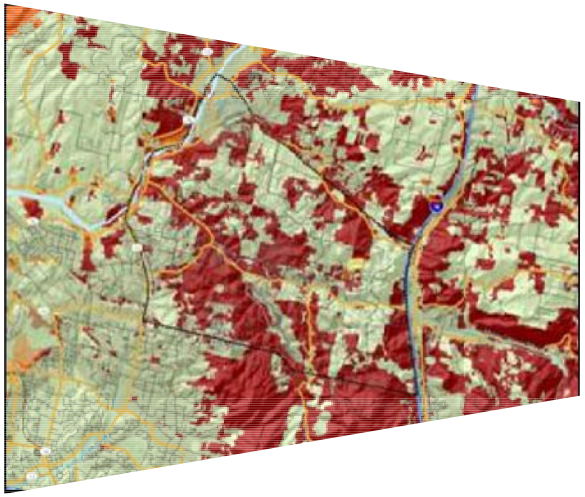
- 80% of US residents live in cities (But there are tremendous rural applications as well)
- Our program is to provide services to address *Urban Sustainability* challenges for the three elements

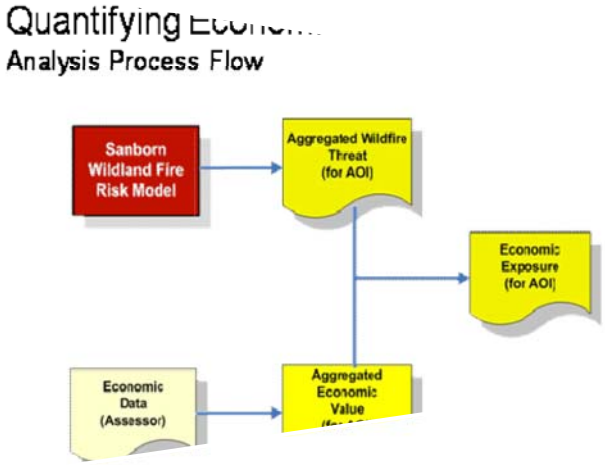
Data / Analysis / Decisions



Initial Cost of Data and Analysis → Benefits based on Economics not data

How Can Geographic Information Help Our Communities Be Sustainable?





Plan → Analyze → Implement

Landcover – Step 1

STORMWATER – WILDFIRE – CITYGREEN

NCTCOG is data rich and CiR lowers the cost of these programs.

Data: Enhanced Impervious

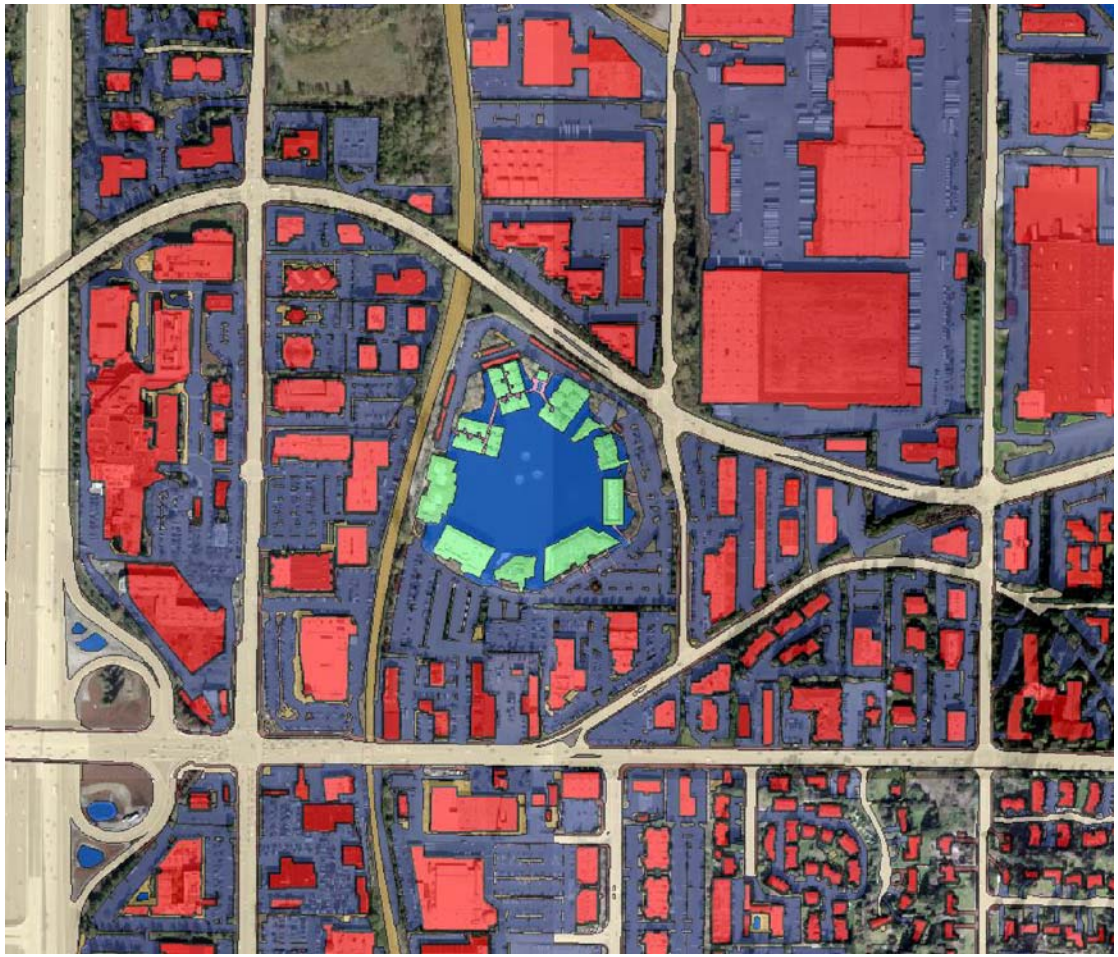
Enhanced automated impervious (1 m pixel size) over ortho imagery for State of Delaware

Datasets: Premium Impervious

Premium impervious (6” pixels) over 6” pixel resolution ortho imagery for Ann Arbor, Michigan

Datasets: Premium Vector Impervious

True color airborne imagery and heads-up digitized impervious surfaces with type for City of Bellevue, WA



Data: Enhanced Land Cover, Level 1

Enhanced Land Cover Level 1 for Prince William County, VA

Legend

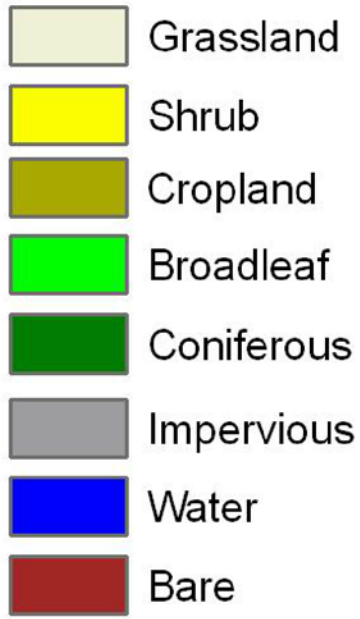
Prince William Green Infrastructure 2008

Class_Names

- Barren
- Impervious
- Non-Woody vegetation
- Water
- Woody vegetation

Data: Enhanced Land Cover, Level 2

Enhanced Land Cover Level 2
Bellevue, WA



Data: Standard Land Cover

- Bare Land
- Cultivated Crops
- Deciduous Forest
- Impervious
- Developed, Open Space
- Estuarine Emergent Wetland
- Estuarine Forested Wetland
- Estuarine Scrub/Shrub Wetland
- Evergreen Forest
- Grassland/Herbaceous
- Mixed Forest
- Open Water
- Palustrine Emergent Wetland
- Palustrine Forested Wetland
- Palustrine Scrub/Shrub Wetland
- Pasture/Hay
- Scrub/Shrub
- Unclassified
- Unconsolidated Shore

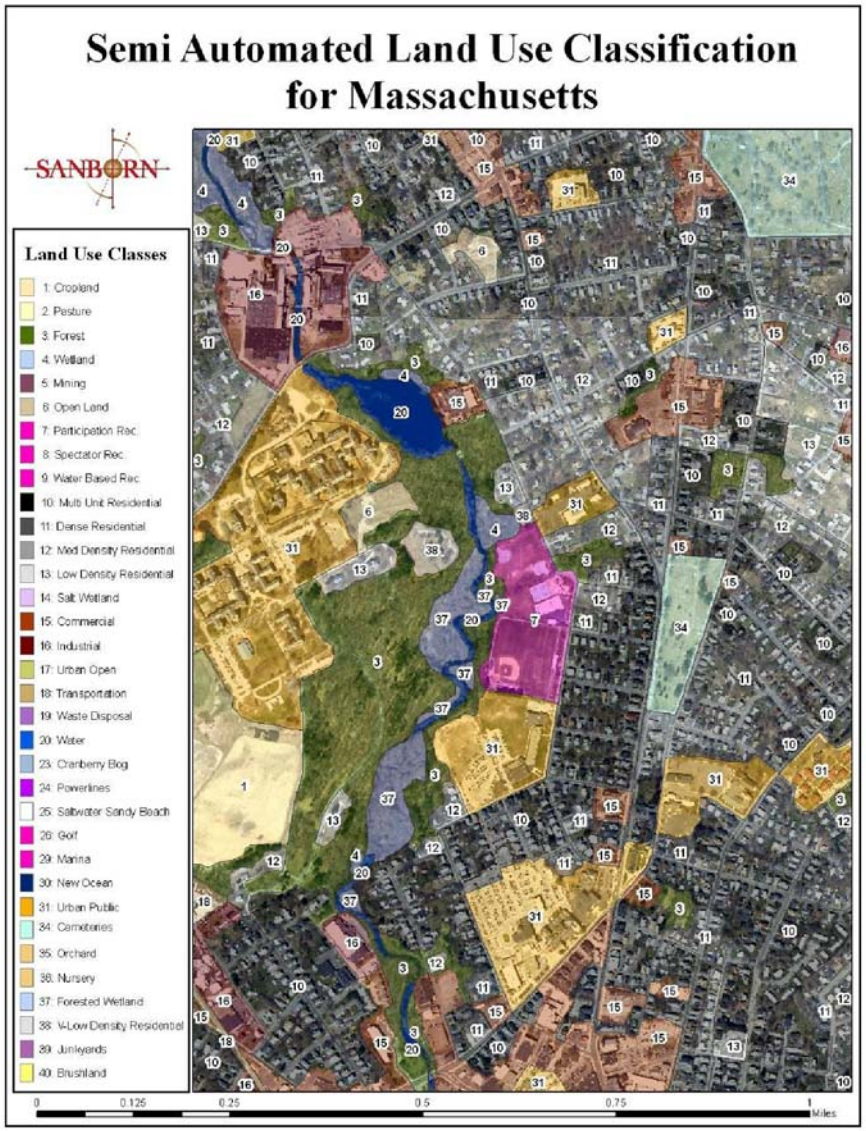
Standard land cover using 2.4 m, 4 band multi-spectral imagery Island of Oahu, Hawaii

Data: Land Use

Ortho use recommended only as a visual check.

Use your GIS to create this!

- **ADParcels**
- **Link database**



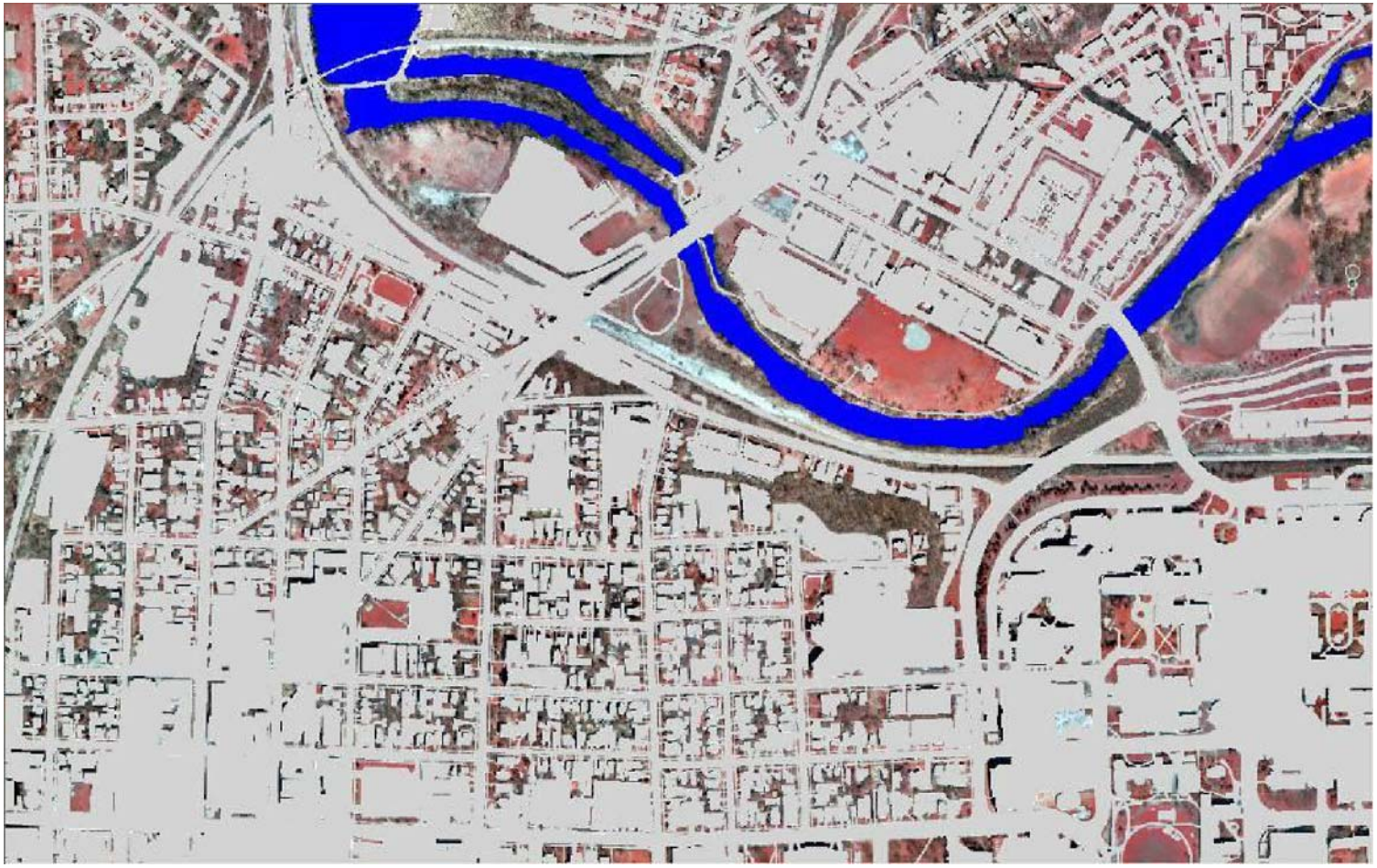
STORMWATER

REVENUE–COMPLIANCE-FLOW-REDUCTION

Analysis / Decisions: Storm Water Utilities

- The storm water system needs to be maintained and expanded for most municipalities
- This cost is significant and ongoing
- Traditionally these costs are built into the water utility rates, general fund costs or taxes
- Rates are generally assessed by type of property and size of property
- These are generally indirectly related to use of storm water infrastructure
- Storm Water runoff has a direct correlation to flooding – especially flash flooding!

Impervious: City of Ann Arbor



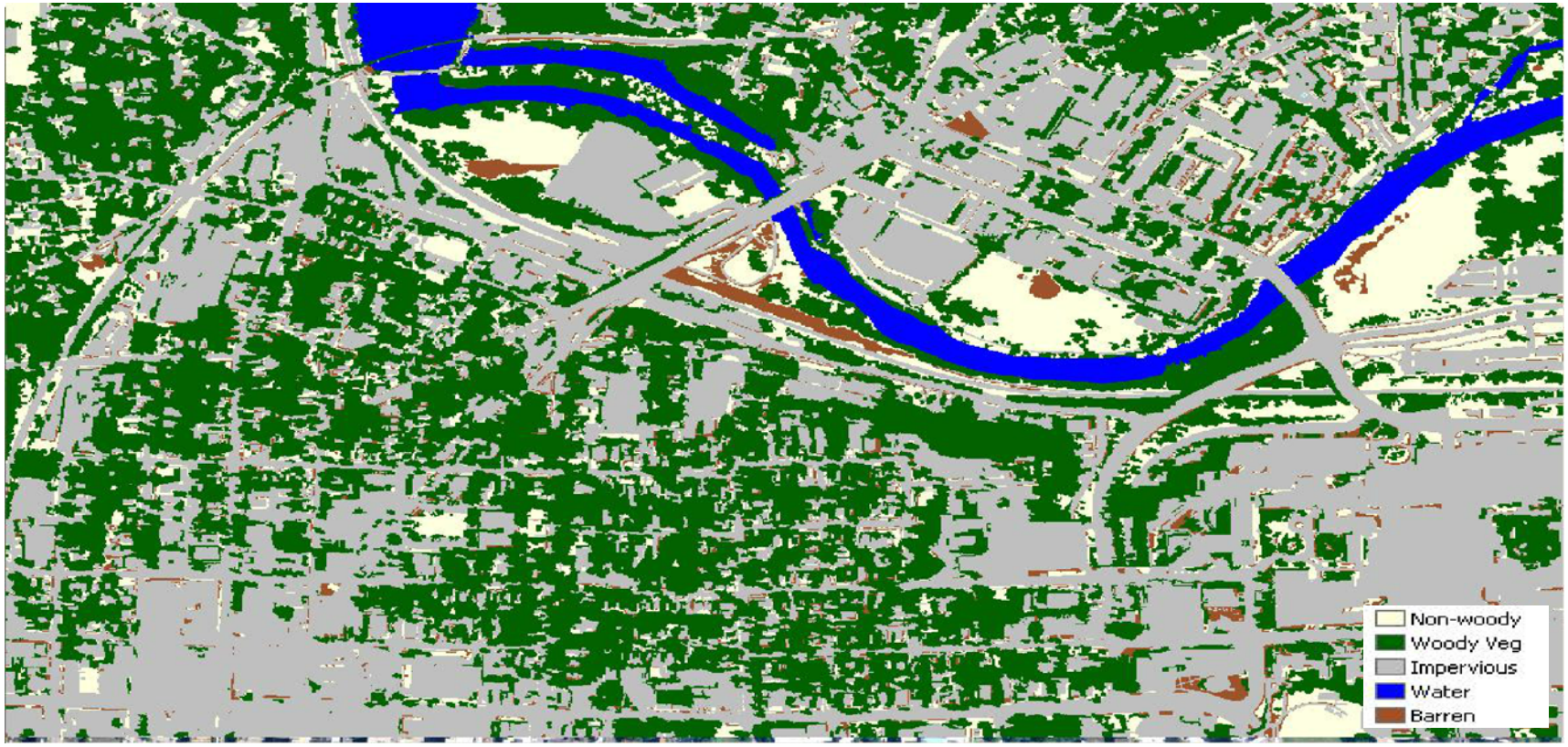
Legend
Grey – Impervious
Blue – Water
Transparent - Pervious

Plan: Gray and Green Infrastructure

- Gray infrastructure – bldgs, roads, etc. is well understood, invested in and maintained
- Green infrastructure – trees and grass is taken for granted until it is lost

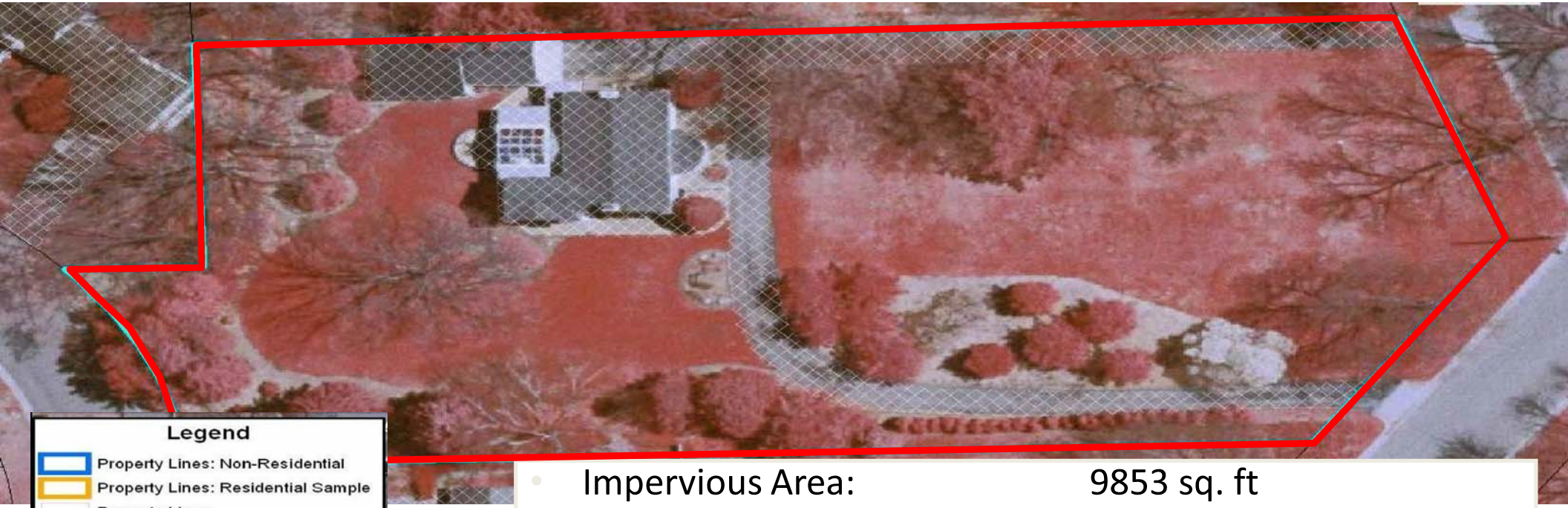
Plan: Gray and Green Infrastructure

City of Ann Arbor



Analyze: Stormwater Utilities

Cost Distributed by Parcel Based on Impervious



- Impervious Area: 9853 sq. ft
- Parcel Size: 51820 sq. ft.
- Current Rate Structure: $ 22.75 / quarter
- User Fee Based on Impervious: $ 58.72 / quarter

Non-Residential Institution

House of Worship

- Parcel Size:
  80,882 sq. ft.
- Impervious Area:
  21,119 sq. ft
- Current Rate Structure:
  $179 / quarter
- User Fee based on Impervious:
  $128 / quarter

Implement: Stormwater Utilities

Credit Program

	Quarterly Fee
Average Fee for Residential	$25.84
Proposed Maximum Credits	
Rain Barrels (1 to 5)	$1.47
Rain Garden	$2.30
RiverSafe Home	$1.02
Chapter 63 Detention Basin	$5.87
Fee With Maximum Credit	$15.18
10 % Deduction for On-Time Payment	$1.52
Minimum Charge	$13.66
Maximum Percent Reduction	47%

CITY GREEN

HEAT ISLAND – URBAN FORESTRY – STORMWATER REDUCTION – APPRAISED VALUES

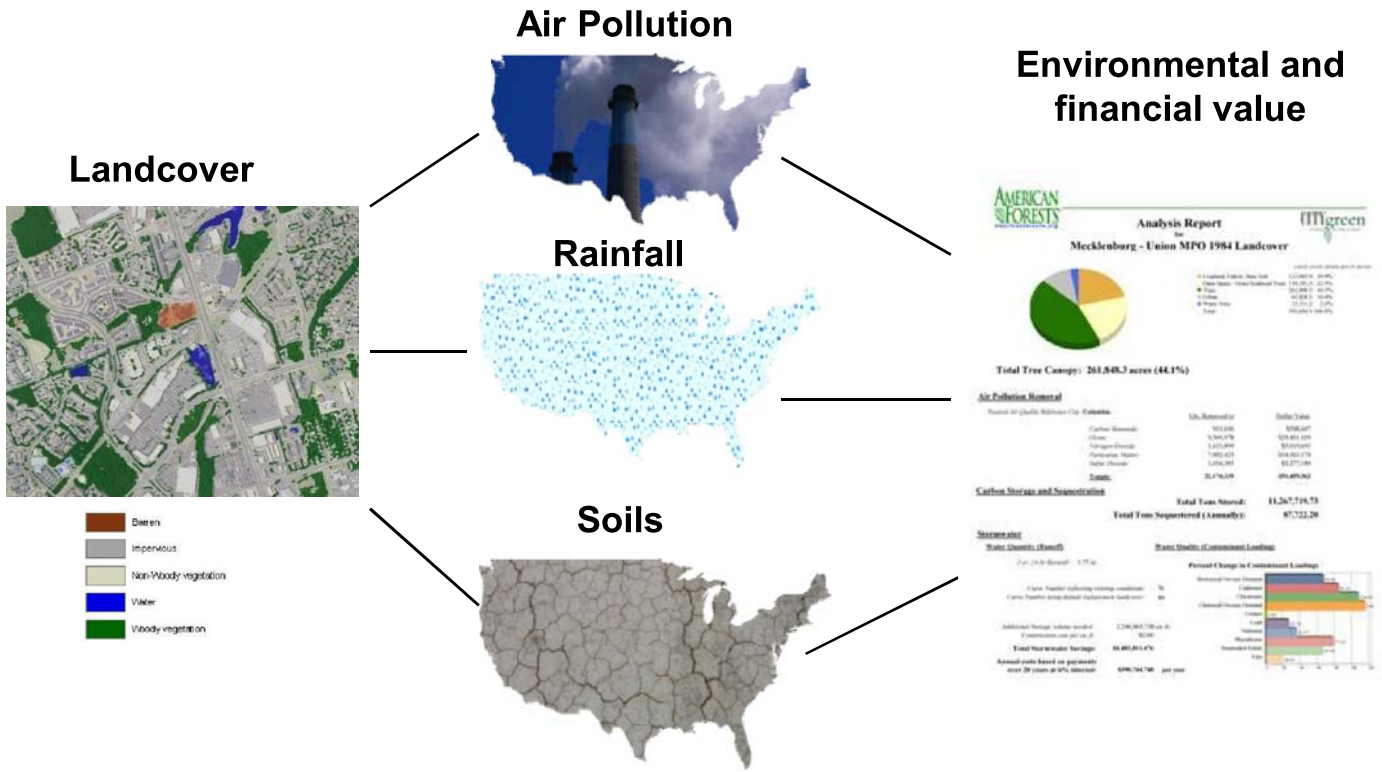
Information / Decisions: City Green

Urban Ecosystem Analysis

Identifies

- **Heat Islands**
- **Water Conservation through vegetation**
- **Areas for tree planting**

Land Structure + Ecological Analysis Model = Decision Support Material



Assessment of Impervious

Most Impervious

ARC Community	Non-Woody Vegetation	Woody Vegetation	Impervious	Water	Barren	Total
Oak Park	16.0%	5.7%	78.3%	0.0%	0.0%	100.0%
Allen Park	25.0%	9.3%	57.7%	2.3%	5.7%	100.0%
Highland Park	29.7%	12.4%	57.3%	0.0%	0.5%	100.0%
Dearborn	26.0%	15.7%	55.1%	1.1%	2.1%	100.0%
Melvindale	29.3%	10.6%	54.7%	1.2%	4.3%	100.0%

Least Impervious

Van Buren Twp.	49.0%	26.6%	19.2%	1.4%	3.8%	100.0%
Novi Twp.	27.8%	52.1%	18.6%	1.5%	0.0%	100.0%
Superior Twp.	61.0%	29.4%	7.3%	1.2%	1.0%	100.0%
Salem Twp.	55.1%	34.1%	6.4%	1.3%	3.2%	100.0%
Lyon Twp.	74.1%	19.8%	4.0%	0.7%	1.4%	100.0%

Average Community Impervious – 37.6%

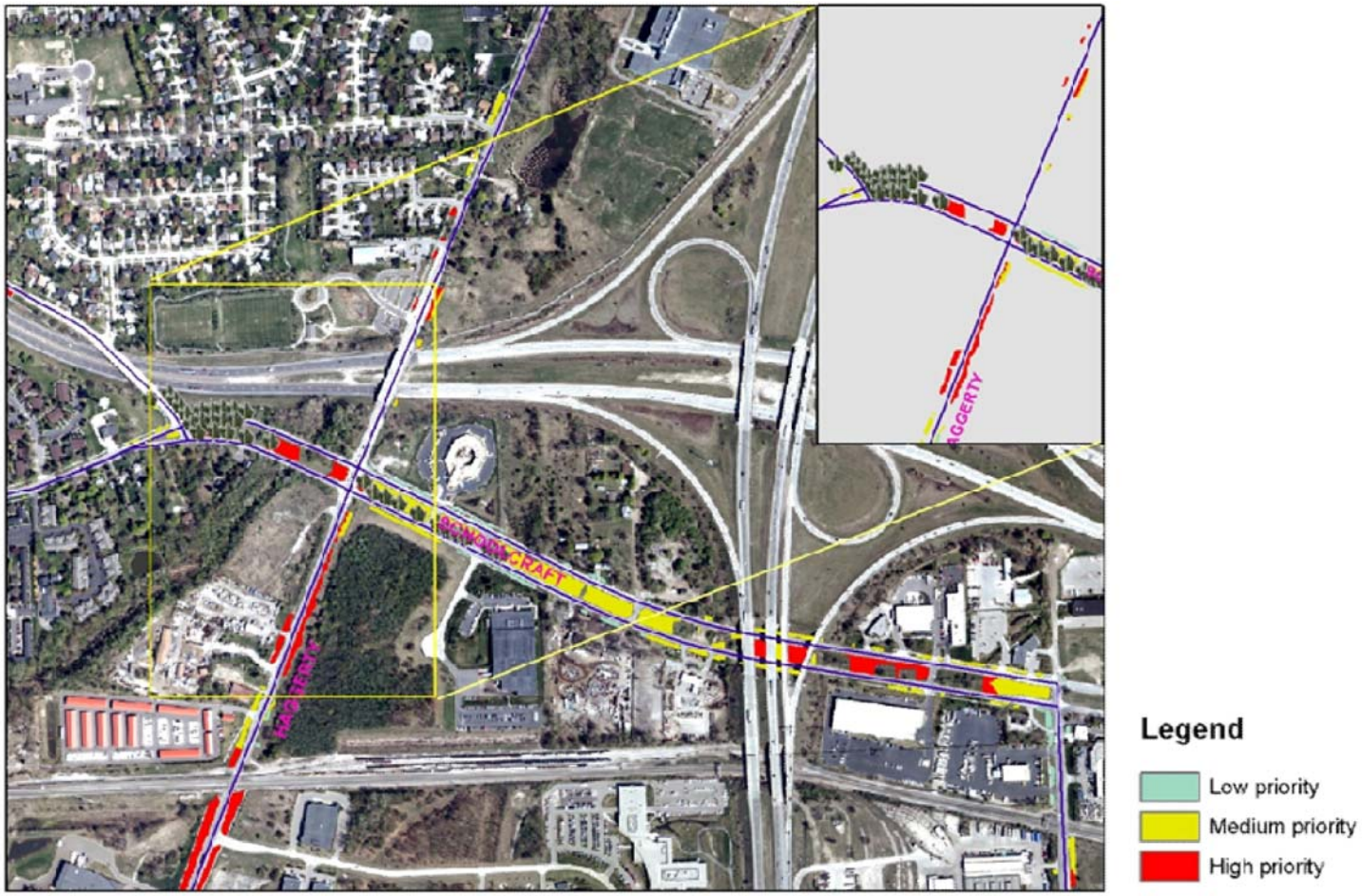
Communities in Rouge River Watershed < 10% Impervious = 3

Communities in Rouge River Watershed < 25% Impervious = 6

Policy Options

- Tree ordinances
- Tree cover written into development plans
- Set tree canopy goals
- Costs of storm water mitigation passed onto developers
- Ability to estimate costs from tree canopy loss from natural disasters or disease for insurers and federal government
- Cost - benefit data to promote tree planting and preservation of open space
- Public education for the value of trees/open space
  - IT”S NOT JUST ABOUT TREES
  - GRASS and low vegetation are just as important.

Map of Tree Plantings



Tree Planting Summary

ROW Plantings

Priority Class	Area (sq feet)	Area (acres)	# trees (240 sq feet per tree)
1	304,904	7.00	1,270
2	1,731,080	39.74	7,212
3	2,078,695	47.72	8,661
Total	**4,114,679**	**94**	**17,143**

Public Land Plantings

Priority Class	Area (sq feet)	Area (acres)	# trees (1600 sq feet per tree)
1	1442	0.03	1
2	188197	4.32	118
3	292908	6.72	183
Total	**482547**	**11**	**302**

PRIVATE PLANTINGS

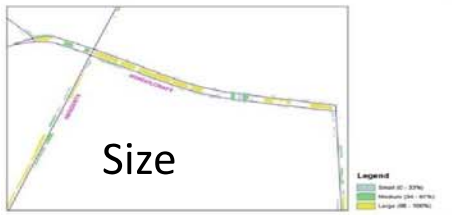
This can also be used as a guide to identify areas for private land plantings!

Analyze: Green Infrastructure

Tree Planting: Criteria for Planting

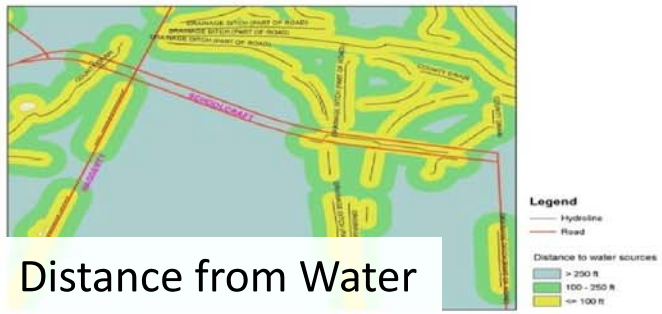
- Exclusion
- I

Areas Suitable for Planting



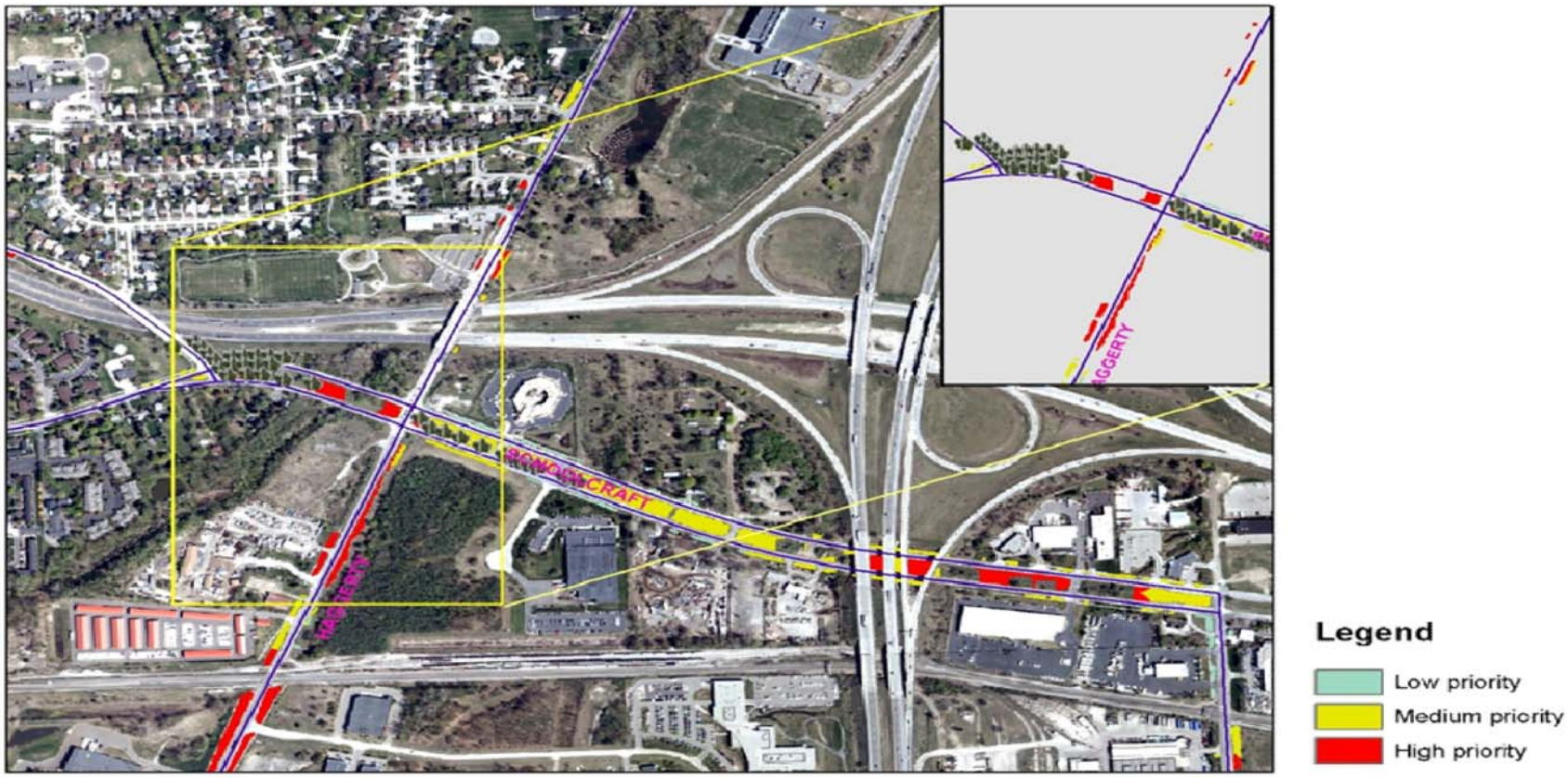
Size

Disease Replacement



Distance from Water

Implement: Green Infrastructure- Tree Planting



Summary

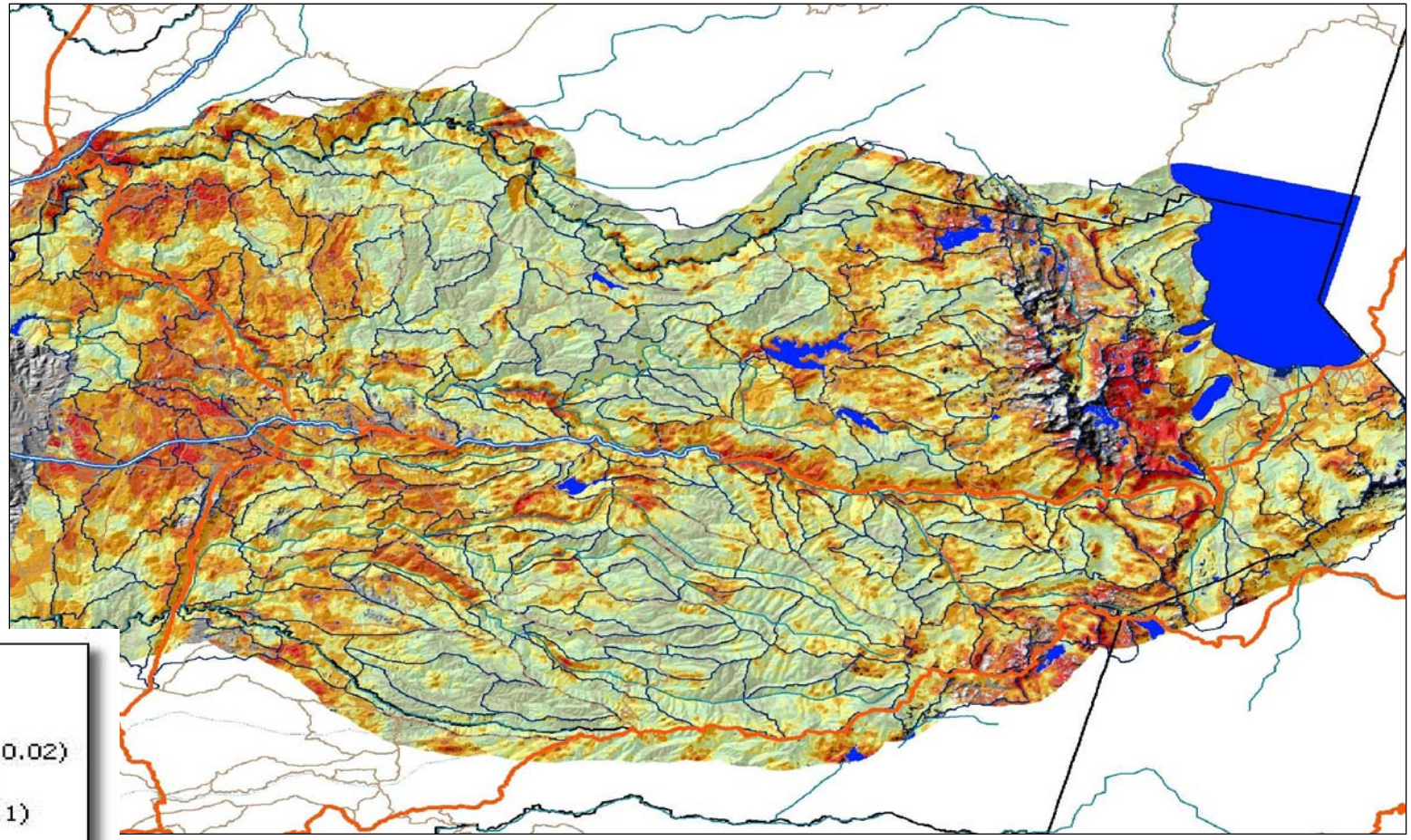
- There is a need to make sustainable decisions for our cities and towns
- To do this we need to understand and link together economics, environment and society benefits of decisions
- Sanborn's data products support the analysis that will lead to the making of sustainable decisions
- Products are easily updated and provide a good indication of how effective decisions are to urban sustainability

WILDFIRE

MITIGATION – INSURANCE – CWPP

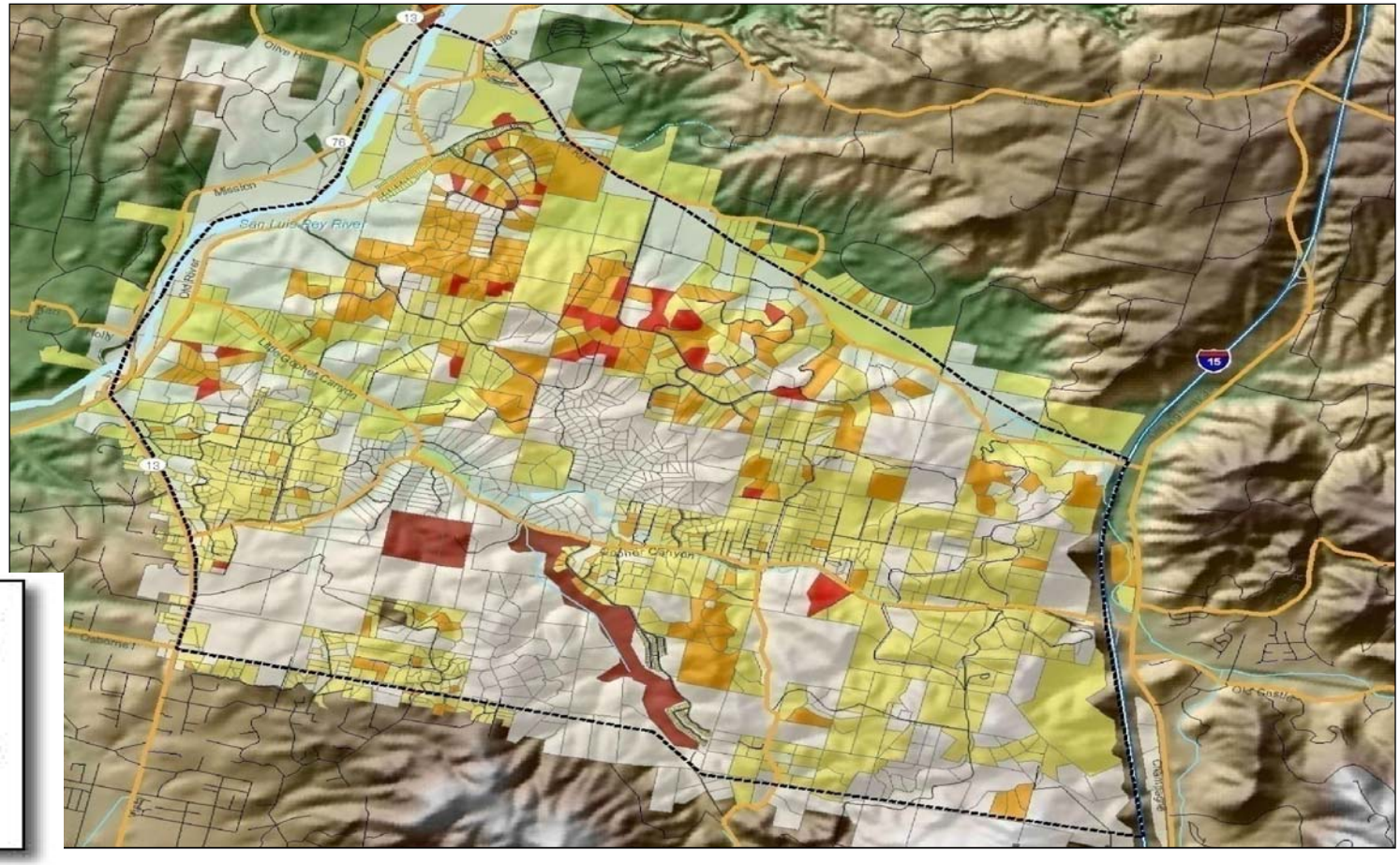
Plan: Wildfire Threat

- Wildfire threat based with watershed boundaries



Analyze: Wildfire -Quantifying Impacts

- Use the assessor data to define the Assessed $ Value per parcel
- Impacts on life and property



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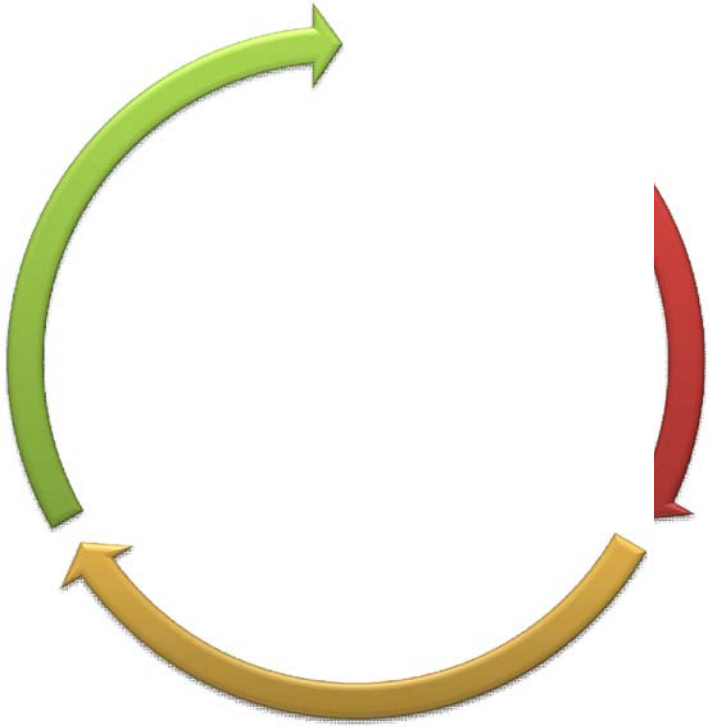
Implement: Wildfire

Where To Spend Money

- Supports decision making
  - Where to get the best return on investment
  - $ spent to $ reduction of exposure
- Extendable to also accommodate economic exposure for:
  - Damage to critical infrastructure
  - Loss in commodity agriculture
- *Wildfire Dollar Exposure* provides a relative measure for comparing impacts and mitigation options across a landscape
- **Community Wildfire Protection Plans – They Work!!!!!!**

Urban Sustainability Goals

1. Reduces peak flows
2. Reduces air and water pollution
3. Carbon fixation & sequestration
4. Reduces flooding frequency
5. Reduces Heat Island effects
6. Financial incentives for landowner actions
7. Compliance with regulations
8. QUALITY OF LIFE
9. Health & Recreational Benefits



GENERATES REVENUE

- City Green
- Stormwater Fees
- Landscaping raises the value a property by 10%. (Imagine the increased value to a City)
- Wildfire Reduction (Insurance Break for Residents)

- This is about making and saving $$$$$$$$$$$$

Using Your GIS Locally for Urban Sustainability

DATA	ANALYSIS	DECISION MAKING
We are data rich in the GIS community!	Wide variety of programs & consultants. Leverage your data and GIS!	End solution should be based on a cost-benefit resulting in a positive economic impact!

- Understand & link economics, environment and society benefits of decisions!

How Sustainable Is Your Urban Area?

Thanks --- Hugh Bender --- hbender@sanborn.com --- 512.569.1084 c