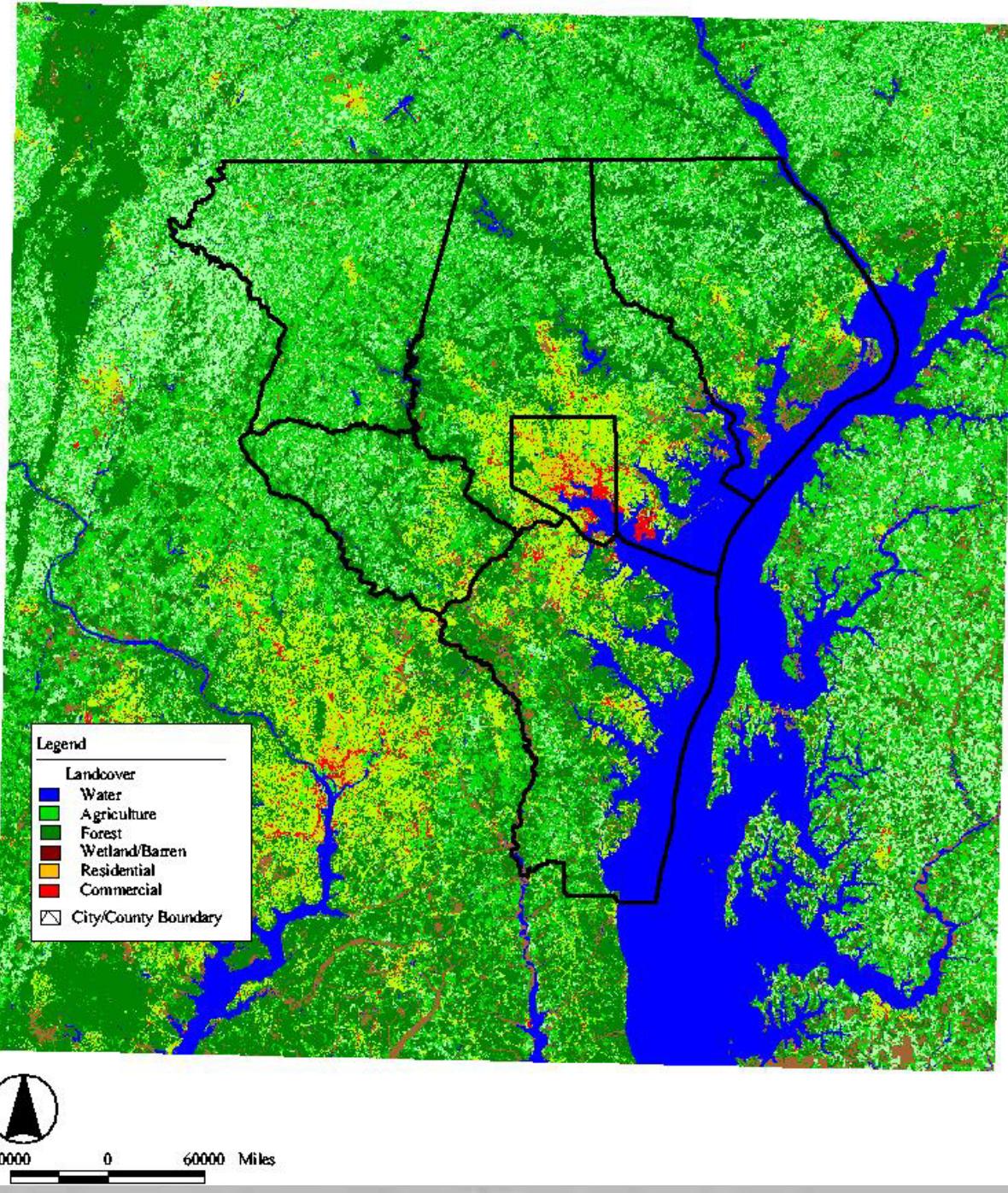


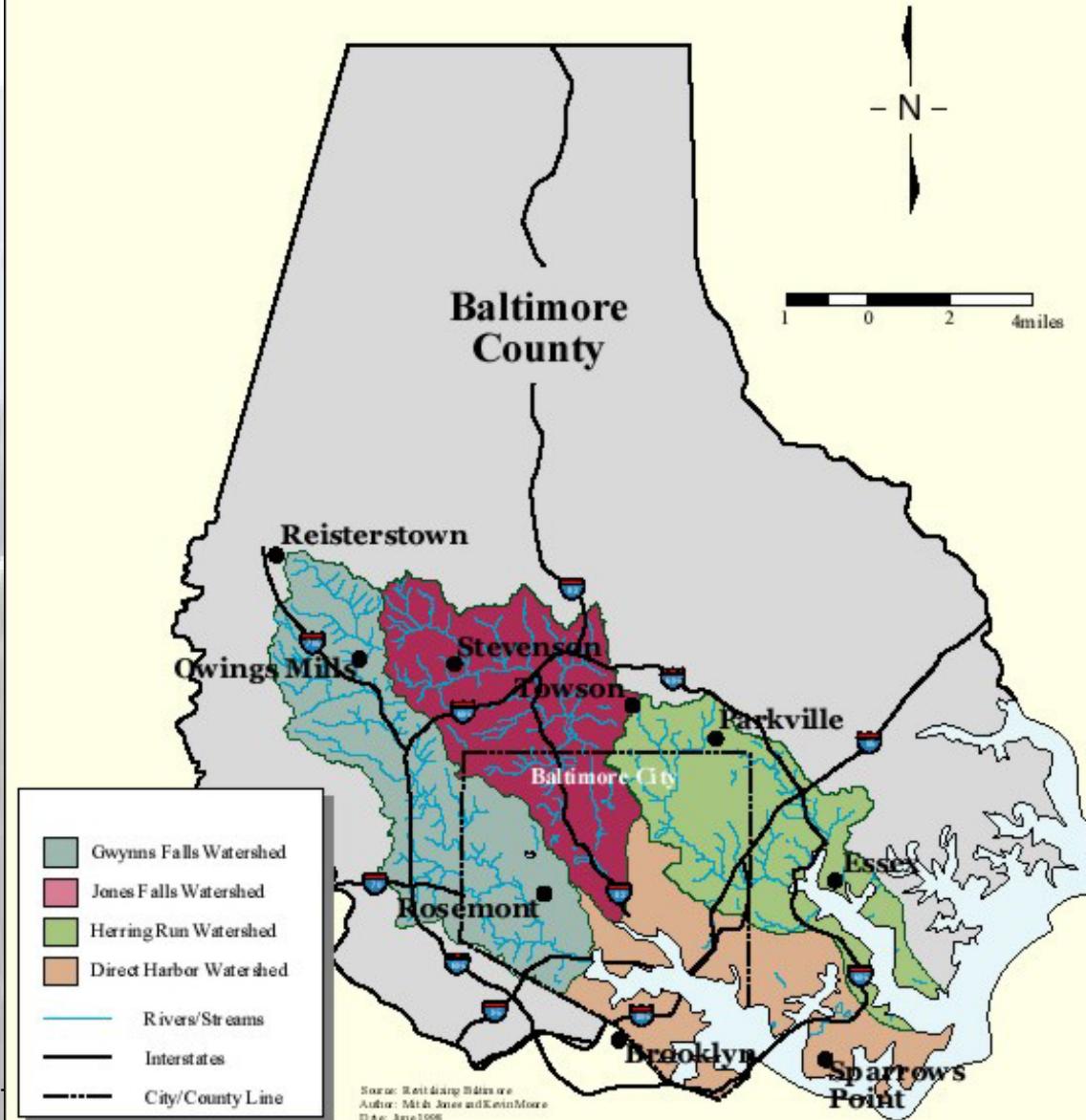
# Understanding and Adaptive Management in Urban Ecosystems

Steward T.A. Pickett  
Baltimore Ecosystem Study LTER  
Institute of Ecosystem Studies





## The Four Watersheds of Baltimore City



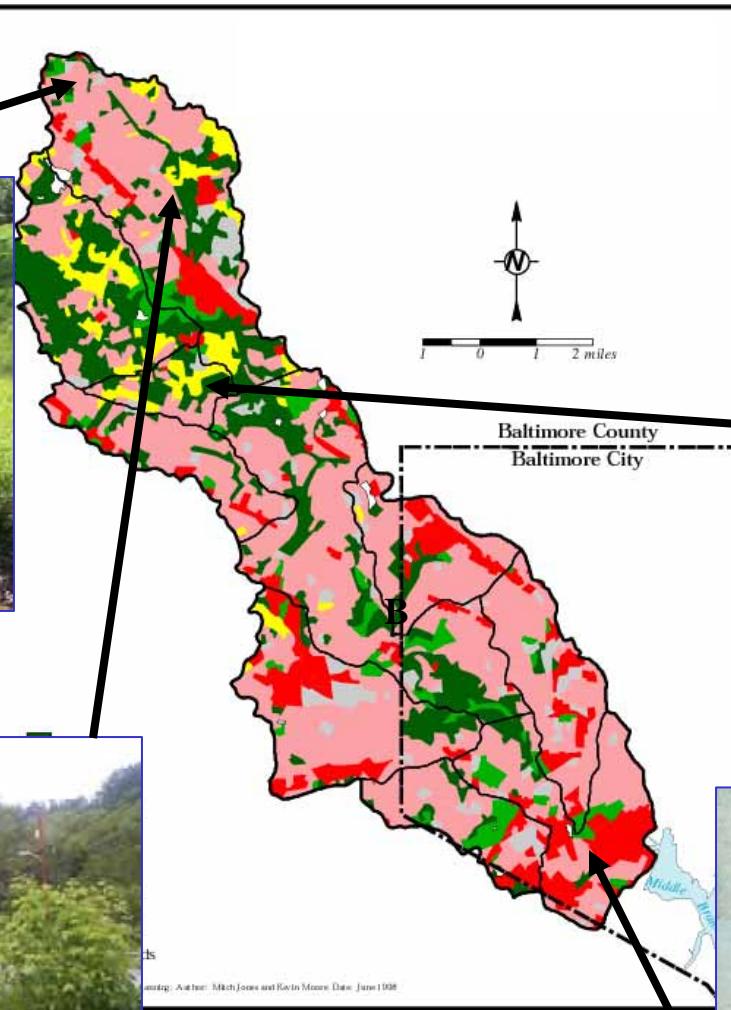
# Stream Flow Gaging Sites



Small Watershed (Suburban)



Subwatershed (Suburban)



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Forest Control



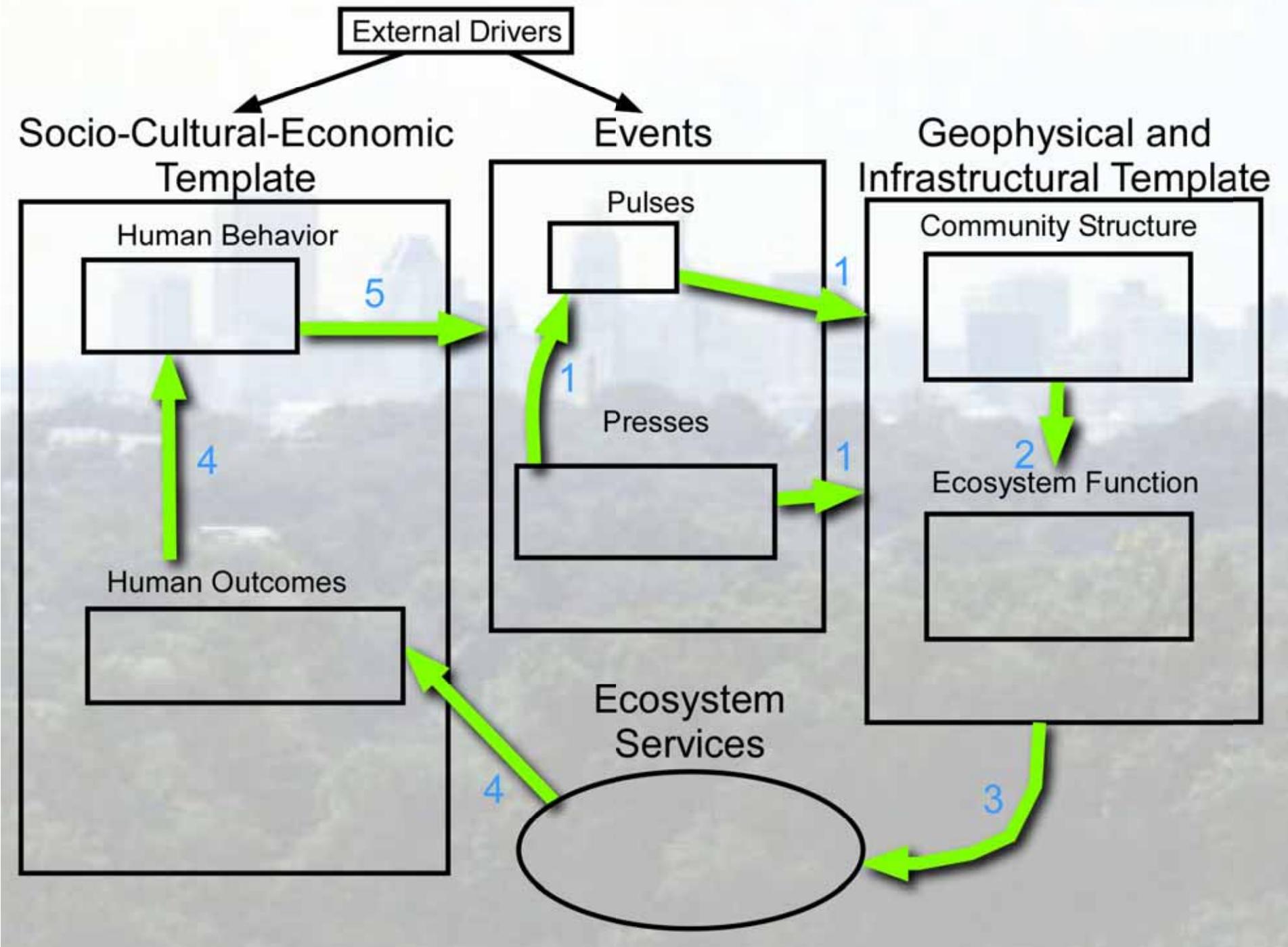
Small Watershed (Agric)

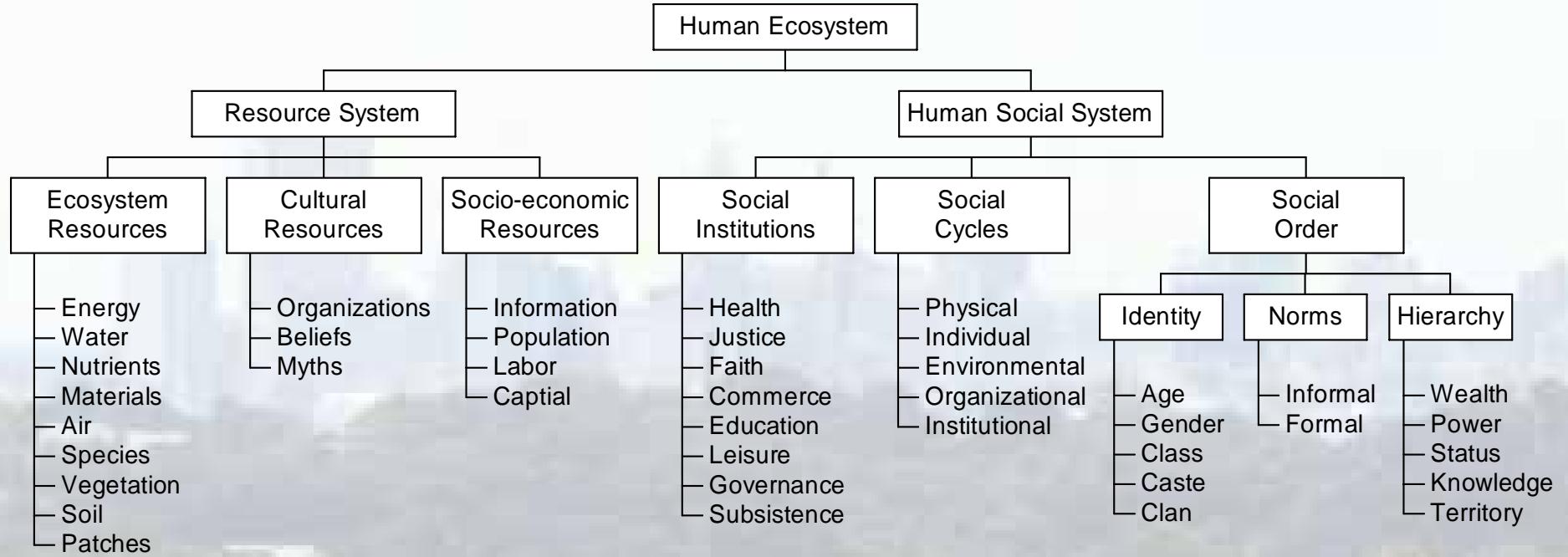


Gwynns Falls (Urban)

Rognel Heights neighborhood and stream gauge location







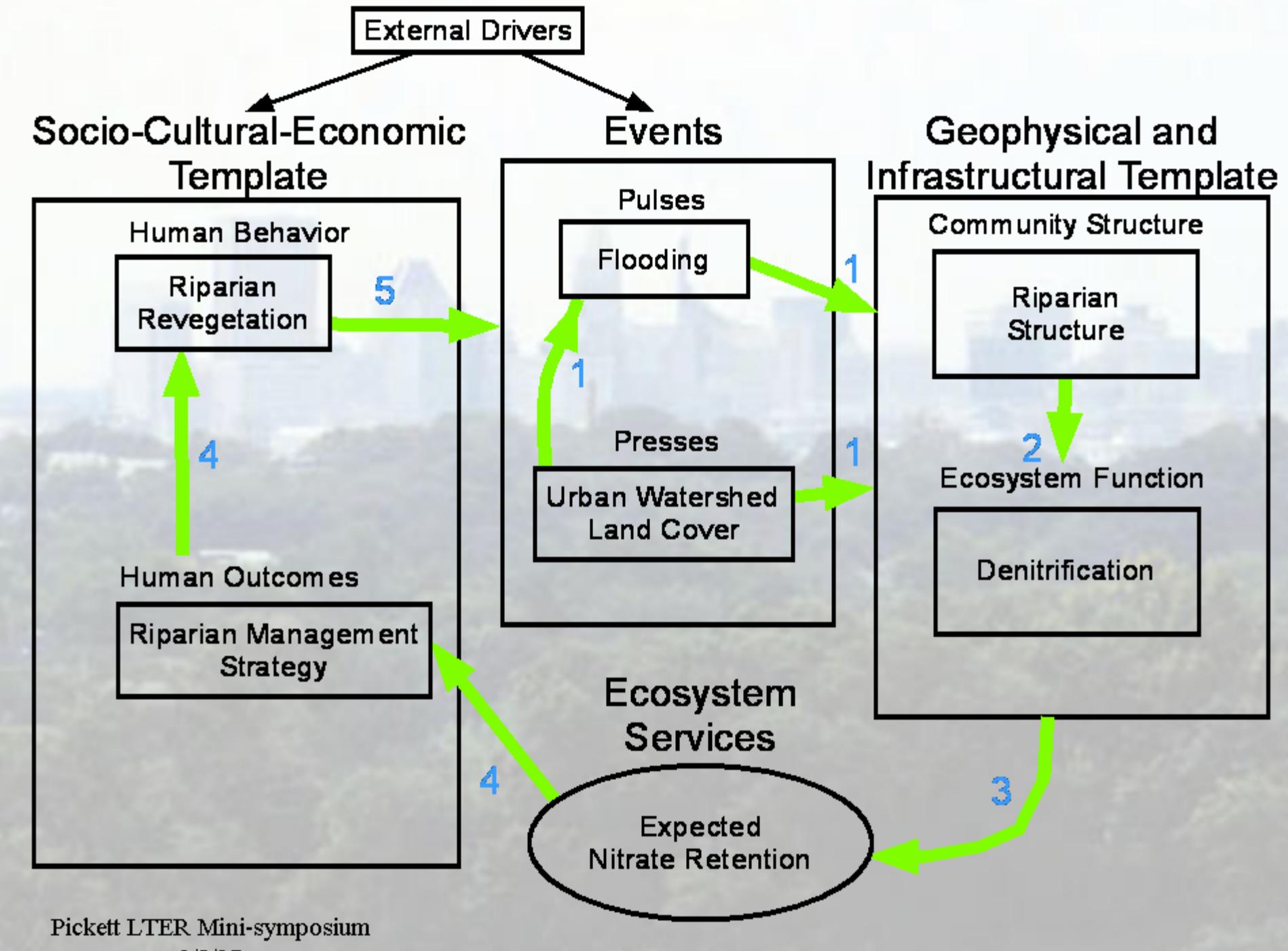


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[earthobservatory.nasa.gov/Study/ChesapeakeBay](http://earthobservatory.nasa.gov/Study/ChesapeakeBay)



# Riparian disconnection 1

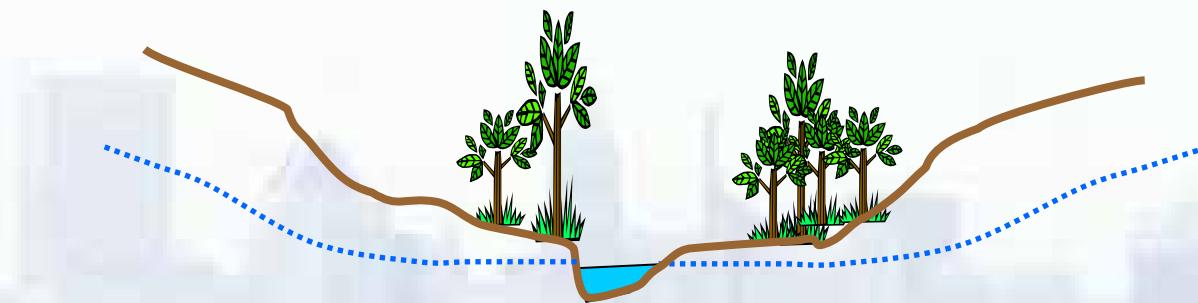


- Urban stream incision

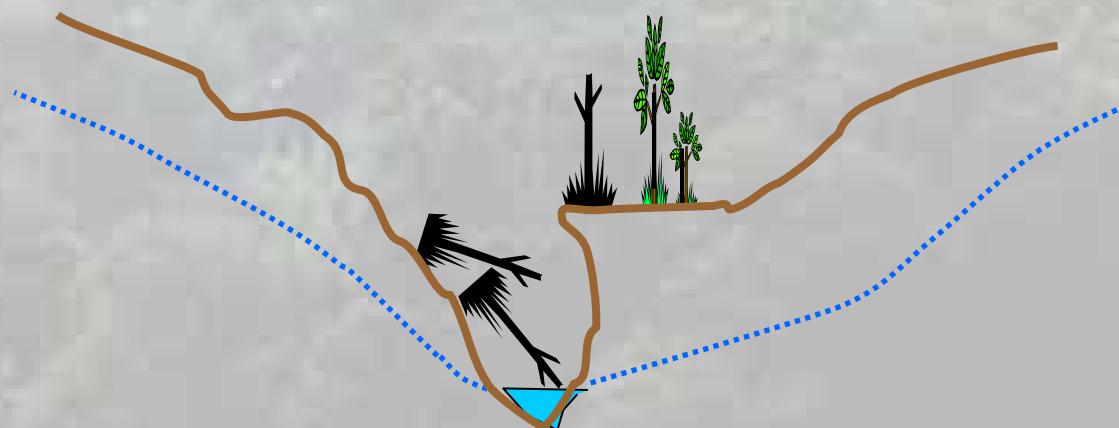


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A. Natural Channel



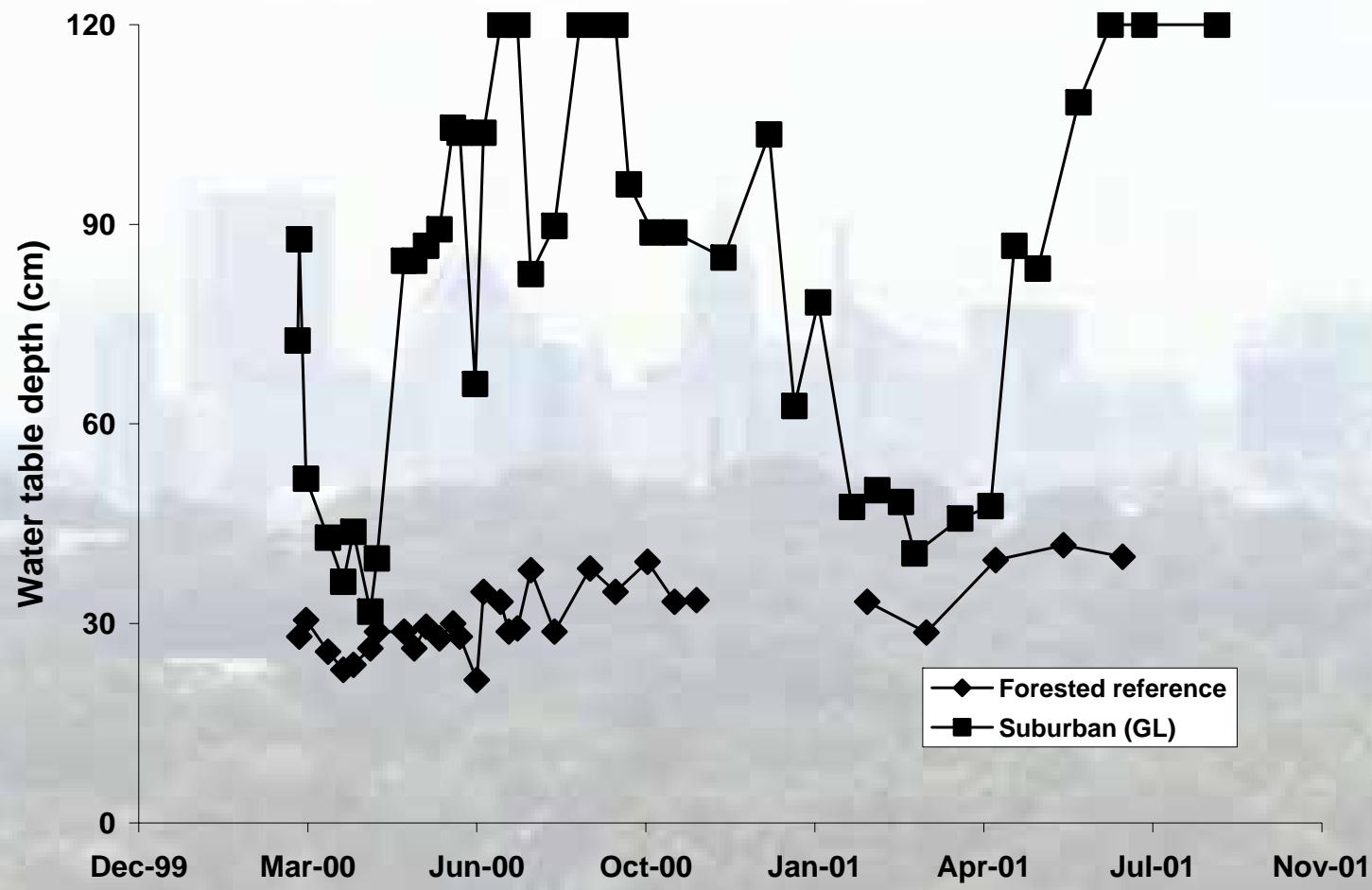
B. Incised Channel Due to  
Increased Runoff



# Riparian disconnection 2



- Water table depth



# Riparian disconnection 3

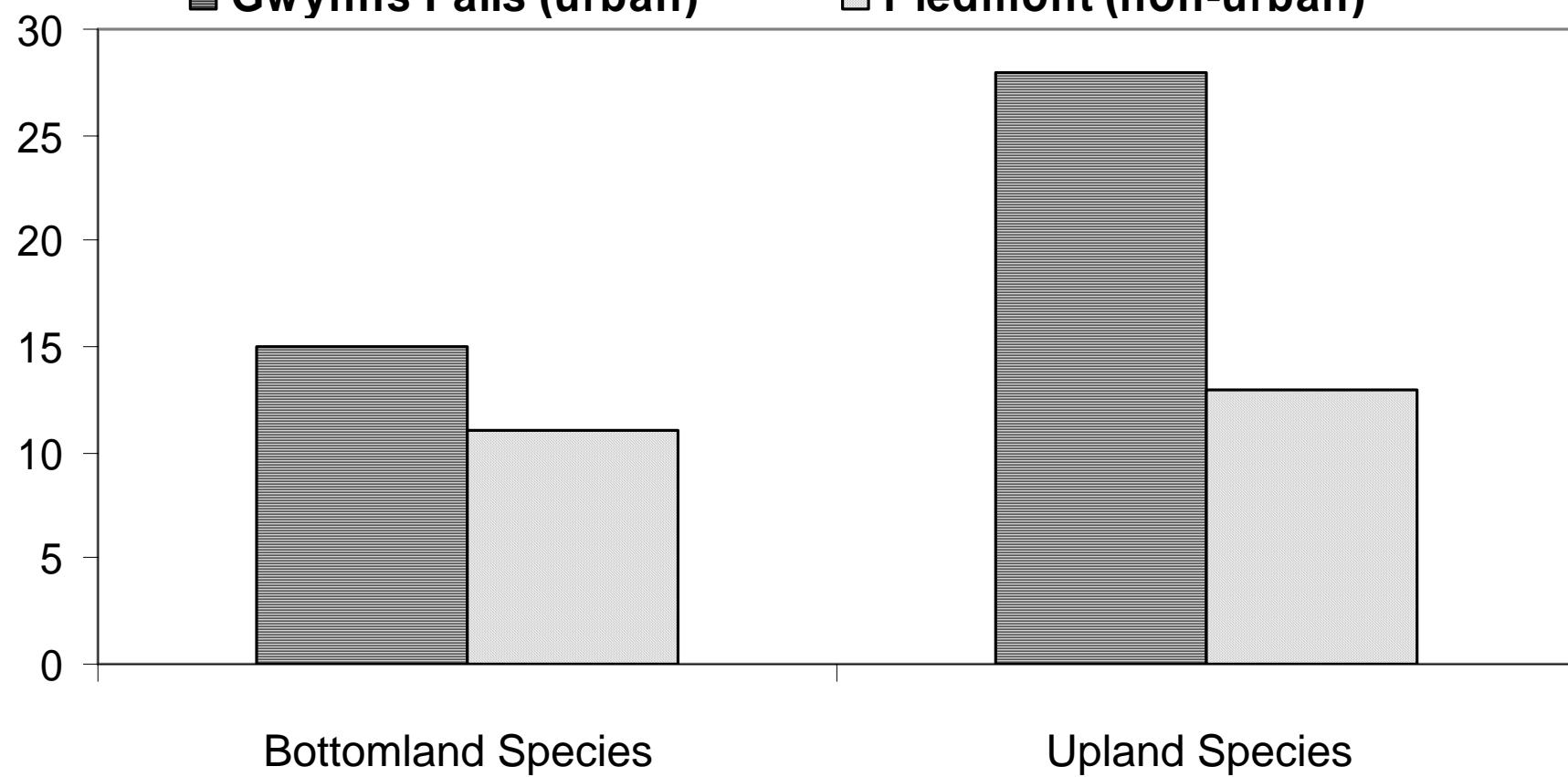


- Tree composition

## Number of tree species in riparian habitats

■ Gwynns Falls (urban)

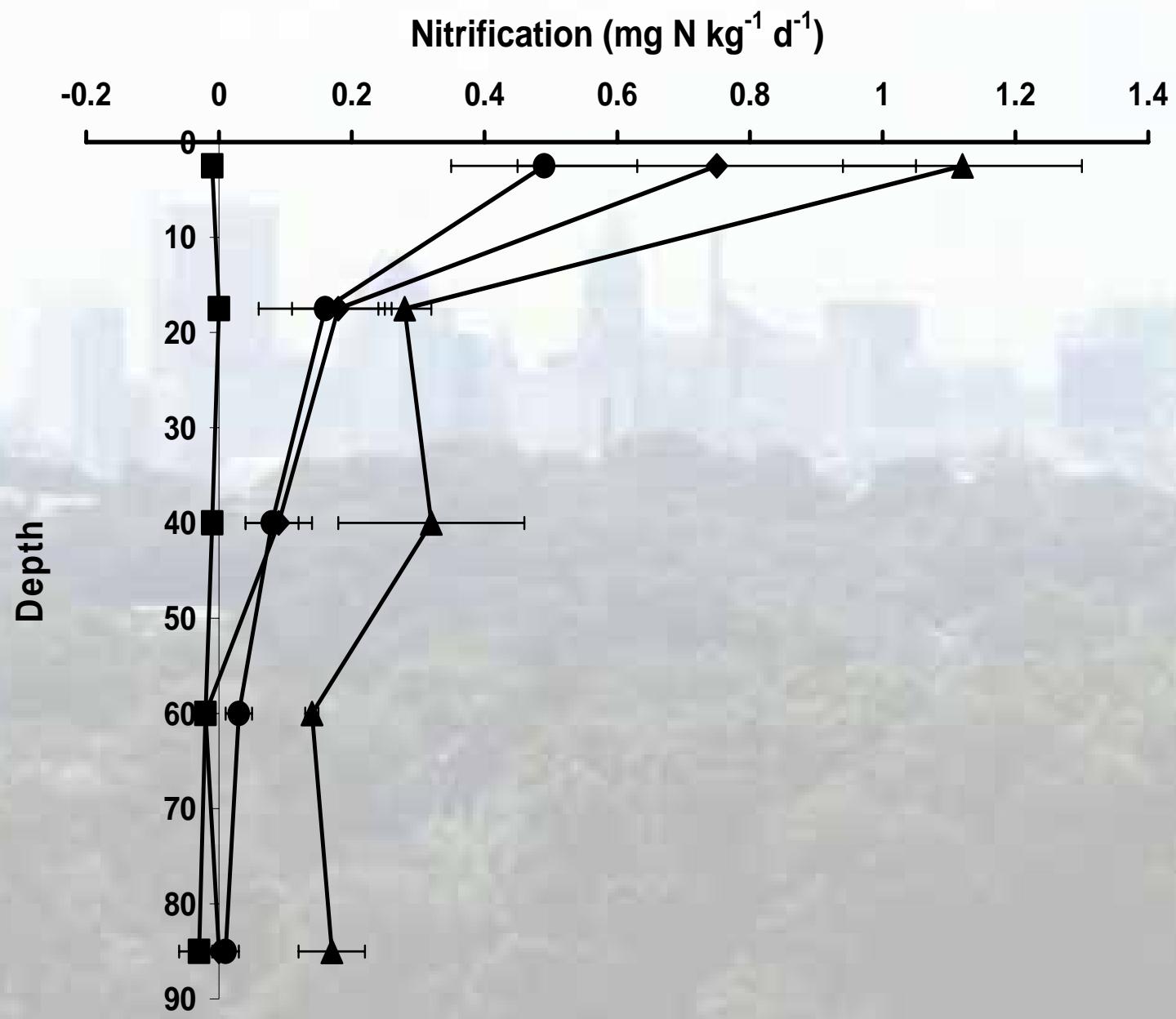
□ Piedmont (non-urban)



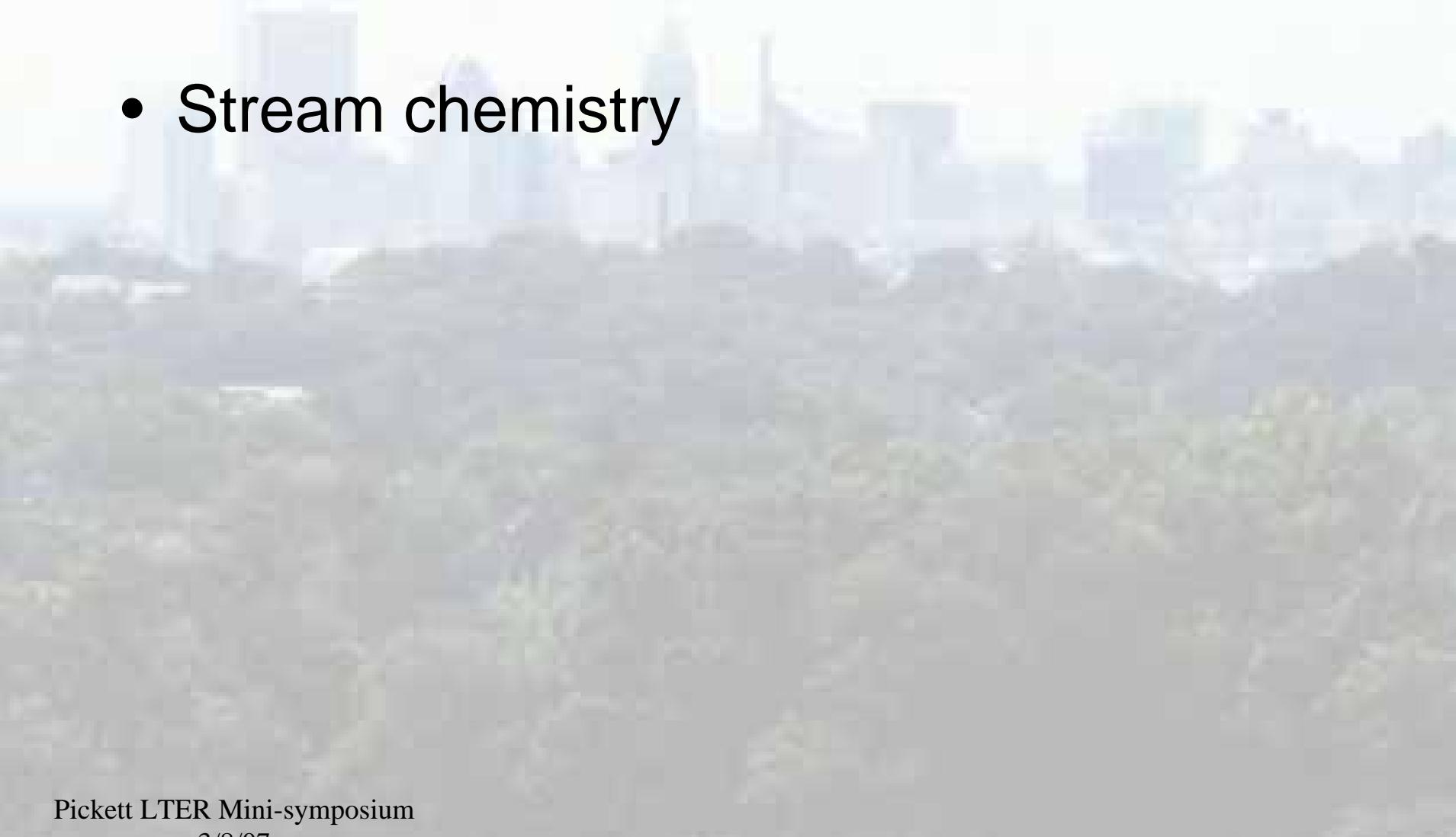
G.S. Brush

# Riparian disconnection 4

- Denitrification

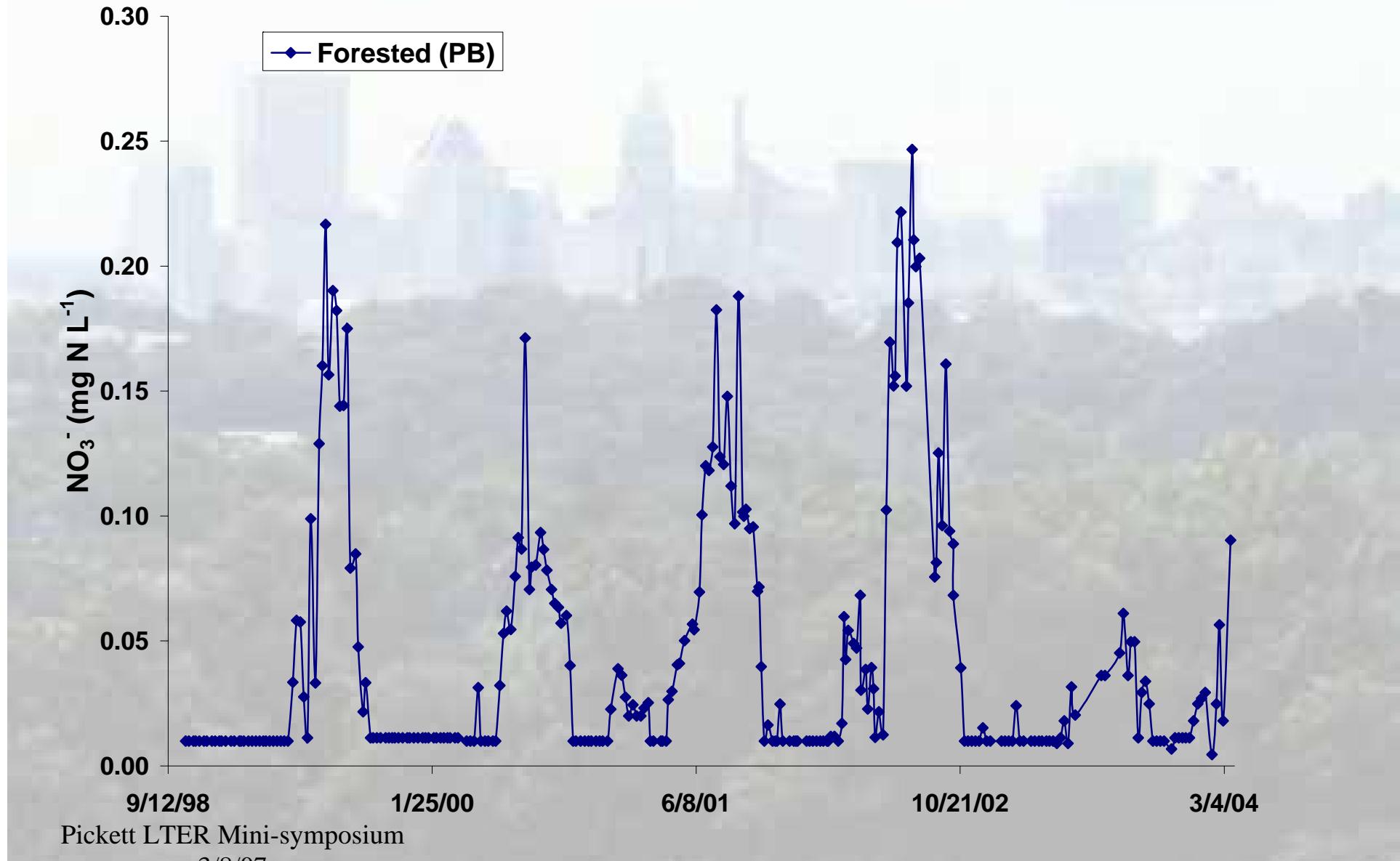


# Ecosystem services

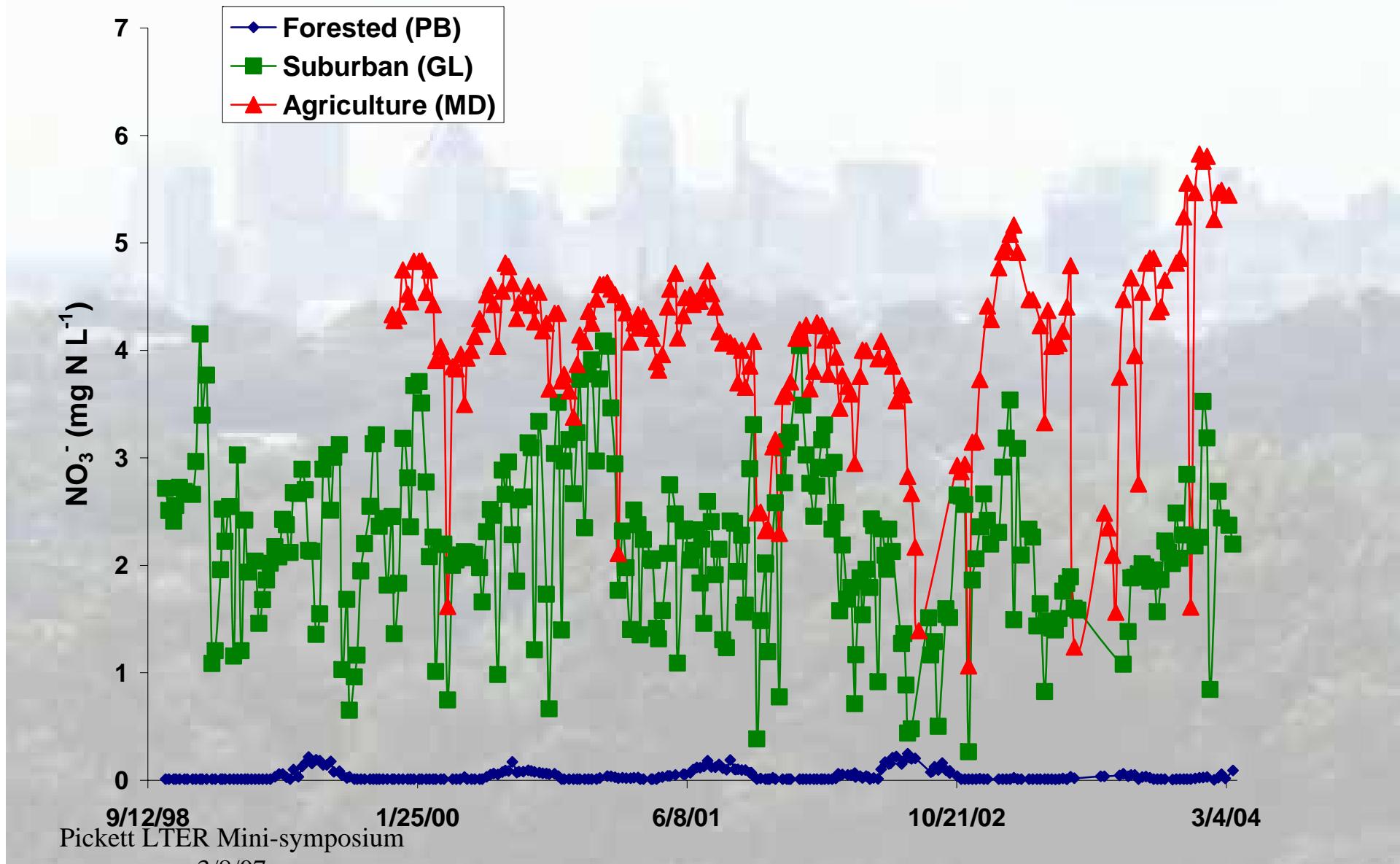


- Stream chemistry

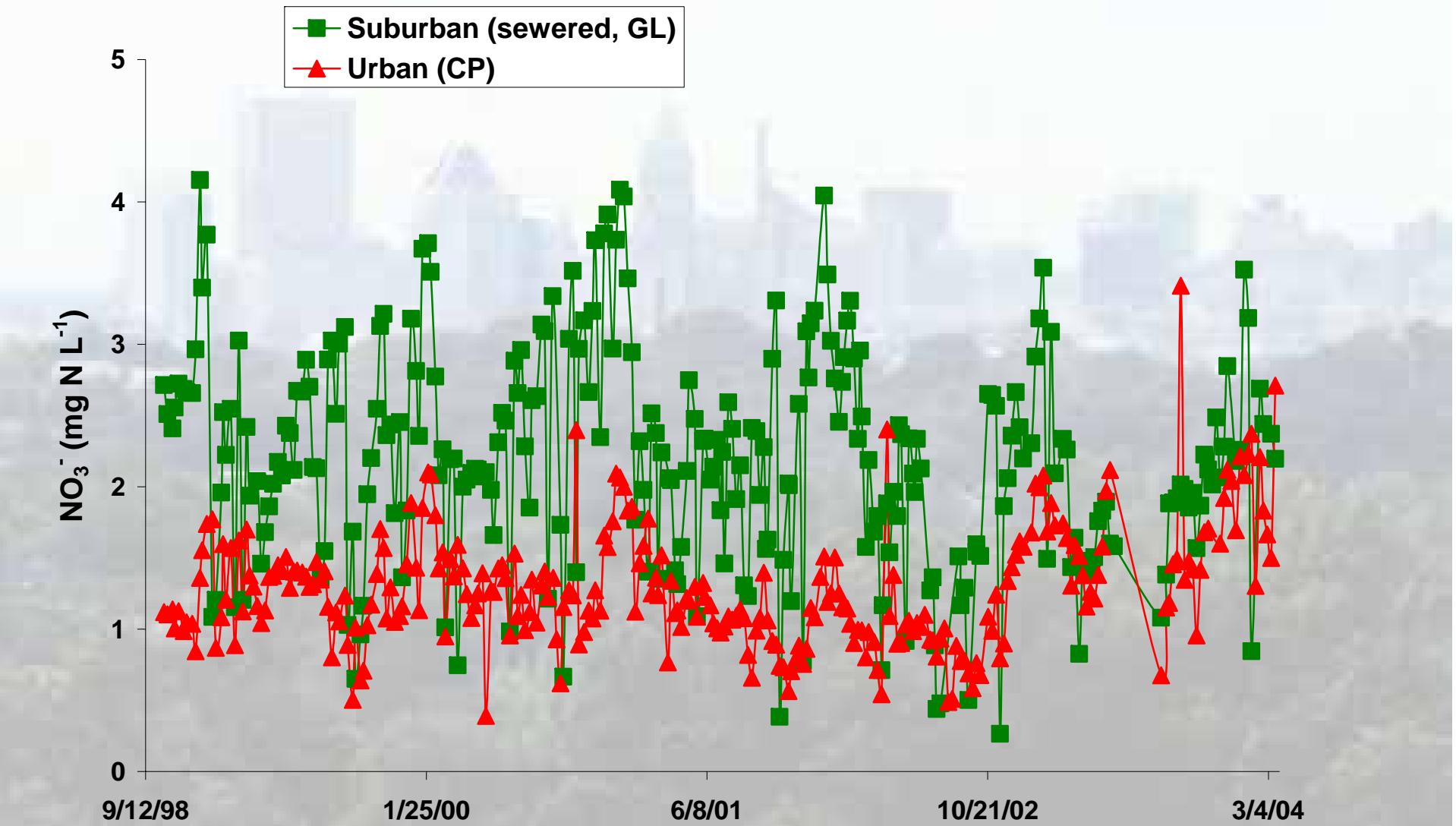
# *Reference stream . . .*



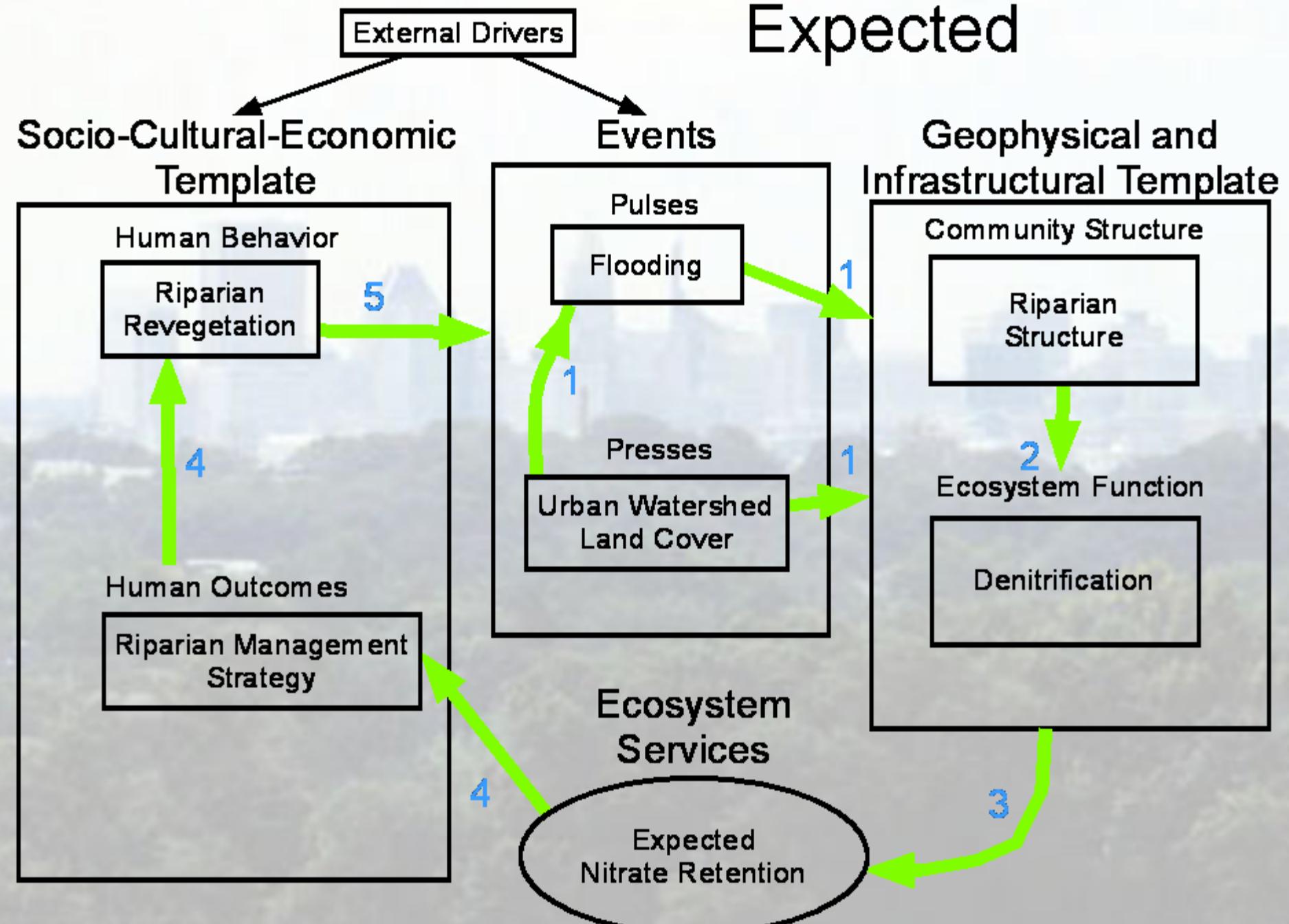
*Ag > Suburban > Forested.*



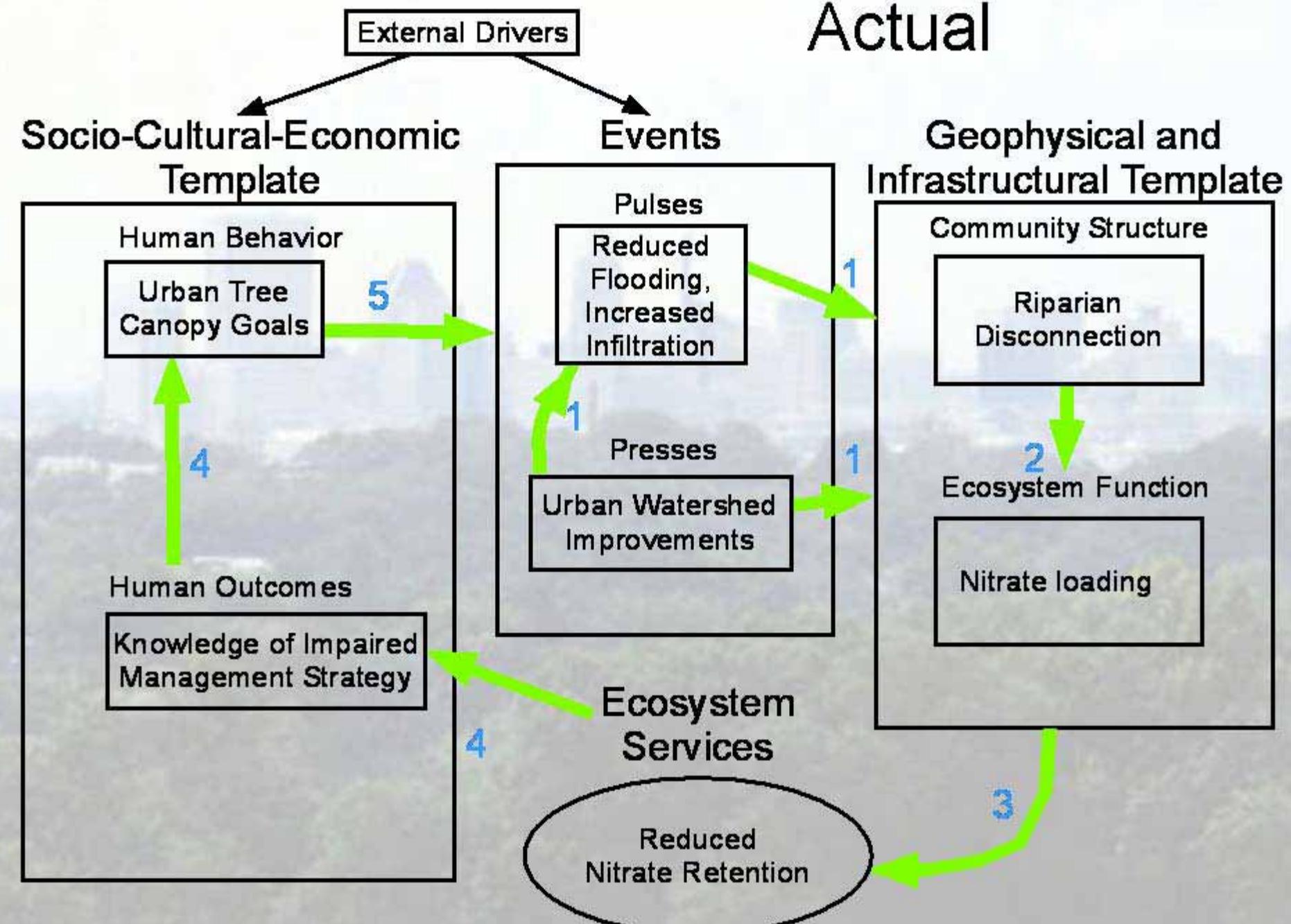
## *Suburban > Urban*



# Expected

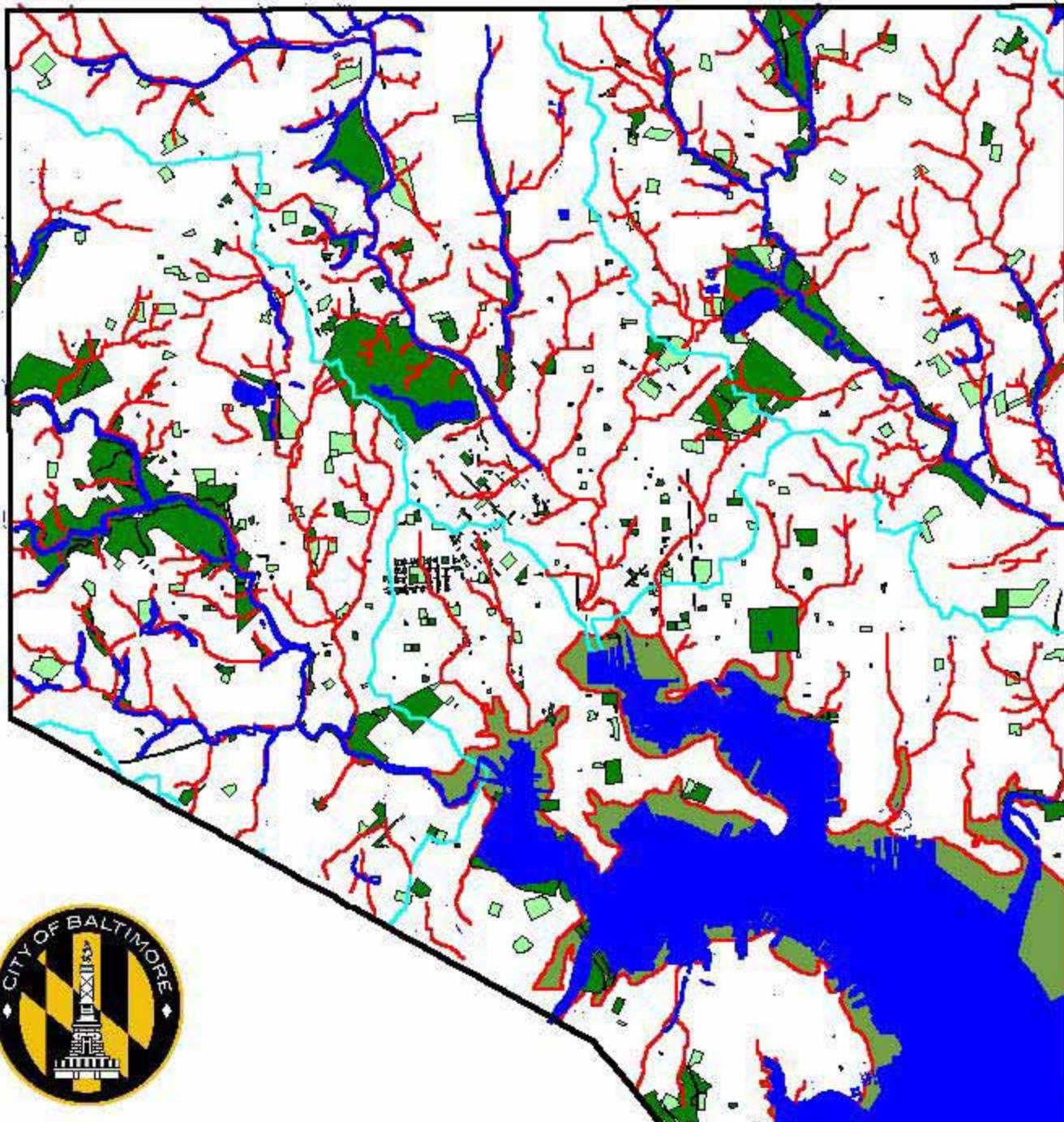


# Actual



# Riparian obliteration





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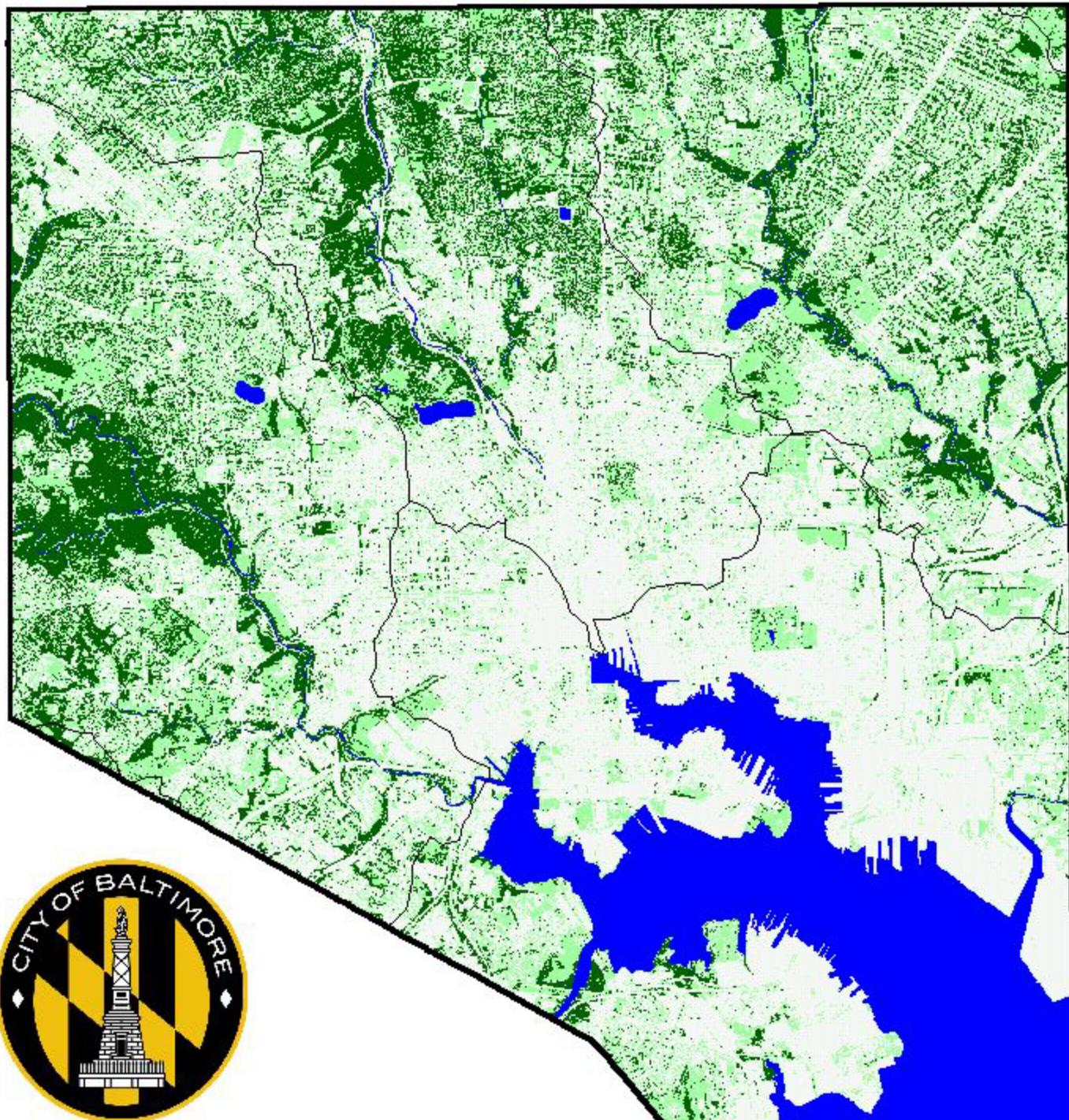
# Management options

- Beyond the riparian
- Increasing urban canopy
- Alter infiltration

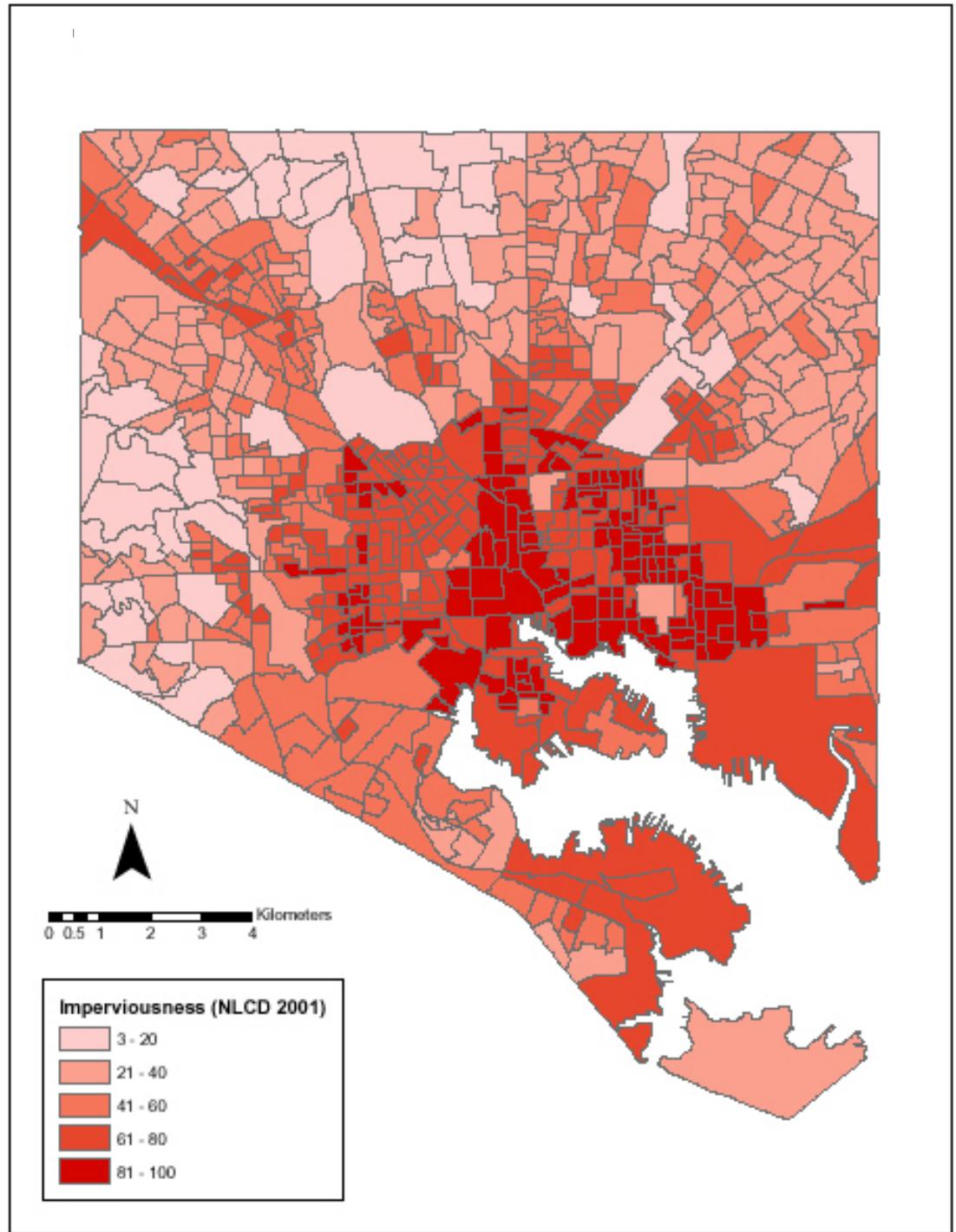
# Increase tree canopy



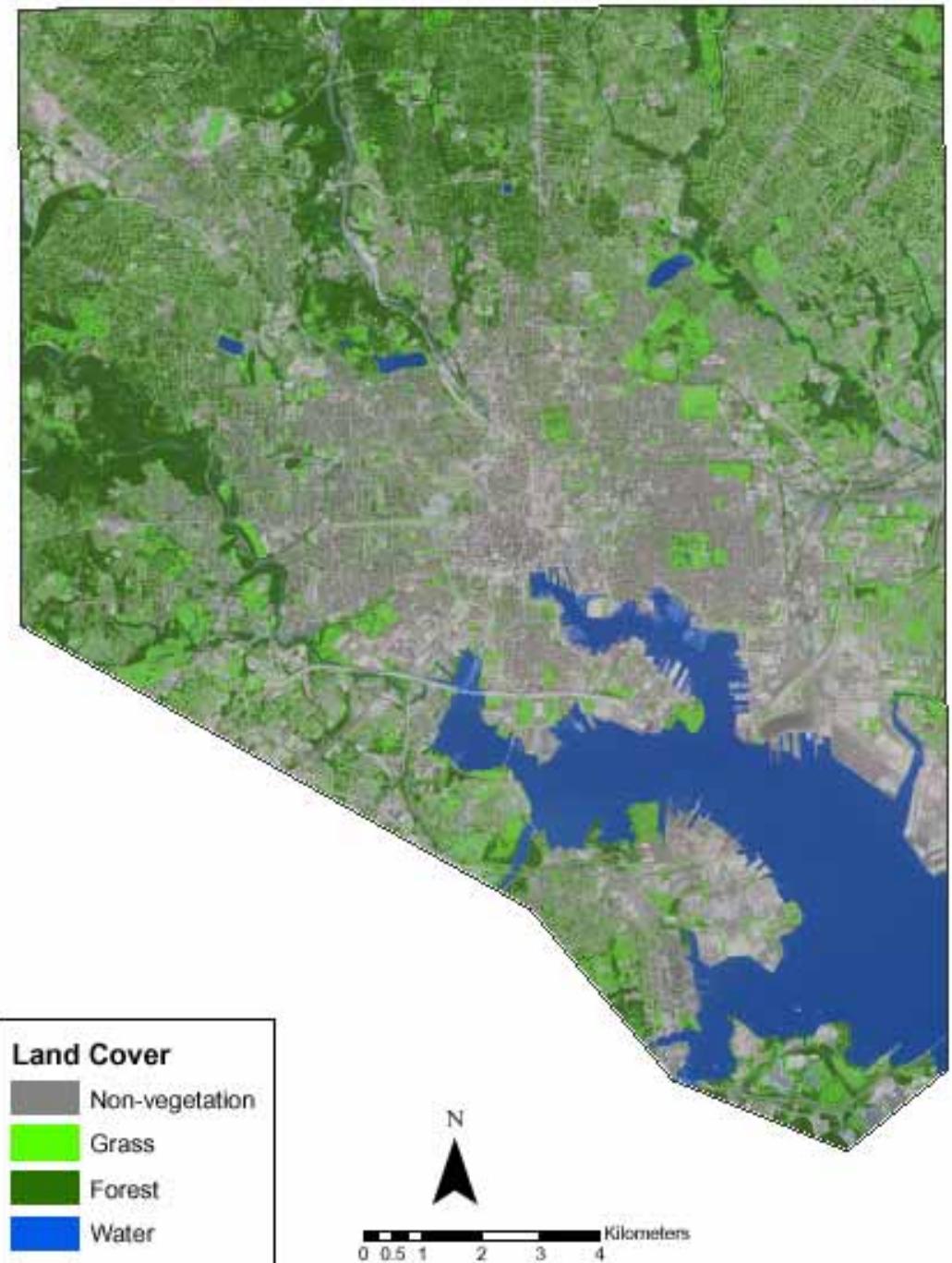
# Baltimore City Urban Forest



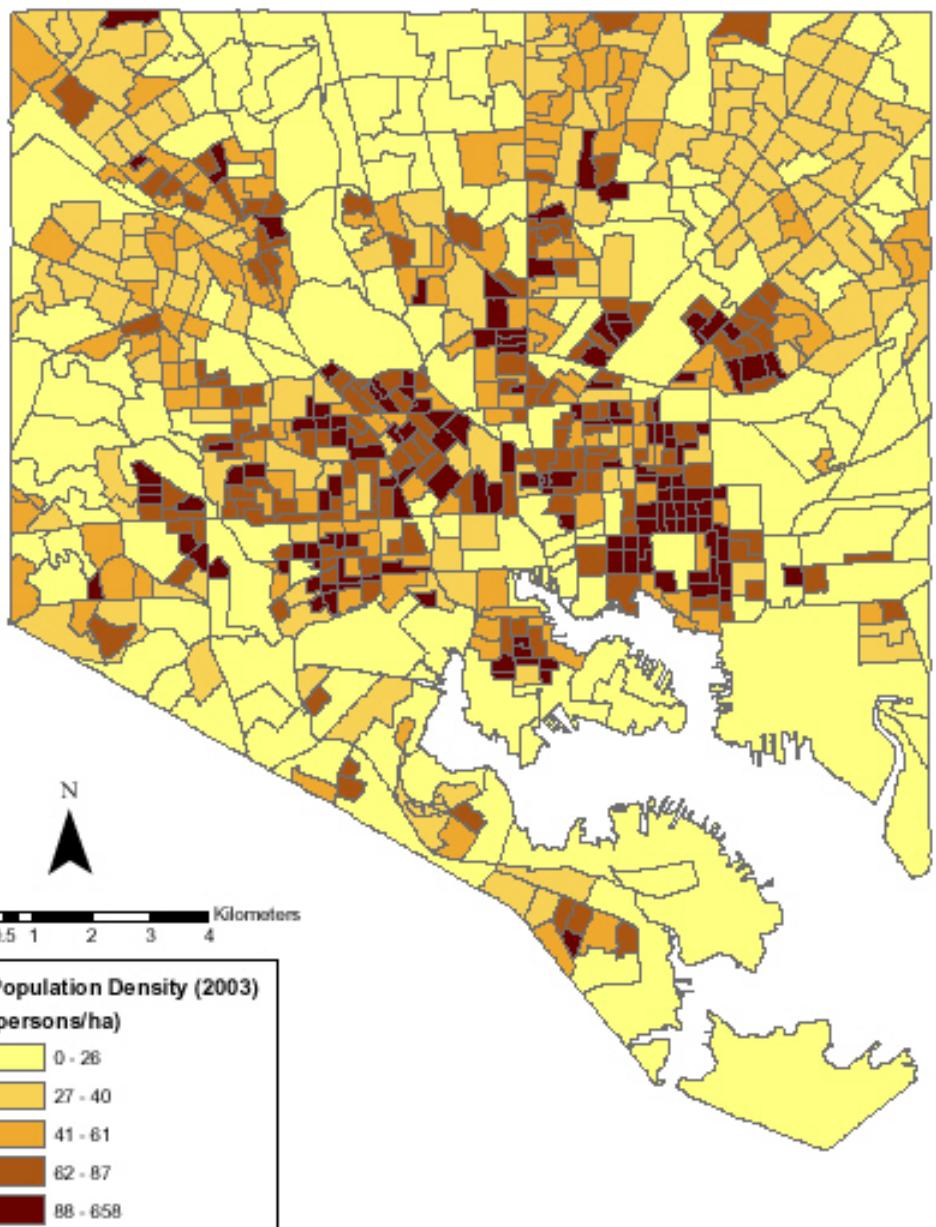
# Data: Physical



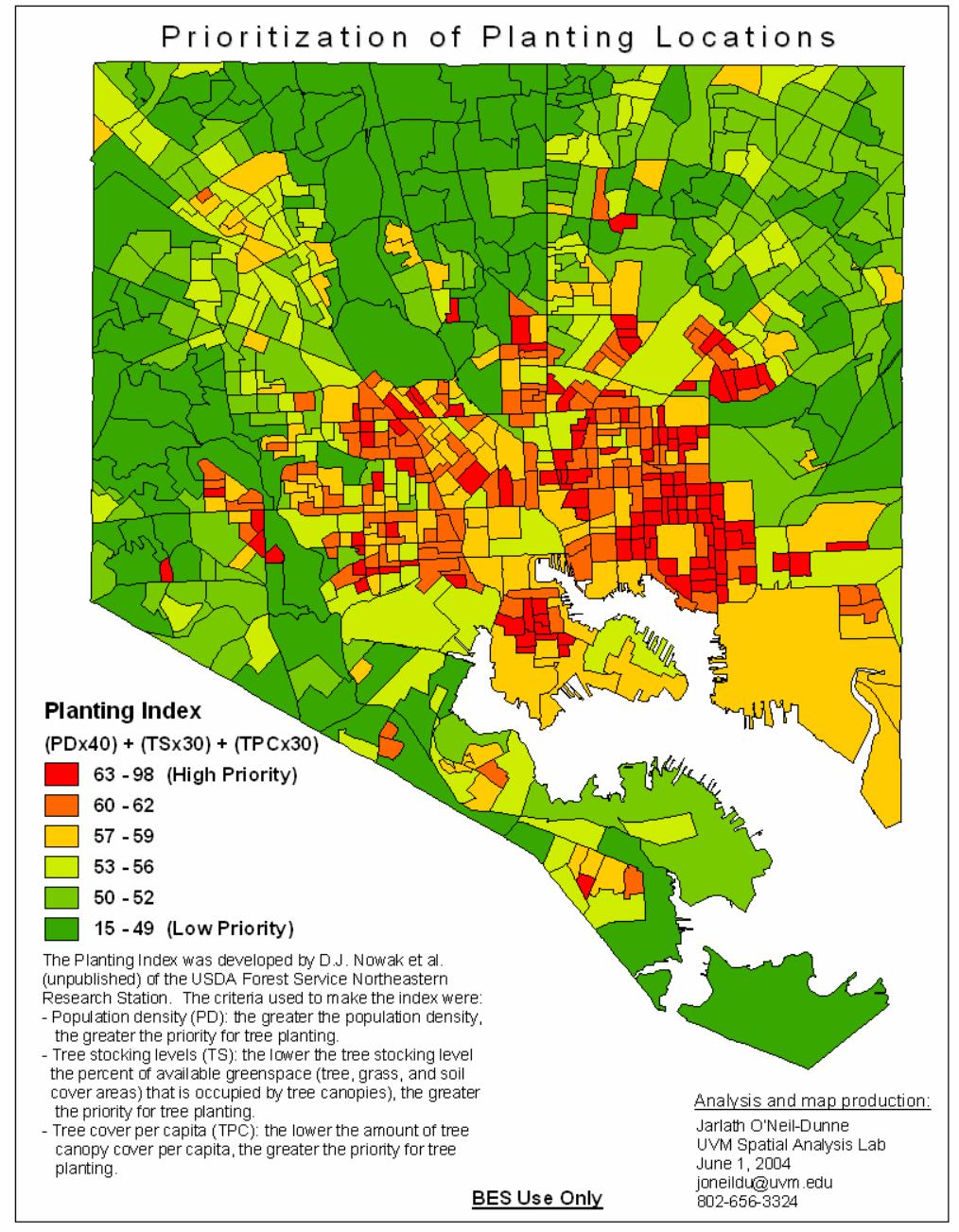
# Data: Biological



# Data: Social



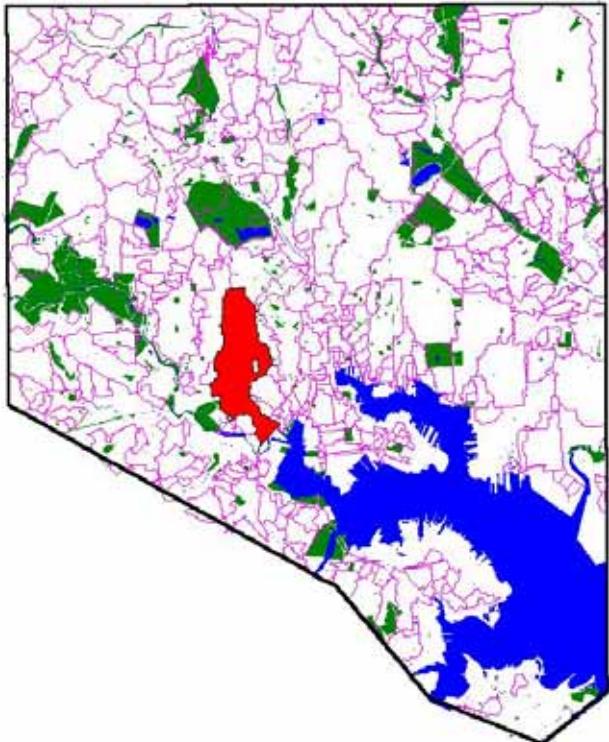
# Analysis



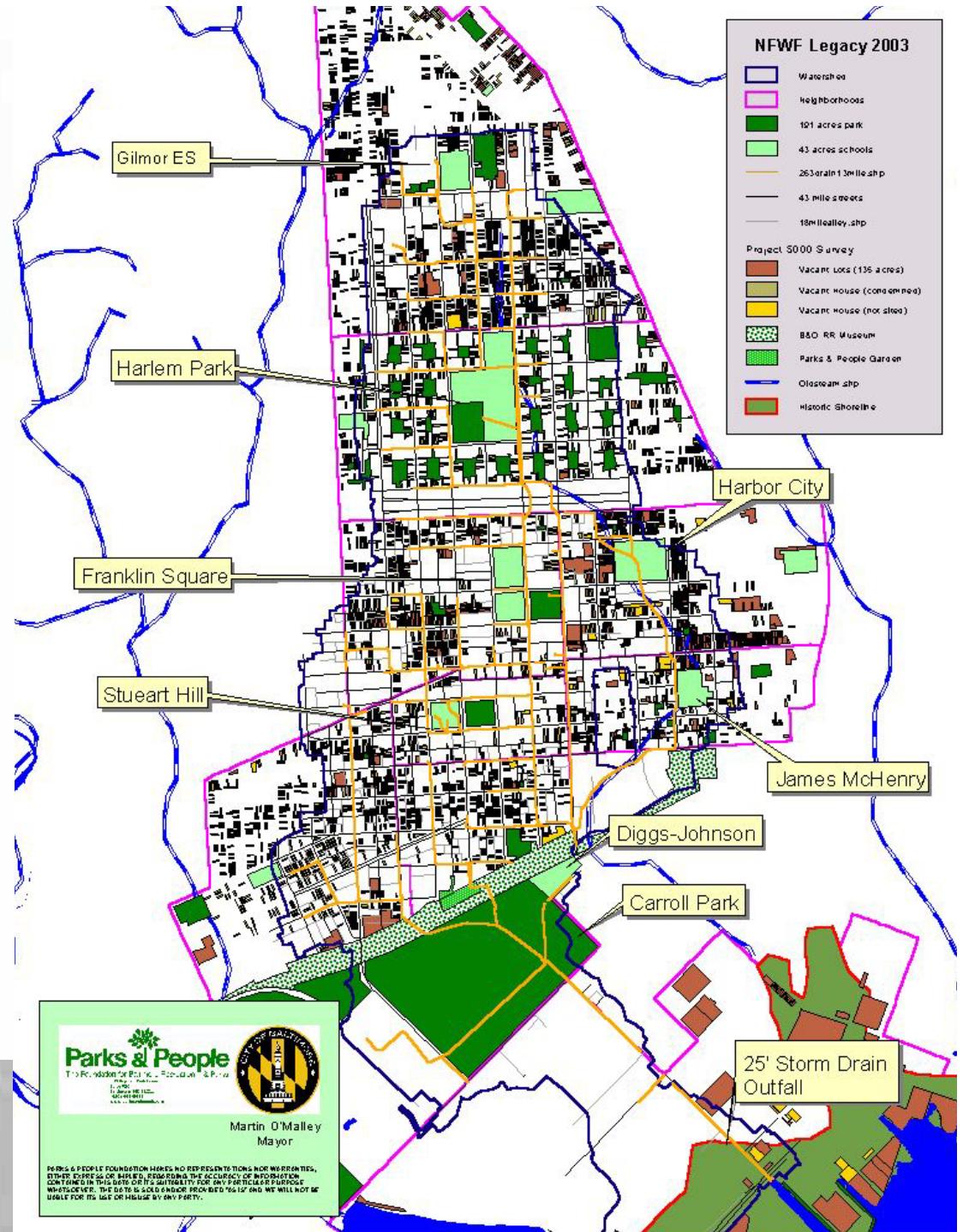
# Urban Design: Watershed 263



# Storm Drain Watershed 263



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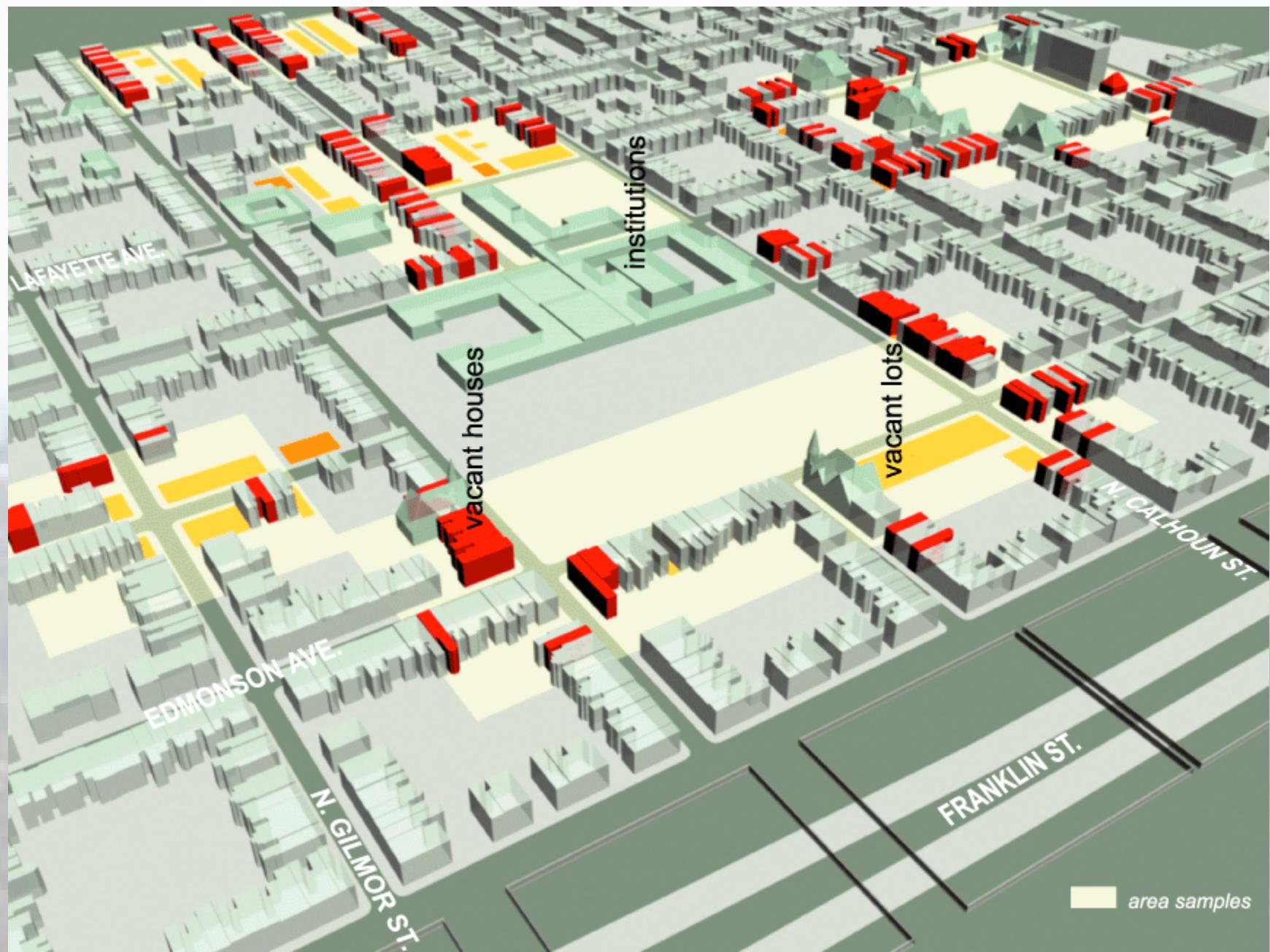


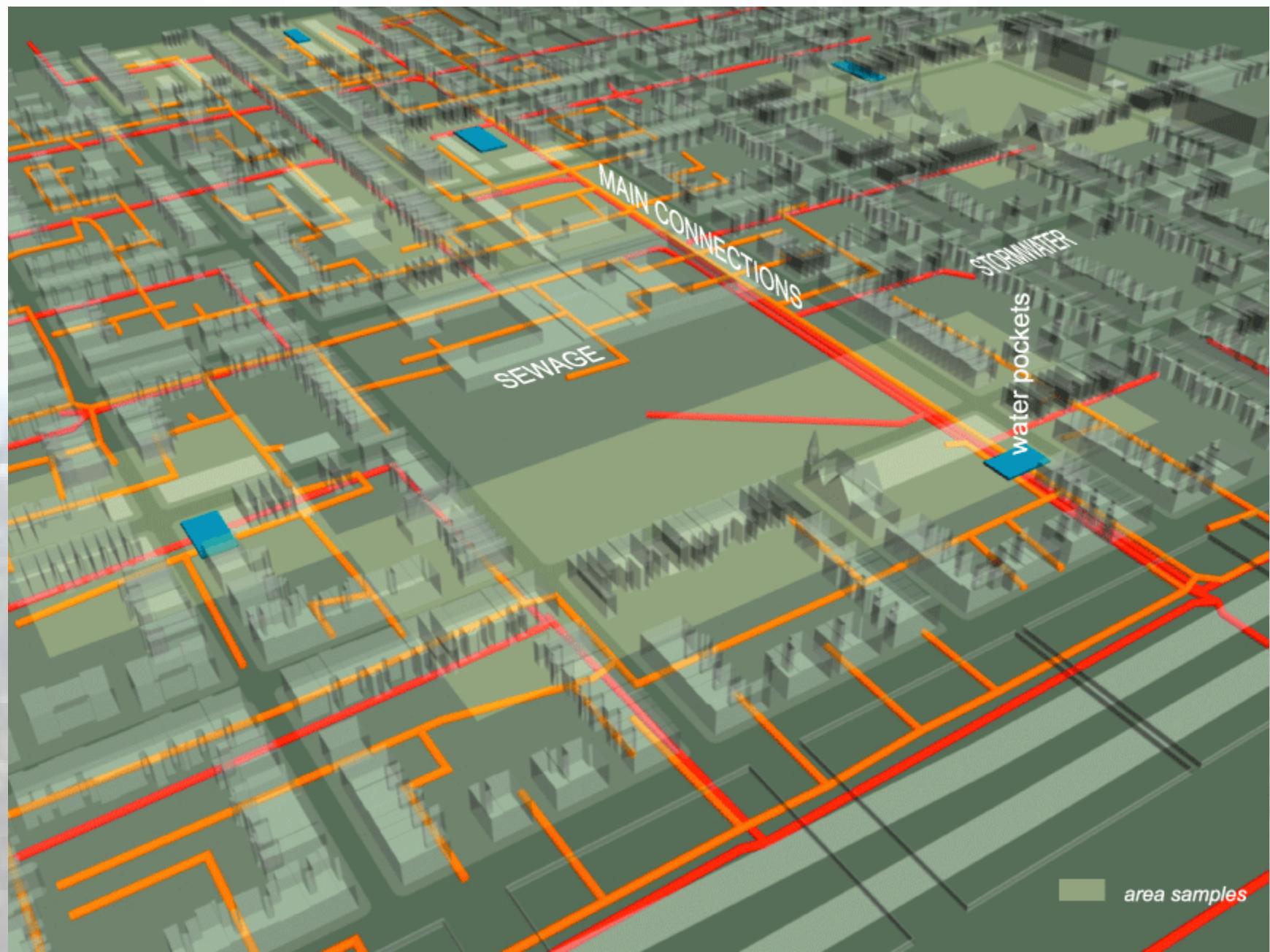


# **Franklin Square ES**

## **Children's Reading Circle**



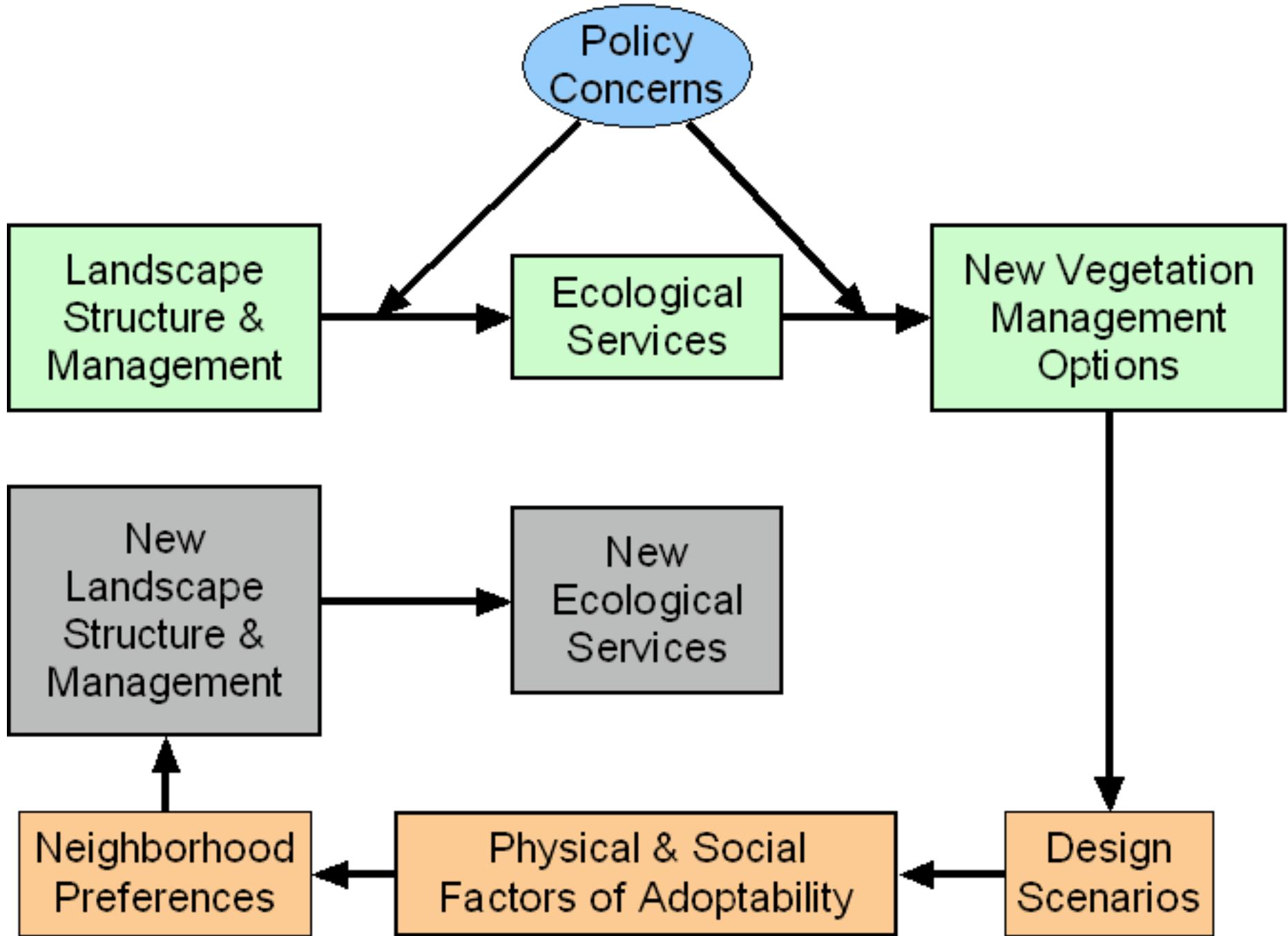


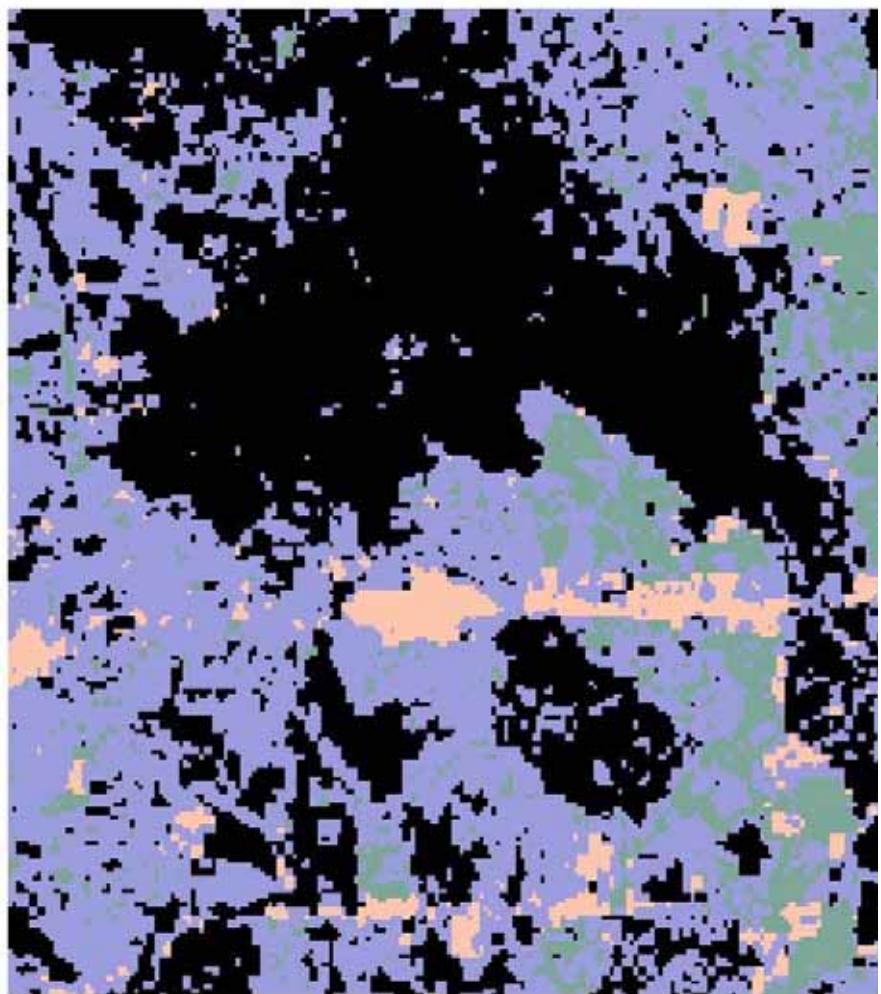


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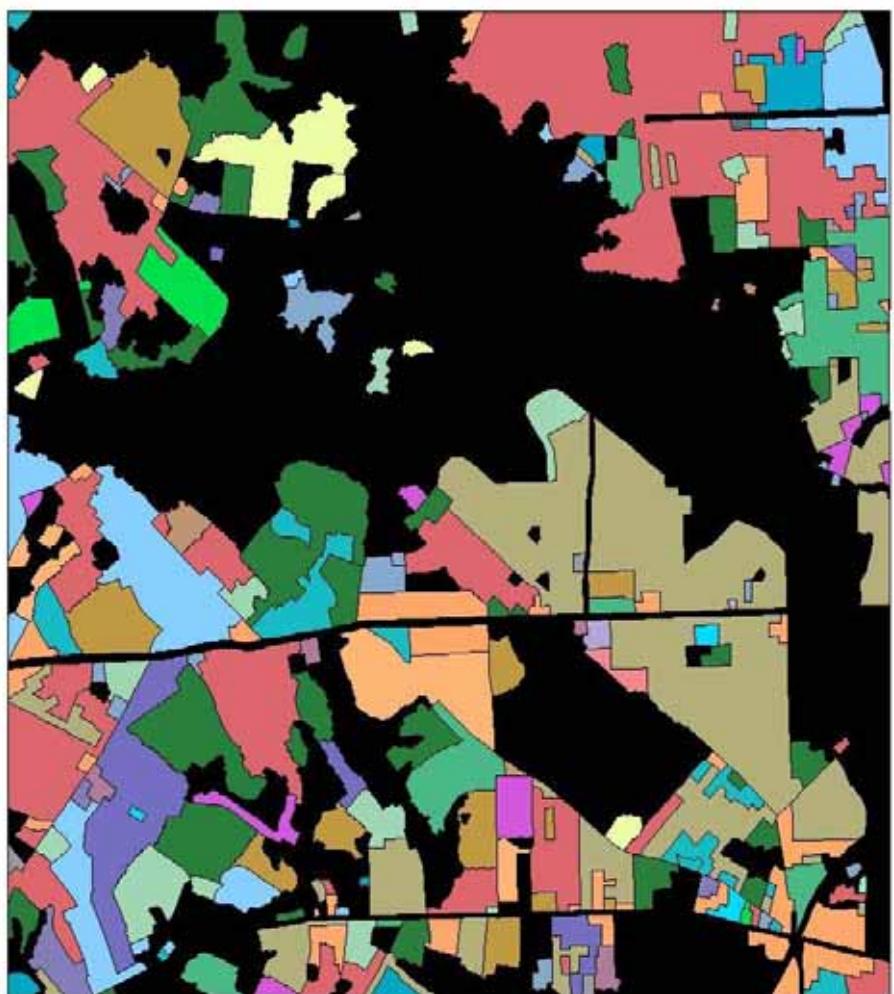
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2/8/07





MRLC 1999

Pickett LTER Mini-symposium  
2/9/07



Cadenasso et al. 2007



Pickett LTER Mini-symposium  
**Salt River, Phoenix**

# Conclusions

- Basic ecology applies to cities;
- Integrate biological, physical, and social;
- Apply the Integrated Science for Society and Environment feedback;
- Failure of urban riparian nitrate retention;
- Management to compensate;
- Open cycle of ecological urban design.

# See Ya Later Bye, Hon

<http://beslter.org>