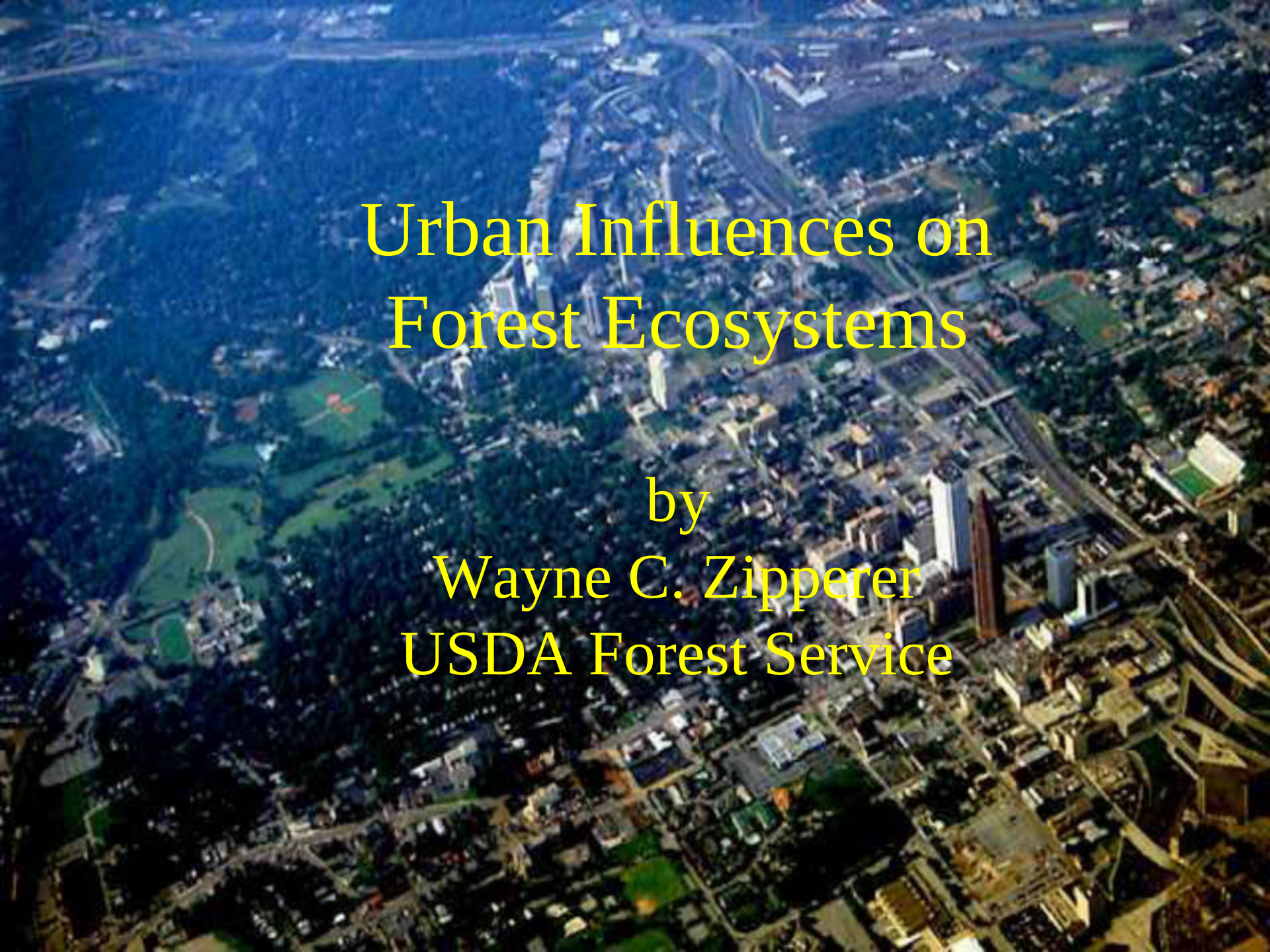

Urban Influences on Forest Ecosystems

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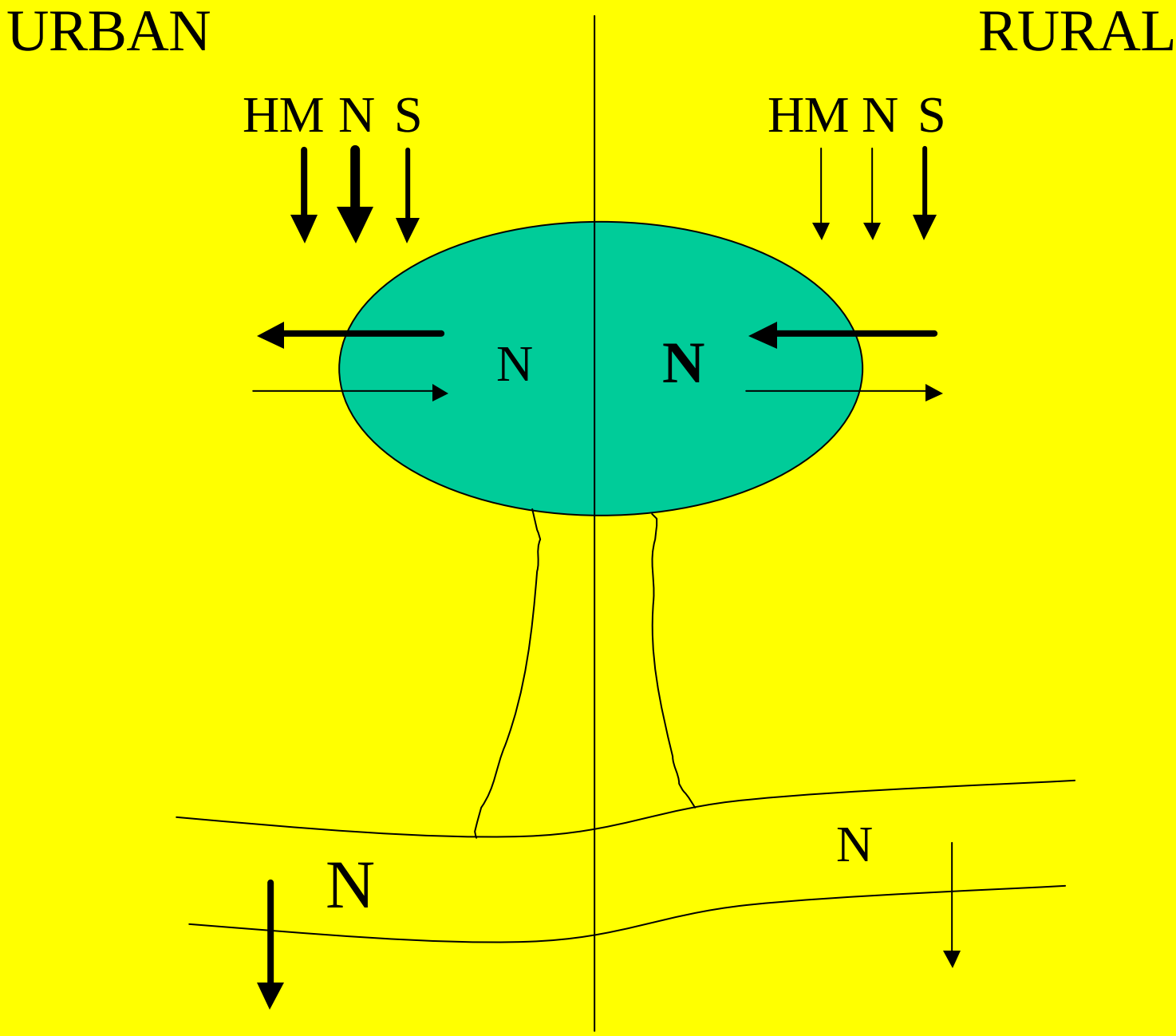
Urban Influences

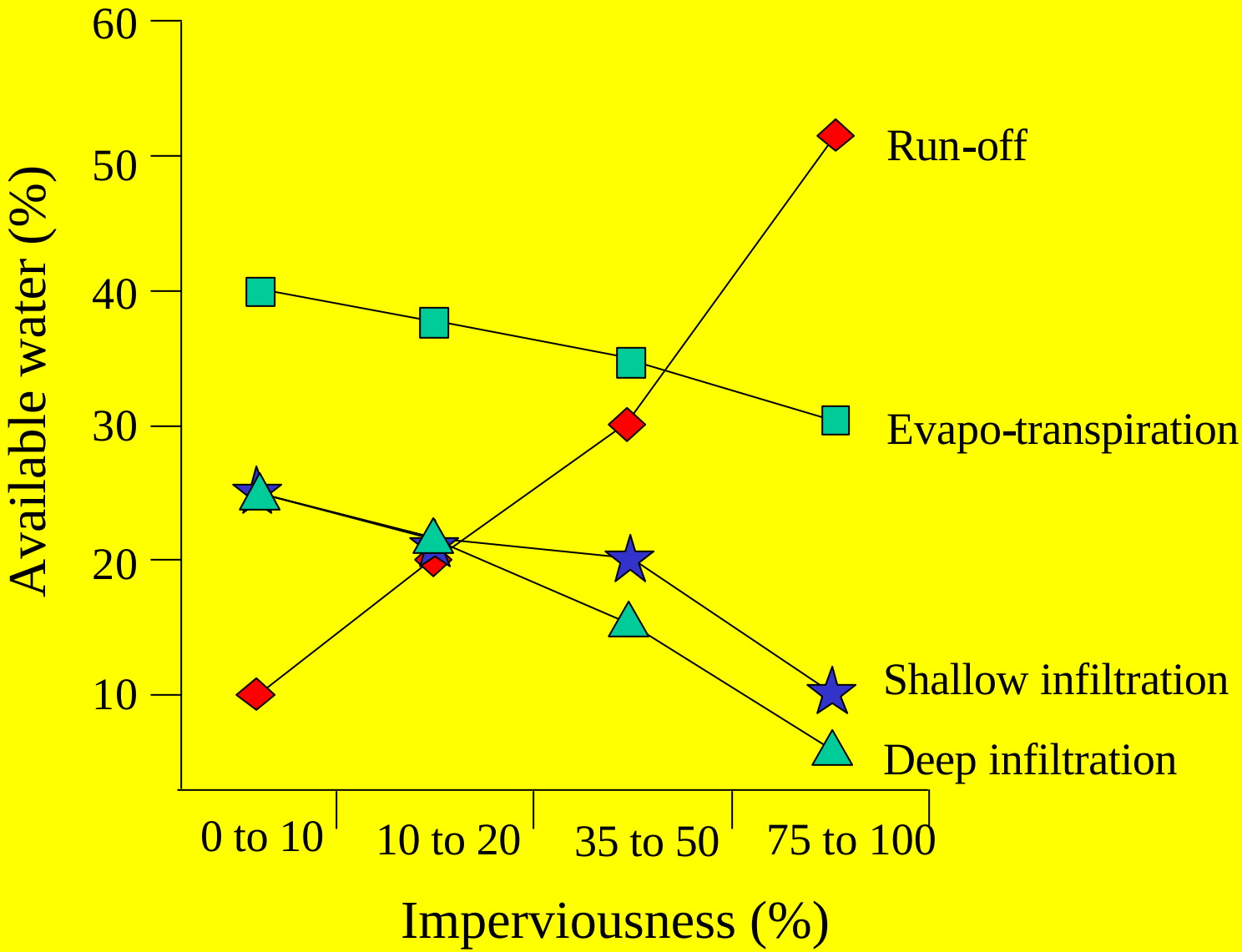
- Direct Influence
  - Land conversion
- Indirect Influence
  - Modifying nutrient cycles
  - Modifying hydrology
  - Introducing non-native species
  - Modifying disturbance regime
  - Changing atmospheric

Tree canopy losses in selected areas in the South as reported by American Forests.

Location	Tree-covered area (1000 acres)	Duration (yr)	Canopy loss (%)
Atlanta Metropolitan area	1747	1974-1996	26
Chattanooga, TN	110	1974-1996	21
Houston Metropolitan area	692	1972-1999	8
Roanoke, VA	313	1973-1977	9
Fairfax County, VA	125	1973-1997	20


URBAN
RURAL
HM N S
HM N S
N
N
N
N

Urban		Rural
+	Soil temperature	
+	Soil hydrophobicity	
	Microinvertabrates	+
+	Earthworms	
	Fungal hyphae	+
+	Non-native plants	
	Leaf litter depth	+
+	Decomposition	
+	Nitrogen-mineralization	


60
50
40
30
20
10
Available water (%)
Run-off
Evapo-transpiration
Shallow infiltration
Deep infiltration
0 to 10
10 to 20
35 to 50
75 to 100
Imperviousness (%)

The effect of different percentages of impervious surface on stream stability, water quality, and biodiversity (from Schueler (1994)).

Stream Attributes	Impervious surface (%)		
	0-10	11-25	25-100
Stream stability	Stable	Unstable	Highly unstable
Water quality	Good	Fair	Fair-poor
Stream biodiversity	Good-excellent	Fair-good	Poor

Through modifying the following factors, urbanization increases the susceptibility of a forest to colonization by non-indigenous species and native generalists.

- Modifying soils
- Altering disturbance regime
- Reducing predator species
- Simplifying food webs