

The background of the slide is a light gray gradient with several realistic water droplets of various sizes scattered across it. The droplets have highlights and shadows, giving them a three-dimensional appearance. The main title is centered in the upper half of the slide.

# **STORMWATER MANAGEMENT: WATERSHED APPROACHES AT THE LOCAL LEVEL**

DAVID J. HIRSCHMAN

CENTER FOR WATERSHED PROTECTION

## Let's Talk About Stormwater Management







<http://www.timeout.com/new-york-kids/attractions/summer-2013-new-exhibitions-for-families-at-nyc-museums>



# WHO IS REGULATED? WHO PAYS?

An aerial photograph of a town with a mix of residential and commercial buildings, surrounded by greenery and mountains in the distance. The image is overlaid with three semi-transparent text boxes.

**New Development  
& Redevelopment:  
Stormwater Regs**

**Agriculture/Forestry:  
Bay TMDL**

**Existing Developed Area:  
Bay TMDL, Local TMDLs,  
MS4 Permits**

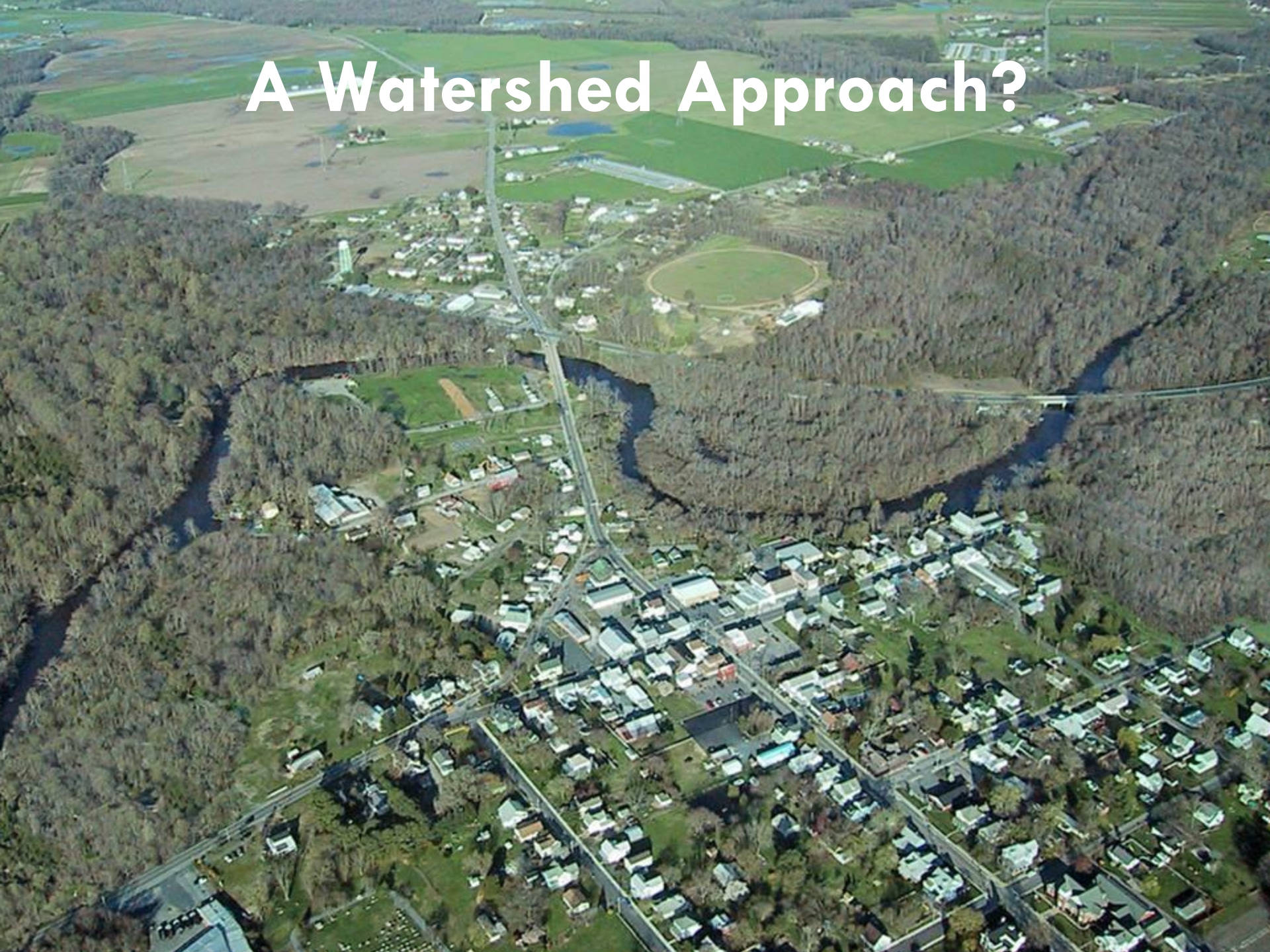


**124 pounds of Phosphorus, 627 pounds of Nitrogen,  
34,285 pounds of Total Suspended Solids. . . .OK?**





# A Watershed Approach?



# 1. SMALL-SCALE PRACTICES



## 2. MODERATE-SCALE PRACTICES



*Before*

*Paint Branch Watershed*

*After*

# 3. LANDSCAPE-SCALE RESTORATION



Watershed Forestry



Urban Nutrient Management



Stream Restoration




Illicit Discharges  
*After*

*Paint Branch Watershed*



**\$12,500 per  
pound of  
Phosphorus\***

**\* Average annual \$ over 20 years**



**\$770 per  
pound of  
Phosphorus**

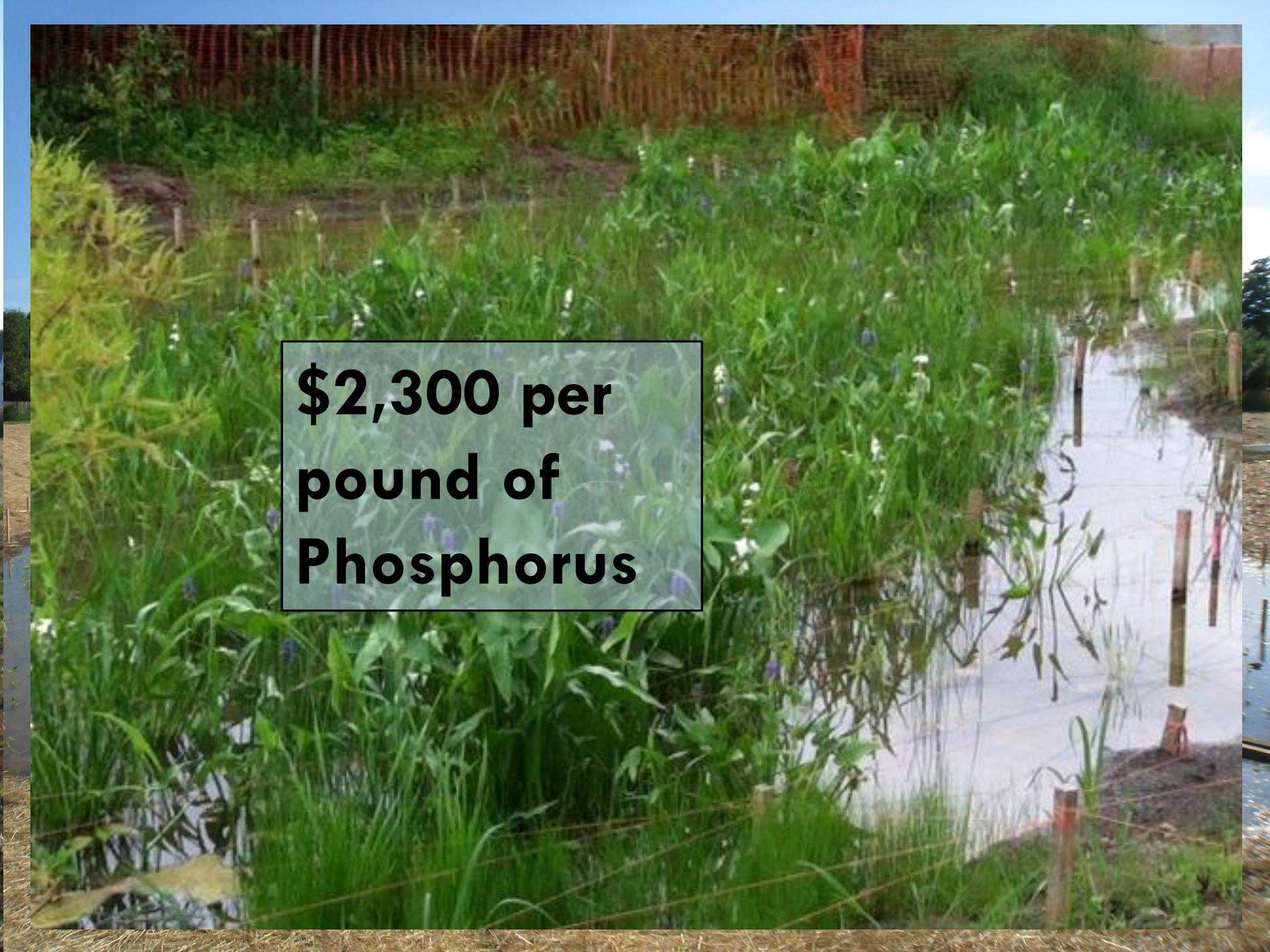
**\$1,850 per  
pound of  
Phosphorus**

### BLACKS RUN: RETURNING TO LIFE

Stream and river health can be measured by the presence or absence of certain organisms, called indicator species. Indicator species, such as the larvae of insects like mayflies, caddisflies, and stoneflies, rely on stable flows, high water quality, and sunlit in-stream habitat for survival. In polluted streams species that are tolerant of pollution, such as many types of fly larvae, darters, and sunfish, are more likely to survive. Vegetated and forested buffers benefit the habitat by providing woody debris for shelter, shade and food. Leaves and vegetation, as well as insects, that fall into the stream make up the primary food source of many aquatic organisms. As water quality declines these organisms disappear, which negatively impacts the entire ecosystem. The presence of a variety of aquatic species is usually a sign of a healthy environment.

Take a walk up to Blacks Run. Look at the water and try to identify any animals or fish on the surface and in the depths.

[WWW.CLEANSTREAM.ORG](http://WWW.CLEANSTREAM.ORG)



**\$2,300 per  
pound of  
Phosphorus**




# FIXING UNAUTHORIZED DISCHARGES



**\$70 per  
pound of  
Phosphorus**



**\$3,475 per  
pound of  
Phosphorus**

A photograph of a residential street paved with grey bricks. A red sedan is driving on the left side of the road. The street is lined with mature green trees and utility poles. A black street lamp is visible on the right sidewalk. A white street sign is mounted on a pole further down the road. The sky is overcast. A text box is overlaid on the bottom center of the image.

**\$70,000 per  
pound of  
Phosphorus**

# LOCAL IMPLEMENTATION: STORMWATER + TMDLS

- PROGRAM DEVELOPMENT & ADMIN
- PLAN REVIEW
- INSPECTIONS
- MAINTENANCE
- COMPLIANCE
- TRACKING & REPORTING
- IN-HOUSE
- CONSULTANTS
- SWCDS/PDCS
- NEIGHBORING JURISDICTIONS (E.G., SHARED STAFF)
- OTHER?

# REVENUE SOURCES

- DEDICATED:
  - ✓ STORMWATER UTILITY, USER FEE
  - ✓ STORMWATER FUND (E.G., \$0.01 FROM GENERAL FUND)
  
- OTHER
  - ✓ PLAN REVIEW, INSPECTION FEES
  - ✓ REVOLVING LOAN FUNDS/OTHER LOANS
  - ✓ NUTRIENT TRADING PROGRAM?
  - ✓ SPECIAL DISTRICT TAX
  - ✓ GRANTS
  - ✓ BOND FINANCING

# QUESTIONS

