Trees and the work you do provide multiple benefits...

- Stormwater Management
- Clean Water
- Healthy Ecosystem
- Plant & Protect
- Pollution Prevention

What is Green Infrastructure?
An approach to wet weather management that combines features of our NATURAL ENVIRONMENT...SOILS and PLANTS...into practices and technologies that promote infiltration, evapotranspiration, and the capture and reuse of stormwater to maintain or restore natural hydrology.

Green Infrastructure is...

- The preservation and restoration of natural landscape features (such as forests, floodplains and wetlands)
- The use of practices that include trees, porous pavements, green roofs, infiltration planters, and rainwater capture and reuse.
The Greying of America

Grey is not a substitute for green.

Typical pre-development conditions:
- Natural Watershed
  - 40% Green
  - 10% Drainage
  - 50% Impervious

Typical post-development conditions:
- Urban Watershed
  - 30% Green
  - 15% Drainage
  - 55% Impervious

Stormwater Runoff
**Traditional Stormwater Runoff Management**

- Collect
- Concentrate
- Centralize
- Convey

**Why Should we be Concerned?**

- Thermal Stress
- Debris
- Toxic Contaminants
- Pathogens
- Sediment
- Nutrients

- Increased quantity
- Dynamic rate
- Decreased quality

**Impacts of Stormwater Runoff on Water Quality**

**Impervious Surfaces**

% Impervious change 1990 - 2000

Climate Change

- Temperature – warmer winters higher minimum temps
- Precipitation – more, changes in frequency, storm events
- Dew points – higher, tropical

Precipitation

- Minneapolis 6.0 to 7.9” (+32%)
- Fargo 5.3 to 6.3 (+19%)
- Large changes over short distances

Trees & Urban Forest provide multiple benefits

Trees. A savings for homeowners, businesses, and government

- Save over 20% on annual air conditioning and up to 8% in heating costs

Aesthetics

Trees. Vital to Community Health.

- Tree-filled neighborhoods are more sociable and safer.

Trees. Important to Human Health.

- 100 trees remove 248 lbs of air pollutants per year
- Lower pediatric asthma rates
- Reduced volatile organic compounds

Healthier environments for us to live and breathe.
Tree Houses

- Each large front yard tree adds about 1% to sales price
- Large specimen trees can add 10%+ to property values

Tree houses are more valuable and sell faster!

The Birds and the Bees - The deer and the leaves

Trees provide critical habitat for birds and wildlife...and participation in birding is very high!

The Birds and the Bees

- Bald eagle

Tree houses are more valuable and sell faster!

Trees Pay Us Back.

Benefits = $379,000

- Energy
- Air Quality
- Runoff
- Real Estate

Costs = $148,000

- Planting
- Pruning
- Irrigation
- Sidewalk Repair
- Litter
- Legal / Admin
- Removal/Disposal

Pay Off: $231,000

Looking for a good ROI? How about a 250%!

Trees Mean Better Business.

Trees create more business!

- More frequent shopping
- Longer shopping trips
- Shoppers spend more for parking
- Shoppers spend 12% more for goods


- 100 mature trees catch about 139,000 gallons of rainwater per year...
  - Less $ for stormwater control
  - Cleaner water

Q & Q FACTOR

Important Ways a Tree Helps with Stormwater Management

- Intercept (slow it down!)
- Absorb (time – release)
- Infiltrate (soak it in!)
The Magic is in the Roots!

Trees are a growing capital asset that benefits everyone in the community.

Plans

Practices

Policies

Urban Tree Canopy Goals

Existing, Possible, and Preferable

Urban Tree Inventory

• Inventory
• Species, Age
• Assessment
• Goals &
• Plan
• Implementation
• Monitoring

Source: Blue Thumb Program and Conservation Research Institute & Heidi Natura

Source: Shutterstock.com

Trees are a growing capital asset that benefits everyone in the community.

Source: Blue Thumb Program and Conservation Research Institute & Heidi Natura

Green Infrastructure for Clean Water: Trees, Roots, and Their Role in Stormwater Management - September 2011

JBilotta. Trees as Green Infrastructure for Stormwater - DRAFT
1. Protection & preservation
2. Tree planting & replacement
3. O & M – operation and maintenance

Implementation Plan
Urban Tree Canopy Goals

- Protection
- Tree planting
- Quality care

Tree protection
why save the big trees?

- Vegetative swales
- Urban tree planters
- Riparian buffers

Practices
- Tree Trench

Practices
- Tree Trench
Green Infrastructure for Clean Water: Trees, Roots, and their Role in Stormwater Management

East/West Corridors; e.g. 17th Ave.

East/West Collector Concept

Kimley-Horn Associates Minneapolis/St. Paul
Trees are a part of our stormwater system.

BUT WAIT!
Trees and leaves can be a potential source of pollution!

Urban Vegetation as a Source of Nutrients to Stormwater
Jacques Finlay, Benjamin Janke, Lawrence Baker, Sarah Hobbie
University of Minnesota

Stormwater runoff: Seasonal signals

And Remember:
1 pound of Phosphorus = 500 pounds of algae!
Enhanced Street Sweeping for Removing Nutrients from Streets

U of M Project Team:
Lawrence Baker, Paula Kalinosky, Sarah Hobbie, Chris Buyarski, & Ross Bintner
City of Edina

For “high canopy” routes: coarse organics comprised 20% of total solids, 74% of N and 42% of P.

Conclusion: Targeted, enhanced street sweeping can be a cost effective way to remove nutrients from streets.

P removal can be accurately predicted from % tree canopy and frequency of sweeping

1. Trees are a part of our stormwater system
2. Trees can mean clean water!
3. Trees are essential for healthy ecosystems

4. Preservation and planting of trees AND preventing pollution from tree leaves are both critically important.

About NEMO

NEMO (Nonpoint Education for Municipal Officials) Program is a nationally recognized education program for local elected and appointed decision makers addressing the relationship between land use and natural resource protection.

Northland NEMO is the Minnesota – Wisconsin program led by the University of Minnesota Extension and Minnesota Sea Grant with significant support and contributions from a variety of partners

www.northlandnemo.org

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• Vermillion River Watershed JPO

RESOURCES – Trees & Clean Water
• How Trees Can Retain Stormwater Runoff 8pp)
• Control Stormwater Runoff with Trees (2pp)
• 22 Benefits of Urban Street Trees (6pp)
• Trees Tame Stormwater (placemat)
• How trees pay us back
• ...and more

Trees, Roots, and their Role in Stormwater Management

by John Bilotta

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Green Infrastructure for Clean Water

Trees, Leaves, Roots, and their Role in Stormwater Management

Presented by John Bilotta
Extension Master Gardener Volunteer Statewide Conference – June 2015