

An aerial photograph showing a large body of water (Onondaga Lake) in the upper left, surrounded by a city (Syracuse) and a large industrial facility (Metro wastewater treatment plant) in the foreground. The water is dark blue, and the surrounding land is a mix of urban development and greenery. The text is overlaid on the image.

# NYSSWMDM Updates & Climate Changes

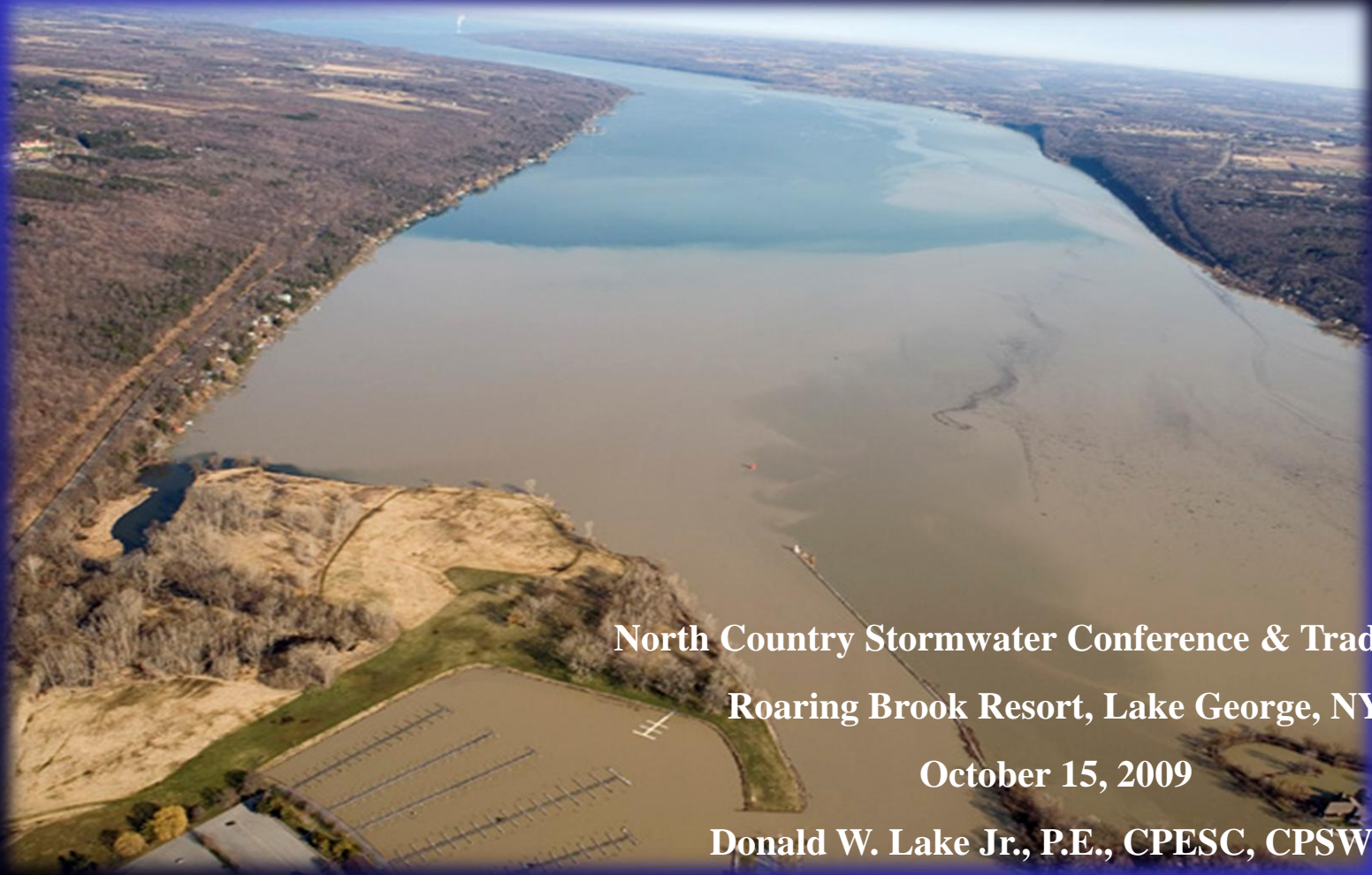
North Country Stormwater Conference & Tradeshow  
Roaring Brook Resort  
Lake George, New York October 14, 2010

Donald W. Lake Jr., PE, CPESC, CPSWQ

photo by Mike Greenlar

**Sediment load into Onondaga Lake from Onondaga Creek. In the foreground is Metro- the recently upgraded sewage facility for the City of Syracuse.**

# What's Ahead for the NYS Stormwater Program?



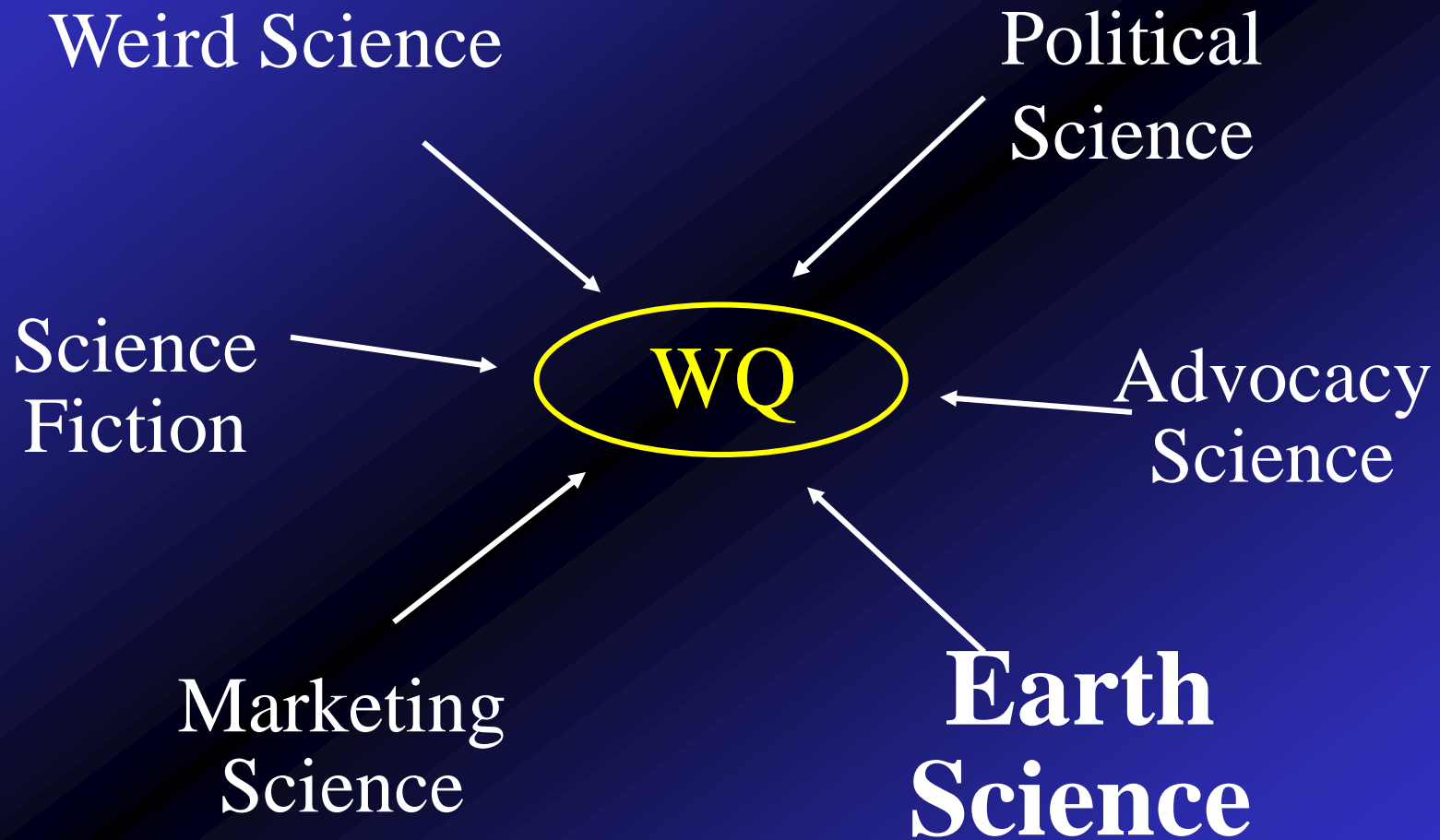
North Country Stormwater Conference & Tradeshow

Roaring Brook Resort, Lake George, NY

October 15, 2009

Donald W. Lake Jr., P.E., CPESC, CPSWQ

# Water Quality Sciences



# What Is Needed

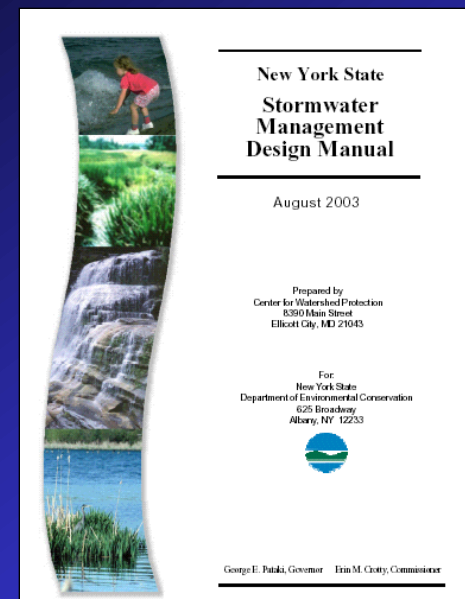
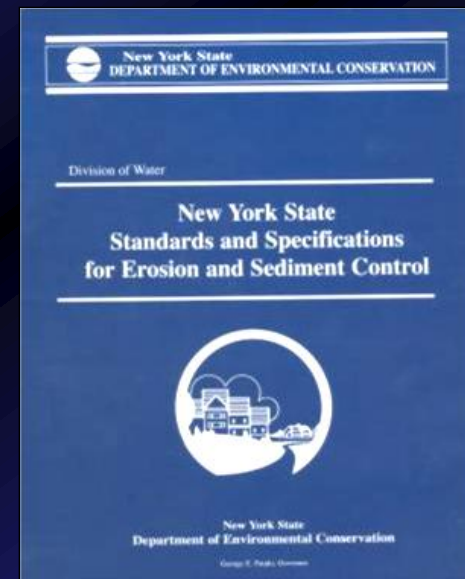
- Continue Local Training & Education
- Create a Stormwater Section @ DEC
- Update Technical Support Standards
- Recognize Stormwater Science
- Create Pro-Active Partnerships
- Evaluate the Program by Internal and External Appraisals
- Stable Funding Mechanisms - \$

# New York State Technical Standards

- *New York State Standards and Specifications for Erosion and Sediment Control (“Blue Book”)*  
*Current Version: August 2005*

- *New York State Stormwater Management Design Manual*  
*NEW Version: April 2010*

*Both documents available on DEC website*  
<http://www.dec.ny.gov/chemical/8694.html>



# 2010 Manual Outline

- Chapter 1. Introduction to the Manual
- Chapter 2. Impacts of New Development
- Chapter 3. Stormwater Management Planning
- Chapter 4. Unified Stormwater Sizing Criteria
- Chapter 5. Green Infrastructure Practices
- Chapter 6. Performance Criteria
- Chapter 7. SMP Selection Matrices
- Chapter 8. Stormwater Design Examples
- Chapter 9. Redevelopment Projects
- Chapter 10. Enhanced Phosphorous Removal

# Unified Approach for Stormwater Management

- Water Quality Criteria
- Channel Protection Criteria
- Overbank Flood Protection  
Criteria
- Extreme Flood Control Criteria

# Water Quality Criteria (WQ<sub>v</sub>)

Criteria: Capture and treat 90% of the annual runoff events

$$WQ_v = (P)(R_v)(A)/12$$

Where:

WQ<sub>v</sub> = Water Quality Volume (acre-feet)

P = 90% storm depth (inches)

R<sub>v</sub> = runoff coefficient (based on %I)

R<sub>v</sub> = 0.05+0.009I

I = Impervious Cover (%)

A = site area (acres)

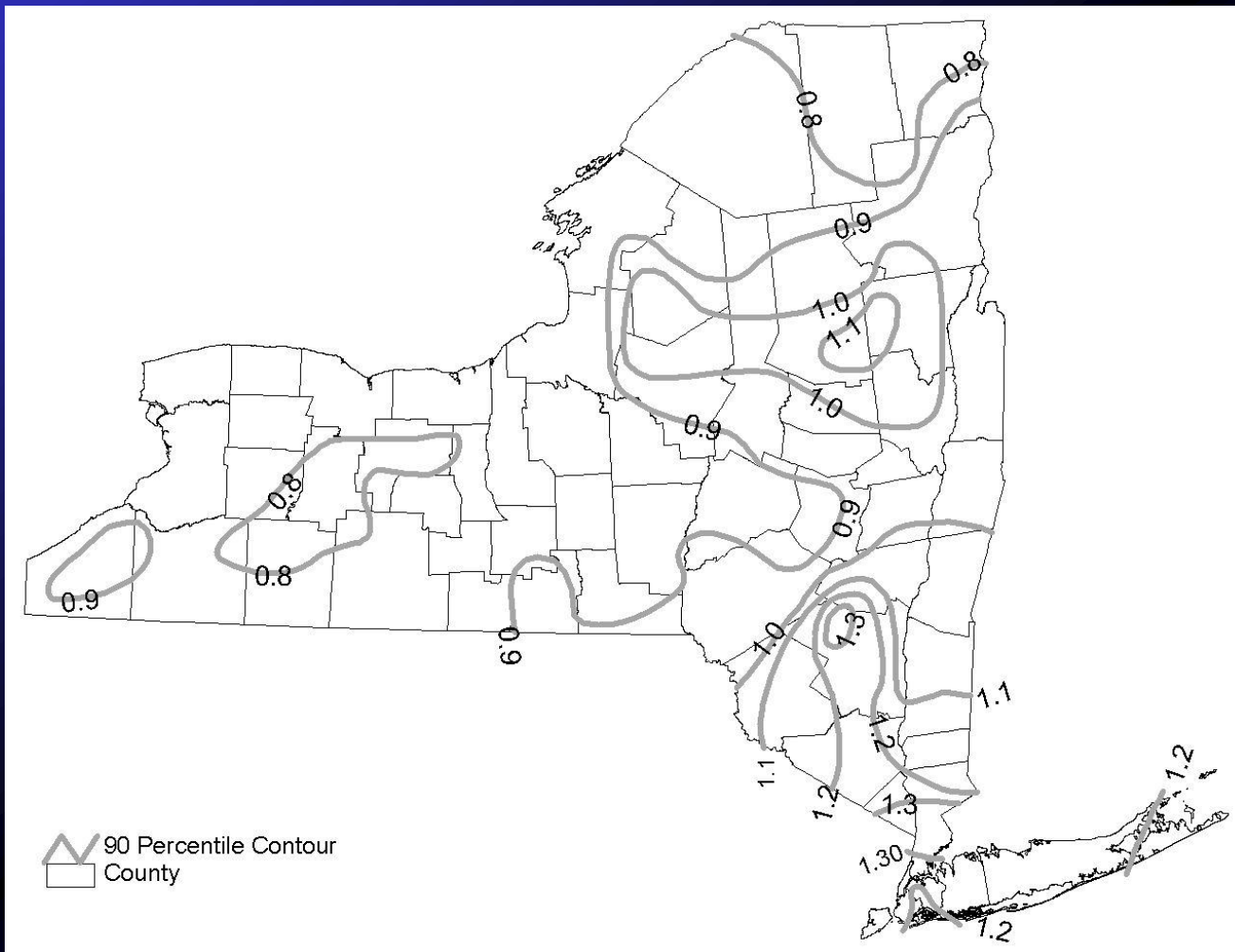
Minimum R<sub>v</sub> of 0.2

# Stream Channel Protection

Morphological disruptions primarily due to changes in hydrology

- Channel widening and downcutting
- Increased streambank erosion
- Shifting sediment bars
- Embedding of stream sediments

# 90% Rainfall in New York

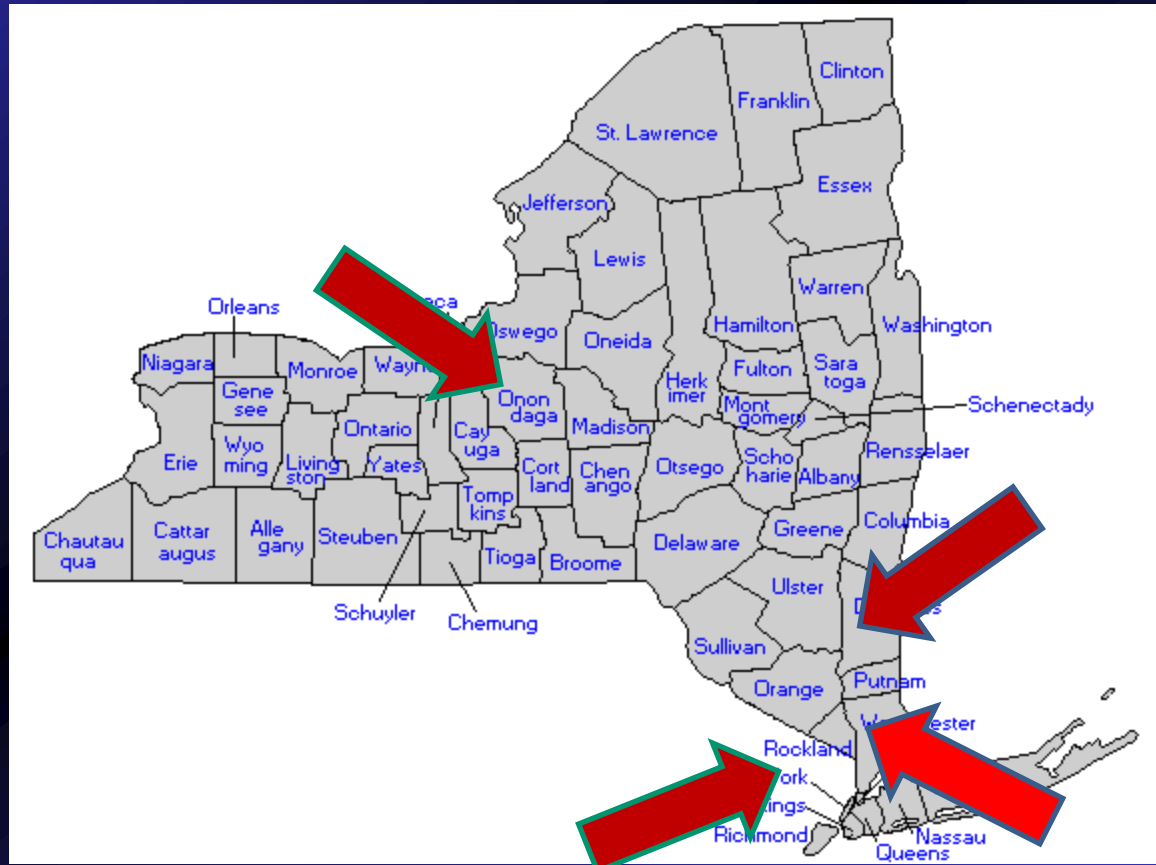


# Water Quality Treatment Objective

- End of Pipe Treatment Practices must be sized for the 1 year 24hr. Developed Runoff.

# Phosphorus Impaired Watersheds in New York

4 (and rising)?



# Chapter 10

## Sizing Criteria

For

## Enhanced Phosphorus Removal

**Table 10.3 New York Stormwater Sizing Criteria for  
Enhanced Phosphorus Removal**

<b>Water Quality (<math>WQ_v</math>)</b>	$WQ_v$ = estimated runoff volume (acre-feet) resulting from the 1-year, 24-hour design storm over the post development watershed (See Figure 10.1). Evaluate and implement hydrologic source control where feasible.
<b>Channel Protection (<math>Cp_v</math>)</b>	Refer to existing requirements.
<b>Overbank Flood (<math>Q_b</math>)</b>	Refer to existing requirements.
<b>Extreme Storm (<math>Q_f</math>)</b>	Refer to existing requirements.

# Source Control Objectives

Direct a minimum percent of impervious surfaces runoff to infiltration and runoff reduction practices:

- “A” soils – was 30%, now 55%
- “B” soils – was 20%, now 40%
- “C” soils – was 10%, now 30%
- “D” soils – was 5%, now 20%

# Sizing Criteria – Water Quality

Four Options :

1. Reduce imperviousness by 25%\*
2. Capture and treat 25% WQv in standard practice targeting largest pollutant sources.
3. Treat 75% WQv using alternative practices
4. Combination of the above 3.

\*must maximize new pervious areas by soil restoration.

# Option 4 - Sizing Criteria Combination of Practices

**%WQv treatment by Alternative  
practice =**

$$25 - (\% \text{ IC reduction} + \% \text{ WQv treatment by Std. Prac.} + \% \text{ Runoff Reduction}) * 3$$

(Determine how WQv is distributed)

TSS – 73%, TP- 52%, TN- 31%

# Stormwater Ponds

End of Pipe



# Stormwater Wetlands

**End of Pipe**

**TSS- 70%, TP- 46%, TN- 24%**

Table 7.2 Physical Feasibility Matrix

SMP Group	SMP Design	Soils	Water Table	Drainage Area (acres)	Site Slope	Head (ft)
Pond	Micropool ED	HSG A soils may require pond liner.	2 foot separation if hotspot or aquifer	10 min <sup>1</sup>	No more than 15%	6 to 8 ft
	Wet Pond			25 min <sup>1</sup>		
	Wet ED Pond					
	Multiple Pond					
	Pocket Pond	OK	below WT	5 max <sup>2</sup>		4 ft
Wetland	Shallow Wetland	HSG A soils may require liner	2 foot separation if hotspot or aquifer	25 min	No more than 8%	3 to 5 ft
	ED Wetland					
	Pond/Wetland					
	Pocket Wetland	OK	below WT	5 max		2 to 3 ft
Infiltration	Infiltration Trench	f <sub>c</sub> > 0.5 inch/hr; additional pretreatment required over 2.0 in/hr (See Section 6.3.3)	3 feet, 4 feet if sole source aquifer.	5 max	No more than 15%	1 ft <sup>6</sup>
	Shallow I-Basin			10 max <sup>3</sup>		3 ft
	Dry Well			1 max <sup>4</sup>		1 ft
Filters	Surface SF	OK	2 feet <sup>5</sup>	10 max <sup>2</sup>	No more than 6%	5 ft
	Underground SF			2 max <sup>2</sup>		5 to 7ft
	Perimeter SF			2 max <sup>2</sup>		2 to 3 ft
	Organic SF			5 max <sup>2</sup>		2 to 4 ft
	Bioretention			5 max <sup>2</sup>		5 ft
Open Channels	Dry Swale	Made Soil	2 feet	5 max	No more than 4%	3-5 ft
	Wet Swale	OK	below WT	5 max		1 ft

## Notes:

- 1: Unless adequate water balance and anti-clogging device installed
- 2: Drainage area can be larger in some instances
- 3: May be larger in areas where the soil percolation rate is greater than 5.0 in/hr
- 4: Designed to treat rooftop runoff only
- 5: If designed with a permeable bottom, must meet the depth requirements for infiltration practices.
- 6: Required ponding depth above geotextile layer.



Source  
Control



Source  
Control

# **Infiltration Trench — Source Control**

**TSS — 82%, TP- 60%, TN- 42%**



# Bio-retention-SOURCE CONTROL

TSS- 75%, TP- 39%, TN- 46%



# Grassed Channel — Source Control

TSS- 78%, TP- 33%, TN- 56%





Sand Filter — Source Control

TSS- 84%, TP- 53%, TN- 32%

# Source Control Concepts

- **Preserving Natural Features and Using Conservation Design** → **▪ Avoid the impacts**
- **Reducing Impervious Cover** → **▪ Reduce the impacts**
- **Using Natural Features and Source Control for Stormwater Management** → **▪ Manage the impacts**

**Source Control is a process to development design that seeks to:**



**◀ Use pervious areas for more effective stormwater treatment.  
AND.....**

Keep and treat water on-site before  
discharging to local waterways

Vegetated Swale  
←



Rain Garden  
→

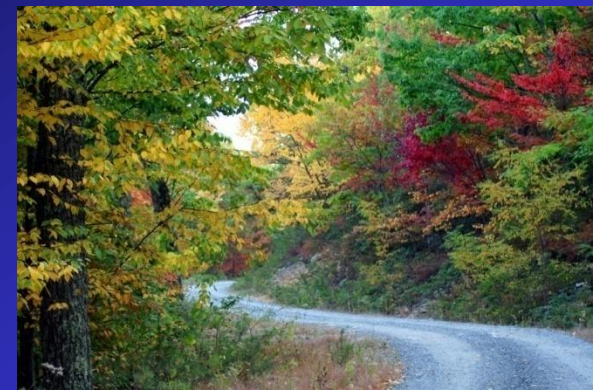


# Land Use

- Rural
- Residential
- Roads and Highways
- Commercial Development



Uses



ONE PRACTICE  
DOES NOT FIT  
ALL CONDITIONS

# **Source Control – Green Infrastructure**

**Practices are separated into Two  
Categories :**

**Planning Practices &  
Treatment Practices**

# Planning Practices for Preservation of Natural Features

1. Preservation of Undisturbed Areas
2. Preservation of Buffers
3. Reduction of Clearing & Grubbing
4. Locating Sites in Less Sensitive Areas
5. Open Space Design
6. Soil Restoration

# Planning Practices for Reduction of Impervious Cover

- 7. Roadway Reduction**
- 8. Sidewalk Reduction**
- 9. Driveway Reduction**
- 10. Cul-de-sac Reduction**
- 11. Building Footprint Reduction**
- 12. Parking Reduction**

# Runoff Reduction Practices

1. Conservation of Natural Areas
2. Sheet Flow to Riparian Buffers or Filter Strips
3. Vegetated Swale
4. Tree Planting / Tree Box
5. Disconnection of Rooftop Runoff
6. Stream Daylighting

# Runoff Reduction Practices, cont'd

7. Rain Garden
8. Green Roof
9. Stormwater Planter
10. Rain Barrels and Cisterns
11. Porous Pavement



**PERMEABLE  
PAVEMENT**

# Planning Practice #1

## Preservation of Undisturbed Areas

“Delineate and avoid disturbing wetlands, stream corridors”

“The plan must have resource protection at the core”



## Planning Practice #2 : Preservation of Buffers



➤ Delineate stream, river and wetland buffers on plans.

➤ Protect during:

- Design
- Construction
- Home occupancy

• ***Consult/amend local codes***

## Planning Practice #3 :

# Reduction of Clearing & Grading

Photo:  
Randall Arendt

- Establish limit of clearing on plans
- Use site footprinting
- Use open space or cluster development



***Consult/amend  
local codes***

## Planning Practice #4 :

# Locate Sites in Less Sensitive Areas

➤ Locate development to avoid:

■ Erodible soils    ■ Floodplains ↓

■ Steep slopes

■ Wetlands

■ Mature

Forests

■ Critical

habitat

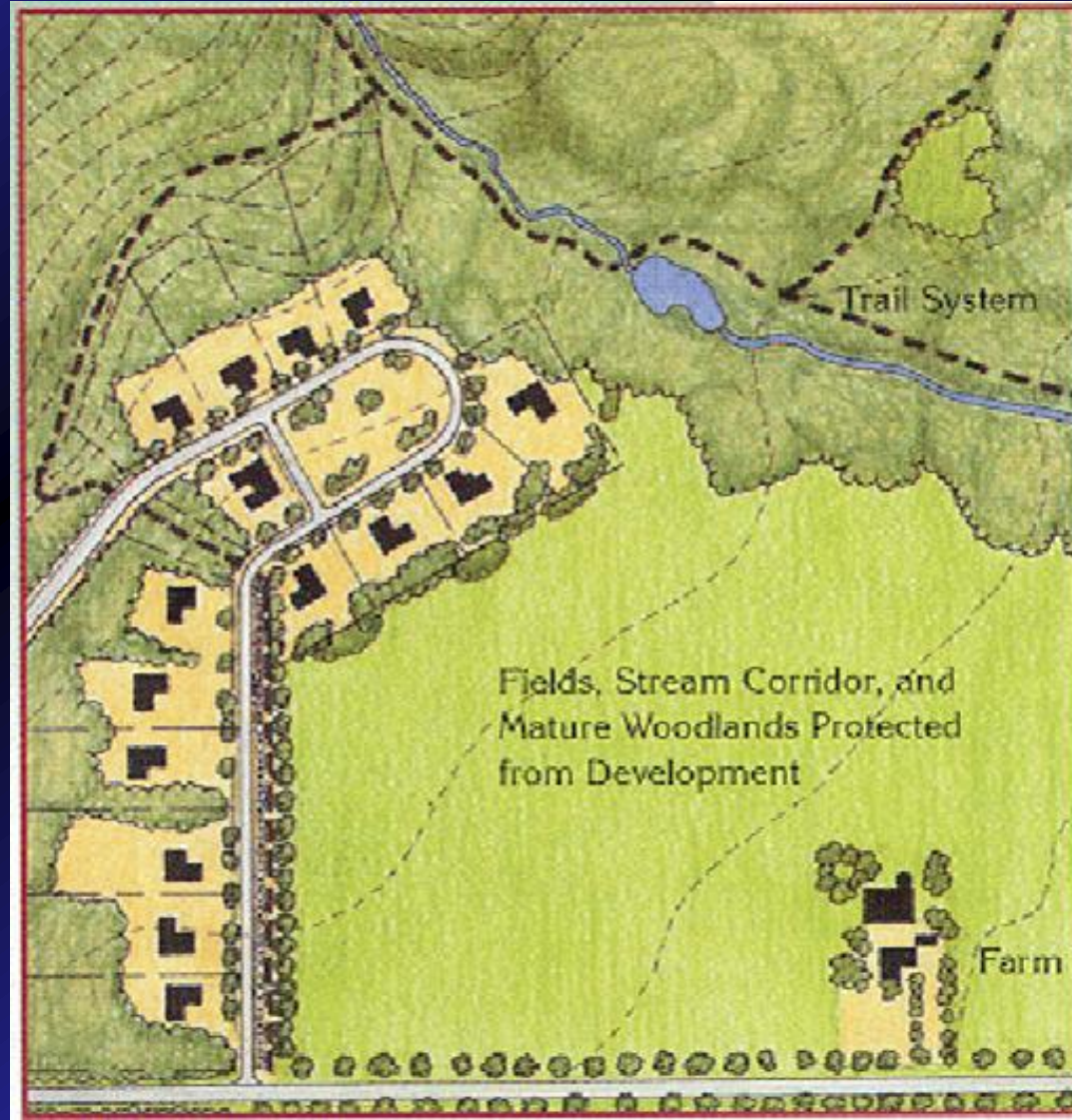


# Planning Practice #5 : Open Space Design

*Consult/amend  
local codes*

- Use smaller lot sizes
- Design non-traditional lot layouts

Locate lots in  
least sensitive  
areas



# Open Space Design

An approach to development design  
that seeks to:



◀ Preserve  
undisturbed  
areas

# Planning Practice #6 : Soil Restoration

Required for Redevelopment

Affects Post-Construction  
Hydrology



# Planning Practice #6 : Soil Restoration

From pg. 5-21: If soil restoration is not used per Table 5.3:

- a) Take compacted areas as impervious for calculating  $WQ_v$  and
- b) Change the HSG to the next less permeable soil group for ALL hydrologic calculations.

# Planning Practices for Reduction of Impervious Cover

- 7. Roadway Reduction**
- 8. Sidewalk Reduction**
- 9. Driveway Reduction**
- 10. Cul-de-sac Reduction**
- 11. Building Footprint Reduction**
- 12. Parking Reduction**

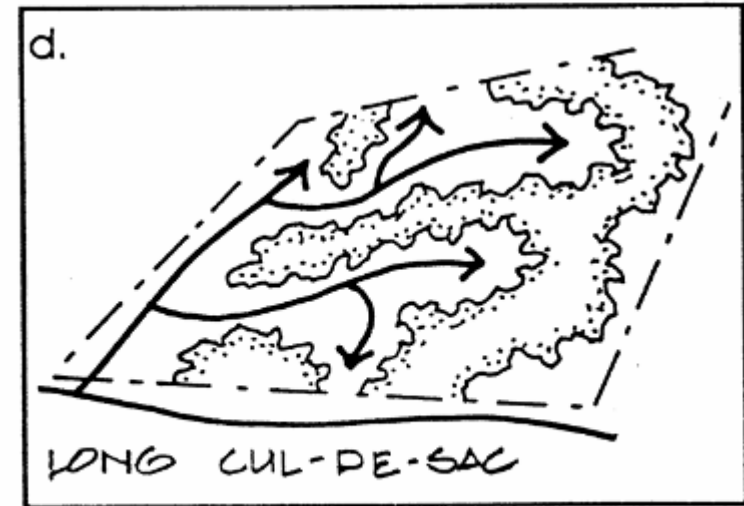
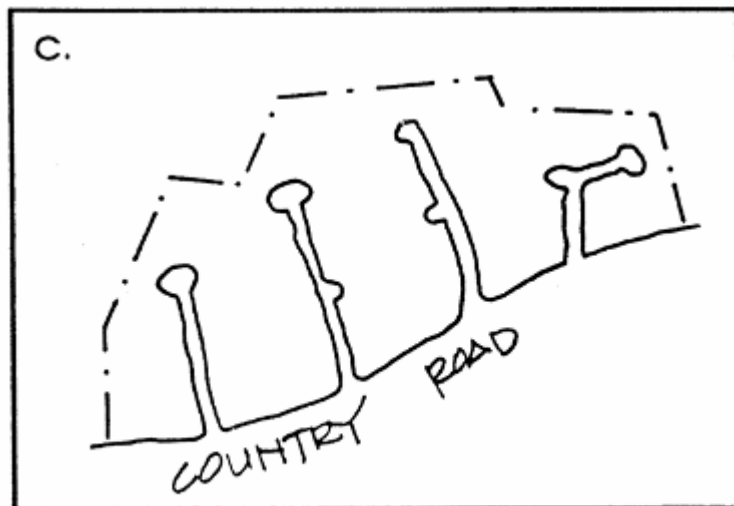
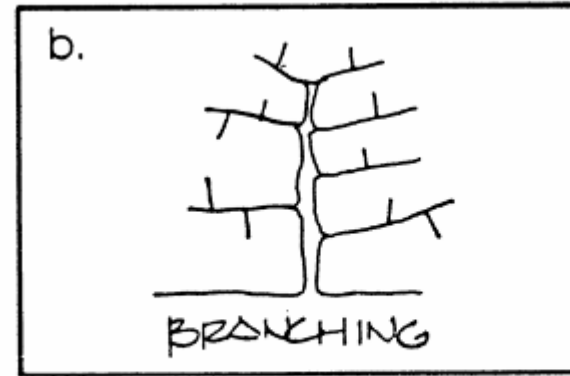
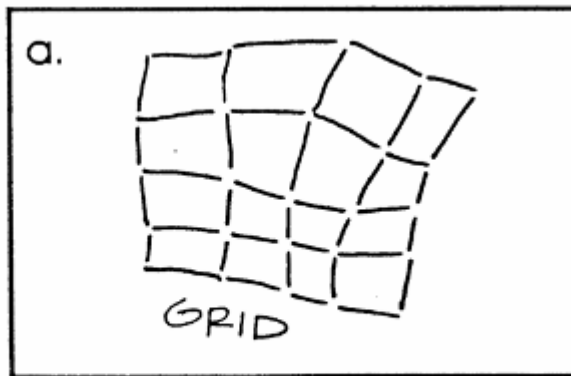
# Practice #7 : Roadway Reduction

- **Design according to density and traffic demand**



# Planning Practice #7 : Roadway Reduction

- Use alternative road patterns to reduce overall road length



# Planning Practice #8 : Sidewalk Reduction



- Use alternative designs
- Design on one side of street only
- Use alternative surfaces

# Planning Practice #9 : Driveway Reduction



How?

- Shared driveways
- Alternative materials
- Shorter setbacks = shorter driveways

***Consult/amend  
local codes***

# Planning Practice #10 : Cul-de-Sac Reduction

- Minimize #  
cu-de-sacs
- Minimize  
radius
- Include  
landscaped  
island
- Use alternative designs . . .



# Planning Practice #11 : Building Footprint Reduction

➤ Reduce  
directly  
connected  
impervious  
area



Practice #12 :  
Reduce  
Parking Lot  
Imperviousness



➤ Use permeable pavers in overflow parking areas (TP #11)

# Runoff Reduction Practice #1 : Conservation of Natural Areas

## ➤ Delineate & Place in permanent conservation:

- Undisturbed forest
- Native vegetation
- Stream corridors
- Floodplains
- Wetlands



# Runoff Reduction Practice #2 : Sheet Flow to Riparian Buffers or Filter Strips

➤ Treat & control runoff with:

- **Forested areas**
- **Stream buffers**
- **Vegetated filter strips**



# Runoff Reduction Practice #3 : Vegetated Open Swales

- **Convey & treat runoff with:**
  - **Natural drainage paths**
  - **Properly designed & constructed channels**
- **On certain sites use in street right-of-way**



# Runoff Reduction Practice #4 : Tree Planting

➤ **Plant trees to:**

- **Reduce stormwater runoff**
- **Absorb nutrients**
- **Stabilize banks**
- **Shade streams**
- **Provide habitat**



# Treatment Practice #5 : Rooftop Disconnection



Direct flows to  
pervious areas.

# Runoff Reduction Practice #6 : Stream Daylighting



## Benefits:

- Increases aesthetics
- Sunlight kills pathogens
- Prevents flooding – increased storage
- Improves in-stream habitat
- Increases public use
- Increases property values

# Runoff Reduction Practice #7 : Rain Gardens

➤ Treat runoff with:

- Rain garden  
(simpler version  
of bioretention)
- Use for Rooftop  
and overland  
flows.
- Use in required  
landscaping



# Runoff Reduction Practice #8 : Green Roofs



# Runoff Reduction Practice #9 : Stormwater Planters



# Runoff Reduction Practice #10: Rain Barrels & Cisterns



# Runoff Reduction Practice #11 : Permeable Pavement



1. An owner of stormwater management practice, including the runoff reduction practices, shall erect or post, in the immediate vicinity of the practice, a conspicuous and legible sign of not less than 18 inches by 24 inches (or 10"X12" for footprints smaller than 400 sf) bearing the following information:

**STORMWATER MANAGEMENT PRACTICE -**  
*(name of the practice)*

**Project Identification -** *(SPDES Construction Permit #, other)*

**Must Be Maintained In Accordance With O&M Plan**

**DO NOT REMOVE OR ALTER** (NYSSWDMpg. 3-12)

What are we doing for  
Climate Change?



New Hydrology

# TP - 40

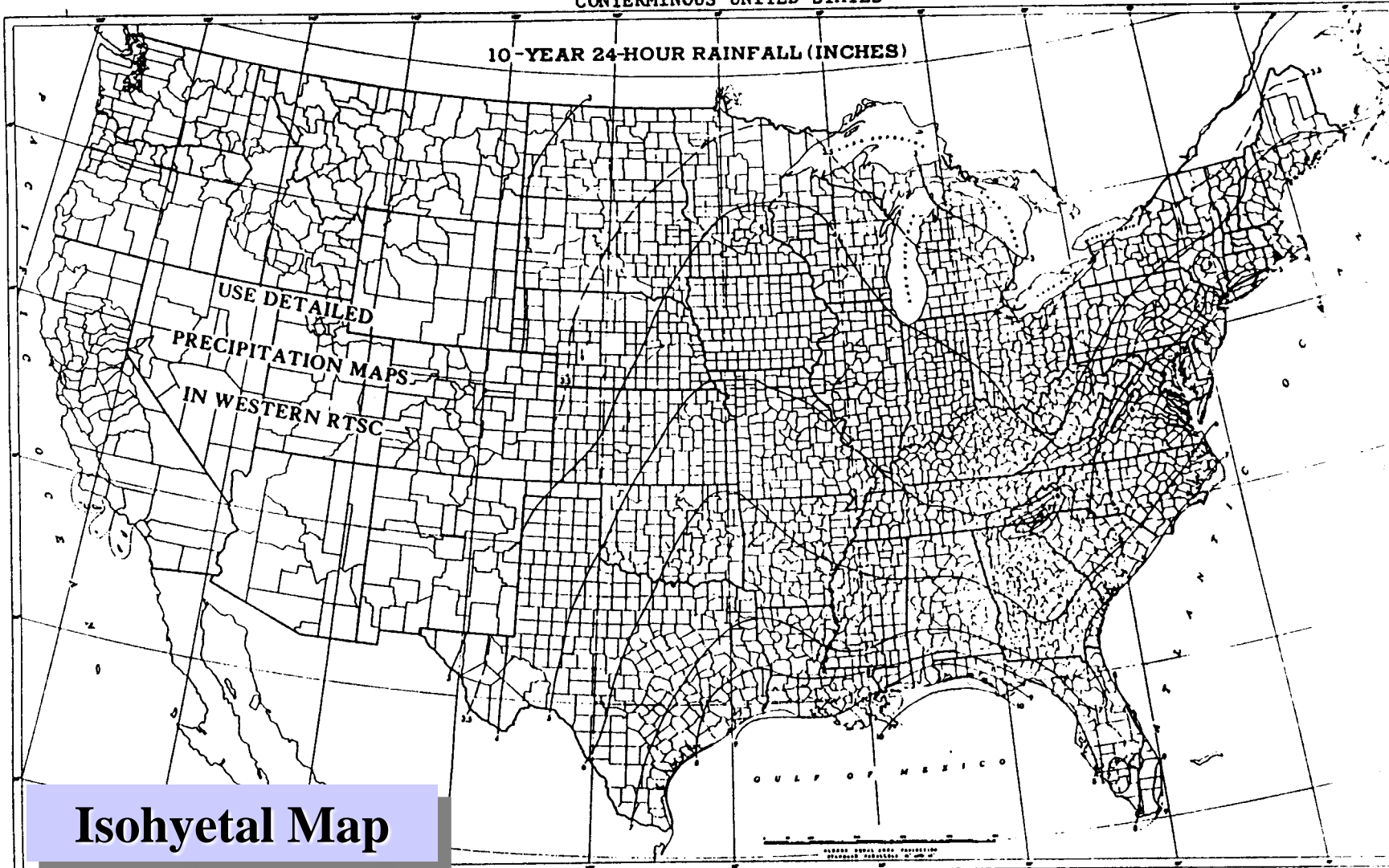
- Technical Paper 40
- Formal name is Rainfall Frequency Atlas of the United States
- Developed by the David Hershfield at the Weather Bureau published in 1961
- Rainfall charts for storm events from a 1-year 30-minute rainfall to a 100-year 24-hour event.

# TP-40 and TR-55

- TP-40 has long been considered the sole source for rainfall quantity in many states. Its use is often mandated by agencies statewide.
- Its is relied upon by numerous municipalities and local, state and federal agencies, engineers and hydrologists. The rainfall quantities are used for designing retention and detention basins, infiltration devices, culverts and other hydrologic structures.
- Unfortunately, TR-55, issued in 1986, publishes the charts from the old TP-40 for its own rainfall charts

CONTERMINOUS UNITED STATES

10-YEAR 24-HOUR RAINFALL (INCHES)



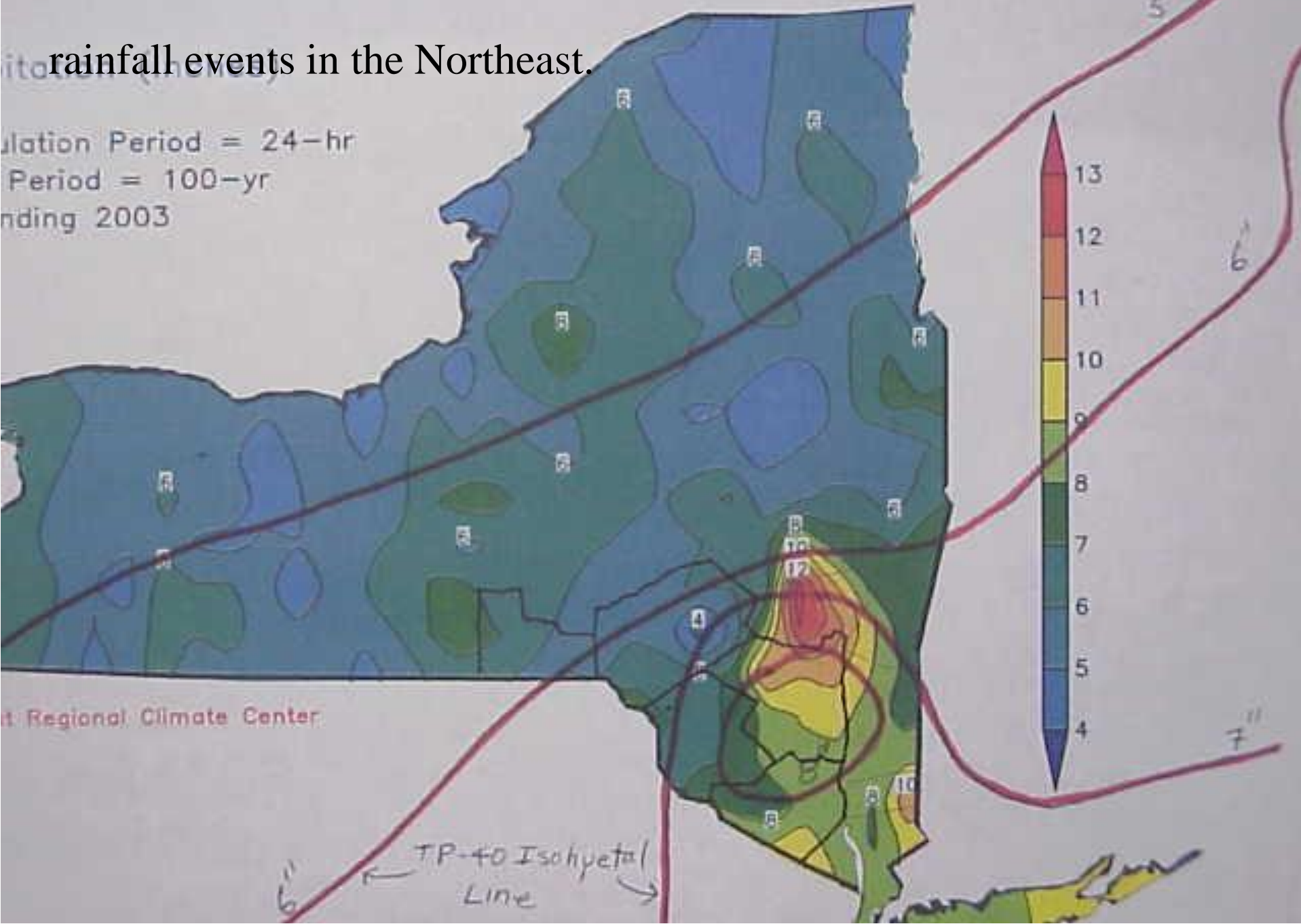
**Isohyetal Map**

Exhibit 2-3  
Sheet 3 of 5

Prepared by U. S. Weather Bureau

NRCC finds a 67% increase in the number of 2” rainfall events in the Northeast.

Simulation Period = 24-hr  
Period = 100-yr  
ending 2003





Address [http://hdsc.nws.noaa.gov/hdsc/pfds/orb/pa\\_pfds.html](http://hdsc.nws.noaa.gov/hdsc/pfds/orb/pa_pfds.html)

Search AOL.com Yellow Pages Maps Shopping Quotes Weather M

Google Go Bookmarks 933 blocked Check AutoLink AutoFill Send to Settings

Pop-up blocked. To see this pop-up or additional options click here...

www.nws.noaa.gov

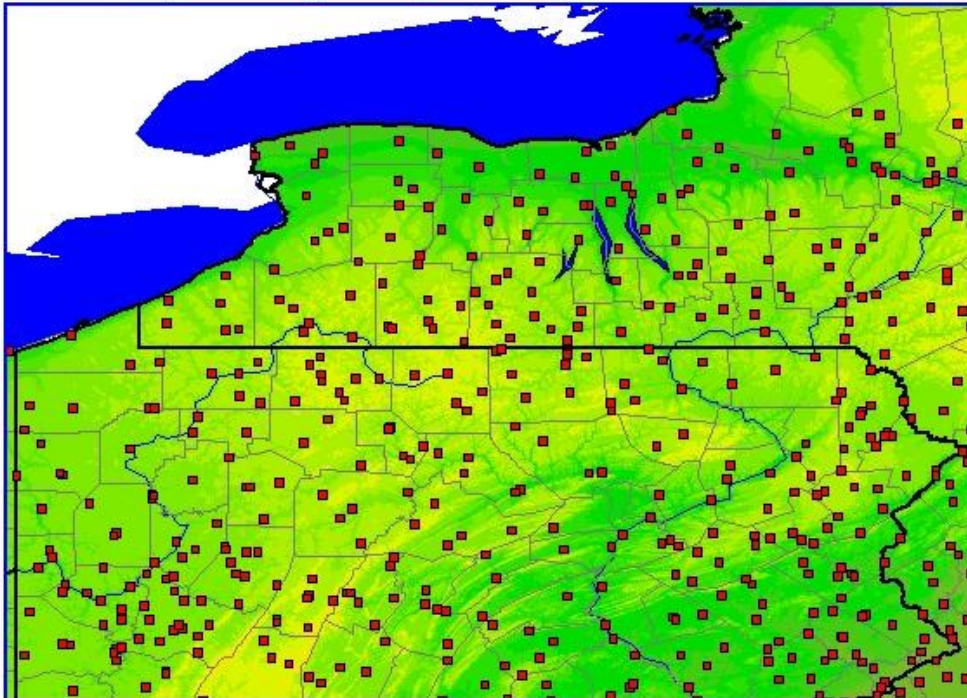


NOAA's National Weather Service

# Hydrometeorological Design Studies Center Precipitation Frequency Data Server



GIS data Maps Temporal Time Series Documentation Versions FAQ Help U.S. map



## PENNSYLVANIA new Version 3 data

Reset

**Data type:**

NOAA Atlas 14 Precipitation Frequency Estimates

**Partial duration or annual maxima based results:**

Partial duration (PD)

Units: U.S. inches or mm

**Select specific observing site from list.**

Select observing site

Submit site

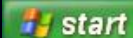
**Enter fixed location.**

Latitude:  Longitude:

Submit location

Done

Internet



12 Internet Explorer

Microsoft PowerPoint ...

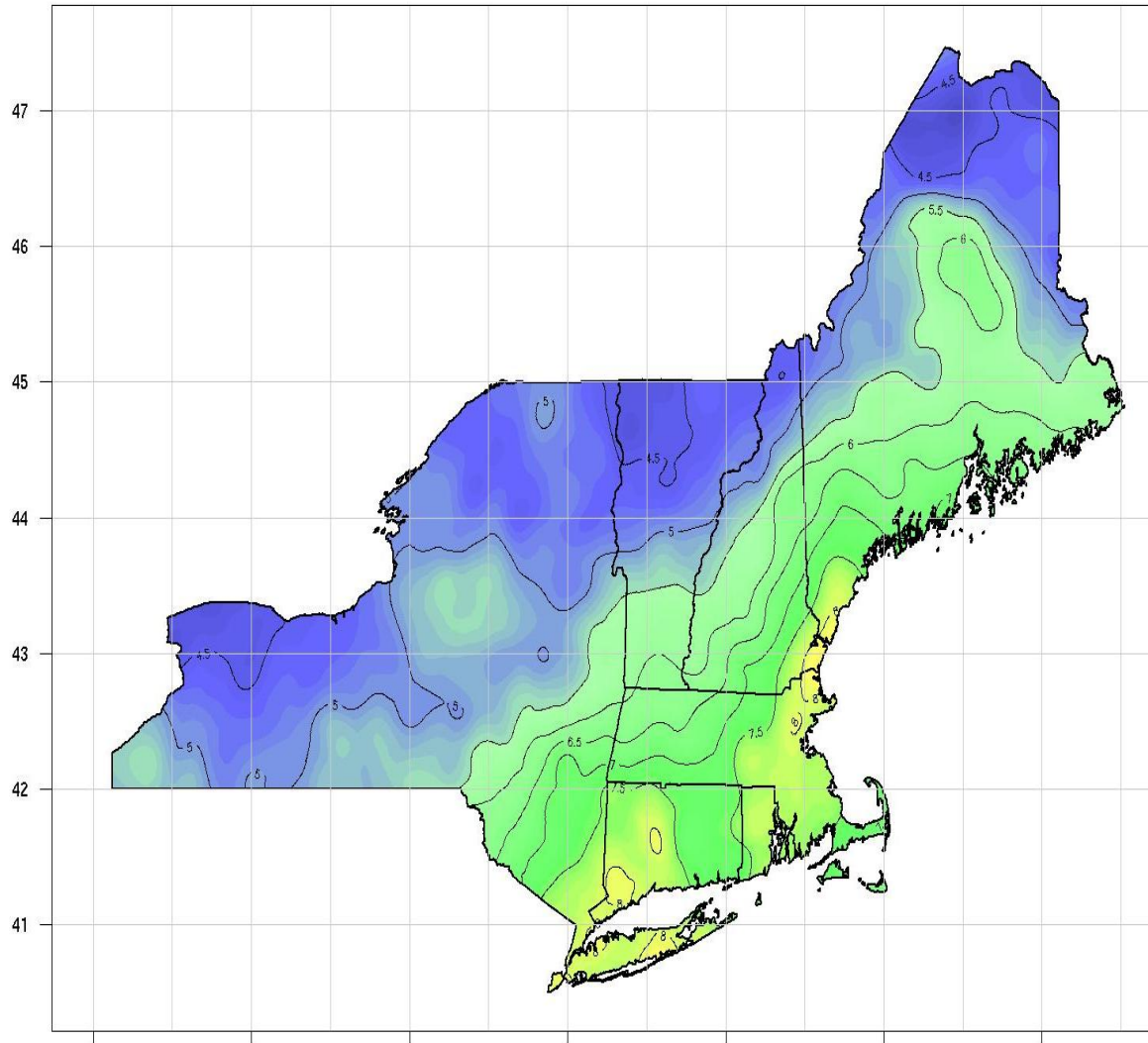
Windows Media Player

Adobe Acrobat Profe...

7:23 PM

# Final Output

Extreme Precipitation Estimates  
1day 100yr



# **Obtaining NRCC Rainfall Data and Importing it into WinTR-20 and WinTR-55**

# Program to convert NRCC text file and import it into WinTR-20

- Program is incorporated into Windows interface;
- Reads NRCC text file created by the user thru download;
- After downloading text file, open WinTR-20 Windows interface and click “**File**” then “**Import NRCC Data**”;
- Rainfall Distribution and Rainfall Data comes as a part of the Window WinTR-20 system.

# Northeast Regional Climate Center web site:

The screenshot shows a Windows Internet Explorer browser window displaying the website 'Extreme Precipitation in a Changing Climate'. The address bar shows the URL: <http://sunspot.eas.cornell.edu/~daz8/xprecip/new3/>. The page title is 'Extreme Precipitation in New York & New England: An Interactive Web Tool for Extreme Precipitation Analysis'. The navigation menu includes 'About this Project', 'Data & Products', and 'Documentation'. A 'First-Time Visitor' box with a question mark icon and the text 'Click here for Getting Started Guide' is prominent. The 'Web Site Features' section describes the site's compatibility with NWS analysis, its design for stakeholders, and the inclusion of extreme rainfall estimates for various durations and recurrence intervals. A small map of the region is visible at the bottom right of the page content.

- Open the NRCC web site at <http://www.precip.net> or <http://sunspot.eas.cornell.edu/~daz8/xprecip/new3>

# Import NRCC Data into WinTR-20

The screenshot shows a web browser window titled "Extreme Precipitation in a Changing Climate - Windows Internet Explorer". The address bar shows the URL: <http://sunspot.eas.cornell.edu/~daz8/xprecip/new3/>. The page features a navigation menu with three tabs: "About this Project", "Data & Products", and "Documentation". The "Data & Products" tab is active, displaying a "Select Location" section with a map of the Albany, New York area. The map includes a search bar, a "Hybrid" map style selector, and three location input fields: "Locate by Address", "Locate by Lat/Lon", and "Locate by State/County". Below the map is a "Select Options" section with "Smoothing" set to "Yes" and "Delivery" set to "Popup". A large green "Submit" button is centered below the options. The footer contains copyright information (2010), logos for the Northeast Regional Climate Center (NRCC) and the Natural Resources Conservation Service (NRCS), and contact information for daz8@cornell.edu.

- Click “Data & Products” tab
- Click on the “Extreme Precipitation Tables – Text/CSV?” from “Select Product?”

# Import NRCC Data into WinTR-20

Extreme Precipitation in a Changing Climate - Windows Internet Explorer

File Edit View Favorites Tools Help

http://sunspot.eas.cornell.edu/~daz8/xprecip/new3/

## Extreme Precipitation in New York & New England

An Interactive Web Tool for Extreme Precipitation Analysis

About this Project Data & Products Documentation

Select Product?

- Extreme Precipitation Tables - HTML
- Extreme Precipitation Tables - Text/CSV
- Partial Duration Series
- Precipitation Distribution Curves
- Intensity Frequency Duration Graphs
- Precipitation Frequency Duration Graphs
- Regional/State Maps
- GIS Data Files
- County Statistics

Select Location? Double-click the map to place a marker, or enter address or latitude/longitude.

Hybrid

Locate by Address? Locate by Lat/Lon? Locate by State/County?

NEW YORK

- Albany
- Allegany
- Broome
- Cattaraugus
- Cayuga
- Chautauqua
- Chemung
- Chenango
- Clinton
- Columbia
- Cortland
- Delaware
- Dutchess
- Erie
- Essex
- Franklin
- Fulton
- Genesee
- Greene
- Hamilton
- Herkimer
- Jefferson
- Lewis
- Livingston
- Madison

Select Options?

Smoothing? Yes

Delivery? Popup

Submit

Copyright 2010. This project is a joint collaboration between:

Northeast Regional Climate Center (NRCC) Natural Resources Conservation Service (NRCS)

USDA

Contact: daz8@cornell.edu

- Click on “Locate by State/County?” to select location.
- Select specific observing site from the list (Example – Albany, New York).

# Import NRCC Data into WinTR-20

**Extreme Precipitation in New York & New England**  
*An Interactive Web Tool for Extreme Precipitation Analysis*

**About this Project**   **Data & Products**   **Documentation**

**Select Product?**

- Extreme Precipitation Tables - HTML?
- Extreme Precipitation Tables - Text/CSV?
- Partial Duration Series?
- Precipitation Distribution Curves?
- Intensity Frequency Duration Graphs?
- Precipitation Frequency Duration Graphs?
- Regional/State Maps?
- GIS Data Files?
- County Statistics?

**Select Location?** Double-click the map to place a marker, or enter address or latitude/longitude.

Hybrid   Locate by Address?   Locate by Lat/Lon?   Locate by State/County?

Albany

**Select Options?**

Smoothing?   Delivery?

Yes   Popup

**Submit**

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This project is a joint collaboration between:  
**Northeast Regional Climate Center (NRCC)**   **Natural Resources Conservation Service (NRCS)**

Partners: LACS, NRCC, Cornell University, USDA

Contact: daz8@cornell.edu

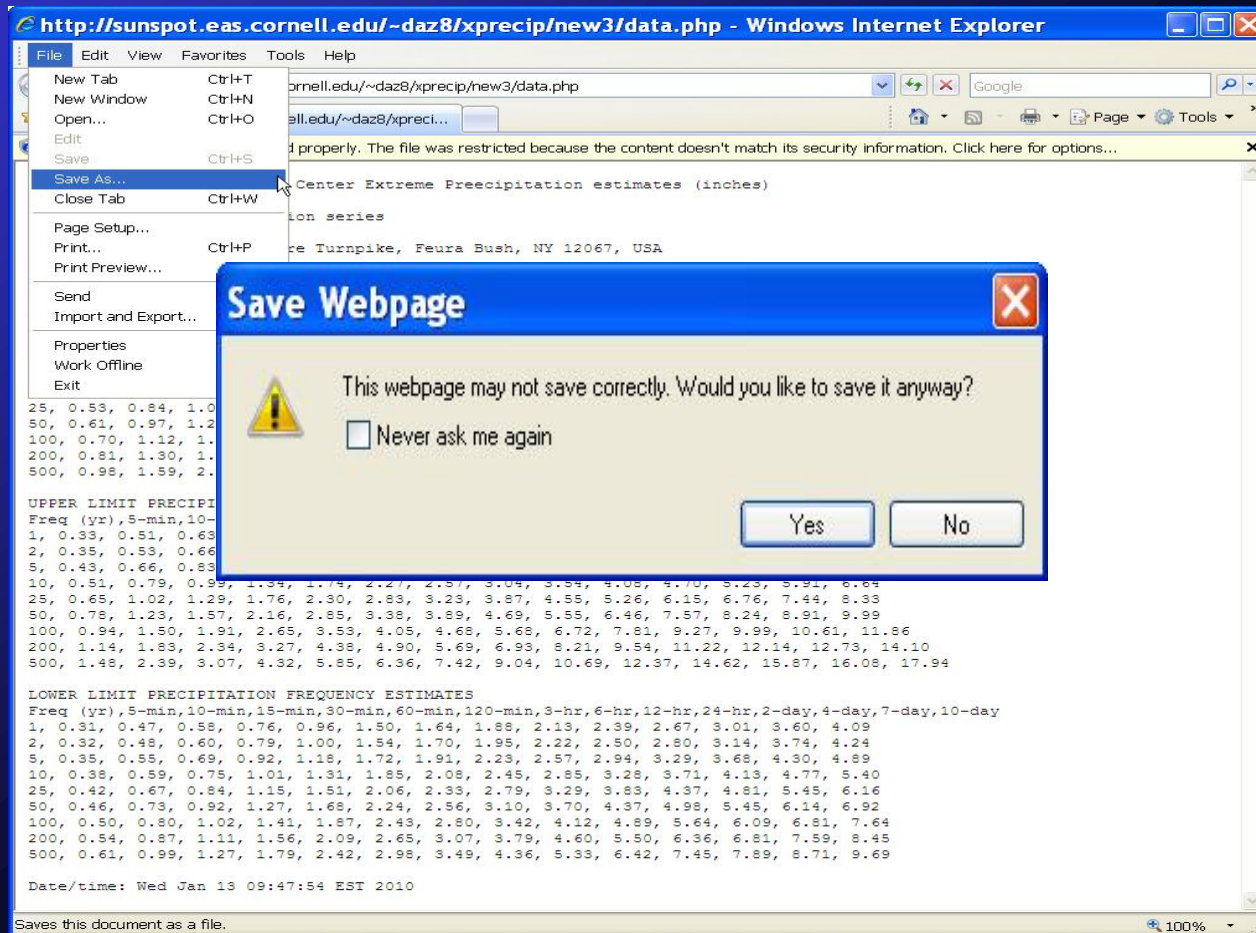
- Under “Select Options?”
  - Smoothing – Yes
  - Delivery - Popup
- Click “Submit site” button.

# Import NRCC Data into WinTR-20

```
http://sunspot.eas.cornell.edu/~daz8/xprecip/new3/data.php - Windows Internet Explorer
File Edit View Favorites Tools Help
http://sunspot.eas.cornell.edu/~daz8/xprecip/new3/data.php
This content might not be displayed properly. The file was restricted because the content doesn't match its security information. Click here for options...
Northeast Regional Climate Center Extreme Precipitation estimates (inches)
Point Estimates
Data series, Partial duration series
State, New York
Location, near 1749 Delaware Turnpike, Feura Bush, NY 12067, USA
Lon (dd), -73.936
Lat (dd), 42.576
Elev (feet), 515
MEAN PRECIPITATION FREQUENCY ESTIMATES
Freq (yr), 5-min, 10-min, 15-min, 30-min, 60-min, 120-min, 3-hr, 6-hr, 12-hr, 24-hr, 2-day, 4-day, 7-day, 10-day
1, 0.32, 0.49, 0.61, 0.79, 1.00, 1.33, 1.68, 1.92, 2.17, 2.44, 2.74, 3.07, 3.66, 4.17
2, 0.33, 0.51, 0.63, 0.83, 1.05, 1.59, 1.75, 2.01, 2.28, 2.57, 2.89, 3.24, 3.85, 4.38
5, 0.39, 0.60, 0.75, 1.01, 1.29, 1.84, 2.05, 2.39, 2.77, 3.17, 3.57, 3.99, 4.62, 5.20
10, 0.44, 0.69, 0.87, 1.17, 1.51, 2.06, 2.32, 2.75, 3.21, 3.71, 4.20, 4.67, 5.34, 6.02
25, 0.53, 0.84, 1.06, 1.44, 1.88, 2.43, 2.77, 3.33, 3.94, 4.59, 5.22, 5.74, 6.41, 7.23
50, 0.61, 0.97, 1.23, 1.69, 2.23, 2.77, 3.19, 3.87, 4.63, 5.44, 6.15, 6.71, 7.40, 8.31
100, 0.70, 1.12, 1.43, 1.98, 2.63, 3.18, 3.68, 4.51, 5.41, 6.39, 7.24, 7.85, 8.53, 9.56
200, 0.81, 1.30, 1.66, 2.32, 3.11, 3.65, 4.26, 5.25, 6.33, 7.51, 8.56, 9.16, 9.91, 11.00
500, 0.98, 1.59, 2.04, 2.87, 3.88, 4.43, 5.20, 6.45, 7.81, 9.28, 10.64, 11.28, 11.98, 13.25
UPPER LIMIT PRECIPITATION FREQUENCY ESTIMATES
Freq (yr), 5-min, 10-min, 15-min, 30-min, 60-min, 120-min, 3-hr, 6-hr, 12-hr, 24-hr, 2-day, 4-day, 7-day, 10-day
1, 0.33, 0.51, 0.63, 0.83, 1.04, 1.59, 1.73, 1.98, 2.25, 2.54, 2.82, 3.18, 3.79, 4.30
2, 0.35, 0.53, 0.66, 0.87, 1.10, 1.64, 1.81, 2.09, 2.38, 2.70, 3.01, 3.38, 3.99, 4.53
5, 0.43, 0.66, 0.83, 1.11, 1.42, 1.96, 2.20, 2.57, 2.98, 3.41, 3.87, 4.32, 4.97, 5.62
10, 0.51, 0.79, 0.98, 1.36, 1.74, 2.27, 2.57, 3.04, 3.54, 4.08, 4.70, 5.23, 5.91, 6.64
25, 0.65, 1.02, 1.29, 1.76, 2.30, 2.83, 3.23, 3.87, 4.55, 5.26, 6.15, 6.76, 7.44, 8.33
50, 0.75, 1.23, 1.57, 2.16, 2.85, 3.38, 3.89, 4.69, 5.55, 6.46, 7.57, 8.24, 8.91, 9.99
100, 0.94, 1.50, 1.91, 2.65, 3.53, 4.05, 4.69, 5.68, 6.72, 7.81, 9.27, 9.99, 10.61, 11.86
200, 1.14, 1.83, 2.34, 3.27, 4.38, 4.90, 5.69, 6.93, 8.21, 9.54, 11.22, 12.14, 12.73, 14.10
500, 1.48, 2.39, 3.07, 4.32, 5.85, 6.36, 7.42, 9.04, 10.69, 12.37, 14.62, 15.87, 16.08, 17.94
LOWER LIMIT PRECIPITATION FREQUENCY ESTIMATES
Freq (yr), 5-min, 10-min, 15-min, 30-min, 60-min, 120-min, 3-hr, 6-hr, 12-hr, 24-hr, 2-day, 4-day, 7-day, 10-day
1, 0.31, 0.47, 0.58, 0.76, 0.96, 1.50, 1.64, 1.88, 2.13, 2.39, 2.67, 3.01, 3.60, 4.09
2, 0.32, 0.48, 0.60, 0.79, 1.00, 1.54, 1.70, 1.95, 2.22, 2.50, 2.80, 3.14, 3.74, 4.24
5, 0.35, 0.55, 0.69, 0.92, 1.18, 1.72, 1.91, 2.23, 2.57, 2.94, 3.29, 3.68, 4.30, 4.89
10, 0.39, 0.59, 0.75, 1.01, 1.31, 1.85, 2.08, 2.45, 2.85, 3.28, 3.71, 4.13, 4.77, 5.40
25, 0.42, 0.67, 0.84, 1.15, 1.51, 2.06, 2.33, 2.79, 3.29, 3.83, 4.37, 4.81, 5.45, 6.16
50, 0.46, 0.73, 0.92, 1.27, 1.68, 2.24, 2.56, 3.10, 3.70, 4.37, 4.98, 5.45, 6.14, 6.92
100, 0.50, 0.80, 1.02, 1.41, 1.87, 2.43, 2.80, 3.42, 4.12, 4.89, 5.64, 6.09, 6.81, 7.64
200, 0.54, 0.87, 1.11, 1.56, 2.09, 2.65, 3.07, 3.79, 4.60, 5.50, 6.36, 6.81, 7.59, 8.45
500, 0.61, 0.99, 1.27, 1.79, 2.42, 2.98, 3.49, 4.36, 5.33, 6.42, 7.45, 7.89, 8.71, 9.69
Date/time: Wed Jan 13 09:44:06 EST 2010
```

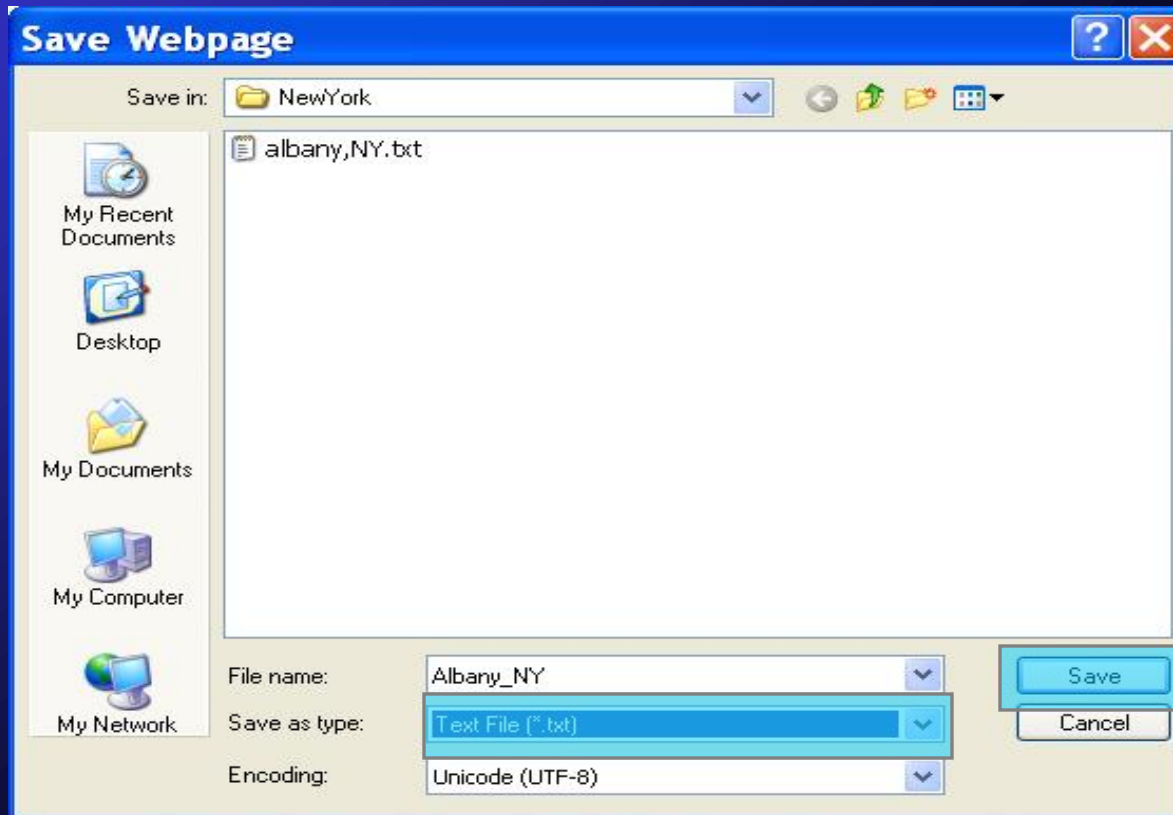
- Northeast Regional Climate Center Extreme Precipitation estimates (inches) table will pop up.

# Import NRCC Data into WinTR-20



- Click **“File”** then **“SaveAs...”**
- The **“Save Webpage”** will popup, Click **“Yes”**

# Import NRCC Data into WinTR-20



- Select an appropriate name for the text file (Albany\_NY)
- “Save as type: Text File (\*.txt)”
- Select a directory, Click “Save”

# Results of One Example: Albany, New York

	<i>TP-40</i>	<i>NRCC</i>
<i>Rainfall Data</i>	4.5 in	3.71 in
<i>Rainfall Distribution Type</i>	Type II	WinTR-20
<i>Runoff Discharge 10Yr-24-hr</i>	53.26 cfs	34.54 cfs
<i>Runoff Volume</i>	2.292 in	1.656 in

DESIGNATED LOCAL  
MUNICIPALITIES MUST  
REVIEW AND APPROVE ALL  
SWPP'S  
AND  
INSPECT ALL CONSTRUCTION  
SITES  
WITHIN THEIR BORDERS

# We Must Continue to :

- EDUCATE
- TRAIN
- PROMOTE
- ADMINISTER
- MONITOR
- EVALUATE

# THE STORM WATER PROGRAM



# Are You A Pointless Personal Polluter?

What's in your garage??



If you keep your sights on the GOAL..



..we can get there!!