



# An Open Standards Framework for Synoptic Evaluations of the Mohawk Watershed

With examples in the Upper Schoharie Watershed

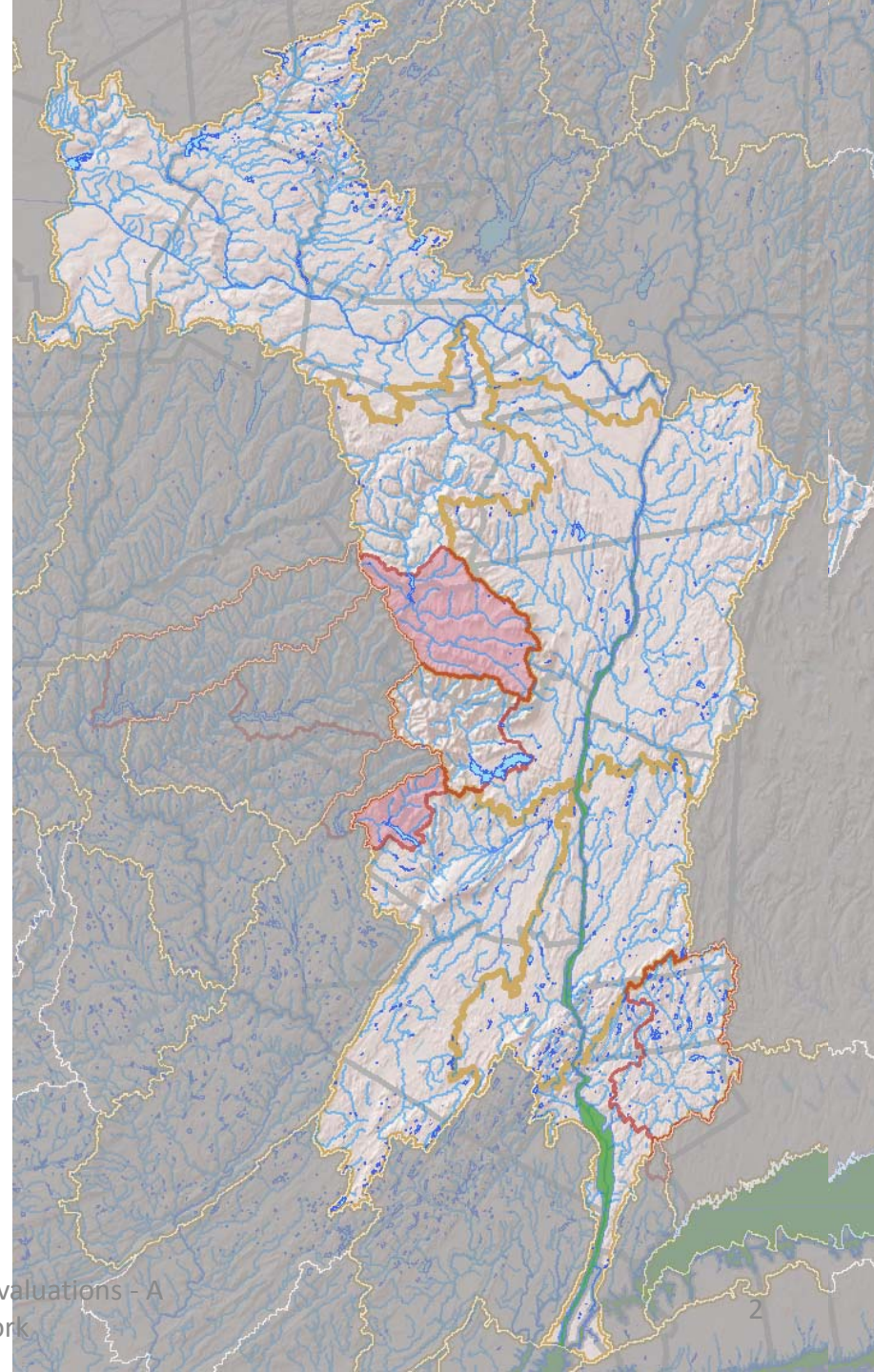
Ricardo Lopez-Torrijos  
Timothy Bondelid

Fifth Mohawk Watershed Symposium  
Union College, April 22, 2013

# Context

NYCDEP funded project  
to develop lidar-  
derived NHD, DEM,  
NHDPlus in the NYCW.

New baseline dataset,  
development of  
applications in  
modeling, land &  
stream management...





# NHDPlus Dataset



**Medium Resolution (~1:100,000)**



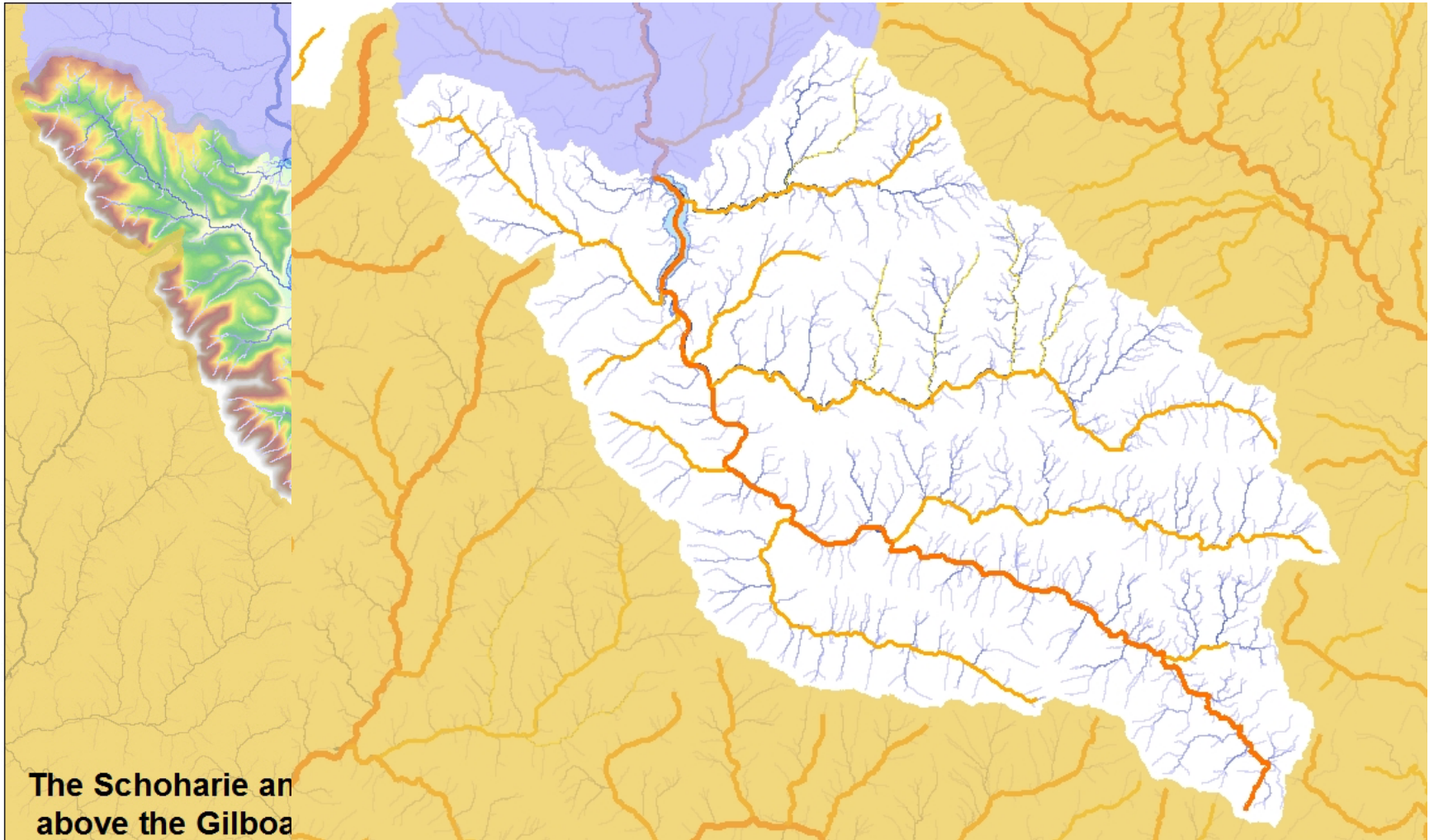
**High Resolution (~1:24,000)**



**Local Resolution (~1:8,000)**

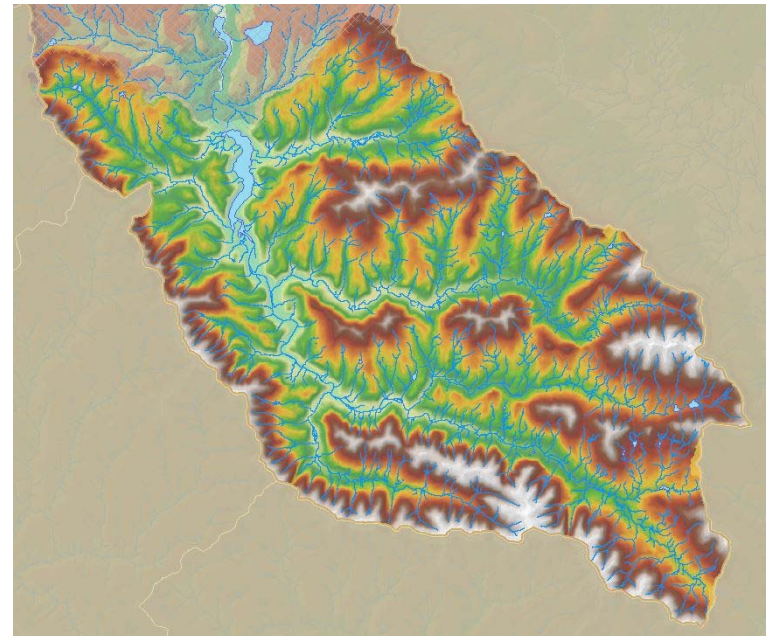
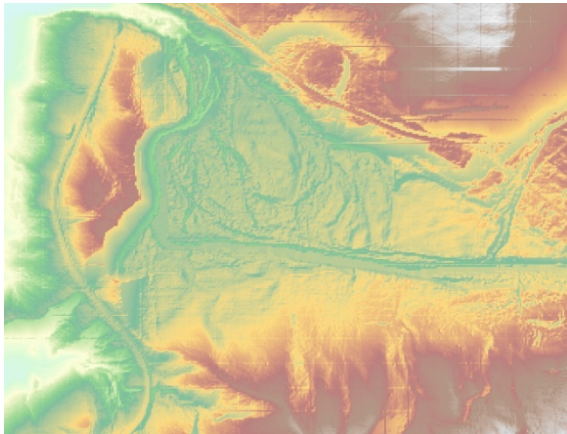


# NHDPlus Dataset

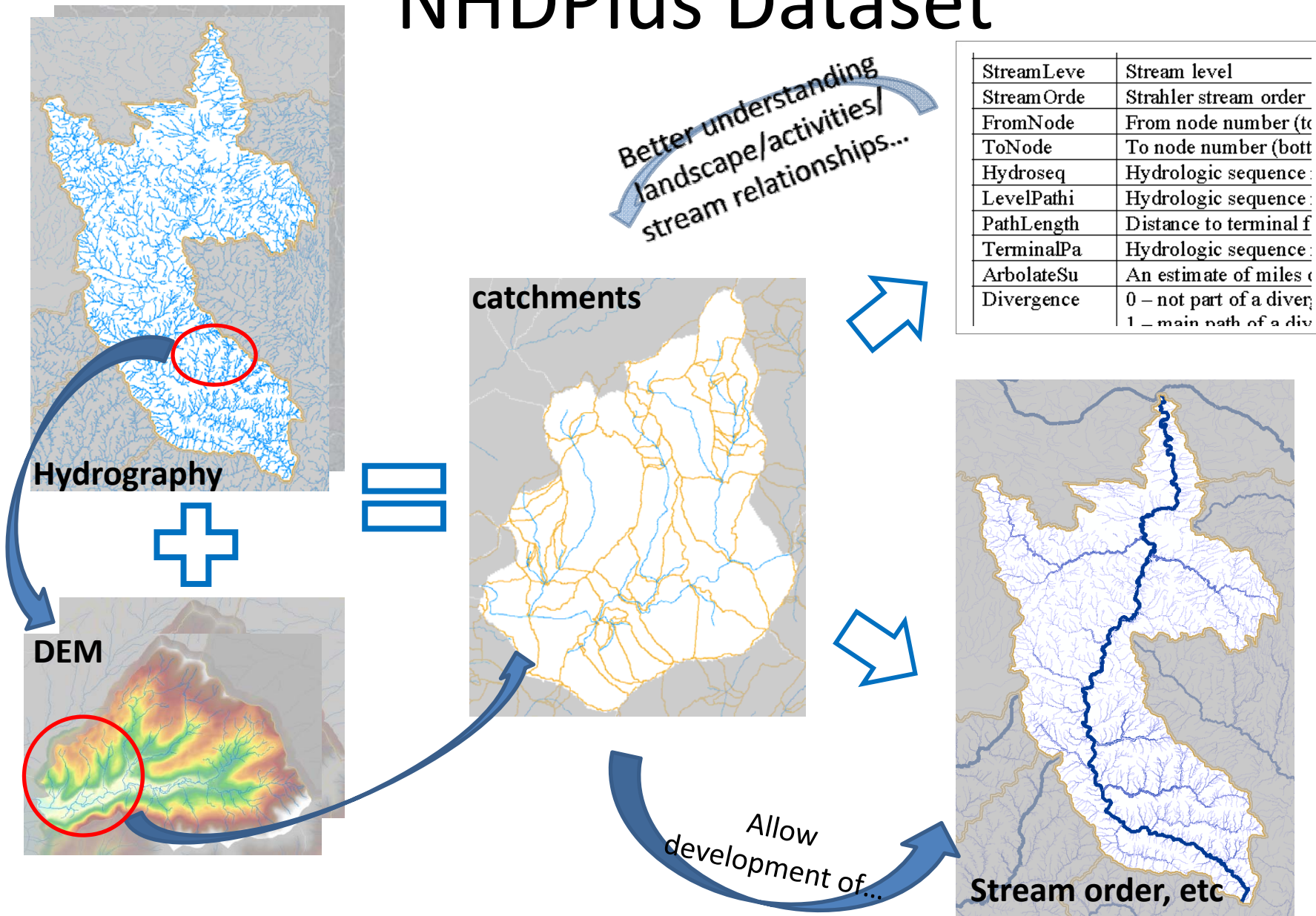


# NHDPlus Dataset

- Local Resolution (~1:8,000):**
- 1 m DEM, from Lidar, hydro enforced with...
  - NHD & HU boundary, from lidar.



# NHDPlus Dataset





# Why?

Evaluate...

(Modeling, analysis, management, tracking...)

Framework? Open Standards?

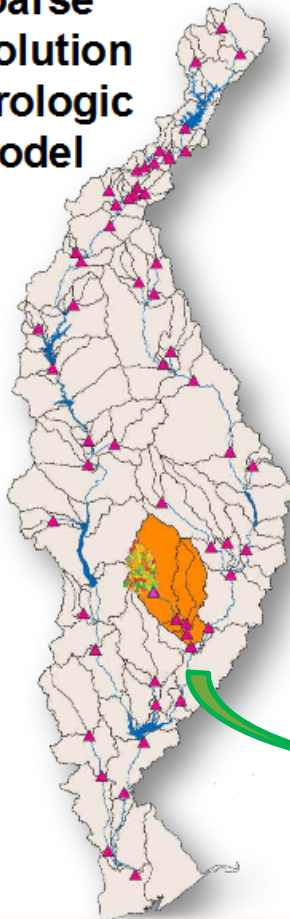
- Complexity
- Consistency
- Efficiency
- Affordability

# The proof is in the pudding...

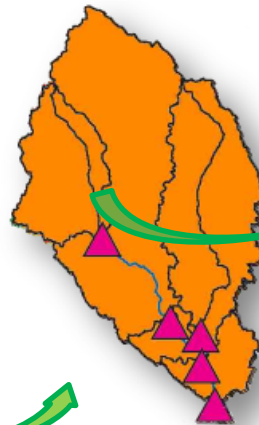


# National Hydrologic Model...

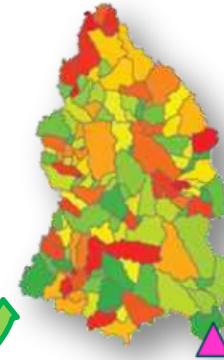
**Coarse  
Resolution  
Hydrologic  
Model**



Pull a stand-alone  
coarse resolution  
model from the larger  
one



Nest a stand-alone fine  
resolution model



Coarse HRUs based on stream  
gages and other "real-world"  
locations to enable nesting of models

Stand-alone models can  
be re-calibrated and  
nested back into the  
coarse resolution model



# Agricultural Conservation Planning Framework



To develop conservation practices in Iowa that can be distributed within watersheds according to geographic criteria, to optimize their environmental performance.





# The proof is in the pudding...

USGS:

- SPARROW
- NAWQA

EPA WATERS

MN DNR Reach Database...

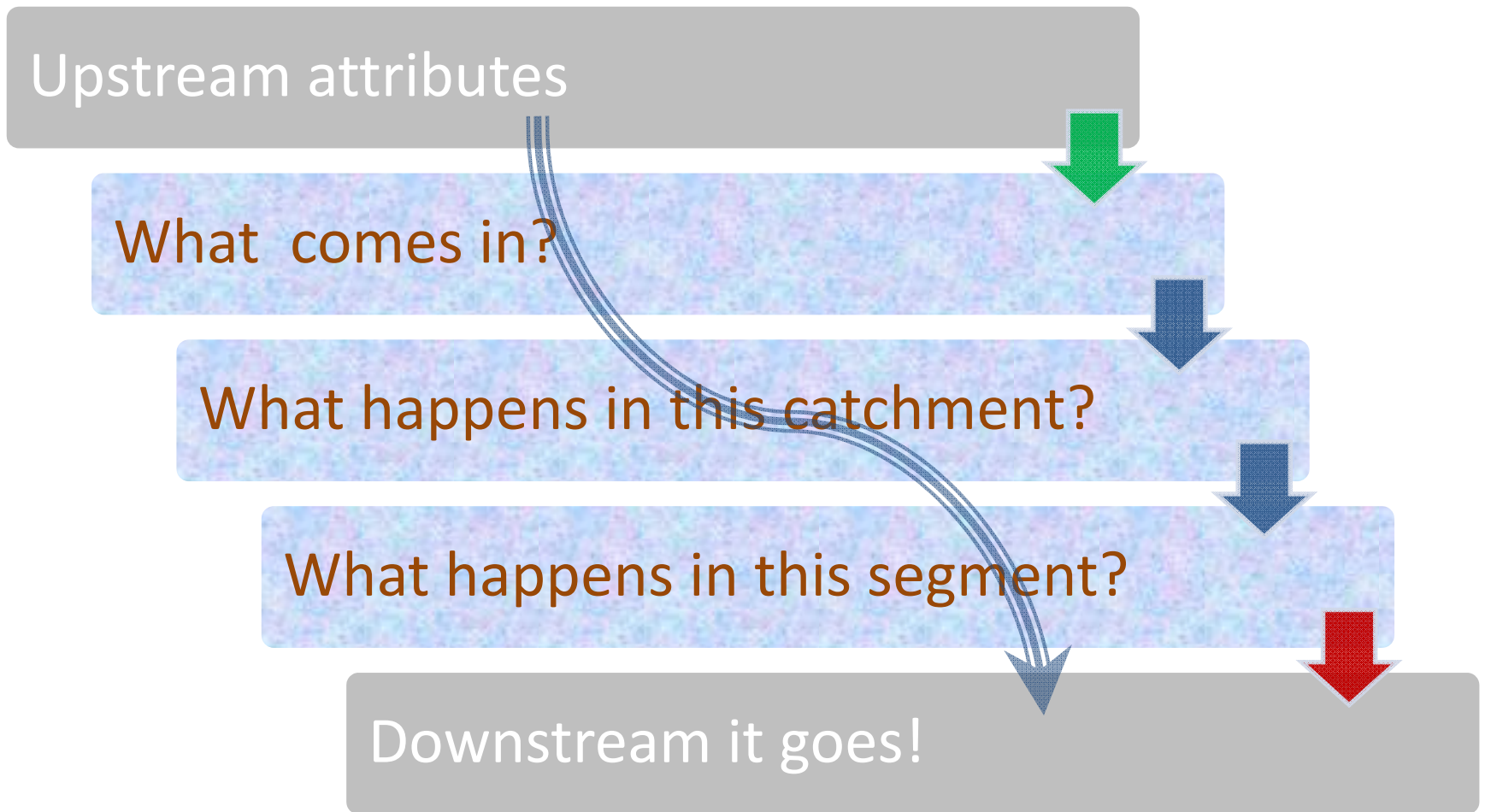


# The proof is in the pudding...

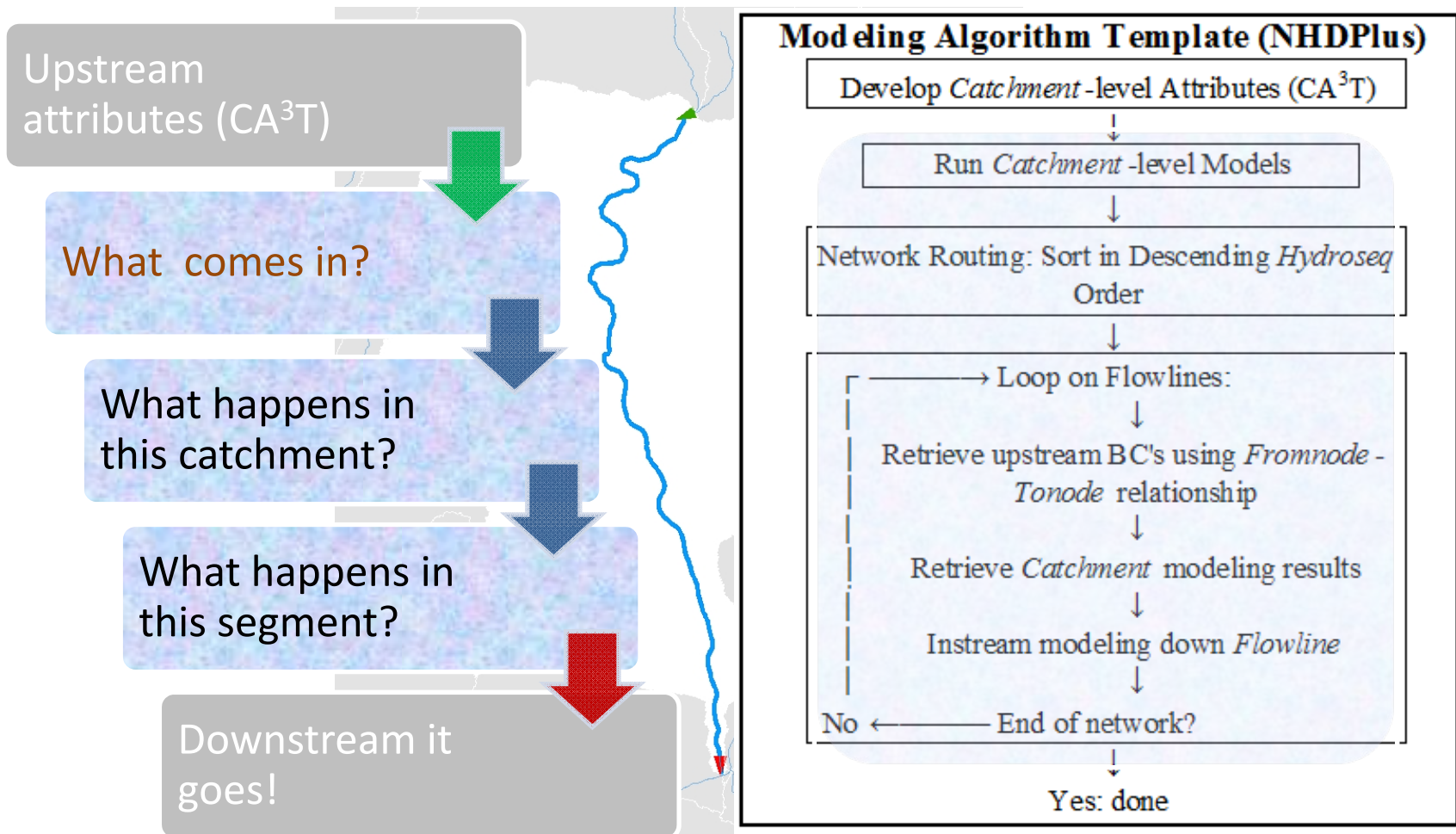
Name	Organization	Date Posted
Watershed Protection for Texas Reservoirs	Texas Water Development Board (Austin, TX)	Nov 13th '12
Geospatial Modeling of Critical Loads of Atmospheric Sulphur and Nitrogen Deposition	E&S Environmental Chemistry, Inc (Corvallis, OR)	Sep 11th '12
The Hydrographic Setting for Mercury Sampling	USGS (Boulder, CO)	Apr 6th '11
Mapping Critical Loads of Atmospheric Nitrogen Deposition in the Rocky Mountains	USGS (Boulder, CO)	Nov 5th '10
The Impaired Waters with TMDLs National Geospatial Dataset	US EPA (Washington, D.C.)	Oct 31st '10
2002 Impaired Waters Baseline National Geospatial Dataset	US EPA (Washington, D.C.)	Aug 3rd '10
Aquatic Ecological Classification, Ecosystem Diversity and Crucial Watershed Areas in the Montana Columbia River Basin	Montana Natural Heritage Program (Helena, MT)	Jul 21st '10

Find more in the [NDHPlus Applications](#) page

# Generic Catchment <issue> Model



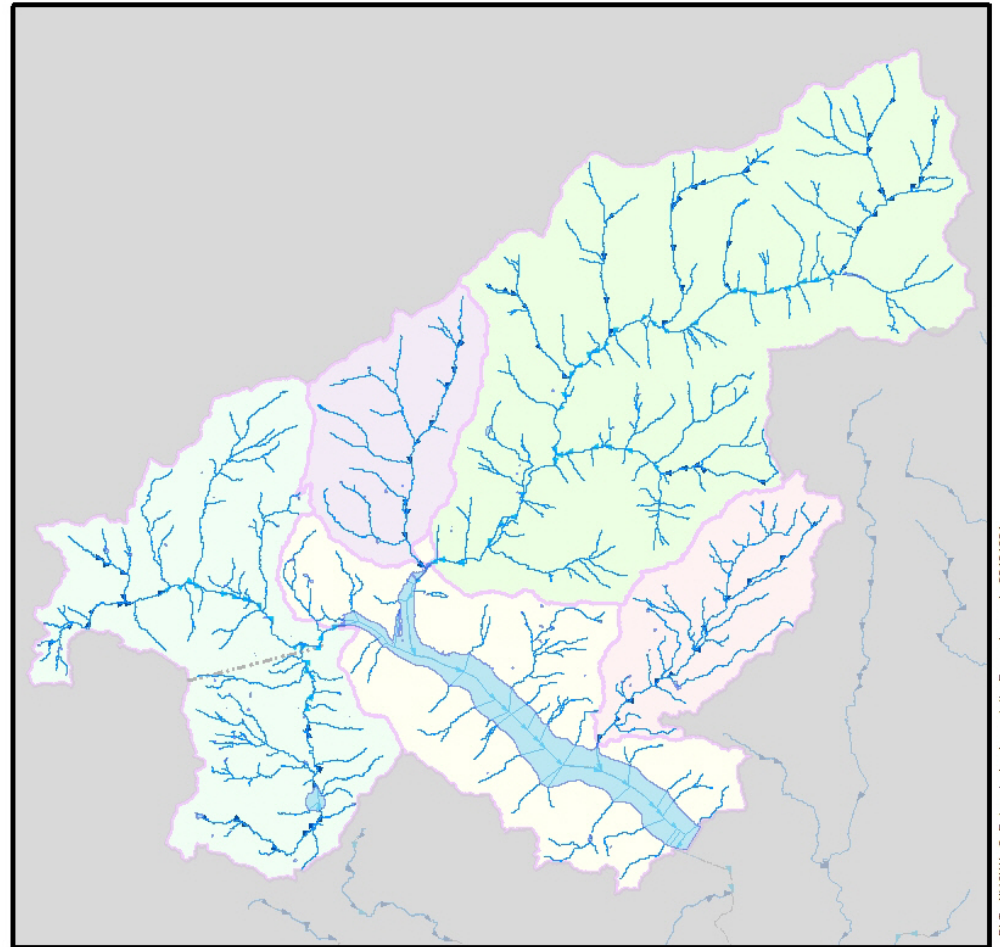
# Generic Catchment Model





# Simple Disperse Pollutant Example

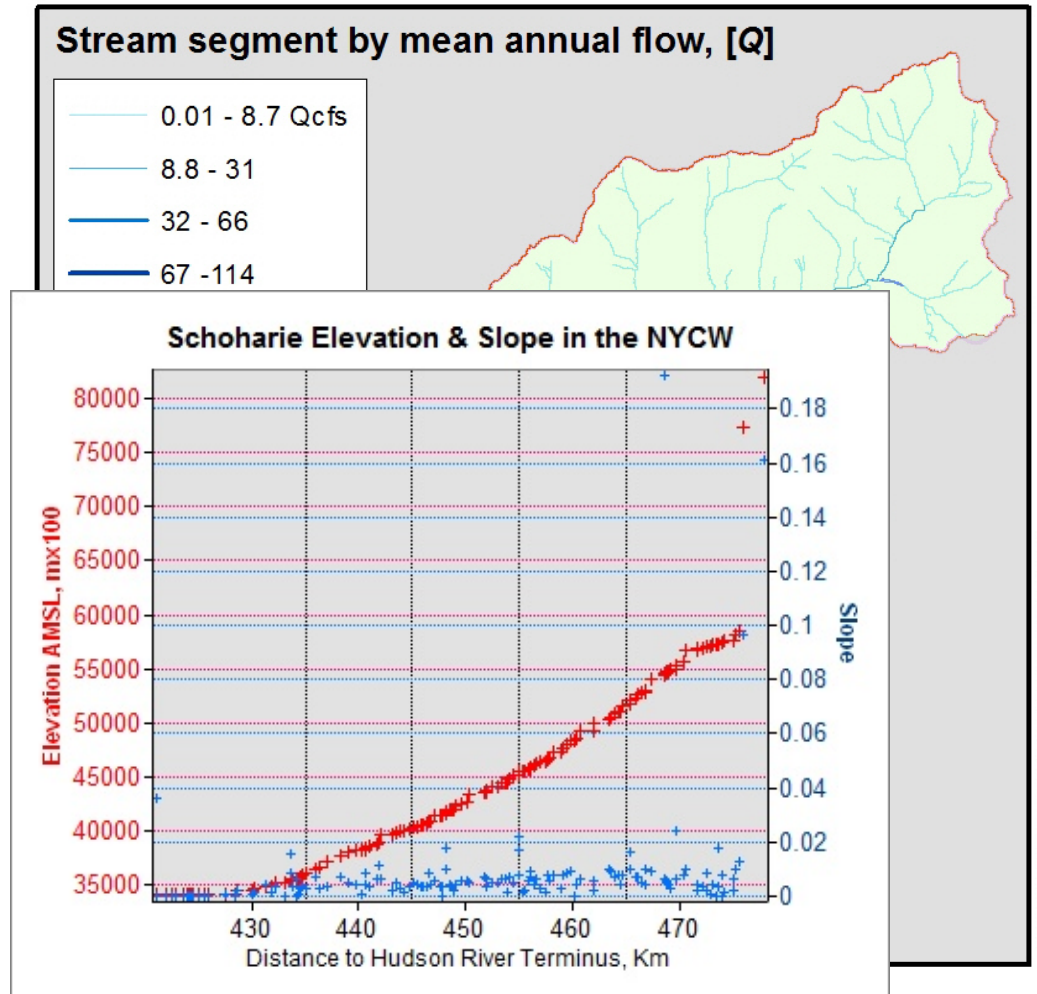
- Water body of concern,
- Management units...



RLT - NY CW hp2\_EnterpriseImplementationExamples.mxd - 20121221

# Simple Disperse Pollutant Example

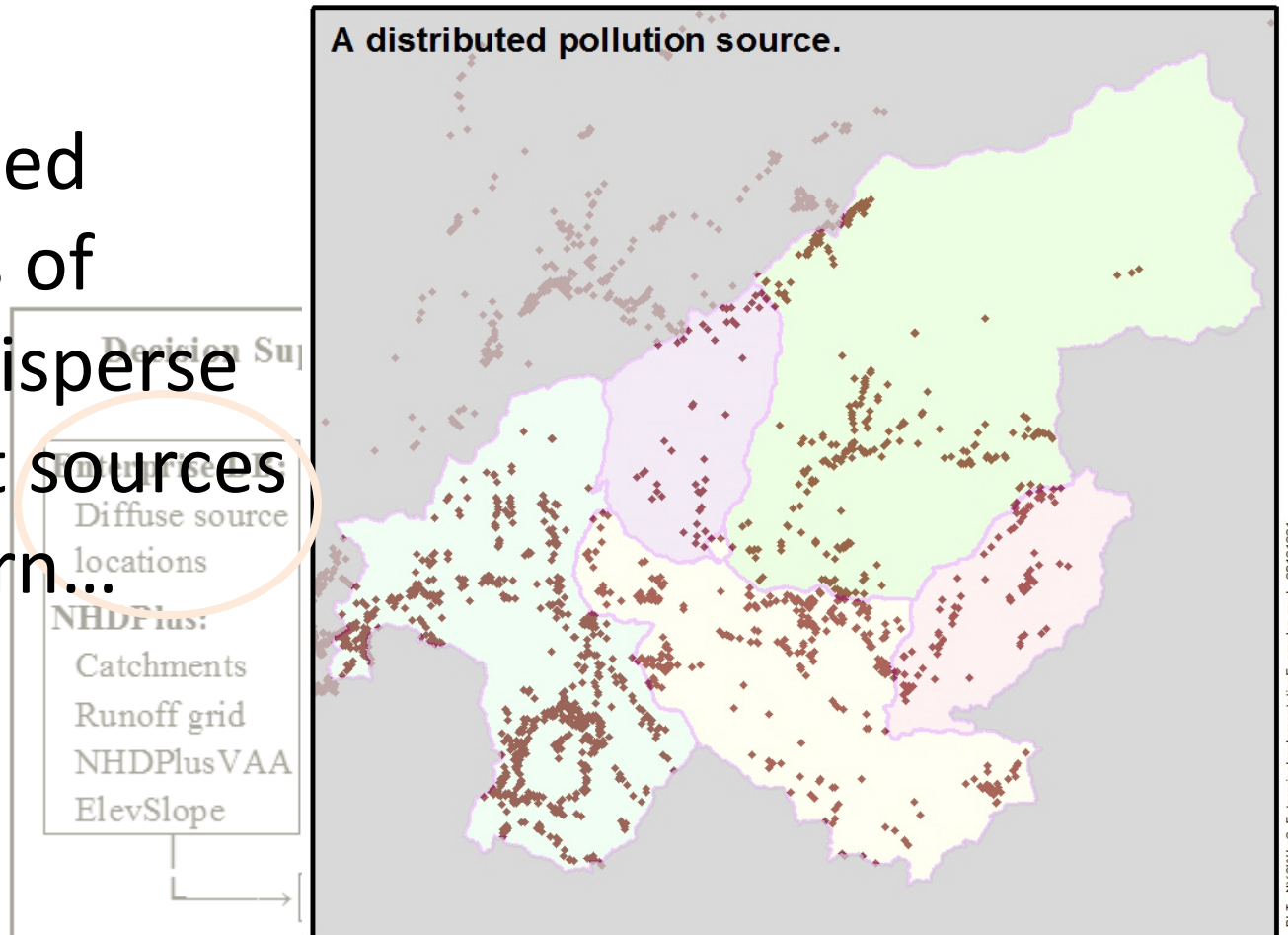
- We know the flow of interest,
- plus the vertical profile of all segments,
- hence the flow speed and time of travel...





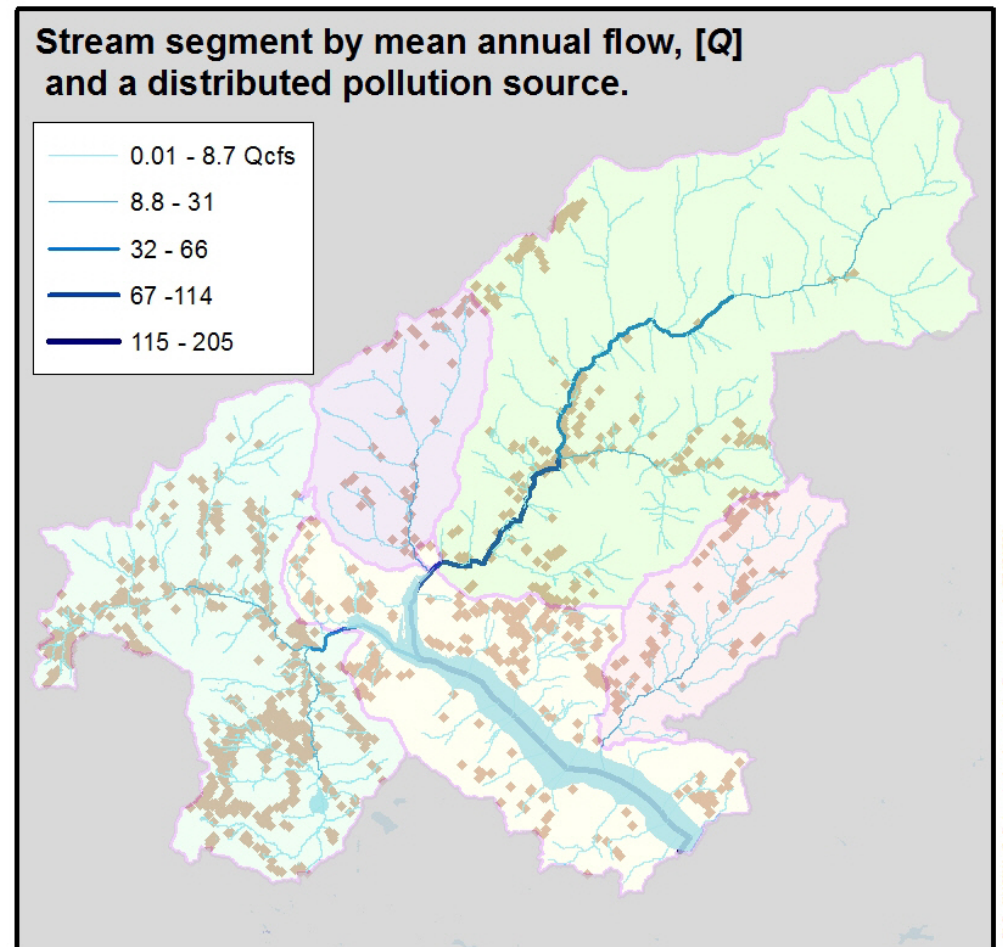
# Simple Disperse Pollutant Example

- We've inventoried locations of certain disperse pollutant sources of concern...

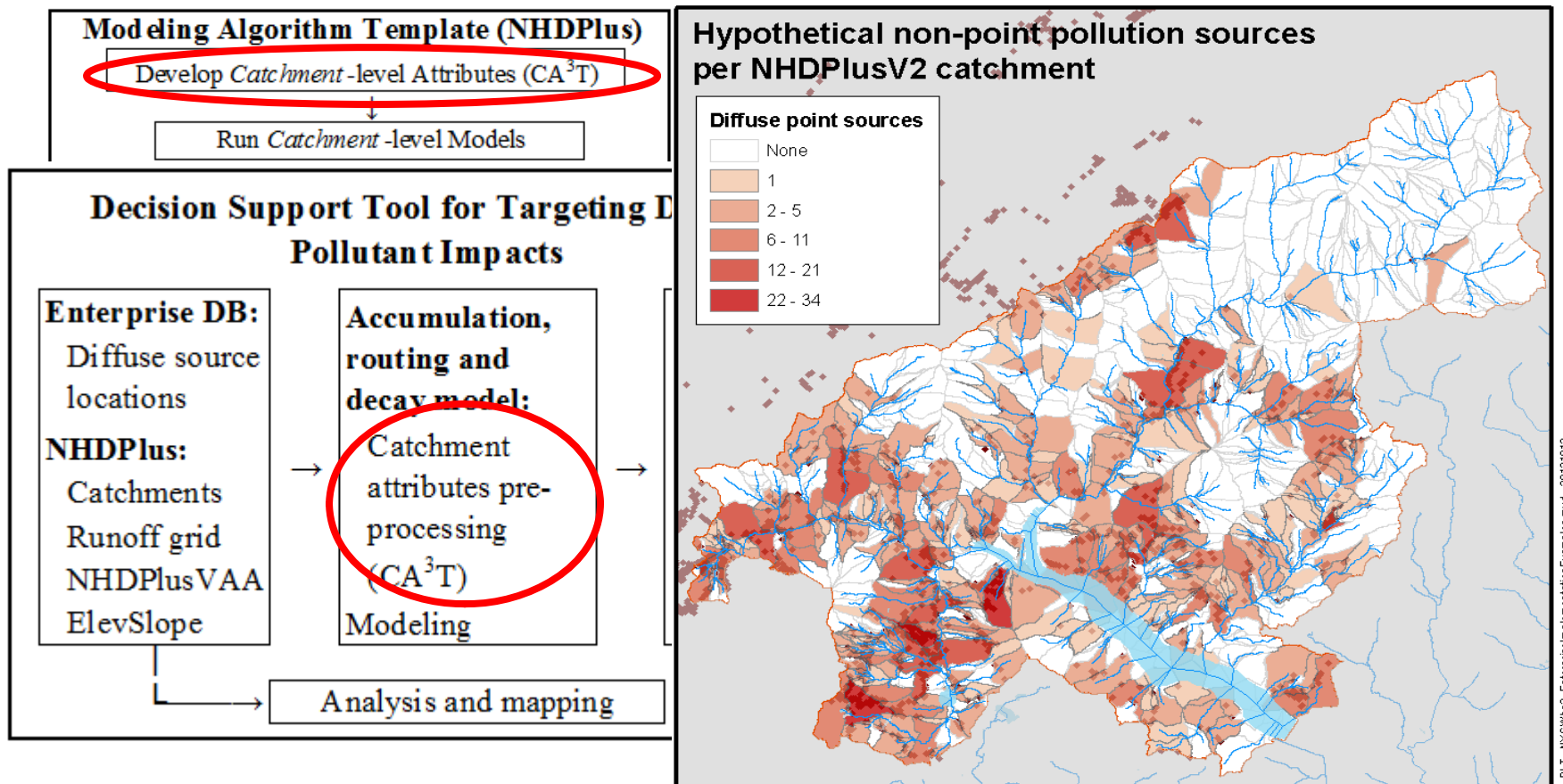


# Simple Disperse Pollutant Example

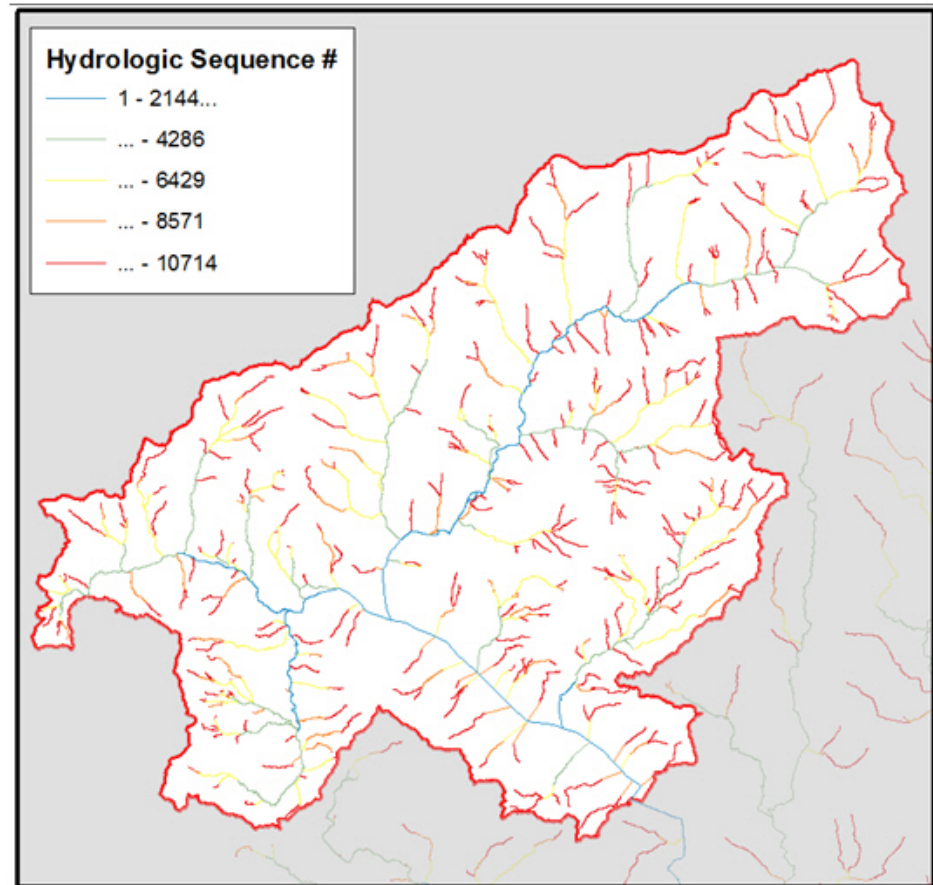
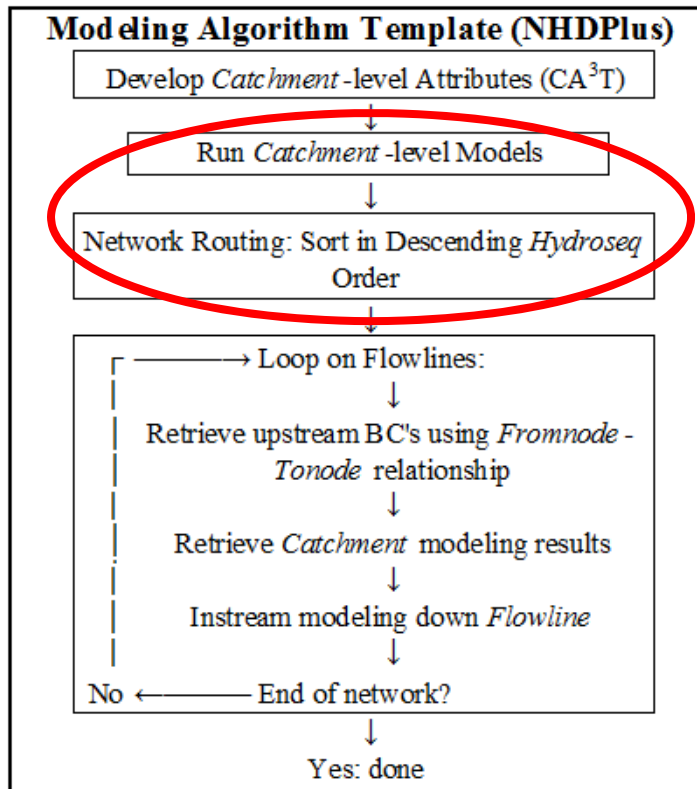
- How do we distribute BMP funding among management units to optimize the performance?
- Which MU contributes most?



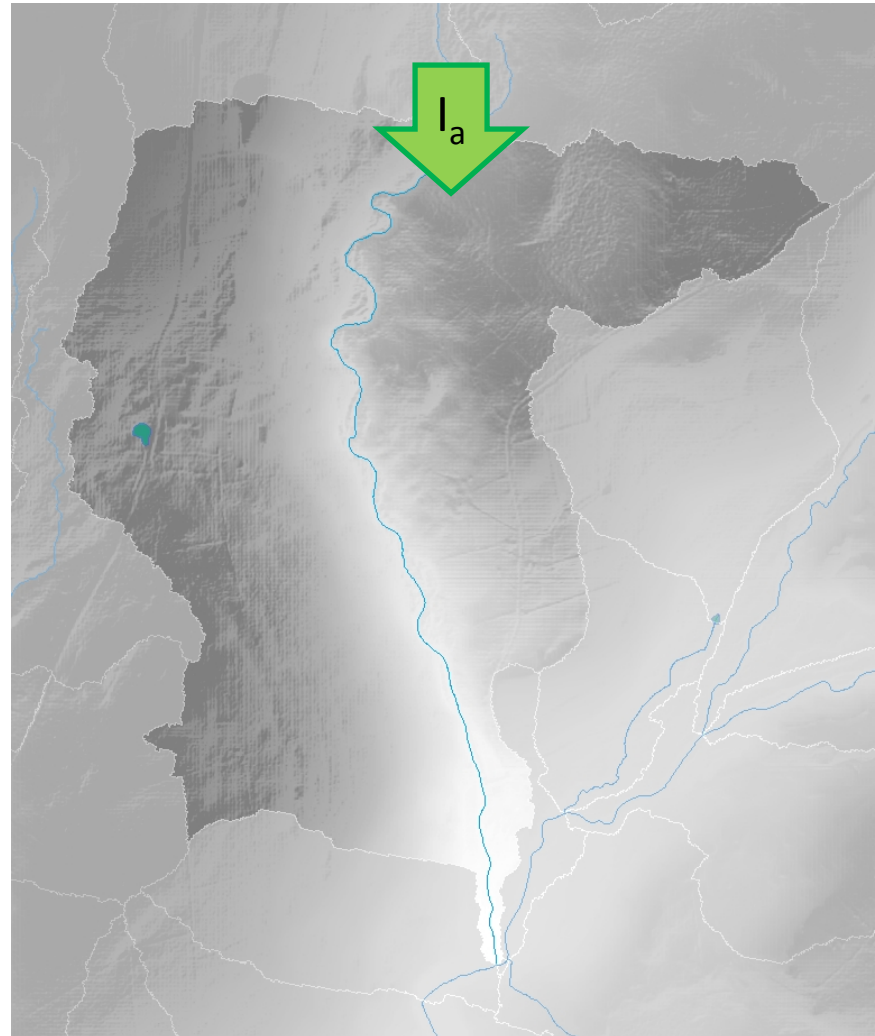
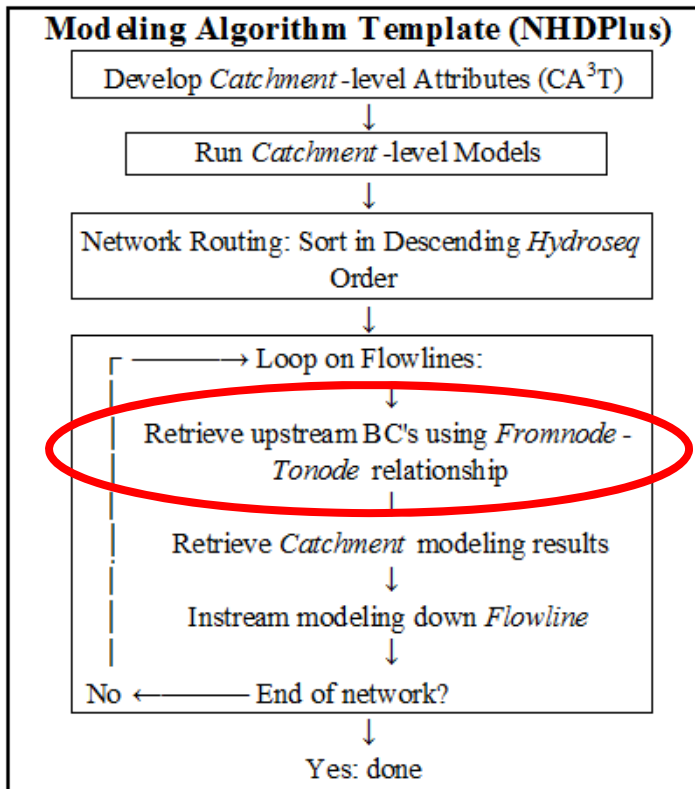
# Simple Disperse Pollutant Example



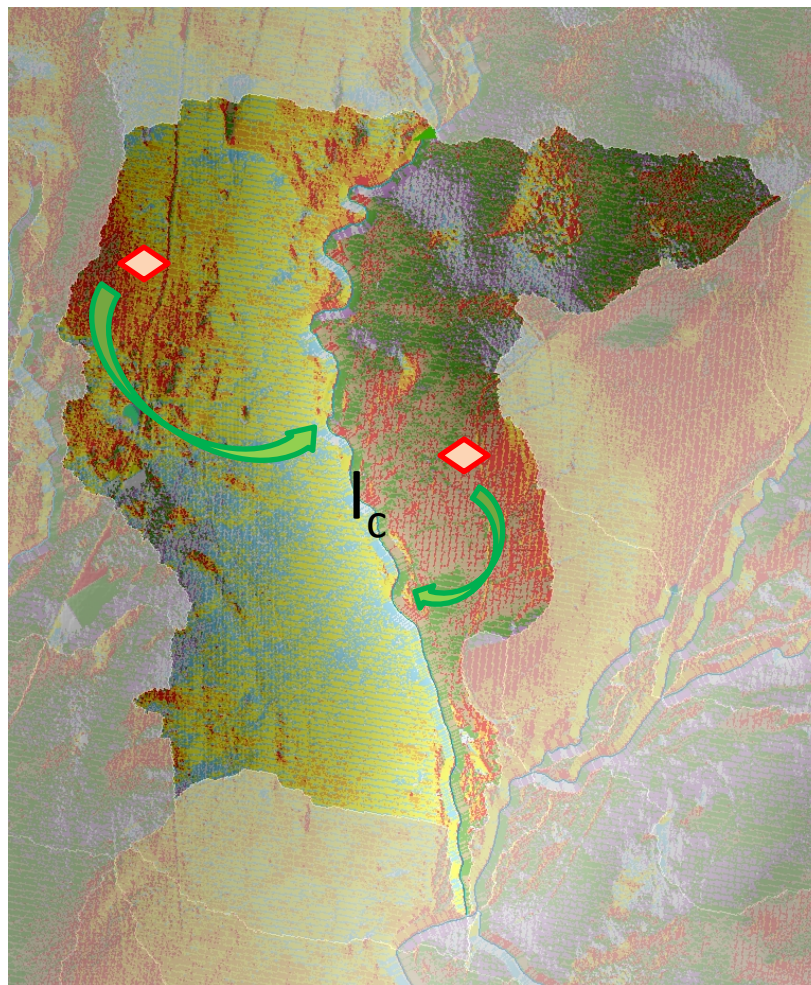
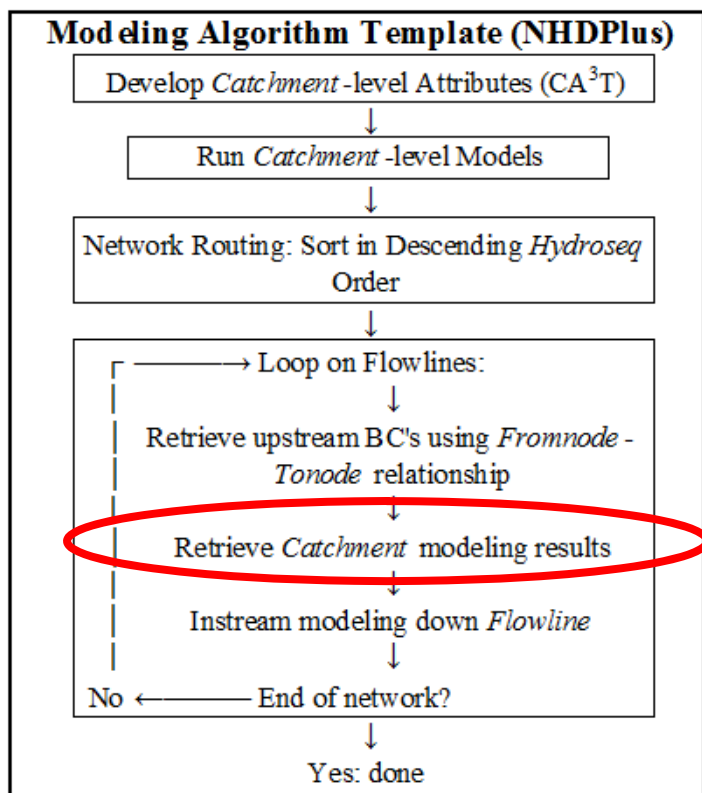
# Simple Disperse Pollutant Example



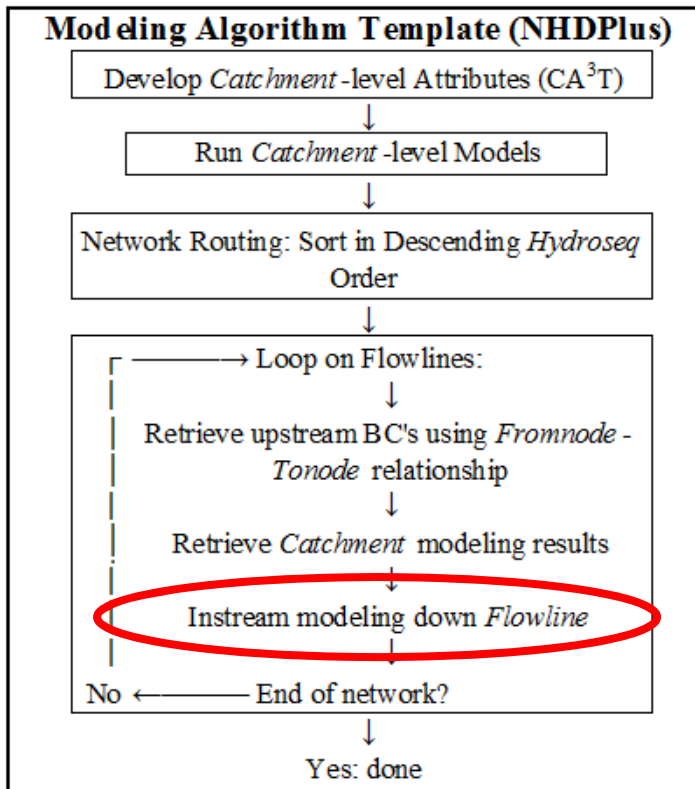
# Simple Disperse Pollutant Example



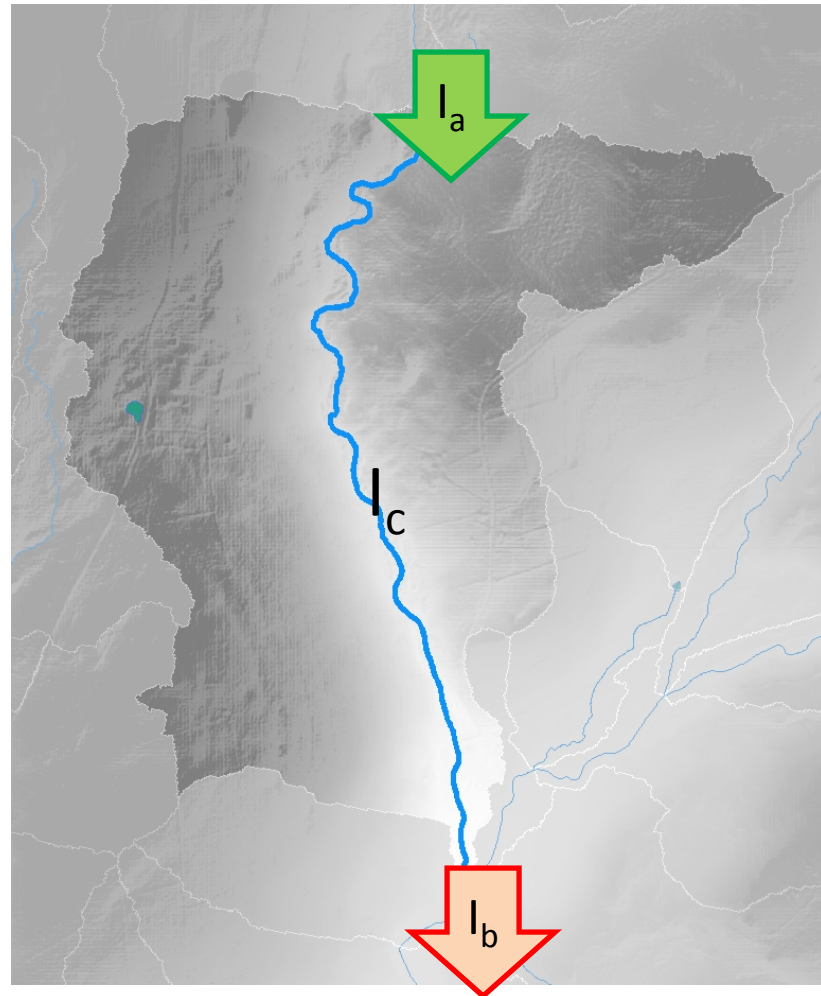
# Simple Disperse Pollutant Example



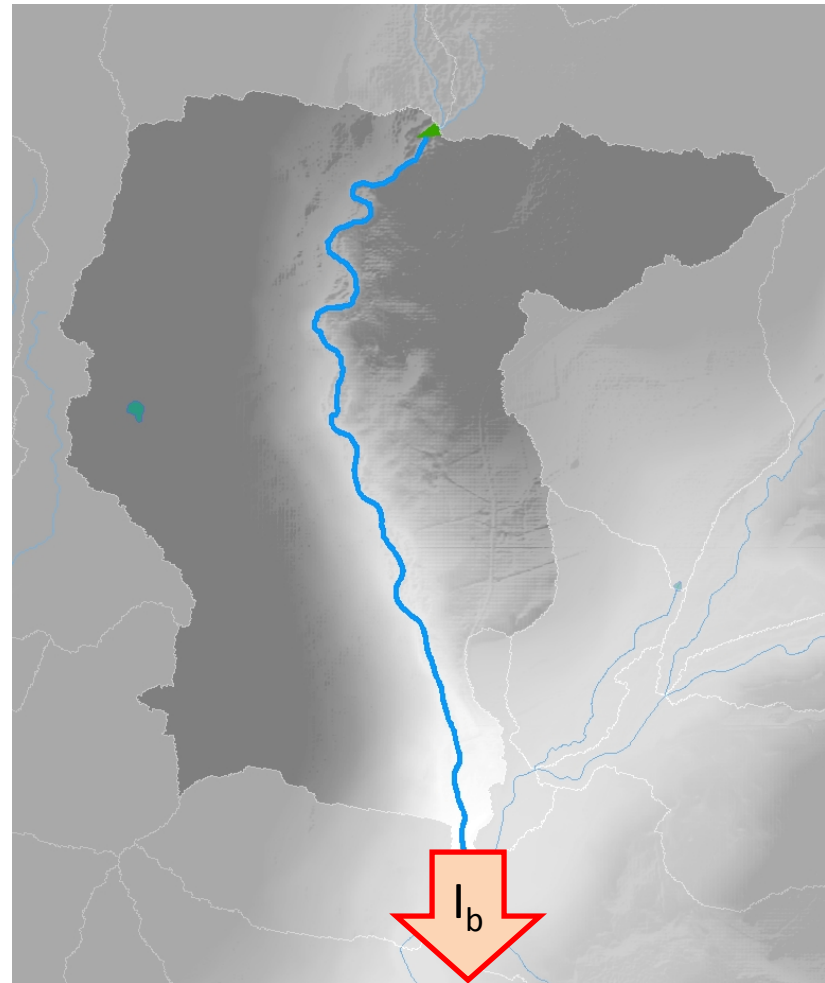
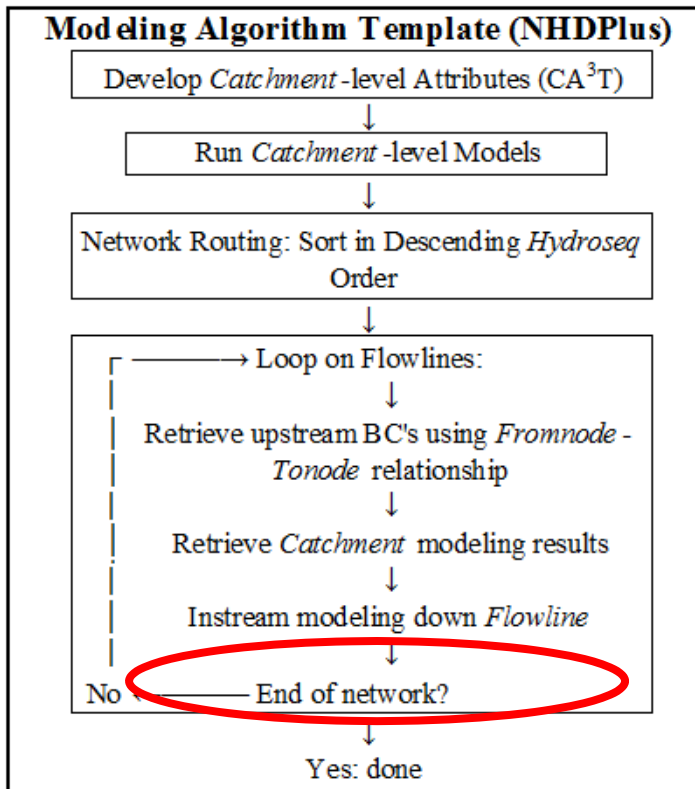
# Simple Disperse Pollutant Example



$$I_b = (I_a + I_c) * e^{(ToT * C)}$$



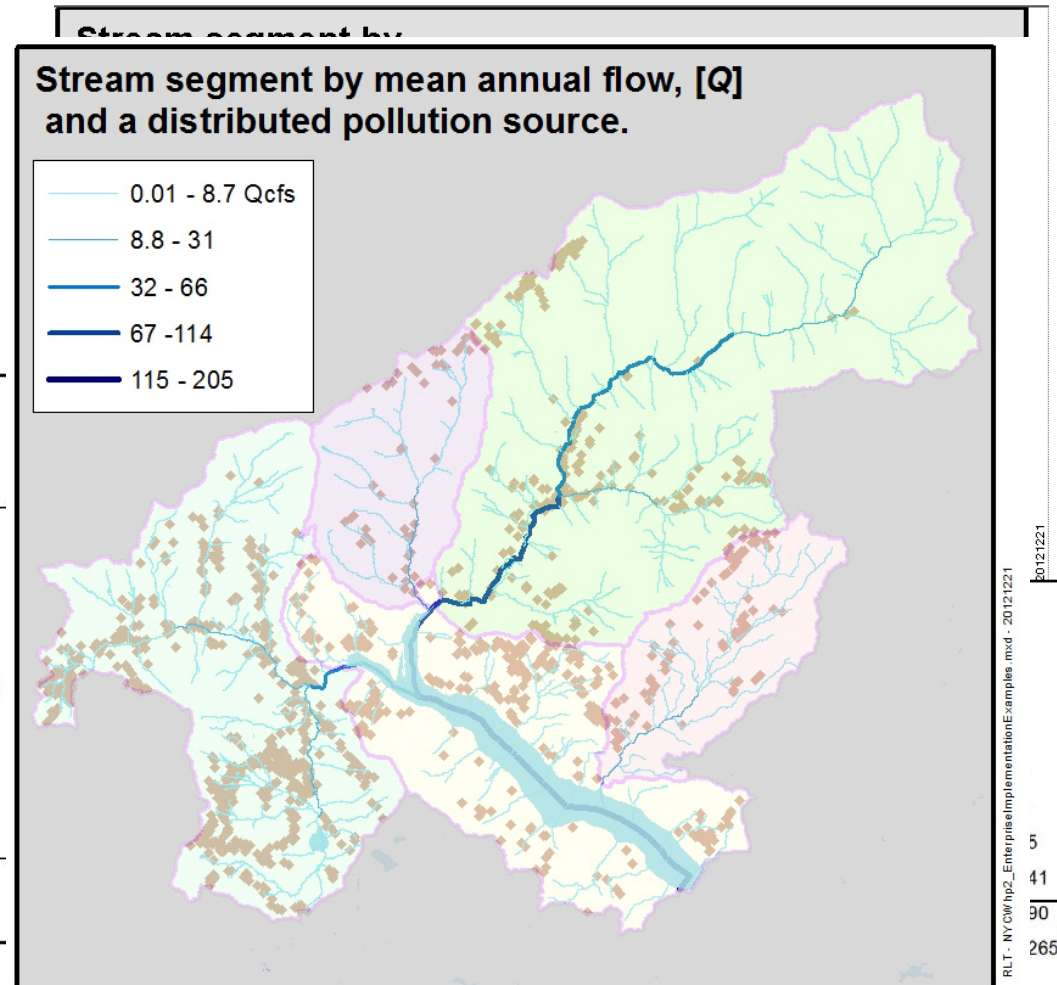
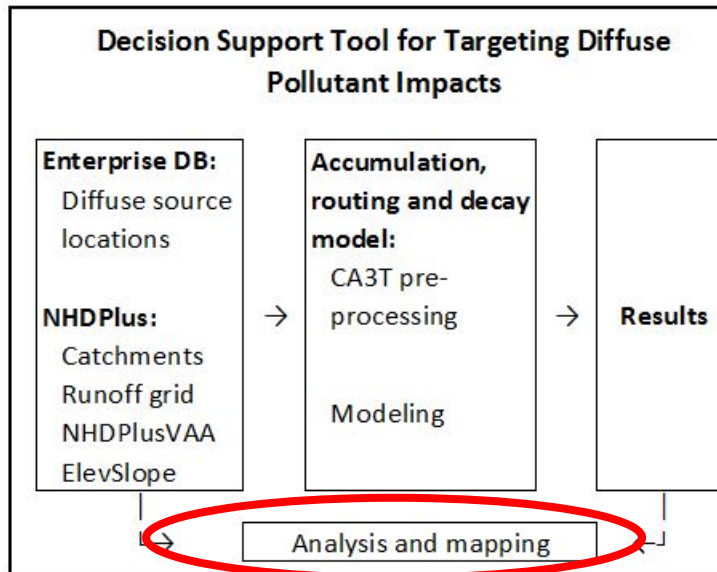
# Simple Disperse Pollutant Example

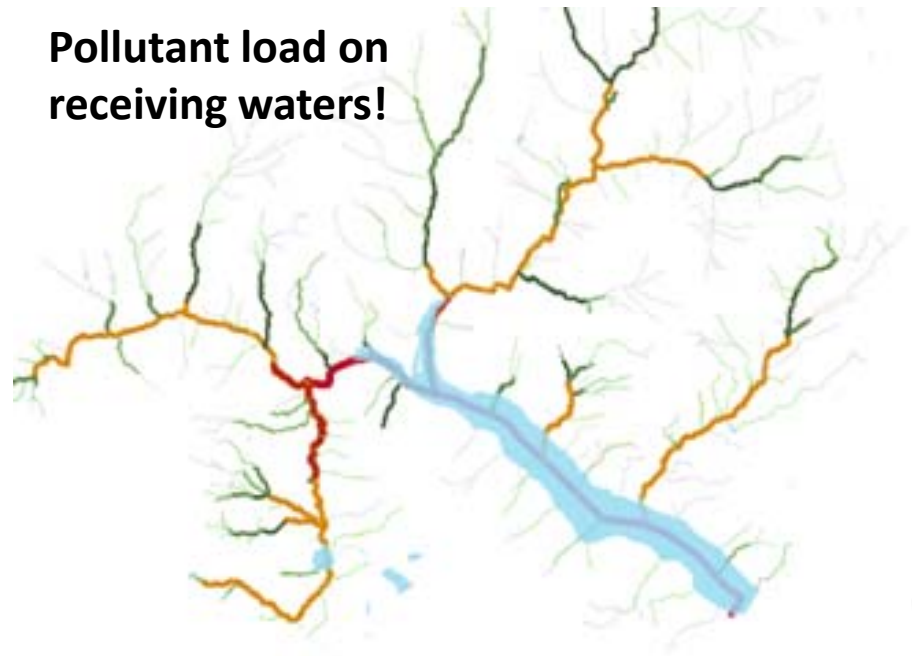
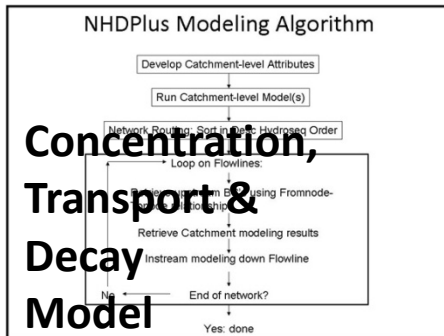
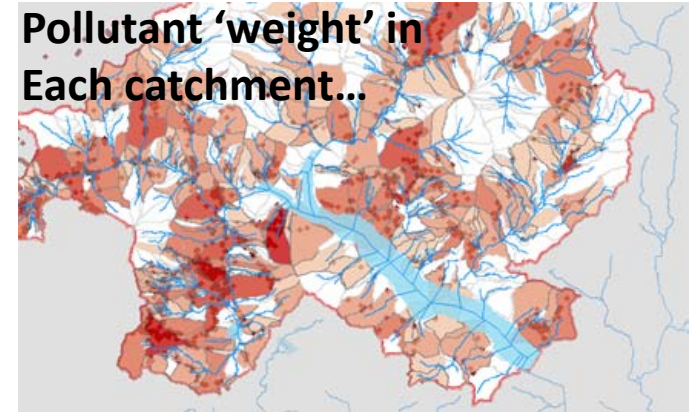
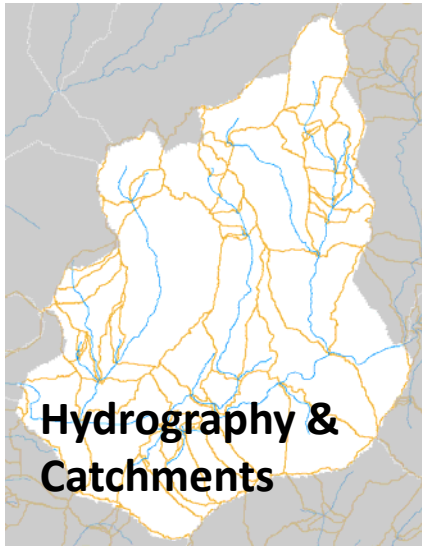




# Simple Disperse Pollutant Example

- Which Management Unit contributes most?







# So...

Evaluations have the support to be:

- As simple or complex as needed,
- Built-in consistency,
- Computationally & visually efficient.

What about

- Affordability?

# NHDPlus affordability

Element	Status	Cost
1 <sup>st</sup> order approximation?	Done (NHDPlus Version2, MR)	\$0
2 <sup>nd</sup> order inputs ready and available? Process?	Yes (NHD High Res, 10 m DEMs). None in NYS.	\$0. ~\$150K NYS-wide?
3 <sup>rd</sup> order inputs?	Variable (Lidar DEM/Hydrography)	Align hydrography, hydro enforce lidar: ≈\$30-\$90/mi <sup>2</sup> ?
3 <sup>rd</sup> order constructions tools? Process?	Done (NHD GeoEdit + Hydrology tools + NHDPlus Build/Refresh Process). NYCW.	\$0. ≈9¢/mi <sup>2</sup> ? (≤0.1% input preparation).
Designs, tools to exploit framework?	Done (Reach Address Database, WATERS...)	Model development, implementation.

# NHDPlus: Open Standards Framework

Qs?

