



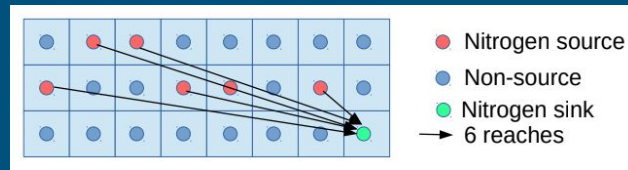
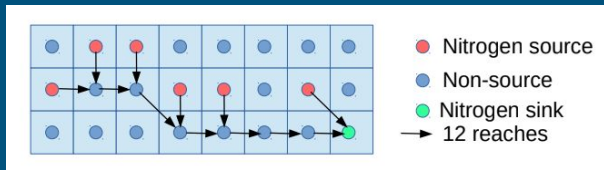
# Pollution Modeling



Lauren and Whitney



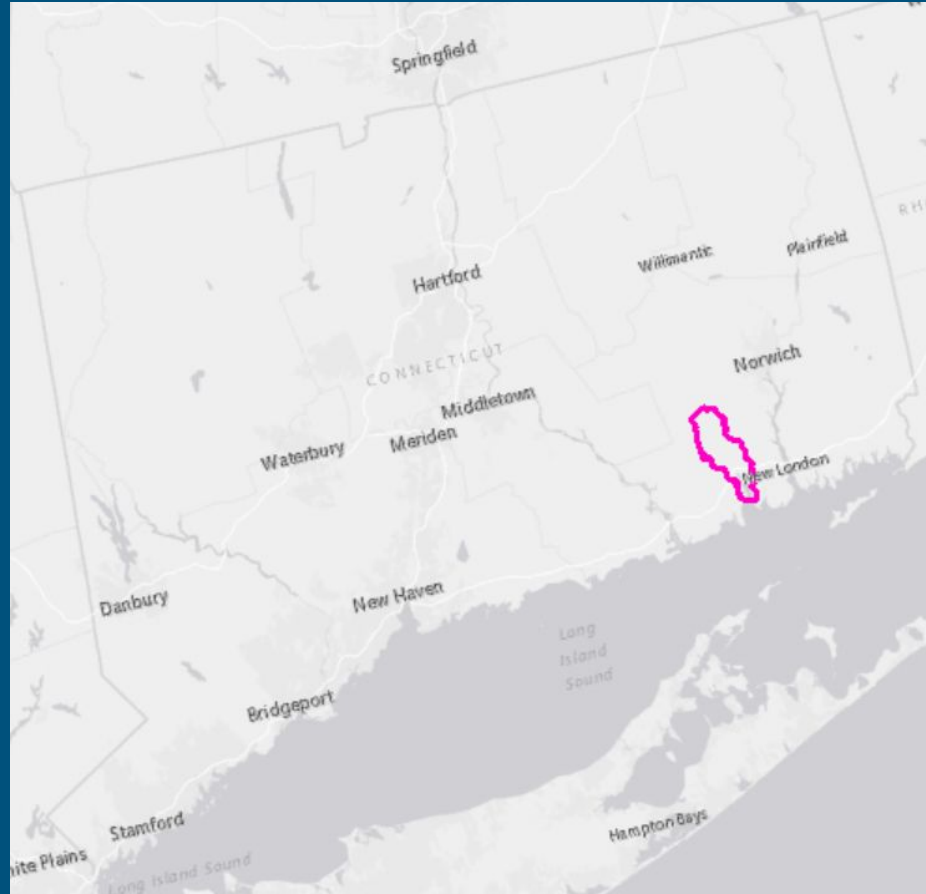
# Background



- **Inspiration:** “Network Flow Algebra for Modeling Non-Point Source Pollution: A Case Study Modeling Nitrogen in Niantic Watershed, Connecticut” (Shook, Merson, Wentz, 2018)
- **Goal:** Jupyter Notebook with interactive widget that allows a user to set a nitrogen load value using a slider and receive a shapefile of flow paths with accumulated nitrogen flow attributed.

**Simple, right?**

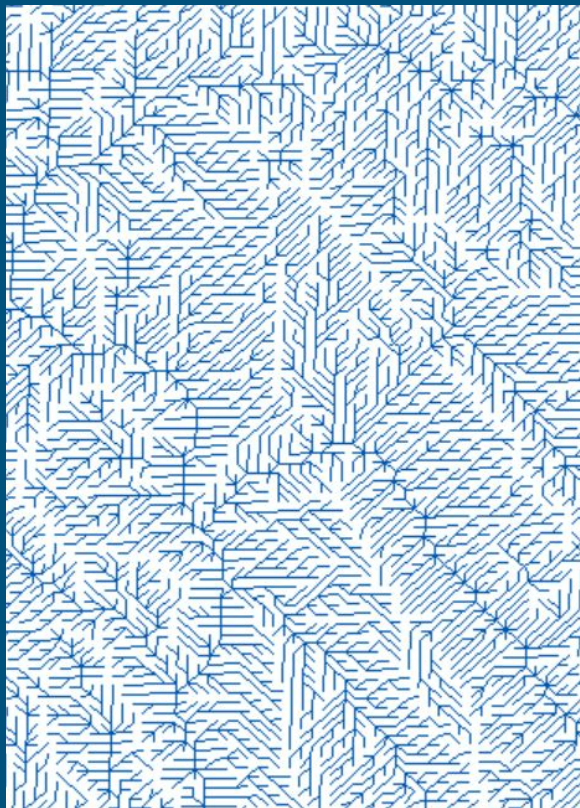
# Niantic River Watershed, Connecticut



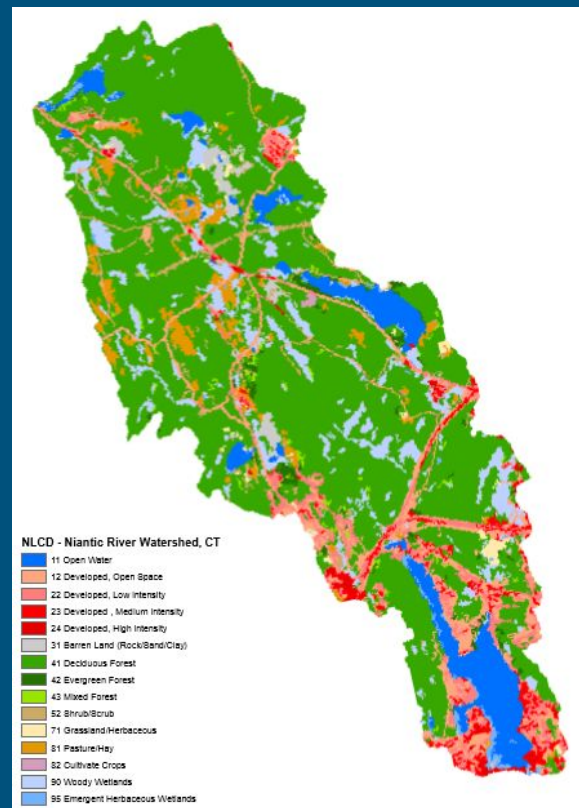
# Data

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## Flow Paths



## 2011 National Land Cover Dataset



# Many (dead end or twisty) roads later...

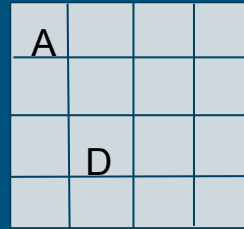
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1. **GDAL** - **Reclassify** NLCD raster with values of (22) Developed (Low Intensity), (23) Developed (Medium Intensity), and (82) Cultivated Crops. Nitrogen values Determined by Jupyter's IntSlider widgets.
2. **GDAL** - **Rasterize** flow path vector layer using HYDROID attribute
3. **GDAL** - **Create** a JSON **dictionary** using **HYDROID** of flow path raster as **KEY** and cumulative **Nitrogen Load** value from reclassified NLCD raster as **VALUE**.
4. **FIONA** - **Create** new field (NLoad) in original flow path shapefile and append the calculated nitrogen load value based on the HYDROID.

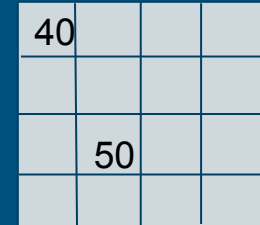
# Overall Methods

1. **GDAL** - **Reclassify** NLCD raster values  
Determined by Jupyter's IntSlider widgets.
2. **GDAL** - **Rasterize** flow path vector layer  
using HYDROID
3. **GDAL** - **Create** a JSON **dictionary** using  
**HYDROID** of flow path raster as **KEY** and  
cumulative **Nitrogen Load** value from  
reclassified NLCD raster as **VALUE**.
4. **FIONA** - **Create** new field in original flow  
path shapefile and append the calculated  
nitrogen load

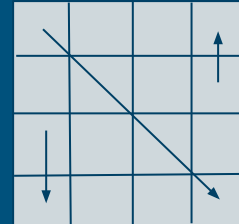
NLCD



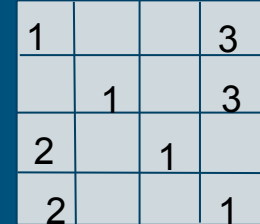
Reclassified  
NLCD

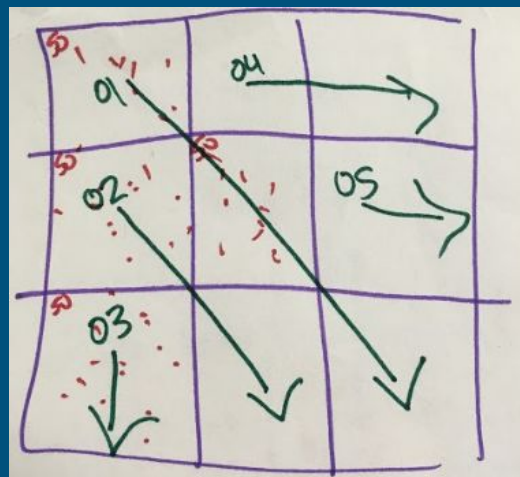
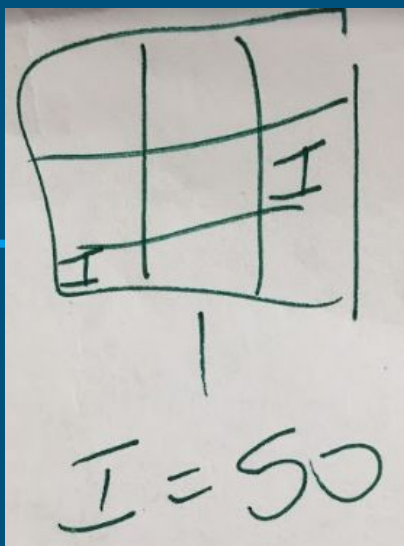


Flow Paths



Rasterized  
Flow Paths



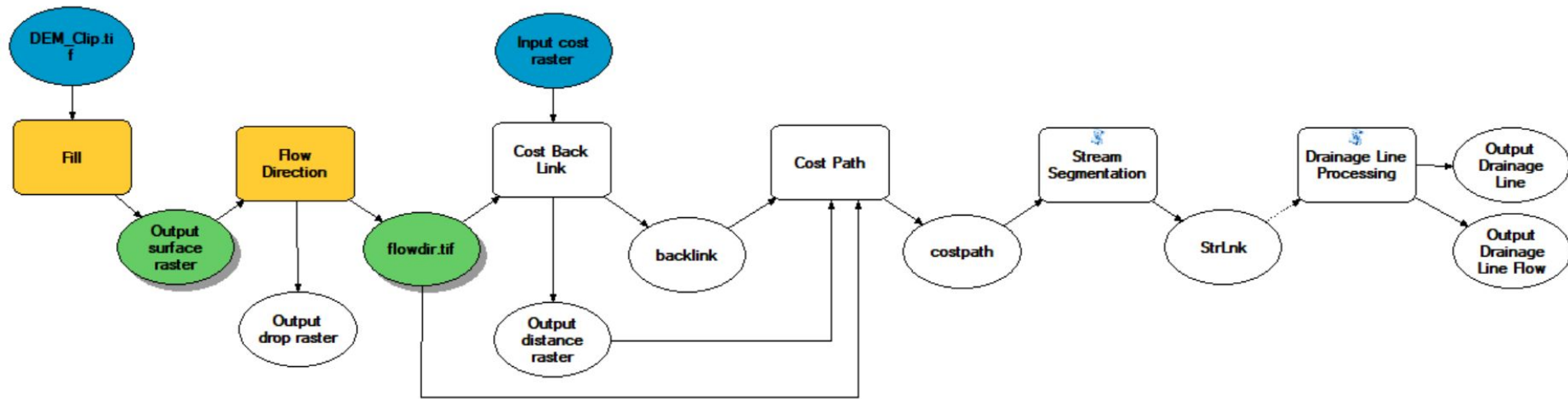


50	0	0
50	50	0
50	0	0

01	04	04
02	01	05
03	02	01

# Mistake

Dramatically underestimated pre-processing!





# Advice

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- Be realistic about scope!
- Communicate and ask questions!
- Take breaks!
- Don't be so hard on yourself!

# Questions?

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