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THE UNIVERSITY OF MAINE AT MACHIAS

Geospatial Models Aid in Shoreland Zoning for Rural Maine Communities

University of Maine at Machias

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Washington County Council of Governments

Maine's Shoreland Zoning Act

Statute: Title 38, Chapter 3, §§ 435-449

- Enacted 1971, Amended Multiple Times
- Requires "municipalities to adopt, administer, & enforce local ordinances" (Maine DEP, 2017)
- Administered by Maine Dept. of Environmental Protection
- Non-compliant municipalities subject to state-imposed ordinances

Shoreland zone includes land areas w/i 250 feet of...

- Great ponds or rivers;
- Coastal wetland
- Certain freshwater wetlands; and
- Certain streams.

Maine Department of Environmental Protection. Mandatory Shoreland Zoning. (n.d.). Retrieved July 27, 2017, from http://www.maine.gov/dep/land/slz/

Helping Rural Communities Comply

- Partnership with Washington County Council of Govts
- Support: ME DACF Municipal Planning Assistance Program
- Update of 2009 - 2013 work (Shoreland Zoning, 2013)
- Geospatial models implementing spatial elements
- Run for entirety of Washington County
- Map template
- Iterative revisions with towns & WCCOG Planner
- Consultation with DEP on…
  - Inputs; Operations within the model; Changes to outputs

Shoreland Zoning. (2013, April 7). Retrieved December 18, 2013, From http://www.wccog.net/shoreland-˘-zoning.htm

Why use a regional GIS model?

- Low cost
- Avoids state-imposed ordinances
- Streamlines WCCOG support for communities
- Supports compliance

Best Practices to Engagement & Empower

- Align Scales of Action, Information, and Feedback
  - (Wilbanks & Kates, 2010; Cash et al., 2006; Ostrom 1990)
- Identify & Frame Efforts around Local Vulnerabilities & Priorities
  - (Hales, D. et al., 2014; Dunlap, 2010; Molnar 2010)
- Bridge the Digital Divide
  - (Kates et al., 2001)
- Support Co-Production of Knowledge in Learning Loops
  - (Pahl-Wostl, 2009; Cash, 2006; Cash et al., 2003)
- Build Bridging and Bonding Social Capital
  - (Smith, Anderson, & Moore, 2012; Adger, 2003)

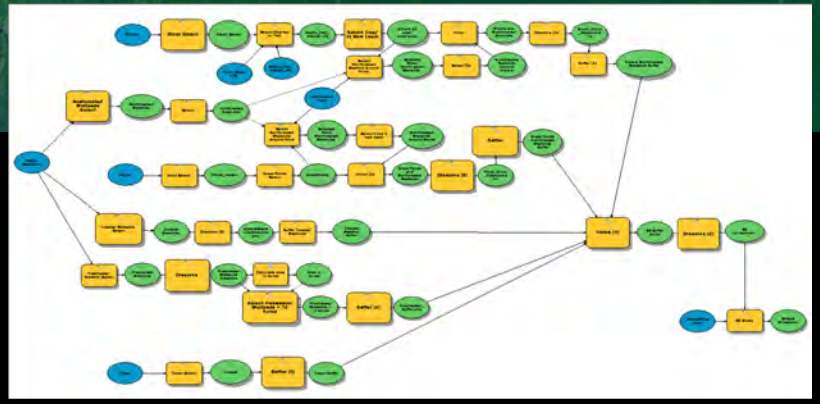
For complete citations & discussion, see:
Johnson, T. (2015). The Role of Dignity in Rural Natural Resource Governance (Dissertation). University of Maine, Orono, Maine. https://digitalcommons.library.umaine.edu/etd/2267/

Maine's Shoreland Zoning Act

Regulations & guidelines (DEP Ch 10000) are unnecessarily...

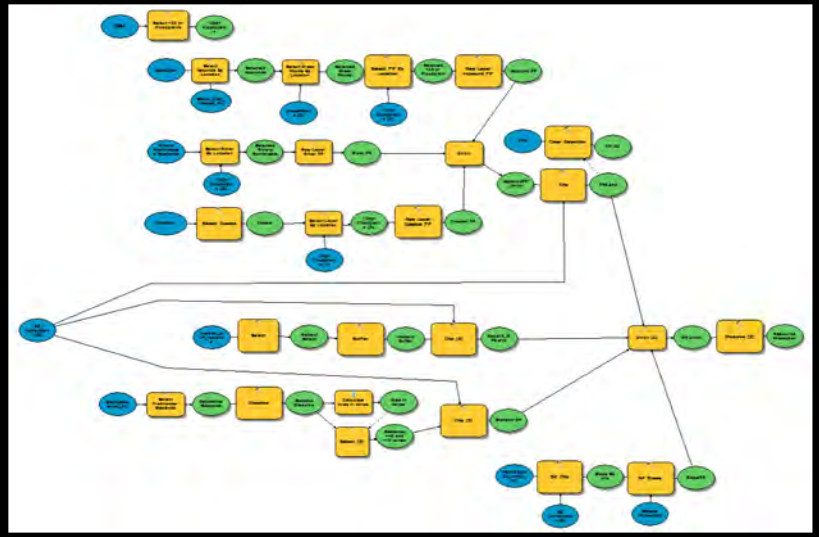
- *Complex*
- *Vague*

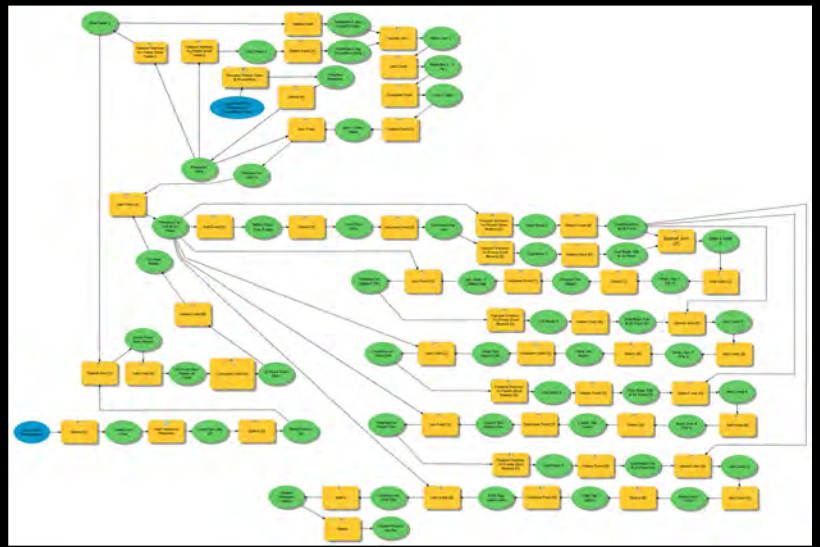
Maine Department of Environmental Protection 06-096, Chapter 1000: Guidelines for Municipal Shoreland Zoning Ordinances, 2017

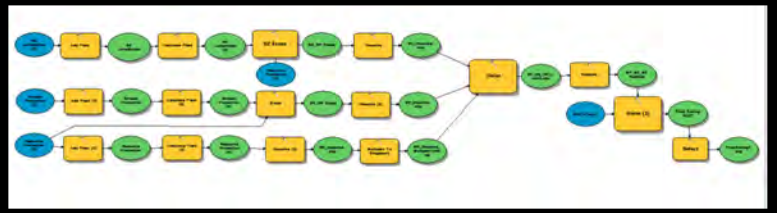


SZ Jurisdiction:
30 Steps

Resource Protection: 25 Steps







TOTAL: 125 Steps

Stream Protection: 54 Steps

Final Compilation: 16 Steps

Shoreland Zoning Jurisdiction Model

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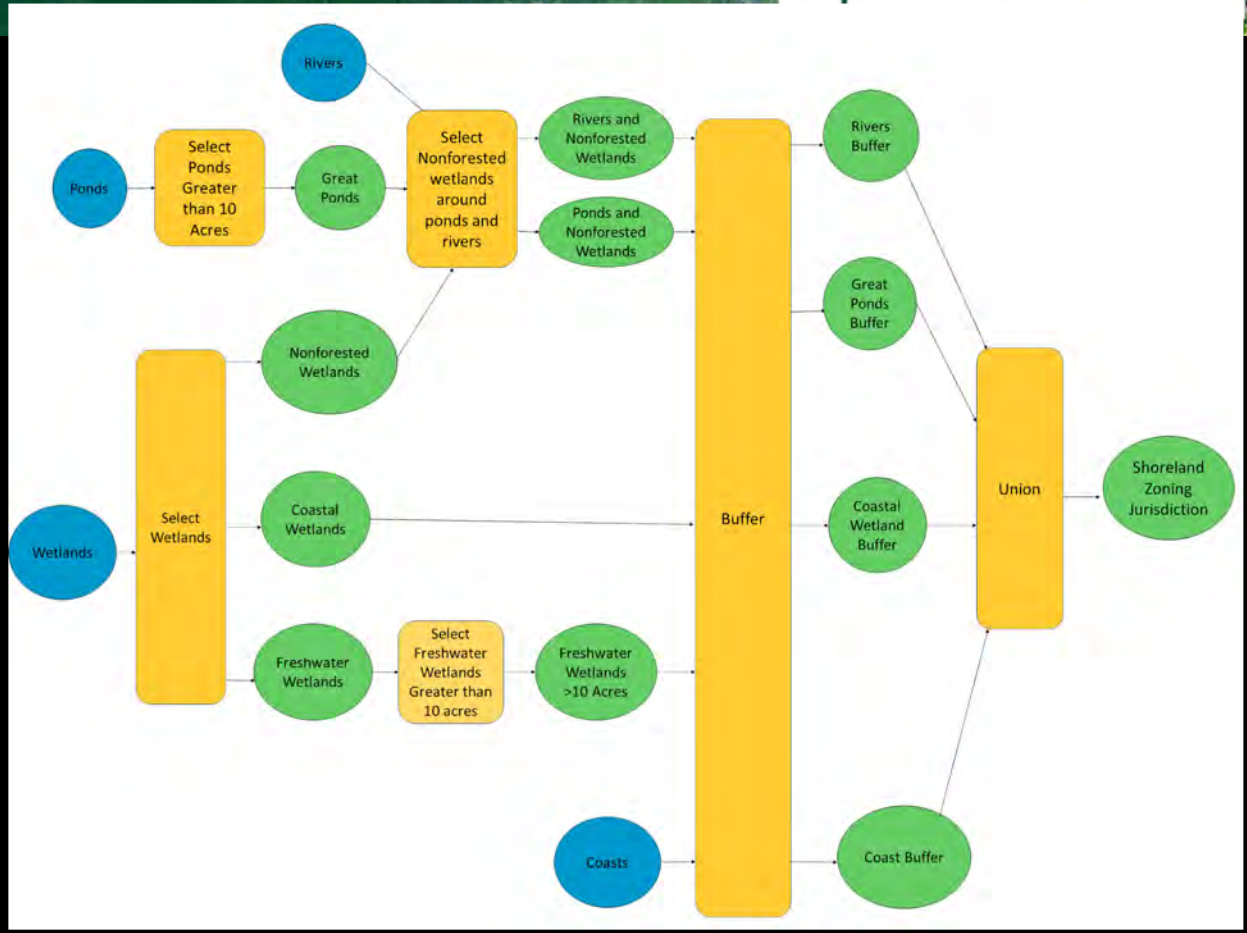
Inputs

- National Wetlands Inventory (NWI) Wetlands
- National Hydrography Dataset (NHD) Area
- NHD Waterbodies



Shoreland Zoning Jurisdiction Model

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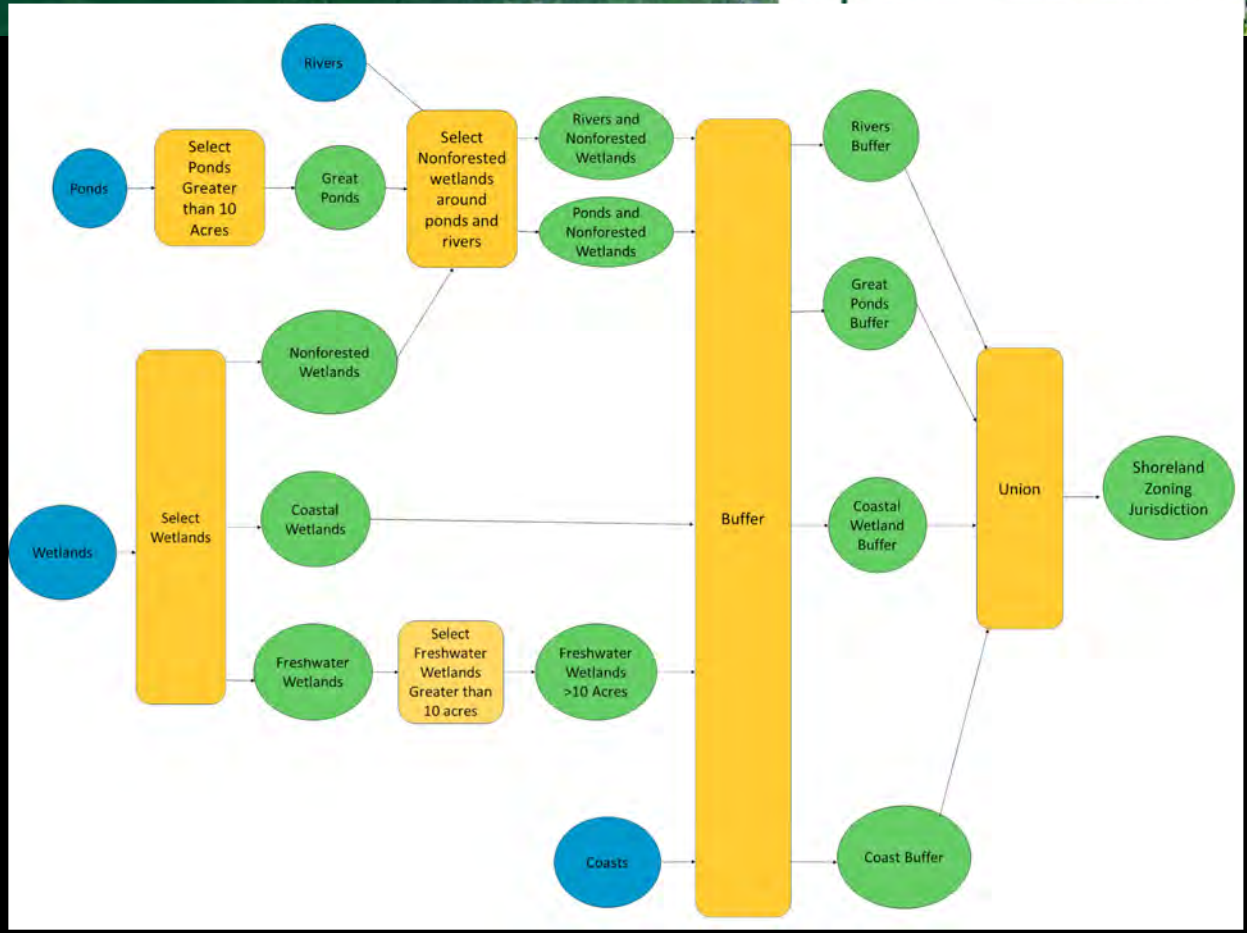
Process

- Select Coastal, Freshwater, & Non-forested Wetlands
- Select Great Ponds & Rivers w/ Wetlands
- Buffer (250ft) & Union



Resource Protection Model

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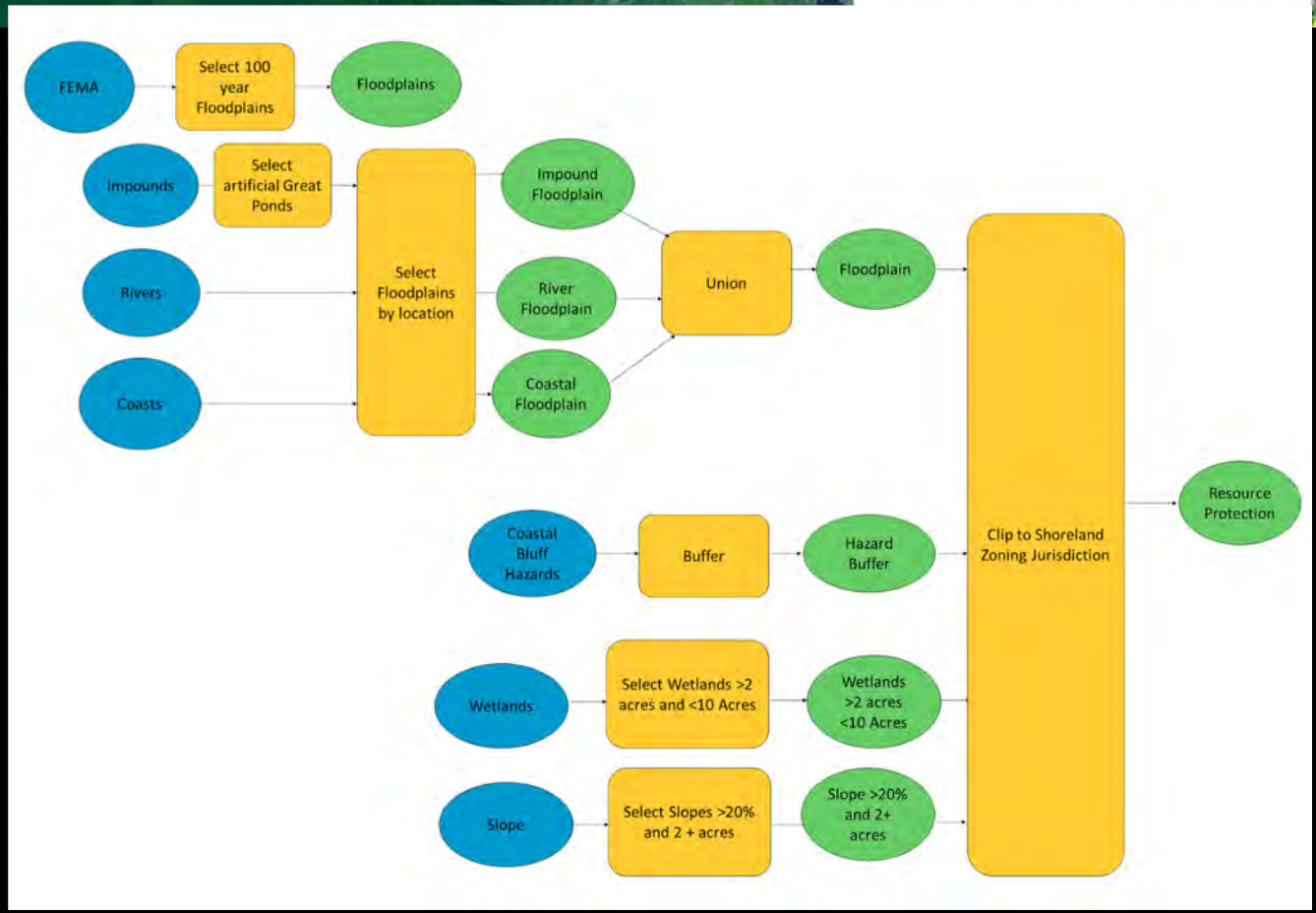
Inputs

- FEMA Flood Ins Rate Map
- Impoundments
- NHD Area (Rivers)
- NWI Wetlands
- Coastal Bluff Hazards
- Slope (from 3m & 10m elev model)



Resource Protection Model

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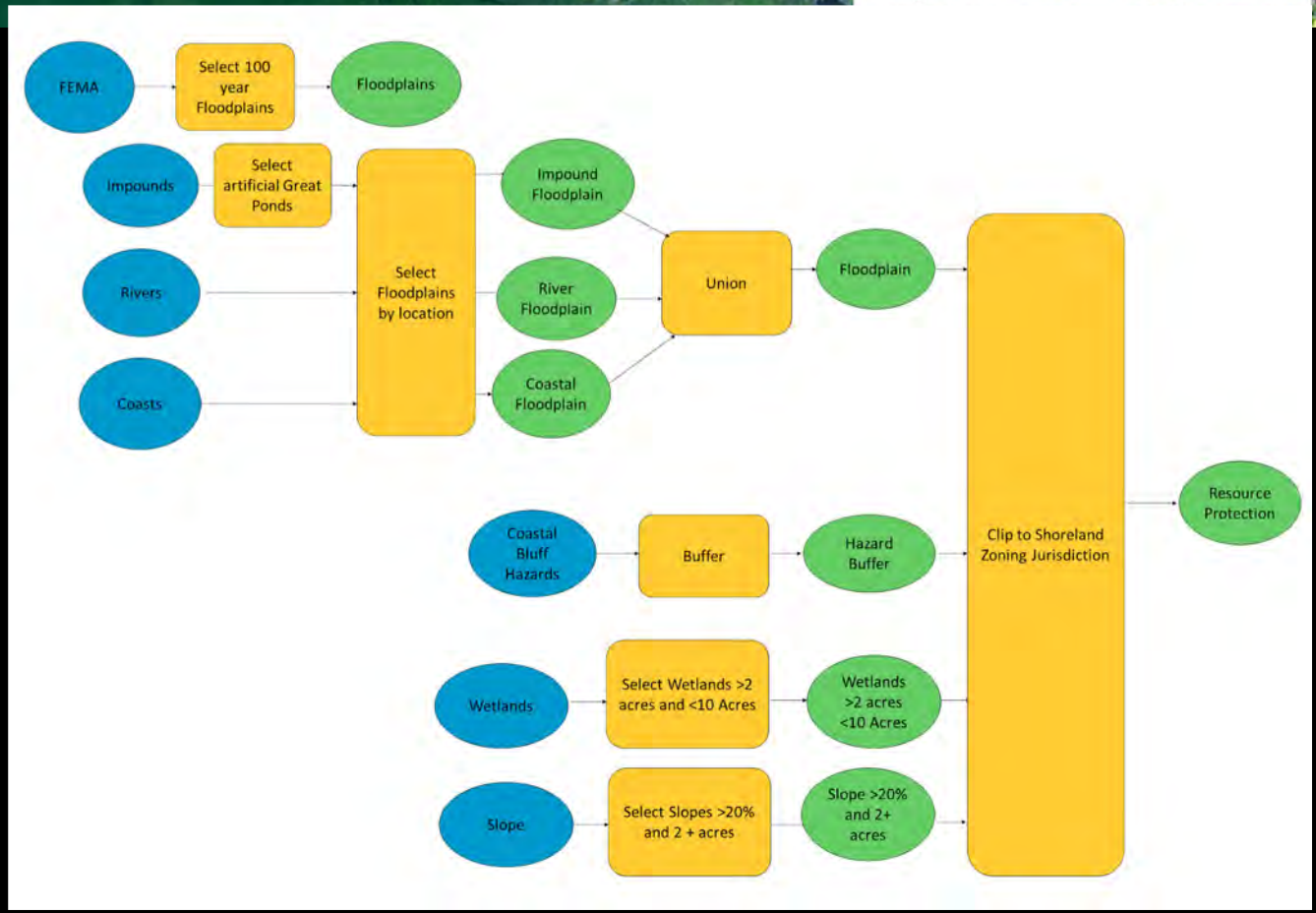
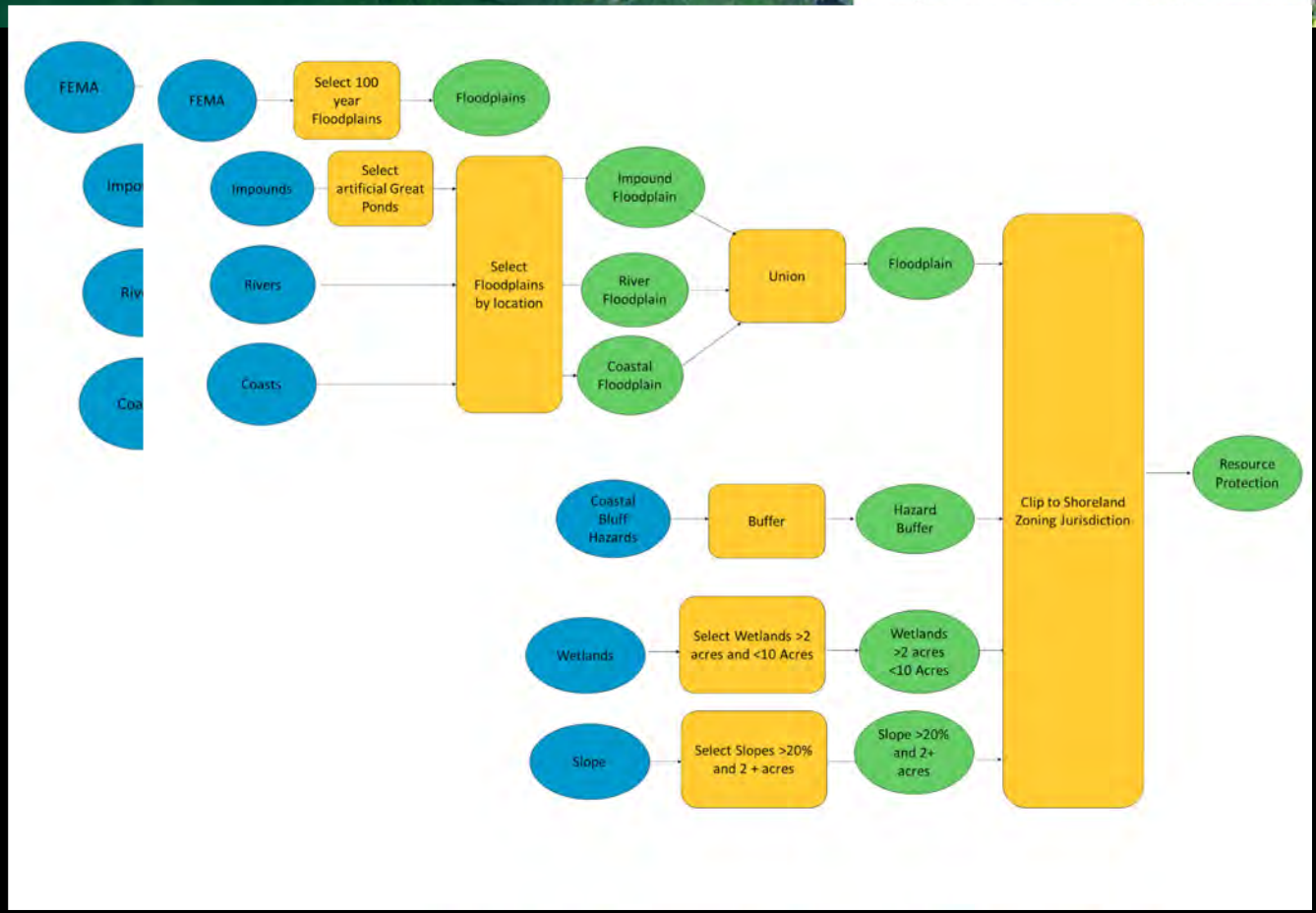
Process

- Select Artificial Great Ponds
- Select Floodplains around:
  - Rivers
  - Artificial Ponds
  - Coasts
- Union



Resource Protection Model, Continued

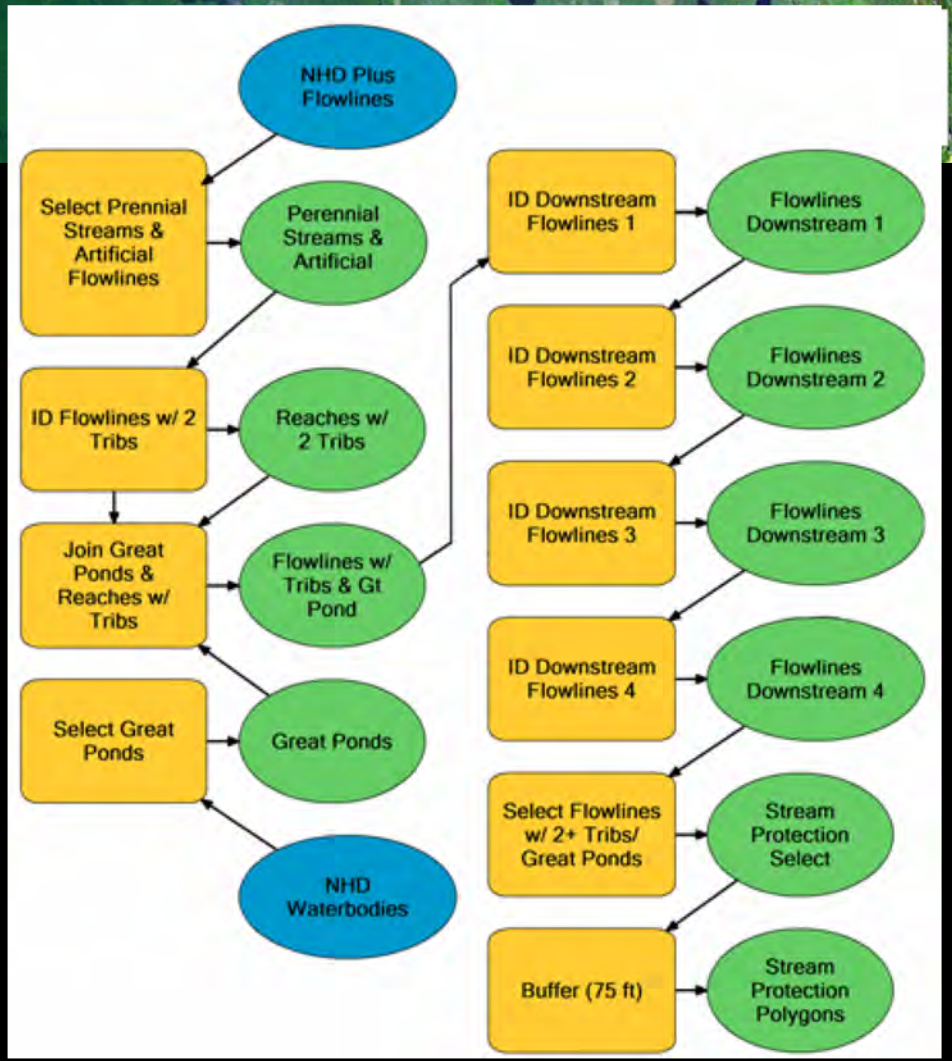
- Buffer Coastal Bluff Hazards (250 ft)
- Select Slopes >20% over 2+ac
- Select Wetlands
  - > 2 acres,
  - < 10 acres
- Clip to Shoreland Zoning



Stream Protection Model

Inputs

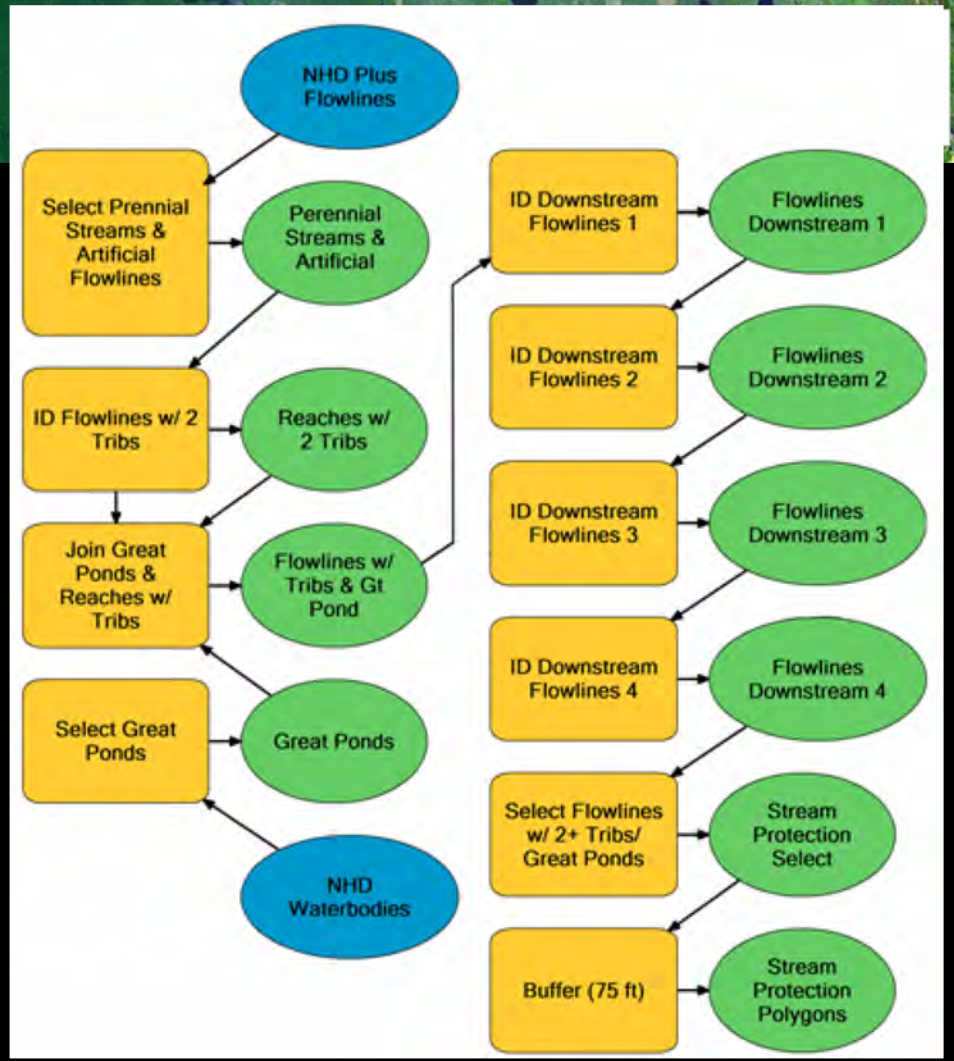
- NHD **Plus** Flowlines
- NHD Waterbodies



Stream Protection

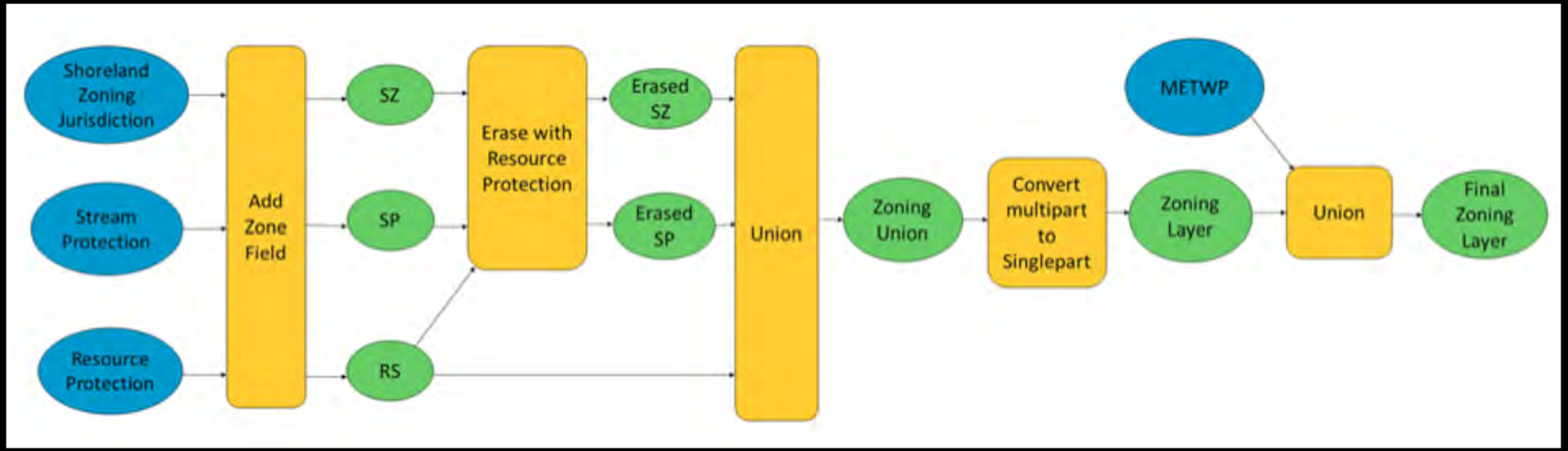
Process

- Select Perennial Streams & Artificial Flowlines
- Select Great Ponds (>10ac)
- ID Flowlines w/ 2+ Tributaries
- Select Great Pond Flowlines
- Join Flowlines
- ID all Flowlines Downstream of Gt Ponds & 2+ Tributaries
- Buffer (75ft)



Compilation Model

- Add & Populate Zone Field
- Union Shoreland Zoning Jurisdiction, Stream Protection, Resource Protection
- Union with Townships



Output

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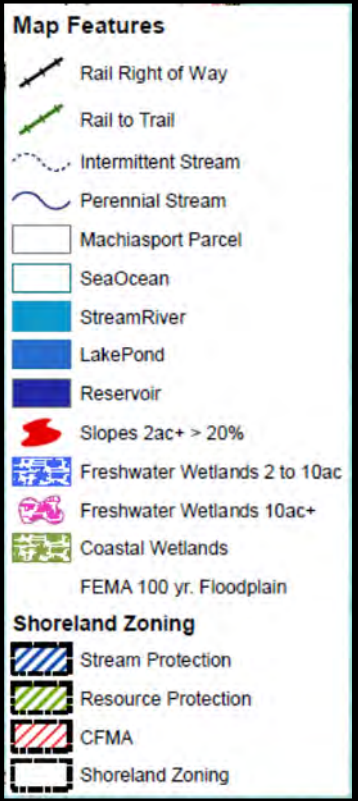

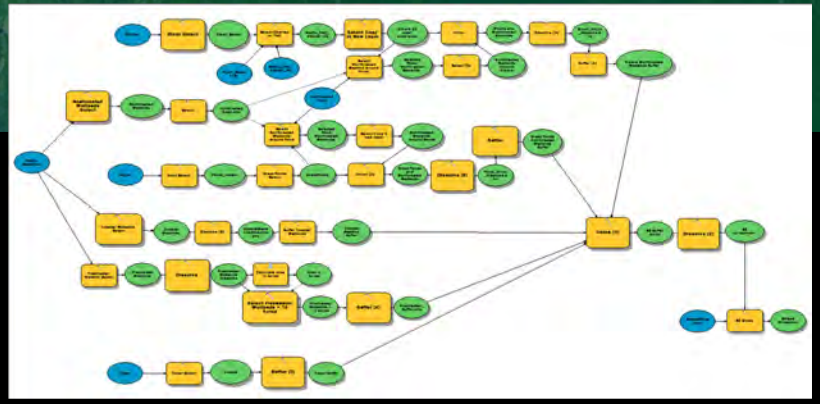

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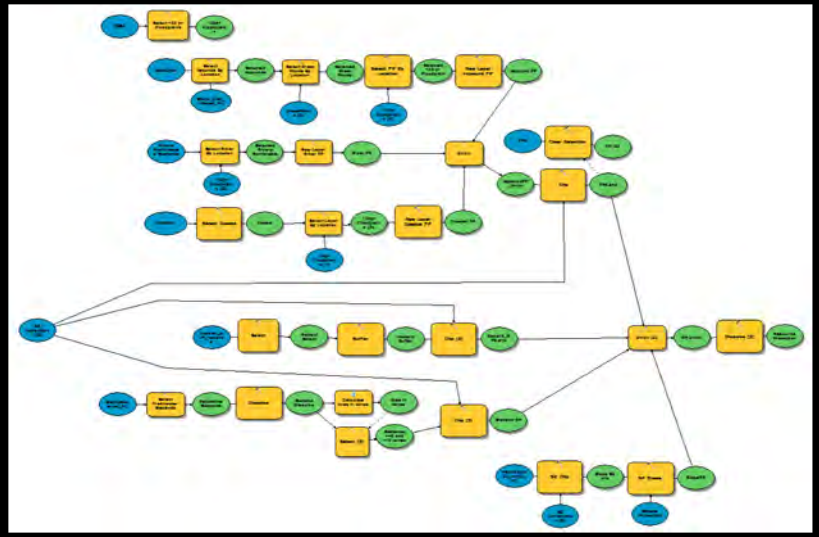

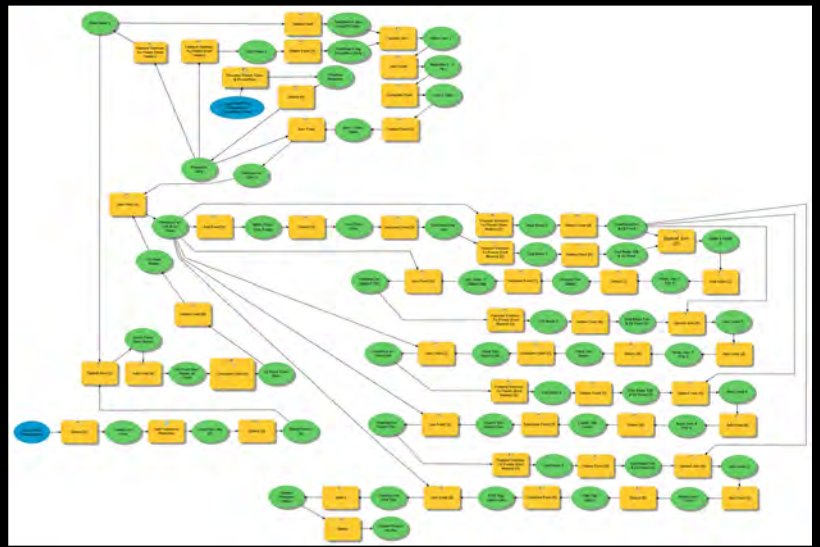

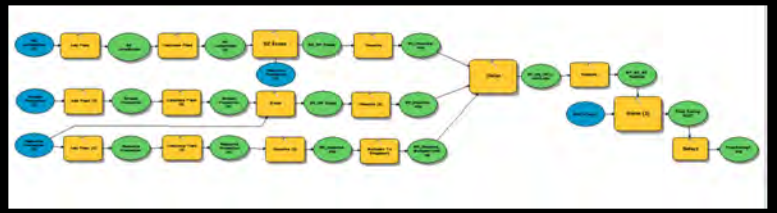

TOTAL: 125 Steps

Stream Protection: 54 Steps

Final Compilation: 16 Steps

Unnecessarily Complex

- Does not reference specific, best-available data sets.
  Example: National Hydrography Dataset

- Does not use widely-used & scientifically-defensible definitions.
  Example: Stream protection criteria are similar to but not identical to stream order.

Unnecessarily Vague

- No definitive guidance for **operational** interpretation of terms like:
  - “Abutting”
  - “Surficially connected”
- No minimum acreages or widths
- MANY questions need to be settled by DEP “looking at the aerial”
- DEP staff lack sufficient mapping expertise

Recommendations

- Reference specific, best-available data sets & provide the current, definitive versions.
- Use widely-used & scientifically-defensible definitions such as stream order.
- Define terms in ways that are **operationally** clear.
- Provide DEP staff with technical training and/or assistance to efficiently implement SLZA.

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