



Inclusive Wealth Accounting for Regulating Ecosystem Services:

An exploratory case study for Colombia

Heather Tallis, Stephen Polasky,
Juan Sebastian Lozano, Stacie Wolny

Case Countries

Colombia

2010 GDP

\$288.8 billion

2009 Poverty Rate

45.5%

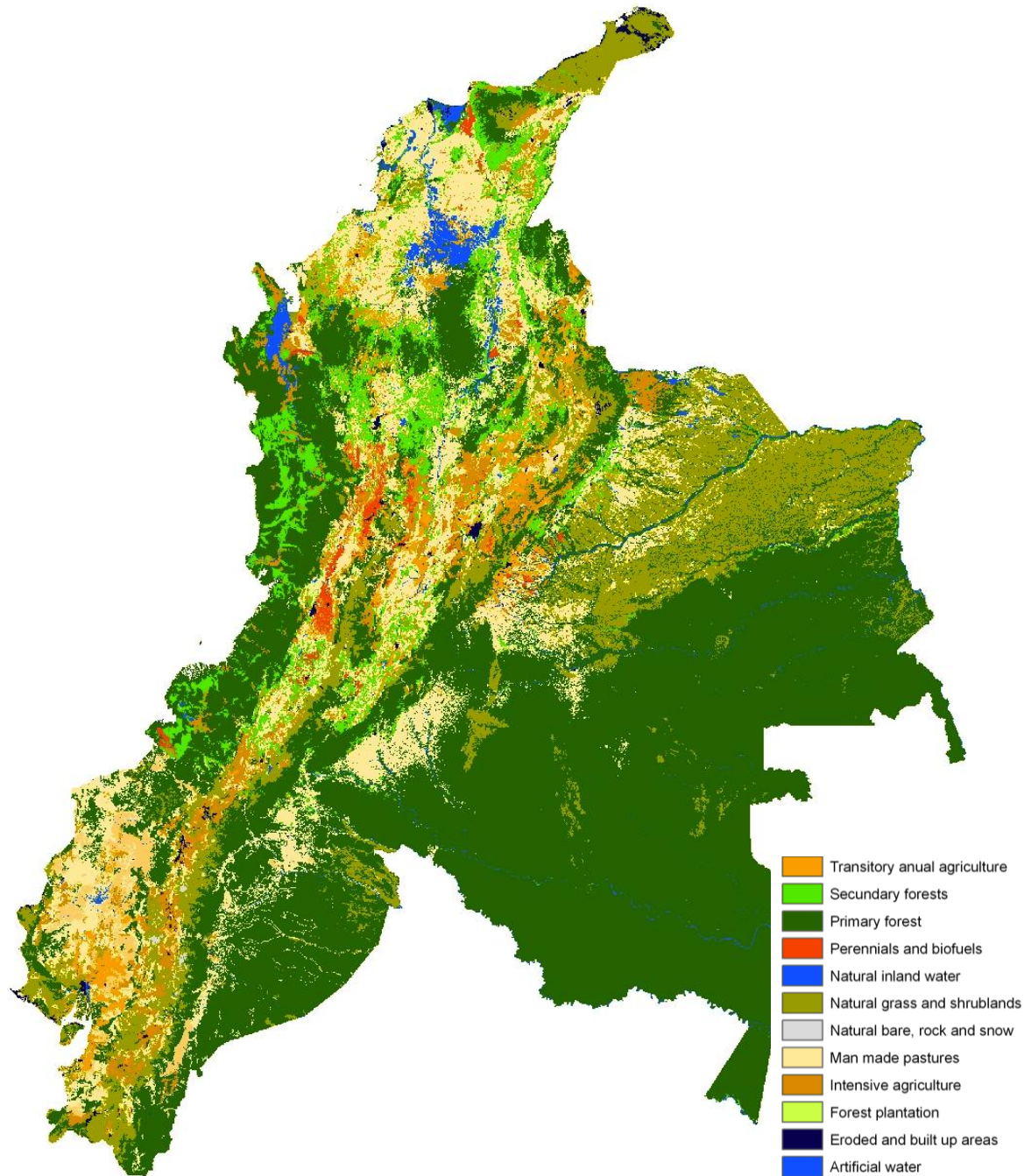
Ecuador

2010 GDP

\$108.4 billion

2010 Poverty Rate

33.1%



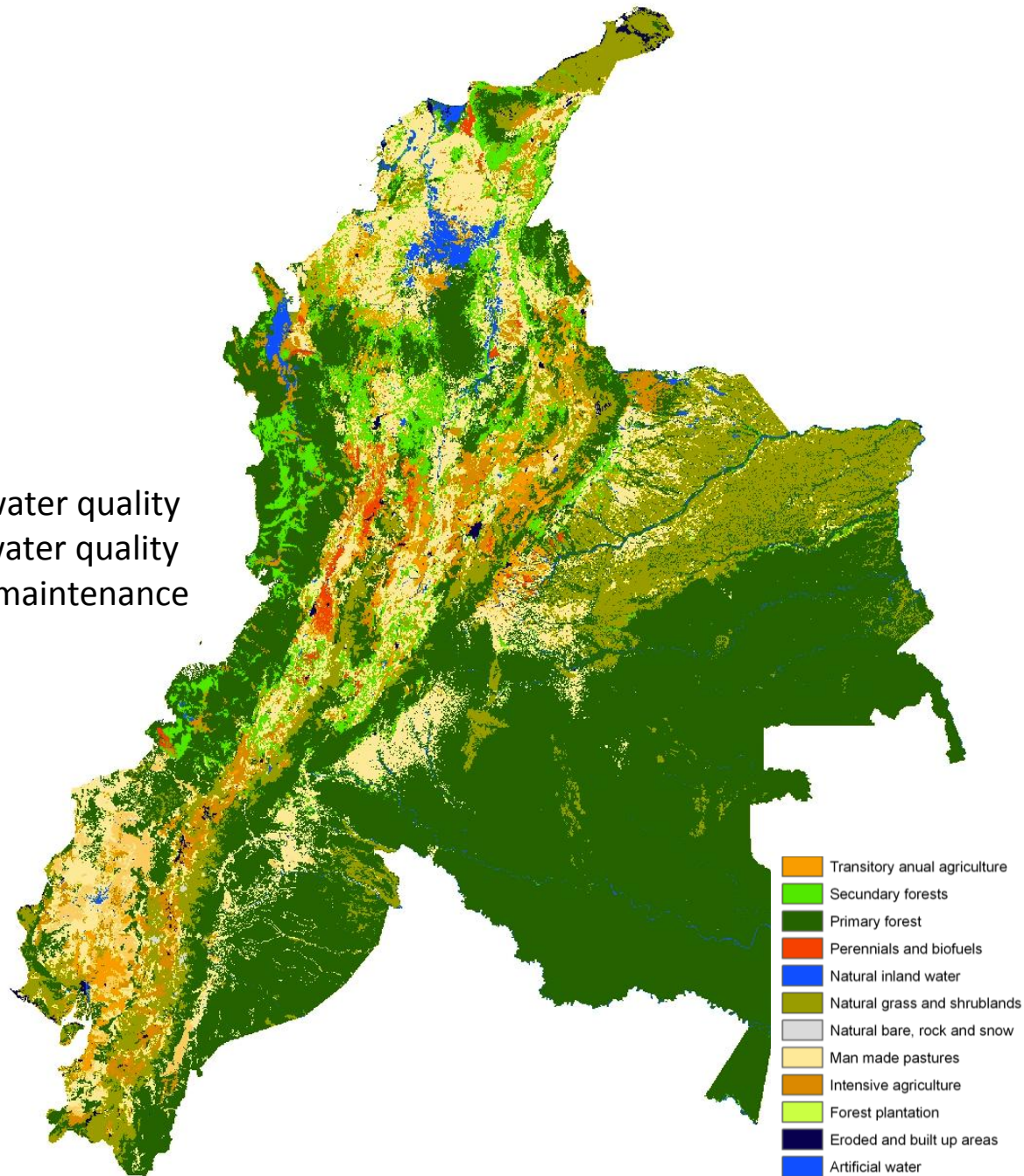
Case Countries

Unofficial processes

Readily available data

4 regulating services

- climate regulation (carbon)
- nitrogen retention for drinking water quality
- erosion regulation for drinking water quality
- erosion regulation for reservoir maintenance



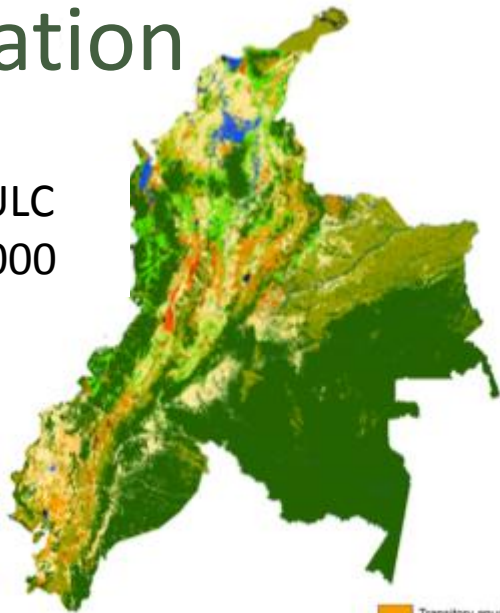
Climate Regulation

$$\begin{array}{l} \text{Carbon stock} \\ \text{IPCC} \\ \text{4 carbon pools} \end{array} * \begin{array}{l} \text{Social Cost of Carbon} \\ \$50/\text{t C} \\ \$20/\text{t C} \\ \$205/\text{t C} \end{array} - \left[\begin{array}{l} \text{Future Carbon Loss} \\ \text{Social Cost of Carbon} \end{array} * \right]$$

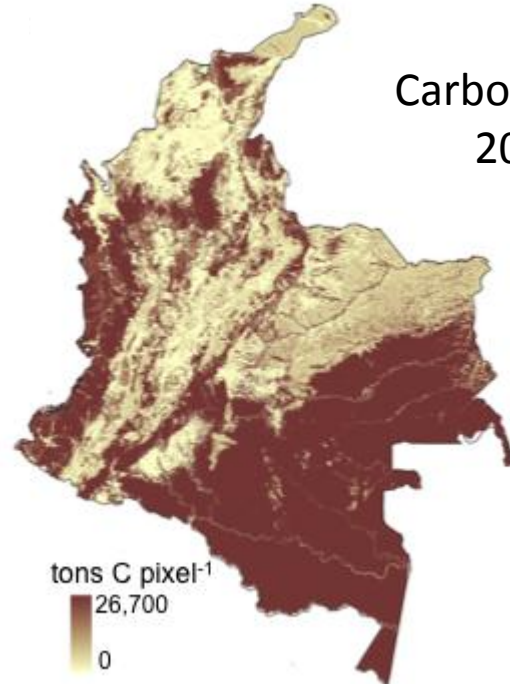
Discount rate (3%, 1%)
Annual rate of price change (0%, 1%)

Climate Regulation

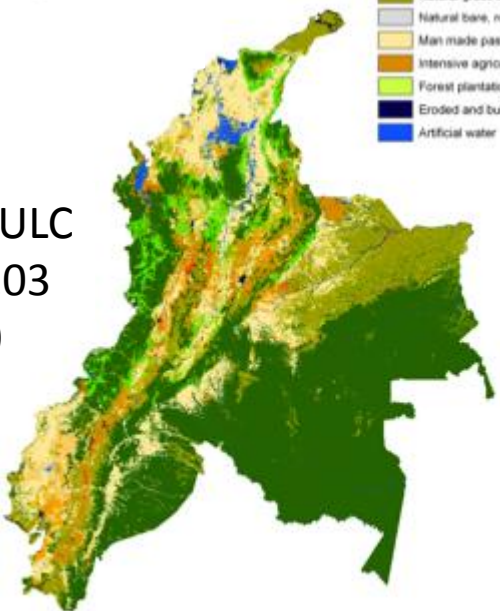
LULC
2000



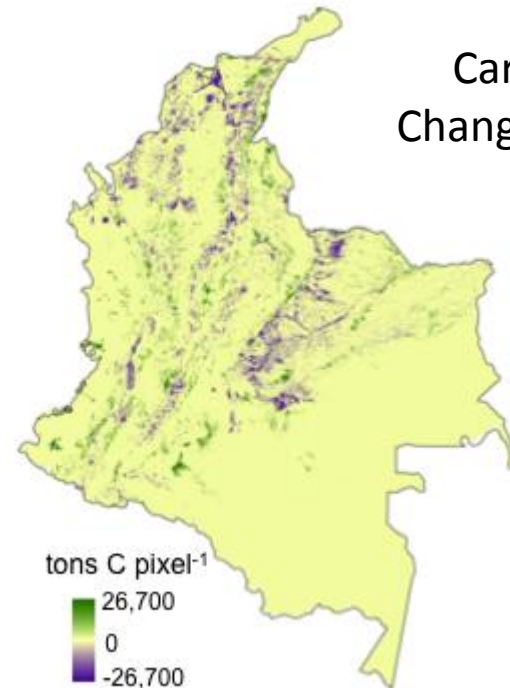
Carbon Stock
2000



LULC
2030
0

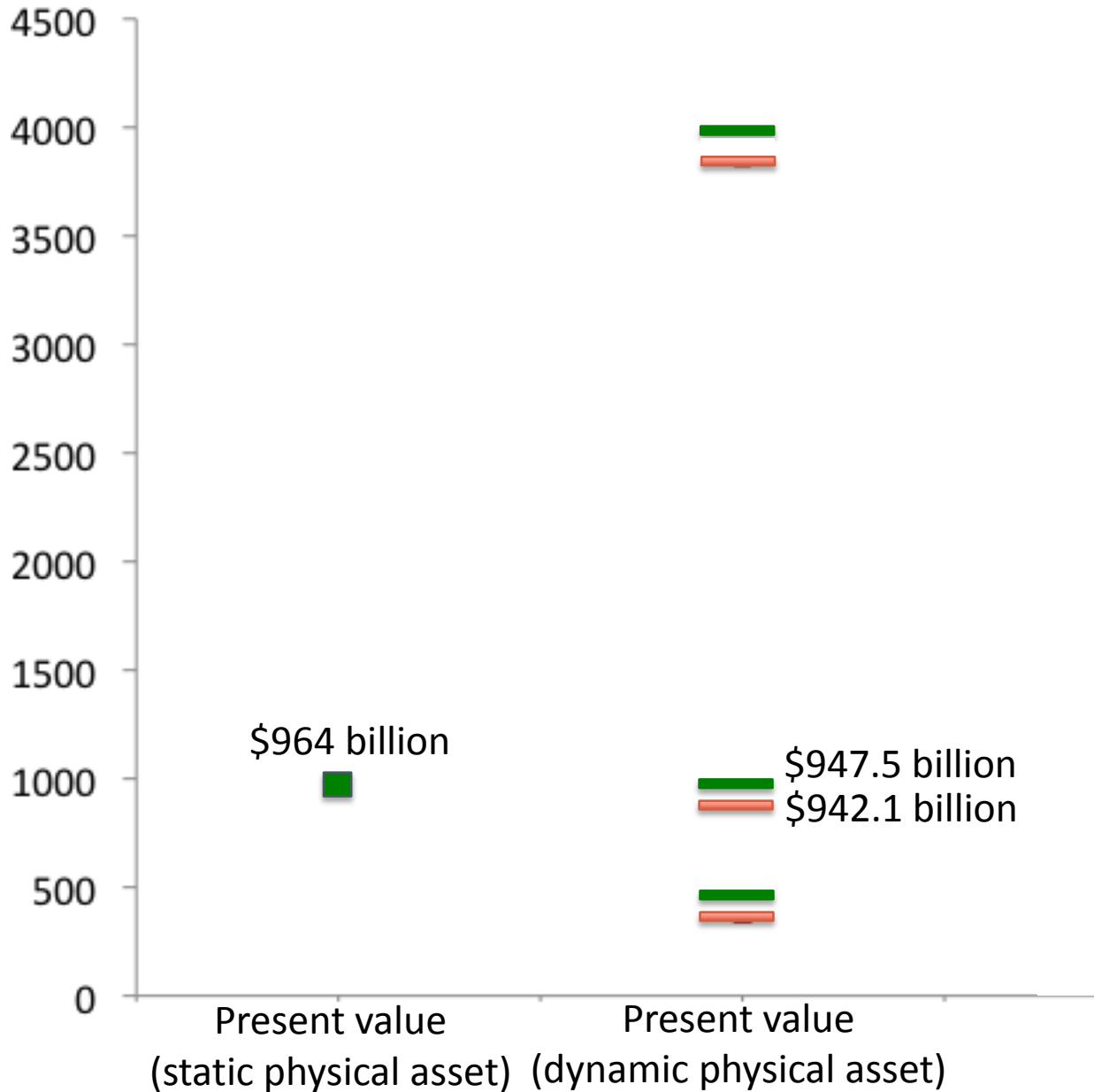


Carbon
Change 2030



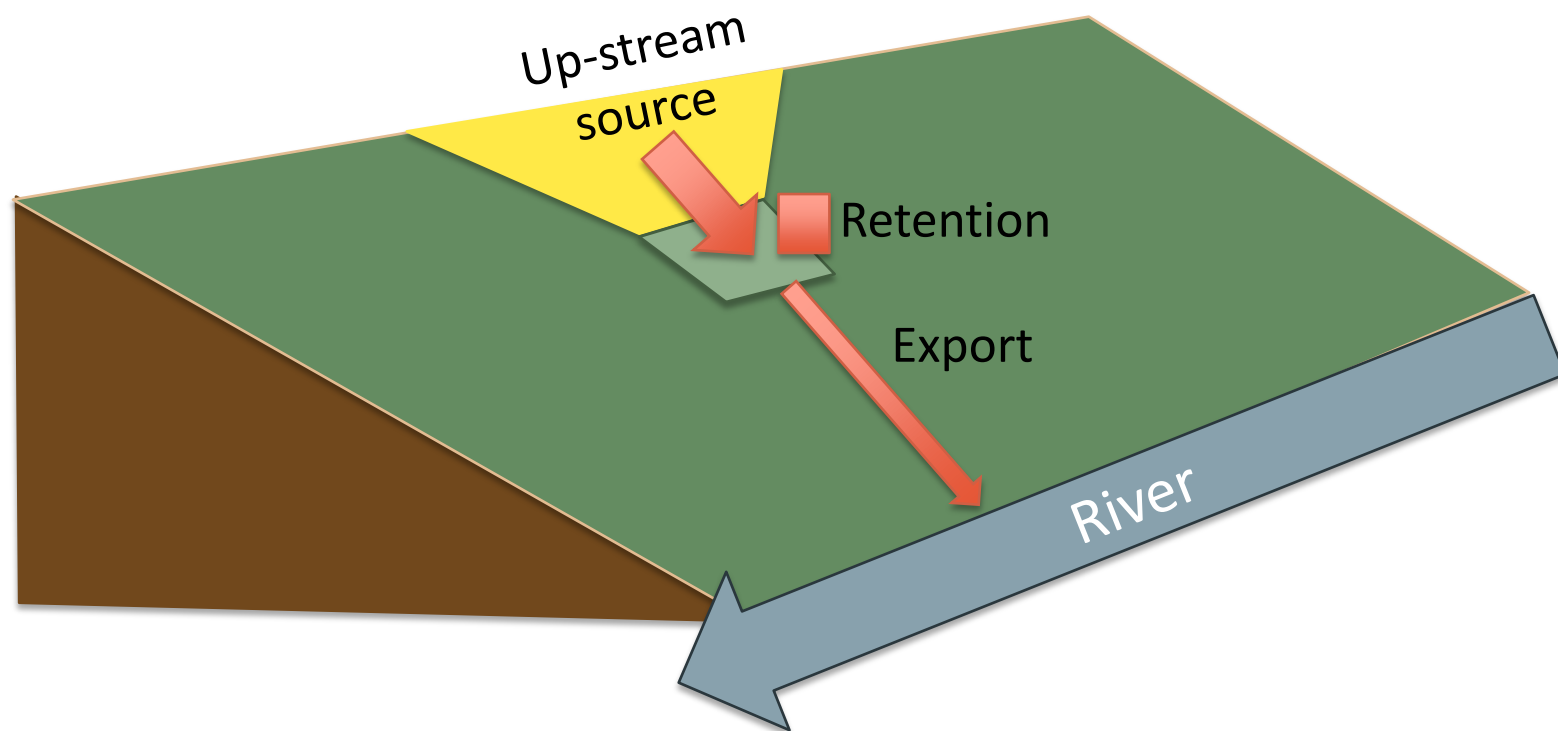
- Transitory annual agriculture
- Secondary forests
- Primary forest
- Perennials and biofuels
- Natural inland water
- Natural grass and shrublands
- Natural bare, rock and snow
- Man made pastures
- Intensive agriculture
- Forest plantation
- Eroded and built up areas
- Artificial water

Climate Regulation Value



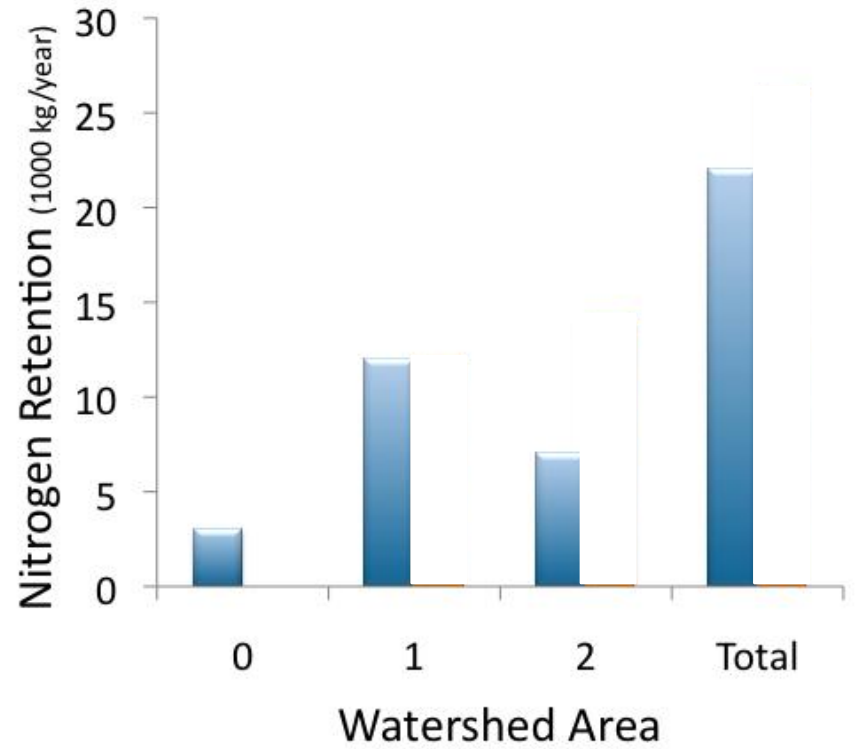
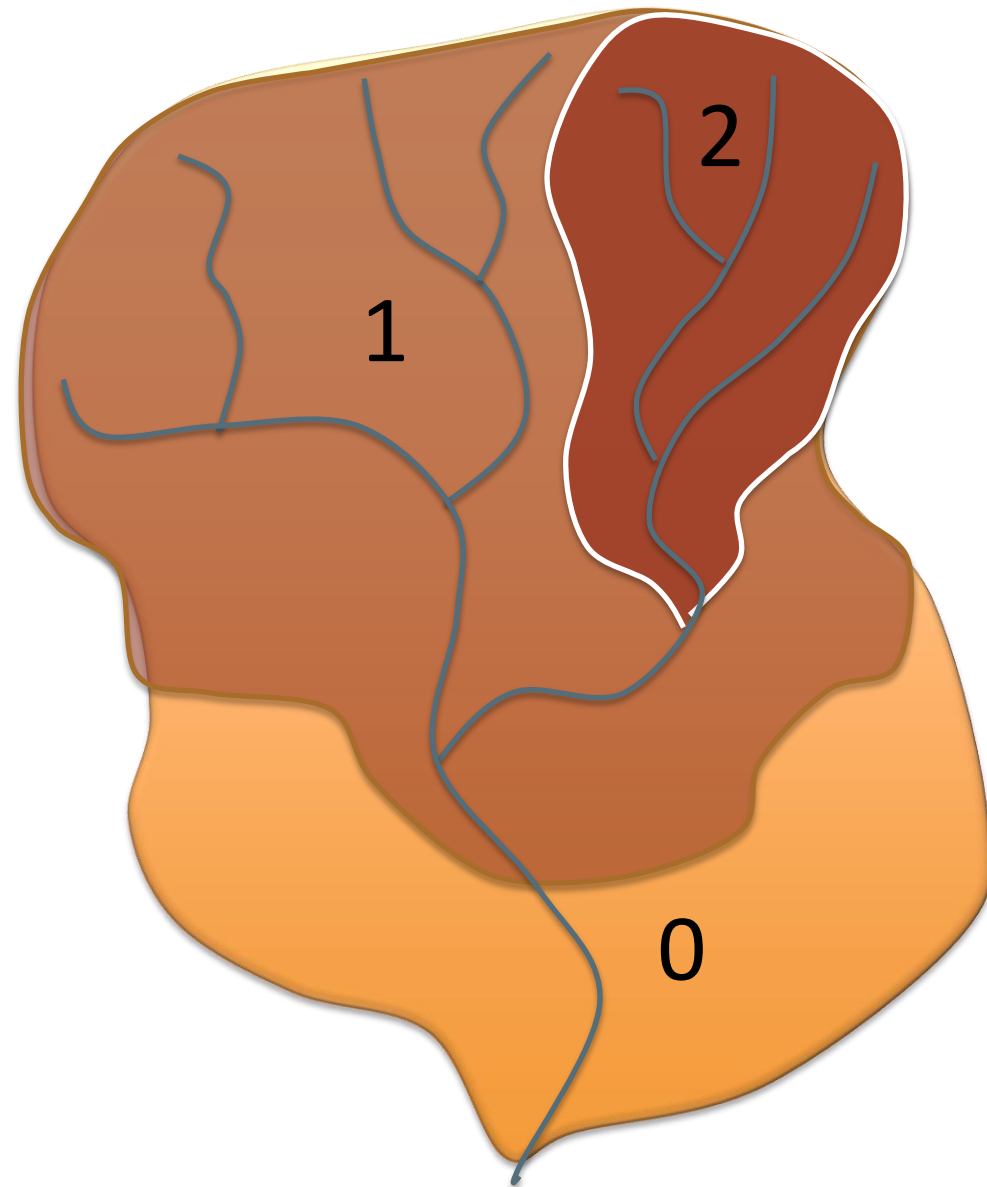
Nitrogen Retention for Drinking Water Quality

nitrogen retained (service) * avoided treatment cost

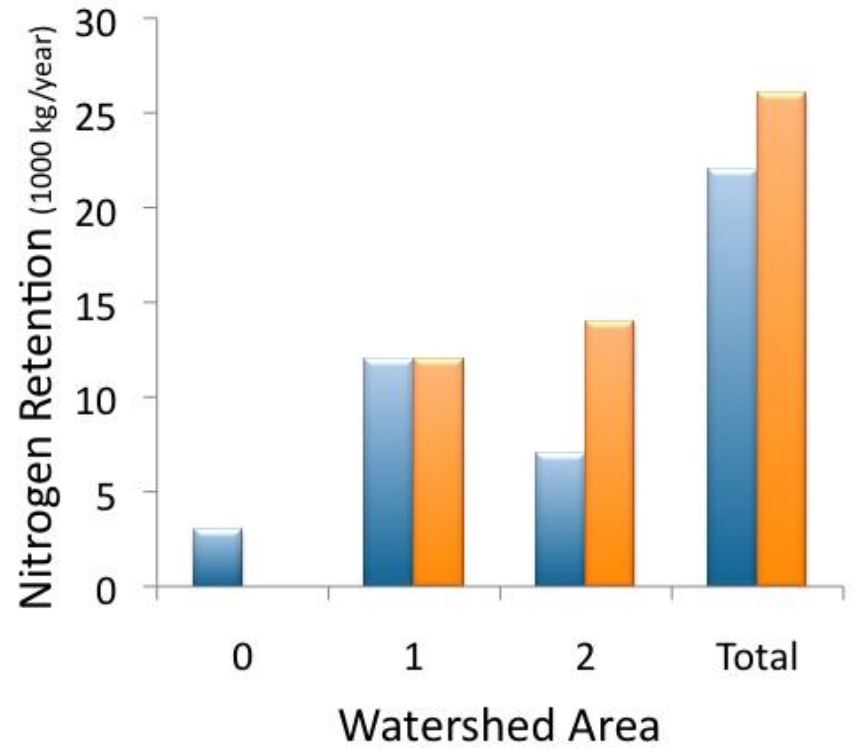
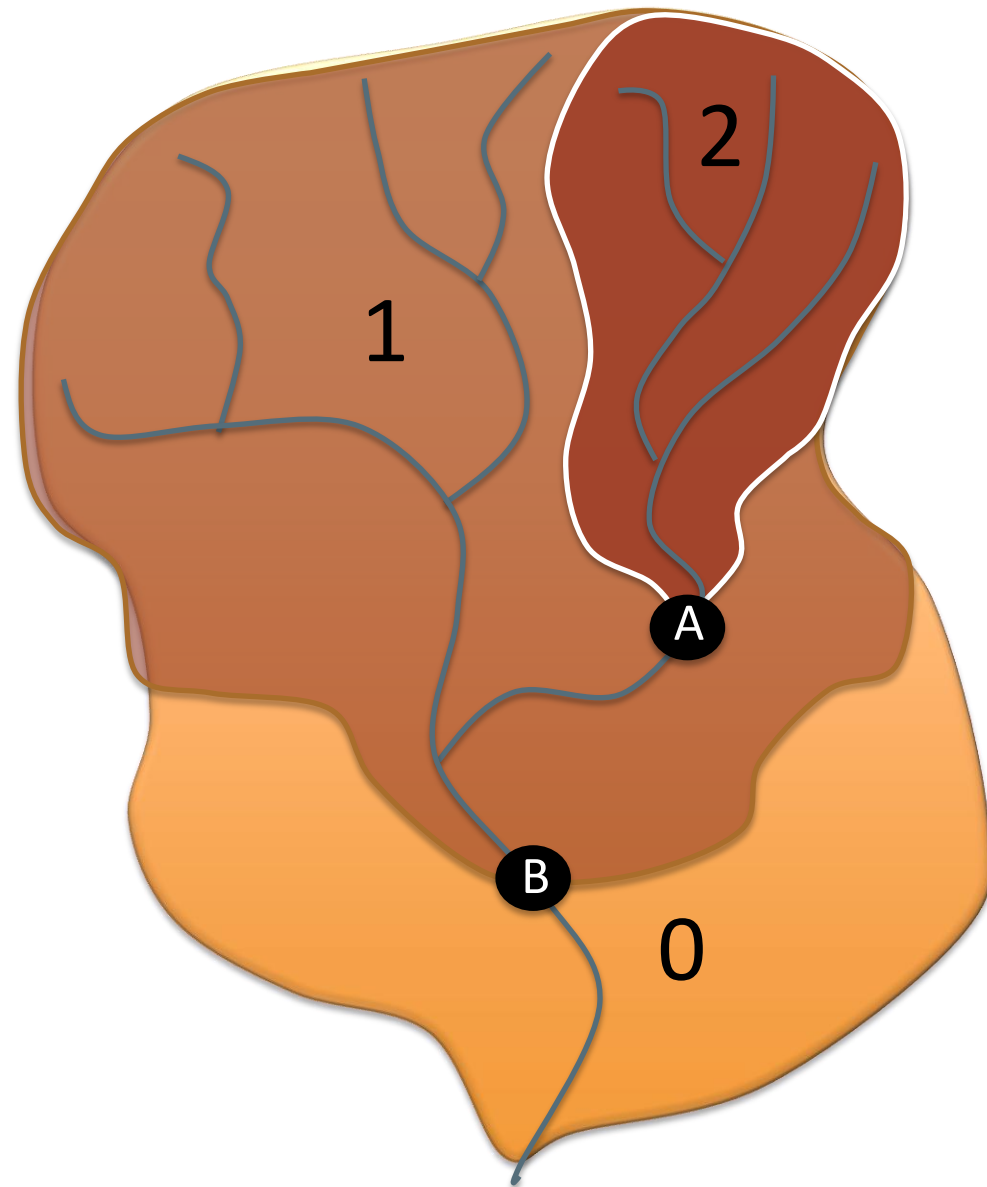


*Pollution is observed: **Retention** is not. Model it.*

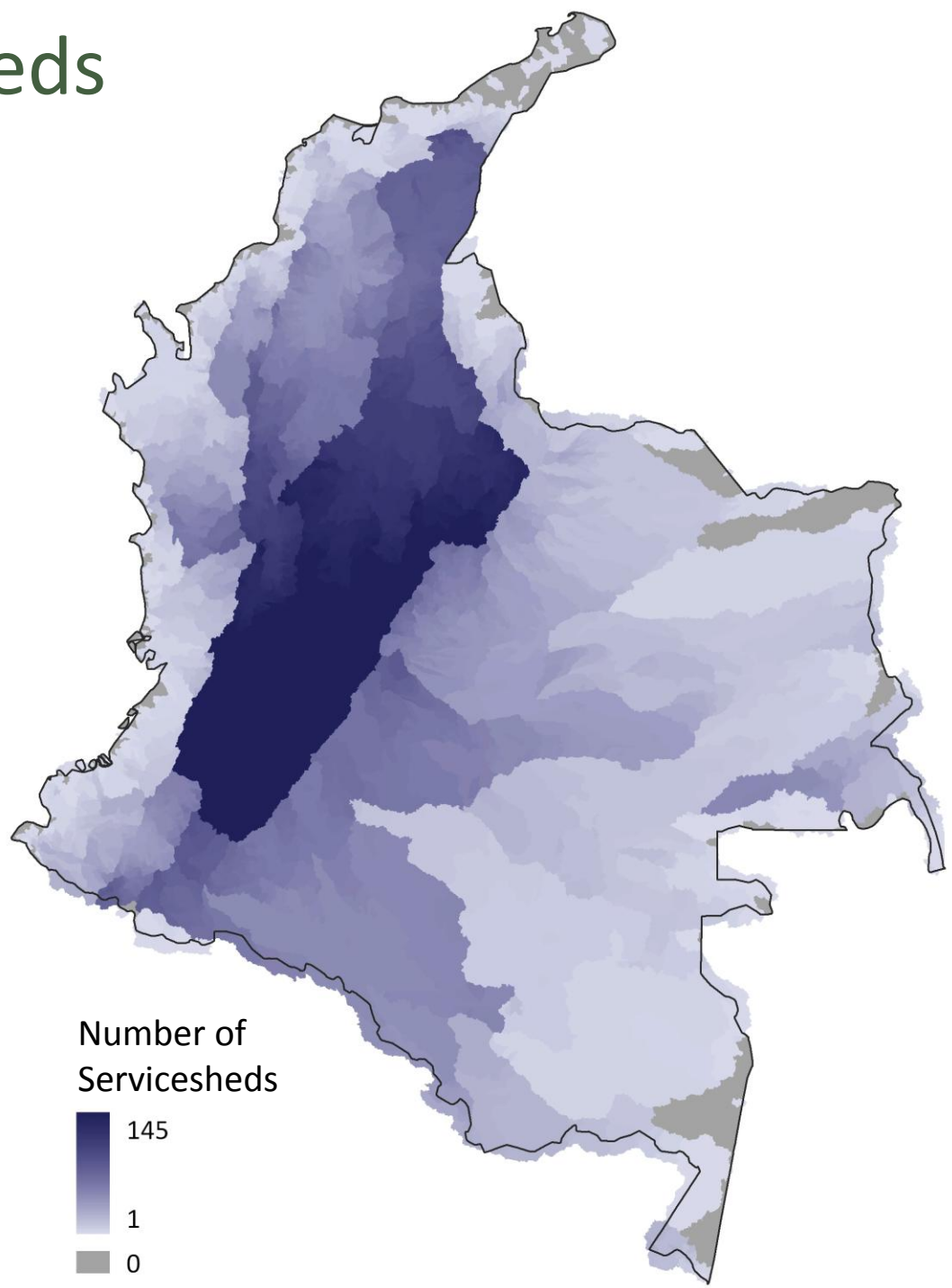
Servicesheds



Servicesheds



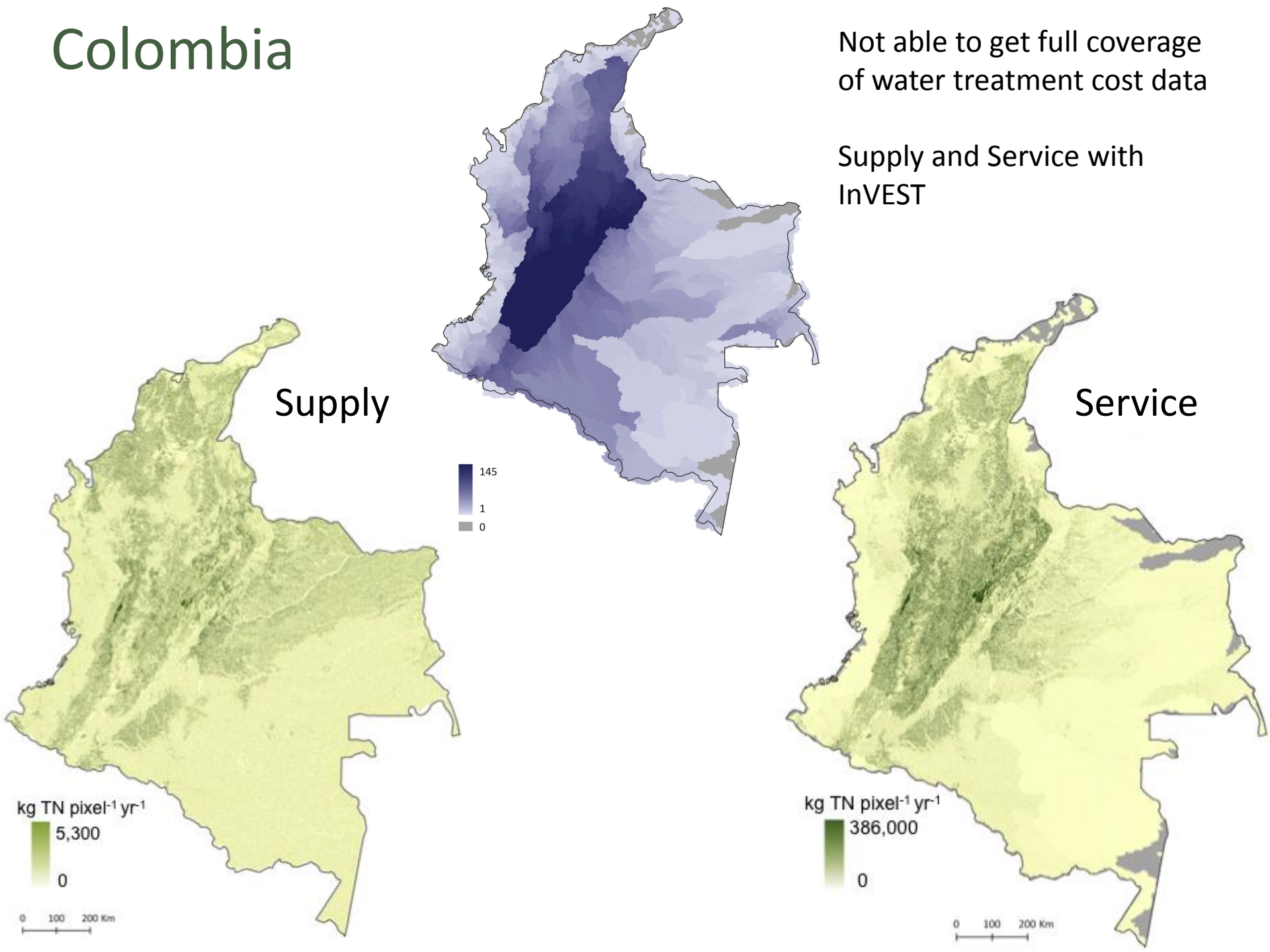
Colombia Servicesheds



Colombia

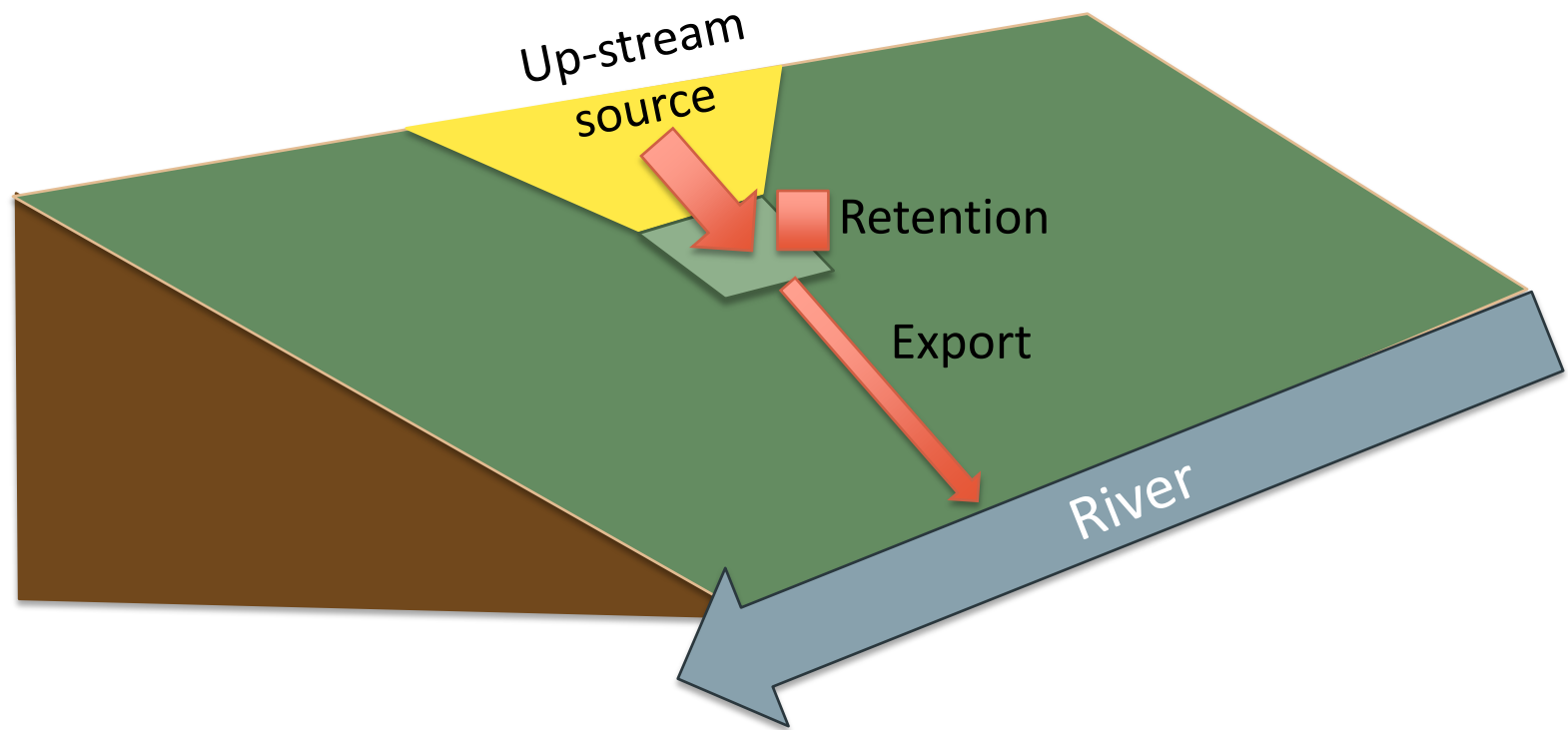
Not able to get full coverage of water treatment cost data

Supply and Service with InVEST



Erosion Retention for Drinking Water Quality

sediment retained (service) * avoided treatment cost

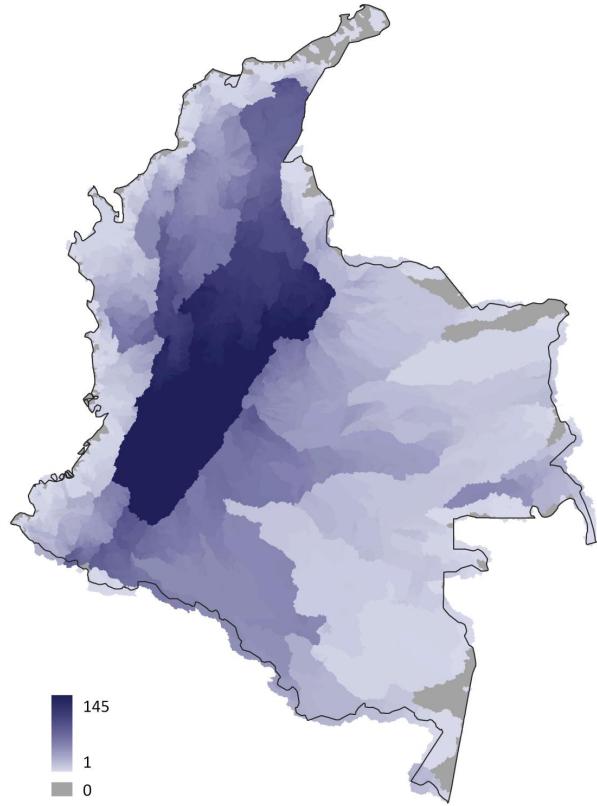


Pollution is observed: Retention is not. Model it.

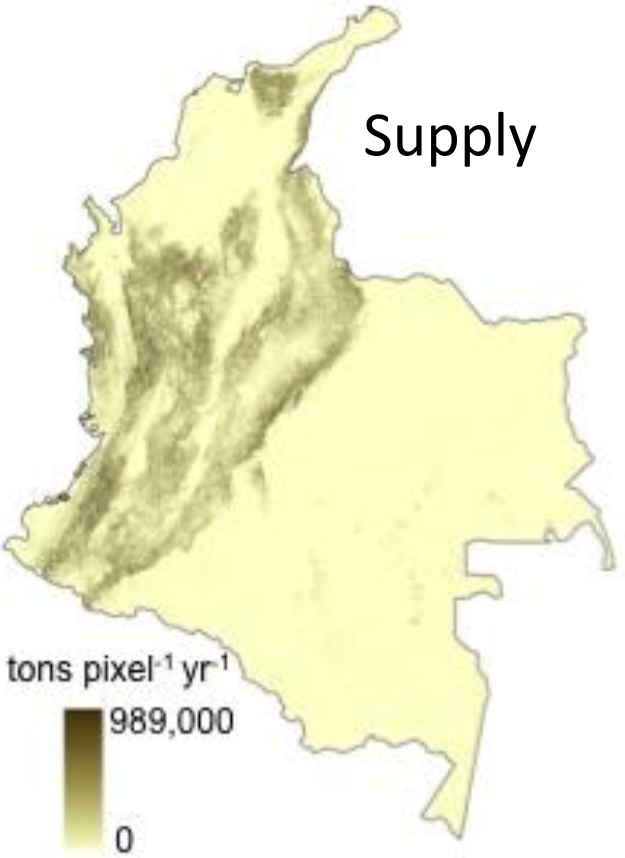
Colombia

Not able to get full coverage of water treatment cost data

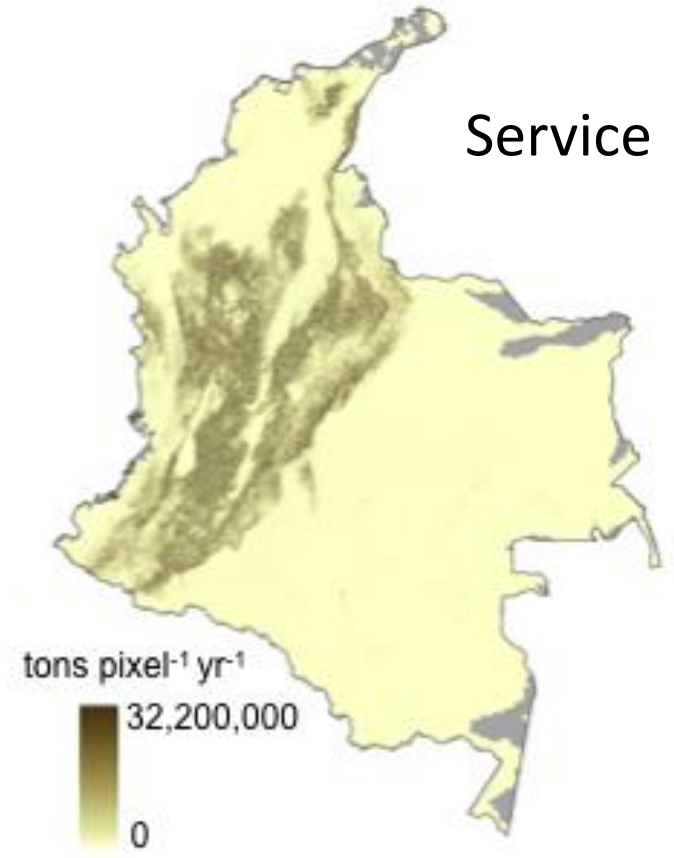
Supply and Service with InVEST



Supply

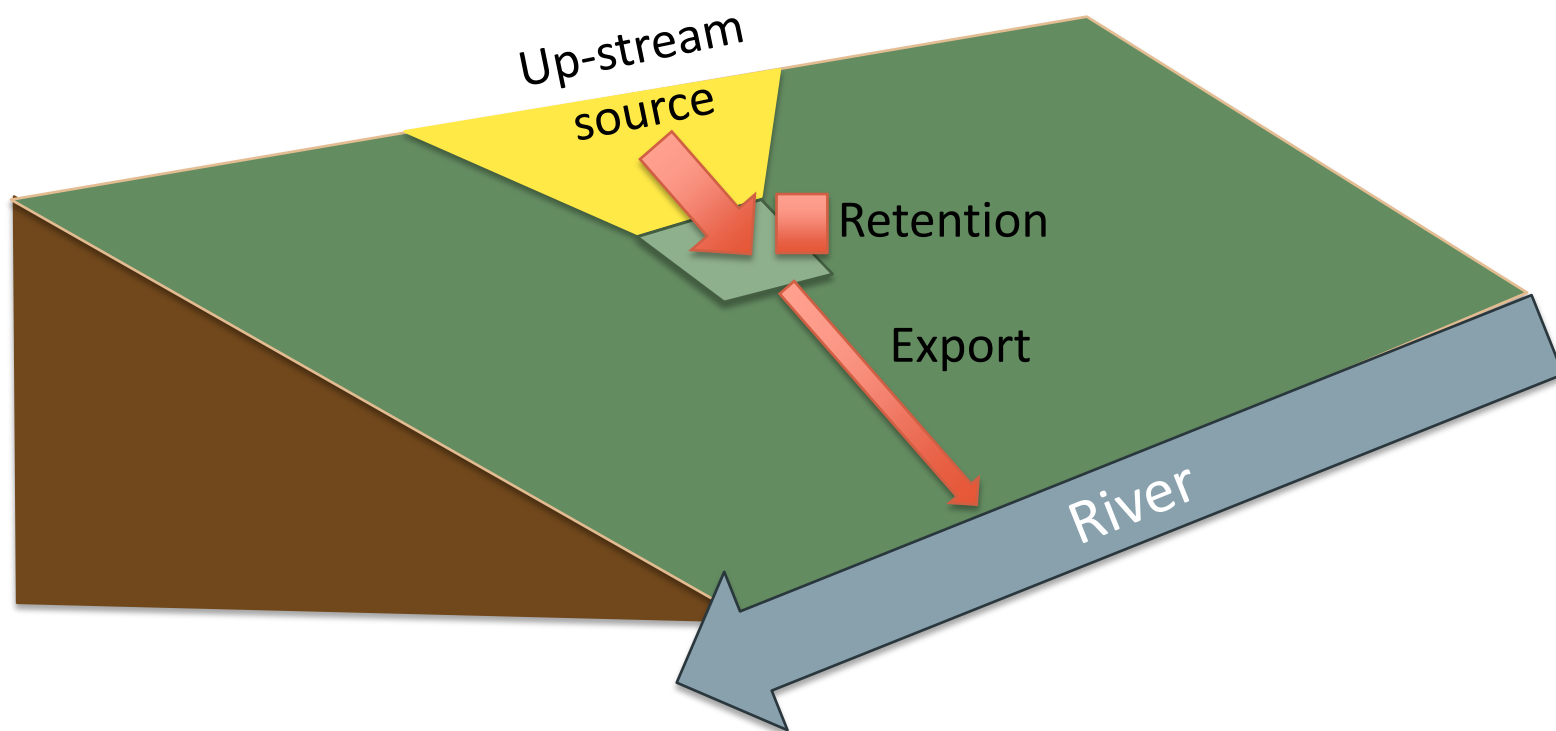


Service



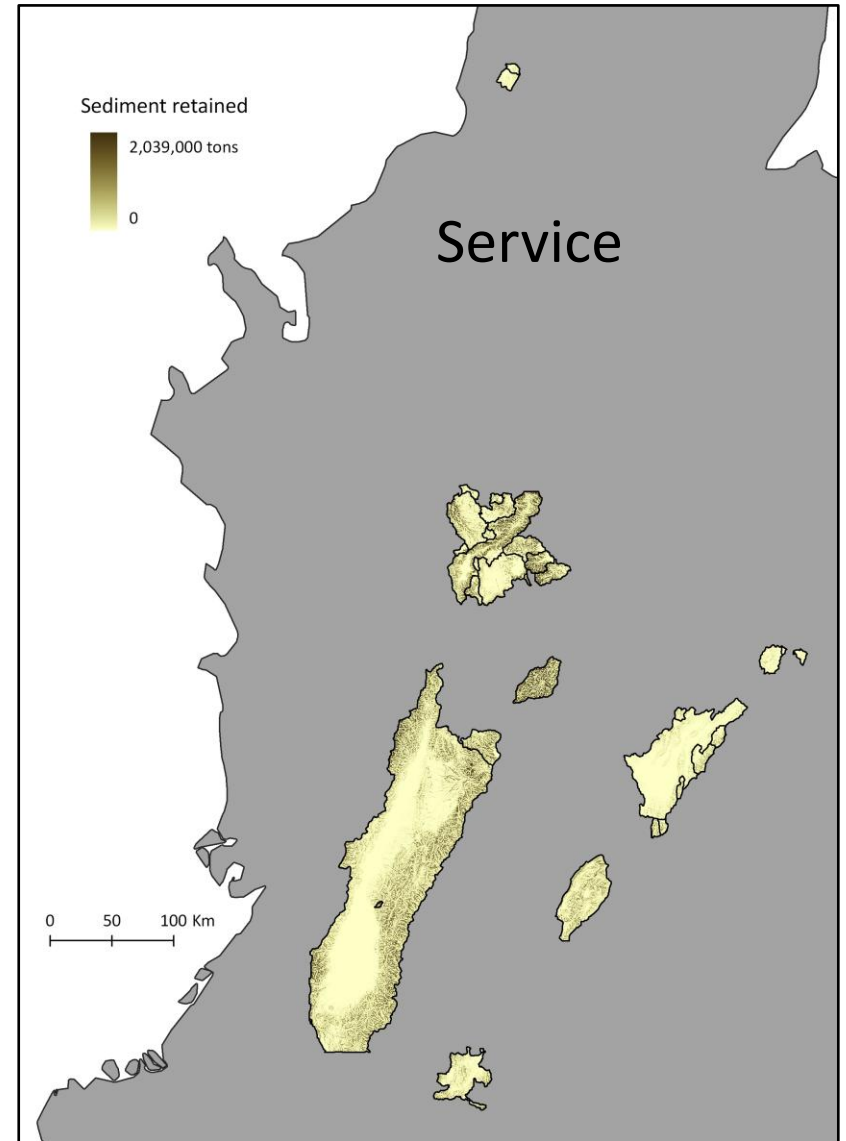
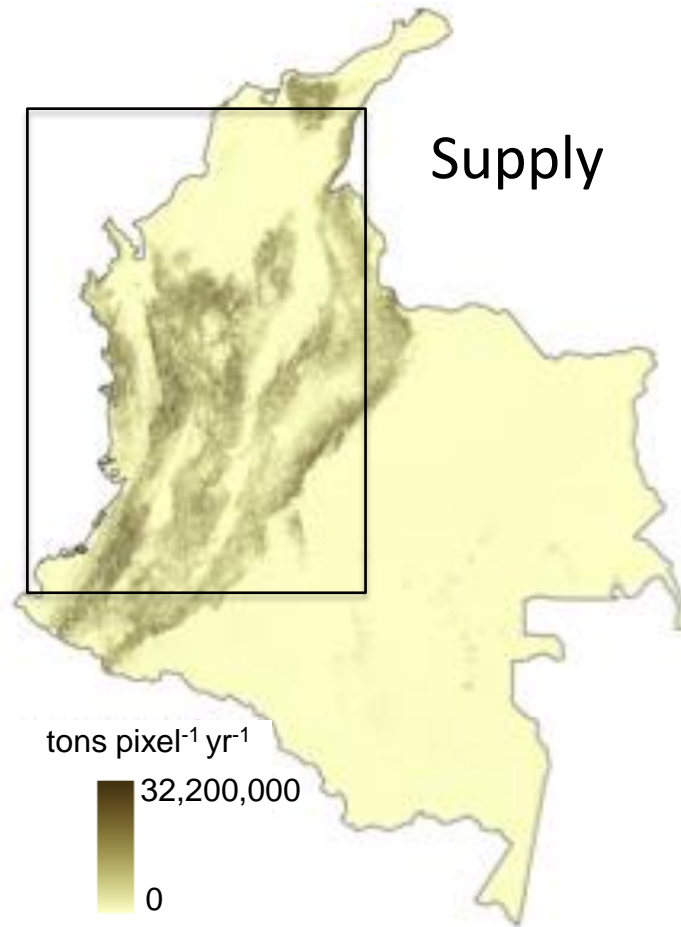
Erosion Retention for Reservoir Maintenance

sediment retained (service) * avoided *dredge* cost



Pollution is observed: Retention is not. Model it.

Colombia



Success and Challenges

- **Were able to**
 - Unbundle regulating services, account for each independently
 - Calculate supply and service at national scale, including sub-national spatial connections
 - Delineate servicesheds
- **Limitations**
 - LULC data not regularly updated
 - Cost data difficult to access
 - Data on extraction points difficult to access (groundwater vs. surface, treatment plant outakes, etc.)
 - Ways to include more services



Acknowledgements



Steve Polasky, Peter Kareiva, Gretchen Daily, Taylor Ricketts, Mary Ruckelshaus, Erik Nelson, Guillermo Mendoza, Driss Ennaanay, Manu Sharma, Marc Conte, Guy Ziv, Becky Chaplin-Kramer, Yonas Ghile, Jim Regetz, Derric Pennington, Anne Guerry, Katie Arkema, Gregory Guannel, Jodie Toft, Chong Ki Kim, Mike Papenfus, Apollo Qi, Gregory Verutes, Matthew Marsick, Nasser Olwero, Nirmal Bhagabati, Robin Naidoo, Eric Lonsdorf, Kai Chan, Dick Cameron, Rich Sharp, James Douglass, Doug Denu

