

Roanoke River Basin: Ecosystem Service Value Assessment

Lower Roanoke River Basin Workshop
April 19, 2018



Project Team



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Agenda

- Introductions
- Project Overview
- Ecosystem Service Framework & Tools
- **Break**
- Baseline, Basin-wide Ecosystem Service Value
- **Lunch**
- Group Discussion
- Break out Discussions
- Priority Actions and Next Steps

Project Overview

- Baseline Ecosystem Services Assessment
 - Basin-wide and for Upper & Lower Dan and for Lower Roanoke subbasins
- What are stressors, issues, opportunities, that may affect ecosystem service delivery
- Evaluate effects of those factors
- Develop the “ESValuator”, a QGIS plugin to make ecosystem service valuation easier and more accessible.

Ecosystem Services Framework

Ecosystem Services are “the effects on human well-being of the flow of benefits from an ecosystem endpoint to a human endpoint at a given extent of space and time (Johnson, et al., 2010).”

Ecosystem Services Framework

Human-focused, but driven by ecological processes.

$$\begin{array}{c} \text{Biophysical quantities} \\ + \\ \text{Human needs and desires} \\ = \\ \text{Ecosystem Services} \end{array}$$

Core Ecosystem Processes
(nutrient and water cycles, weathering, erosion, etc.)

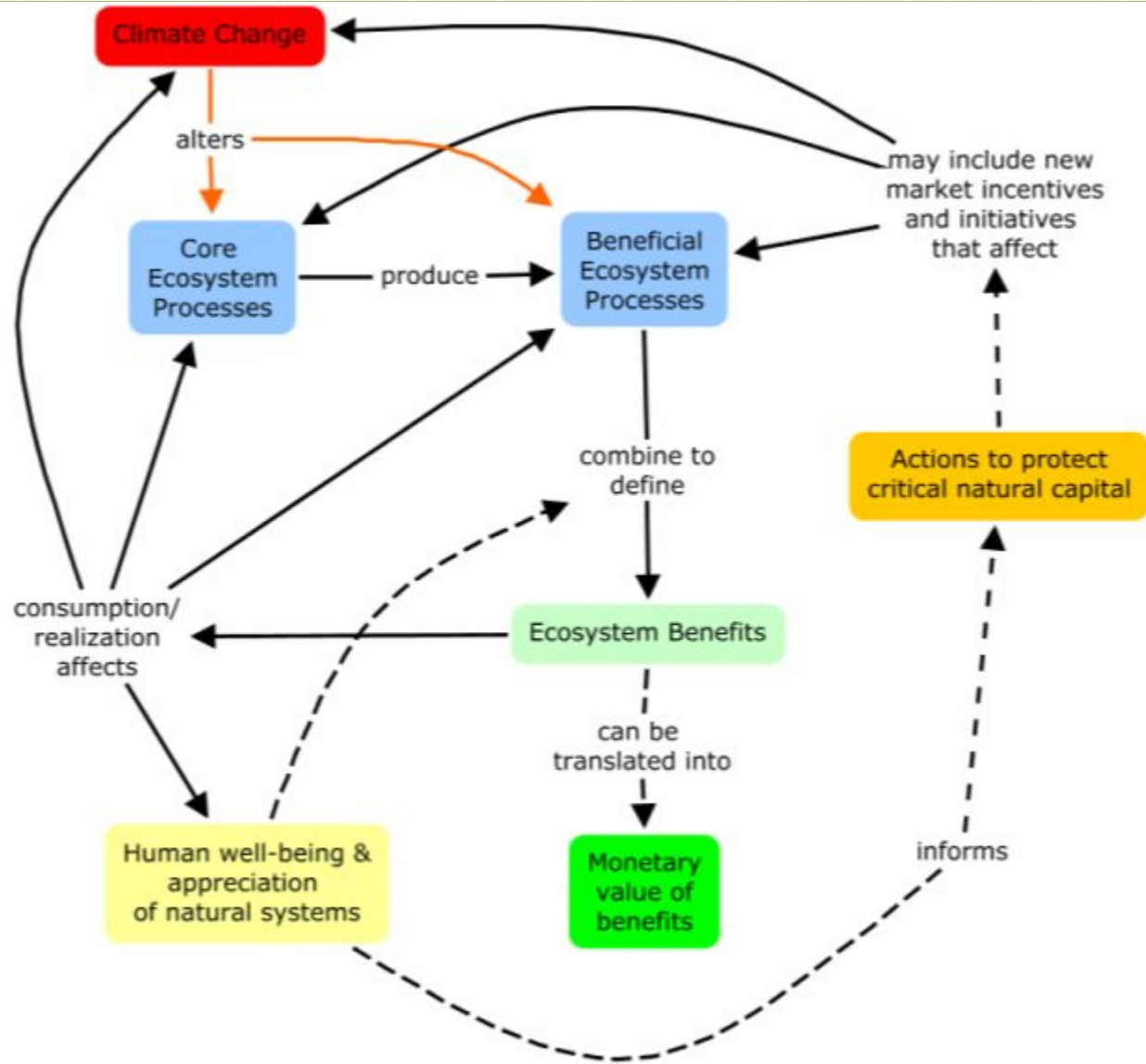
Stressors
may affect
entire system

Beneficial Ecosystem Processes
(biomass production, formation of pleasant scenery, water purification, etc.)

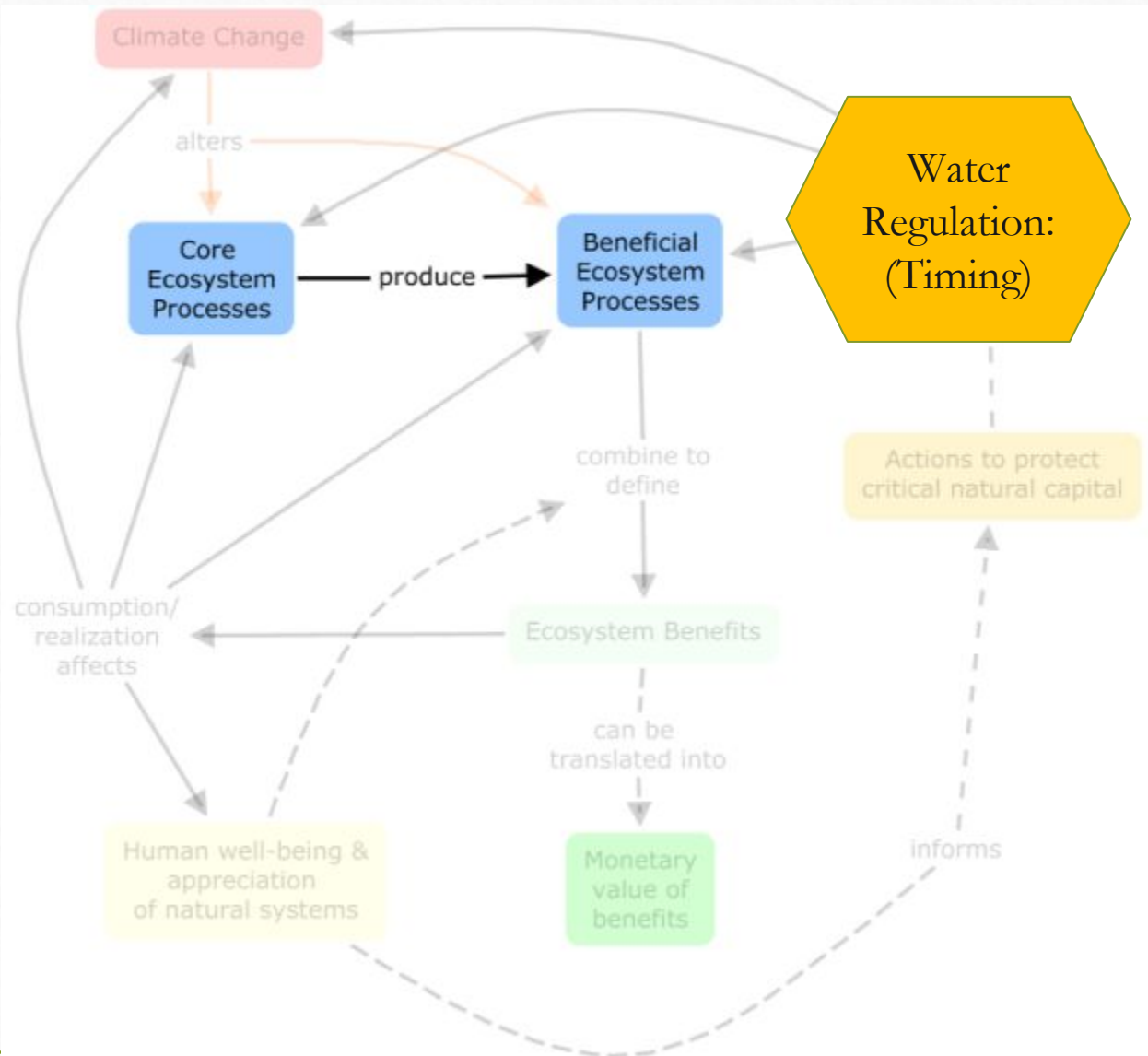
Ecosystem Benefits
(food, fresh water, raw materials, energy, physical health, psychological well-being, knowledge, etc.)



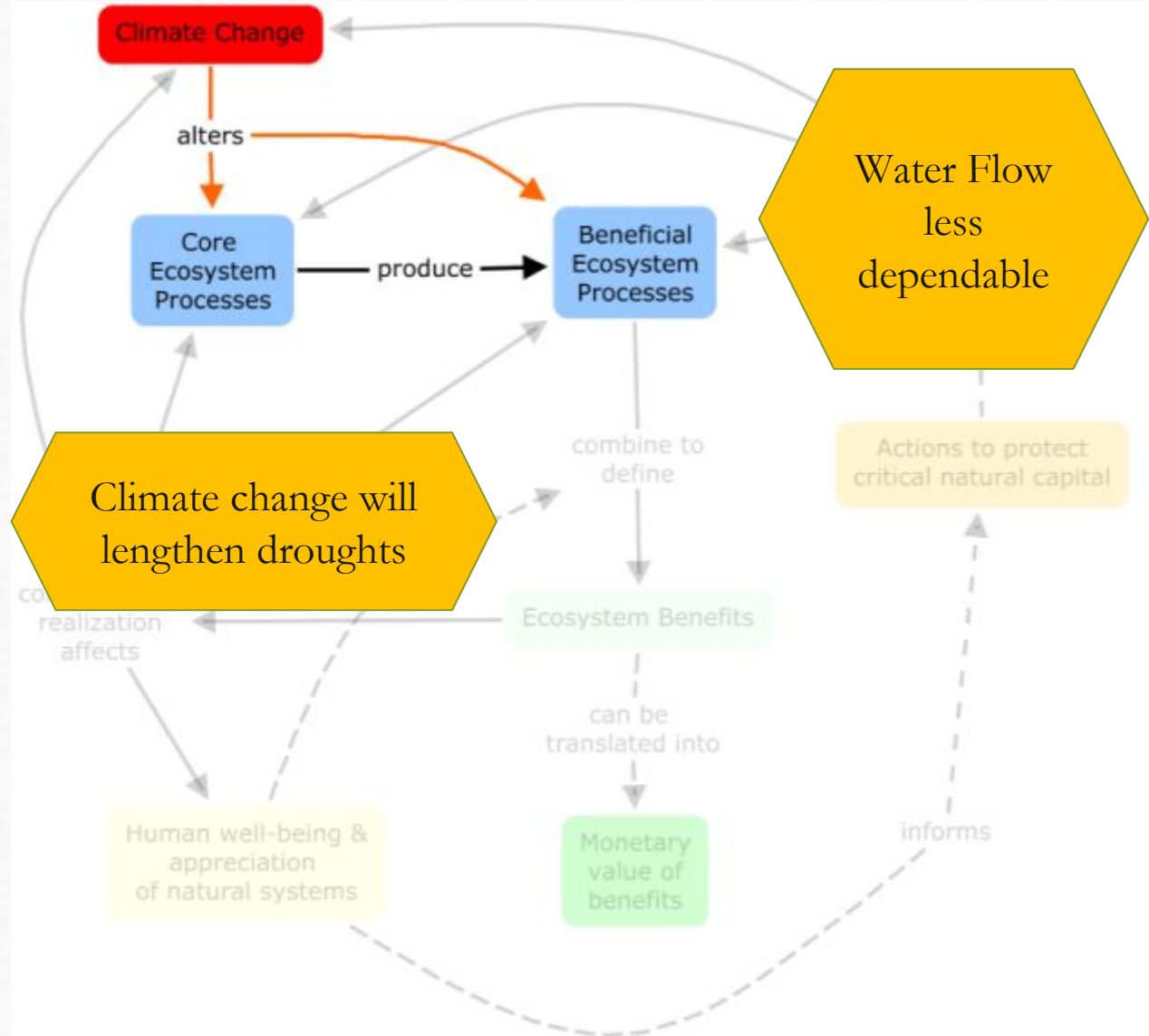
Concept Map (Sample)



Core processes produce beneficial processes.

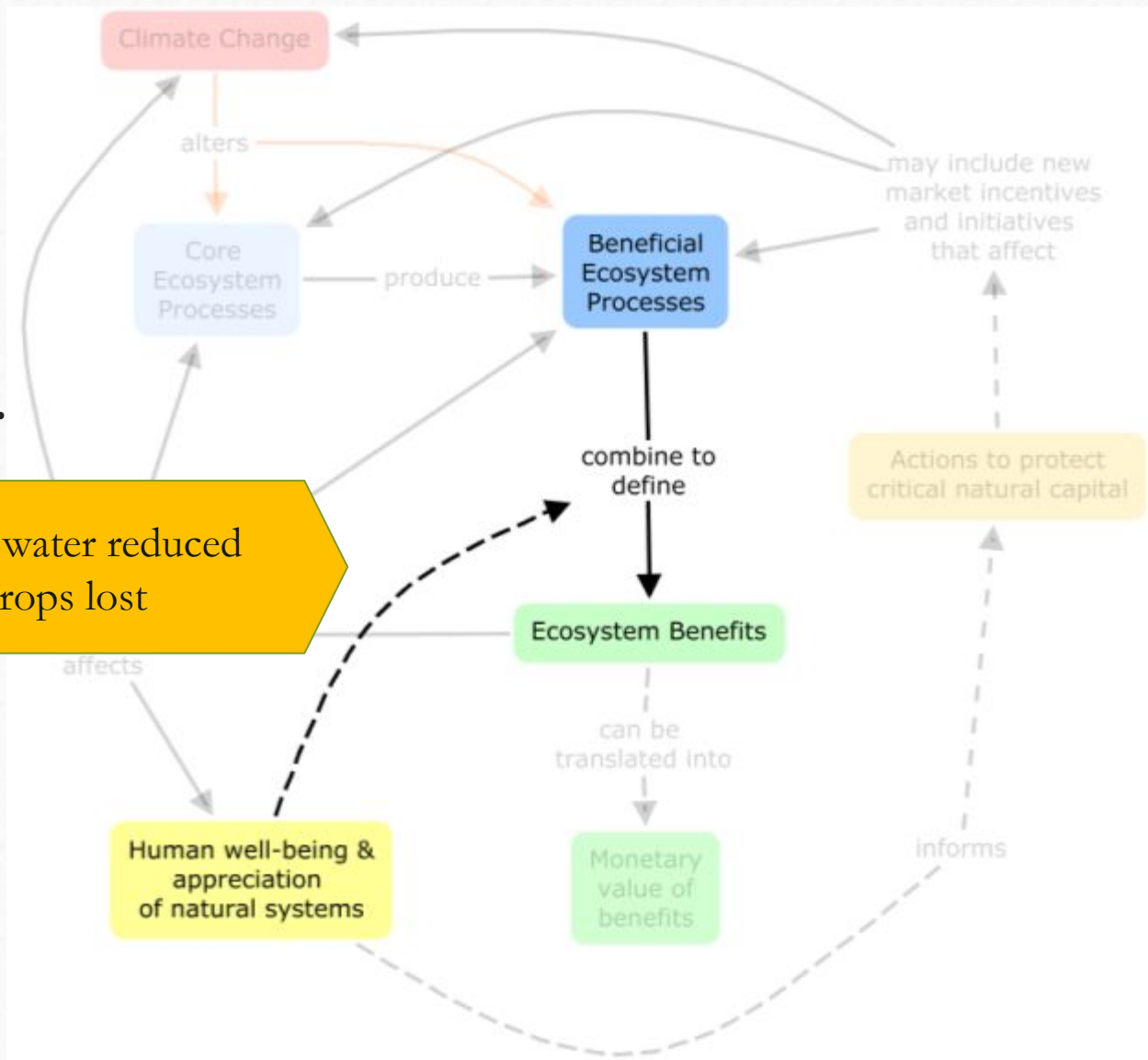


Stressors
alter
processes.

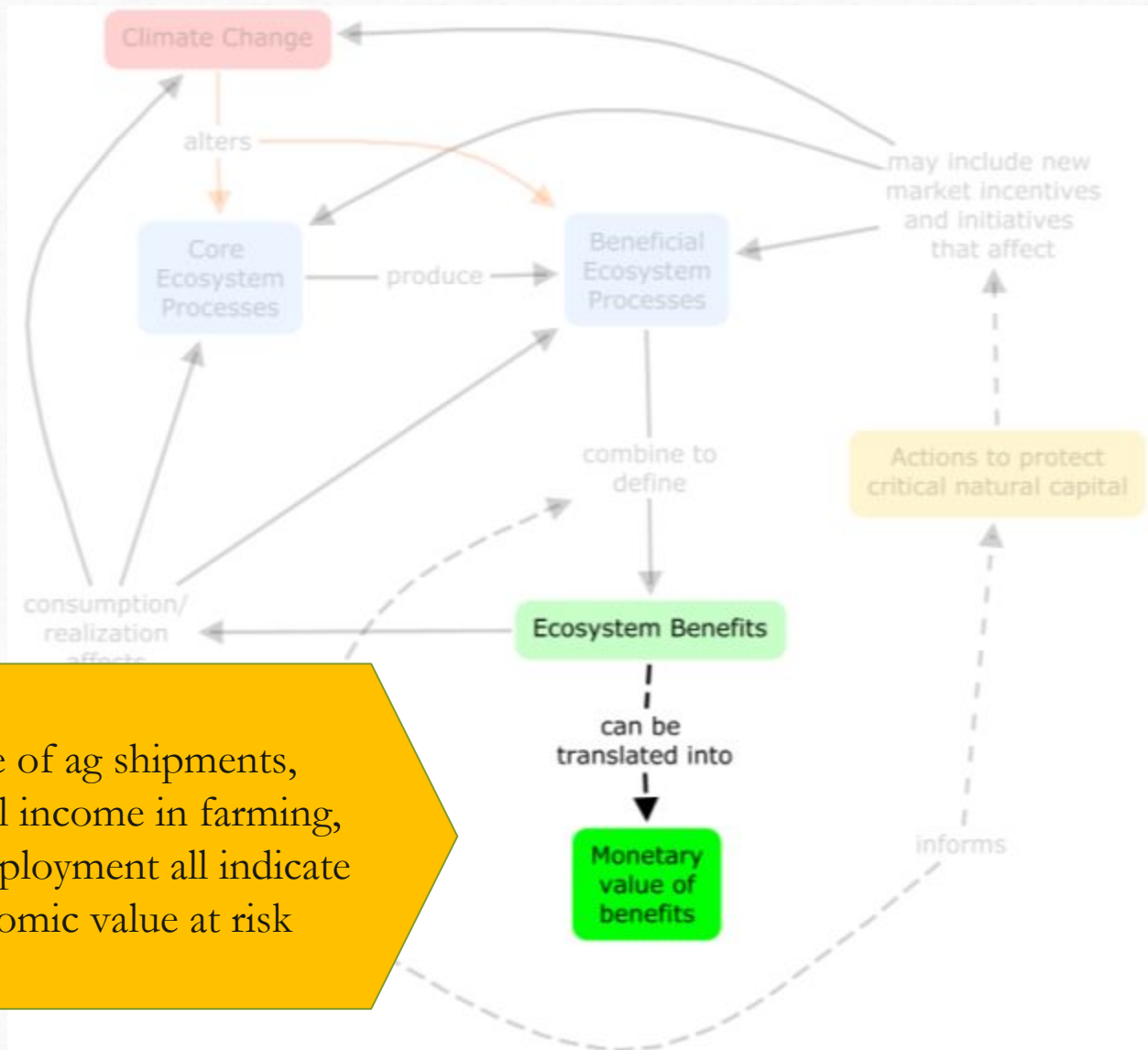


Benefits
derive from
processes
AND
appreciation.

Irrigation water reduced
-> crops lost

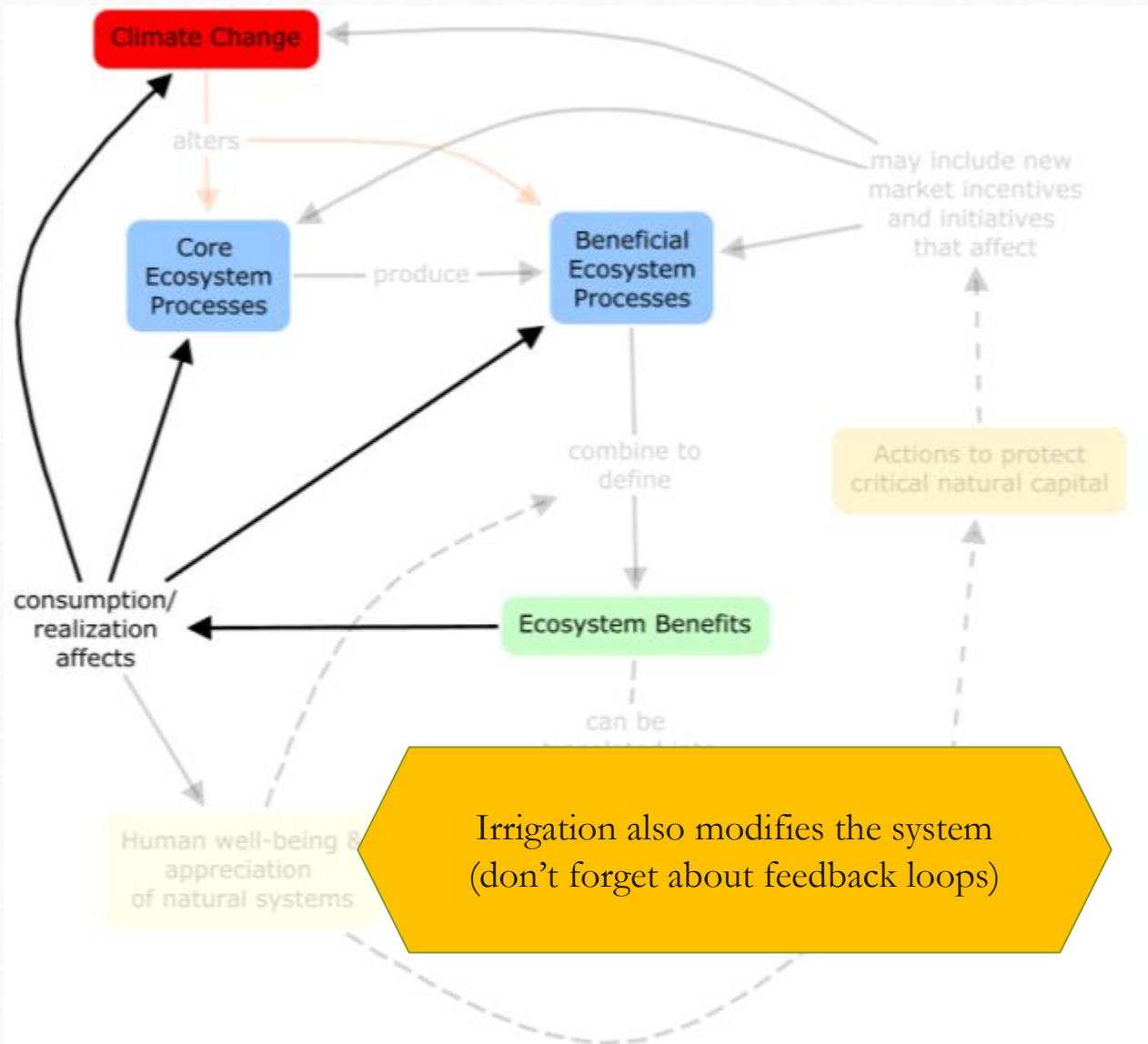


Benefits can be (but do not have to be) expressed in dollars.

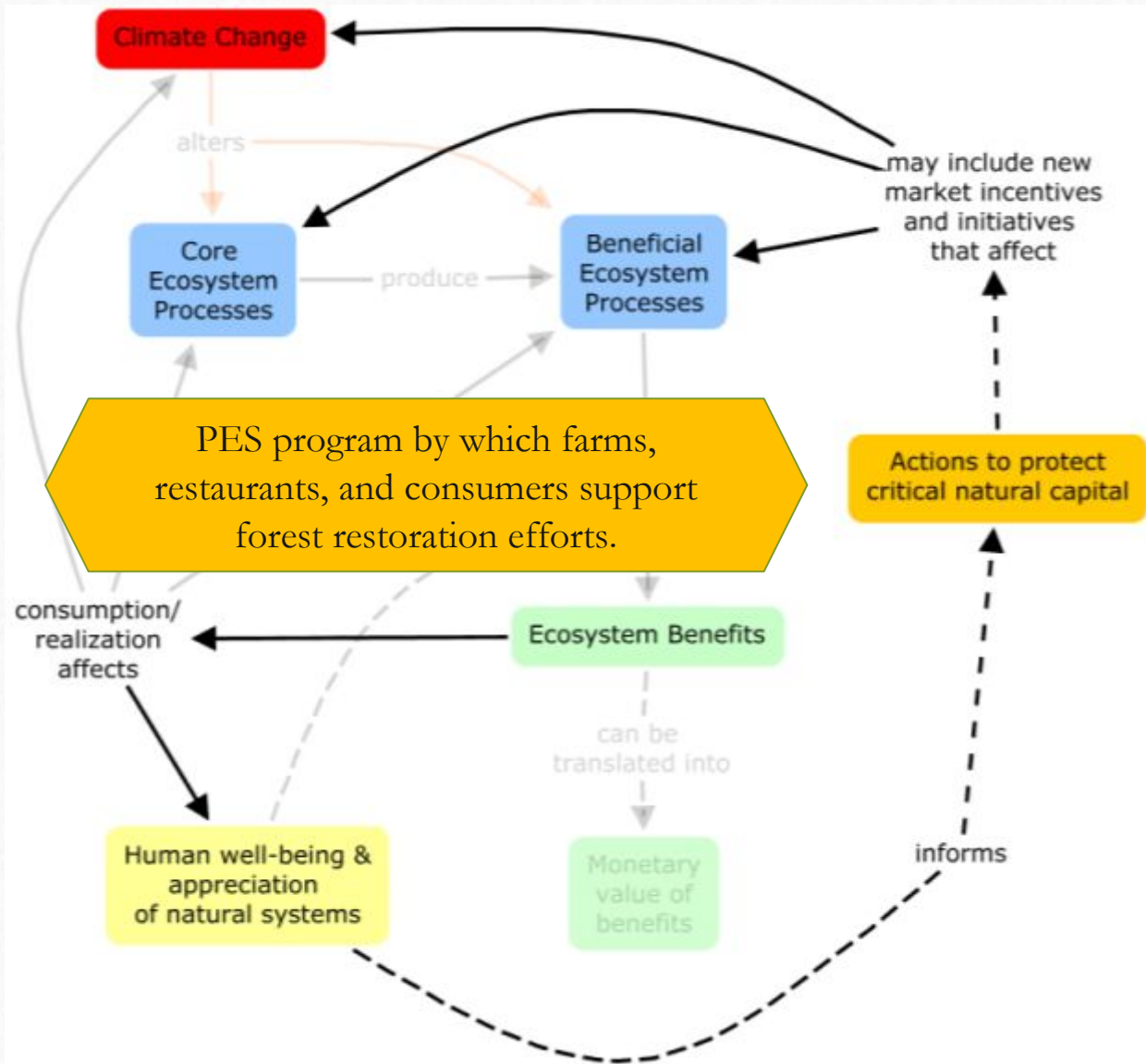


Value of ag shipments, personal income in farming, farm employment all indicate economic value at risk

Using benefits has bio-physical feedbacks.



Using benefits also has policy and market feedbacks.



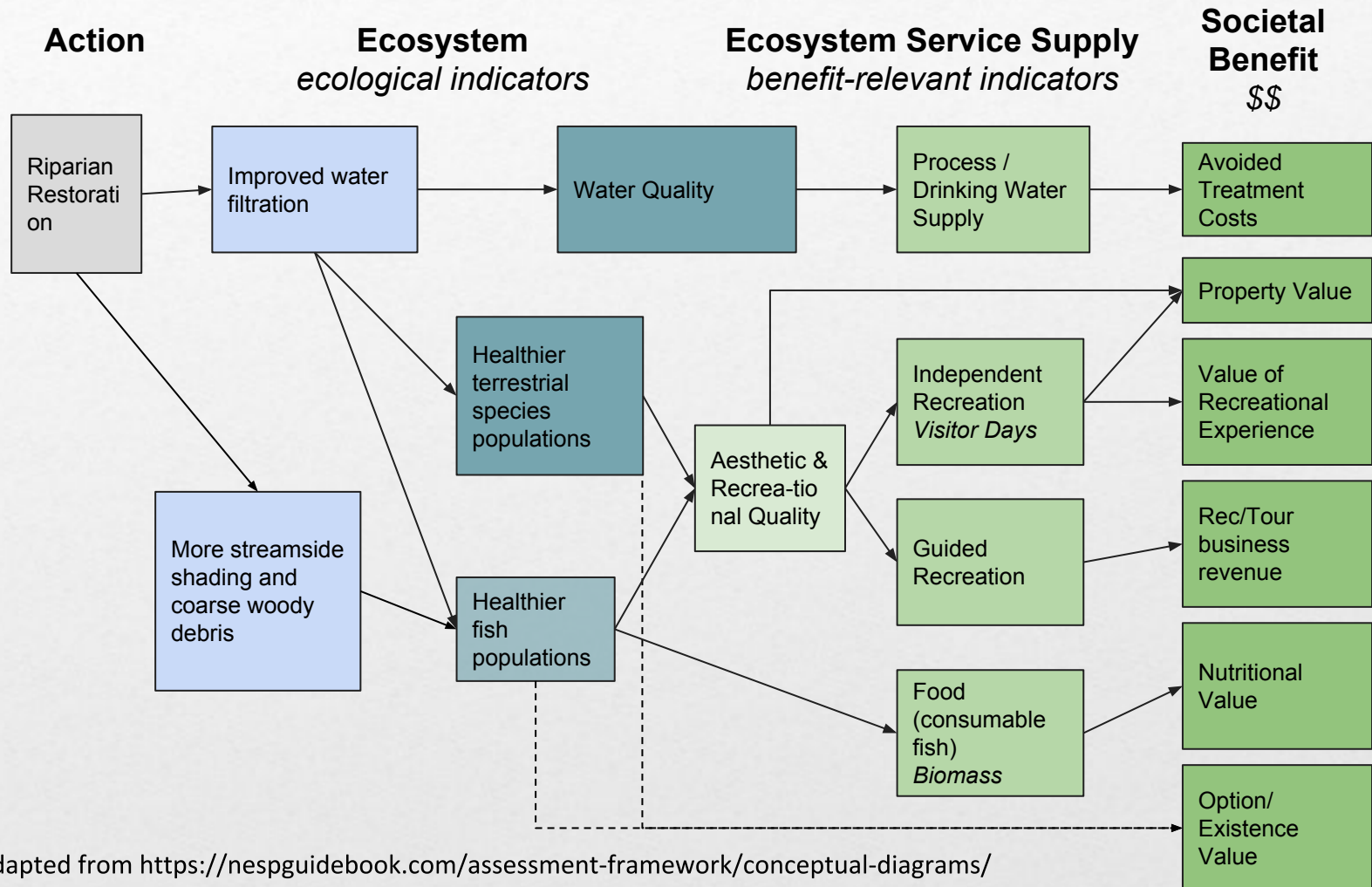
Ecosystem Services Assessment

- To enumerate and, possibly, quantify key ecosystem service values and impacts
- To provide a basis for land use management that restores, conserves and sustains ecosystem processes and benefits
- To support market-based and other relationships that provide resources for adaptation actions
 - Payments for ecosystem services
 - Marketing and other partnerships
 - Revenue / cost sharing
 - Education

For After-Lunch Discussion

- What are some key economic sectors?
- What ecosystem benefits are those sectors connected to?
- What ecosystem processes are important to the supply of those benefits?
- What stressors affect those processes?
- What actions could make stressors worse (or better)?

Ecosystem Services Value Chain



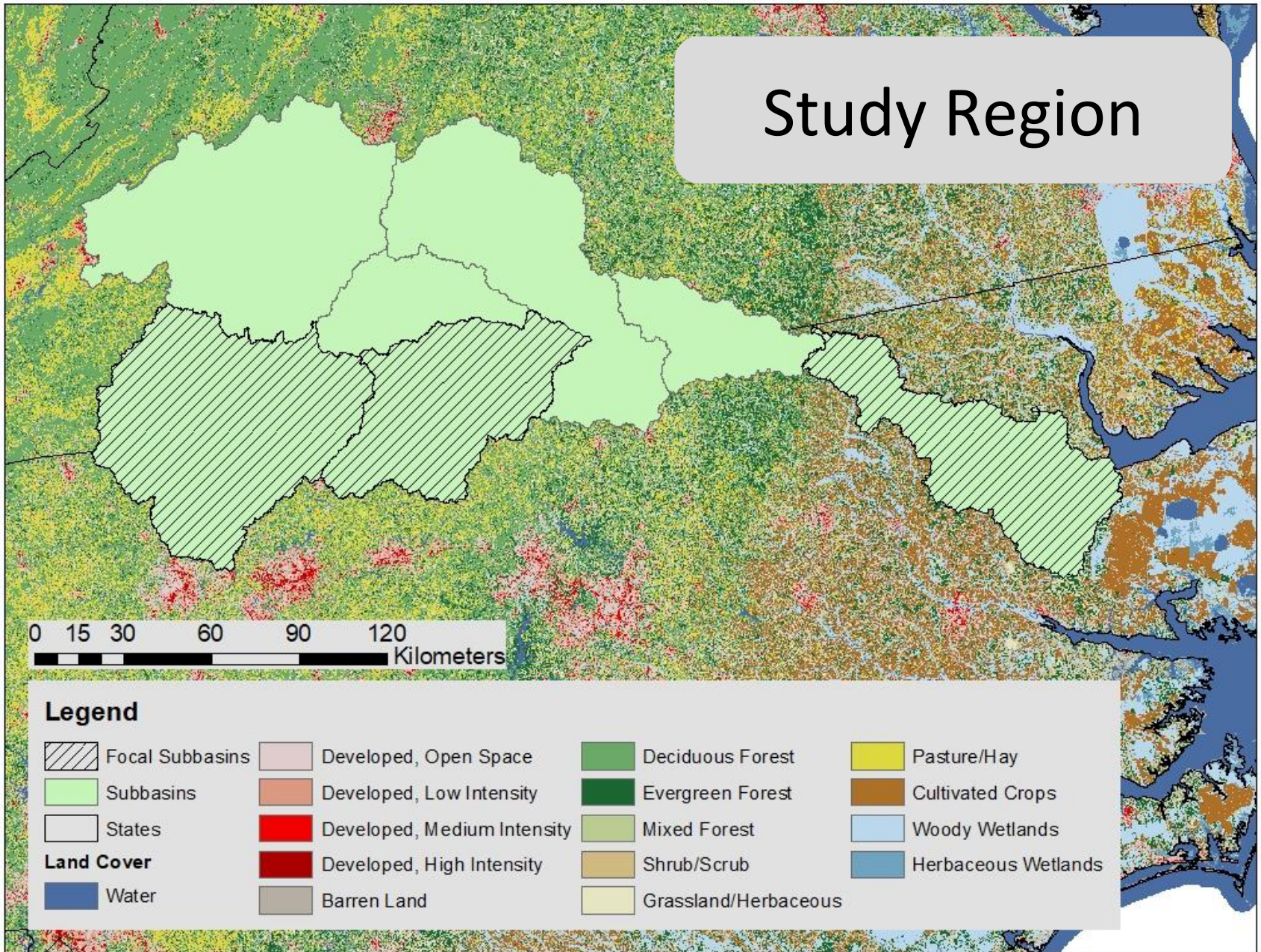
Adapted from <https://nespguidebook.com/assessment-framework/conceptual-diagrams/>

Break (10 Minutes)

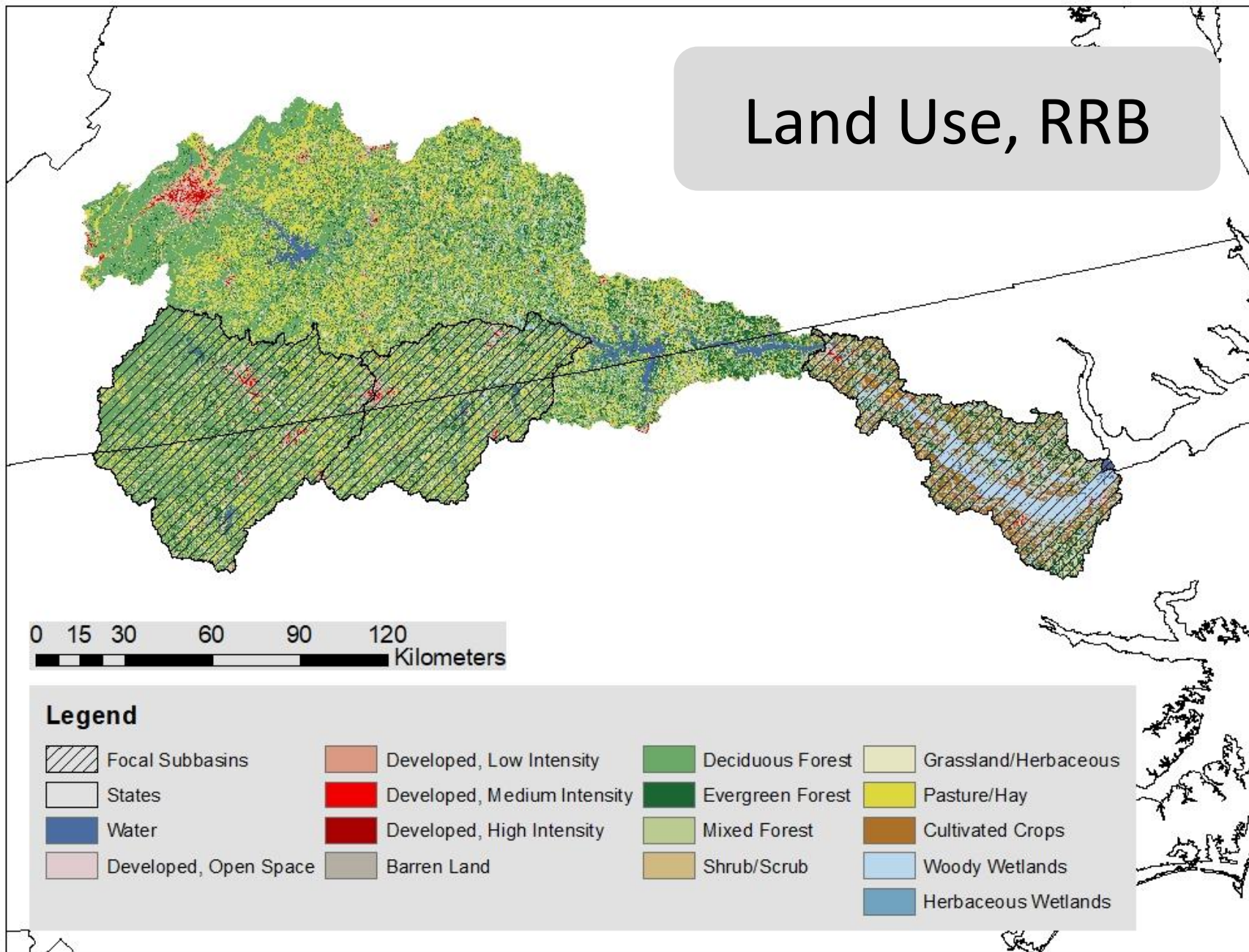
Baseline Estimates

- Land Cover (or Land Use)
 - Area in each land
- Ecosystem Service Productivity
 - \$ per unit area per year
 - for a range of ecosystem services (water supply, recreation, aesthetics, raw materials, etc.)
 - Minimum of “candidate values” or “comps” used today
- $\text{Area} \times \$/\text{area}/\text{year} = \$/\text{year}$

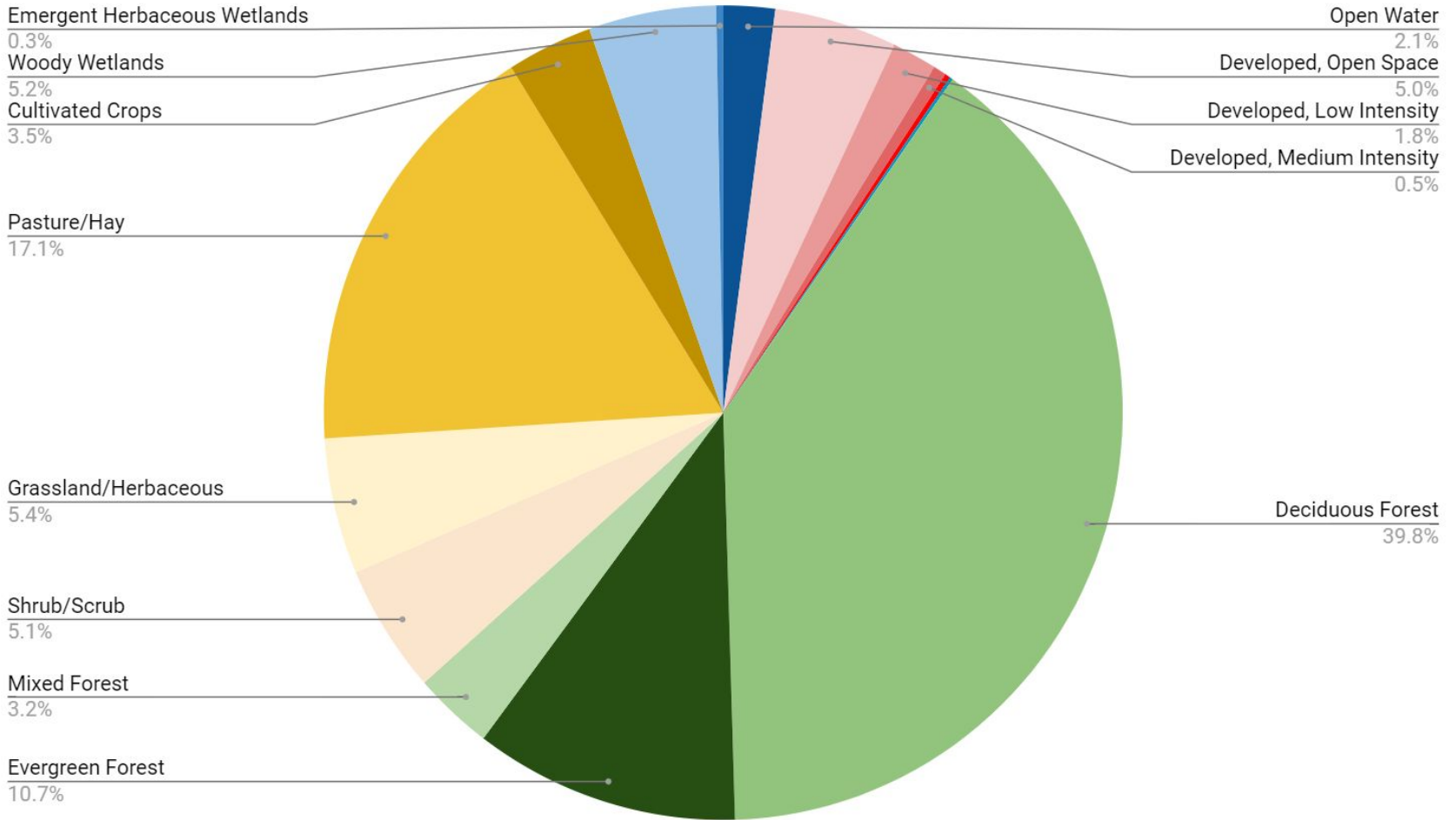
Study Region



Land Use, RRB



Roanoke River Basin Land Cover Distribution

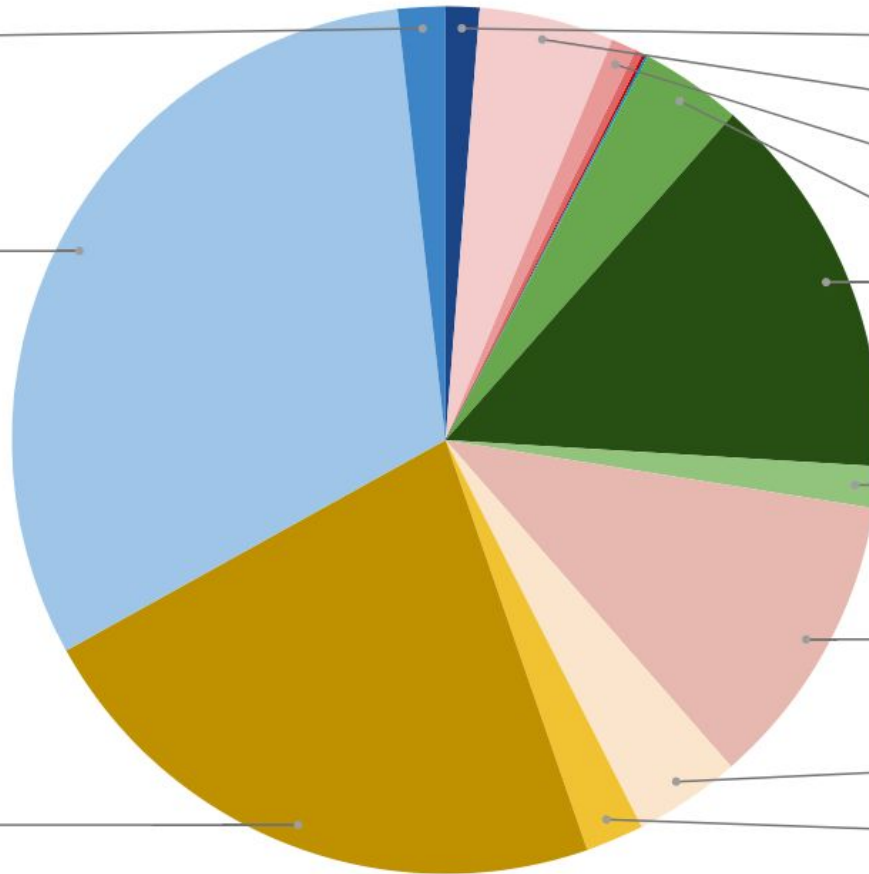


Lower Roanoke River Basin Land Cover

Emergent Herbaceous Wetlan...
1.8%

Woody Wetlands
31.3%

Cultivated Crops
22.2%



Open Water
1.3%

Developed, Open Space
5.0%

Developed, Low Intensity
0.9%

Deciduous Forest
3.8%

Evergreen Forest
14.4%

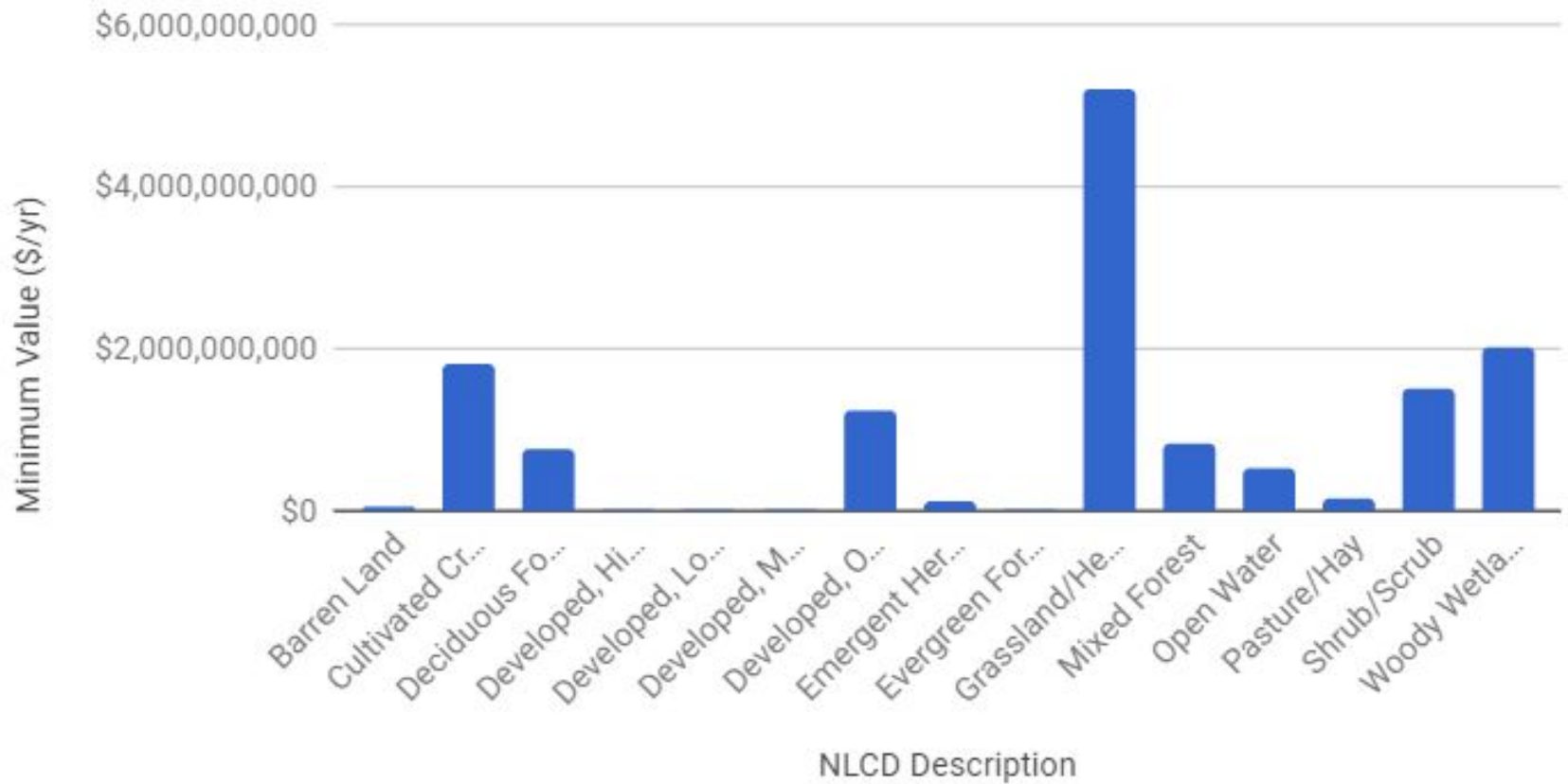
Mixed Forest
1.5%

Shrub/Scrub
11.0%

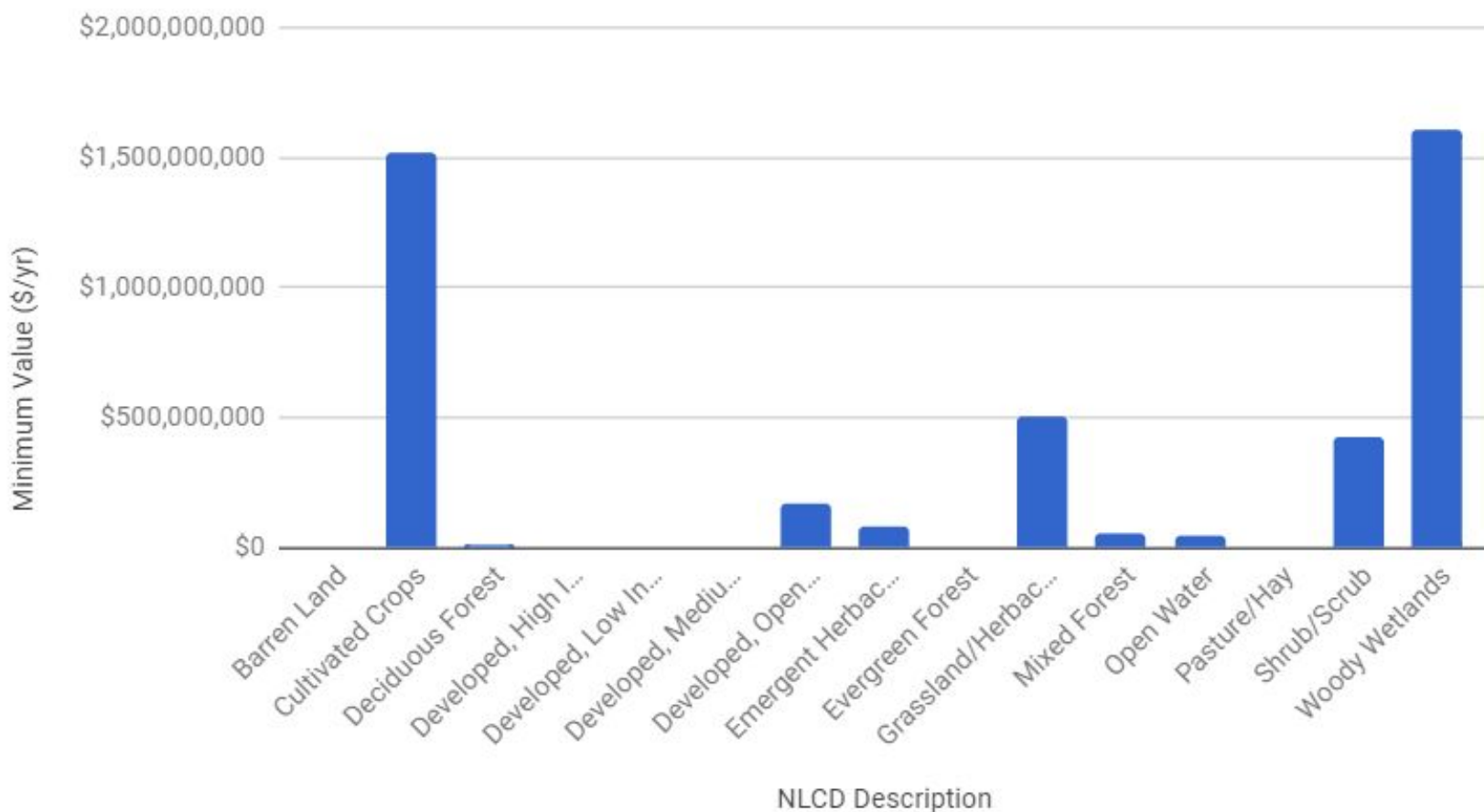
Grassland/Herbaceous
4.0%

Pasture/Hay
2.2%

Roanoke River Basin Total Ecosystem Service Values by Land Cover

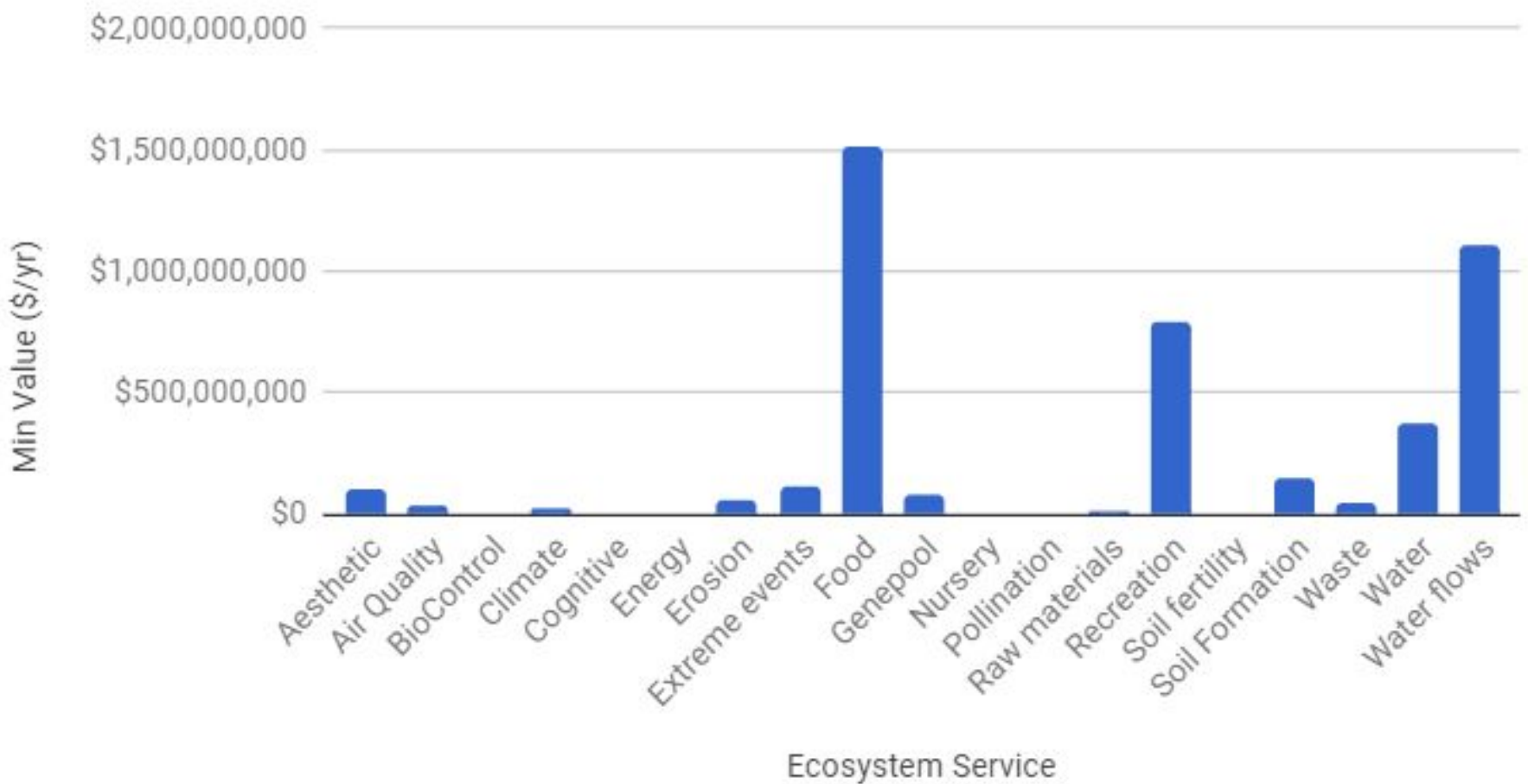


Minimum Value (\$/yr) by Land Cover in the Lower Roanoke River Basin



Further ESV Exploration

Min Value (\$/yr) by Ecosystem Service in the Lower Roanoke River Basin

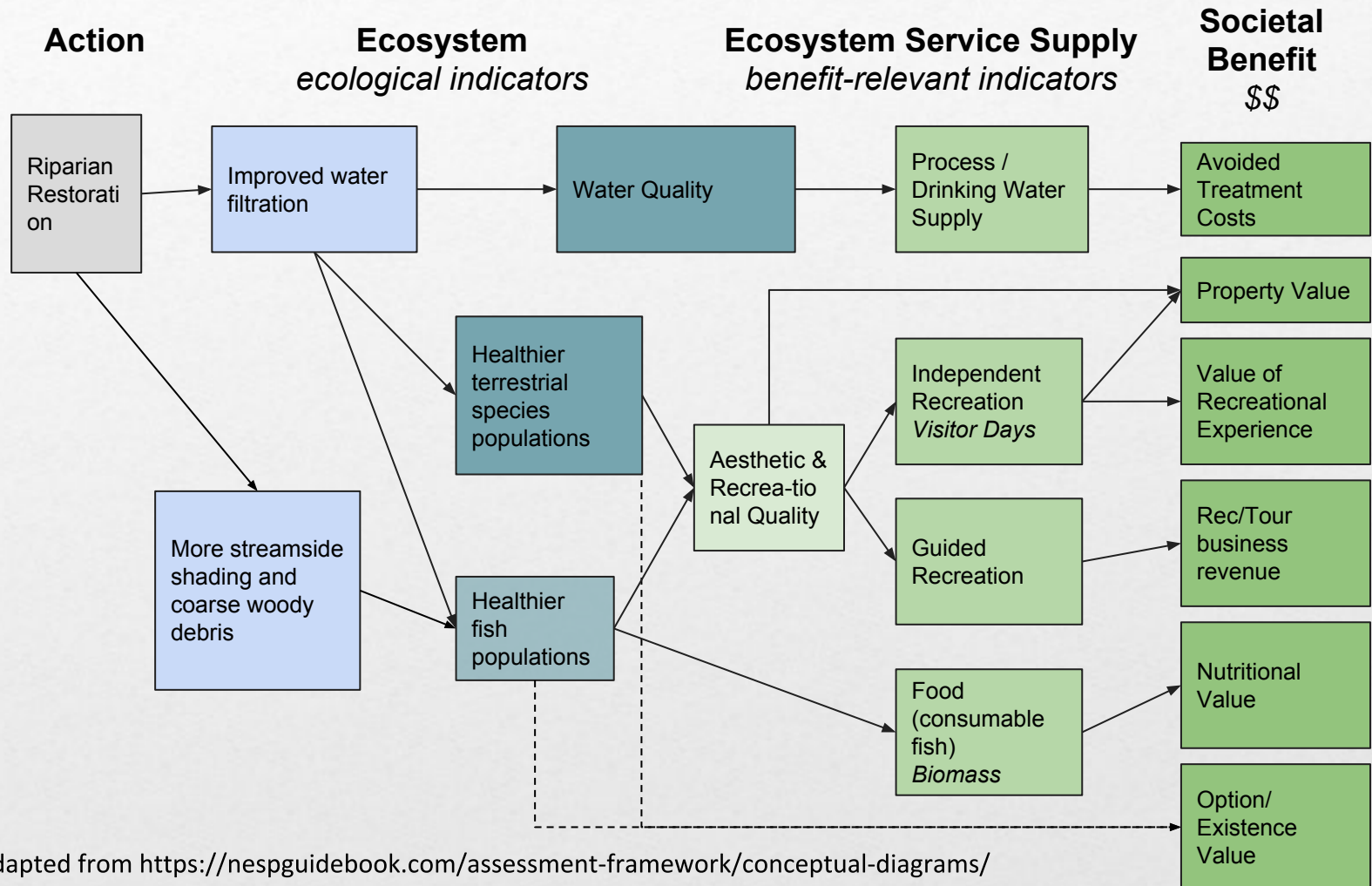


Lunch: 45 Minutes

Lower Roanoke Concerns

- What are some key economic sectors?
- What ecosystem benefits are those sectors connected to?
- What ecosystem processes are important to the supply of those benefits?
- What stressors affect those processes?
- What actions could make stressors worse (or better)?

Ecosystem Services Value Chain



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