

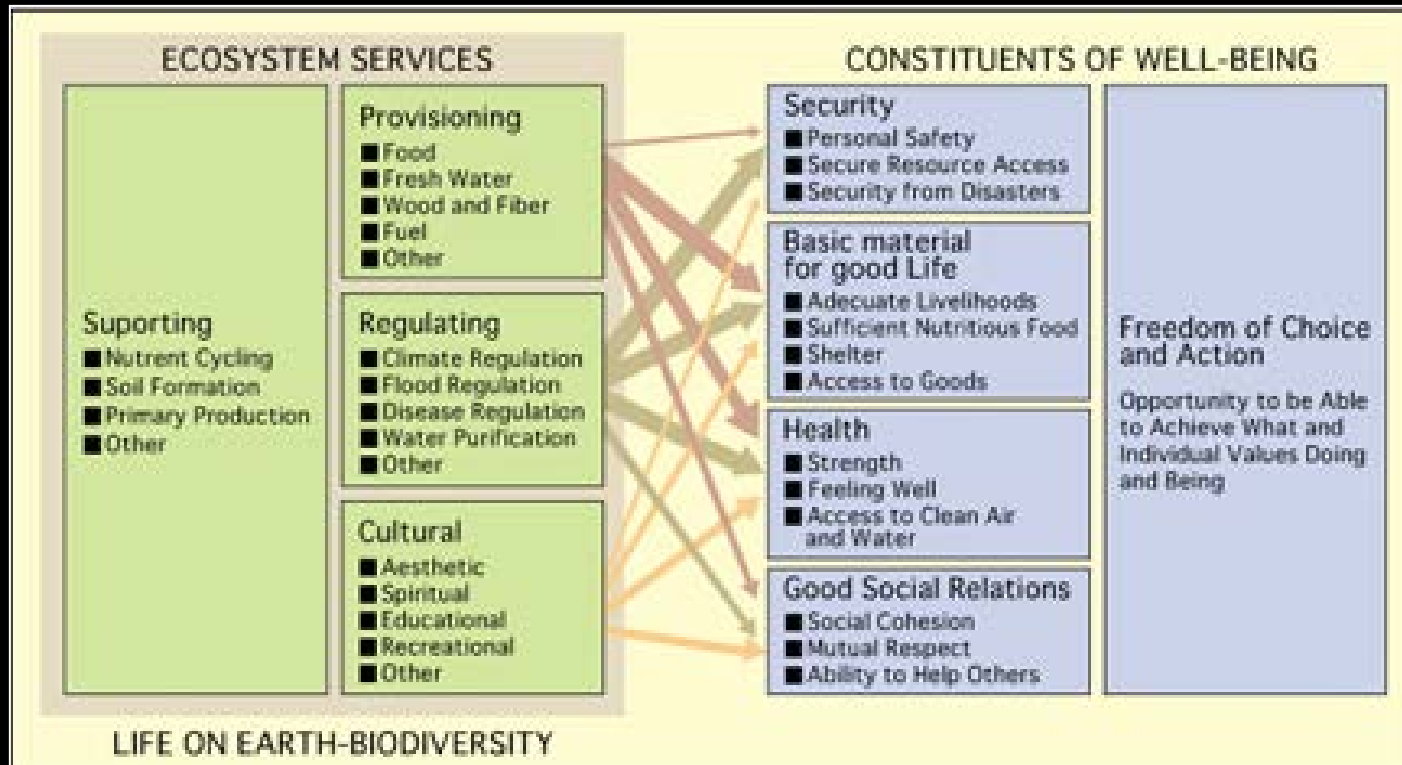
Final Ecosystem Goods and Services Classification System - **FEGS-CS**

Some thoughts with regard to SEEA

Dixon Landers – USEPA Office of Research and
Development

Where it all started...

Millennium Ecosystem Assessment (MEA) sparked the vision of using ecosystem services as a tool.



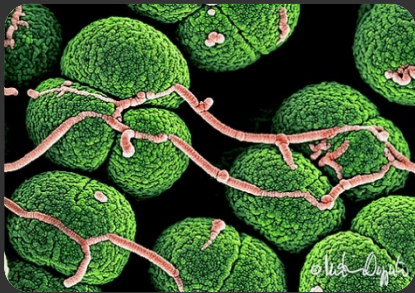
“Ecosystem services are the benefits people obtain from ecosystems.” (MEA 2005)

What is the problem?

- Many definitions and disparate “lists,” “frameworks,” and “perceptions” of ecosystem services
- Miscommunication and discord among disciplines
- Disconnect between environment and human well-being
- Lack of consistency, rigor and a systematic approach; need typology and classification for “framework”

What do people care about?

soil microbes



clean water



habitat



fauna



DESIRED CHARACTERISTICS OF AN es CLASSIFICATION SYSTEM

[proposed by collaborating social scientists]

Complete

Non-duplicative

Facilitates metrics

Links with beneficiary (HWB)



FEGS

“components of nature, directly enjoyed, consumed, or used to yield human well-being” *(Boyd & Banzhaf 2007)*

Environmental Class + Beneficiary → FEGS



Estuaries and Near Shore Marine



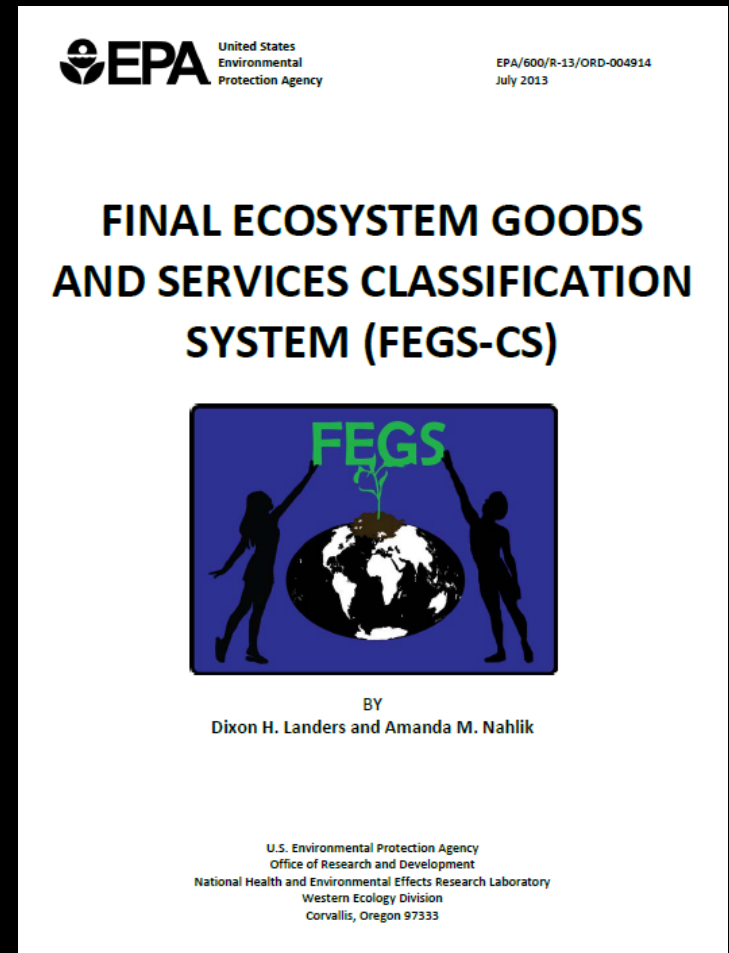
Recreational Food Pickers and Gatherers



Flora and fauna, such as mussels, seaweed, crabs, etc.

Identifying FEGS

- By using the FEGS approach, an infinite list of ecosystem services was pared down to 338 FEGS
- FEGS-CS is an operational framework that standardizes identification of ecosystem services at multiple spatial scales
- Published EPA Report
 - Available at cfpub.epa.gov/si/
 - EPA/600/R-13/ORD-004914
- Interactive FEGS-CS website (**LIVE!**)
 - <http://gispub4.epa.gov/FEGS>
 - Create and download custom checklists of potential FEGS
 - Link with EnviroAtlas, mapping and models
 - Provide comments to the authors
 - Participate in forum discussions

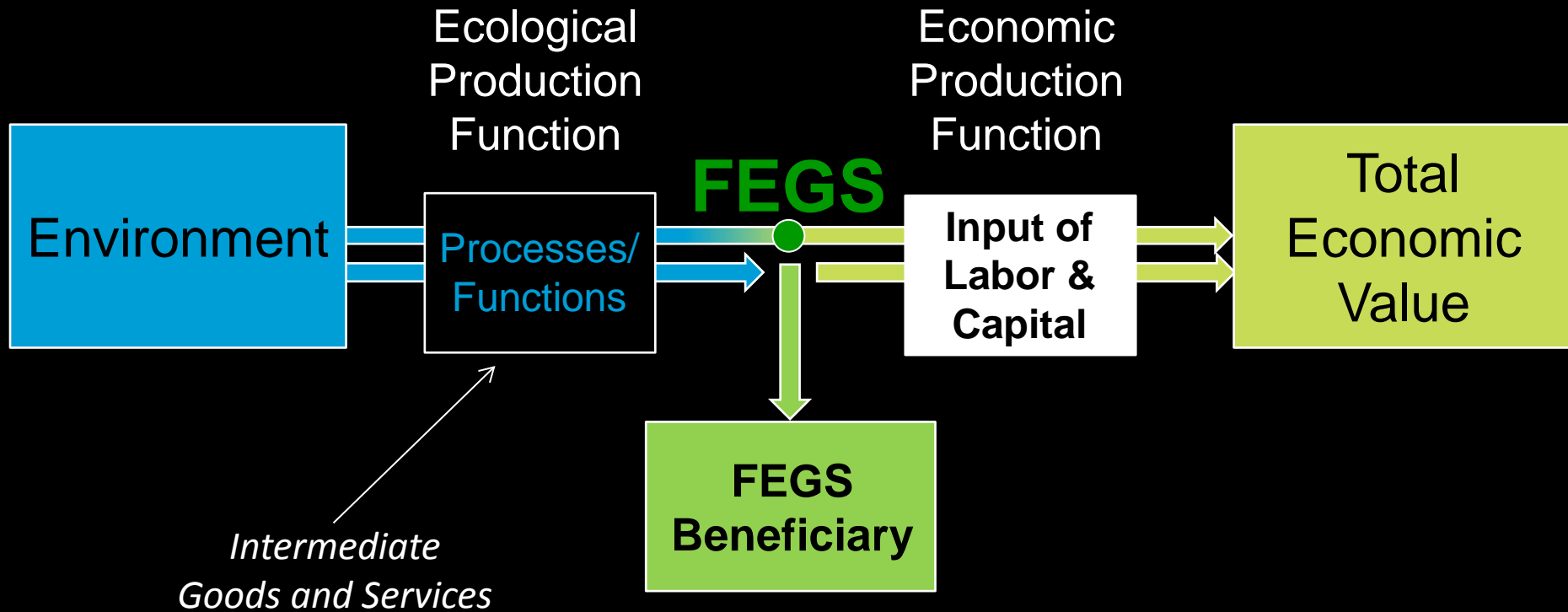




**Ecological
Production
Function**

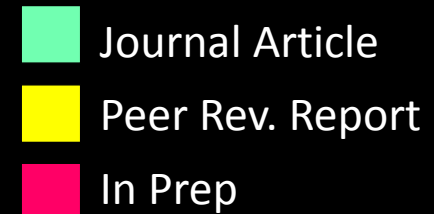
**Economic
Production
Function**

Example 2: Carrot Farming



EPA Publications About or Using FECS

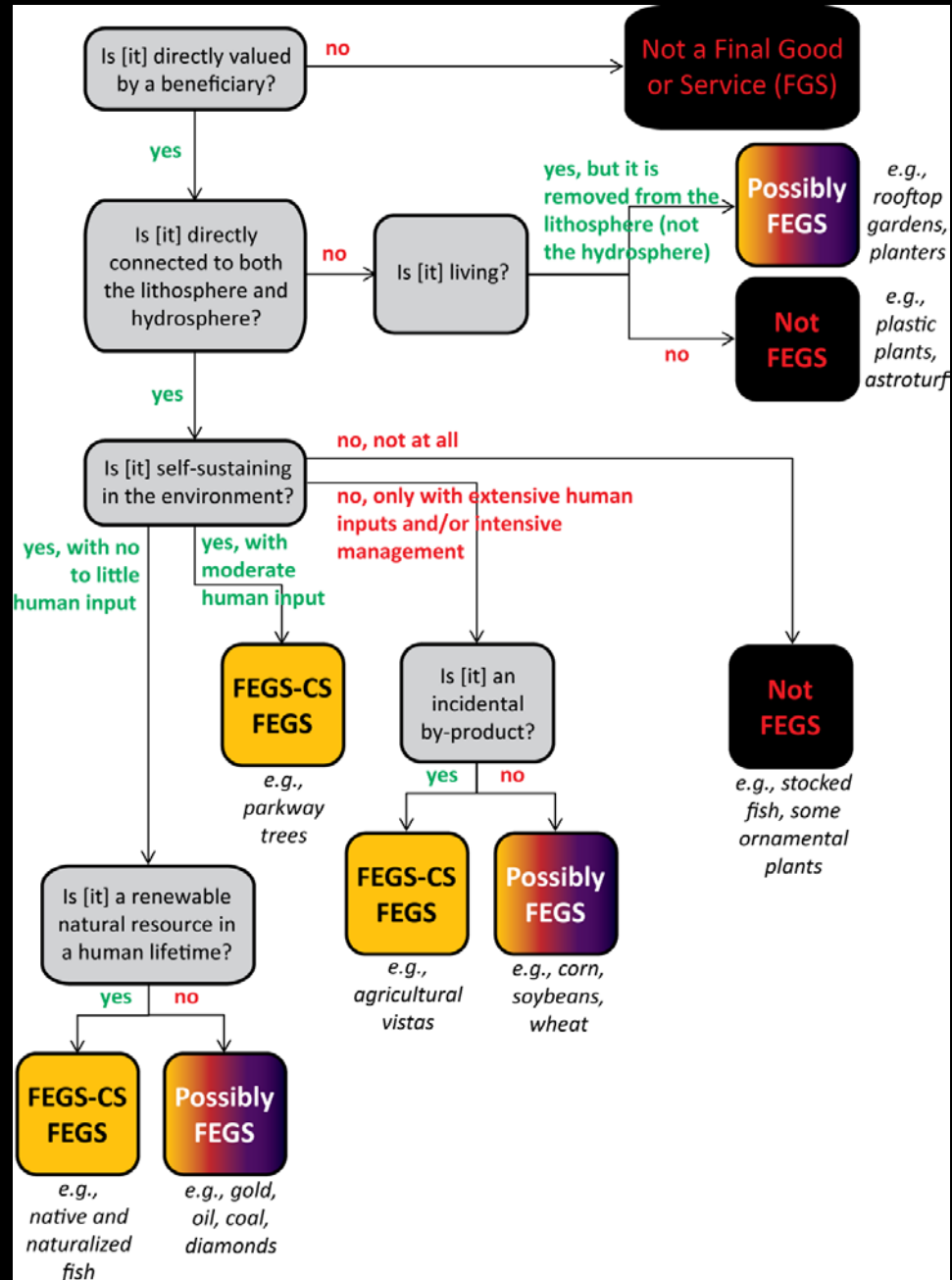
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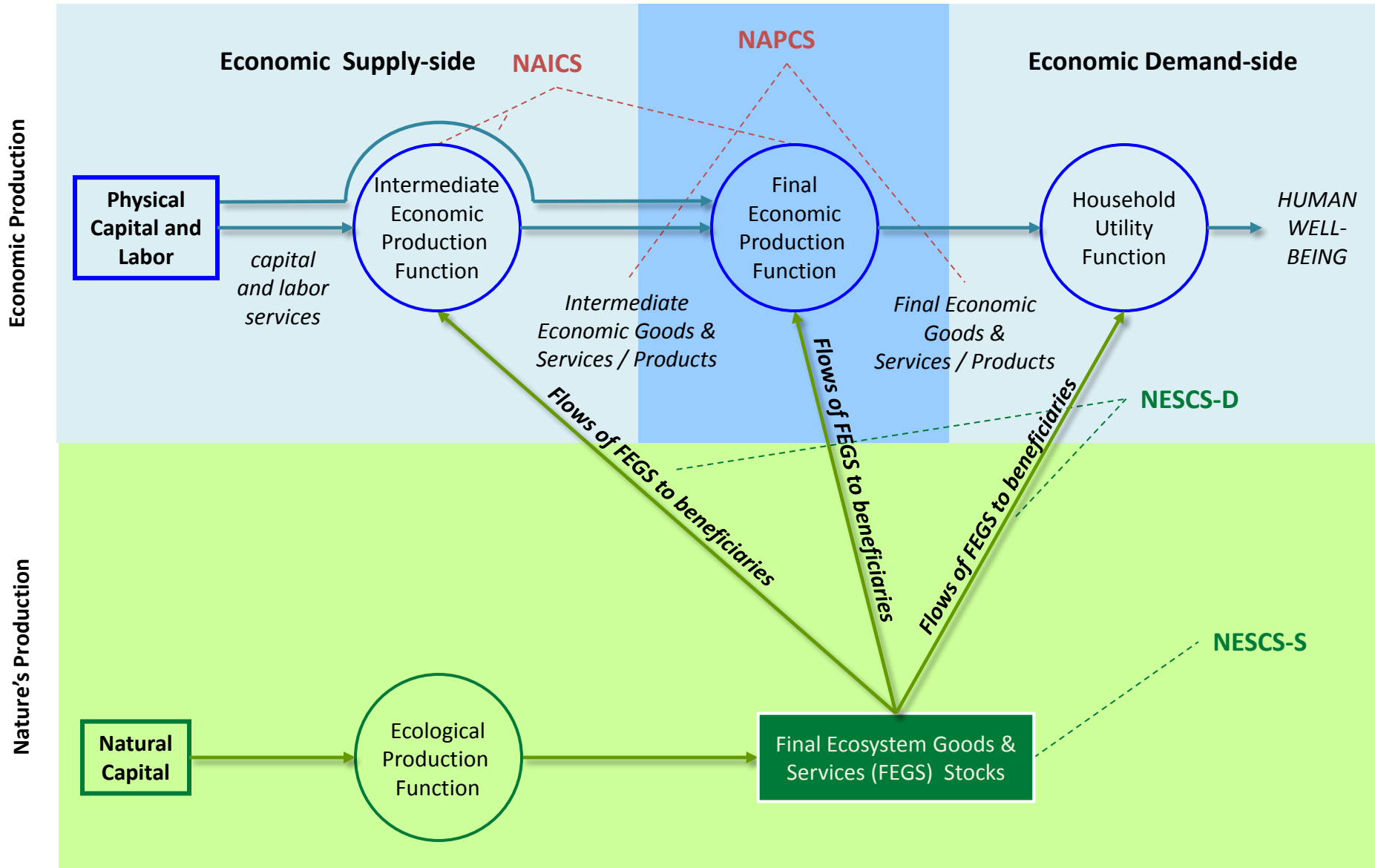
Distinguishing FEGS from Non-FEGS



- We used rigid boundaries for FEGS, and made our boundary decisions explicit in FEGS-CS



NESCS (linking FEGS with Economic Benefit and Cost Analysis)



END

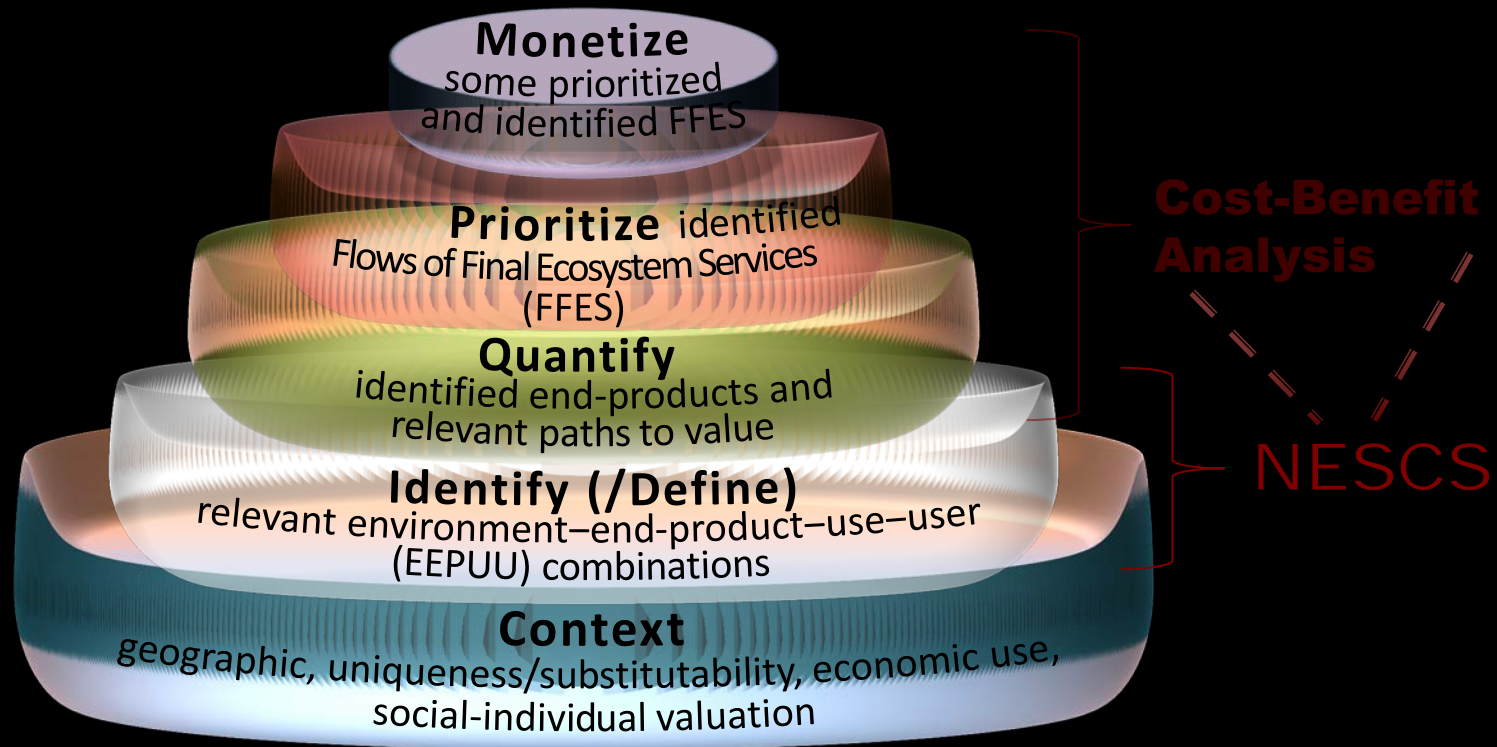
Summary

We started looking at ecosystem services using the MA approach, but we found the standard wanting, therefore we developed the Final Ecosystem Goods and Services Classification System, that seems to be an important improvement.

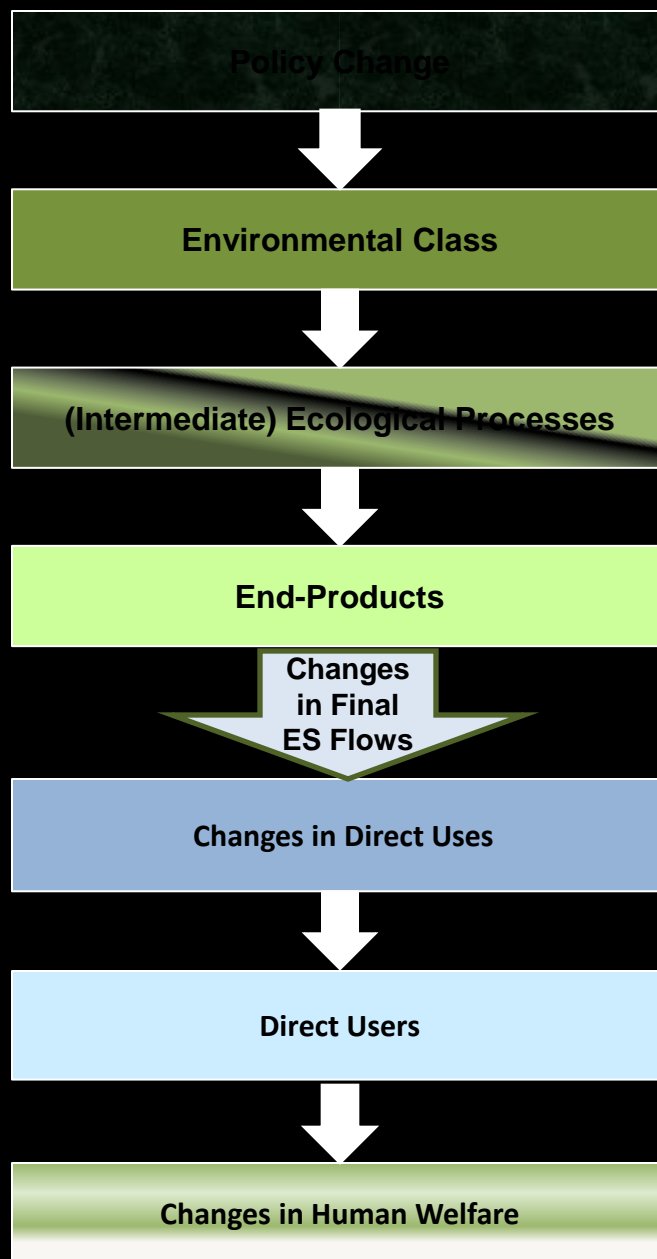
Begin CEQ Briefing

A bit of Background on ecosystem services

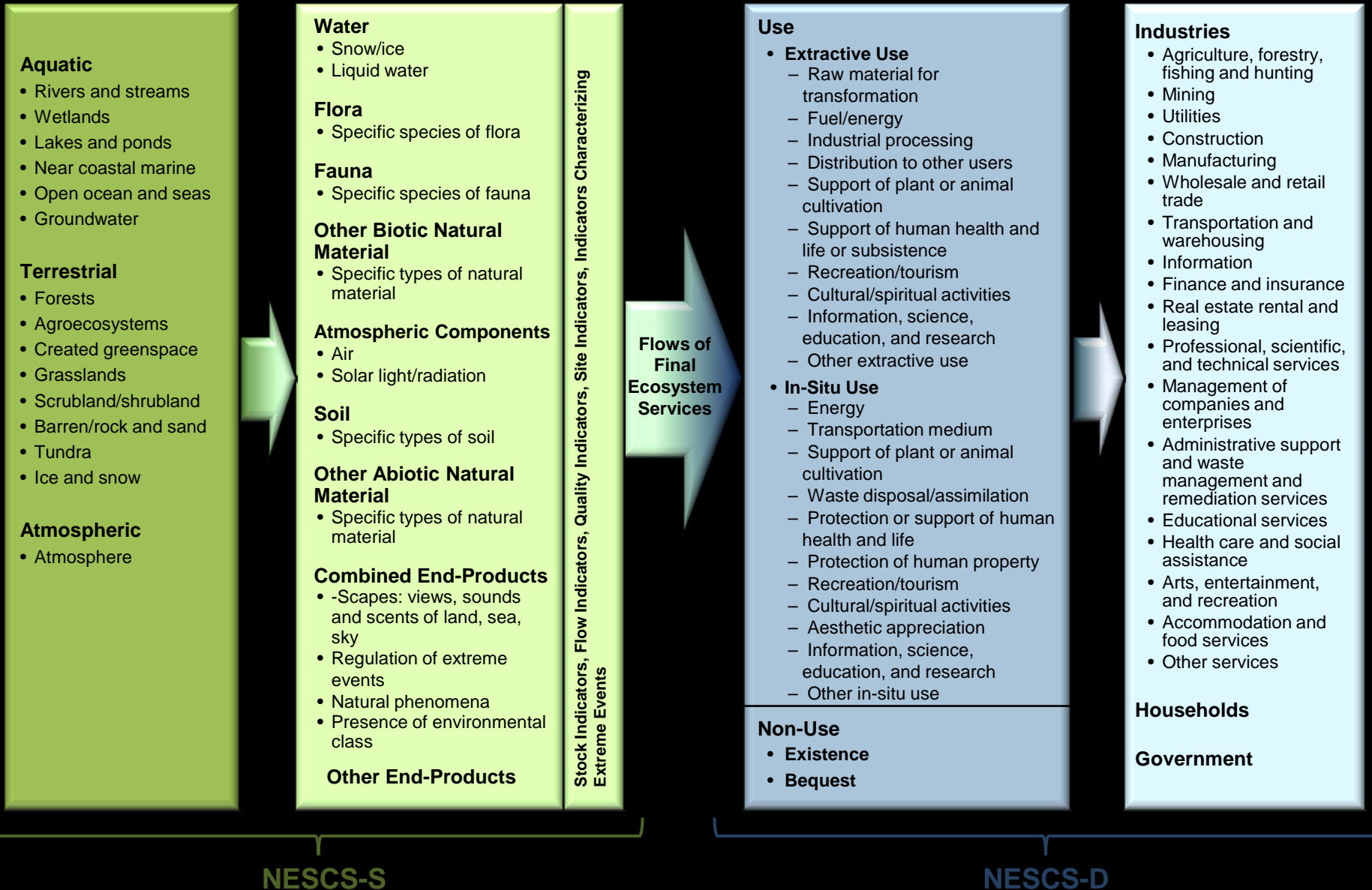
National Ecosystem Services Classification System



Pathway Linking Policy Changes to Human Well-Being



National Ecosystem Services Classification System, Four-Group Structure



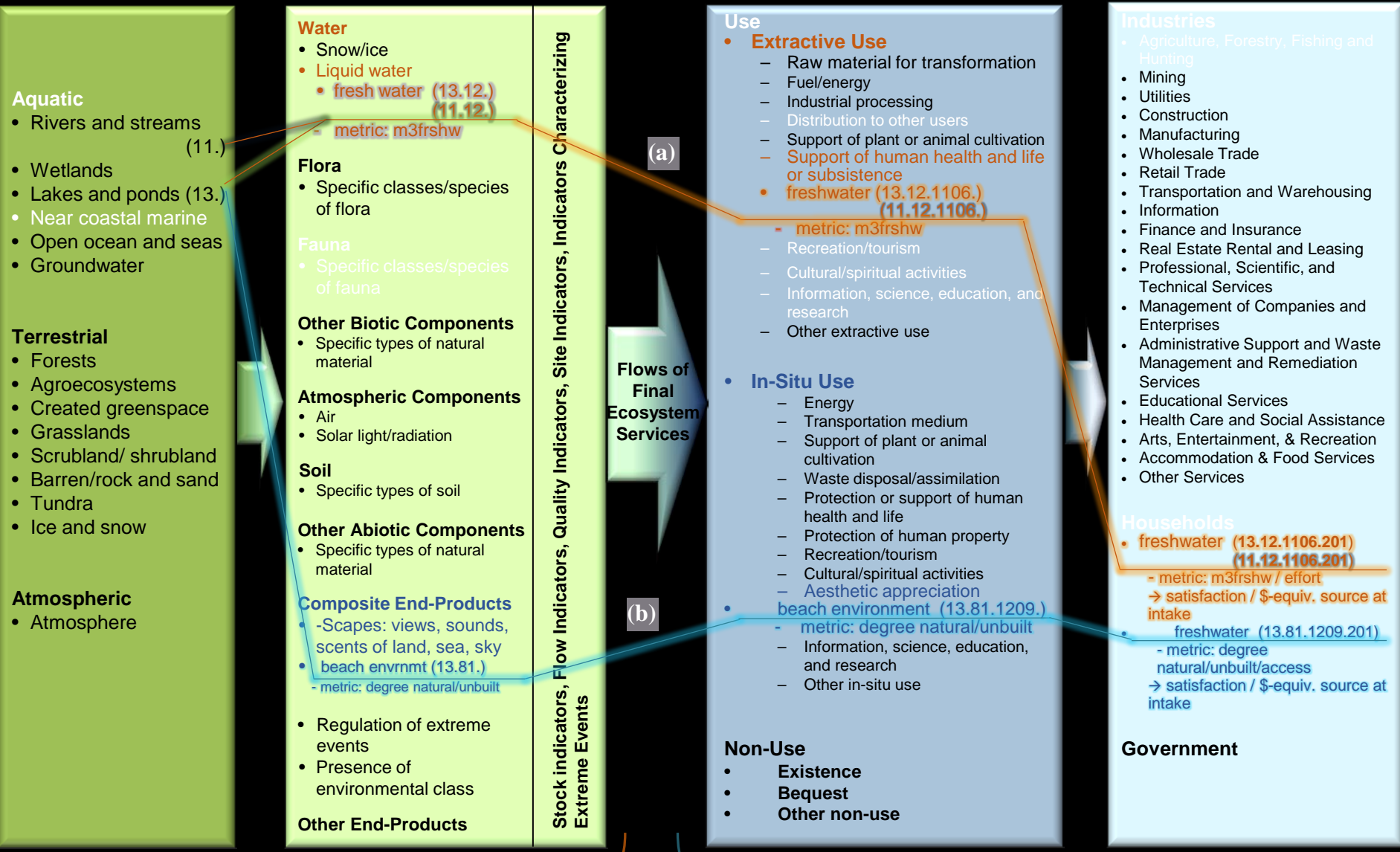
NESCS-S

NESCS-D

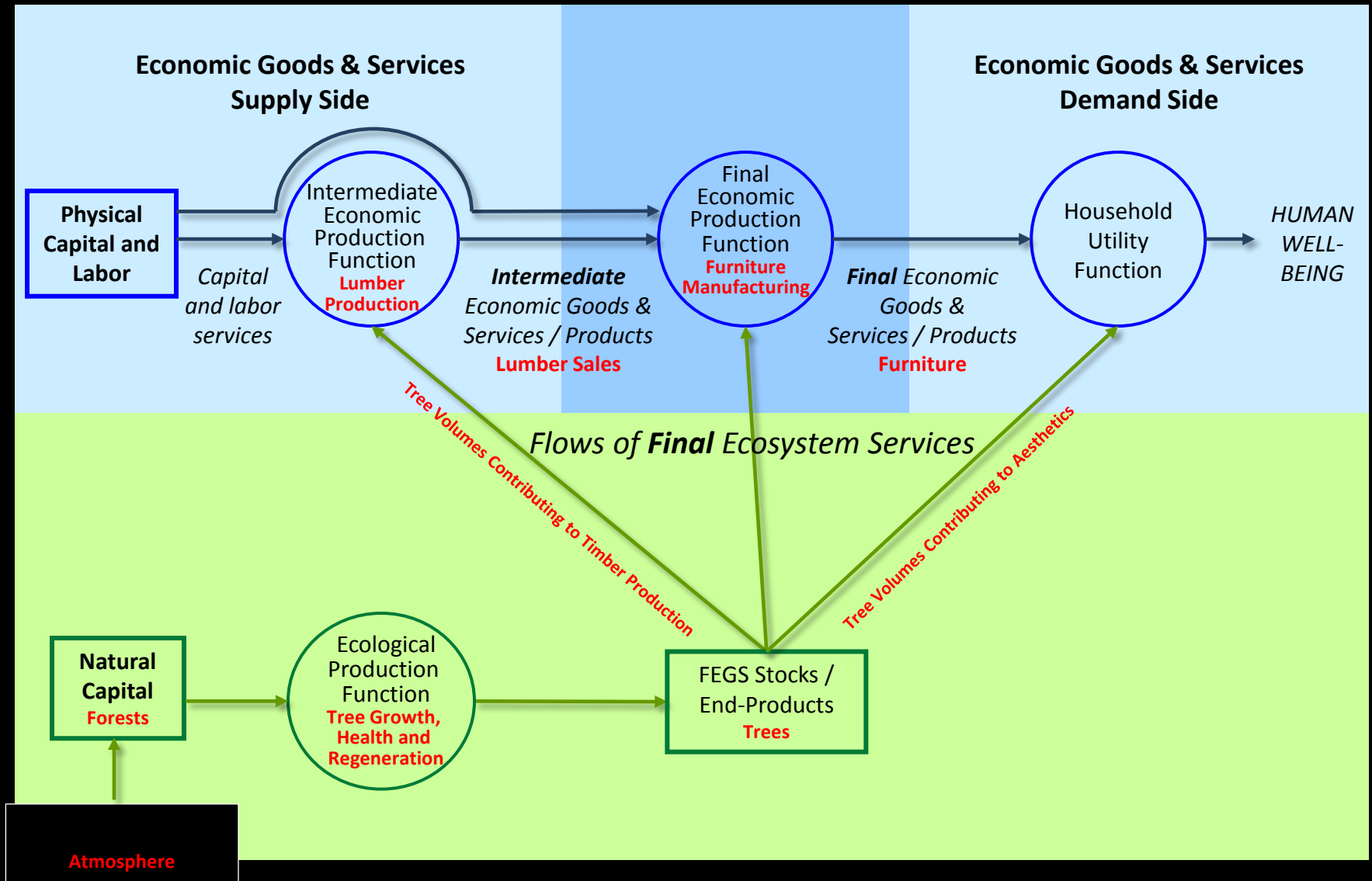
Proposed 4-Group NESCS Structure – “Wiring Diagram” with Proposed Metrics By Group

Example: (a) lake, river, or stream water for drinking – m³ fresh water (m3frshw)

(b) same water in composite viewing environment – degree natural/unbuilt



The NESCS Conceptual Framework – Specialized to a Terrestrial Acidification Example



Applying NESCS: Policies Impacting Terrestrial Acidification – Two-species example table, with NESCS numeric coding pieces

NESCS-S				NESCS-D													
Env. Class	Env. Sub-Class	End-product Class	End-product Sub-Class or Example	Direct Use/ Non-Use Class	Direct Use/ Non-Use Sub-Class	Direct Use/ Non-Use Detail	Examples of Direct Uses/ Non-Use	Direct User Class	Direct User Sub-Class	User Detail							
2. Terrestrial	21. Forests	2. Flora	Sugar maple trees	1. Direct Use	11. Extractive Use	1101. Raw material for transformation	Input for maple syrup, furniture, construction	1. Industry	111. Agriculture, Forestry, Fishing and Hunting	1113. Forestry and Logging <i>(e.g., 21.2.1101.1113)</i>							
									123. Construction	123. Construction							
									131–33. Manufacturing (Manufg.)	1311. Food Manufg. 1321. Wood Product Manufg. 1337. Furniture and Related Product Manufg.							
									1. Industry	148–49. Transportation and Warehousing	1487. Scenic and Sightseeing Transportation						
										172. Accommodation and Food Services	1721. Accommodation 1722. Food Services and Drinking Places						
									2. Households	201. Households							
			2. Households	201. Households	<i>(e.g., 21.2.1209.201)</i>												
			2. Non-Use	21. Existence	2101. Existence	Existence use	2. Households	201. Households									
									22. Bequest	2201. Bequest	Bequest use	2. Households	201. Households				
														1. Direct Use	11. Extractive Use	1101. Raw material for transformation	Input for musical instruments, furniture, construction
									131–33. Manufacturing (Manufg.)	1321. Wood Product Manufg. 1337. Furniture and Related Product Manufg. 1339992. Musical Instrument Manufg.							
									2. Non-Use	21. Existence	2101. Existence	Existence use	2. Households				
22. Bequest	2201. Bequest	Bequest use															

Environmental Classes

1. AQUATIC

11. Rivers and Streams

12. Wetlands

13. Lakes and Ponds → ...include (but are not limited to)

14. Estuaries and Near Coastal and Marine • saline lakes

15. Open Oceans and Seas • reservoirs

16. Groundwater → ...include (but are not limited to)

• rechargeable aquifers

• geysers

• water in caves → ...include (but are not limited to)

• uncut and wilderness area forests

2. TERRESTRIAL

21. Forests → ...include (but are not limited to)

22. Agroecosystems

23. Created Greenspace → ...include (but are not limited to)

24. Grasslands

• parks, playgrounds, trees

25. Scrubland / Shrubland

• cemeteries and airfields

26. Barren / Rock and Sand → ...include (but are not limited to)

27. Tundra

• abandoned (dry) quarries

28. Ice and Snow

• dry desert

• beaches, unvegetated dunes

3. ATMOSPHERIC

31. Atmosphere

Beneficiary Categories

00.01. AGRICULTURAL

→ ...including,

- 00.0103 Livestock Grazers
- 00.0106 Farmers

00.02. COMMERCIAL / INDUSTRIAL

00.03. GOVERNMENT, MUNICIPAL, AND RESIDENTIAL

00.04. COMMERCIAL / MILITARY TRANSPORTATION

00.05. SUBSISTENCE

→ ...including,

- 00.0501 Water Subsisters
- 00.0503 Timber, Fiber, Fur / Hide Subsisters

00.06. RECREATIONAL

00.07. INSPIRATIONAL

→ ...including,

- 00.0701 Spiritual and Ceremonial Participants
- 00.0702 Artists

00.08. LEARNING

00.09. NON-USE

→ ...including,

- 00.0901 People Who Care (Existence)
- 00.0902 People Who Care (Option / Bequest)

00.10. HUMANITY

- Under the 10 Beneficiary Categories, there are a total of 37 Beneficiary Sub-Categories

Guiding Questions to Determine FEGS

- For a specific Environmental Sub-Class, which Beneficiary Sub-Categories are present?
 - *Q: Do Recreational Food Pickers and Gatherers utilize Estuaries and Near Shore Marine environments? A: Yes.*
- For a specific Beneficiary Sub-Category interested in a specific Environmental Sub-Class, what are the FEGS? Or, what does the beneficiary utilize or care about that is directly provided by the environment?
 - *Q: What do Recreational Food Pickers and Gatherers utilize from Estuaries that result in a benefit? A: Flora and fauna, such as seaweed, kelp, mussels, crabs, etc.*
- What is the importance of this FEGS to the beneficiary?
 - *Q: Why do Recreational Food Pickers and Gatherers in Estuaries care about flora and fauna? A: These are edible organisms that can be collected for personal use.*