

5th SWAN Progress Meeting

Towards a Framework for a Transatlantic Dialogue on Water: What Role for The University of Arizona?



ECOSYSTEM SERVICES ASSESSMENT IN TUCSON BASIN CASE STUDY

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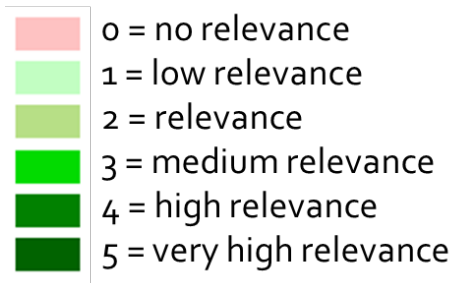


Structure of the presentation

- Review of the research
 - Results so far
 - Next stage
 - How to cooperate?
-

REVIEW — GENERAL OBJECTIVES

- Importance of certain ecosystem services and their potential in terms of natural resources



Major Goals:

1. Investigation
2. Assessment matrix
capacities supply demand
3. Mapping goods and services

Target groups:

- SWAN members;
- UofA Academia;
- UofA students.

55/86



65%

METHODOLOGY: Expert based assessment of the provision of ecosystem services through INTERVIEWS

Burkhard, B., de Groot, R., Costanza, R., Seppelt, R., Jørgensen, S.E., Potschin, M., 2012a. Solutions for sustaining natural capital and ecosystem services. Ecological Indicators 21, 1–6.

Burkhard, B., Kroll, F., Nedkov, S., Müller, F., 2012b. Mapping ecosystem service supply, demand and budgets. Ecological Indicators 21, 17-29.

REVIEW — RESEARCH QUESTIONS

Key words: *ecosystem services, expert-based assessment, mapping supply and demand, water management*

What's the relationship service-benefit-management?

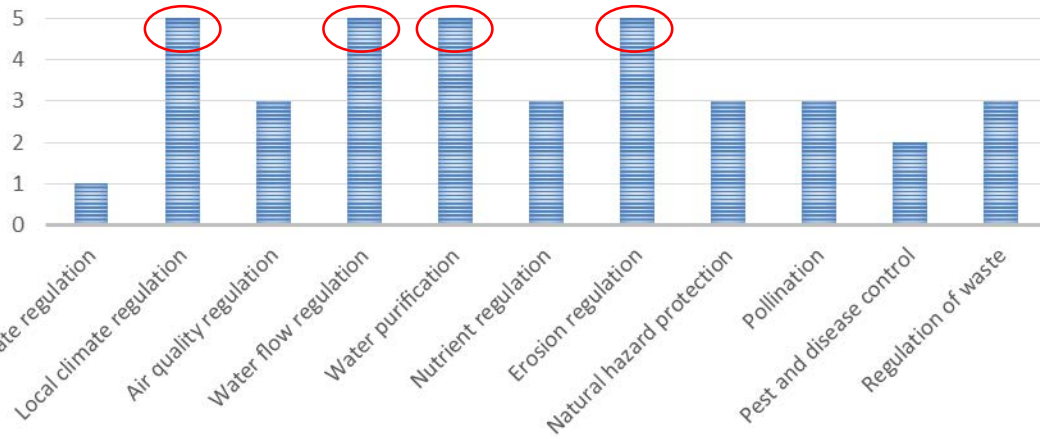
Where are the ES provided – source of ES?

What are the changes in the provision of ES and are there any changes in their supply and demand capacities ?

How could ES serve as instruments for environmental management improvement?

RESULTS SO FAR

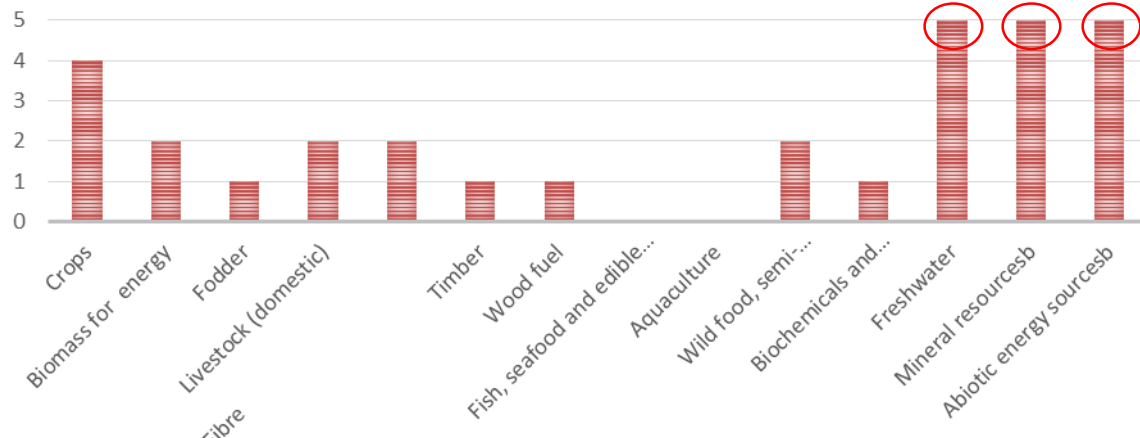
REGULATING SERVICES



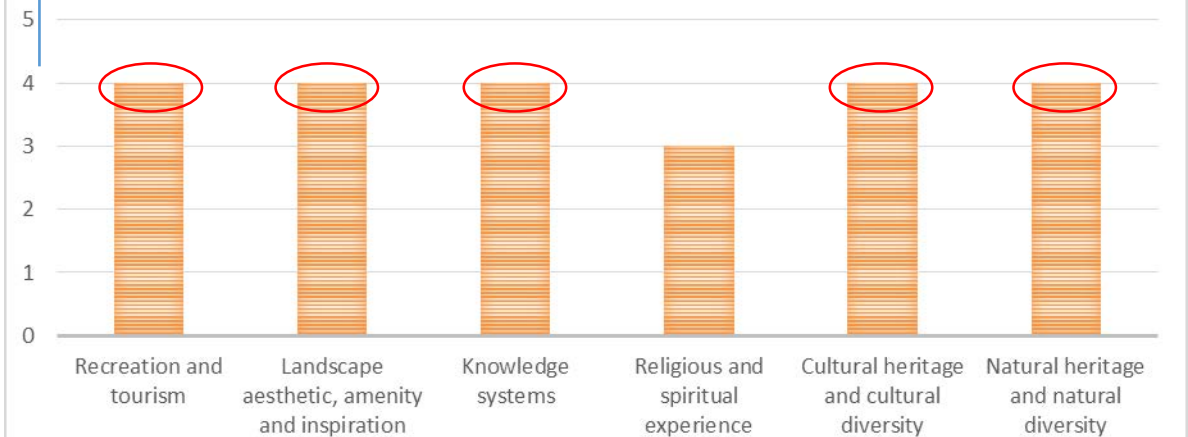
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supply/demand for ES within different land cover classes

PROVISIONING SERVICES



CULTURAL SERVICES



RESULTS SO FAR

Local climate regulation
Water flow regulation
Water purification
Erosion regulation
...

Freshwater
Mineral resources
Abiotic energy sources
...

Recreation and tourism
Landscape aesthetic, amenity and inspiration
Knowledge systems

Cultural heritage and cultural diversity
Natural heritage and natural diversity

- 0 = no relevant supply/demand
- 1 = low relevant supply/demand
- 2 = relevant supply/demand
- 3 = medium relevant supply/demand
- 4 = high relevant supply/demand
- 5 = very high relevant supply/demand

LAND COVER AND LAND USE CLASSES (NLCD 2006)	regulating services											provisioning services				cultural services				
	2	3	4	5	7	8	9	11	12	23	24	25	26	27	28	30	31			
Open Water																				
Developed, Open Space																				
Developed, Low Intensity																				
Developed, Medium Intensity																				
Urban																				
Rock/Sand/Clay																				
Deciduous Forest																				
Evergreen Forest																				
Mixed Forest																				
Shrub/Scrub																				
Grassland/Herbaceous																				
Pasture/Hay																				
Cultivated Crops																				
Woody Wetlands																				
Wetlands																				

NEXT STAGE - ES ASSESSMENT STEP 2

Q1: What is the **capacity** of different land **cover classes** to supply ES?

Q2: What is the **demand** for ES within different land **cover classes**?

in scale from **0** to **5**

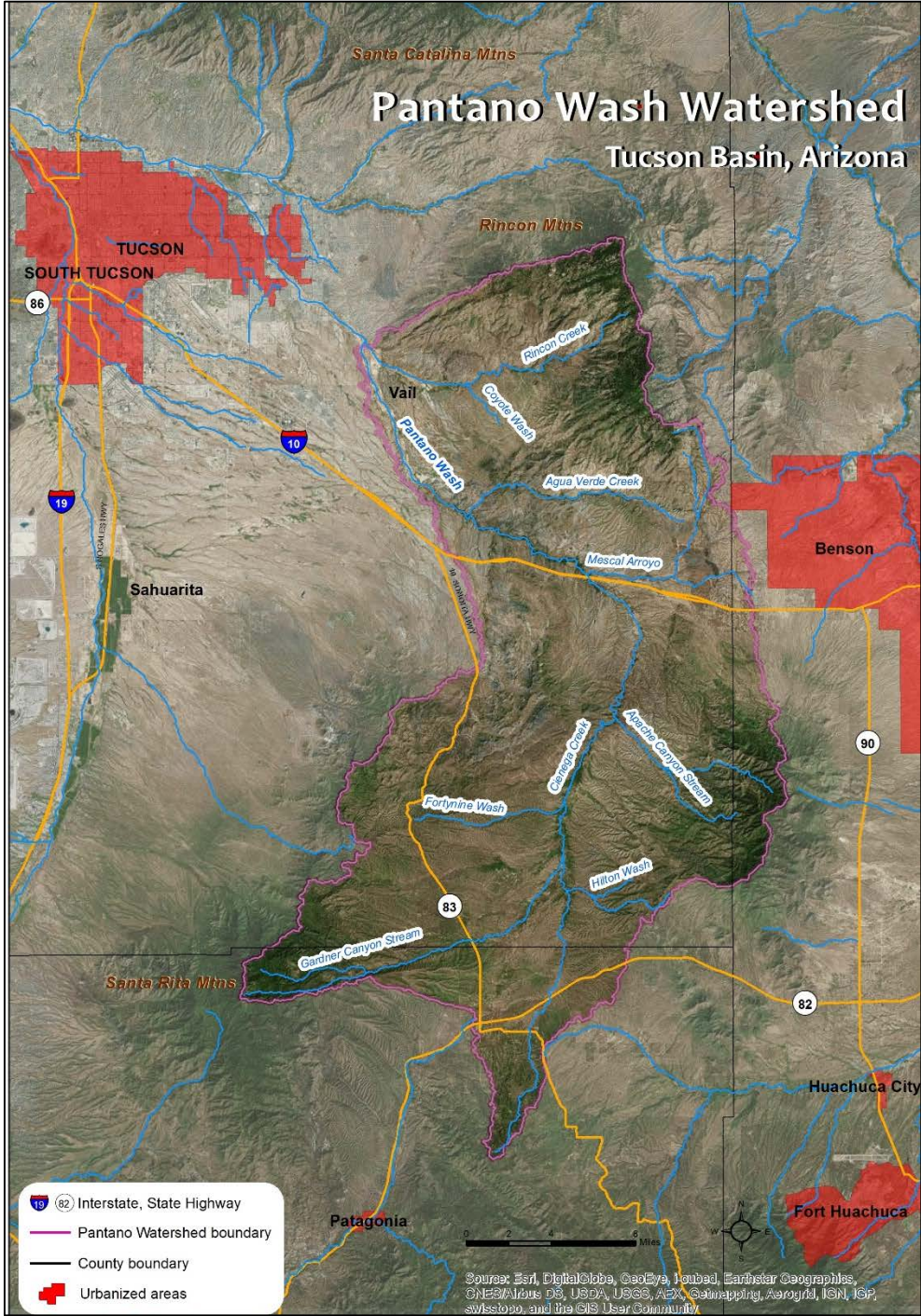
Ecosystem's supply capacity refers to the capacity of a particular area to provide a specific bundle of ecosystem goods and services.

Demand for ecosystem services is the requirement for optimum realization of a specific activity.

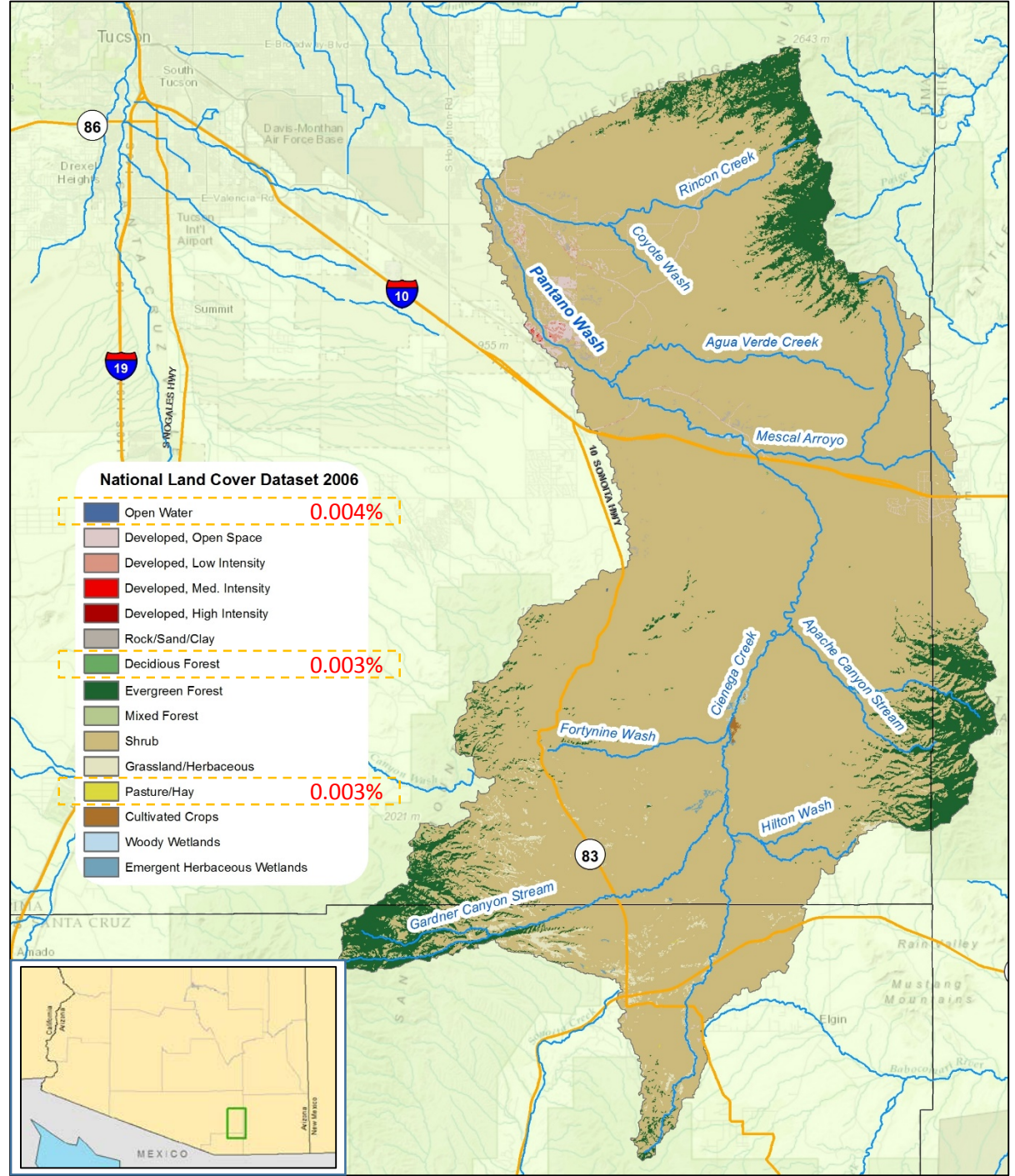
LAND COVER AND LAND USE CLASSES (NLCD 2006)	regulating services							provisioning services				cultural services					
	Local climate regulation	Air quality regulation	Water flow regulation	Water purification	Wetland regulation	Natural hazard protection	Pollination	Regulation of waste	Crops	Freshwater	Mineral resources	Fossil energy sources	Recreation and tourism	Landscape aesthetic, amenity and inspiration	Knowledge systems	Cultural heritage and cultural diversity	Natural heritage and natural diversity
Open Water																	
Urban																	
Rock/Sand/Clay																	
Deciduous Forest																	
Evergreen Forest																	
Mixed Forest																	
Shrub/Scrub																	
Grassland/Herbaceous																	
Pasture/Hay																	
Cultivated Crops																	
Wetlands																	

Pantano Wash Watershed

Tucson Basin, Arizona



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, IGP, swisstopo, and the GIS User Community



National Land Cover Dataset 2006

Open Water	0.004%
Developed, Open Space	
Developed, Low Intensity	
Developed, Med. Intensity	
Developed, High Intensity	
Rock/Sand/Clay	
Deciduous Forest	0.003%
Evergreen Forest	
Mixed Forest	
Shrub	
Grassland/Herbaceous	
Pasture/Hay	0.003%
Cultivated Crops	
Woody Wetlands	
Emergent Herbaceous Wetlands	

HOW TO COOPERATE?

Research with other students:

Supply&Demand of ES will verify, supplement, and visualize the researches of the socio and natural scientists <> general perceptions of and correlation with the data input and analysis.

My results will be useful for water governance engaged agencies and institutions and monitoring actions (WRRC, CAP, AZ Dept of Water Resources, Tucson Water, University of Arizona).

... and intend to put awareness to socio-ecological questions concerning the water management, sustainability, urban and industrial development.

Thank you for
your attention!

