

QUALITATIVE ASSESSMENT OF THE SUPPLY AND DEMAND OF ECOSYSTEM SERVICES IN THE PANTANO WASH WATERSHED, TUCSON

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BACKGROUND

Since the 1950's, the southwestern US has experienced a severe and extended drought which has a multidimensional natural and social impact.

To manage the scarce natural resource water – “the greatest wealth of the earth” (Exupéry) in a sustainable way, requires a holistic approach that can bring together manifold factors within an interdisciplinary framework.

Identification, quantification and evaluation of ecosystem services can contribute significantly to a) the design of new policies, and b) the strategic development of a landscape.



Fig. 1 Map of the investigated area of Pantano Wash Watershed

METHODOLOGY

INVESTIGATION – ECOSYSTEM SERVICES ASSESSMENT
METHODS – ES VALUATION TECHNIQUES

Expert-based assessment of the provision of ecosystem services through INTERVIEWS

S1Q: Which regulating/provisioning/cultural ES do you think are the most relevant for the Tucson Basin?

S2Q1: What capacity do you think these land cover classes have to supply Regulating/Provisioning/Cultural ES?

S2Q2: What is the demand for Regulating/Provisioning/Cultural ES within different land cover classes?

- Target groups:
- SWAN members;
 - UoA Academia;
 - UoA students.

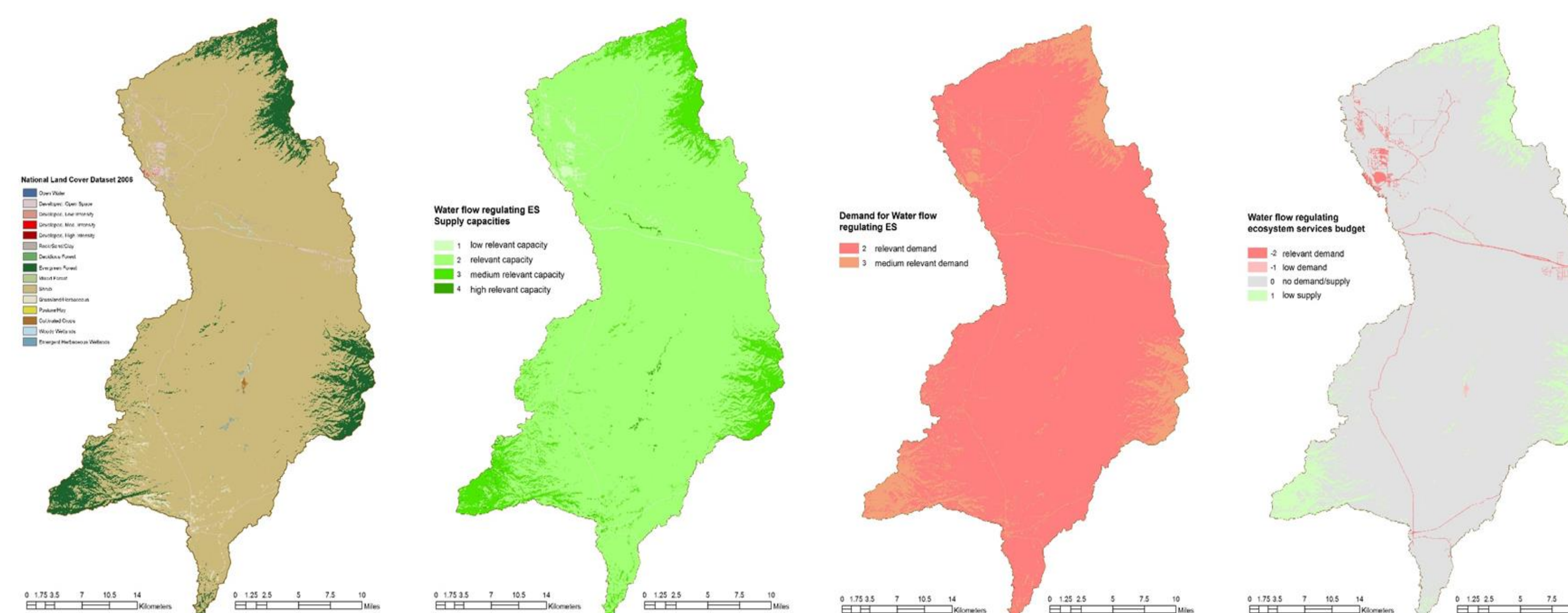
The scale for ES balance (budget) ranges from -5 = demand greatly exceeds supply (strong undersupply) to +5 = supply greatly exceeds demand (strong oversupply). The 0 values indicate a neutral balance (demand is equivalent to supply).

NLCD 2006	regulating services					provisioning services					cultural services					
	Local climate regulation	Air quality regulation	Water flow regulation	Water purification	Erosion regulation	Natural hazard protection	Pollination	Regulation of waste	Crops	Freshwater	Mineral resources	Abiotic energy sources	Recreation and tourism	landscape aesthetic, amenity and inspiration	Knowledge systems	Cultural heritage and cultural diversity
Open Water	0	0	1	-1	-1	0	0	0	-1	0	0	0	1	1	0	1
Developed, Open Space	-1	-1	-2	-2	-2	-2	-2	0	-2	-1	-1	0	0	0	0	0
Developed, Low Intensity	-1	-1	-2	-2	-2	-2	-2	0	-2	-1	-1	0	0	0	0	0
Developed, Med. Intensity	-1	-1	-2	-2	-2	-2	-2	0	-2	-1	-1	0	0	0	0	0
Developed, High Intensity	-1	-1	-2	-2	-2	-2	-2	0	-2	-1	-1	0	0	0	0	0
Rock/Sand/Clay	0	0	0	-1	-1	0	-1	0	0	1	1	1	0	1	0	1
Deciduous Forest	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1
Evergreen Forest	0	1	1	0	0	0	0	0	0	0	0	1	1	0	1	1
Mixed Forest	0	1	1	0	0	0	1	0	0	0	0	1	1	1	1	1
Shrub/Scrub	0	0	0	0	0	0	0	0	-1	0	0	0	0	1	0	1
Grassland/Herbaceous	-1	0	0	0	0	-1	0	0	-1	0	1	0	0	0	0	0
Pasture/Hay	-1	0	0	-1	0	-1	-1	0	-1	0	1	0	0	1	1	0
Cultivated Crops	-1	-1	-1	-1	-1	-1	-1	1	-2	0	0	0	0	1	0	0
Wetlands	0	0	1	1	0	1	0	1	0	1	0	1	1	1	0	1
Emergent Herbaceous Wetlands	0	0	1	1	0	1	0	1	0	1	0	1	1	1	0	1

Fig. 2 Assessment budget matrix of ES supply and demand within different NLCD classes

RESULTS

Resulting maps of S&D of ES for the Pantano wash watershed present the information provided by the supply capacity and demand assessment matrixes. The relative scale values (0-5) corresponds to each LULC class, and represents the mean scores derived from the stakeholders evaluation results.



DISCUSSION

Many participants, many opinions!

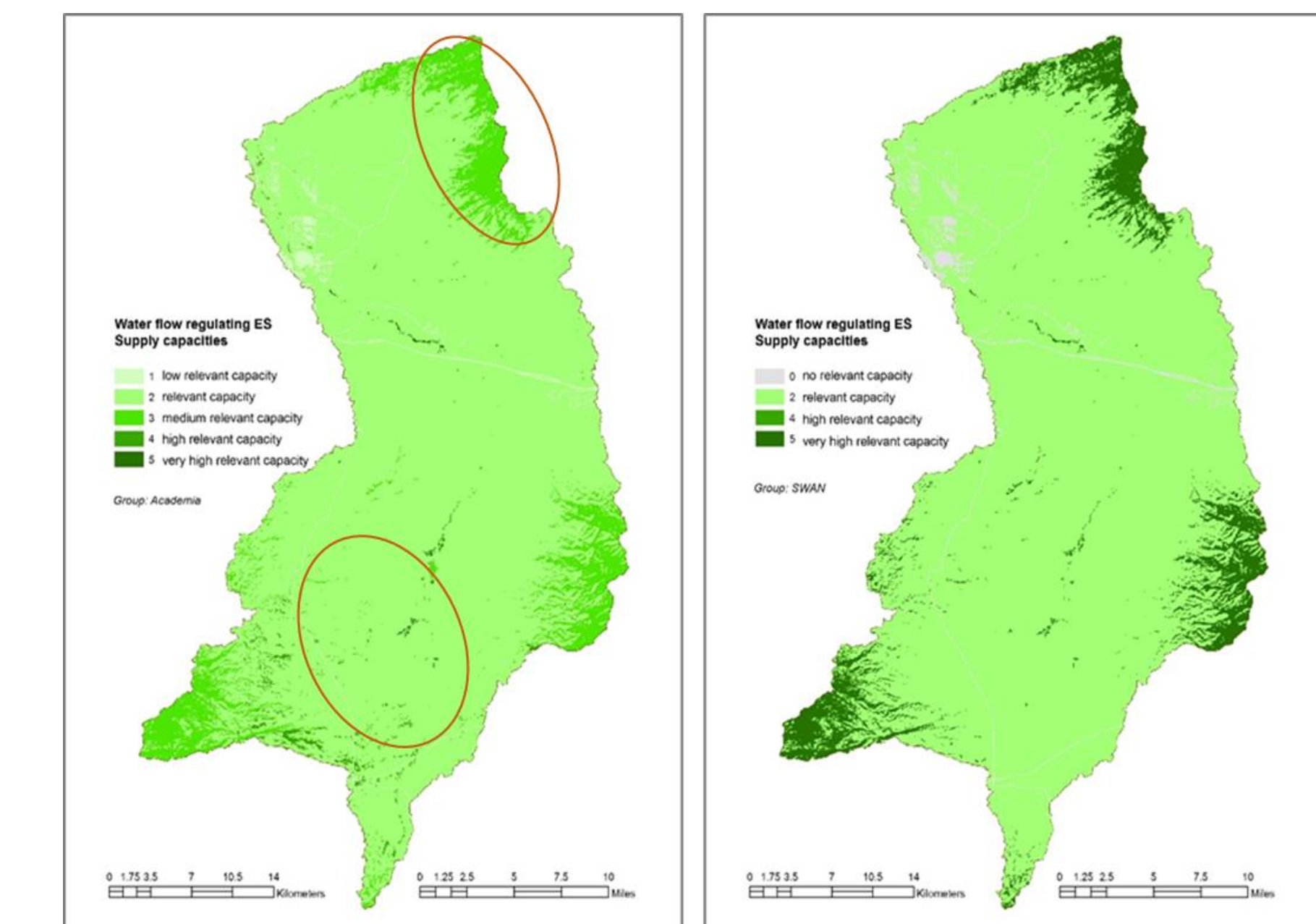


Fig. 3 Maps of Water flow regulating ecosystem service supply based on Academia group (left) and SWAN group (right) evaluations

Knowledge = ...

... long term experience in the related?
... it is an object of study?

CONCLUSION

Expert-based assessments can be used to obtain qualitative results regarding the capacity of each land cover type to provide ecosystem services. The approach can lead to improved environmental benefits for citizens and help in the establishment of their socio-economic priorities.

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