5th SWAN Progress Meeting Program 2014
Towards a Framework for a Transatlantic Dialogue on Water:
What Role for The University of Arizona?

Climate and Land Cover Change Impact on Hydrology and Ecosystem Services

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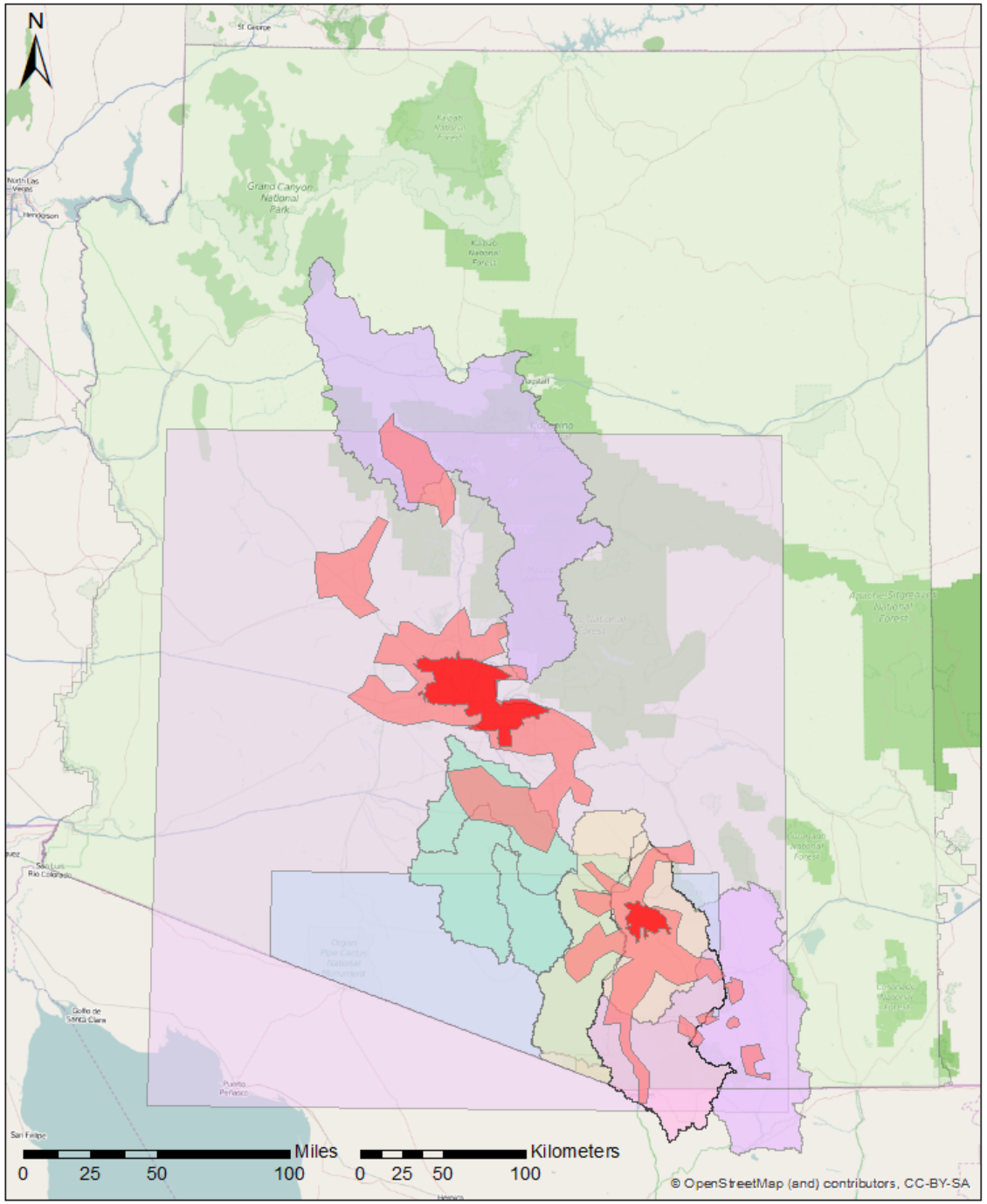
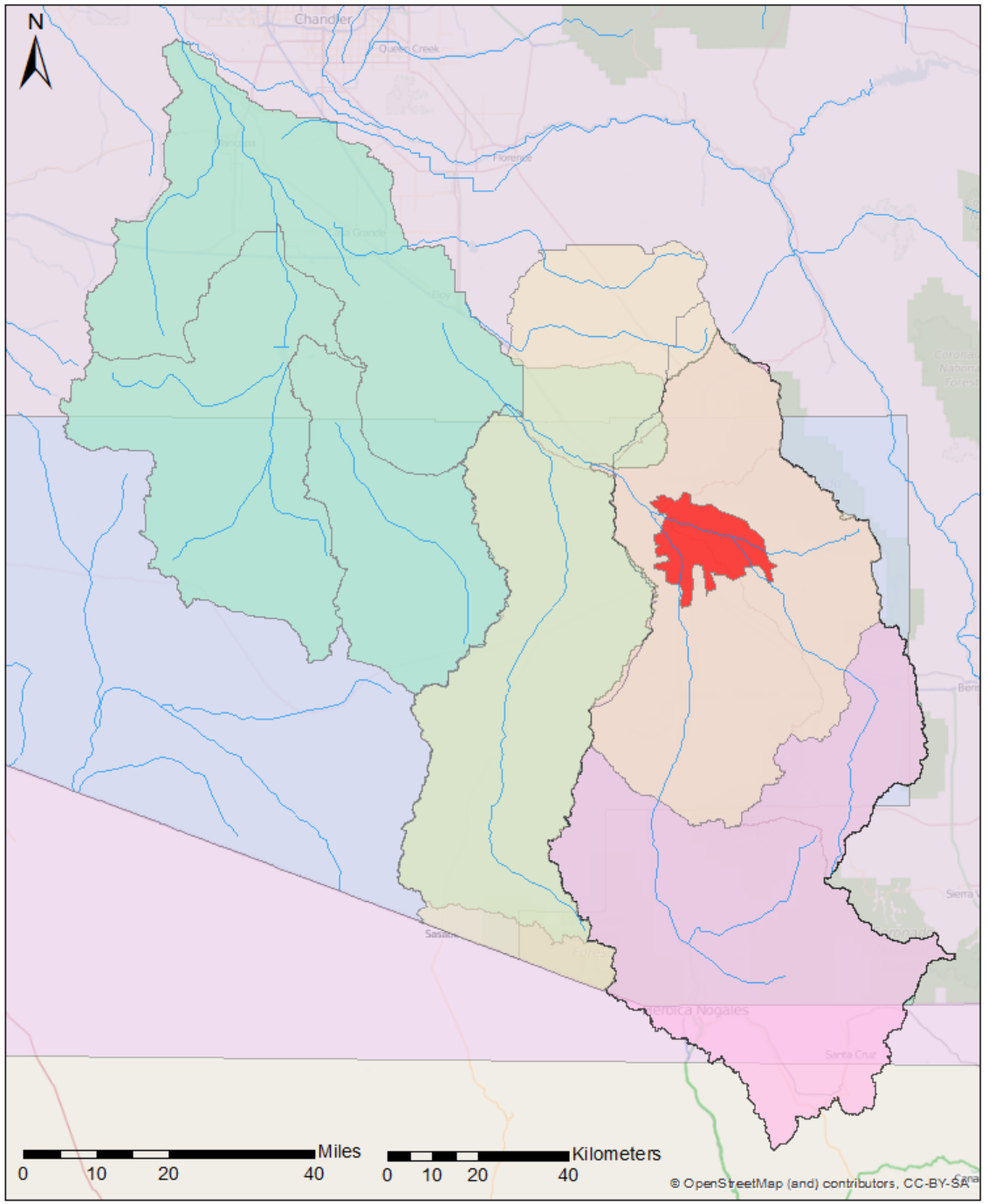
General remarks

- The **organizing principle** of natural science is **space**
- The **spatial scale** of the “case study” is spread throughout Arizona
- What is the **organizing principle of social science**? Power?
- The holistic research of a “case study” **demands spatial overlap of the areas** where different disciplines work
- Methodologically we are lacking the **hydrological** modeling, which is needed to make the jump from **climate change modeling to water management**



General objectives

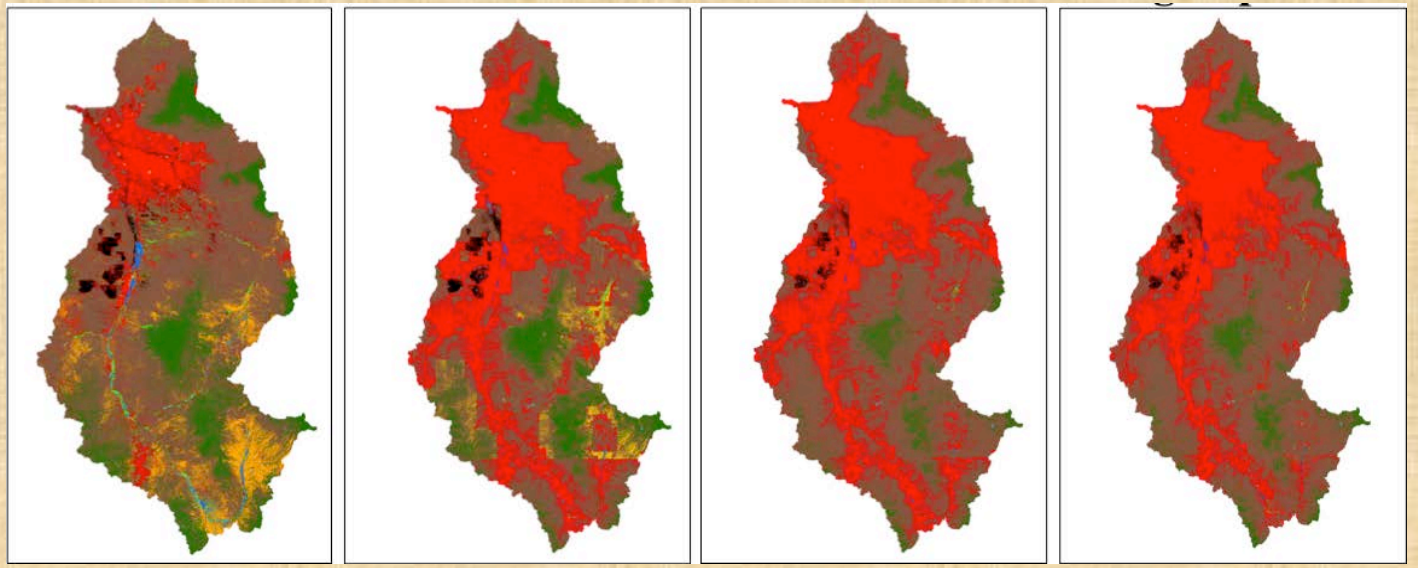
- The **Santa Cruz** is overlapping most of the research areas – Arizona, Pima County, TAMA, Tucson
- **Climate and land cover change** future scenarios data from modeling can be used as **input for SWAT** hydrological model
- Understanding the **hydrological cycle** within the basin is important for recognizing **the drivers of the decisions** that have been taken in the area
- **Ecosystem services** analysis will provide understanding on the **supply/demand budgets**
- Key services in the area are **groundwater recharge** and **riparian vegetation protection,** which are both dependent on the **hydrological cycle**



LULC Scenarios

Year 2050

Year 1999 | Conservation | Current trend | Megalopolis



	Current 1999	Conservation 2050	Current Trend 2050	Megalopolis 2050
Urban	11.82	35.02	38.45	34.09
Evergreen Forest	14.55	11.95	5.19	6.18
Shrub/Scrub	59.1	47.37	54.95	58.07
Grass	9.17	3.59	0.38	0.45

The LULC scenarios for the Santa Cruz Watershed are developed by Norman et al., (2012) with the SLEUTH (Clarke et al., 1997; Clarke and Gaydos, 1998) urban growth model.

Thanks to Rewati Niraula (HWR, UofA)

Where are you on your research?

- Building up the methodology
- Recognizing gaps and issues – spatial issues are still present.
- Assessing the benefits of such research (for SWAN)

Key research questions

- How will **climate and land cover change** influence the **hydrological cycle** and **ecosystem services** supply in the area?
- Which are the **key ecosystem services** within the basin? How to assess them?
- What is the contribution of the **natural groundwater recharge** to the **groundwater table** in the basin?
- What is the relation between the **natural groundwater recharge** in the basin and the **artificial recharge from CAP**?
- How will changes in **hydrological cycle** influence **riparian vegetation**, which is key component for the **ecosystem integrity**?

Map/define the scale of research: challenges, opportunities

- What is the **benefit** of applying a **hydrological model** in an **interdisciplinary research**? What is the benefit for SWAN?
- How do we choose the **basin**?
- How do we **integrate** the results in **sociological perspective**?
- What are the **benefits** of understanding the **hydrological cycle** within a **water scarce area**?

Methodological approaches/theoretical frameworks

- Climate and land cover change modeling
- Hydrological modeling
- Ecosystem services analysis
- Mapping of ecosystem services
- Future scenarios analysis

What information do you need?

- **We need someone to run the model for whole Santa Cruz basin**. If not, we stay with **Upper Santa Cruz** (Rewati), but in these case spatial mismatches are still present
- **Which are the stakeholders to which such results should be reported? How?**
- How can our research supplement the other disciplines?

Thank you!

Gracias!

Merci!

Dank u!

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Благодаря!