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Integration with the TAMA Case Study



Research questions suggested:

*How does copper mining affect GW in Tucson Basin?
Can we take the example of Rosemont to know this?
Is water metabolism the best option to study this?*

Initial ideas

Before knowing how mines affect GW is important to know the role of GW in the mine

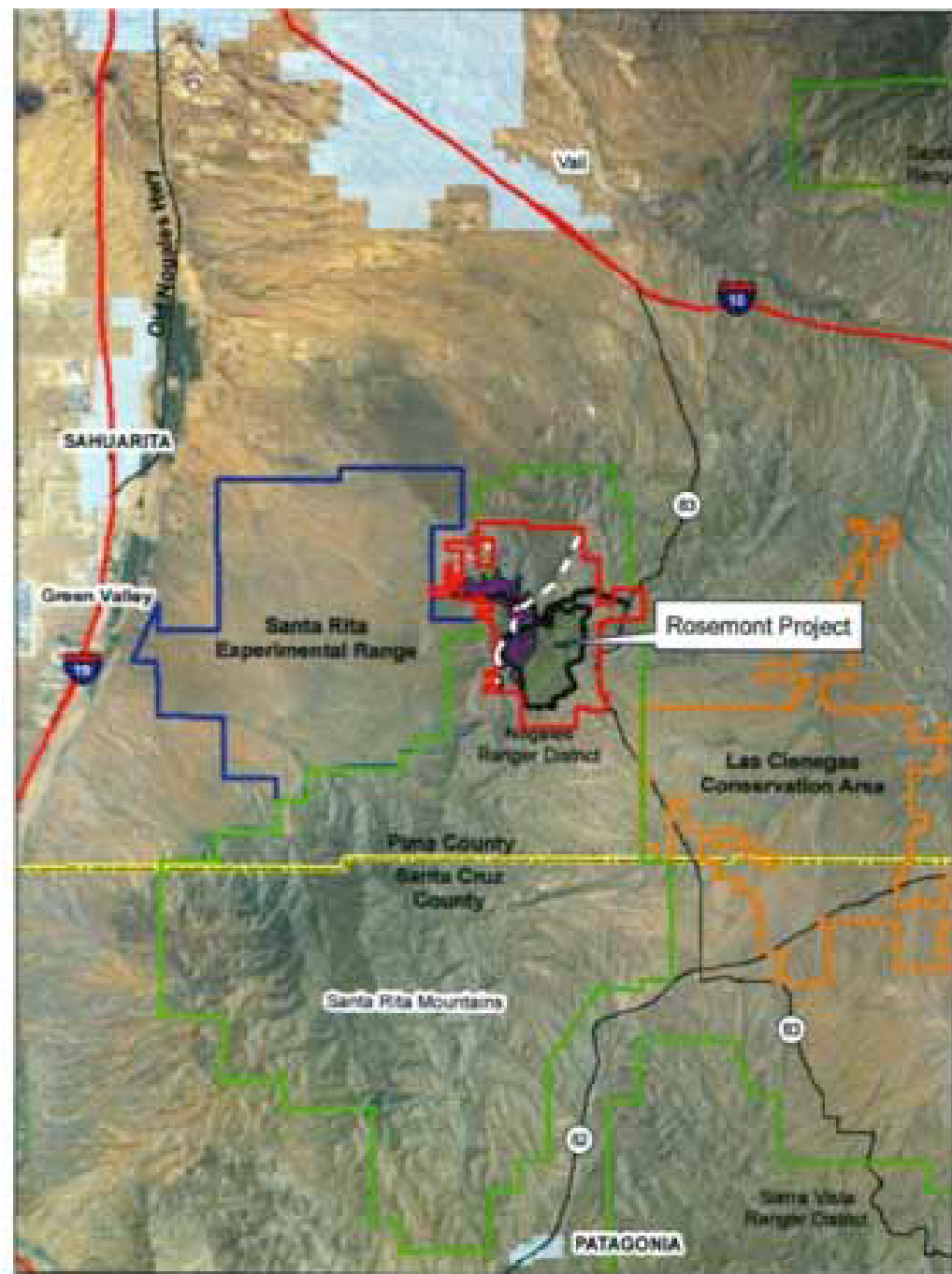
Since other SWAN Project members analyze water metabolism, we considered this methodology to address the issue

We thought in the case of the Rosemont mine because:

A- Being the most recent, the information is fully available

B- It is large and it has a lot of weight

C- It is controversial



Key

- Rosemont Patented Claim
- Rosemont Unpatented Claims
- Municipality
- Coronado National Forest
- Interstate Highway
- Highway
- Santa Rita Ridgeline

Rosemont Project
Project Location Map

Objectives

We will study **the mine as an organism** and we will try to explain what are the funds of water on it and what are the flows, as in any organism

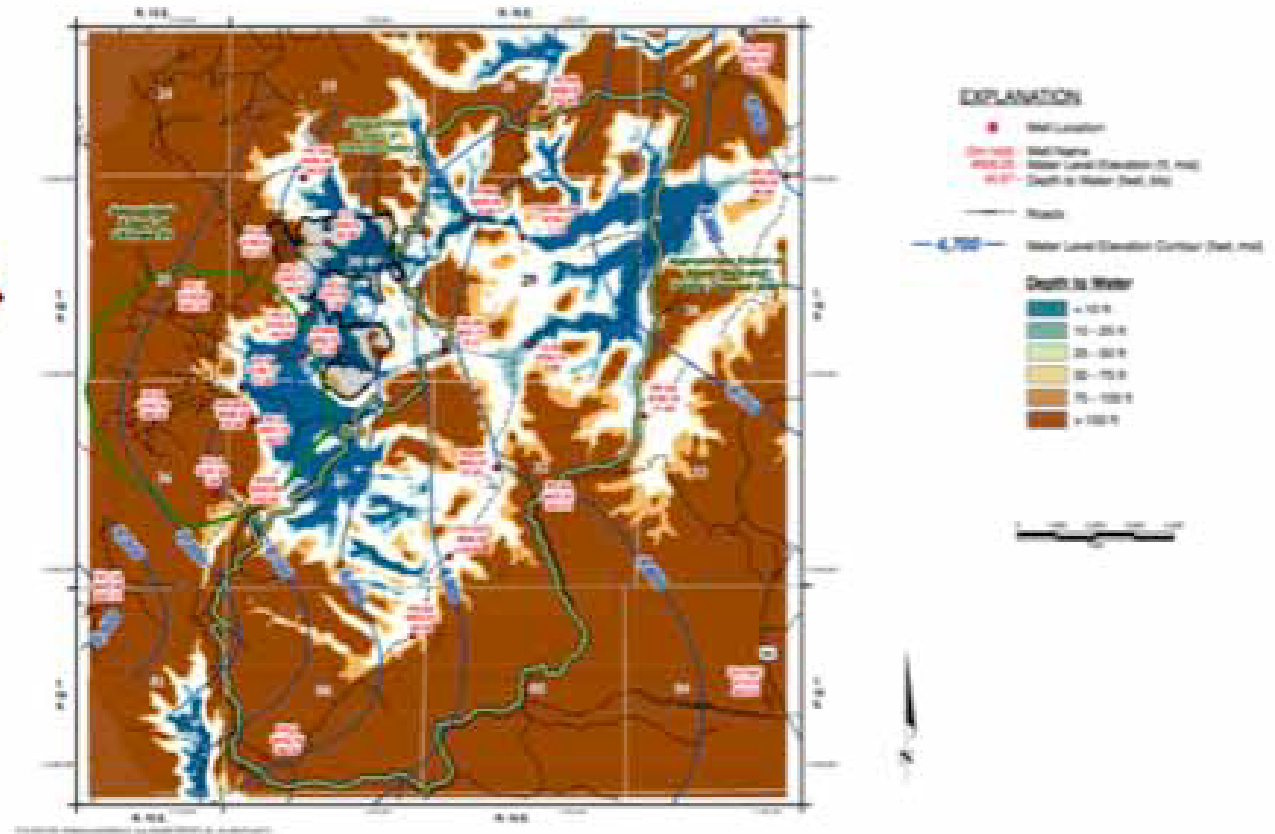
The most important things to outline are extraction and excretion, but also evaporation, which is another output

After the study we will consider if it is possible to extrapolate what impacts would all similar mines have

The Rosemont Project → *Study area*



FIGURE A: Groundwater map of the area where Rosemont mine is projected.



SOURCE: "GW Contour Mine". Rosemont Copper, 2010.

Rosemont is projected exactly on one water body of shallow groundwater

Methodology

The study requires to address the complexity of hydrosocial systems and of the hydrological cycle of the mine conceptualizing **funds and flows of water** without losing the important details to make a diagnosis of the GW services are affected

The final product does not differ much from a table or graph of the mine water balance but in which the funds and external water flows are also incorporated to it as surrounding spheres, as well as other socio-economic issues affecting water circulation

These external spheres to study are:

A- Socio economic framework. The groundwater conflict

B- Institutional and legal framework

C- Geographic and environmental framework

The Rosemont Project → *Main flows and funds*

INPUT

For extraction, the mine has a permit of 6,000 acre feet / year

Water used is from Sahuarita, approximately 14 miles west

Water is conveyed to the water transmission pipeline and stored in ground level tanks

INNER FLOWS

Sulfide ore → 3 steps: grinding, flotation (and dewatering) and filtering, undertaken in facilities built for each purpose. Few water used for filters

Oxide ore → is leached and the resulting solution processed through a solvent extraction and electrowinning facility to produce a copper cathode product. Water used is also recirculated

The open pit lake will create a long-term hydraulic sink

EXCRETION

Seepage within this capture zone do not reach the aquifer down. it is removed from the system by evaporation.

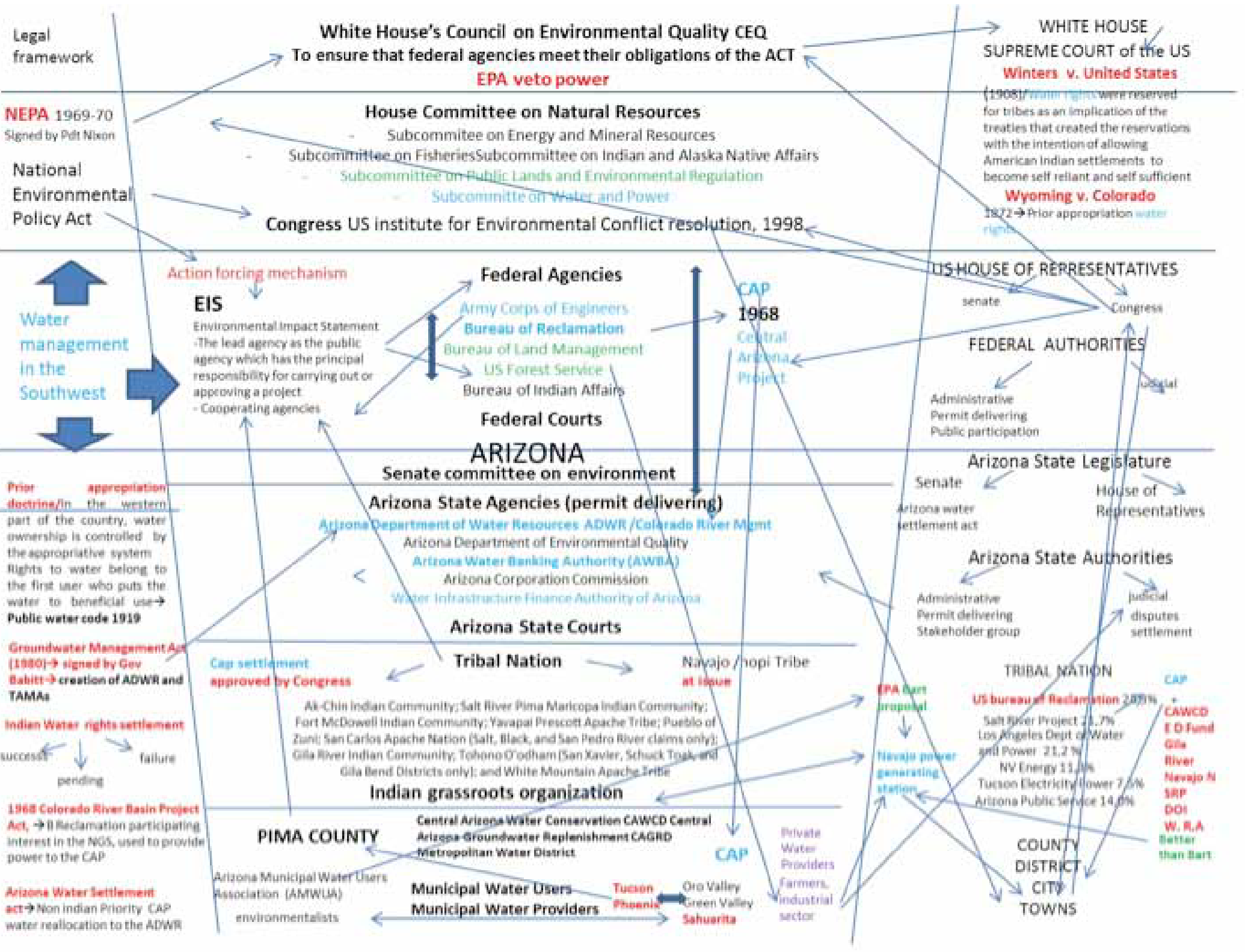
Socio-economic issues

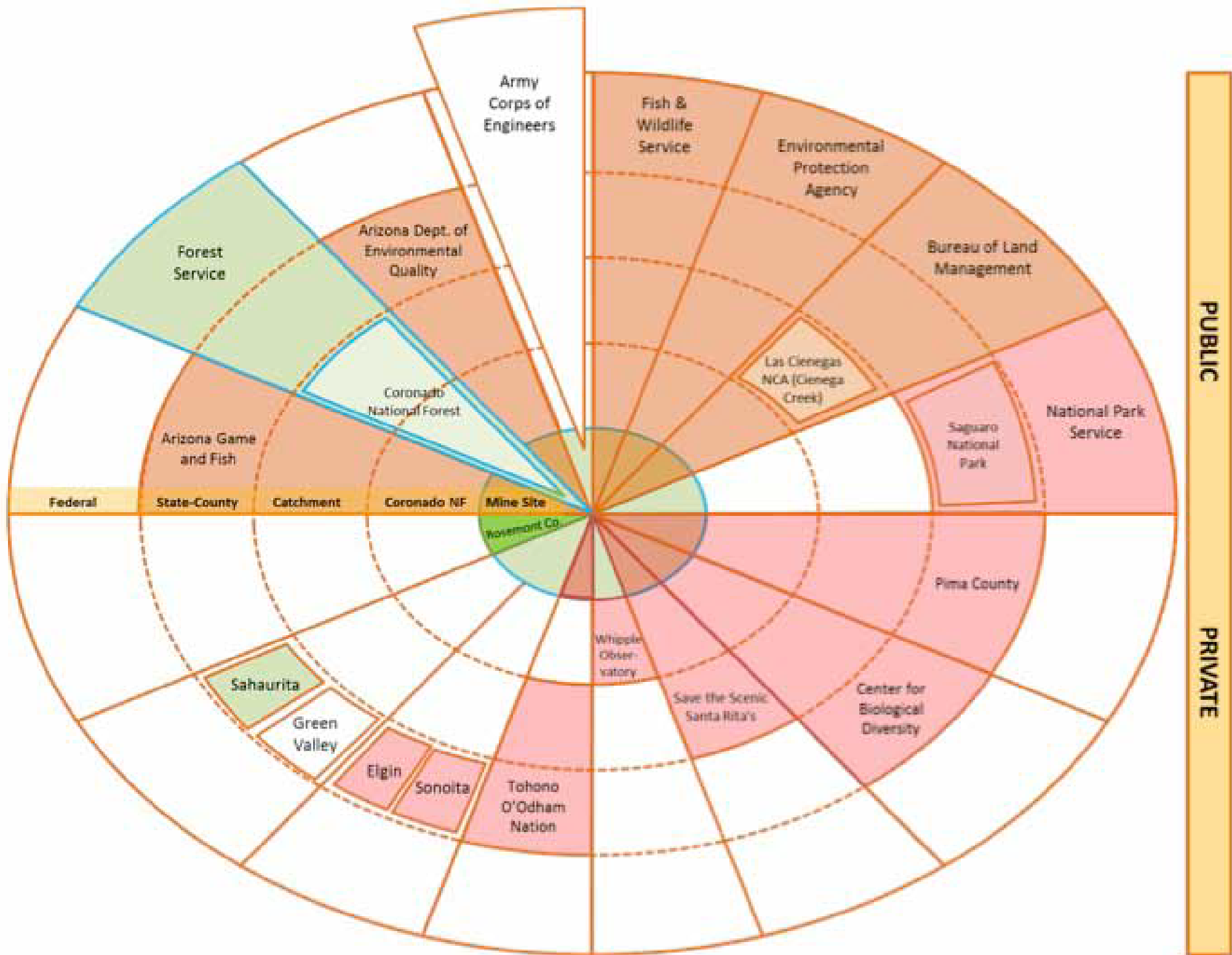
Southwest America context :

- Arizona, a leading state for copper production in the USA, where mining activities are regarded as being an engine for regional development while posing a threat to water use in semi-arid areas, public health.
- Under the new environmental federal law passed in the 1970, getting an authorization to dig an open pit on public land is far from being a simple formality, the private company having to be compliant with environmental standards.
- The balance between economic and ecological impacts is at issue. Rosemont copper project - a controversial issue.

Methodological Approach

- Opportunity for studying environmental regulation, conflicts resolution and decision making process.
- Implementing a methodological approach which is complementary to hydrological perspective through...
 - Identifying social/political relations with water highlighted by the Rosemont Copper project
 - Stakeholder mapping – actors/institutions/levels/coalitions
 - Arguments of those involved - Discourses
 - Strategies of assertion / Resources used





U.S. Forest Dept (EIS Lead Agency)

My decision to approve the proposal is guided by federal law. The primary guidance comes from the General Mining Act of 1872, which grants the citizens the right to conduct mining activities on public lands that are open to mineral exploration.

«NO SERIOUS IMPACT» «MITIGATION»

EIS cooperating agencies

Env. Protection Agcy

Army Corps of Eng.

Bureau of Land Mgmt

Pima County

- Possible violation of federal laws
- Fragmentation of natural hydrological landscape
- Cumulative impact (on gw and sw)
- Prevention action against degradation of OWS
- Pollution from mine vehicles (crushers, conveyors)



Municipal Water Supply

Augusta Resource

Cienega Creek – Davidson Canyon

Lowering of water table to dig the open pit, dewatering the creek

Environmental Water Supply

Central Arizona Project

Rosemont Copper Mine

Grassroots/activist orgs
Interest not specifically water related

Sahuarita & Green Valley
Rosemont agreement to fund extention to CAP to secure groundwater supply for Sahuarita.

Groundwater

Powerful lobby
against threat to
water supply

Agricultural Water Supply

- FICO (Walden Family)
- Crown





Explanatory factors of domestic water demand. A comparative case study in Seville and Tucson.

*Thesis: Explanatory factors of domestic water demand. Study microscale
the city of Seville*

My thesis is based in Municipality of Seville, an study of *microscale*
(Census Tracts = 522)

The *purpouse of my thesis is*: test the relationships between some
variables (buildings characteristics, demographic characteristics and
indicators) and water consumption per capita in every census tracts.
[preliminar map]

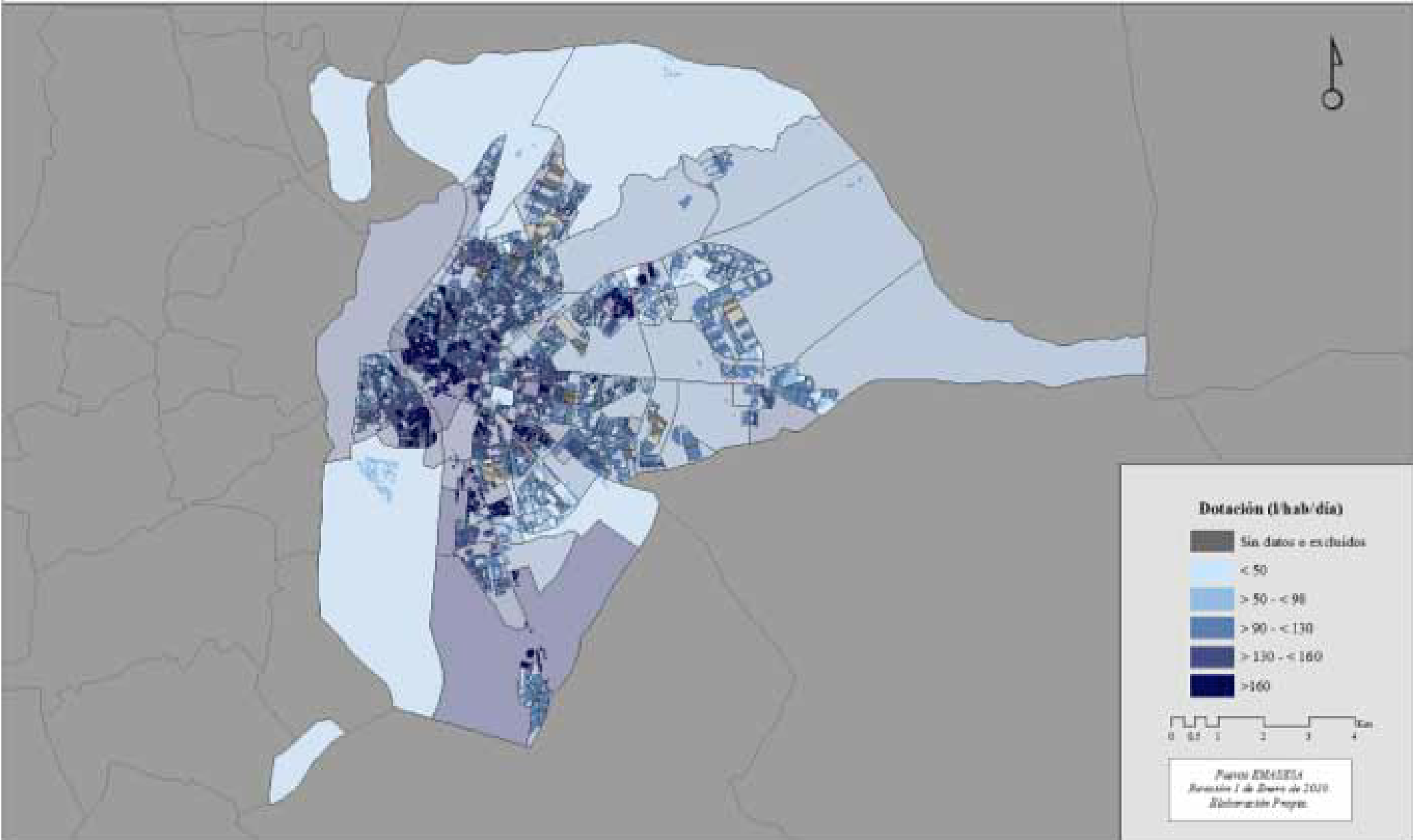
The *purspouse of comparative case study* in Seville and Tucson:

- Indentify variables.
- Statistical analysis.
- Answer some questions:

Which are the main explaining factor or factors of urban water demand?

What are the differences between compact and urban sprawl?

Dotación per cápita distribuida por sección censal.
Municipio de Sevilla



Dotación (l/hab/día)

- Sin datos o excluidos
- < 50
- > 50 - < 90
- > 90 - < 130
- > 130 - < 160
- > 160

0 0.5 1 2 3 4 km

Plan de EMASESA
Resolución 1 de Enero de 2010
Elaboración Propia