

Pre-Proposal Application Form
2018–2019 TWRI Graduate Student Research Programs

1. Risk Perception and Trust in Texas-Mexico Transboundary Groundwater Sharing

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4. Funds would be used to support ongoing research. The study has been approved by IRB and is in the pre-testing phase. The instrument will be distributed in January. Data collection, cleaning, coding, and analysis will take place in the spring and early summer. Dissertation writing will be complete by September with defense in October, with a December 2018 graduation expected.

5. **Abstract:** *Along the Texas-Mexico border, different management regimes, property rights, and uses for groundwater are overlapping or conflicting, which has led to unilateral takings on both sides of the border and severe aquifer degradation. This dissertation is motivated by the expectation that improved water security requires stakeholders, managers, and policy makers to behave in cooperative ways, yet cooperation is impeded by institutional complexity and conflict. This study advances the empirical foundation for understanding the influences of risk perceptions on the use and conservation of a precious resource, with particular relevance for managing a specific common pool resource: shared transboundary water. It draws directly on and integrates 1) psychometric approaches to the effects of risk perception on water issues, 2) work that analyzes cooperation or conflict over shared water at the national level through a risk perception lens, and 3) trust and social capital approaches. The cross-sectional study design collects and analyzes survey data from transboundary water policy decision-makers in the Texas-Mexico border region, covering counties and municipalities in Texas. Results from this project identify points of contention and disunity between decision makers of transboundary policy in Texas and Mexico and guide interventions to promote cooperation in protecting our most vital resource.*

6. Research Proposal:

Statement of Critical Regional or State Water Problem. Water is arguably the most precious resource on Earth. It is necessary for the survival of every living thing on this planet. Humans are especially dependent on water for survival; not only is water necessary for drinking, but it is the fuel that keeps the engine of society rolling. However, for the most part natural hydrological boundaries do not fall within political boundary delineations. Surface water and groundwater cross political boundaries all the time, which creates immense challenges for peaceful and efficient management. In fact, the world's 263 transboundary rivers and lakes comprise slightly less than half of the Earth's land surface (UN Water). With a historical focus on surface water, many of the world's river systems are already fully allocated or over allocated. This has led communities to turn to groundwater, where available, to make up for the deficit in surface water. My research will contribute to a deeper understanding of the vulnerability of groundwater resources along the Texas-Mexico border. Currently, groundwater in Texas is treated as a private property right under the Rule of Capture. However, groundwater management along an international border is especially complex and presents a common pool resource challenge under the current Rule of Capture use doctrine. There are no formal groundwater management structures in place for transboundary resources. El Paso and Ciudad Juarez have a Memorandum of Understanding over the Hueco Bolson, but little has been done under the auspices of this informal agreement. My research proposes to survey Texas decision makers along the border to gain insight into perceptions of risk and level of trust as influences on willingness to cooperate formally or informally over shared water resources. This research is necessary for identifying a way forward for binational cooperation. As surface water becomes scarcer, groundwater reliance will continue to increase on both sides of the border, leading to aquifer drawdown and degradation. In order to maintain regional water

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security and growth, both sides of the border must have a shared understanding of available resources, vulnerabilities, and potential needs for the future. This requires a cooperative approach to management. Currently, there is indication that there are high levels of distrust in Texas regarding the ability of Mexican water managers to meet surface water allocations required under the 1944 Water Treaty. However, to date, this has not been studied and the relationship between risk perception and levels of trust are poorly understood.

Nature and Scope: The study of transboundary water governance lacks empirically-tested theory and has been limited by the individual case-study basis of empirical work. Much work has focused on the nation-state level, with less attention to either individual decision makers or those at different levels of government. Risk perception has begun to be used as a promising lens through which to analyze water decisions, but the approaches are not fully developed, nor do they account for the potential effects of institutional contexts. This project fills those gaps by advancing the empirical foundation for understanding the influences of risk perceptions on the use and conservation of a precious natural resource, with particular relevance for managing a specific common pool resource problem -- shared transboundary water. It draws directly on and integrates 1) psychometric approaches to the effects of risk perception on water issues, 2) work that analyzes cooperation or conflict over shared water at the national level through a risk perception lens, and 3) trust and social capital approaches. By measuring risk, trust, and willingness to cooperate at the individual level, while also measuring variations in the perceptions of individuals in different institutional positions and levels of government, the research will provide a deeper understanding for how, why, and under what conditions decision-makers cooperate effectively over shared transboundary water resources. The larger aim is to work toward a broader, more generalizable risk perception theory of transboundary water cooperation. The Texas-Mexico border is a particularly rich area for studying these topics, with its length, variety of shared hydrologic resources, multiplicity of stakeholders, and complexity of governing institutions.

Objectives:

- Measure willingness to cooperate over transboundary water issues, the level of trust in the social and political institutions of water governance, and levels and types of interactions within multiple stakeholder networks.
- Empirically examine and verify five categories of risk perceptions (Capacity and Knowledge; Accountability and Voice; Sovereignty and Autonomy; Equity and Access; and Stability and Support) as described by Subramanian, Brown and Wolf (2014).
- Explore the relationship between risk perception and trust in a binational setting.
- Examine how risk perceptions and levels of trust impact formal versus informal cooperation and/ or conflict over shared transboundary water resources across an international border.

Timeline: Currently, the study has IRB approval and the questionnaire is in the pre-testing phase. During the remainder of the fall semester the survey will be pre-tested, and any necessary edits or adjustments will be made. Starting in January 2018, the questionnaire will begin distribution. Distribution, follow-up, and data collection will take place in the spring semester, along with data coding and cleaning. Data analysis and document writing will take place during the summer semester. Requested funds would be used as salary to support full-time writing during the summer if funded through USGS, or to pay fees for the academic year, if used from Mills Scholarship. The final dissertation draft will be submitted to committee members by September 1st and the dissertation defense will be scheduled for October. Upon successful defense, the dissertation will be submitted to OGAPS and the remainder of the semester will be dedicated to finalizing the document.

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Methods, procedures and facilities. A cross-sectional study design will be used to collect and analyze survey data from known transboundary public water policy decision makers in Texas along the border with Mexico. The survey will be multimodal, including mail, internet, and phone. Incentive for participation will be in the form of a chance to win Amazon gift cards. Surveys will be administered to over 1,200 appropriate public local, county, Texas state, and federal officials with responsibilities for water policy and management along the border. A snowball sampling method will be used to identify additional public officials for inclusion.

Statement of expected results or benefits. This research will gain information regarding perceptions of risk for the purpose of better informing future efforts to find mutually-beneficial allocations of shared transboundary groundwater. The analysis will examine the empirical relationships between different dimensions of risks of cooperation and trust on one hand, and willingness to formally and informally cooperate on the other. It will include assessments of different forms of improved data on shared groundwater resources with an eye toward ensuring that new data will facilitate, rather than hinder, discussions about future water allocations.

7. Intended career path:

I believe that the skills and experience gained from my doctoral research will help me to achieve my specific career goals to work in identifying and implementing sustainable groundwater management for future Texans. I am passionate about creating scientifically-driven policy and change. I aspire to find a career that allows me to apply rigorous scientific findings to effect real-world change. Such a career could include working for a think tank, a research institute, a governmental agency, or a nonprofit. I feel that it is vital to not only create usable, actionable science, but to also understand how to convince policy makers and water managers to use those results to enact positive changes in management.

8. Budget: I am eligible for both USGS and Mills. As requested, I have included the budget for just USGS, with the understanding that if I receive Mills instead it may only be used for tuition and fees.

a. Please indicate your specific funding needs:
 Other costs (salary, fringe, travel, other) is needed

b. Proposed use of funds by category

Category	Request- USGS	Justification
Salary	\$ 5,000.00	Summer salary- so I can focus on writing.
Other	\$	
Total	\$ 5,000.00	<i>Not to exceed \$5,000</i>

c. Matching funds

Category	Match	Justification
Salary	\$ 15,059.59	Based on 2016 W2
Fringe Benefits	\$1,894.00	Health insurance benefits
Travel	\$1,250.00	ESSM Travel Award, OGAPS Travel Award
Tuition	\$5,802.00	Tuition for Spring, summer, and fall
Total Direct	\$ 24,005.59	
Total Match	\$ 24,005.59	