

Transcript Fireside Charla 011: RE:BORDER and the Water We Share

President Adela de la Torre:

Welcome to the fireside, Charla. today I'm thrilled to host a conversation that touches on one of San Diego State University's key areas of distinction. Our connection to the most talked about border region in the world. This month SDSU inaugurates Re:Border, the first annual collaborative conference that explores key transborder binational issues and innovative solutions. This year's theme is "The Water We Share", which will bring U.S. and Mexican researchers, practitioners, students, public policy experts and community stakeholders to explore how San Diego State University and its regional partners can contribute to innovative solutions for water related challenges in the transborder region. With me today are three of our leading water researchers from the Blue Gold Group, one of SDSU Centers of Excellence focused exclusively on water research. Let's kick off our chat with a round of brief introductions.

Natalie Mladenov:

Hello, I'm Natalie Mladenov, I'm an associate professor in the Department of civil construction and Environmental Engineering. And I teach courses in environmental engineering related to water pollution control and physical, chemical, biological processes. I spent two years teaching at Kansas State University, and then I found out about a position out here in San Diego. I was compelled to come out here and fortunate to get the position and and now teach here at San Diego State.

Trent Biggs:

My name is Trent Biggs. I'm a professor in the geography department. And I'm a hydrologist and I'm primarily interested in human impacts on water quantity and quality. And I started addressing that issue through my doctoral work at the University of California, Santa Barbara, where I did work in the Brazilian Amazon to answer the question, how does land cover change and Tropical deforestation impact water quality there. And since then I came to San Diego and have been doing work on the border and on watershed and water related issues on the border.

Mathew Verbyla:

Hi, my name is Matthew Verbyla, and I'm an assistant professor of environmental engineering at San Diego State. And so I teach courses on water treatment, wastewater treatment and the microbiology of environmental engineering. And then I have a research group with about eight students right now we call ourselves the safe water lab. And essentially what we study is, is water safe? And then if not, what, what do we need to do in order to make it safe? So we study although there's a variety of pollutants that can make water unsafe - chemical microbial, we focus on the microbial ones like viruses, bacteria, parasites, and so I got motivated to pursue

being engaged in teaching and research after spending a few years in Central America when I was younger after I graduated It's what motivated me to become a professor.

President Adela de la Torre:

First of all, what is the Blue Gold Group.

Trent Biggs:

So blue gold is a group of interdisciplinary faculty and students from four different departments at SDSU, geography, civil and construction and environmental engineering, geological sciences and public health. And we're all dedicated towards solving interdisciplinary problems related to water; and particularly in the border region, we think of the border as a fascinating living laboratory to study water related problems, including water scarcity and water pollution, and their impacts on ecosystems and humans. And we do this through looking at three different areas of research, water resources, water technologies, and water and health.

President Adela de la Torre:

So this is great, this background wealth of information on water. So what are the major problems you think we're facing today in addressing issues of water and why is reboarding conference important? The theme is water. Why water? And why is it important today?

Trent Biggs:

Well, water connects us across the border, right? There's no stopping water from flowing across borders, you can try but you won't succeed for very long. And along with that water can come, pollution can come sediment can come a whole bunch of things, solid waste that impact ecosystems and impact people on both sides of the border. So it's a sort of unifying resource that helps us understand how we can achieve sustainability as a society. I don't know matter, Natalie do you have anything to add?

Matthew Verbyla:

Yeah, definitely. And I think what's interesting about the topic of water and water management across different sides of a border is that in different cultures, different countries, we might understand water problems differently, we might define them differently and we might come up with different solutions to solve the challenges of water and water quality. So I think it's a, it's a great topic for the conference so that we can learn from each other on both sides of the border about how to address these challenges.

Natalie Mladenov:

And I would just reaffirm that because here in the United States, we're used to seeing water treated a certain way we're used to seeing large centralized water and wastewater treatment systems and water reuse systems, and when we go across the border, we can see that it's done successfully in other ways, and sometimes decentralized approaches. Other technologies that we really haven't conceived of here are being used elsewhere. And so it's a great opportunity not just for us to conduct collaborative research, but also for our students to engage with other students and faculty across the border. And I think with this conference, we're looking to augment or enhance some of those connections and, and really be able to take on these large daunting sometimes research questions together with our colleagues across the border.

President Adela de la Torre:

You know, I've read a lot about the issues of water pollutants coming out of Mexico and affecting our water quality. But it seems to be looking at just one side of the equation. I think you alluded to that, Natalie, about this difficulty. How can we begin to talk in a more collaborative way, when we talk about addressing binational water issues and create creative solutions? I mean, I was really surprised that oftentimes people don't understand very well, the types of technologies that are used in countries outside of the US. And that, to me, seems pretty important if you're going to try to create a binational solution.

Trent Biggs:

Well, I was going to say that, um, I think a lot of times, solving environmental problems, also ends up improving the lives of people who are experiencing those problems, right. So in Mexico, one of the reasons why there might be a solid waste problem or a sediment loading problem is because there might be a water supply issue, there might be problems with drainage, there's infrastructure problems related to, to rapid development. And that really solving the problems that affect both sides of the border, involve doing things that improve people's lives, particularly the the most marginalized in the poorest communities. So I think that's, that's one of the hopes that we can identify win-win solutions that really improve the quality of life and protect the environment at the same time.

President Adela de la Torre:

So, Matthew, if you look at some of these issues about sewage and pollution, and looking forward, what would be the types of projects that we should be looking at, to really operationalize to make a difference in terms of the quality of water?

Matthew Verbyla:

Right, so um, one of the things that we're we're trying to do is find different ways to track sources of pollution to water bodies. So for example, trying to look at different ways to determine where the where the pollution comes from. Is it pollution coming from animals? Is it

pollution coming from human sources? Is it coming from industry? And I know that one of the methods that we're using in our laboratory, the safe water lab is called microbial source tracking. So we're using the DNA of bacteria to determine if that came from a dog if it came from a human and a little bit more information about the type of pollution and one of the, there's similar methods that are using chemical markers and physical markers and I know Natalie, that's something that that your lab has been working with.

Natalie Mladenov:

Yeah, so there are - real important questions also related to our own rivers here in San Diego, San Diego River and its tributaries. And we've had a collaborative research effort that's involved Matt and our colleagues in public health and also in public administration to get a holistic view of the pollution inputs to the San Diego River and to try to tease apart different sources of contamination like Matt said. We've been using novel biological markers and he's been largely involved in that, but also chemical markers like caffeine and sucralose, to try to really tease apart those different contamination sources. And, you know, we have in and this is true for many urban areas we have here in San Diego over 3000 miles of sanitary sewers that run across the city, many of them are aging, failing cracking. So there's some below ground inputs of contamination potentially from those types of sources, especially when it rains. Those that groundwater can rise and connect to the to the rivers and transfer the pollutants to the San Diego River. We also have pollutant sources on the surface of the soil such as waste associated with homeless encampments, pet waste, dumpster waste. And these are also important sources of contamination. So the same is true in other urban areas. And it's certainly true in Tijuana as well. And we're hoping to in the future be able to employ some of these forensic tools to be able to better understand the hotspots, the areas in in Tijuana, where perhaps priority areas where investment in infrastructure can be made, and look at ways to control not just the domestic sewage, but also also industrial waste that does enter many of these arroyos and creeks that that feed into the Tijuana River.

President Adela de la Torre:

What's so amazing is that the work that you're doing I know it spans from the Pacific all the way into the Imperial Valley. And what's impressive is of course, that not only are the researchers here, at San Diego State and students looking at pollutants that are occurring here in San Diego but also in the Imperial Valley, and I know you're doing work in Mexi-Cali, and there are a number of issues with agricultural runoff, and many other pollutants. So what are the issues that you're seeing in Mexi-Cali? And on the border in this part of the region?

Trent Biggs:

Yeah, so one thing we've done is used time series of satellite imagery to identify where land use is changing in Mexicali, and then we go talk with the farmers there to understand why things are changing. And water scarcity is a big problem that Mexicali during dry years and after

earthquakes, the earthquake in 2010, for example, destroyed one of the biggest irrigation canals there, and 10s of thousands of farmers were impacted by that. So we're also really connected in the water scarcity in Mexicali is also really connected with what we're doing in the United States. So one thing we're doing to conserve water in the Imperial Valley is lining the irrigation canals with concrete, which, on the face of it sounds like a great idea, but the water that was lost through percolation underneath that canal, sustained groundwater abstraction in Mexico. And so there's all these interesting cross border linkages. And thus far, our data suggests that the impacts of the canal lining has been sort of modest, but the groundwater table is falling, rapidly, and so that's going to be a pressing issue for Matt Kelly is falling groundwater tables and deteriorating groundwater quality over the next 10 to 20 years.

Matthew Verbyla:

Yeah Trent I think you brought up an important point, which is that there's a number of different social, political, geographical, even cultural factors that play into the water quality challenges that are faced on both sides of the border. And so, um, you know, like, for example, just understanding what are the different approaches that are used in these different contexts. And having our students be exposed to some of the solutions that have been proposed on the Mexican side of the border and vice versa, is going to be a really important factor in finding solutions. So for example, one of the projects that we're working on right now is we have a grant with the National Science Foundation called the International Research Experiences for Students Grant. We're bringing students to places outside of the US to conduct research with collaboration from foreign mentors, and working with foreign PhD students. So for example, to understand types of wastewater treatment technologies that have been developed in places like Brazil, Colombia and are used in Mexico but they're not used in the United States just because of maybe the history or the the familiarity that we have with technologies that we've been using. And I know that's something that that Natalie's also been looking at with collaborators and Tijuana at the Echo Park.

Natalie Mladenov:

Yeah, yeah, I'd love to talk about that a little bit because they're even even just across the border in Mexico, there's some exciting new work or it's not that new it's actually been happening for over 30 years they've been treating wastewater from a community in Tijuana, and using that treated water to irrigate their landscape. And it's really a success story. It's an urban reforestation project that has allowed this for this large green area to exist in Tijuana as a result of wastewater being treated to a level that can be used for irrigation. And we're currently working in my research team with the folks at El Colegio de la Frontera Norte, to be able to optimize their system a little bit better and then produce excellent water quality that's even better, because they're working on supporting native plants and having a nursery there as well, and really working with the community on educational projects. But I think this is another great opportunity right now. It's a small research team that's collaborating with Cola faculty. But we could be larger, we could bring a larger group of students through these type of National

Science Foundation funded international research experience for students' projects. And I think that would be a fantastic way forward for the future, and it could involve not just engineers, but they have a large social science team at El Colef. And so we do have other other majors here that would also benefit from that type of international research experience.

President Adela de la Torre:

So let's talk about the border conference a little more. It seems like that, that we're seeing a lot of interesting projects in Mexico, San Diego is in the forefront and using wastewater, how do we create a regional approach a regional platform to become the area that really transforms how we use water and how we look at water. Right now we're talking about two countries; but let's talk about a regional approach. What would you suggest that we do?

Trent Biggs:

Well I know the first thing is to approach us from a watershed context, right? Recognizing how all of our water bodies are interconnected across the border, and SDSU has a has a decades long tradition and trying to help us think about the border from a watershed context starting with the work of Paul Ganster and Richard Wright back in the 80s and 90s. Where they really they put up posters showing the Tijuana watershed and all the all the ways in which we're connected to cross the border, and I think that's really had a good impact. They recently passed the Minute 2020 addendum to the to the to the to the US Mexico border treaty that recognizes the Tijuana watershed is an important water resource that should be managed binationally. So that was that would be one suggestion, and then the other one is, is what we're doing at this conference is which is learning from each other, and particular listening to our Mexican colleagues and from the students, because they're much they have much more experience with the water problems, in Mexico, of course, then we do and, and then the students are the next generation who are going to have to live with the reality we create today. Right.

Natalie Mladenov:

And I think some of the things we mentioned were also the strengths that we see from different disciplines. This multidisciplinary, transdisciplinary, type of research that that really needs to happen. These are daunting questions. I mean, if you think about the Tijuana River pollution issue and the different sources of pollution, but the different strategies to alleviate that alleviate that pollution, it does seem like a tremendous undertaking, but it can be addressed through small and large projects here and there, some that are going to involve river restoration upstream, some that are going to require hard solutions like infrastructure, but all are going to require a buy in from multiple stakeholders. And they're going to be from, you know, different different disciplines, different angles that need to be represented.

Mathew Verbyla:

Definitely, the that's the the idea, I think of training engineers of the future and other disciplines of the features that they can't work within a silo of their discipline, they have to be comfortable working on transdisciplinary teams, and also another aspect, developing things like global competency, having intercultural abilities. I think one of the strengths that we have as a university to be a leader in this area is the fact that many of our students already have intercultural abilities. They identify with more than one culture. They speak more than one language and you know, developing those global competencies and being comfortable communicating and understanding the way that other people approach problems, which might be differently from the way that you approach problems, I think is the first step in solving problems that involve the complexity like, you know, trans-border water issues.

President Adela de la Torre:

You know, it's amazing people refer to this region as the Baja California Region, but when you think about water in every dimension, whether it's the ocean, to the rivers, to the creeks that we see, it connects us and you're right, there are no borders in that area. How do we get the kind of political support to create this broader solution to make sure that the future will have enough water, will have an environment that is supporting all all important aspects of life, as well as create the kind of solutions that allow both countries to be collaborative and learn from each other. In other words, the conference is obviously a first step. But there are other important areas to think through so we can sustain, if you will, this movement so that can we really think about water for the future?

Trent Biggs:

Yeah, that's a great question.

You know, I think cooperation and collaboration usually starts with identifying win-win solutions for everybody, right? And so, so I think in order to really solve the water resources problems, we have to figure out concrete actions that can be taken, where everybody sees that they're winning or benefiting in some real concrete way. So, you know, finding those can be challenging. But I but I don't think it's impossible, right. And I think it starts with building a network of people who trust each other from a whole bunch of different backgrounds like Natalie and Matt were both saying, and maintaining a dialogue where you're actively seeking win-win solutions and compromises.

Matthew Verbyla:

And I think something again, going back to the transdisciplinary nature of these problems is that when you have, when you get three or more different disciplines in the same room talking about the same issue, even if we, the people in the room, let's say we share the same culture, same background, just being from different disciplines, we might define a problem differently. A politician, somebody who's in politics or policy or public affairs might see a problem very differently than the engineer does. An engineer might see it very differently than a public health

specialist does. So you know, for example, at the re-border conference, there's going to be panels that are led by, you know, the water technology kind of engineering background, panels led by folks who have a public health background, and then also with a focus on governance. And I think that just getting those people in the same room. And especially when you deal with transborder water issues, we have people with different cultural backgrounds who again might have their own way of defining and finding solutions for problems. Just getting everyone in the same room and talking to each other so, we understand each other's language. We understand each other's way of framing problems. That's definitely the first step. And I think that's one of the reasons why this conference is so important for finding solutions for finding solutions to these challenges.

Natalie Mladenov:

Yeah, I mean, I think there's been a lot of negativity maybe, when we hear about the border, but I think around all of that there is so much positive, positive dialogue with our colleagues across the border. Especially when we talk about the topic of water. It's there's a lot more, I think, in the current time, there's a lot of will also in Mexico to make a difference to address some of the issues regarding water pollution that that we've seen in recent years and to move forward in a positive direction.

President Adela de la Torre:

Yeah, I have to agree with you. I think right now there's tremendous positive energy to address this issue in water and the opportunities are endless. I think you're absolutely right. We need to get a good cross discipline of individuals to the table to begin to find those solutions. And I also liked the story, Natalie, that you did. You provided me about the the individuals who were using repurposing wastewater for growing the garden. In other words, you mentioned Trent that you have to see in yourself when you do something, there has to be self interest. You got to see a benefit. It's hard to get people to table if people aren't willing to see something that they're going to get in return and I think water brings to everybody together at some level, every person needs to use water. And they'll join in this great effort if they see a return on the investment. So in closing, I'd like to ask you, what would you say to those that are listening today? Who would like to attend the conference? What would they get out of it?

Natalie Mladenov:

I think we have really a very exciting and amazing opportunity to have in one room on both sides of the border one day in the US, the other day in Mexico, experts in different different disciplines related to water, who are going to be speaking together from from all walks of life, looking to address all types of water related questions. And I think it's a great opportunity to have all these people in one room and hear all of us in the same room hearing each other's ideas and and plans for the way forward.

Matthew Verbyla:

Yeah I'd say another benefit for attending is just learning about some of the exciting work that some of our students in San Diego and in Tijuana and other universities that you know some of the exciting work that these students are doing. So for example, we're going to have students that will present posters on their research, their thesis projects, and learning about how these students are finding solutions to problems in the laboratory outside in the field, and how they're working together with community partners to find those solutions would be one reason to attend.

Trent Biggs:

Yeah, and yeah, I think it's also an opportunity to make your own voice heard. I mean, come and tell us what you think the solutions are. And the problems are to water resources, because we're really we have open ears and open minds and are looking forward to learning from y'all.

President Adela de la Torre:

So I just want to thank you. I think this has been a great conversation about the conference about water. And I just applaud you all for the great work you're doing for San Diego State, our students, and our community. So thank you.

(inaudible):

Thank you, it was a pleasure.

Natalie Mladenov:

Thanks for having us.