AGU
THRIVING EARTH EXCHANGE

Equitably Addressing Community Priorities: Geoscientists and Communities co-creating tools and solutions

Natasha Udu-gama
Director

Maria Sharova
Program Manager, Fellows Engagement

24 March 2023

THRIVING EARTH EXCHANGE

Thriving Earth Exchange strengthens and enhances collaboration among communities, scientists, and partner organizations so that all communities can build healthy, resilient, thriving, just, and ecologically responsible futures.

Modes of Science

AGU THRIVING EARTH EXCHANGE

Top down

(aka “push science” or “loading dock model”)

Researcher does science → **Decision-maker finds publication**

Co-production

(aka community science)

Researcher (dialogue) ↔ **Decision-maker (dialogue)**

Public Participation in Science Research
Co-created Citizen Science
Collaborate Science
Co-management
Community Based Participatory Research

Community Science

Use Inspired Science
Usable Science
Participatory Action Research
Extreme Citizen Science
Pedagogy of the Oppressed
Coproduction
Sustained Assessment
Solutions Science

AGU THRIVING EARTH EXCHANGE

Community Science

The process by which scientists and communities **do science together** to advance one or more **community priorities**.

It encourages communities, particularly historically marginalized and oppressed communities, **to guide, participate in, learn from, and benefit from science.**

Principles of Community Science

Begin with Community Priorities

AGU THRIVING EARTH EXCHANGE

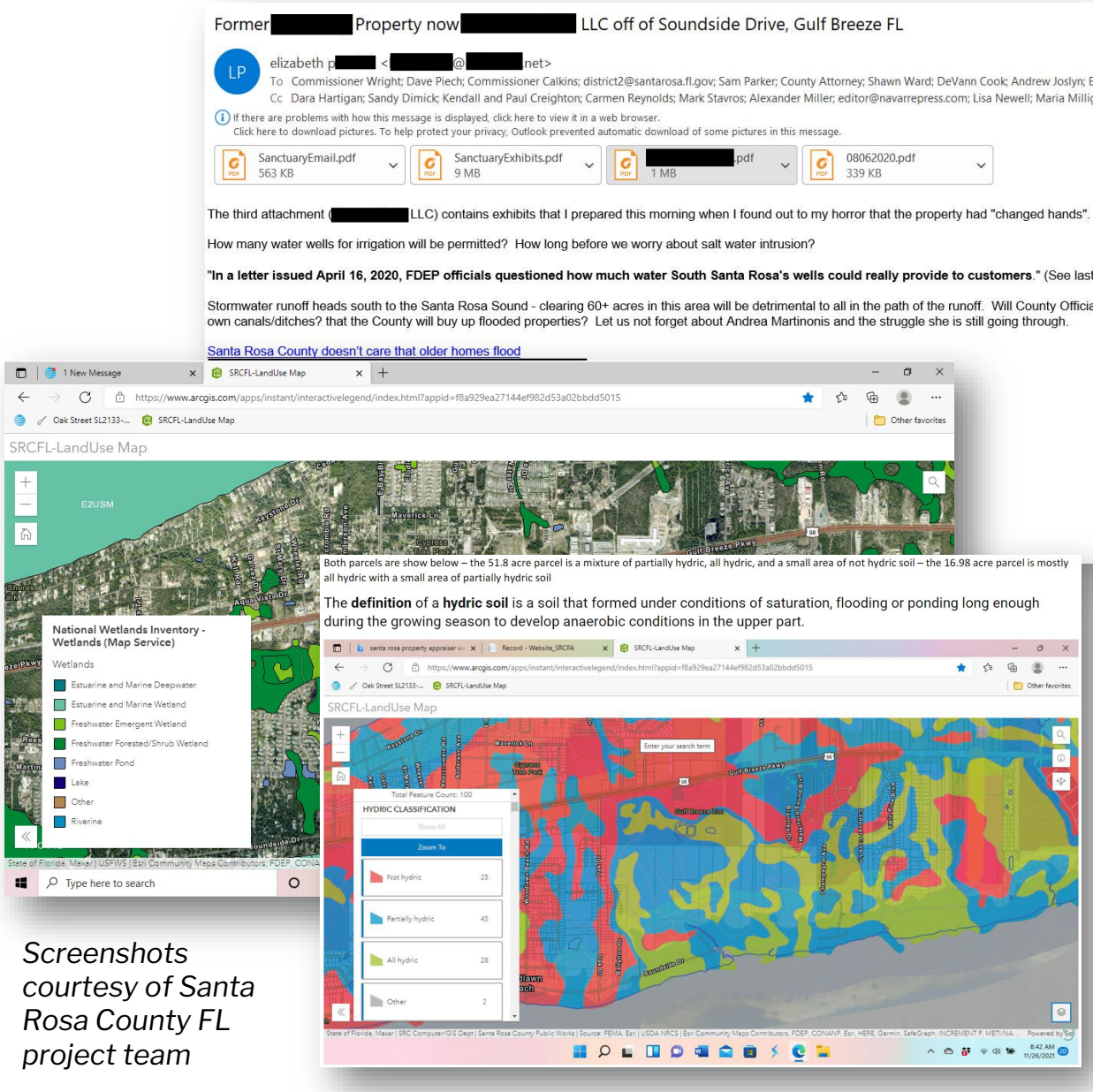
- Listen
- Build sound relationships with **authenticity & respect**
- Engage broadly
  - Communities exist within communities
  - Ensure safety
- Value local knowledge
- Mutually define goals

Photo courtesy of Healthy Community Services

End with Community Impact

AGU THRIVING EARTH EXCHANGE

- Ask: “What is different (or will be different) in the community after this work is done?”
- Start Small
  - Iterate and improve
- Produce meaningful outputs
- Aim for outcomes that help communities achieve their end goals



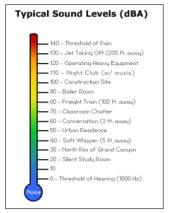
Screenshots courtesy of Santa Rosa County FL project team

Science is a Human Right

AGU THRIVING EARTH EXCHANGE

- All communities deserve the opportunity to ask & investigate their scientific questions.
- Plan & budget together
- Manage data together
- Communicate openly, frequently & effectively

Using a noise dosimeter, students measured the change in the noise level on our field experience walk from Phyllis Wheatley Community School, up the Lafitte Greenway to the Claiborne overpass.



Stop	Average Reading
5 Blocks	Blue
2 Blocks	Green
1 Block	Green
Under I-10	Yellow

Now, air pollution is causing respiratory illness.

Top images from "Field Study of the effects of I-10 Claiborne Corridor on the Treme Neighborhood" By Ms. Davidson's 4th grade class at Phyllis Wheatley Community School May 2019
Bottom Image: Jamell Tate, Next City

Community Science Benefits...

communities

- **Helps** communities become more resilient and sustainable.
- **Enhances** communities' abilities to participate in, contribute to, help guide, and benefit from science.
- **Chips away** at pressing global challenges.

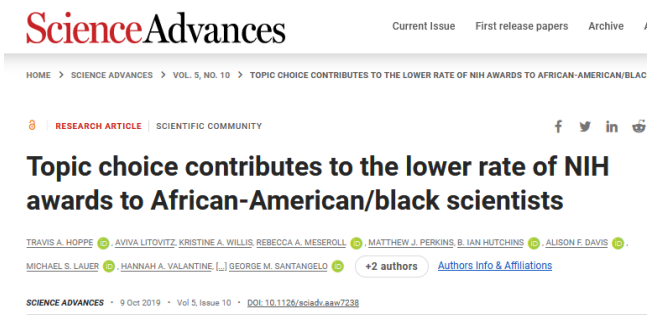
and science

- **Generates** new research questions and approaches.
- **Increases** public support for sciences.
- **Helps** scientists hone skills and prepare for diverse careers.

AGU
ADVANCING EARTH AND SPACE SCIENCE

Community Science Supports
Diversity, Equity, Inclusion & Justice

- **Enlarges our conception** of what counts as science and who can be part of science.
- **An ally for communities** that are tackling injustice, by offering science as a tool to ask and investigate their questions.
- A way for science to **learn about equity** from community organizations that have more experience with equitable ways of working.


Science Advances

Current Issue | First release papers | Archive

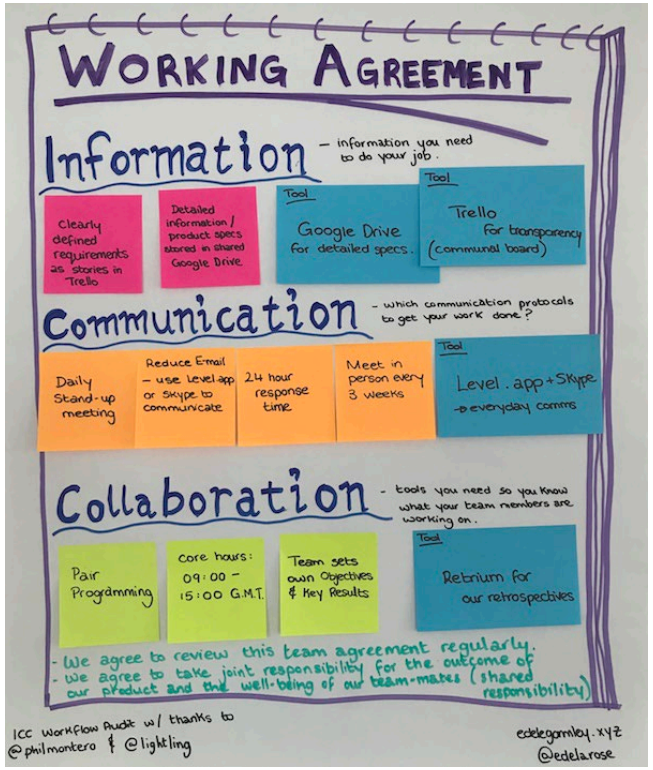
HOME > SCIENCE ADVANCES > VOL. 5, NO. 10 > TOPIC CHOICE CONTRIBUTES TO THE LOWER RATE OF NIH AWARDS TO AFRICAN-AMERICAN/BLAC

RESEARCH ARTICLE | SCIENTIFIC COMMUNITY

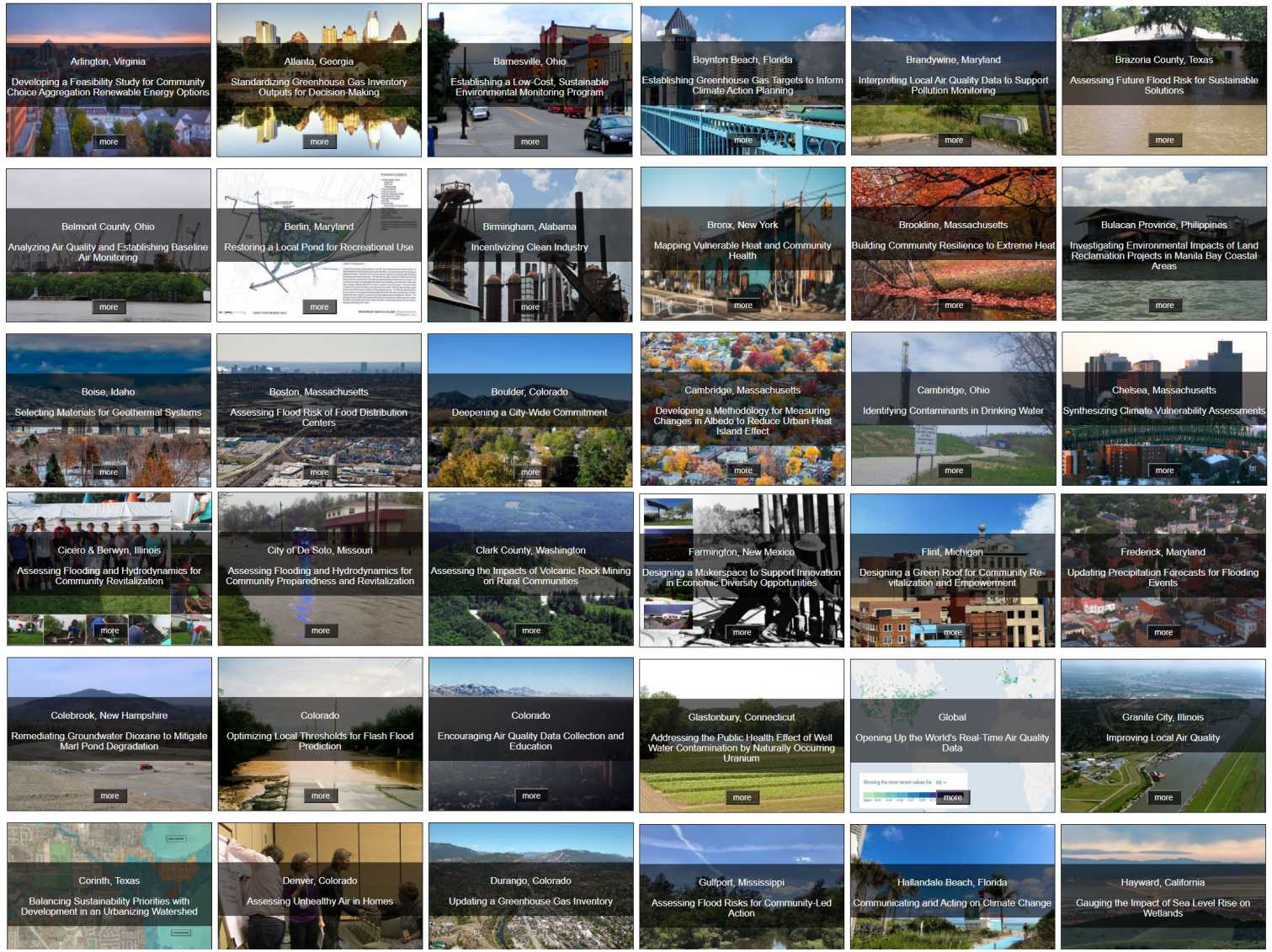
Topic choice contributes to the lower rate of NIH awards to African-American/black scientists

TRAVIS A. HOPPE, AVIVA LITOVITZ, KRISTINE A. WILLIS, REBECCA A. MESEROLL, MATTHEW J. PERKINS, B. IAN HUTCHINS, ALISON F. DAVIS, MICHAEL S. LAUER, HANNAH A. VALANTINE, [...] GEORGE M. SANTANGELO +2 authors Authors Info & Affiliations

SCIENCE ADVANCES • 9 Oct 2019 • Vol 5, Issue 10 • DOI: 10.1126/sciadv.aaw7238



AGU THRIVING EARTH EXCHANGE



By the Numbers

- **>250** Projects Launched
- **532** Community Leaders
- **371** Scientists
- **173** Community Science Fellows
- **135** Unique cities/regions
- **39** States
- **10** Countries

How we enable community science

A flexible approach provides a guiding framework; together they enable community science

AGU THRIVING EARTH EXCHANGE

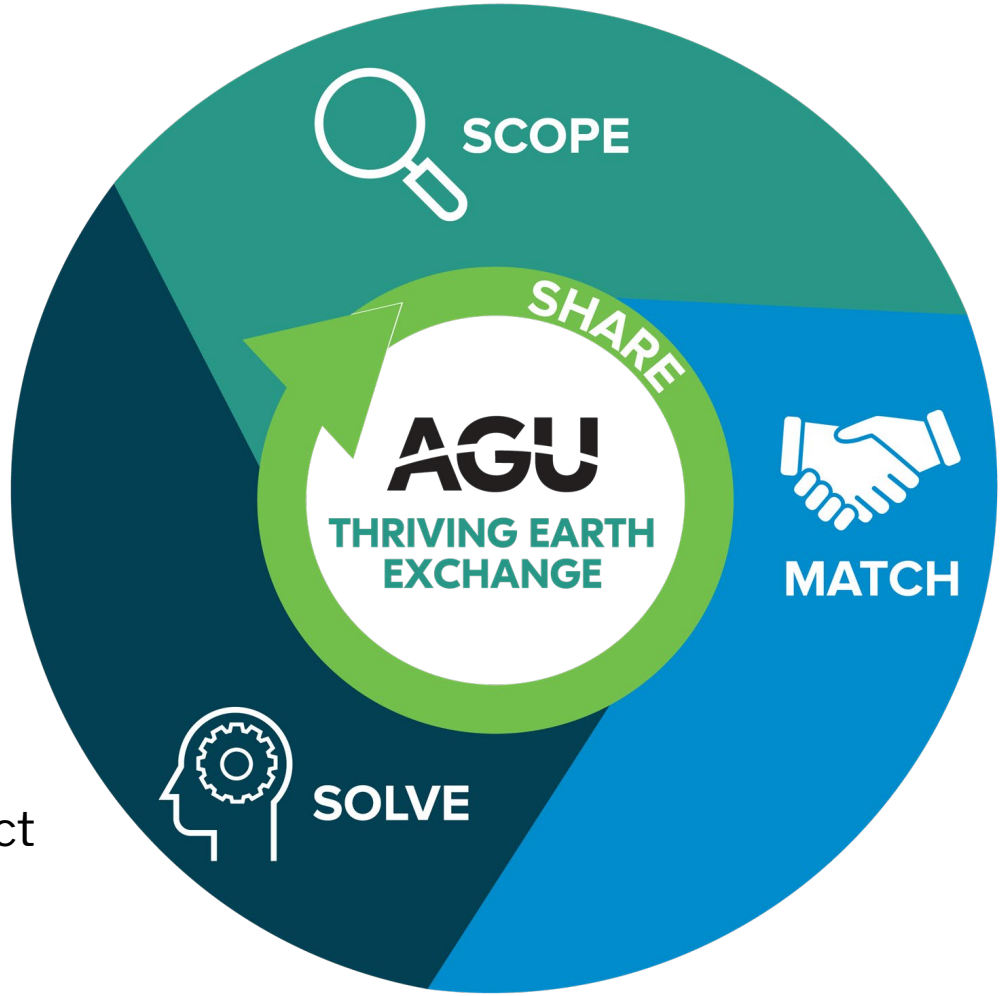
Our Model:

- Flexible but guided framework: Scope-Match-Solve-Share
- “One-to-one” community-scientist pairs (typically individual scientists, vs. institutions)
- A dedicated Project Manager (Community Science Fellow) builds the bridge between the community & scientist
- Free to communities
- Volunteer effort
- 18 month project duration

Our Approach

AGU THRIVING EARTH EXCHANGE

Share is all about sharing the highlights, milestones, results and outcomes throughout all phases of a community science project.



Scope is all about turning community priorities into an actionable project that merges community and scientific knowledge.

Solve is all about completing your project. In this phase, the project team develops a project plan and works toward the milestones they co-create.

Match is all about finding the appropriate scientific expertise for the envisioned project.

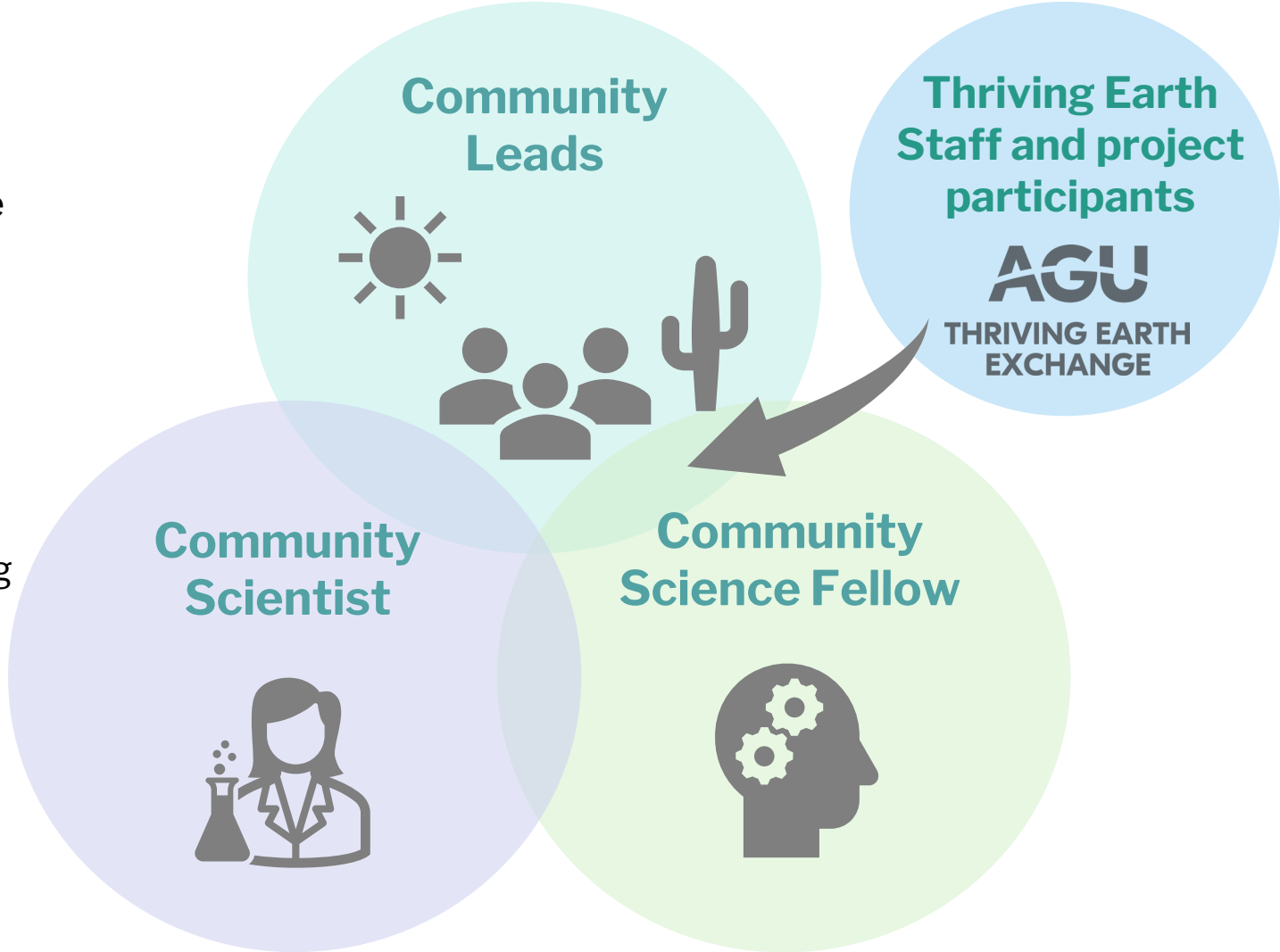
Make-up of a Community Science project team

AGU THRIVING EARTH EXCHANGE

Community Leads
Brings community context, knowledge, insights and connections. Represents and speaks on behalf of the community. Engages widely within the community and ensures that the project is responsive to community priorities and that it is relevant and impactful in the community.

Community Science Fellows
Guides the team through the process, ensures communication and coordination, primary connecting point to Thriving Earth Exchange network and resources. Recruits the community scientist(s).

Community Scientist
Brings scientific knowledge, insights and connections. Engages as a representative of the scientific community. Ensures that science is relevant, responsive, and meaningful



Examples of Community Science in Action

Community Science is With, not For.

- Power of including all voices (who is at the table?)
- Creativity and patience in defining a problem
- Many people won’t share your priorities as a scientist. However, science can help them reach those priorities in ways that also tackle yours.

AGU THRIVING EARTH EXCHANGE

Mapping Natural and Developed Resources to Encourage Responsible Growth

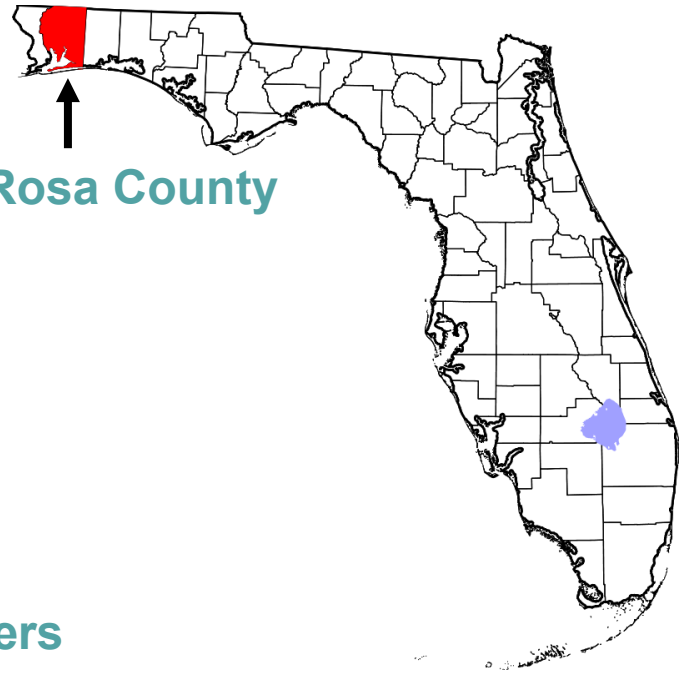
Santa Rosa County, Florida

Image credits: Elisabeth Pavlick

Scope:

AGU THRIVING EARTH EXCHANGE

Define a project that uses Earth and space science to advance community priorities.



- What strengths does the community have?
- What are the community's challenges and priorities?
- How do they connect to Earth and space science?
- How could a scientist contribute?

Project Partners

Anthropocene Alliance

CLIMATE COST PROJECT

Match:

AGU THRIVING EARTH EXCHANGE

Recruit a pro-bono scientist to co-lead the project with community leader(s).

What kind of scientist is needed for this project?

What skills should they have?

Amy Richardson
Geologist

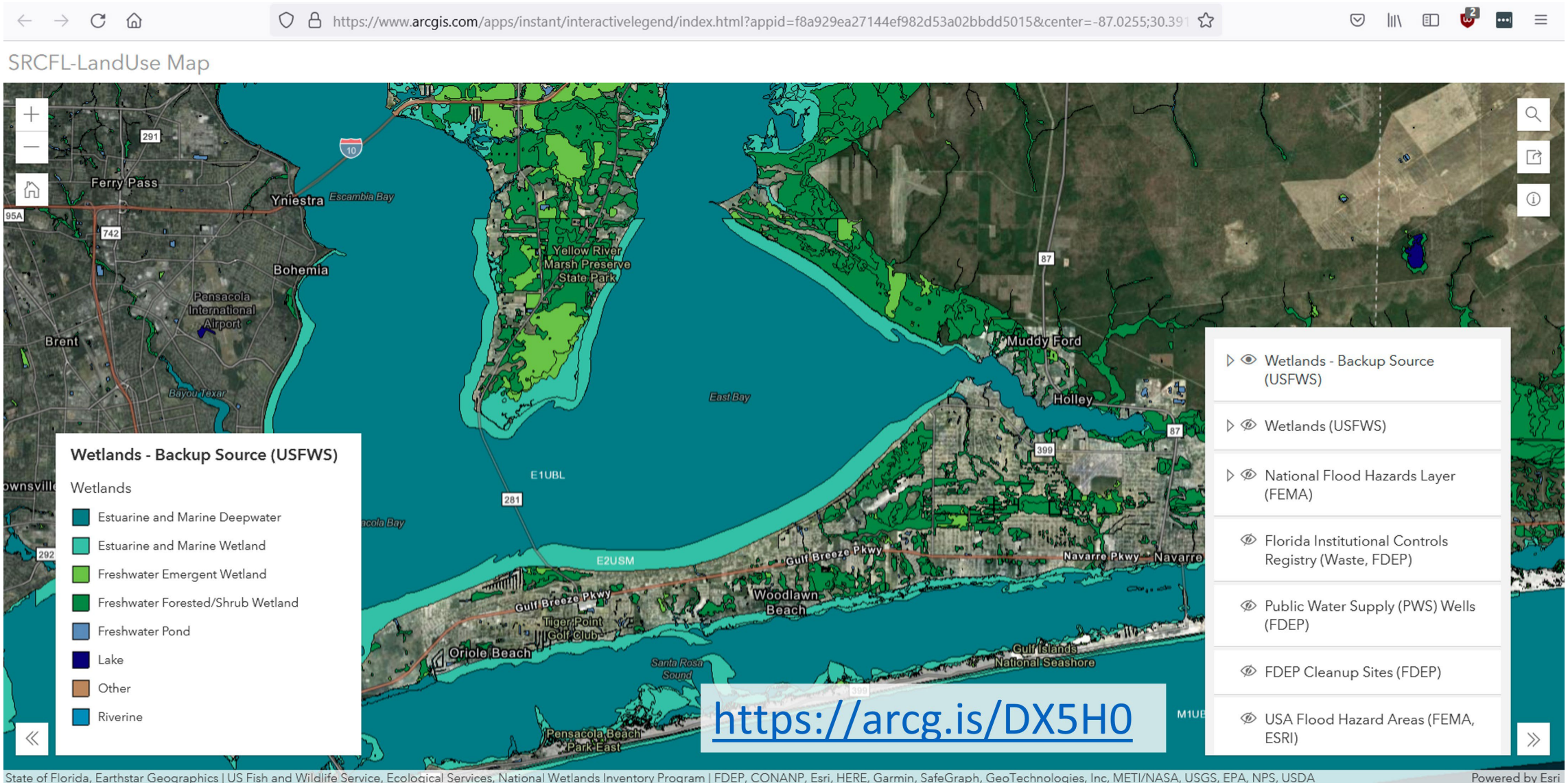
Chris Curb
Stormwater Engineer,
FloodDefenders.org

Ryan Kmetz
Climate Resilience
and GIS Professional

Solve:

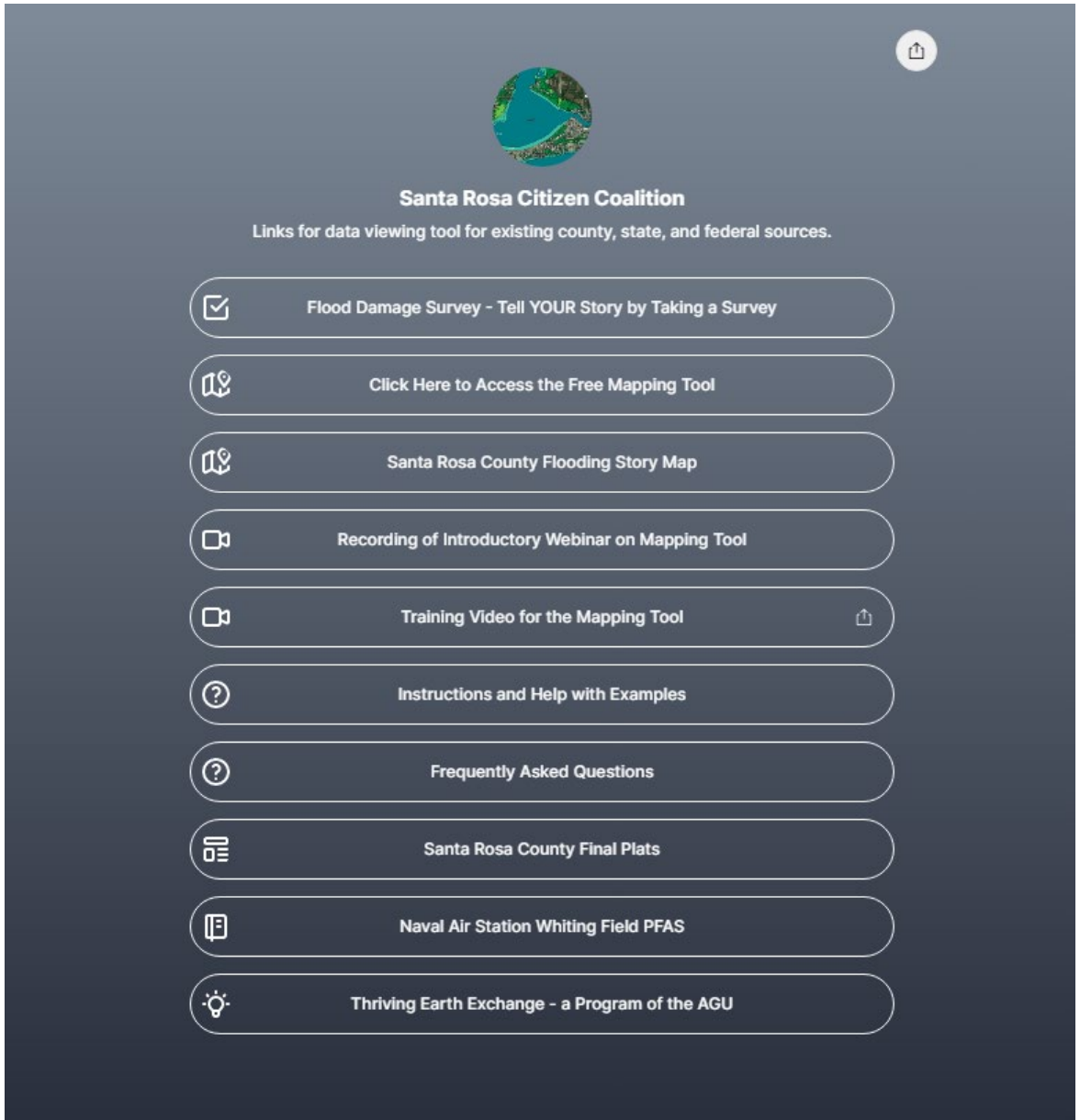
AGU THRIVING EARTH EXCHANGE

Provide ongoing coaching and connections to make an impact

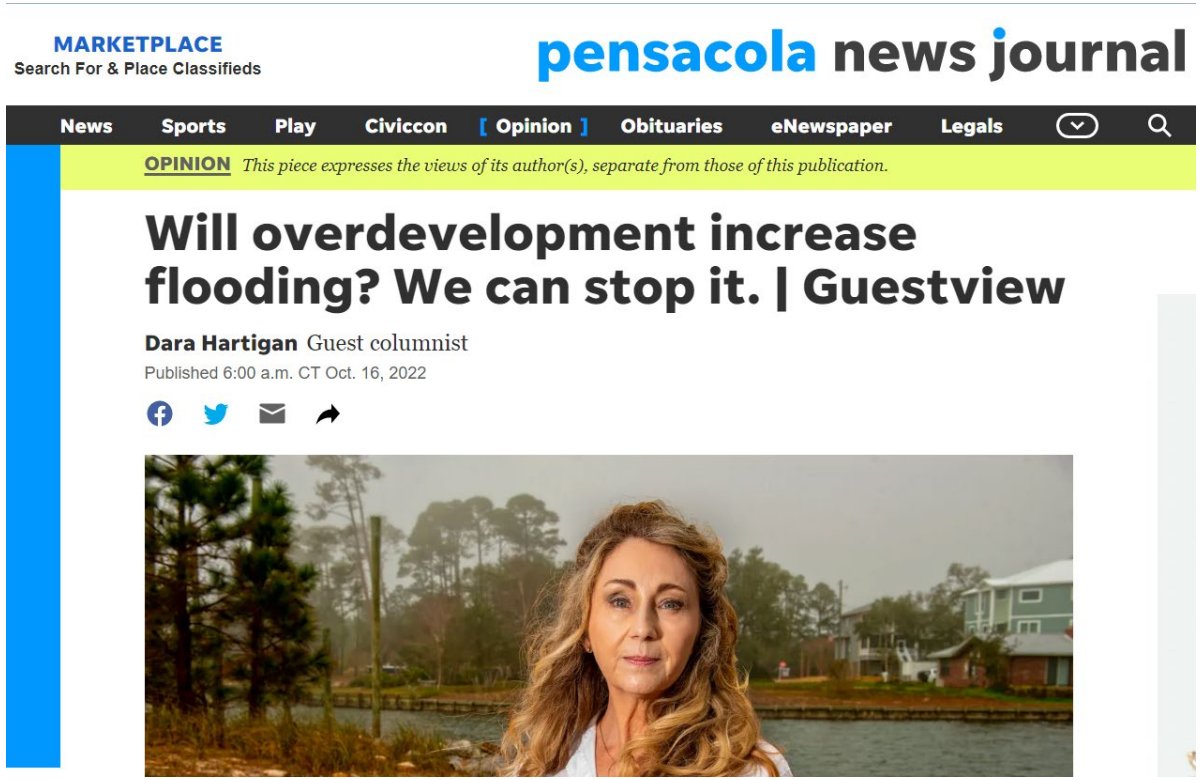


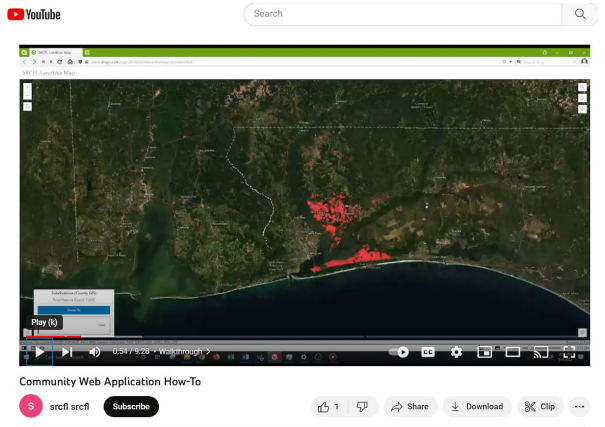
Share:
Celebrate successes and exchange methods

AGU THRIVING EARTH EXCHANGE



https://linktr.ee/santarosacitizens





Addressing the Public Health Effect of Well Water Contamination by Naturally Occurring Uranium

Glastonbury, CT

AGU THRIVING EARTH EXCHANGE

Scope:

AGU THRIVING EARTH EXCHANGE

Define a project that uses Earth and space science to advance community priorities.

- What strengths does the community have?
- What are the community's challenges and priorities?
- How do they connect to Earth and space science?
- How could a scientist contribute?

Richard J. Johnson, Glastonbury Town Manager

Wendy S. Mis, Glastonbury Director of Health

Match:

Recruit a pro-bono scientist to co-lead the project with community leader(s).

What kind of scientist is needed for this project?

What skills should they have?

Hari Kandel, Lake Superior State University

Rachel Coyte, Duke University

Solve:

AGU THRIVING EARTH EXCHANGE

Provide ongoing coaching and connections to make an impact

What did we find out?

The original source is likely Glastonbury Gneiss, a type of bedrock known to contain uranium.

Geology and geochemistry change over time, allowing uranium to enter into the surrounding groundwater.

Since the underlying geology is fractured, water quality prediction for individual wells is unreliable.

70% of the wells with uranium concentrations > 30 ppb are deeper than 400 ft.

Next Steps: Citizens

Submit test results from untreated well water to the Glastonbury Health Department.

Next Steps: Town

Work with consulting firm Tighe and Bond to evaluate opportunities to extend public water service to areas with high uranium levels.

Share:
Celebrate successes and exchange methods

AGU THRIVING EARTH EXCHANGE

Our Community » About Us » PR & Communications » Town Updates »

News

Town and TEX finalize Scientific Report Regarding Uranium in Glastonbury Well Water

Post Date: 06/23/2021 8:35 AM

In 2018 and 2019, the Town of Glastonbury was notified by homeowners from the Minnechaug Mountain and Chestnut Hill Corridor sections of town that they had detected elevated levels of naturally occurring uranium in their well water. In response to these concerns, the Town engaged Thriving Earth Exchange (TEX) to study the naturally occurring uranium observed in groundwater in these sections of town. TEX connects communities with scientists and supports them as they work collaboratively to tackle local challenges related to natural hazards, natural resources, and climate change.

AGU THRIVING EARTH EXCHANGE

Developing Strategies for Mitigating Heat Islands in La Crosse, WI

City of La Crosse, WI

Image credits: City of La Crosse

Scope:

AGU THRIVING EARTH EXCHANGE

Define a project that uses Earth and space science to advance community priorities.

- What strengths does the community have?
- What are the community's challenges and priorities?
- How do they connect to Earth and space science?
- How could a scientist contribute?

Lewis Kuhlman
City of La Crosse Environmental Planner

Match:

Recruit a pro-bono scientist to co-lead the project with community leader(s).

What kind of scientist is needed for this project?

What skills should they have?

Generally, the project team is looking for team members who can brainstorm options and provide:

- **Policy options for mitigating heat islands in the city**
- **Plan a pilot project to test out different strategies**
- Knowledge of which **tree species** will be best suited for La Crosse's climate

Learn more about the project and apply here:

https://thrivingearthexchange.org/project/city-of-la-crosse-wi

Get Involved

AGU THRIVING EARTH EXCHANGE

AGU Thriving Earth Exchange is a program where you can practice these skills AND contribute to positive impact in communities at the same time

Join us as a Community Scientist

We'll connect you to community groups that need your scientific knowledge, skills and network.

- All career stages welcome
- Requirements vary project-by-project
- Selection on rolling basis

Join us as a Community Science Fellow

We'll train you in Thriving Earth Exchange's community science approach and support you in managing a project.

- All backgrounds and career stages welcome
- Three trainings in 2023!

Thank You

thrivingearthexchange@agu.org

@ThrivingEarth
www.ThrivingEarthExchange. org