

Annex B

Final Technical Report: LEQSF-EPS(2022)-RAP-40 Assessing NASA's Open Science Outlook for Environmental Justice and Resilience of the Louisiana Gulf Coast (OSO-LoGiC)

In this annex, you will find presentations given at **American Geophysical Union (AGU) Fall Meeting Chicago – December 2022 & Tulane Research, Innovation and Creativity Summit, New Orleans, March 1-2, 2023:**

1. Open Source Science as a Service; Learning from the Communiversity-model for equitable and sustainable engagement with underserved and environmental justice communities
 - a. Abstract_OSSAS_AGU22.pdf
 - b. Presentation: AGU_OSSAS_Morrow_12_14.pdf
 2. Assessing NASA's Open Source Science Outlook for Environmental Justice and Resilience of the Louisiana Gulf Coast (OSO-LoGiC)
 - a. Abstract_OSO_logic_AGU22.pdf
 - b. AGU_OSO_12_14.pdf
 3. Assessment of the Gulf Coast Environmental Justice Landscape for Equity (AGEJL-4-Equity)
 - a. Abstract_AGEJL_AGU22.pdf
 - b. AGU_AGEJL_dec2022.pdf
- B2. Tulane Research, Innovation and Creativity Summit, New Orleans, March 1-2, 2023
1. OSO-Logic Poster
 - a. PDF of poster
 2. AGEJL-4-Equity poster
 - a. PDF of poster
 3. TRICs_pictures

American Geophysical Union Fall Meeting December 12th, 2022

GH15A-06 - Assessing NASA's Open Source Science Outlook for Environmental Justice and Resilience of the Louisiana Gulf Coast (OSO-LoGiC)

Abstract

Environmental injustice persists, in part, when observations are unable to promote collective understanding and present patterns of harm in ways that decision makers cannot ignore. Individual complaints and marginalized voices too often lack accessible scientifically valid processes to aggregate evidence for sustainable and consequential action. Negative wellbeing outcomes for people and damage to the planet are frequently unmeasured and consequently go unaccounted for. Open Source Science broadens participation in the scientific process for more equitable policy response. Perhaps most importantly for resilience-oriented policy and policy implementation, Open Source Science inclusion of the private sector, public entities, academia and citizens builds common trust in the evidence that informs decisions and policy dialogues. The synoptic observational power of NASA data products to address domestic challenges remains largely underutilized even as it has played a decades long role in global monitoring of Earth system changes or informing resilience programing for agencies like USAID in planning international cooperation or emergency response. Increased temporal and spatial resolution of NASA data streams make previous research on global issues like climate change now tractable for decision support at more local levels. The resilience of the Louisiana Gulf Coast with a broad diversity of communities facing a wide-range of environmental challenges could potentially benefit the most as well as provide real world assessment of opportunities for value addition to NASA investments with greater inclusive and equitable engagement in Open Source Science. The OSO-LoGiC project assessed, with participatory engagement of the EJ organizations, to what extent Open Science can advance the impact of NASA investments to further equity, environmental justice, and resilience outcomes and their measurement in Louisiana. This work builds on Louisiana's comparative advantages as an established resilience science hub (environment, disaster, social, costal, and health sciences) and emergent 'Silicon Bayou' technology hub (data, decision support, and citizen science) to outline potential synergies of Open Source Science and Environmental Justice for improved resilience policy and policy implementation.

OSO-LoGiC

Assessing NASA's Open Science Outlook for Environmental Justice and
Resilience of the Louisiana Gulf Coast

(supported by NASA EPSCORPS and LA Board of Regents Support Fund)

AGU December 2022



LOUISIANA NASA EPSCoR



Open Source Developers Per Capita (Wachs et al., 2022)

rank	state	count_github	count_twitter	count_total_contributors	population	contributors_per_100k
1	WA	9767	943	10710	7705281	139.00
2	OR	4003	471	4474	4237256	105.59
3	MA	5713	651	6364	7029917	90.53
4	CO	4498	432	4930	5773714	85.39
5	CA	27164	3011	30175	39538223	76.32
...
46	LA	422	69	491	4657757	10.54
47	AR	275	31	306	3011524	10.16
48	SD	75	8	83	886667	9.36
49	AL	391	66	457	5024279	9.10
50	MS	155	24	179	2961279	6.04

DataDriven NOLA – Open Data at City of New Orleans



Office of Information Technology & Innovation | City of New Orleans
Open Data Analytics for data.nola.gov

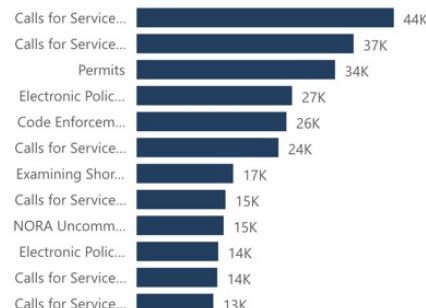
[Visit DataDriven for more information about our Open Data program](#)

207
datasets

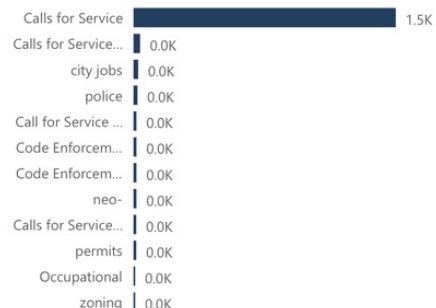
Downloads



Visits

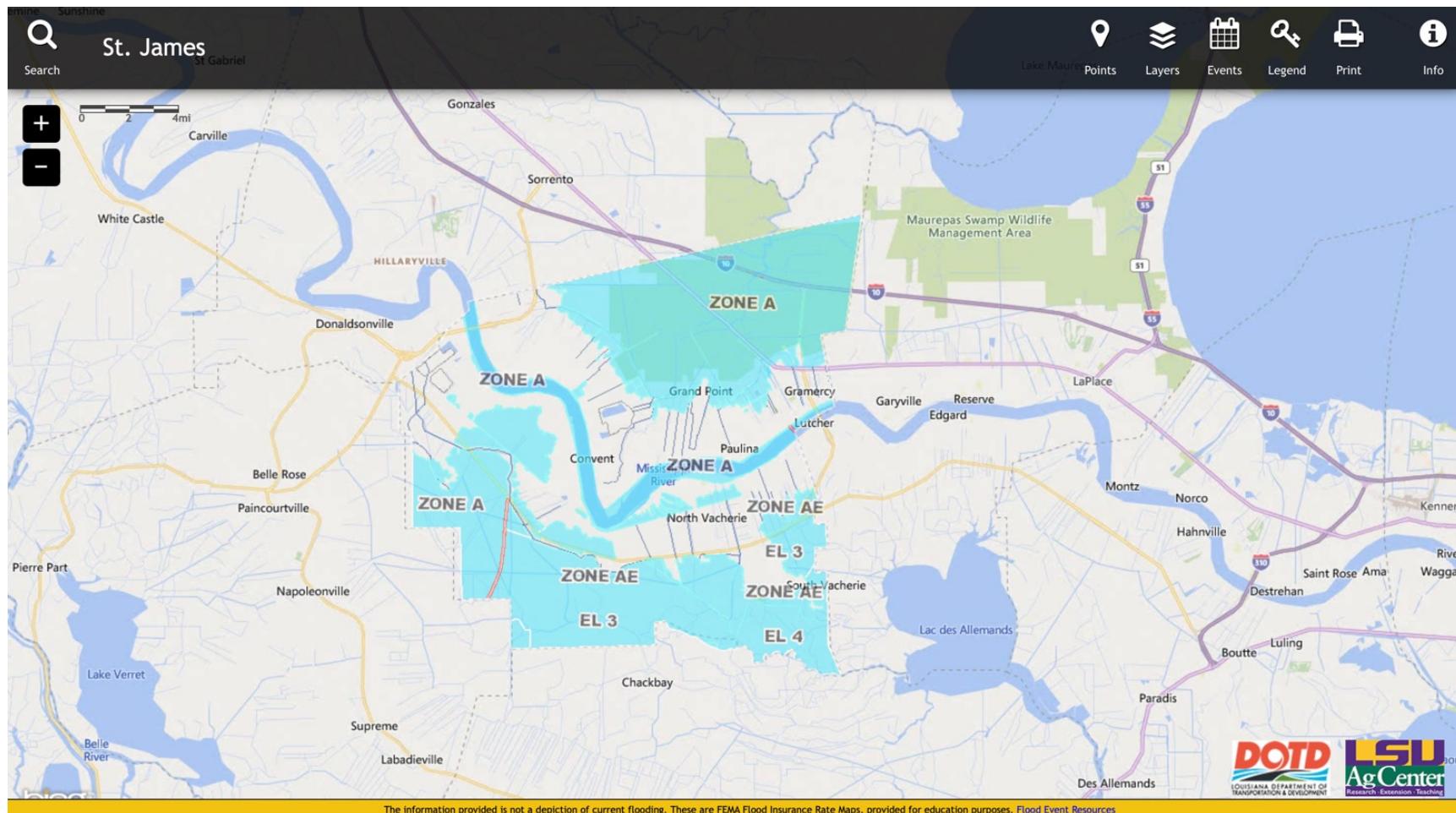


Search terms



Dataset	Category	Department	Created on	Last updated on	Visits	Downloads	ID
Grocery Stores		Revenue	23/01/2018	13/11/2020	423	362	s98n-tfyf
Food Truck Zones	Customer Service	Safety and Permits	23/01/2018	13/11/2020	160	264	qqun-pgv6
Restaurants		Revenue	25/01/2018	13/11/2020	458	578	yc3w-jdut
Business Associations		Revenue	24/01/2018	13/11/2020	96	207	j93p-az7f
Parcels		Information Technology and Innovation - Enterprise GIS	26/01/2018	13/11/2020	1162	628	4tiv-n7fd
Literary Arts and Humanities	Arts, Culture, History	Cultural Economy	06/07/2018	13/11/2020	90	152	b7m3-7nub
Police Districts			29/11/2017	13/11/2020	458	382	qbhf-vwma
Design Non-profits	Arts, Culture, History	Cultural Economy	06/07/2018	13/11/2020	77	171	7k4x-f3cn

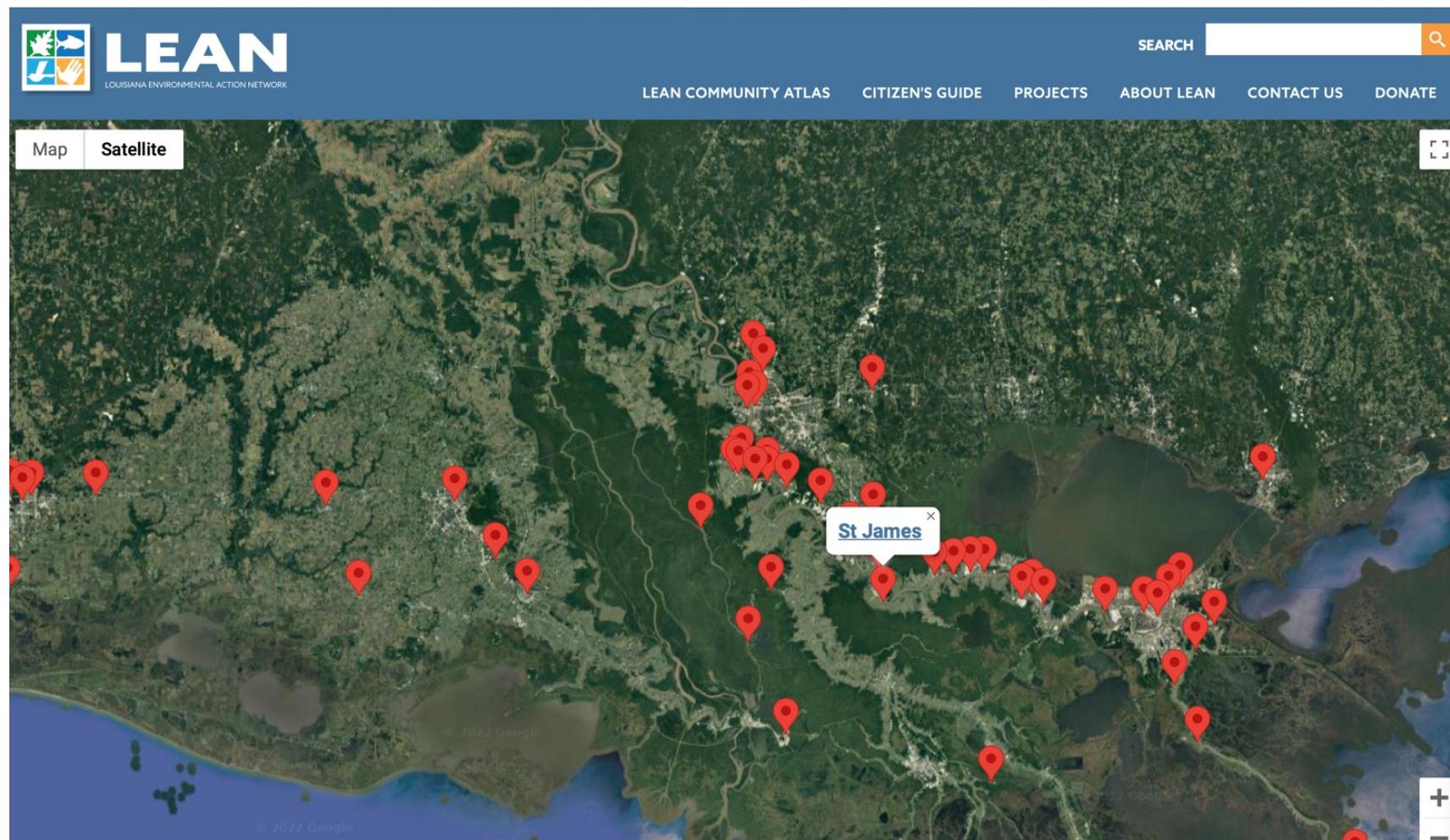
Flood Maps by Parish or Location – Louisiana



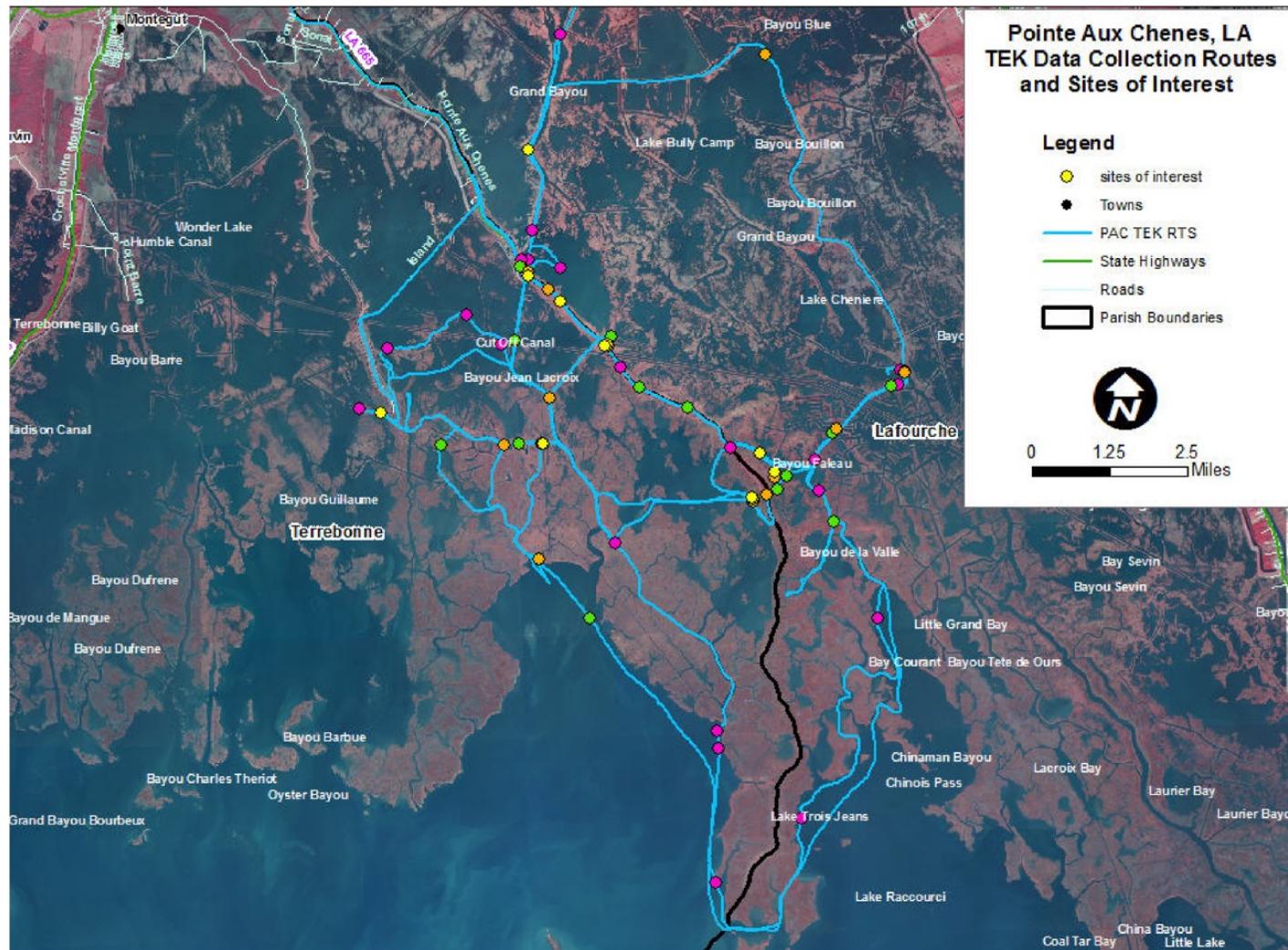
Literature Review – Louisiana and Environmental/Climate/Economic/Racial Justice

PubMed Database					
1975-2022	Each Justice Term	Each Justice term AND Louisiana	% LA in specific Justice term	%of alll Justice terms	
Environmental Justice	3040	45	1.5	0.07	
Climate Justice	813	12	1.5	0.02	
Economic Justice	8929	26	0.3	0.04	
Racial Justice	1850	25	1.4	0.04	
Total	14632				
Web of Science - DB					
1976-2022	Each Justice Term	Each Justice term AND Louisiana	% LA in specific Justice term	%of alll Justice terms	
Environmental Justice	16554	123	0.7	0.07	
Climate Justice	6443	44	0.7	0.03	
Economic Justice	14390	53	0.4	0.03	
Racial Justice	7316	62	0.8	0.04	
Total	44703				

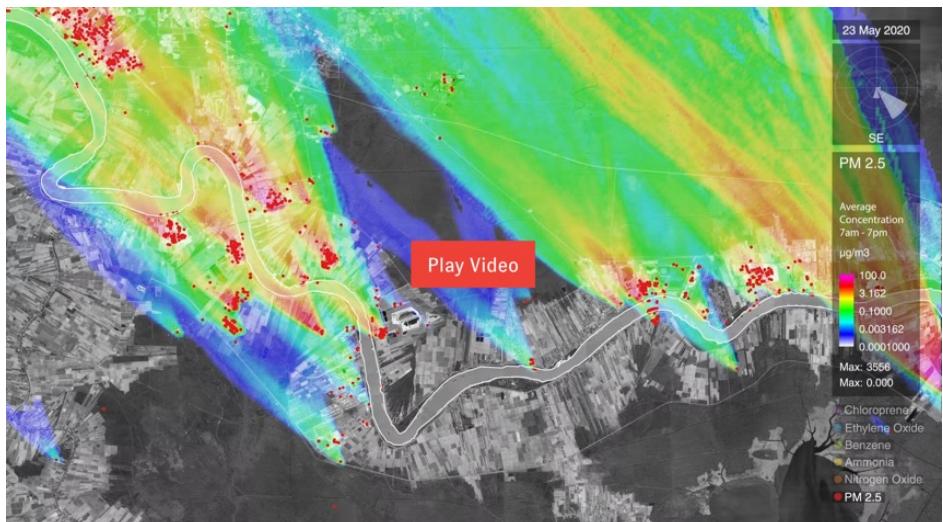
Louisiana Environmental Action Network



Mapping risk factors to climate change impacts using traditional ecological knowledge to support adaptation planning with a Native American Tribe in Louisiana -- Bethel et al. 2022
The Pointe-au-Chien Indian Tribe, <https://www.lowlandercenter.org/>



Environmental Racism in Death Alley Project



- Rise Saint James in partnership with:
 - Center for Constitutional Rights (CCR)
 - Center for International Environmental Law (CIEL)
 - The Descendants Project
 - Earthworks
 - Healthy Gulf
 - Imperial College London
 - Louisiana Bucket Brigade
 - The Human Rights Advocacy Project (HRAP),
 - Loyola New Orleans College of Law
 - The Ethel and Herman L. Midlo Center for New Orleans Studies
 - Louisiana Museum of African American History
 - Whitney Plantation Museum



Dr. Beverly Wright's Communiversity Model:

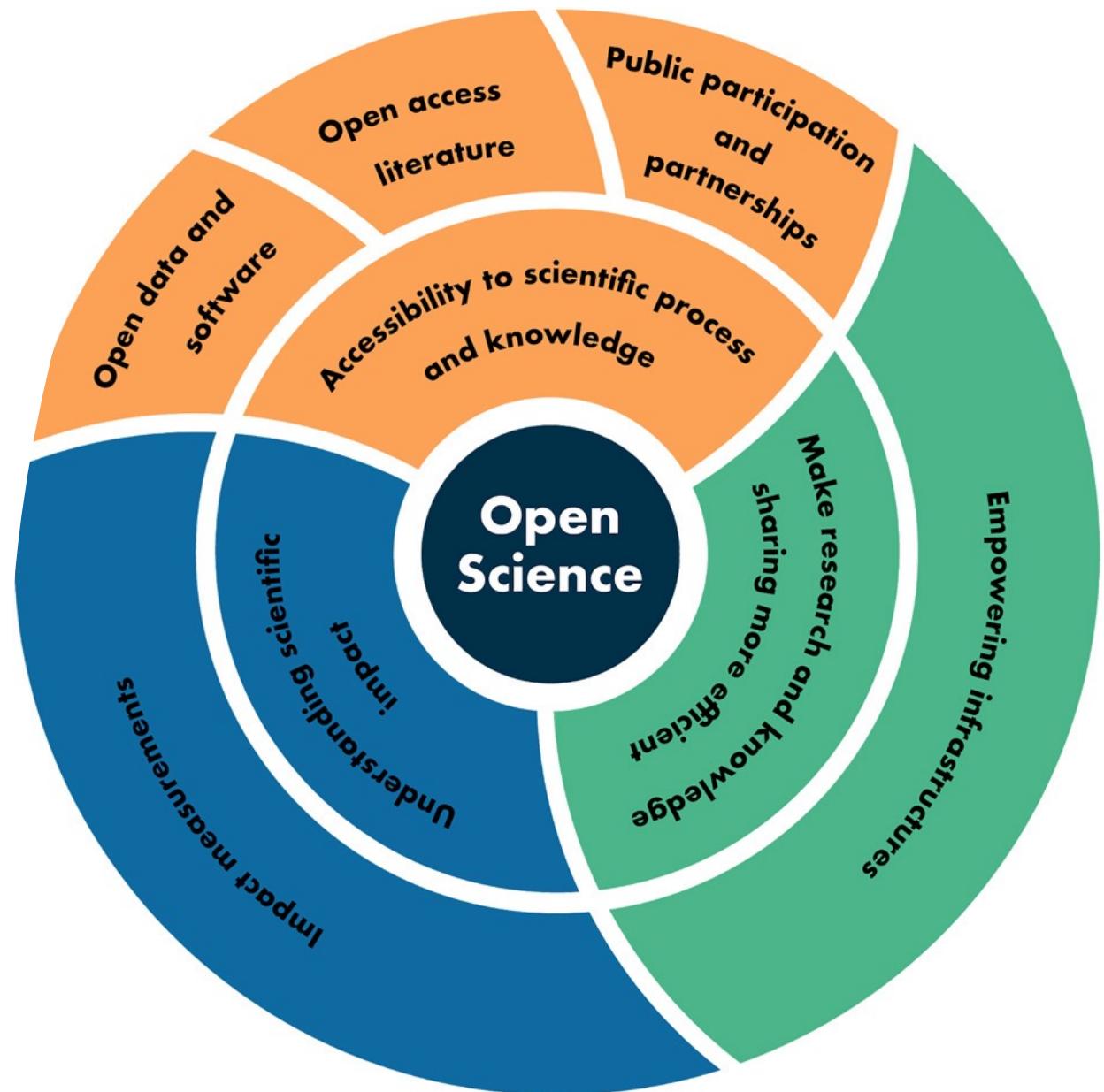
A community university partnership model that sets guidelines and establishes processes for ensuring an equal voice in the partnership among community members and academic researchers.

fully embraces the Environmental Justice Principle:
"We speak for ourselves," -- the bedrock of self-determination.



Beverly L. Wright, Ph.D
Founder & Executive Director





Ramachandran, R., Bugbee, K., & Murphy, K. (2021). From open data to open science. *Earth and Space Science*, 8, e2020EA001562.
<https://doi.org/10.1029/2020EA001562>

Next steps

- Check-in with EJ & CJ organizations in LA
 - Ground truth some state of Open Science assumptions and assertions
 - Invite to an Open Source Sceince workshop in Feb 2023
- Support pilots of community-led Open Source Science with capacity develop approach and open source mapping tools
- Produce a paper on the potenial of Open Source Sceince for more sustainable production, sharing, and use of EJ/CJ relevant knowldge in Louisiana

American Geophysical Union Fall Meeting December 12th, 2022

SY36B-06 - Open Source Science as a Service; Learning from the Communiversity-model for equitable and sustainable engagement with underserved and environmental justice communities

Abstract

Scientific agencies are increasing efforts to involve a diversity of Americans in researching solutions to the challenges, beginning with Climate Change, that affect their lives. Policy makers and agency leaders recognize more inclusive science processes promote greater consensus around the evidence base for policy formation that in turn advances collective action. Environmental Justice (EJ) leaders have pioneered participatory engagement models, such as the Deep South Center for Environmental Justices' "Communiversity Model." The Communiversity Model represents an innovative approach for understanding and assessing environmental issues with emphasis on specific problems that exist due to the disproportionate impact on minority communities. The approach is unique in that it fosters collaboration with, and equal partnership between, communities and universities. The partnership promotes bilateral understanding and mutual respect between community residents and academicians. The Communiversity approach helps to engage, offer technical assistance, and build the capacity of underserved and Environmental Justice (EJ) communities. At the same time, Open source science projects have consistently harnessed the enthusiasm of volunteer communities to produce high quality solutions to address a shared challenge. However, both EJ and Open Source communities face challenges in equitable incentives and rewards for participation. The NASA-funded EJ research project -- Assessment of the Gulf Coast Environmental Justice Landscape for Equity (AGEJL-4-Equity) – convened four environmental justice networks and “Communiversity” proved a flexible format to reflect on the potential of NASA Open Source Science and data products. This research into the links between Open Source Science, equity, and environmental justice engaging with an evidence-based process leveraging Open, Earth, and related geospatial, historical/political or socio-economic science may demonstrate practical pathways for realizing sustainable and more equitable program benefits for underserved communities that we have termed “Open Source Science as a Service”.

Open source Science as a Service (OsSaS)

AGU Chicago, December 14th 2022

Nathan Morrow, David Padgett & Beverly Wright

“There is no universal solution, but there is a universal process to find appropriate local solutions.”

-Carl Taylor

Now Decades of Open Source Geospatial Projects

- **Oil Spill Crisis Map**
 - Louisiana Bucket Brigade I-witness pollution map
 - <https://labucketbrigade.org/pollution-tools-resources/iwitness-pollution-map/>
- **Ushahidi Haiti Project Evaluation**
 - Crisis mapping of Haitian Earthquake 2010
 - <https://irevolutions.org/2013/02/26/haiti-lies/>
- **GEONETWORK**
 - Metadata search catalog for spatial data
 - <https://geonetwork-opensource.org/>



GeoNetwork screenshots

This paragraph lets a visual representation of some of the main functionalities of GeoNetwork.

Search



Map Viewer



Find & Get information

Make your maps

New record

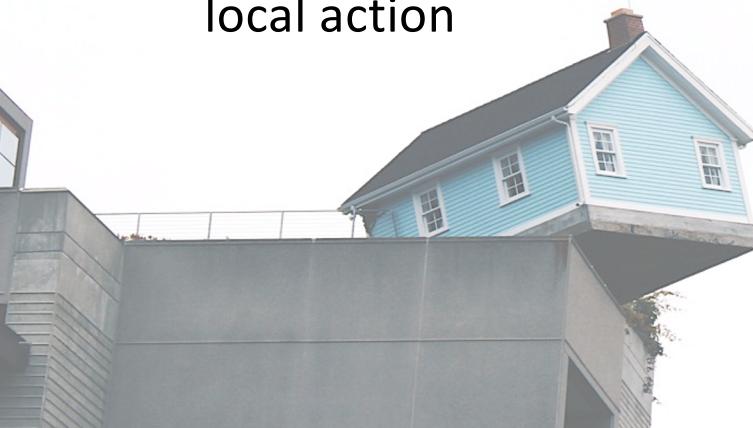
The Editor



Mixed results of open source community engagement and open science approaches

Digital humanitarian tendencies

- Technological convergence
- Participatory production and exchange – co-creation of solutions
- New data streams to complement monitoring assessment
- Full rich capture of experience
- Empowers relevant and sufficient local action



Techno-colonialist tendencies

- Data monopolies of leading platforms
 - Top-down approaches limit local use and value
- Bias & undervaluing of local perspectives and pathways
- Continued questioning of validity
 - Sampling & marginalized communities
- Innovation fatigue – lack of coherence – difficulty scaling
- Ushahidi Haiti Project could be considered undeclared & unauthorized experiment on Haiti

Decades of Equitable EJ Research

Dr. Beverly Wright's Communiversity Model

- Environmental Justice Principle:
 - “We speak for ourselves,” -- the bedrock of self-determination
- Goals
 - Strengthened communities
 - Relevant, Efficient and Effective Research Resources
 - Evidence for inclusive & equitable decision making
- Effective research and policy-making must value:
 - community life experiences regarding environmental insult
 - integrate experience with the theoretical knowledge from academics, educators and researchers
 - maintain a non-threatening environment





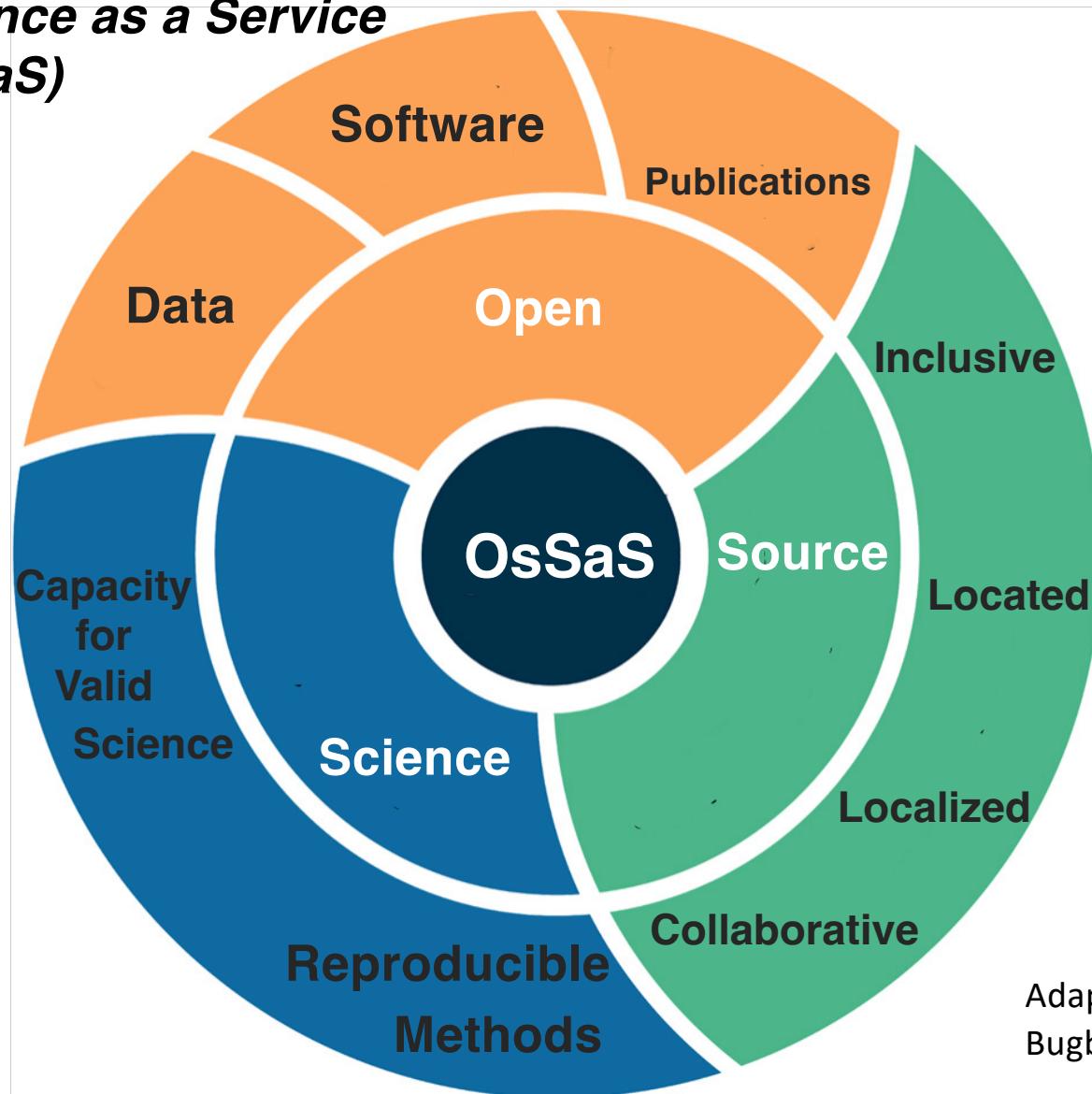
Dr. Beverly Wright's Communiversity Model: Research Frame for our AGEJL-4-Equity Project

- Deep South Center for Environmental Justice
 - Providing leadership of network engagement, administering resources, ensuring integrity of design
- Capacity Development (Tulane, Dr. Padgett)
 - Assessment and prioritization of hazards, risks, harms
 - Inventory environmental data and identify gaps
 - Rights and the duties of communities and governmental agencies
 - Capacity requirements to advance evidence-based strategic advocacy

Beverly L. Wright, Ph.D
Founder & Executive Director



Open source Science as a Service (OsSaS)



Adapted from Ramachandran,
Bugbee and Murphy, 2021

Incentives for Open Source Science in EEJ research?

Previously

- Reward through your own job as researcher or consultant
- Funder mandate

Open source science as a Service (OsSaS) as the emerging model

- Meets requirements for contracting with public funds

Open source Software as a Service(SaaS)



Updates complied w/distribution notes



Capacity development
and certification

Standards
Rights
Quality



Access to guidance and tools



Super user support



Community and network engagement

OsSaS: Open Source Science as a Service

- Broad inclusive engagement
 - Support for networks and backbone projects
 - Foster community/local institutions and university partnerships
- Capacity development frame for engagement (Wright's 'Communiversity' or Taylor's 'Seed&Scale')
 - Situational awareness, monitoring and exploratory investigations of patterns of harm and root causes
 - On-going inclusive appraisal of existing capacities, resources and information
 - Resilience and vulnerability participatory mapping led by & maintained in local institutions
 - Open access platforms: rights & duties of communities, governmental and civil society
 - Resourcing capacities to advance evidence-based strategic advocacy and response action
- Leverage open source science community and resources
 - Platforms and tools
 - Backstopping and outreach
 - Co-creation of solutions
 - Communication, mobilization and advocacy

American Geophysical Union Fall Meeting December 12th, 2022

**GH15A-07 - Assessment of the Gulf Coast Environmental Justice Landscape for Equity
(AGEJL-4-Equity)**

Abstract

Environmental damage and climate change related hazards are unequally distributed in communities on Earth in patterns that are often observable from space. Since the earliest investigations of the disproportionate burden of environmental ills sited in marginalized and disempowered communities, it has been clear that EJ community context, stakeholders, issues and drivers differ from one region to another. The purpose of the AGEJL-4-Equity project is to improved capabilities and recognition of EJ community members to use Earth science, including NASA open science, as an evidence base to frame EEJ decision making and solutions in an inclusive and scientifically valid way. Comparative analysis helps to appreciate this important diversity of experience to highlight evidence gaps such as the intersection of hurricane vulnerability and point source pollution on the Gulf Coast. Using participatory mapping tools developed and supported with a common multi-disciplinary multi-perspective EEJ analytical frame, four Equity and Environmental Justice (EEJ) networks convened to map Southern Gulf Coast, primarily African American, underserved EJ communities and their priorities: the National Black Environmental Justice Network, the Historically Black College and University-Community Based Organization Gulf Coast Equity Consortium, the Deep South Center for Environmental Justice (DSCEJ) Community Advisory Board, and the Environmental Justice Forum. The EEJ networks received capacity development-centered support through an Earth science-focused adaptation of the tried-and-true Communiversity participatory assessment model. Together, the project mapped underserved EEJ stakeholder communities, EEJ priorities, ways of working, and knowledge of Earth science-based evidence to advance EEJ decision-making and action presented in a comprehensive network-landscape analysis.

AGEJL-4-Equity

Assessment of the Gulf Coast Environmental Justice Landscape for
Equity

Dr. David Padgett, Dr. Nathan Morrow, Dr. Beverly Wright





“There is a need for additional discussion about how to work together and collaborate more broadly around a movement toward climate and environmental equity and justice in the South. The South offers lessons about some of the worst environmental challenges and most severe disasters in the nation. These lessons learned can inform work on these issues across the nation.” – Catherine Coleman Flowers (NAS, 2021)



AGEJL-4-Equity

- Convenes four Equity and Environmental Justice (EEJ) to map Southern Gulf Coast, primarily African American, underserved EJ communities and their priorities:
 - the National Black Environmental Justice Network,
 - the Historically Black College and University-Community Based Organization Gulf Coast Equity Consortium,
 - the Deep South Center for Environmental Justice (DSCEJ) Community Advisory Board, and
 - the Environmental Justice Forum.
- Adapt Dr. Beverly Wright's Communiversity model for NASA-relevant landscape analysis



Dr. Beverly Wright's Communiversity Model:

A community university partnership model that sets guidelines and establishes processes for ensuring an equal voice in the partnership among community members and academic researchers.

fully embraces the Environmental Justice Principle:
"We speak for ourselves," -- the bedrock of self-determination.



Beverly L. Wright, Ph.D
Founder & Executive Director



About Dr. Beverly Wright's Communiversity Model

Acknowledges effective research and policy-making must value:

- community life experiences regarding environmental insult
- Integrate experience with the theoretical knowledge from academics, educators and researchers
- maintain a non-threatening environment



Operationalizing the Communiversity Model for NASA: A.49 Earth Science Applications Equity and Environmental Justice (EEJ)

1. Advance Information

1. Engage and capacitate four EEJ networks to map underserved EEJ stakeholder communities, priorities, ways of working, and knowledge of Earth science
2. Co-create a network-landscape analysis suitable for presentation to diverse audiences

2. Advance Organizations -- Convene meeting of EJ networks:

- a. Compare and overlay EEJ network community mapping results
- b. Dynamic visualize and synthesize evidence for joint landscape analyses
- c. Interrogate geo-spatial, socio-economic and earth science data, highlighting NASA products and open source science resources
- d. Address gaps in evidence and potential utility of NASA-related missions

3. Advance Integration –

1. Synthesize learning, reporting on barriers/opportunities and community assets unique to the Gulf Coast context
2. Next steps to advance EJ organizations

Key Learning from AGEJL-4-Equity kickoff meeting

AGEJL-4-Equity Kick off meeting – Hosted by the Deep South Center for Environmental Justice 10/15/2022

Key learning during meeting:

- **Integrity** in engagement is fundamental to successful work with EEJ communities
- **Community voices and multiple perspectives** provide framework for understanding EEJ problems in context
- **Fair data access and results dissemination** primary concern of EEJ communities and organizations



Dr. Wright and Ty Bradley at kickoff meeting
-10/15/2022

ASSESSING NASA'S OPEN SCIENCE OUTLOOK FOR ENVIRONMENTAL JUSTICE AND RESILIENCE OF THE LOUISIANA GULF COAST (OSO-LOGIC)

Kodsup P.^a, Morrow N.^b, Bradley T.^a

^aDepartment of Environmental Health Sciences
^bDepartment of International Health and Sustainable Development
School of Public Health and Tropical Medicine, Tulane University



INTRODUCTION

Environmental injustice persists because it too often goes unobserved. Individual complaints and marginalized voices too often lack scientifically valid processes that can aggregate evidence for sustainable and consequential action.

Open Science broadens participation in the scientific process with tangible benefits of increased value for money, faster innovation, and equitable policy response. Open Science inclusion of the **private sector, public entities, academia and citizens** builds common trust in the evidence that informs decisions and policy dialogues.

The resilience of the Louisiana Gulf Coast with a broad diversity of communities facing a wide-range of environmental challenges could potentially benefit the most as well as provide real world assessment of opportunities for value addition to NASA investments with greater inclusive and equitable engagement in Open Science.



The OSO-LOGIC is part of the NASA's newest initiative element of the Earth Sciences Division (ESD) to advance equity by focusing programmatically on underserved communities, redoubling efforts to understand domestic impacts of environmental and climate change, and intentionally promote diversity, inclusion and accessibility.

OBJECTIVE

To assess the focus points of environmental justice, climate justice, economic justice, and racial justice peer reviewed literature over time. We compare multiple databases to make detailed review of database differences when searched with the same criteria



Figure 1. Three key domains of Open Science and their program elements from program elements from Ramachandran, Bugbee & Murphy "From Open Data to Open Science" in Earth and Space Science Volume 8(5) 2021

OVERVIEW METHOD

Literature Review

Remote sensing of Louisiana Gulf Coast Resilience with NASA products

Open science for Equity & Environmental justice in Louisiana Gulf Coast

Stakeholder Mapping

Environmental justice initiatives, organizations, communities in LA

Open Science initiatives in LA

Open Science Capacity Assessment

Survey, Interview, Conference

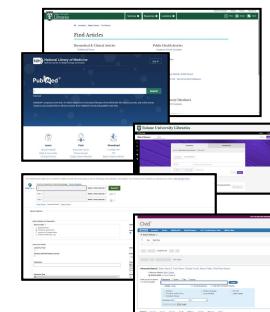
Strategy Analysis

Synthesis of Open Science capacity Assessment and Environmental Justices Information

Presentation to NASA HQ & Publication

LITERATURE REVIEW METHOD

1. Select database services from Rudolph Matas Library of the Health Sciences



2. Select keyword combinations: [Peer-Reviewed Filter]

(TS = ("Gulf Coast") AND TS = ("Louisiana") AND TS = ("Justice Term"))

Search 1:

(Gulf Coast) AND (LOUISIANA) AND (Environmental Justice)

Search 2:

(Gulf Coast) AND (LOUISIANA) AND (Climate Justice)

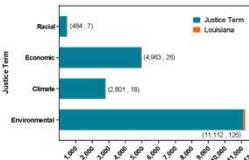
Search 3:

(Gulf Coast) AND (LOUISIANA) AND (Economic Justice)

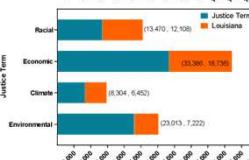
Search 4:

(Gulf Coast) AND (LOUISIANA) AND (Racial Justice)

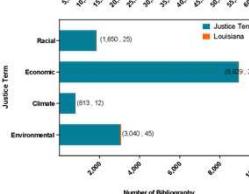
RESULTS



EBSCO



Pro Quest



PubMed

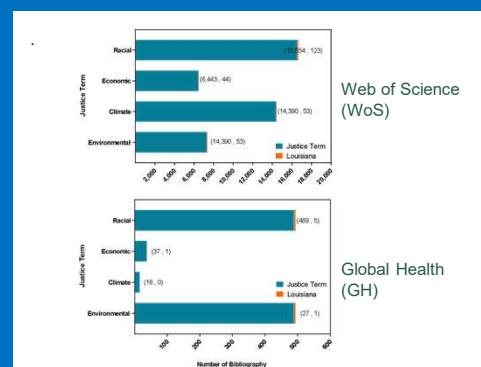


Figure 2. Results from database search using keywords Gulf Coast and Louisiana and Justice term retrieved from database service: a) EBSCO, b) Pro-Quest, c) PubMed, d) Web of Science, and e) Global Health
Note: Environmental Justice (EJ); Economic Justice (ECONJ); CMJ (Climate Justice); Racial Justice (RJ)

Search 1:

- Yielded 7, 13, 3, 3, and 12 results in PubMed, WoS, GH, EBSCO, and ProQuest, respectively.

Search 2:

- Yielded 3 and 1 results in WoS and ProQuest, respectively, zero result found in GH and EBSCO

Search 3:

- Yielded 3, 5, and 1 results in PubMed, WoS, and ProQuest, zero result found in GH and EBSCO

Search 4:

- Yielded 1,2, and 3 results in PubMed, WoS, and ProQuest, zero result found in GH and EBSCO

CONCLUSIONS

- Based on the literature review results, comparing between five scientific database services, we found that the results of "Economic Justice" peer-reviewed articles were the highest rate compared to other terms.

- "Environmental Justice" peer-reviewed articles were the lowest rate (0-0.3%).

- The peer-reviewed articles in "EJ, ECONJ, CMJ and RJ" in respective databases contributed to roughly 0.3% - 1.5% in Louisiana's Gulf Coast. Therefore, more studies are necessary.

ACKNOWLEDGEMENTS

Research Awards Program (RAP) of the NASA EPSCoR Research Infrastructure Development (RID) Project sponsored by: NASA & the Louisiana Board of Regents (BoR) with Technical & Management Support from the Louisiana NASA EPSCoR Team at Louisiana State University. Awarded to Dr. Nathan Morrow.

Assessment of the Gulf Coast Environmental Justice Landscape for Equity (AGEJL-4-EQUITY)

Tyneisha Bradley, Dr. Nathan Morrow, Dr. David Padgett, Dr. Beverly Wright

Department of International Health and Sustainable Development, School of Public Health and Tropical Medicine, Tulane University



INTRODUCTION

Environmental Justice is the equal and fair treatment of all people regardless of their background with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. This allows everyone to have equal protection from environmental health hazards and equal access to a healthy living, work, and learning environment. The AGEJL-4-EQUITY project is part of NASA's initiative to promote open science in the community. This project focuses on the assessment of environmental justice in the Gulf Cost with the implementation of Dr. Wright's Communiversity Model. With the use of community data and the Communiversity Model, a landscape analysis can be conducted.

AIM

- Convenes four Equity and Environmental Justice (EEJ) to map Southern Gulf Coast, primarily African American, underserved EJ communities and their priorities:
 - The National Black Environmental Justice Network
 - The Historically Black College and University-Community Based Organization Gulf Coast Equity Consortium
 - The Deep South Center for Environmental Justice (DSCEJ)
 - Community Advisory Board
 - The Environmental Justice Forum.

Adaptation of Dr. Beverly Wright's Communiversity model for NASA-relevant landscape analysis

METHOD

1. Advance Information

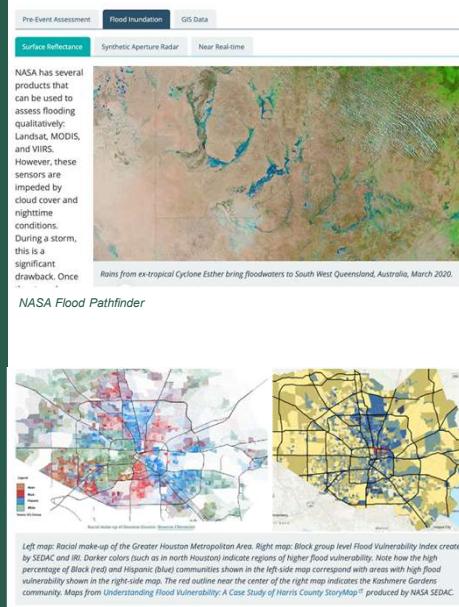
- Engage and capacitate four EEJ networks to map underserved EEJ stakeholder communities, priorities, ways of working, and knowledge of Earth science
- Co-create a network-landscape analysis suitable for presentation to diverse audiences

2. Advance Organizations -- Convene meeting of EJ networks:

- Compare and overlay EEJ network community mapping results
- Dynamic visualize and synthesize evidence for joint landscape analyses
- Interrogate geo-spatial, socio-economic and earth science data, highlighting NASA products and open-source science resources
- Address gaps in evidence and potential utility of NASA-related missions

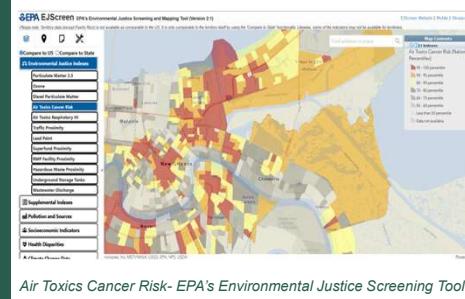
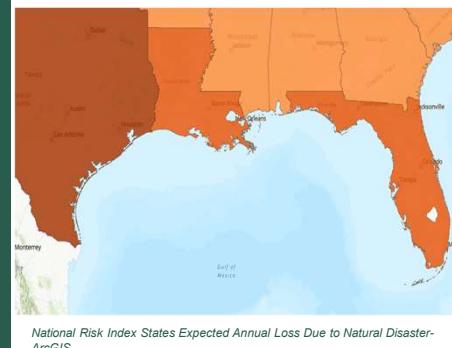
3. Advance Integration –

- Synthesize learning, reporting on barriers/opportunities and community assets unique to the Gulf Coast context
- Next steps to advance EJ organizations



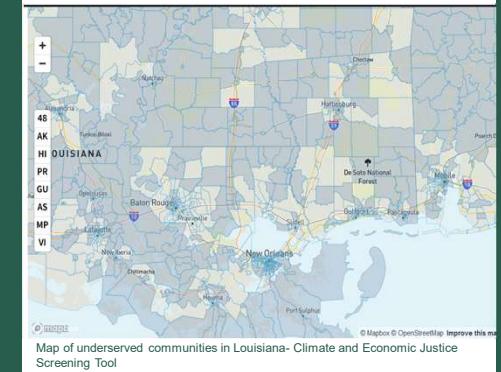
RESULTS

Based on NASA and EPA tools, the U.S. Gulf Coast has underserved communities that are disproportionately affected by environmental hazard and weather events.



Underserved Communities in Louisiana

Shown Below is a map of the southernmost region of Louisiana. This depicts the areas that are underserved throughout the state.



CONCLUSIONS

Current mapping data suggests that underserved and minority communities in the Gulf Coast could be impacted greater by weather events and environmental hazards. The need to better measure and characterize the impact of these events are the priorities identified by the EJ communities.

Further mapping will be done to create a landscape analysis of these communities and the threats they face.

ACKNOWLEDGEMENTS

