**Project Summary**

**Environmental Justice Needs Assessment for Disasters**

*Assessing the Landscape and Capacity of Organizations & Communities Working Towards Environmental Justice with Potential to Use NASA Earth Observations to Support Equitable Disaster Management and Risk Reduction*

**Project Team:**

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**Project Objectives:**

* Conduct a landscape analysis of: the inequitable experience of disasters in the United States; organizations working towards more equitable disaster response, management, and risk reduction; and methods employed by affected communities in preparation and response
* Assess the ways in which remote sensing data and geospatial tools could support Environmental Justice (EJ) organizations’ disaster preparation and relief efforts
* Expand DEVELOP’s range of partners and projects by connecting with EJ organizations and compiling resources, including potential project ideas, for DEVELOP to pursue in future terms
* Increase the awareness of open-source geospatial data, tools, and software trainings available to EJ organizations and the general public
* Promote the further integration of EJ in DEVELOP and NASA Applied Sciences by creating a framework for future landscape analyses and listening tours

**Abstract:**

Natural disasters pose an increasing risk to communities worldwide. Marginalized populations, in particular, experience compounding vulnerabilities that contribute to unequal burdens of natural hazards as a result of systemic inequality stemming from historical disenfranchisement, disinvestment, and discriminatory policies such as racial redlining. This project connected with community organizations working at the intersection of environmental justice (EJ) and natural disaster management throughout the United States, to assess how NASA DEVELOP can leverage geospatial science to advance EJ efforts. Our team conducted a landscape analysis, which included a literature review, annotated bibliography, and identification of organizations working in EJ and disasters. We engaged EJ organizations in discussions to understand their current resources, challenges, and geospatial needs to inform how DEVELOP and NASA Applied Sciences can support their EJ and disaster work. Findings were compiled in a synthesis report and visualized in an ArcGIS StoryMap to showcase the work of EJ organizations, provide geospatial resources for them to explore, and provide examples of how remote sensing can be utilized in EJ and disasters work. The knowledge gained and end products created support the integration of EJ in future DEVELOP projects, and the expanded use of Earth observations by communities in support of a more just tomorrow.

**Organizations Engaged**1**:**

|  |  |  |
| --- | --- | --- |
| **Organization** | **Contact (Name, Position/Title)** | **Potential Partner Type** |
| **Alaska Institute for Justice** | Robin Bronen, Executive Director | End User |
| **All Hands and Hearts** | George Hernandez Mejia, U.S. Disaster Response Manager | End User |
| **Depave** | Katya Reyna, Program Director | End User |
| **Florida Housing Coalition** | Michael Chaney, Technical Adviser | End User, Boundary Org |
| **Great Salt Lake Institute** | Bonnie Baxter, Director | Collaborator |
| **Imagine Water Works** | Klie Kliebert, Executive Director;  Miriam Belblidia, Co-Founder and Director of Research and Advocacy | End User |
| **NC Climate Justice Collective** | Jodi Lasseter, Founder and Co-Director | End User, Boundary Org |
| **Save Our Great Salt Lake** | Chandler Rosenberg, Co-Founder | End User, Boundary Org |
| **SBP** | Elizabeth Egle, Chief Development Officer; Reese May, Chief Strategy and Innovation Officer | End User |
| **Seeds of Resistance (of American Friends Service Committee FL)** | Guadalupe De La Cruz, Program Director | End User, Boundary Org |
| **Valle de Oro**  **National Wildlife Refuge** | Jennifer Owen-White, Refuge Manager;  Katie McVey, Deputy Refuge Manager;  Xavier Barraza, EJ Coordinator | End User |

1 A complete list of EJ and disasters organizations, including those which were contacted but not interviewed, can be found in the Synthesis Report and Partner Handoff Files.

**End Products:**

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| --- | --- |
| **End Product** | **Description & Benefit** |
| **Synthesis Report** | Our synthesis report encompasses and summarizes the broad scope of our project. It utilizes information from our literature review and landscape analysis which investigated the role of EJ in disaster research and how remote sensing and other geospatial technologies can be incorporated in EJ work. The appendix also includes an annotated bibliography and an overview of disaster-oriented EJ organizations interested in collaboration. This report will offer NASA DEVELOP ideas and important considerations for integrating an EJ framework in future projects. |
| **Annotated Bibliography** | The annotated bibliography is a collection of valuable resources for our team and partners. It provides research pertaining to EJ, applied geospatial science, and disasters within the United States. This thoughtful analysis of noteworthy works will help detail and clarify the scope of the EJ and disasters’ project for our partners and the public. |
| **List of EJ and Disaster Organizations** | By conducting a landscape analysis, we curated a list of EJ organizations that manage aspects of disaster mitigation, response, or recovery. The list includes their point of contact, location, GIS and remote sensing capabilities, and organization type (EJ and Disaster; EJ and Disaster adjacent; and Disaster and EJ adjacent). The list will also bring awareness to meaningful EJ and disaster work in the United States and inspire collaboration and ideas for future NASA DEVELOP projects. |
| **ArcGIS StoryMap: Listening to the Land and Lived Experiences of Disasters** | As a public online resource, our StoryMap provides an interactive summary and display of our collected information. We included maps illustrating the distribution of EJ and disaster organizations along with descriptions of the work of those we interviewed to offer insight on potential DEVELOP partners. We also included quotes from our interviews to highlight the recurring themes identified in our analysis. Further, our StoryMap provides examples of how geospatial information, with particular focus on past DEVELOP projects and NASA Earth observations, can be used to understand and analyze EJ disaster issues (e.g., susceptibility to landslides), along with resources which will help organizations become familiar with EJ, geospatial data, and NASA DEVELOP projects. Ultimately, the StoryMap serves as a foundational tool that will connect remote sensing to local EJ advocacy efforts and improve needs assessment efficiency. |
| **EJ, Disasters, and Geospatial Science Resources PDF** | Guided by the principle of reciprocity between NASA DEVELOP and the organizations we interviewed, our team compiled a list of available resources related to EJ, disasters, and geospatial science and distributed it post-interview. It includes trainings for geospatial software and community-based research, relevant data sources, and collaboration and grant opportunities. This resource sheet will be used for future circulation to community organizations and as a reference for DEVELOP and other NASA branches working on similar projects. |

**Project Reflections**

**Does the team consider this project to be successful?**

Our team considers this project to be successful with the creation of several end products that can be used by DEVELOP to support and inform future projects, such as a database of 82 organizations working at the intersection of Environmental Justice and disasters and a PDF of relevant resources. We were able to conduct 11 interviews with organizations, many of whom were interested in pursuing a project with DEVELOP. We believe the listening project format was beneficial and should be pursued in the future, as it allowed our team and DEVELOP to think critically about how to approach community organizations and engage in deeply informative conversations with people working to solve high-stakes problems.

**If you had the opportunity to do this project again, what would you do differently?**

Ten weeks was too short to establish relationships and communications with organizations, and this challenge was especially apparent for some disaster-focused organizations who had trouble meeting our programmatic deadlines due to their prior engagements with disaster response. Listening projects may thus be best suited for multi-term projects to truly listen to community needs and build trusting relationships between NASA DEVELOP and organizations. The DEVELOP deliverable deadlines could also be modified to increase the quality of interactions and relationships with organizations within a 10-week period. Moreover, from our interviews, our team identified that many groups and communities in the EJ landscape have an abiding distrust in government agencies, a perspective that should be considered as DEVELOP moves forward with EJ projects. Hesitancy surrounded SSAI email addresses and questions were raised about DEVELOP’s information sharing protocols with other branches of the federal government. Therefore, intentional measures for building trust and transparency need to be implemented when reaching out, building, and maintaining these relationships.

**Do you have any recommendations for future teams pursuing a similar project to consider?**

Our team created a detailed methodology for communicating with organizations in a listening project, allowing us to be organized, react with timely responses, and analyze findings from an abundance of work. Additionally, we spent a great deal of time planning out our interview analysis process and created checklists to follow. We had an excel sheet where we could track everyone’s progress and identify where more attention could be addressed. These methodologies were informed by conversations we had with academic experts with backgrounds in EJ and disaster research. I must be noted that these conversations should also be supplemented by additional conversations with community and organizational experts, whether that come from interviews or other informal meetings.

We also recommend reaching out to groups as soon as possible. We were not able to send initial emails to organizations until Weeks 5 and 6 due to needing to focus on other deliverables and coding workshops, which shortened our window of time for actually conducting interviews. Having more possibilities for interview times could have been beneficial as many organizations were involved with active disaster response and could not meet within the 1–2-week period we had outlined. We also struggled to get written permission to use quotes from the interview in our StoryMap. It was important for us to get approval for the quotes we wanted to include, but in retrospect, this intentionality could have also been better balanced with programmatic deadlines. In turn, programmatic deadlines could have also been better balanced to allow the team to incorporate edits and continue working on deliverables at a gradual pace. Further, while recognizing it is important to continuously have conversations as the project evolves, defining preferred vocabulary for methodology and deliverables would be better placed at the beginning of the term for most effective work.

Moreover, we strongly recommend considering the ways in which you can engage in sustainability and creating meaningful relationships in a 10-week period. We had many conversations as a team and with our Fellow about what it means to do EJ work with participant and leadership turnover rates. There are no correct answers, but it is important to think beyond your time and how your project and/or project impacts can carry on beyond the term.

**Culminating Research Questions Generated**

**Team-Identified Future Work:**

* VEJ Fellow should continue communication and relationship building with potential partner organizations between terms and follow our guiding principles of transparency, reciprocity, accessibility, sensitivity, and awareness when developing project ideas.
* VEJ Fellow and DEVELOP NPO need to follow up with all organizations interviewed to ensure that they know if there is a potential collaboration in the future. Even if organizations’ ideas are not feasible, it is important for them to know that and be contacted, which could serve as another point for brainstorming a project that is more feasible.
* VEJ Fellow should follow up with all the organizations and researchers involved with our project and share the StoryMap and/or other publicly released deliverables once they leave export control. It is important for them to see where their quotes and other experiences went.
* A transition between the team and VEJ Fellow is important, such as a goodbye email from the team and a hello email from the VEJ Fellow.
* In orientation, the VEJ Fellow could deliver an “EJ 101” presentation which covers the history and current movement because not everyone is in the same place on their EJ journey. DEVELOP could also do something similar during orientation, (coding) workshops, or professional development week to better integrate EJ into the entire program and have teams discuss how EJ is related to their projects.
* DEVELOP could consider creating a different term and deliverable structure for EJ projects to better facilitate relationship building and community focus. Even in technical projects, it would also be helpful to just spend one meeting getting to know each other, rather than hopping right into deliverables and tools. With EJ projects, it is even more important.
* DEVELOP could expand offerings during (coding) workshops to cover social science, statistics, and EJ topics relevant to our work. Even in traditional feasibility projects, these topics are critical to understand and are interwoven in their work.
* DEVELOP should also hire another VEJ Fellow to support the programmatic integration of EJ. To have one VEJ Fellow manage teams and take on other traditional Fellow responsibilities, in addition to identifying ways in which DEVELOP could further its EJ action and implement these changes, is a big ask of one person. Having two VEJ Fellows could allow work on both fronts to be pushed forward as well as promote the inclusion of multiple EJ perspectives.
* It was a great opportunity to speak with some of the folks at NPO at the end of the term when a question arose. As is done with traditional feasibility projects, it would have been beneficial to have the VEJ Node meet with them at the beginning of the term, too.

**Listening Tour-Identified Follow-On Research Questions:**

* Projects could work towards creating social vulnerability with disaster response maps to identify underserved communities for quick disaster response and assistance.
* Organizations were interested in quantifying their impact by overlaying their project sites with remote sensing data about heat, flood zones, drought extent, and more. These ideas are interesting, but resolution is important to consider.
* Organizations were also interested in visualizing changes over time, especially before and after disaster events. This would help them understand which areas of their communities were most impacted, as well as possible gaps in their work and where they can direct additional attention.
* Some organizations had general interests in using remote sensing data in their work, but did not have specific ideas yet. They preferred DEVELOP help them better understand the possible applications and continue to brainstorm together. An emphasis was repeatedly placed on collaboration and co-development.
* There is a need for accessible open-source disaster data to enable organizations to respond quickly in communities affected by disasters as well as training on how to do it. A resource page on DEVELOP’s website could be helpful to house resources for disasters, as well as DEVELOP’s other issue areas.
* With EJ founded as a community-led movement, it is important to consider who is on the DEVELOP teams and how they approach this type of work. Many organizations noted they had folks in their community interested in learning more about remote sensing and mapping to build their own capacities. It could be beneficial to hold spaces on the team for one or two community members who could also offer more insight into the issues they are facing. Or, it could also be helpful for EJ teams to create detailed tutorials about how community members could re-create the products.
* More detailed recommendations can be found in our Synthesis Report.