2019 NSF Civic Innovation Challenge

Code for Sacramento - Resilience Theme

Problem Statement

- Communities are at a high risk from flooding and erosion. How can we use data and technology tools, like sensing and mapping, to help protect our communities?"
- Code4Sac Objectives:
  - Develop tools to identify and assist at-risk communities
  - Support Mayor's Commission on Climate Change
  - Raise public awareness regarding climate change
  - Explore new datasets and technologies

Potential Impacts

- Flooding: Increased or Erratic Rainfall due to Climate Change
  - Property Damage, Emergency Response and Shelter
  - Insurance Coverage and Fraud During Recovery
  - Homeless Population within Watershed
- Erosion: Collapse or Subsidence of Land after Flooding
  - Water Quality Impact due to Erosion
  - Groundwater Impacts due to Pollution
  - Aquatic Wildlife Impacts due to Pollution

Addressing the Challenge

1. Develop GIS base map and data layers
   a. Understand hydraulics, watershed and infrastructure
2. Identify at-risk communities
   a. Identify resilience characteristics, needs and response
3. Develop technology and tools
   a. Web application: Notification and communication system
   b. Data science: GIS, monitoring, sensing and crowd-source data
4. Draft report, recommendations and next steps

Demo: Node.js + ESRI JS API + Heroku

https://ncic.herokuapp.com/map
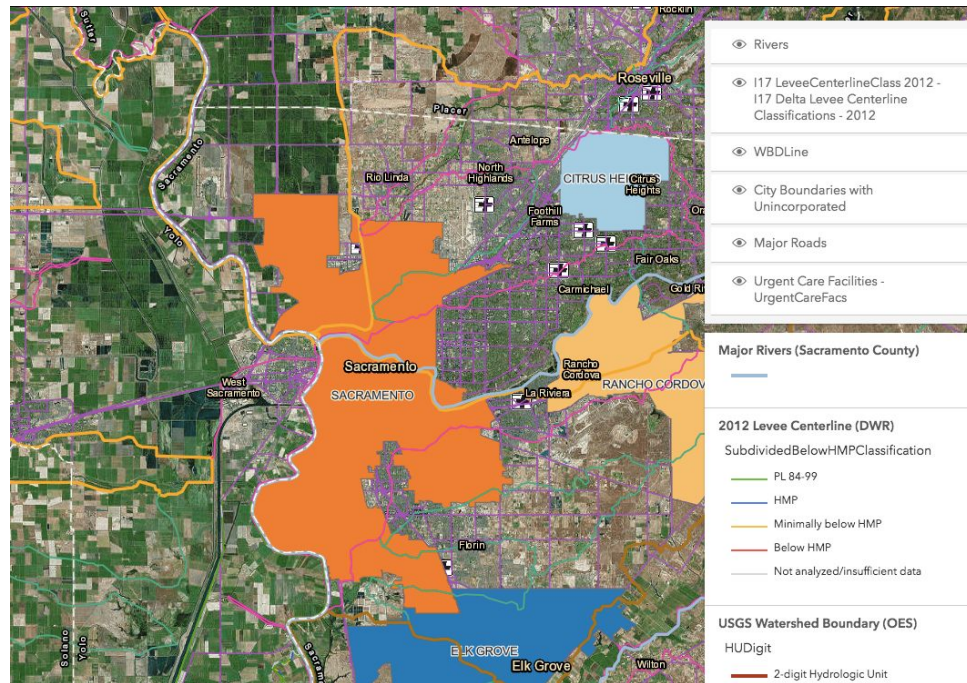
Datasets

1. ESRI [Open Data Portal](#)
2. Federal:
   a. FEMA: [Flood Hazard Layer](#) , [GIS Portal](#) , [Google Earth Layers](#)
   b. USGS: [Monitoring Data](#) , [GIS Portal](#), [Data Portal](#) , [Flocast](#)
   c. NOAA: [NWS Portal](#) , [NOAA Portal](#)
   d. Army Corp. of Engineers (ACOE): [ArcGIS Library](#) , [GIS Portal](#)
3. State:
   a. Sacramento River: [GIS Library Datasets](#) , [Data Portal](#)
   b. Office of Emergency Services (OES): [GIS Portal](#)
   c. Dept. of Water Resource (DWR): [ArcGIS Library](#) , [GIS Portal](#)

Resources

1. Sensor and Monitoring:
   a. IoT Sensor Datasets: [Array of Things](#) , [Data.gov](#)
   b. USGS Monitoring Data: [Water Quality](#) , [Groundwater](#)
2. Flooding:
   a. Santa Clara Water District: [Homeless Encampments Program](#)
   b. FHWA Research: *[Rivers, Rainfall, and Resilient Roads](#)*
   c. CalRecycle: [Homeless Encampments Guide](#)

Next Steps

1. Team Roles
   a. Developers, Designers, Data Scientists and Analysts
2. Research
   a. Define resilience and its characteristics
   b. Identify at-risk communities and communication
   c. Contact subject matter experts
3. Develop web application, data model and analysis
4. Draft Report and Recommendations