

CDI FY17 Request for Proposals

Visualizing community exposure and evacuation potential to tsunami hazards using an interactive Tableau dashboard

Submission Title: Visualizing community exposure and evacuation potential to tsunami hazards using an interactive Tableau dashboard

Lead PI: Jeff Peters

Mission Area: Climate and Land-Use Change

Region: Pacific Region

Organization: Western Geographic Science Center

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Co-PIs and Collaborators:

Science Support Framework Element 1: Knowledge Management

Science Support Framework Element 2: Science Data Lifecycle - Publishing/Sharing

Science Support Framework Element 3: Applications

In-Kind Match: 21382.44

List of anticipated deliverables from the project: • Tableau interactive dashboard for exploration and interpretation of community exposure and evacuation modeling results. • Embedded Tableau dashboard in webpage within a USGS website. • A cost saving analysis comparing time and resources for developing a Tableau dashboard and a conventionally hand-coded website

Lead Cost Center: Western Geographic Science Center

Notes, Comments:

Project Description: Analytical data from tsunami community exposure and evacuation modeling projects exist but only as static maps, graphics and tables in scientific reports. These data will be integrated into an interactive dashboard that will be built using Tableau, a third-party data analysis and visualization software application. Additionally, the dashboard will be embedded in a webpage to present project results, improve public risk awareness to tsunami hazards, and provide access to USGS-derived information.

Total Budget: 43352.83

SECTION 1. PROJECT SUMMARY

Project Title: Visualizing community exposure and evacuation potential to tsunami hazards using an interactive Tableau dashboard

Principal Investigator: Jeff Peters

Scope: Western Geographic Science Center research on community exposure and pedestrian evacuation for tsunami hazards has resulted in numerous publications in static reports and journal articles. Population exposure and evacuation modeling has been completed for several communities in Alaska, along the Pacific Northwest coast of the United States, and in Alameda County, CA, to provide estimates of the time required to reach safety on foot before tsunami-wave arrival. Although these data are critical for risk-reduction planning and outreach efforts, they are currently only available in static reports. Interactive graphics are quickly becoming a new standard in visualizing complex scientific data and can potentially allow for a deeper understanding of the concepts being concluded from these data. Recent efforts in visualizing data from USGS reports in online interactive graphics have required a team of programmers and months of development. Leveraging third-party software like Tableau could reduce costs for developing interactive graphics by minimizing the need for advanced programming skills and long development timelines. Under this project, data will be published in: (1) a Tableau dashboard, to provide interactive interpretation for the public and partner agencies, and (2) a USGS website into which the Tableau dashboard will be embedded, to improve access for the public and partner agencies. The dashboard will benefit communities by sharing project results through publicly-available, interactive graphics. Embedding the dashboard in a website will benefit the public by presenting information derived from USGS scientific modeling, allowing diffusion of knowledge of tsunami threats to reduce potential loss of life from future events. Additionally, community exposure data from similar research published by our research team related to volcano (Washington), earthquake (Washington), hurricane (Florida), sea level rise (Florida), and coastal change hazards (Oregon) exists, indicating that products developed within this tsunami-focused project could improve accessibility of other USGS hazard projects across the nation with regard to characterizing and communicating societal vulnerability to and impacts from natural hazards.

Technical Approach: Communities use USGS research on tsunami exposure and evacuation for mitigation, preparedness, outreach, and exercise planning. The current practice is to create and distribute reports with static maps of analytical and modeling results. However, using interactive graphics to visualize research results allows partner agencies to use the data for further analysis to improve knowledge of variations in vulnerability to hazards. This project aims to establish a new model for this hazard data dissemination using third-party software technologies, both to partner agencies and USGS-wide, and will prototype and document the process with a case study of community exposure and evacuation for tsunami hazards on the island of O'ahu, HI. Interactive graphic interfaces allow improved understanding of the impact of various tsunami scenarios by letting the audience dynamically change data queries and affect visualizations; for example, highlighting impacted areas on a map or comparing travel times to for different tsunami zones. This approach may also increase the use of USGS results in planning exercises and in post-disaster response and could set a new precedent for sharing authoritative research results while minimizing the need for costly programming and lengthy timelines. A cost saving analysis will also be conducted to compare the time and resources required for developing the Tableau dashboard and a conventionally hand-coded website.

Project Experience and Collaboration: The principal investigator has led or co-authored several successfully completed research projects at the USGS, including publishing multiple tsunami exposure and evacuation reports in scientific journals. Collaborator #1 has experience in web visualization platforms, such as d3, web service GIS data management, and custom web-mapping application development. Collaborator #2 has expertise in hazard vulnerability science to provide guidance on emergency manager needs and in geospatial analytical and modeling methods. For this project, Hawai'i state emergency managers will be consulted to see that local needs are met.

Sustainability: The dashboard will visualize data previously made available in an official USGS data release to accompany a published report in a scientific journal and that has been uploaded to ScienceBase. The dashboard will be maintained by Tableau and remain published through a publicly-accessible Tableau dashboard gallery online regardless of future licensing agreements. The dashboard will be embedded in a

publicly-accessible USGS webpage regardless of future licensing agreements.

Budget Justification: Budgeting accounts for salary for the PI and collaborators’ time. Additional costs cover travel to the 2017 CDI Workshop and purchasing a one-year license for the Tableau software.

Timeline:

Mar.	Apr. - May	June - July	Aug.	Sept.
Project planning	Online Tableau training and tutorials	Build Tableau dashboard	Testing and Review	Embed in website

SECTION 2. ESTIMATED BUDGET

Budget Category	Federal Funding	Matching Funds
1. PERSONNEL (SALARIES including benefits):		
Federal Personnel Total:	\$31,724.20	\$15,862.10
Student Contract Personnel :	\$0.00	\$0.00
Total Salaries:	\$31,724.20	\$15,862.10
2. TRAVEL EXPENSES:		
Travel Total (Per Diem, Airfare, Mileage/Shuttle) x # of Trips:	\$1,522.00	\$1,522.00
Other Expenses (e.g. Registration Fees):	\$0.00	\$0.00
Total Travel Expenses:	\$1,522.00	\$1,522.00
3. OTHER DIRECT COSTS:		
Equipment (including software, hardware, purchases/rentals):	\$2,000.00	\$0.00
Publication Costs:	\$0.00	\$0.00
Office Supplies, Training, Other Expenses:	\$0.00	\$0.00
Total Other Direct Costs:	\$2,000.00	\$0.00
Total Direct Costs:	\$35,246.20	\$17,384.10
Indirect Cost (23%):	\$8,106.63	\$3,998.34
GRAND TOTAL:	\$43,352.83	\$21,382.44