Most Effective Methods for Educating Three Population Demographics at Risk of Large-Scale Lahars Originating from Mt. Rainier

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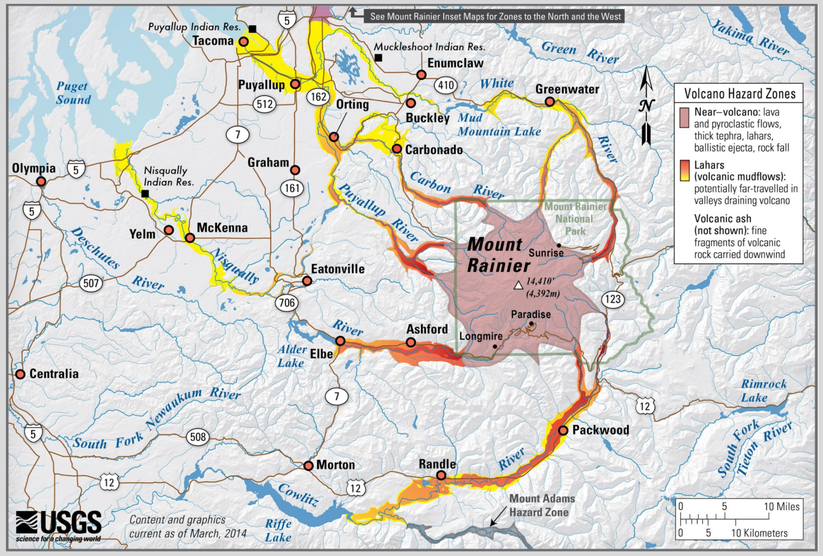
Background

Lahars are defined as water saturated debris flows originating from a volcano and traveling at high speeds downslope inundating low lying areas. These flows are among the most threatening of volcanic hazards and have been historically responsible for property damage and loss of life. Lahars are unique in their ability to be triggered independently of a volcanic eruption which makes predicting their occurrence challenging. Mt. Rainier in central Washington poses one of highest risks for lahars to adjacent communities and surrounding populated areas. Mapping of past lahar deposits has confirmed that Mt. Rainier is capable of producing large-scale lahars that could travel many miles and significantly impact communities (Wei and Lindell, 2017).

Mt. Rainier Hazard Zone (USGS, 2016)



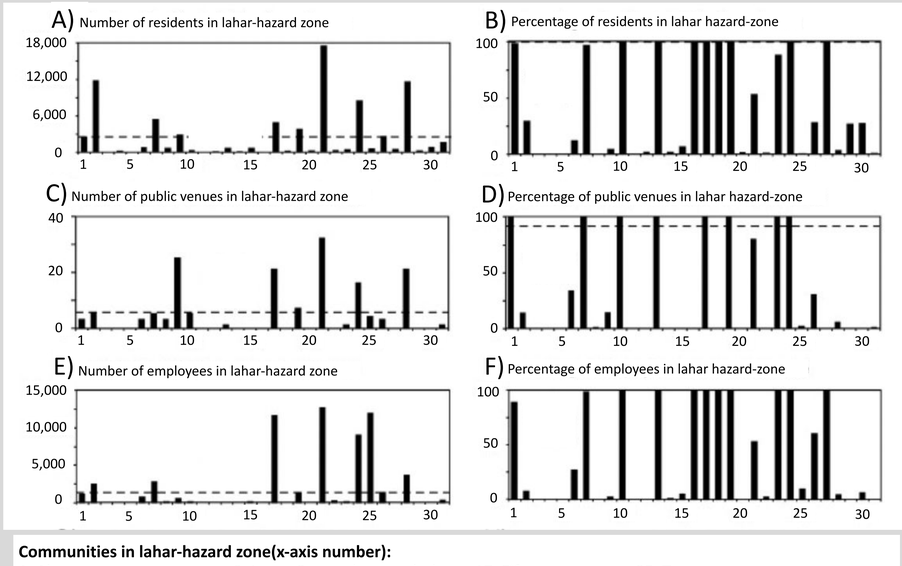
Study Goals

- Identify Populations at highest risk from a Mt. Rainier Lahar
- Evaluate most effective risk communication and outreach strategies

Populations Within Hazard Zone Identified by Wood and Soulard, (2009):

- Residents: 78,049
- Employees: 56,678
- Tourists: 150 public venues including 57 overnight tourist accommodations

Population Variation Data of Communities Within the Lahar Hazard Zone Identified by Wood and Soulard (2009)



Communities in lahar-hazard zone(x-axis number):

1. Alonga
2. Auburn
3. Enumclaw
4. Federal Way
5. Lakeland South
6. Milton
7. Pacific
8. King County (remainder)
9. Lewis County (remainder)
10. Ashford
11. Bonney Lake
12. Buckley
13. Carbonado
14. Eatonville
15. Edgewood
16. Elbe
17. Fife
18. Greenwater
19. Orting
20. Prairie Ridge
21. Puyallup
22. South Hill
23. South Prairie
24. Sumner
25. Tacoma
26. Waller
27. Wilkeson
28. Pierce County (remainder)
29. Nisqually Indian Community
30. North Yelm
31. Thurston County (remainder)

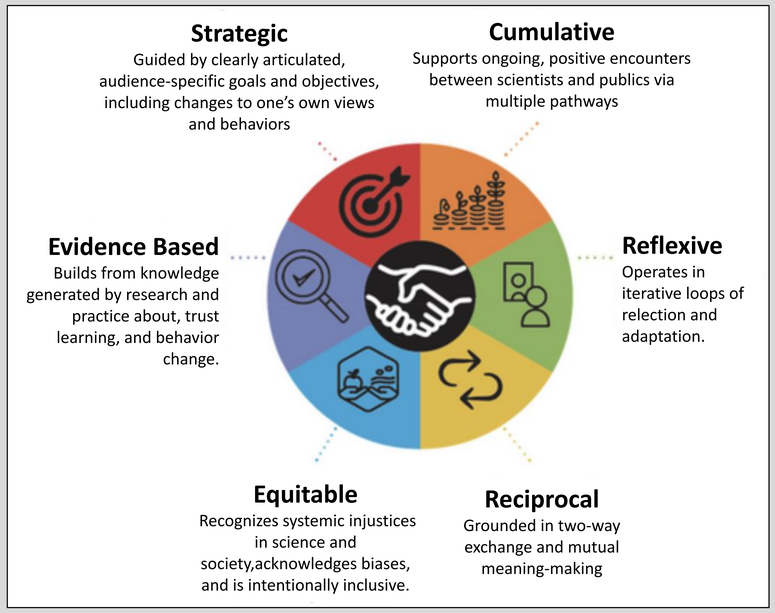


Diagram of SCREE methodologies as described by Garlick et. al. (2025). SCREE is a six point framework of effective public engagement with scientific outreach.

Discussion

Communication to Residents

Garlick et. al. (2025) developed a six point framework for effective science communication to community members (SCREE model). The goal of SCREE is to engage in multiple targeted community outreach programs using evidence-based, equitable, and respectful methods.

Communication to Employees

Employees educated in a evacuation plan were able to put the emergency plan into action much more effectively (Renschler et. al., 2016).

Communication to Tourists

Often the tourism industry is reluctant to share information about potential natural hazards fearing patrons will decide to visit a different location (Jong and Goossen, 2025). A combined effort of government agencies and local tourist accommodations must inform tourists of the potential threat of a lahar.

Policy Suggestions

1. Multiple targeted community outreach initiatives based on the SCREE methodologies focusing on informing residents living within the Mt. Rainier Lahar hazard zone.
2. Government mandated presentations at all workplaces within the lahar hazard zone should be implemented with a focus on evacuation procedures and employee responses to an active lahar.
3. Governments should mandate that tourists be made aware of the threat of a lahar when checking into any accommodations within the hazard zone as well as evacuation routes.

References:

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