



## CASE STUDY – Teaching Note

### Community Flood Risk Reduction

GALENA ALASKA, FLOOD RECOVERY

**Learning Objective:** Share the steps taken and lessons learned by a rural community in central Alaska to integrate resilience into rebuilding efforts and be better prepared for future flood events.

**Keywords:** Recovery, Flood, Local Government, Tribal Government, Rural Community, Major Disaster Declaration, Housing, Hazard Mitigation, Public Communication, Recovery Planning, Resilience, Staffing for Recovery

#### Instructor’s Introduction

This Teaching Note is intended to prepare an instructor to use this case study in a classroom (live or virtually). The note expands on the lessons learned from this case study, which has been written to help students learn from a real-world disaster recovery experience. Selection of learning objectives, discussion questions, and activities can be customized based on audience and time allowance. The remainder of the guide provides suggestions of key concepts to explore as you teach the case. It is recommended that students read the Background and Challenges sections (Part One), and then pause to discuss the scenario before they move on to read the Actions, Results, and Lessons Learned sections (Part Two).

In May 2013, flooding from the Yukon River inundated the rural, isolated town of Galena, Alaska, forcing residents to evacuate and causing significant damage to homes and community facilities. This case study outlines the steps that the Galena community took to not only recover from the 2013 flood event but integrate resiliency into rebuilding efforts and be better prepared for future flood events. The lessons learned may be applicable to other communities seeking to reduce their risks to future flooding events.

To become more familiar with relevant concepts before teaching the case, please review the following:

- [Executive Order 11988](#)
- [Guidance for Old Town Galena Residents Regarding Permanent Construction](#)
- [Alaska Department of Homeland Security & Emergency Management](#)
- [Louden Tribal Council and City of Galena Hazard Mitigation Plan 2015](#)

#### Student Learning Outcomes:

- Identify the unique challenges facing an isolated, rural community post-disaster.
- Explain the different perspectives stakeholders bring to recovery.
- Explore considerations in identifying recovery issues/needs and developing recovery solutions.
- Describe strategies used to increase resiliency to future disasters while recovering from a disaster.
- Analyze how lessons learned apply to a familiar community/jurisdictions’ pre-disaster planning.

#### Key Takeaways:

- The City Council ordinance instituting a new elevation requirement of two feet above base flood elevation demonstrated the town’s commitment to future flood preparedness.
- Community meetings were key to ensuring residents understood the decision to limit work in the high-risk Old Town area to emergency work and temporary repairs only.
- The partnerships between local leadership and federal/state agency counterparts drove the success of the various initiatives chosen as part of the recovery effort.

## PART ONE

### Background

During the spring break up<sup>1</sup> in May of 2013, flood waters carrying massive ice chunks from the Yukon River inundated nearly 90% of the homes, businesses, and government facilities in the small town of Galena, Alaska. An ice jam downriver caused floodwaters to rise and back up overbank in Galena. House-sized chunks of ice mowed down the native birch trees and ripped homes off of pilings. Most areas received between seven and nine feet of water. The event forced nearly all of the 472 residents to evacuate by air to Fairbanks and Anchorage as waters quickly rose and local roads became impassable.



Figure 1. Flooding in Galena in 2013.

Located roughly 270 miles due west of Fairbanks in interior Alaska, Galena is a regional education and transportation hub on the banks of the Yukon River. Since its establishment in 1918 on an Alaskan Native fishing site, Galena has dealt with multiple destructive flooding events, a common issue for communities situated along the Yukon River.

The Galena Air Base was constructed in World War II as a stopover point for U.S. Air Force planes flying between the United States and Russia. In 1948, just a few years after the base was constructed, the Yukon River flooded the airstrip during a spring break up event. A robust levee was then constructed to protect the airstrip from future flood events. The base became a primary employer in the region, and homes, fuel distribution, storage facilities, and other infrastructure emerged along the banks of the river, outside of the levee protecting the airstrip. The base was officially closed in 2010, and the land and facilities were transferred to the City of Galena, the Galena School District, and the Alaska Department of Transportation.

The residents of Galena have long recognized the town's vulnerability. Following a major flood in 1971, the community relocated the school, the health clinic, more than 150 residences, and city offices to a location 1.5 miles farther from the river, called New Town. The original town site, known as Old Town, remained partially occupied and at extreme risk from high velocity water and ballistic ice<sup>2</sup> due to its location between the levee and the river. Soil conditions and permafrost make the Old Town area of Galena prone to erosion and liquefaction, both during flood events and as flood waters recede. The levee north of Old Town protecting the former U.S. Air Force base creates a pinching effect, forcing ice and water into Old Town and further increasing risk to people and property.

Residents still view the evacuation in May 2013 as a traumatic experience which they do not wish to repeat. Evacuating kids, elders, and sled dogs was a significant challenge for the community, and convinced Galena leadership that risk reduction, safer homes, and smarter development needed to be a high-priority during recovery.

### Challenges

Snow and freezing temperatures typically begin in late September, so many residents would be unable to return until their homes were safe and habitable. Galena residents, volunteers and contractors worked hard throughout the summer to repair and rebuild as many homes and facilities as quickly as possible. Destroyed homes and critical infrastructure – including septic and sewer systems – were the highest priority to complete before the Yukon froze.

The expedited rebuilding process involved significant logistical challenges. With no road or rail system connecting Galena to other communities in Alaska, people and goods – including emergency supplies and building materials – must be brought in via barge or plane. Hundreds of contractors and volunteers arrived by air requiring temporary

<sup>1</sup> The period of time in spring when the ice on the river physically breaks and the surface becomes free flowing again. Seasonal snow melt adds to the Yukon River's water level, and shifting pieces of ice pile up to create ice jams that break unpredictably.

<sup>2</sup> Large chunks of ice moving at high velocity, caused when an ice jam breaks, releasing high volumes of water and ice.

lodging and feeding. Timelines were highly dependent on weather conditions, supply availability, and higher prices, which impacted the timely arrival of critical personnel and materials recovery projects were depending on.

The volunteers supporting home reconstructions, primarily carpenters and workers from Mennonite Disaster Services, were hard-pressed to meet the demand for repairs and rebuilds before winter. Once construction began, several residents identified concerns about construction methods and materials used to mitigate future hazards, as well as the resulting increased cost to rebuild. For example, some homes were slated to be elevated as high as 20 feet to be out of harm's way in future floods, but elderly homeowners would have difficulty climbing all the stairs in order to access their homes.

At the same time, Galena families who rely on subsistence food also had to make time for fishing and hunting to build up their winter food stocks. To accommodate the community's priorities, Galena leadership requested that the federal Interagency Recovery Coordination (IRC) partners delay local engagement until after moose hunting season.

## Part One Discussion Activities

### Discussion Questions:

1. One of the major challenges for Galena's recovery was the town's isolation – emergency supplies, building materials, and volunteers all had to be brought in via plane or boat. How do you think this impacted the recovery timeline? What are some strategies that could mitigate the impact of this challenge?
2. Elevated homes can cause issues for elderly residents and individuals with accessibility needs. What resources are available for these individuals? How would you communicate the availability of those resources to disaster survivors?

## PART TWO

### Actions

Early in the recovery, with support from state and federal officials, the Galena City Council passed an ordinance requiring that all new construction be elevated two feet above base flood elevation. This timely action integrated risk reduction into the permitting process before residents expended their own money, federal housing grants, or insurance proceeds on repairing or rebuilding their homes.

The Galena City Manager and Louden Tribal Administrator<sup>3</sup> worked closely with the State Hazard Mitigation Officer to identify and scope eligible at-risk homes for elevation using the Hazard Mitigation Grant Program (HMGP) and funds from the State of Alaska. The Alaska Department of Homeland Security and Emergency Management (DHSEM) was able to expedite the contract for performing the elevations so that the work could be done before the winter. Average winter temperatures in Galena range between 7° and minus 16° F, so the expedited timeline was crucial in allowing families to re-occupy their homes sooner and helping to restore community stability. The Louden Tribal Council served as the applicant for all elevation projects.

In collaboration with the State Coordinating Officer (SCO), the Federal Coordinating Officer (FCO) determined that the investment of federal funds for permanent construction in Old Town, where no effective mitigation options are available, would violate 44 CFR Part 9.2, of E.O. 11988 which directs FEMA to avoid adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development. The decision aligned with the community's risk reduction goal of limiting development in this high-risk area. In consultation with the community, the FCO restricted federal funding in Old Town to emergency work and temporary repairs only.

The SCO and FCO conducted a community meeting to explain the limited federal funding for Old Town and provide residents with a forum for questions and concerns. Additional meetings, as well as community visits, were held to answer questions about the elevation project and funding, and encourage homeowners to participate in the elevation project.

Galena leadership also pursued the acquisition of a parcel of land still owned by the Air Force, located 11 miles from the river and out of the high flood risk area. The parcel has the potential to accommodate recreational, residential, or other uses. Galena's ownership of this land allows for greater flexibility in its future development. Galena leadership worked successfully with their Congressional delegation to make the transfer official through the 2017 National Defense Authorization Act (NDAA).



Figure 2. A home in Galena prior to elevation.



Figure 3. The same home in Galena, after elevation.

#### Key Partners

- Galena Community Leadership
- City of Galena
- Louden Tribal Council
- Alaska Division of Homeland Security and Emergency Management (DHSEM)
- FEMA
- Alaska Department of Community & Economic Development (DCRA)
- United States Army Corps of Engineers (USACE)

<sup>3</sup> Galena has two elected governing bodies: the municipal government and the Louden Tribal Council. The town's population is a mix of Alaskan Native and non-native residents.

In late October, after the expedited rebuilding effort was over, the Loudon Tribal Council hired a Galena Local Disaster Recovery Coordinator (LDRC), a two-year position funded by the Alaska Department of Homeland Security & Emergency Management (AK DHSEM). The LDRC recruited community champions to support the recovery process locally, including by continuing the execution of hazard mitigation projects and forming a local Recovery Planning Committee.

Galena's Five Recovery Priorities  
(Established by Galena residents at recovery-focused, facilitated community meetings.)

- Reduce risks to life and property
- Improve energy generation and efficiency
- Improve housing quality
- Increase the number of leaders and skilled workers
- Develop models for economic growth

In January 2014, Galena hosted two evening community potlatch meetings, to ensure residents had a say in defining recovery goals and projects. Around 30 Galena residents participated in the meetings, which were conducted by the LDRC and a FEMA Alternative Dispute Resolution facilitator. Divided into small discussion groups, the community members were able to discuss their goals and potential projects directly with state and federal leadership. These solutions-based conversations helped residents brainstorm feasible projects, identify goals, and list community needs. Collectively, Galena residents identified over 200 projects for consideration. Each project was captured in writing at the community meetings and clarified in subsequent IRC planning meetings. The IRC team committed to honoring the projects as written by the community.

From the initial list of 200 projects, the LDRC and the Recovery Planning Committee prioritized the top 30 items. Plans for the implementation of this “top priorities” were developed in partnership with the LDRC and the project champions on the Recovery Planning Committee. These five priorities formed the structure of the recovery effort. IRC partners supported project implementation by providing technical assistance, identifying funding and resources, and assisting with building capacity so that federal and state program opportunities could be leveraged.

The Recovery Planning Committee and the IRC continued to convene monthly for six months. Federal and state agencies continued to support the recovery effort after FEMA regional personnel transitioned back to steady-state duties.

### Case Comparison

#### Construction on Floodplains in New Jersey Following Superstorm Sandy

Similar to Galena, New Jersey communities were highly motivated to reduce property risk after destructive flooding resulting from Superstorm Sandy in 2012. New Jersey communities also adopted stricter elevation requirements for development within floodplains. All rehabilitation and reconstruction resulting from Superstorm Sandy in New Jersey had to meet the following criteria, when applicable:

- Within tidal floodplains, the lowest floor of the structure had to be elevated at least one foot above the highest state- or FEMA-designated 100-year flood level.
- Within non-tidal floodplains, the lowest floor of the structure had to be elevated at least one foot above the state-designated flood level for that location.

Both locations also contended with accessibility challenges, particularly for elderly residents who expressed a strong desire to age in place. In Galena, residents only required a doctor's note to obtain an Americans with Disabilities (ADA) compliant ramp for their elevated homes, but no residents requested the installation of a ramp. In New Jersey, a key activity under the state's Supportive Services Program was the distribution of grants for elderly or mobility-disabled households to install accessibility improvements during post-disaster reconstruction efforts. These improvements included ramps, rails, and elevators that will ensure vulnerable elderly populations can easily get in and out of their homes before, during, and after a disaster.

## Results

Of the 54 residential structures deemed “severely damaged,” 42 were elevated using a combination of HMGP, homeowner insurance, and FEMA Individual Assistance (IA) program funds. Alaska DHSEM funded an additional nine elevations. Each home cost approximately \$100,000 to elevate. Other homeowners were able to combine FEMA Individuals and Household Program (IHP) funding and volunteer labor to rebuild and elevate to the higher standard set by the City Council.

Tribal, city, state, and federal representatives worked closely with the construction team to address all resident concerns in a timely manner and rectify issues where possible. However, due to concerns about the overall increased cost of construction resulting from the higher elevation requirement, no new construction permits have been issued in Galena since the code was enacted.

The elevation ordinance passed by the City Council exceeded the federal recommendation by one foot, demonstrating the community’s commitment to mitigation and resiliency. The result has been increased preparedness for future flood disasters of this scale, and an assurance that future construction projects in Galena will meet minimum safety standards. The elevation project allowed residents to remain in their homes safely, no longer fearful of losing their house or having to evacuate during the next flood event.

The decision not to apply federal funding to non-emergency efforts within Old Town supported the community’s previous decision to relocate buildings to lower-risk areas, an effort that had started prior to this disaster with the relocation of community buildings to New Town. Limiting new construction in Old Town will continue to reduce the risk to critical infrastructure, lives, and livelihoods for Galena residents. In addition, the transfer of the Air Force parcel land into Galena ownership provides a much safer location for future development.

Eleven FEMA Public Assistance (PA) projects also included Section 406 Mitigation funding, which supported improvements to culverts, elevation of emergency generators, and flood-proofing certain facilities and structures.

## Lessons Learned

- Galena’s commitment to risk reduction directly contributed to successful recovery projects and increased resilience for future disasters.
- Deliberate public engagement in decision-making processes, along with clear and consistent communication, are critical steps for successful community recovery.
- Galena’s recovery was locally-driven by strong local leadership, with support from federal and state agency partners committed to collaborating with community members and honoring Galena’s recovery goals.

### Part Two Discussion Activities

#### Discussion Questions:

1. If you were managing this recovery effort, how would you have communicated the decision to prevent permanent reconstruction in Old Town to residents?
2. There were multiple stakeholders in Galena’s recovery beyond the residents themselves – the Galena City Council, the Loudon Tribal Council, volunteer organizations, state agencies, and federal agencies all played a role. What are some strategies for effective coordination and collaboration among diverse stakeholder groups?

#### Activity 1 (Optional): Identifying Areas of Focus

**Duration:** 30-45 minutes

**Instructor's Setup:** Assign roles to each student or small group (depending on class size). Note that more than one person can be assigned to a role. Instructor may add additional roles to this activity based on the audience (i.e. FDRC, CPCB, EHP, etc.).

**Activity Roles:** Local Resident, Local Business Owner, Galena Mayor, Galena City Council Member, Louden Tribal Council Member, Alaska Division of Homeland Security and Emergency Management Staff Member, FEMA Individual Assistance Staff Member, FEMA Mitigation Staff Member; State Coordinating Officer.

**Instructions:** Give individuals 10-15 minutes to write down a few notes on the recovery issues and priorities of the individual/group they are representing.

**Discussion:** After time expires, pull the group back together and ask for a few volunteers to share the recovery issues and priorities for their stakeholder role. After the issues/priorities of each individual/group have been shared, discuss:

1. Did anyone hear any conflicts between the needs and priorities of different individuals/groups? If there is a conflict between stakeholders needs or priorities, what steps might local officials, state officials, or federal representatives take to address this?
2. What is the role of federal staff in capturing these issues and addressing these priorities?
3. Who are the key stakeholders in addressing some of the issues or priorities stated?

### **Activity 2 (Optional): Developing Solutions to Support Recovery Practices**

**Duration:** 30-45 minutes

**Setup:** Students will work in small groups of 2-4 individuals.

**Instructions:** Ask students to review the five major priorities of Galena on the first page of the case study. Ask groups to think through key questions that need to be answered to develop recovery solutions, any relevant considerations for each and key recovery partners needed to support.

**Discussion:** After time expires, pull the group back together and ask for a few volunteers to share their findings for each priority.

1. Are there any partners you've identified that will support multiple priorities?
2. What factors may determine which priority is implemented first?
3. How do you ensure resiliency is integrated into recovery planning and project implementation?
4. How do you ensure federal interagency partners are aware of and coordinating resources to develop solutions and support priorities?

## **Follow up with the FEMA Guidance Development Office**

The Guidance Development Office (GDO) develops and distributes FEMA's Interagency Recovery Coordination (IRC) case studies. Our team would appreciate your feedback on these case studies and accompanying teaching notes. Please let us know how you have used this case study for a learning experience and your thoughts on what went well or could have been improved. To get in contact with our team, please email [FEMA-RECOVERY-ICD-GDO@fema.dhs.gov](mailto:FEMA-RECOVERY-ICD-GDO@fema.dhs.gov). Thank you.