ICE IS THICKER THAN WATER

GALENA, ALASKA

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2014 ASFPM Conference • Seattle, WA • June 1 - 6, 2014
Agenda Outline

- Challenges for Floodplain Management in Rural Alaska
- Ice Jams and Flood Disasters
- Long-term Recovery
- Reconstruction - Today
Alaska Floodplain Management

Floodplain Management Program’s mission is to reduce public and private sector losses and damage from flooding and erosion.

DCRA provides coordination, compliance reviews and technical assistance to local governments to facilitate informed decision-making for hazard resilient communities.
How Big is Alaska . . . Really!!!

SIZE AND DISTANCE COMPARISON

*Alaska is 586,400 square miles, over twice the size of Texas

The size of Alaska is equivalent to the entire Eastern Seaboard spanning north to south from Maine to Florida and west to Tennessee.
Managing the Floodplains in Rural Alaska

Fort Yukon, Alaska
Emmonak, Alaska
The Yukon River

Yukon River, one of the largest rivers in North America. From headwaters in northern British Columbia the river flows 1,875 miles (3,018 km) in a giant curve through the Yukon Territory and Alaska to the Bering Sea.
The Yukon River

Almost as long as the Mississippi with comparable stream flows.

Yukon River in January at Fort Yukon
What is an Ice Jam?

- An accumulation of ice in a river that restricts water flow.
- May cause backwater that could produce flooding.
- Downstream locations can be flooded by sudden release of jams. That flood wave is attenuated or lessened with distance, so is most likely to affect areas within a short distance of the jam location.

*Courtesy of Scott Lindsey
National Weather Service, Alaska Pacific River Forecast Center*
Ice Jam Triggers

- Form in early winter as ice forms or in the spring when the ice cover begins to break up and move downstream.
- Likelihood increases through factors such as river geometry, local weather, and floodplain characteristics.
Breakup Mechanisms

- Two main types of ice breakup
  - Thermal
    - Ice melts in place
    - Direct sunlight plays a large role
  - Mechanical
    - Hydrodynamic forces exceed ice cover strength and breakup results
Breakup Examples

- Thermal
- Mechanical
Factors Affecting Ice Breakup

- Snowpack
- Air Temperature
- Freezing level
- Rainfall
- Ice Thickness
- Ice Strength
- Freeze-up water level

Graphic from *Shokotsu River ice jam formation* by Hung Tao Shen, Lianwu Liu, Cold Regions Science and Technology Volume 37, Issue 1, July 2003, Pages 35–49
Past Ice Jams Across Alaska
from CRREL Ice Jam Database
Current snow conditions – normal to above normal for most of the state

Current ice thickness – normal to above normal for most of the state

Weather outlook over the next month?
  • Colder than normal now
  • Much increased chance of below normal through April 30
Ave Temp Comparison for Eagle Climate April 1-15 = 23.2 Deg F
This year April 1-15 = 5.9 Deg F
Galena is seeing major flooding caused by ice damming on the Yukon River. Photo by David Lee, AK DHS&EM May 27, 2013
Galena
Eagle - 2009

Height of Ice Approx. 70 – 80 feet
16 homes destroyed
9 people displaced
Health Clinic off the foundation
May 17 to June 11 2013 flood impacts were catastrophic:

- Ballistic ice did significant damage to structures
- No household escaped damage
- Joint PDAs identified 185 primary residences with damage
- Those not damaged by flood waters were affected by lack of power, water and wastewater facilities
- The Galena sewer lagoon was damaged
- Galena potable water system was damaged. Potable water is being transported to the community.
What about Galena?.... Cont.

- River swamped houses above the 1% floodplain within a matter of hours
- Disaster destroyed supplies and subsistence foods including 17 tons of frozen meat following the long power outage
2013 Spring Flood Facts

Affected community populations per 2000/2010 census:

- Galena: 470
- Hughes: 78
- Tok: 1,258
- Circle: 100
- Eagle: 86
- Fort Yukon: 598
- Emmonak: 782
- Alakanuk: 683

4 month building season

Breakup of river ice and flooding occurs in May/June.

Access:

- Generally, no connecting road systems outside the community
- Air (limited by unpredictable/severe weather and smoke)
- River barge (when the river is ice free for 4-5 months/year)

Material transport costs are exceptionally high
Galena Air Force Base BRAC’d in 1992/fully closed by 2009

- AFB/7200 foot runway is protected by a levee

“Old Town” and “New Town are outside the levee. “New Town,” was built on higher ground after the 1971 floods

Galena is a regional hub for transportation, schooling, health care, etc

Galena is all floodplain – some areas are in greater risk than others

Galena is a NFIP participating community

Local government resources is limited

Local government mutual aid is limited due isolation
acquired May 27, 2012

NASA’s Terra satellite

Source: http://earthobservatory.nasa.gov/IOTD/view.php?id=81227
Estimated inundated area: 504 square miles

Source: http://earthobservatory.nasa.gov/IOTD/view.php?id=81227
Housing Damage Overview: All Communities

Homes destroyed: 3

Homes substantially damaged: 52

Homes requiring elevation: 32

IA-TAC estimate to repair 25 homes: $10,732,170

($429,300 per home)
EO 11988 – Old Town
COMMON OPERATING PICTURE
INCIDENT PERIOD: 05/17/2013 - 06/11/2013
DECLARED: 06/25/2013

09/06/2013 (DAY 74)

STRATEGIC TIMELINE
September 2013

- Galena BLM Community Shelter closes
- Stage 2 Galena Feeding and Wraparound Services Begins
- Last large shipment leaves Nenana
- 85% PWs are Obligated
- AmeriCorps Demob begins
- 95% PWs are Obligated
- 50% PWs are Obligated
- Willow House (Fairbanks) shelter closes

October 2013

- Infrastructure complete under Phase 1
- Volunteer Agencies complete housing repairs under Phase 1
- Photo study completed by USACE
- Recovery Phase 1 ends

Projected Milestone/Event Target Data

Key Points
- FEMA
- IA/OSA
- IA
- EM
- Resources
- WA/PA
- Long
- Planning
- NDPA
- SSA
Long Term Recovery

Phase 1: June 25 – October 31, 2013

Phase 2: November 1, 2013 – May 15, 2014

Phase 3: May 16 – October 31, 2014
Phase I
Dates: 6/25/13 - 10/31/13
- Mass Care / Sheltering
  - Began shelter operations at Galena BLM barracks on 8/9/13
  - Opened Birchwood Hall, and Larsen Community Center on 8/12/13
  - Currently sheltering survivors in Galena and in Fairbanks
  - Complete transition plan for winter sheltering by 9/1/13
  - State-managed Responder Support Camp opens on 8/20/13
- Housing Repairs
  - Completed identification of rapid repairs to make homes habitable through winter on 9/12/13
  - Volunteers assessing scope of work, assign teams and complete repairs by 10/15/13
  - Provide financial assistance to eligible applicants to complete their repairs.
  - Provide wrap-around services by 9/15/13
  - Air or large building materials to all communities - began 8/1/13 will continue until 9/15/13. Air delivery only after 9/15/13 until hard winter.
- Identify and develop permanent housing solutions
- Complete repair work in all other communities, except Akutan, in Phase I

Phase II
Dates: 11/1/13 - 5/15/14
- Mass Care / Sheltering
  - Support winter shelter operations for up to 100 survivors in Galena
- Housing Repairs
  - Continue with interior home repairs
  - Complete staffing plan and logistics requirements for Phase III by 4/1/14
  - Identify volunteer and contract labor staff for construction in Phase III
  - Support wrap-around services through Phase III
- Complete Permanent Housing Construction HQ approval process for all communities

Phase III
Dates: 5/16/14 - 10/31/14
- Mass Care / Sheltering
  - Support survivors until home repairs or rebuilds are completed
- Housing Repairs
  - Prioritize home repairs for unfinished properties
  - Resistant construction by 6/15/14
  - Residents are back in their homes by the end of Phase III
- Begin Permanent Housing Construction (with case-by-case approvals)
  - Sites cleared, home kits delivered and installed, utilities connected
  - Complete permanent housing solutions for two condemned homes in Alakanuk in Phase III
- Housing Mitigation
  - HMGP current available funding is $1.1M
  - Implement Mitigation Strategies: complete elevations and rebuilds
- Infrastructure Requirements
  - Assess and rebuild infrastructure to meet future community needs
  - Galena has more robust and resilient housing and infrastructure at the end of Phase III
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<thead>
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<th>Flood Resiliency</th>
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<td>• Community Rating System (CRS) – Higher development and regulatory standards</td>
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<td>• No Adverse Impact</td>
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<td>• Natural and Beneficial Functions</td>
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<tr>
<td>• Nonstructural Flood proofing</td>
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<tr>
<td>• Elevations</td>
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<td>• Relocations</td>
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<td>• Buy-outs</td>
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Mitigation Funding

Louden Tribal Council

HMGP project award 39 home elevations for $5.2 Million
HMGP funds available May 25, 2014

City of Galena

- Power Plant
- Water Plant
- Fuel Tanks
- Elevation of City Hall and Health Clinic
- UAF Building
What is next?
Reconstruction
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