

DAM SAFETY

Chena River Lakes Flood Control Project

U.S. Army Corps of Engineers, Alaska District



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Fairbanks, Alaska

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North Pole, Alaska



US Army Corps of Engineers
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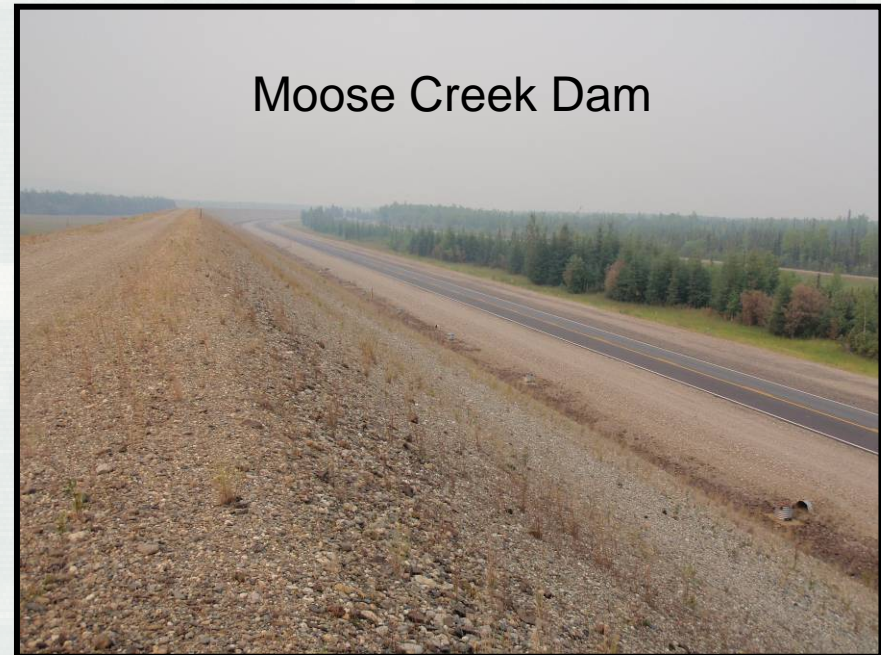
Agenda

- Welcome & Introductions
 - COL Reinhard Koenig, PE, Alaska District Commander
- Overview of Chena River Lakes Flood Control Project
 - John Schaake, Manager of the Chena Project
- Dam Safety at Moose Creek Dam
 - Trish Opheen, PE, Chief of the Engineering Division and Dam Safety Officer for the Alaska District
- Virtual Tour
 - Marcus Palmer, PE, Dam Safety Program Manager for the Alaska District
- Closing Remarks
 - COL Reinhard Koenig, PE, Alaska District Commander
- Questions & Answers



Welcome

- Public safety is our top priority.
 - We have extremely high public safety standards.
 - We are dedicated to making sure that risks associated with dams we own and operate are minimized.
 - We are coordinating with local, state and federal agencies.
- “Building and Preserving Alaska’s Future”
 - We are focused on quality.
 - We are committed to providing world-class facilities to our customers in Alaska.



Corps Representatives

- COL Reinhard Koenig, PE, Commander
- Trish Opheen, PE, Chief of Engineering & Dam Safety Officer
- Larry McCallister, PhD, PE, Deputy for Program Management
- Pat Coullahan, PE, Chief of Construction – Operations
- John Schaake, Manager of Chena Project
- Marcus Palmer, PE, Dam Safety Program Manager
- Chuck Wilson, Alternate Dam Safety Program Manager
- Tom Findtner, Public Affairs Officer
- Pat Richardson, Public Affairs Specialist
- Ken Eisses, PE, Chief, Hydraulics & Hydrology Section
- James Saucedo, PE, Chief, Engineering Services Branch
- Jim Pekar, PE, Chief, Geotechnical Services
- Tim Feavel, Senior Park Ranger

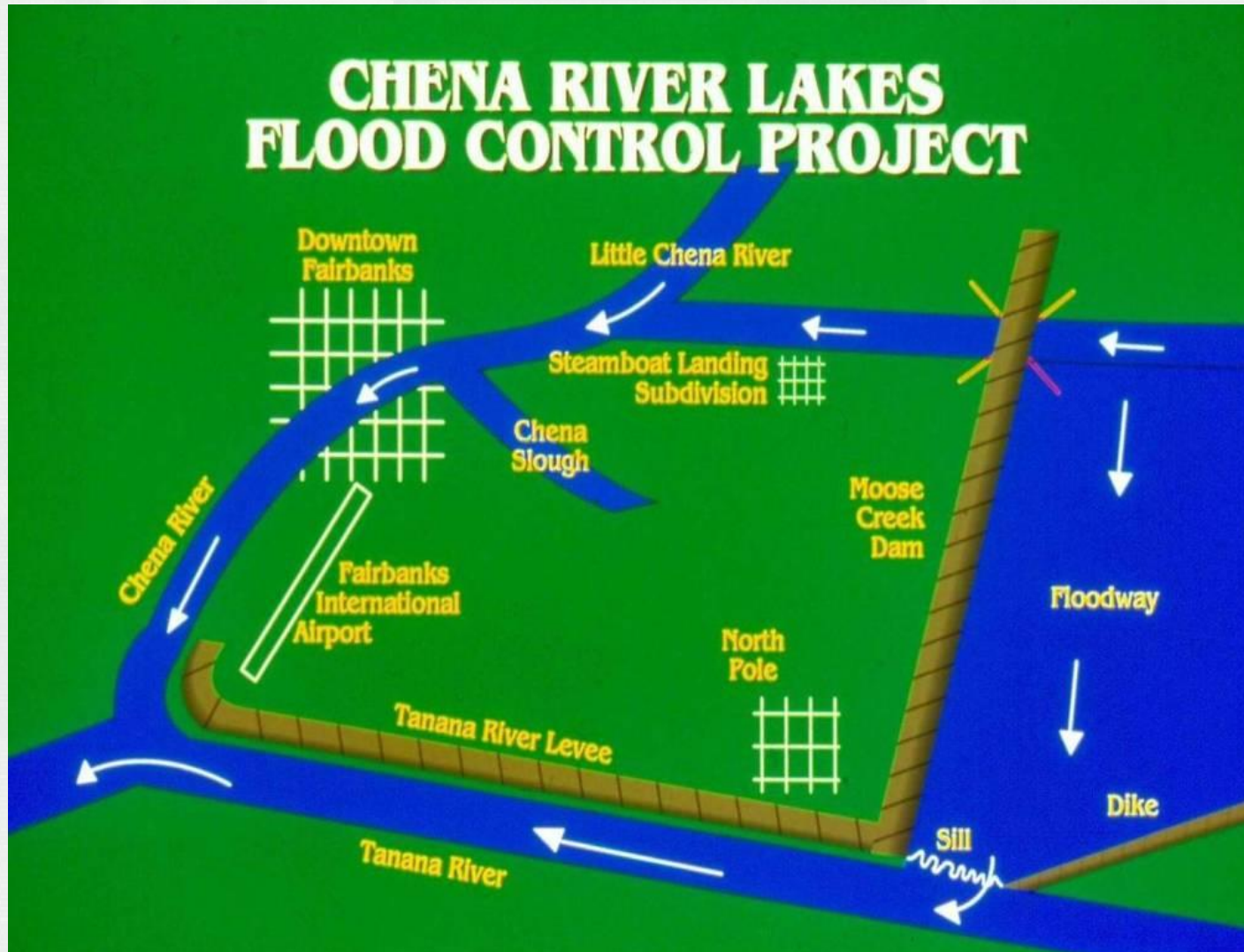


Federal-Borough Partnerships

- Army Corps of Engineers
 - Operates Moose Creek Dam
 - Manages Emergency Action Plan for the Chena Project
 - Provides inundation map information to Fairbanks North Star Borough
 - Manages Chena Project and all land outside the parks
- Fairbanks North Star Borough
 - Issues inundation maps to public
 - Oversees notification and evacuation of public
 - Provides emergency management services
 - Coordinates Emergency Response
 - Operates River and Lakes Parks



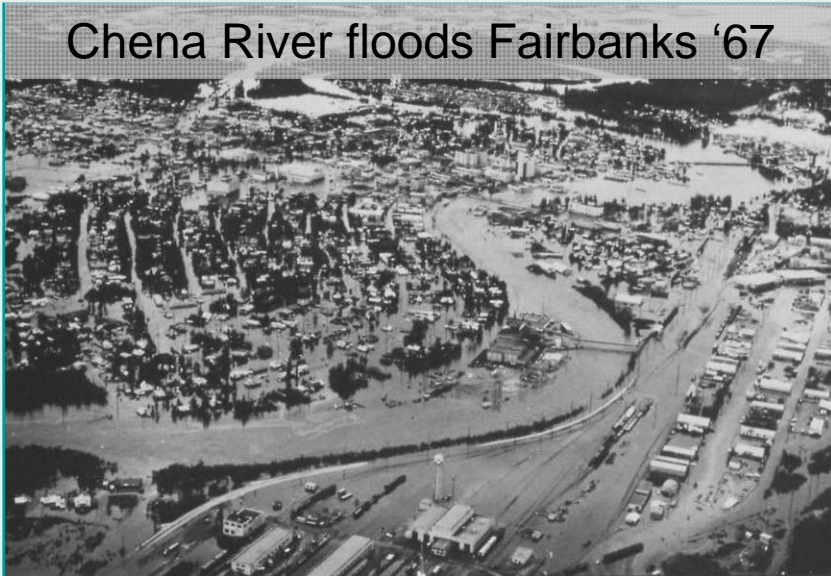
Project Overview



Project Timeline

- 1967: Chena River floods Fairbanks
- 1968: Congressional authorization
- 1973: Construction begins
- 1979: Project operational
- 1981: Test fill operation

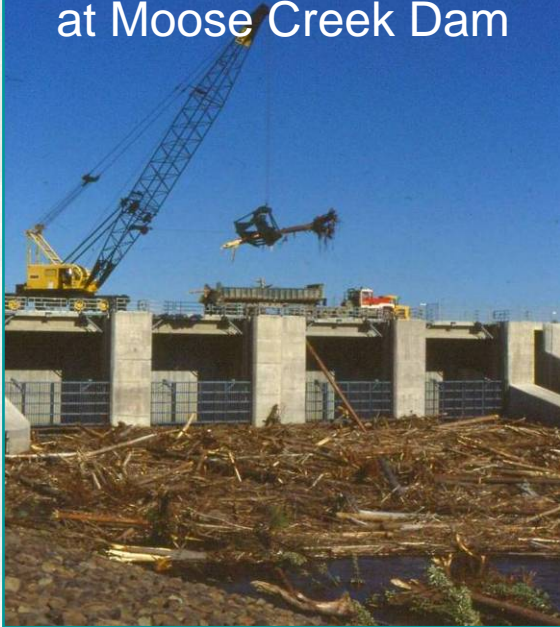
Chena River floods Fairbanks '67



Downtown Fairbanks
during flood of '67



Flood Debris Removal
at Moose Creek Dam



Project History

- Flood risk reduction operations
 - 20 dam operations to date
 - Largest operational flood: 1992*
- Recreational Operations
 - Recreation area opened in 1984
 - Partner with Borough

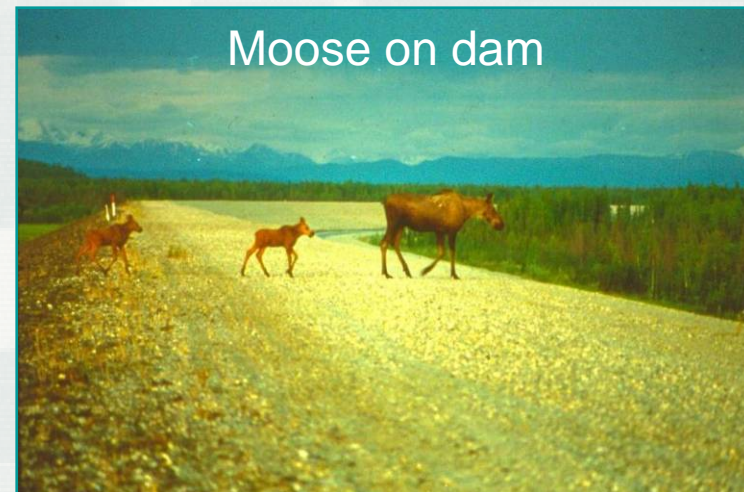
* Third largest documented flood on
Chena River since 1948

Chena River Lakes
Flood Control Project



Project Benefits

- Flood risk reduction
- Community asset
 - 20,000 acres of public land
 - 150,000 annual visitor days of use
 - Chena Lakes Recreation Area
 - * 250-acre recreational lake
 - * 2 fully developed parks with facilities / amenities
 - * Trail system maintained year-round



Project Benefits

- Public Events

- Special use / event permits

- * 30 permits issued annually

- * Available to community groups

- Corps sponsored annual events

- * Dam tours

- * School water safety program

- * Salmon watch program

- * Snowmobile Rendezvous and Safety Day

- * Moose hunt for paralyzed veterans

Paralyzed Veterans of America
Moose Hunt



Snowmobile Rendezvous



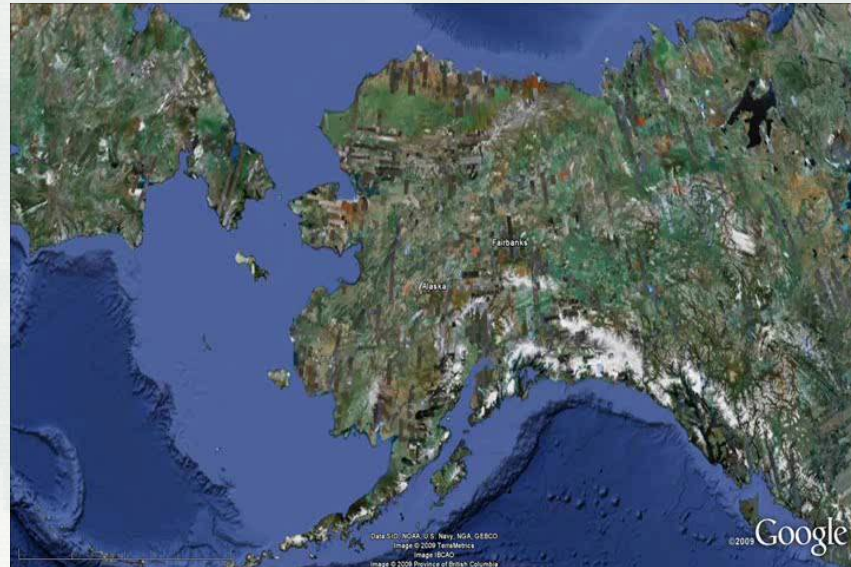
Corps Dam Safety Assessments

- Risk-Informed program initiated in 2001
- National teams evaluate all Corps dams beginning in 2005
- Evaluation process prioritizes the funding and allocation of dam safety resources Corps-wide
- Moose Creek Dam shown to have “Urgent and Compelling” safety concerns
- East Cutoff Dike shown to have “High Priority” safety concerns



Project Overview

- Virtual Tour
 - By Google Earth



Actions Currently Underway

- Interim Risk Reduction Measures (IRRM)s
 - Short term efforts (1-2 years) to reduce risk
 - Moose Creek IRRM implementation is funded
- Long-Term Solutions
 - Studies to enhance knowledge of current site conditions
 - Developing and evaluating alternatives
 - Implementation is national priority



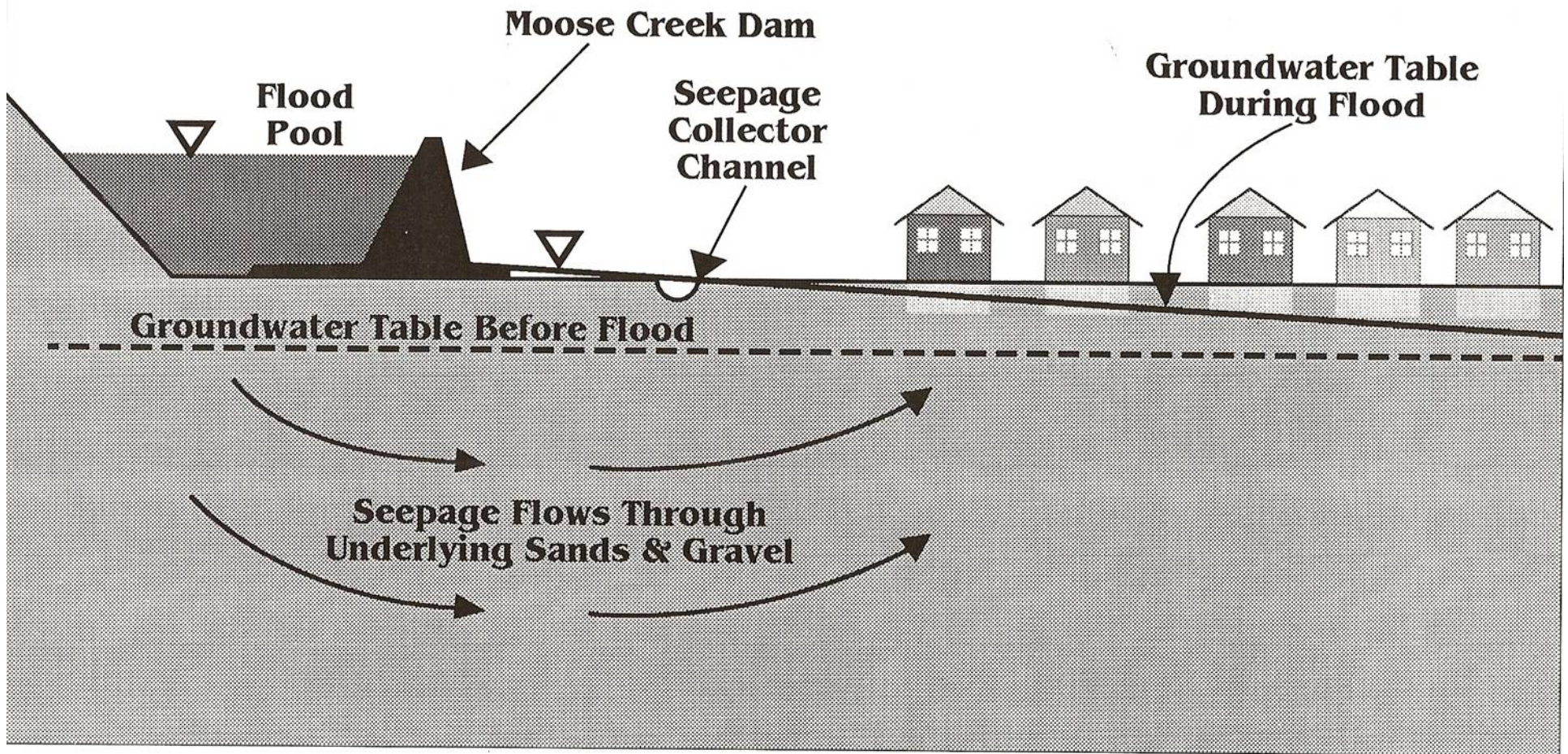
Dam Safety Review Identified Deficiencies

- Absence of a complete cut-off to prevent water from seeping beneath dam
- Relief well performance
- Excessive vegetation



Relief wells are subject to damage by frost action and have required continual maintenance or replacement





Moose Creek Dam

Five Potential Failure Modes

- Seepage and piping in the foundation
- Seepage and piping along both low point drains
- Foundation liquefaction during a seismic event



Moose Creek Dam

Five Potential Failure Modes



- Instability of the dam embankment during a seismic event
- Instability of the control works structure from both flood and seismic loadings



Moose Creek Dam

Interim Risk Reduction Measures (Ten)

1. Evaluate and Implement Lowering the Control Sill to the Tanana River
 - Evaluating flow conditions to reduce the peak height and duration of the impounded pool
 - Coordinating effects with Alaska DOT&PF and Alaska Railroad
 - Removing several vertical feet of sheetpile
 - Scheduled completion by May 2010



Moose Creek Dam

Interim Risk Reduction Measures

2. Revise and Exercise the Emergency Action Plan

- Include three-tiered plan
- Updated EAP distributed by May 2010
- Update inundation mapping
- Exercises
 - Orientation Seminar (Includes FNSB) ~ March 15, 2010
 - Table Top Exercise ~ Summer 2010
 - Functional Exercise ~ Summer 2011



Moose Creek Dam

Interim Risk Reduction Measures

3. Increase Stockpiled Materials

- Material and equipment for temporary levee near control sill and for additional flood fighting capacity
- Pre-arrange contracts for additional capacity
- Material in place summer 2010



Moose Creek Dam

Interim Risk Reduction Measures

4. Revise Flood Control Operations

- Considering fish ladder operations
- Increase discharge to maximum authorized when 1992 pool elevations are reached
- Water Control Manual updated by May 2010

5. Increased Monitoring and Surveillance

- Additional on-site and Fairbanks area staffing during flood events
- Additional instrumentation and routine inspections



Moose Creek Dam

Interim Risk Reduction Measures

6. Provide vehicle mounted lighting for flood monitoring
 - Installed on project related vehicles by May 2010
7. Improve relief well performance
 - 149 relief wells were inventoried, cleaned, and repaired in 2009
 - Adequacy (pump) testing in Summer 2010



Moose Creek Dam

Interim Risk Reduction Measures

8. Identify an alternative incident command center
 - Plan in place by May 2010
9. Vegetation removal
 - Clearing approximately 100 acres along 8.2 miles of dam and floodway
 - Coordinating with FNSB to provide wood to public while respecting clean air initiative
 - Removal complete in 2010
10. Perform more detailed potential failure mode analysis
 - Scheduled for May 2010



Three-Tiered Approach to Risk Reduction

- Tier 1 ~ Any pool elevation below the 1992 event (507.6 feet *MSL NAVD29).
 - Minimize pool elevation and retention time
 - Increased monitoring and surveillance
 - Flows limited to 8,500 cfs discharge measured downstream of the dam not to exceed 12,000 cfs at downtown Fairbanks gage

* All elevations in this presentation are Mean Sea Level based on North American Vertical Datum of 1929.



Three-Tiered Approach to Risk Reduction

- Tier 2 ~ Any pool elevation above the 1992 event (507.6 feet MSL).
 - Tier 2 preparation begins upon forecast above 507.6 feet MSL or at pool elevation 506.6 feet MSL
 - Discharge up to maximum authorized; 12,000 cfs measured at downtown Fairbanks gage
 - Monitor downstream areas that have historically experienced flooding above 8,500 cfs measured downstream of dam
 - Increased monitoring and surveillance



Three-Tiered Approach to Risk Reduction

- Tier 3 ~ Any pool elevation causing distress that compromises integrity of the dam.
 - Require immediate implementation of the Emergency Action Plan including evacuations and flood fighting to prevent uncontrolled release of pool
 - Discharge above 12,000 cfs measured at downtown Fairbanks gage is considered

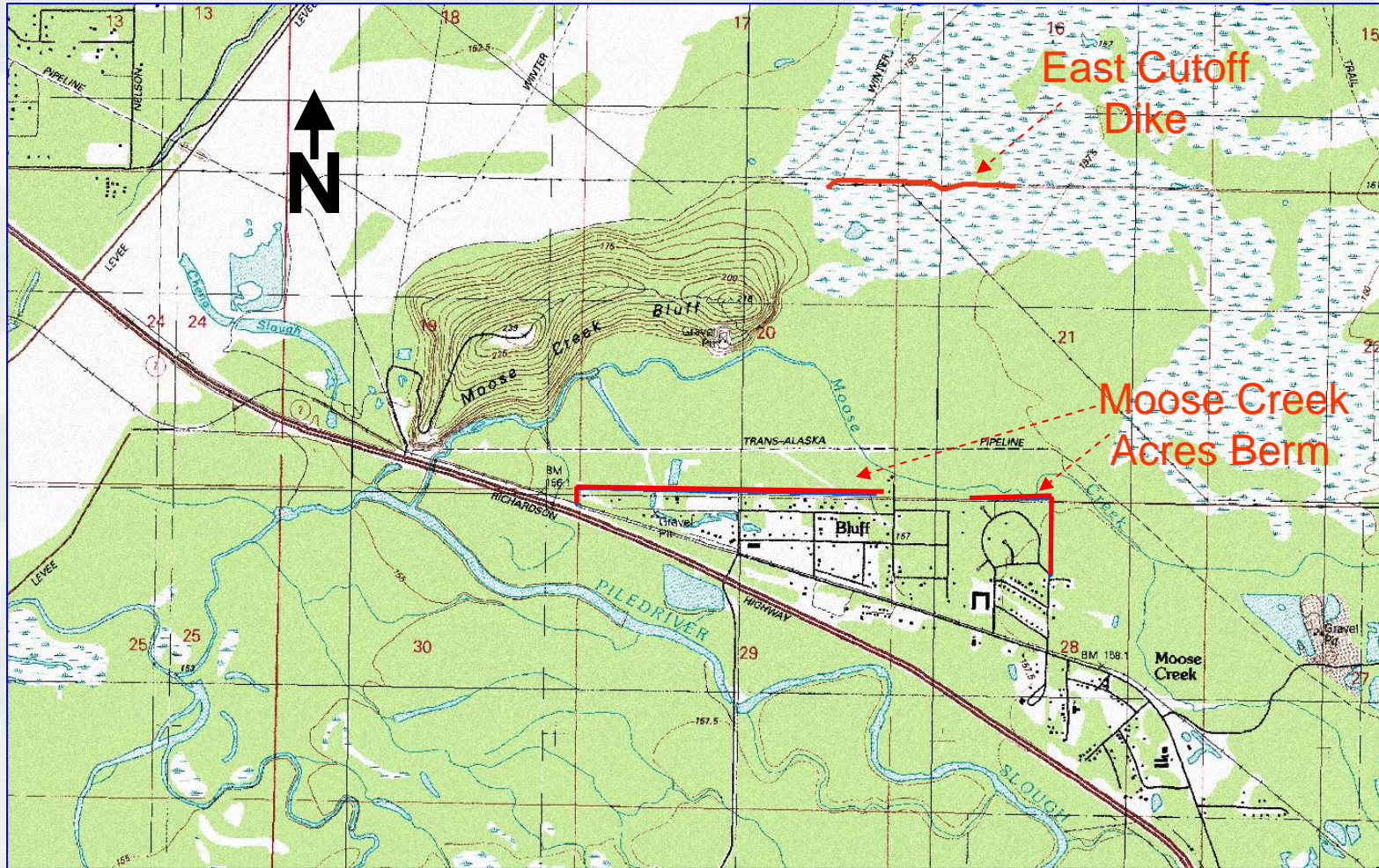


East Cutoff Dike Overview

- East Cutoff Dike shown to have “High Priority” safety concerns
- Potential Failure Modes
- Recommended Interim Risk Reduction Measures Alternatives



East Cutoff Dike Location



East Cutoff Dike

- East Cutoff Dike only retains water during extreme flood events
- Potential Failure Modes
 - Seepage and piping in the foundation during extreme flood events
 - Overtopping during extreme flood events



East Cutoff Dike

Interim Risk Reduction Measures

- Interim Risk Reduction Measures shared with Moose Creek Dam
 - Evaluate and implement lowering of the control sill
 - Revise and exercise the Emergency Action Plan
 - Control Sill and EAP revision completed by May 2010
- Interim Risk Reduction Measures specific to East Cutoff Dike
 - Increase monitoring and surveillance
 - Remove vegetation
 - Completed as funding allows



Command Emphasis

- Public safety
- Accountability for all activities in the Alaska District
- Continuity of command interest & involvement





QUESTIONS?



“Building and Preserving Alaska’s Future”