An Introduction to Dam Ownership

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Dam and Floodplain Section

Information for Owners

- History of Dams
- Dam Regulation
- Dam Inspection
- Emergency Action Plans
- Inspection Operation and Maintenance Plans
- Dam Transfer
- Grant Programs

History of Dams

Wisconsin is a state that was built by dams

Logging

Milling

Hydroelectric

Mill dam conversion

Utility

to

Municipal Ownership

Real

Estate

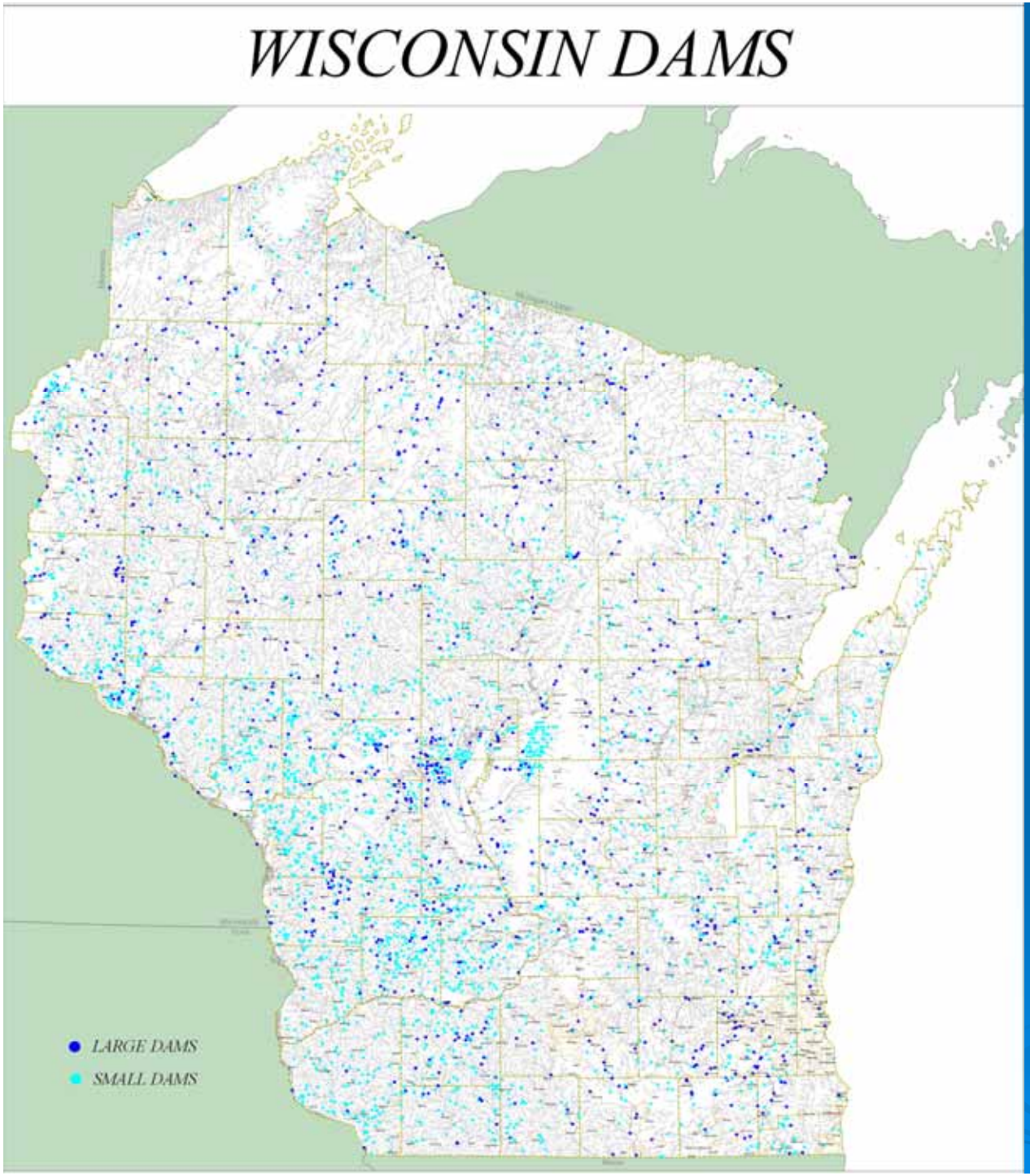
Development

Flood Control

Recreation

Raised Lakes

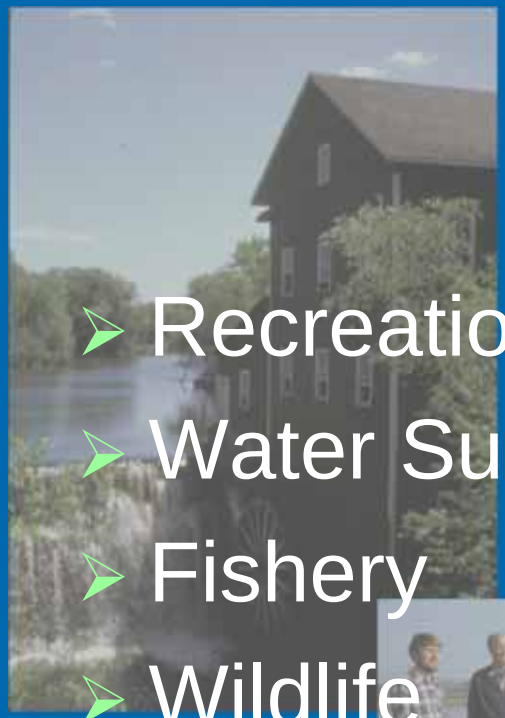
Ag/Wildlife



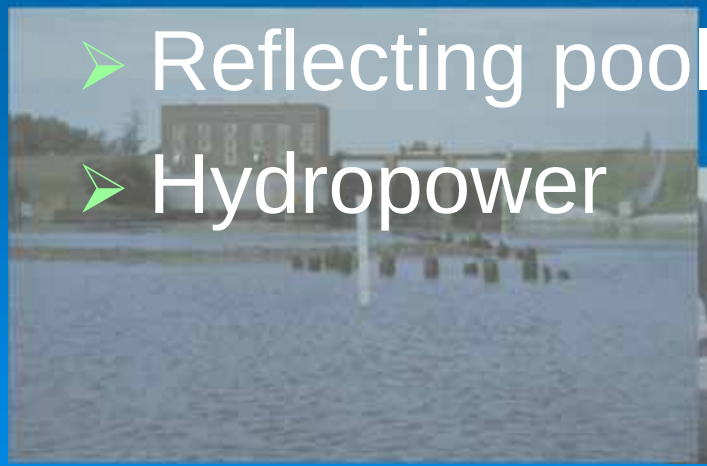
Wisconsin has over 3700 dams

Types of Dams

- Recreation
- Water Supply (Agriculture)
- Fishery
- Wildlife
- Detention / retention / flood control
- Reflecting pool
- Hydropower






Dams in Wisconsin

Benefits of Dams

+ Power generation
+ Navigation
+ Reservoir creation
+ Agricultural use
+ Waterfowl habitat

Impacts of Dams

- Fragment river habitat
- Disrupt stream flow and flooding patterns
- Increase water temperature
- Decrease dissolved oxygen
- Block fish migration

Dam Regulation

A Dam Is….

…Any artificial barrier, together with appurtenant works, built in or across a watercourse for the primary purpose of impounding or diverting water.

Reasons to Regulate
Authority in Chapter 31, State Statutes

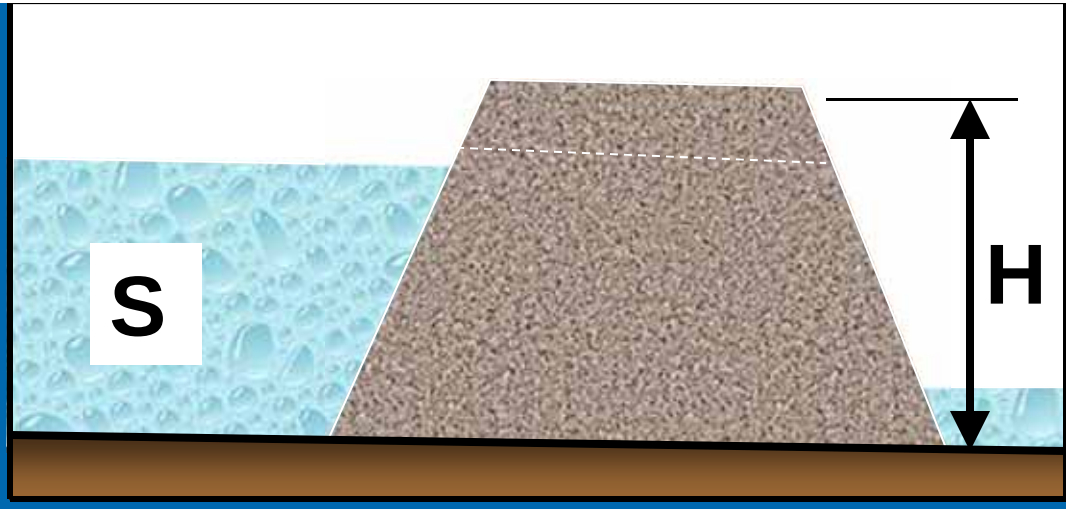
- Protection of public rights in navigable water - Public Trust Doctrine

- Protection of life, health and properrty from unsafe dams.

Classification

- Waterway Type - Public Trust
  - Navigable vs Nonnavigable
- Size - Public Safety
  - Large vs Small

Large Dam



Structural Height > 6 feet …and…

Maximum Storage >= 50 acre feet

or

Structural Height > =25 feet …and…

Maximum Storage >15 acre feet

or

Any dam that causes a significant threat to life or property

Dam Hazard Rating

- Hazard potential classifications are:
  - High hazard – probable loss of life
  - Significant hazard – significant property damage but no loss of life
  - Low hazard – no loss of life or significant property damage
- Base hazard rating on existing development and land use controls, not condition of the dam

Dam Regulation

- Permitting new dams
- Dam transfers
- Levels and flows
- Plan approval for repair/reconstruction/removal
- Approve EAP and IOM documents
- Process abandonment permits
- Safety Inspections
- Emergency response

Primary responsibility of WMEs & WMSs

Regulation Requirements

- A permit or application/approval may be required to:
  - Repair, enlarge, or alter a dam
  - Construct or reconstruct a dam
  - Remove or breach a dam
  - Drawdown or maintain altered water levels
  - Transfer ownership/financial responsibility

The responsibility for proper operation, maintenance, and inspection of dams falls upon dam owners.

Owner Responsibility

- Operate and Maintain in Safe Manner
- Perform Periodic Inspections
- Prepare and Implement EAP/IOM Plans
- Obtain Appropriate Permits/Approvals
- Coordinate Operation with Others
- Keep Informed About Regulations

Dam Inspection

- Dam inspection is a key element of a dam safety program
- The State may/must enter and inspect (Ch 31.19)
  - Mandatory 10 year inspection (Significant & High Hazard)
  - On discretion or upon complaint
  - To ascertain compliance or enforce conditions of approval
  - determine water levels or appropriate operation

Dam Inspection

- Owners of large dams are required to inspect their dam periodically inspected by a P.E. at a frequency based on hazard.
  - High = every 2 years (4 x between DNR inspections
  - Significant = every 3-4 years (2 x between DNR inspections)
  - Low = once every 10 years

Dam Inspection

- Submit report within 90 days
  - Results of inspection
  - Identified deficiencies
  - Recommendations
- Inspection schedules have been established and can be viewed on website http://dnr.wi.gov/topic/Dams/damSearch.html
  search on dams, click owner tab, click Dam Search

Purpose of Inspections

- Look for CHANGE in Conditions
- Identify O & M needs
- Identify small problems before they become big problems
- Identify early warning signs of failure

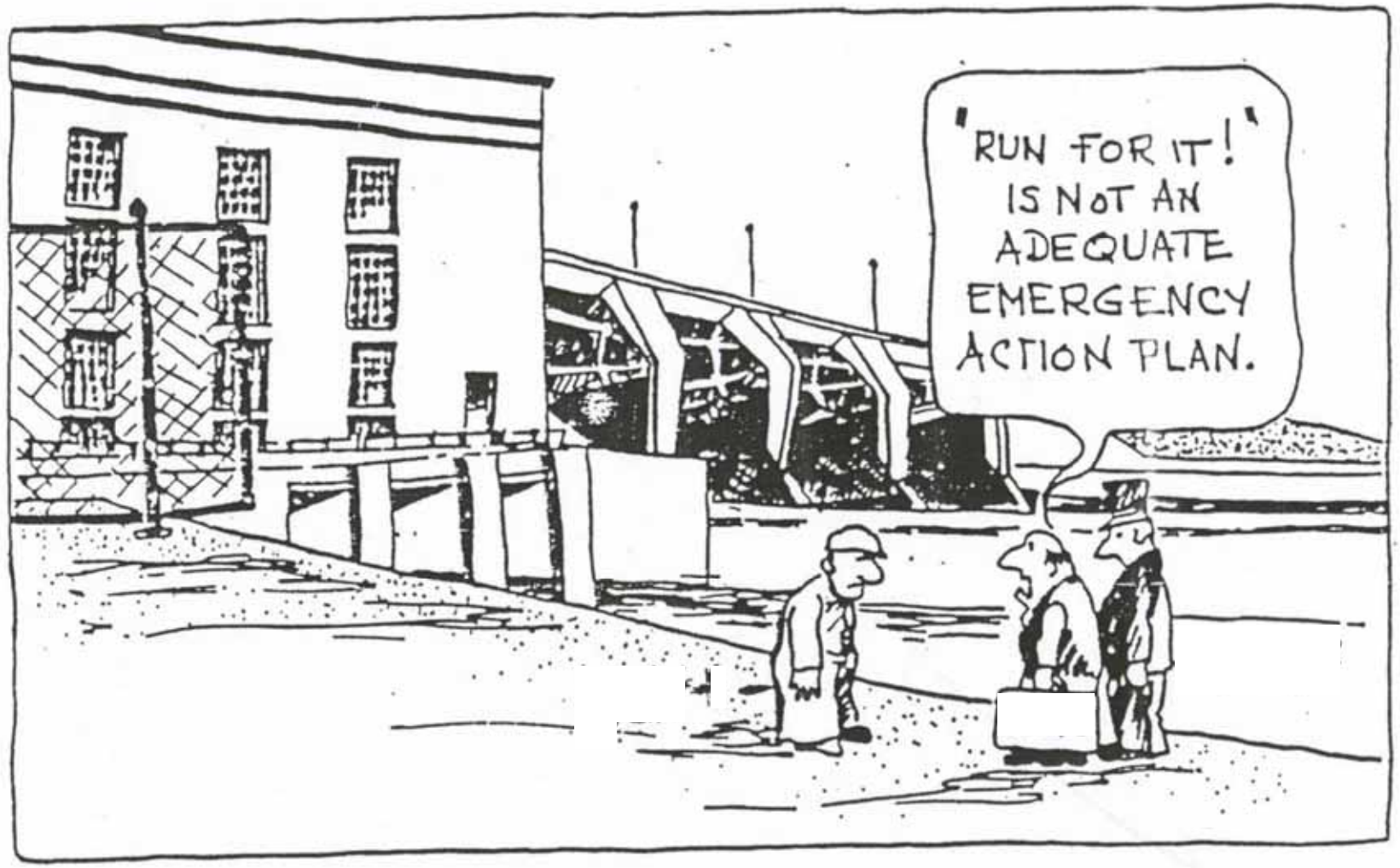
Dam owners should inspect their dam more frequently than state mandate

Common Problems

- Trees and Brush
- Deteriorated Concrete
- Woody Vegetation
- Deteriorated Outlet Pipe
- Trees and Brush
- Inoperable Gates
- Woody Vegetation
- Embankment Erosion/Seepage
- Trees and Brush

EAP & IOM Requirements

- Emergency action plans (EAPs) and Inspection, Operation and Maintenance Plans (IOM) are required by the State for large dams...
  - At the time of initial dam construction
  - Upon reconstruction, substantial alteration or approval to raise and enlarge a dam
  - After a dam failure incident
  - Directive as a result of an inspection


'RUN FOR IT!'
IS NOT AN
ADEQUATE
EMERGENCY
ACTION PLAN.

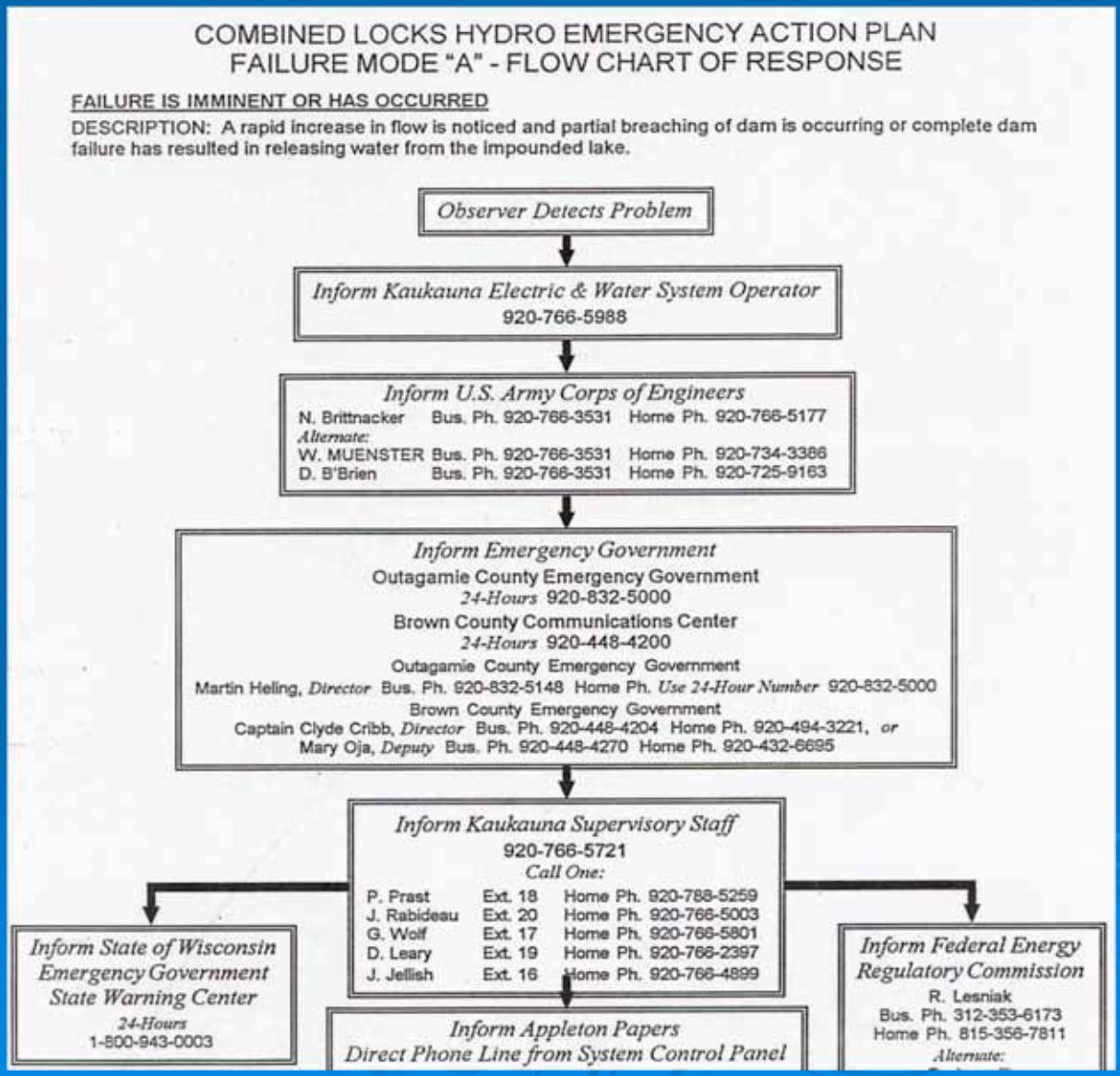
Emergency Action Plan

- Formal Document - unique to each dam
- Identifies potential emergency conditions
  - Failure in progress
  - Potential failure conditions exist
  - Flooding condition, no threat to dam
- Specifies procedures to:
  - mitigate problems at dam
  - notify effected population
  - Activate emergency services

Emergency Action Plan

- Provides information for local emergency managers
- Identifies notification responsibilities
- Completed by dam owner in coordination with local emergency managers
- Document is signed by parties with response responsibility
- Template available on website

EAP Flow Chart



COMBINED LOCKS HYDRO EMERGENCY ACTION PLAN
FAILURE MODE "A" - FLOW CHART OF RESPONSE

FAILURE IS IMMINENT OR HAS OCCURRED

DESCRIPTION: A rapid increase in flow is noticed and partial breaching of dam is occurring or complete dam failure has resulted in releasing water from the impounded lake.

Observer Detects Problem

Inform Kaukauna Electric & Water System Operator
920-766-5988

Inform U.S. Army Corps of Engineers
N. Brittnacker Bus. Ph. 920-766-3531 Home Ph. 920-766-5177
Alternate:
W. MUENSTER Bus. Ph. 920-766-3531 Home Ph. 920-734-3386
D. B'Brien Bus. Ph. 920-766-3531 Home Ph. 920-725-9163

Inform Emergency Government
Outagamie County Emergency Government
24-Hours 920-832-5000
Brown County Communications Center
24-Hours 920-448-4200
Outagamie County Emergency Government
Martin Heling, *Director* Bus. Ph. 920-832-5148 Home Ph. *Use 24-Hour Number* 920-832-5000
Brown County Emergency Government
Captain Clyde Cribb, *Director* Bus. Ph. 920-448-4204 Home Ph. 920-494-3221, *or*
Mary Oja, *Deputy* Bus. Ph. 920-448-4270 Home Ph. 920-432-6695

Inform Kaukauna Supervisory Staff
920-766-5721
Call One:

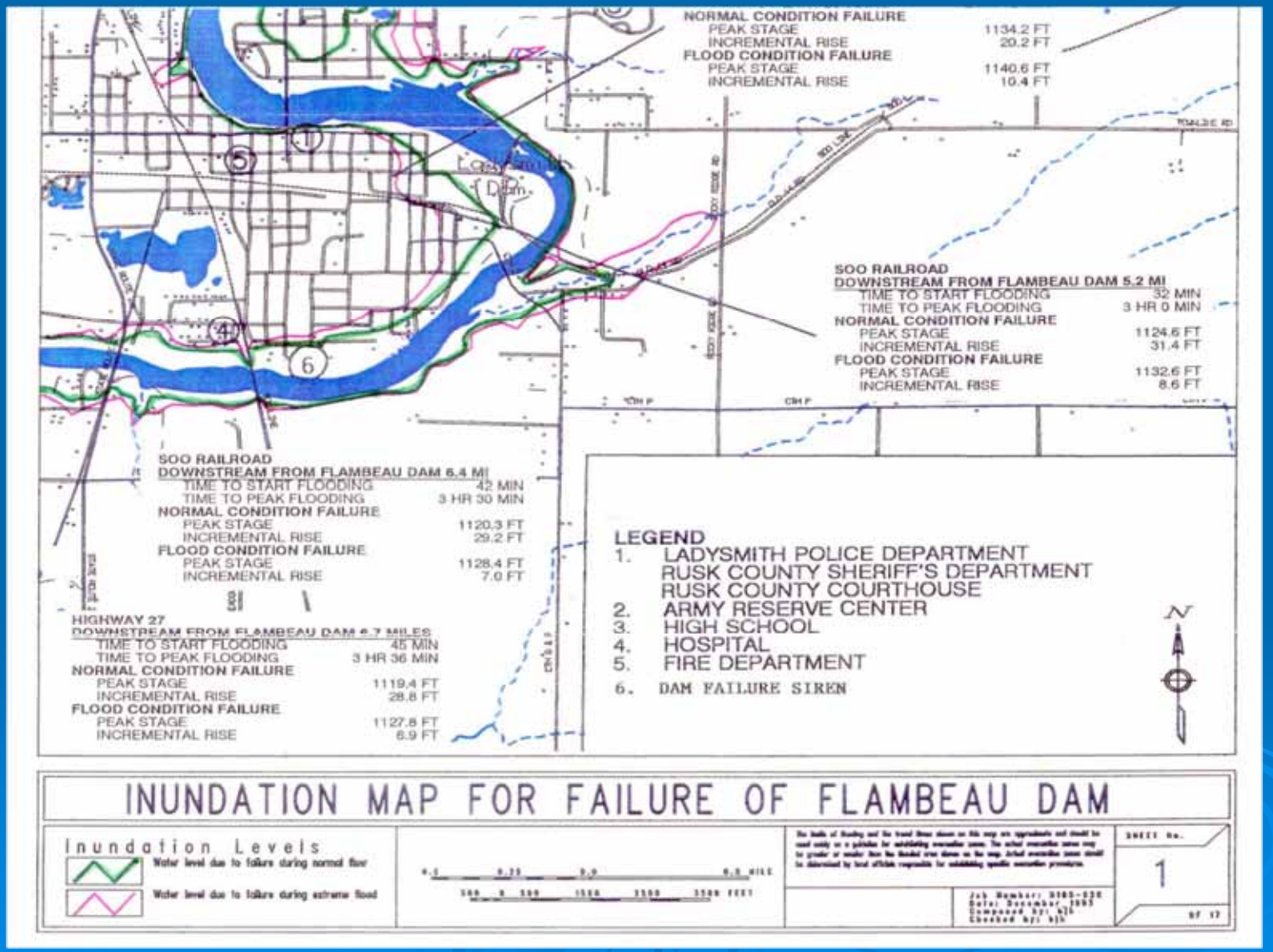
P. Prast	Ext. 18	Home Ph. 920-788-5259
J. Rabideau	Ext. 20	Home Ph. 920-766-5003
G. Wolf	Ext. 17	Home Ph. 920-766-5801
D. Leary	Ext. 19	Home Ph. 920-766-2397
J. Jellish	Ext. 16	Home Ph. 920-766-4899

Inform State of Wisconsin Emergency Government State Warning Center
24-Hours
1-800-943-0003

Inform Appleton Papers
Direct Phone Line from System Control Panel

Inform Federal Energy Regulatory Commission
R. Lesniak
Bus. Ph. 312-353-6173
Home Ph. 815-356-7811
Alternate:

EAP Inundation Map



Dam Failure Notification

1. Name, title, callback number of reporter
2. Name, location, county, river of dam
3. Time of failure, if failure has occurred
4. Present condition of dam (overtopping, seeping (clear/cloudy), concrete cracking, gate operability, downstream boils, breach, culvert failure)
5. Who else contacted
6. Areas threatened downstream
7. Agencies/personnel on-site
8. Weather conditions

IOM Plan
proper prior planning prevents…..

IOM Plan

- Plan should include..
  - water level orders and procedures to maintain levels
  - Procedure for recording operation and levels
  - An operation schedule
  - A maintenance schedule and procedures
  - Names and telephone numbers of key people
  - Maintenance should include all area identified on the “Dam Inspection Checklists” which are used to inspect the dam.
- Template is available on website

Dam Transfers

- **s. 710.11, State Statutes - Transfer of land where dam exists.** A person may not accept the transfer of the ownership of a specific piece of land on which a dam is physically located unless the person complies with s. 31.14(4) – (financial responsibility or ownership/access)
- Both the seller of property on which a dam is located, and the buyer of the property, must cooperate to complete the dam transfer process.
- Realtors, attorneys, and lenders are required by law to advise clients of these requirements.
- If dam transfer requirements are not met, the real estate transaction may be nullified.

Dam Transfers

- Key elements of transfer
  - Inspection
  - Proof of financial responsibility
  - Transfer of permit or approval
- Identifies potential dam deficiencies, allowing buyer to understand the responsibility and potential liability of dam purchase
- Helps assure responsible ownership

Dam Transfers

- Application and fee required for transfer (processed by WMS/WME for county)
- Statutes limit who can assume ownership of a dam.
- Ownership can be transferred from
  - a private individual to another private individual;
  - a private individual to a municipality; or
  - a municipality to another municipality.

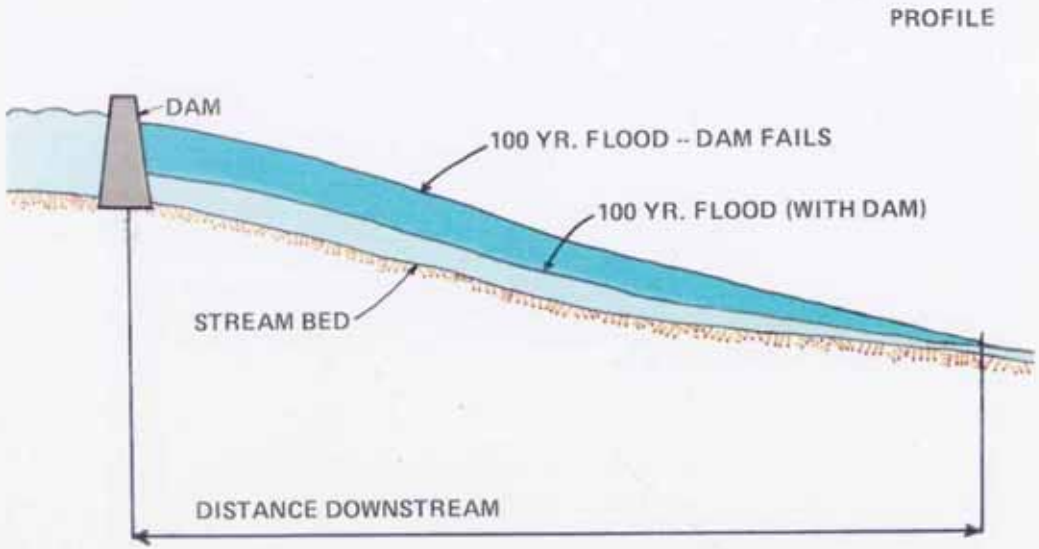
Dam Funding

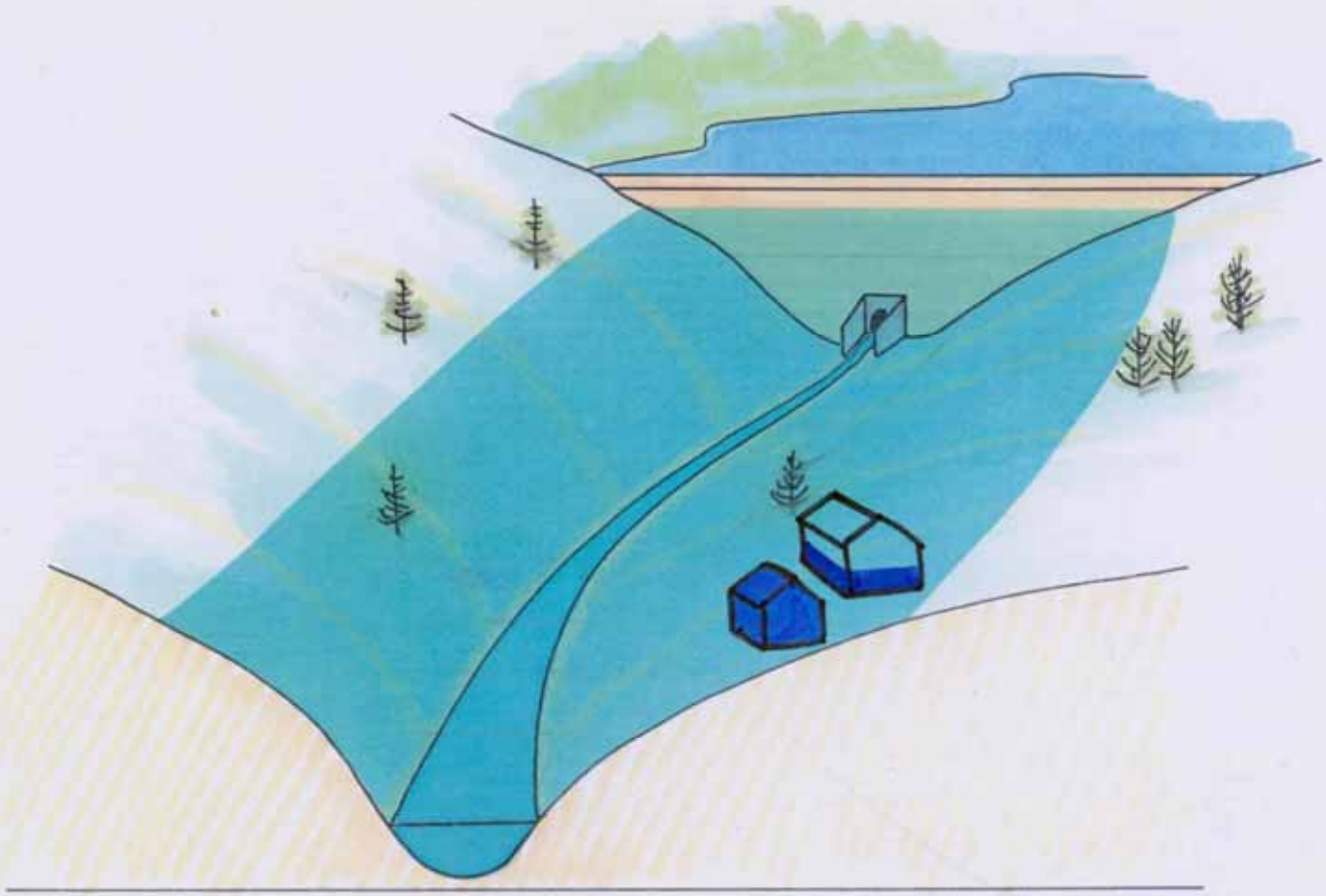
Dam owners have ultimate responsibility for the bringing their dams into compliance with all applicable requirements. The legislature has provided funding in the past to assist some owners with these responsibilities.

- NR 335 - Municipal Dam Grants
- NR 336 - Dam Removal Grants

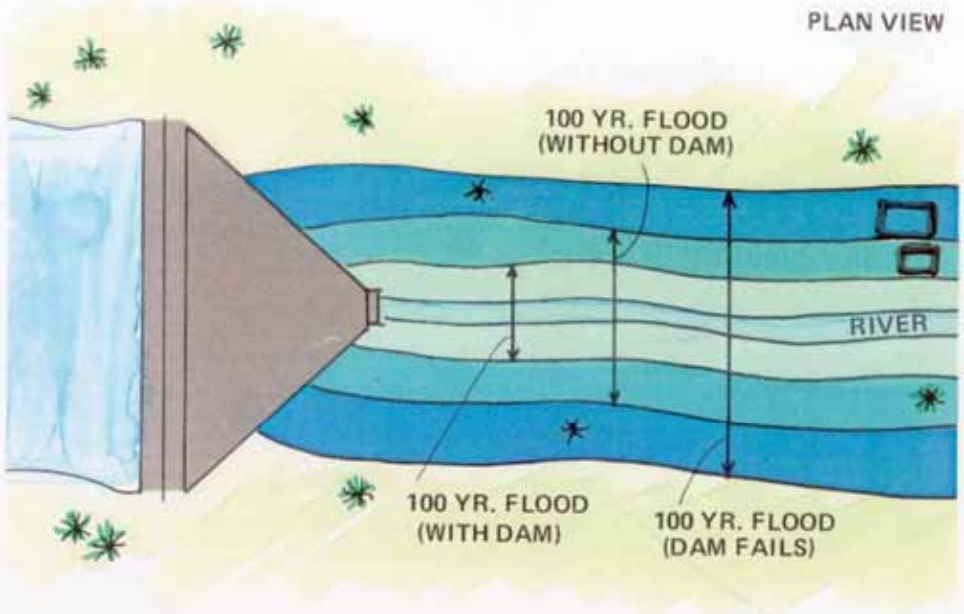
Remember…

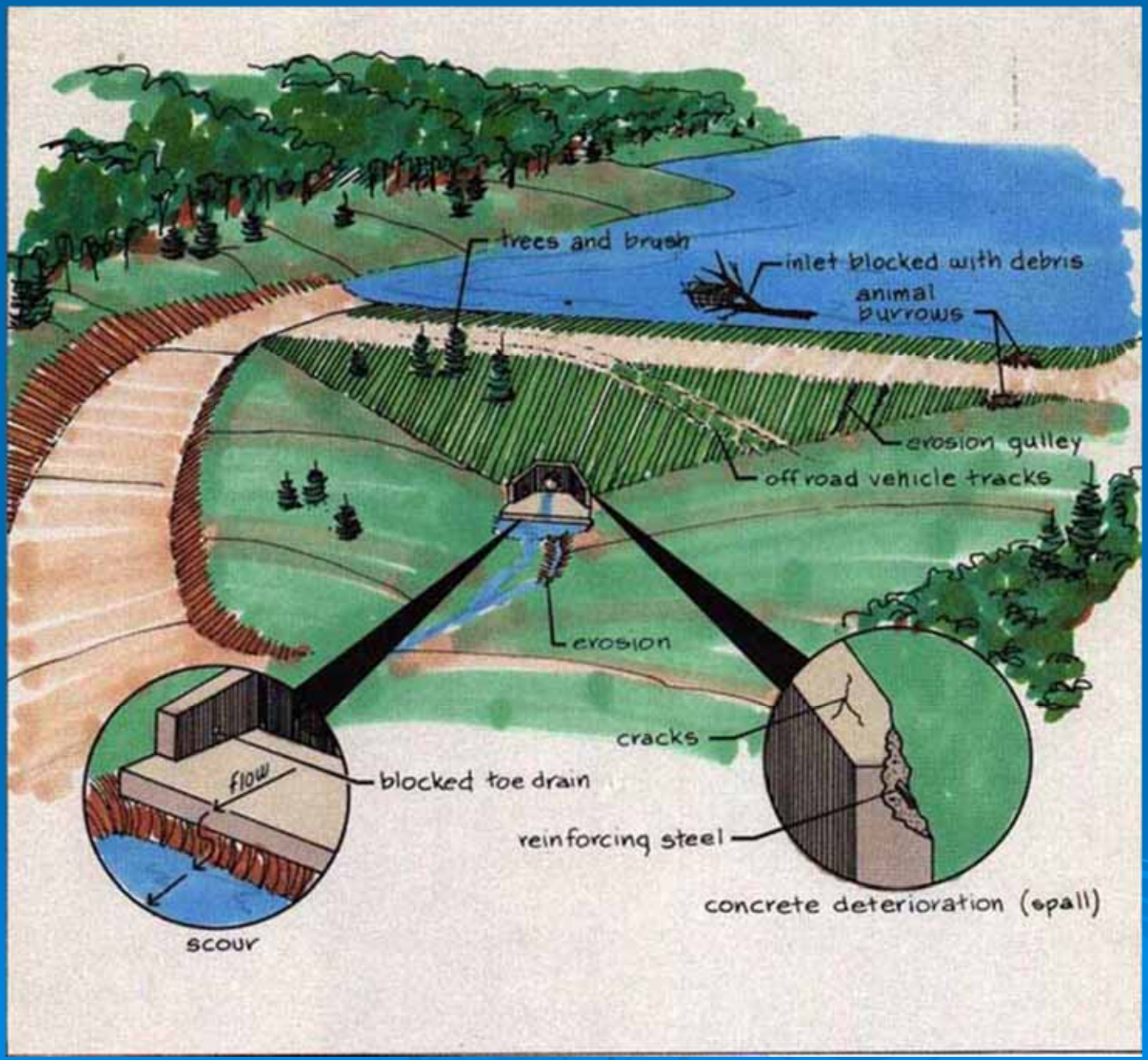
…Be Dam Safe


PROFILE
DAM
100 YR. FLOOD -- DAM FAILS
100 YR. FLOOD (WITH DAM)
STREAM BED
DISTANCE DOWNSTREAM



100 YEAR FLOOD -- DAM FAILURE


PLAN VIEW
100 YR. FLOOD
(WITHOUT DAM)
RIVER
100 YR. FLOOD
(WITH DAM)
100 YR. FLOOD
(DAM FAILS)


trees and brush
inlet blocked with debris
animal burrows
erosion gulley
off road vehicle tracks
erosion
cracks
blocked toe drain
flow
reinforcing steel
concrete deterioration (spall)
scour

Statutes – Codes - Guidance

- Chapter 31, State Statutes
- NR 300 – Fees
- NR 330 – Signing
- NR 333 – Design Standards, Large Dams
- NR 335 – Municipal Grant Program
- NR 353 – Wetland Restoration Projects
- NR 336 – Small Dam Removal/Abd. Dam Grants
- NR 331 – Fish Passage
- Water Regulation Handbook
  - Chapters 130 (levels/flows) & Chapter 140 (dams)

“Safe” vs “Unsafe” Dams

- A “Safe” Dam is compliant with Requirements in NR 333 and NR 116
  - Design Spillway Capacity
  - Appropriate Zoning for Hazard
  - Adequate Stability
  - Approved EAP & IOM
- An “Unsafe” Dam has deficiencies which could result in the improper operation or failure of a dam (capacity, stability, seepage, animal burrows, erosion, vegetation, ownership)

Safety Deficiencies

- A condition that impairs or adversely affects the safe operation of a dam.
  - Embankment cracks, erosion, or deep animal burrows.
  - Unusual seepage.
  - Dam instability.
  - Inadequate spillway capacity
  - Outlet weakness

Most Common Causes of Dam Failure

- Overtopping
  - Capacity
  - operation
- Structural failure
- Slope failure
- Cracking
- Poor maintenance
- Piping

Dam Failure Anaylsis

- Used for three purposes
  - Identify the innundation area and determine the hazard potential
  - Determine the design capacity requirements
  - Incorporate into the Emergency Action Plan
- Data intensive analysis done by engineering consultant

Transfers

- Application with fee
- Ch 140
  - 16 - Transfer of existing dams
  - 32 - Financial capability
  - 40 – Transfer of ownership
  - 55 – Transfer process
  - 56 - Establishing Financial responsibility
- For large dam, do full inspection or use recent inspection to establish conditions
- Differences between permitted dams and mill dams. Don’t always do a formal transfer.