AECOM Water

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Evaluation of Public Safety at Run-of-River Dams

- An Illinois Statewide Program

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making every drop count

Authority

Section 23a of the Rivers, Lakes and Streams Act (615 ILCS 5/23a) Authorizes IDNR to:

- **Inspect Dams**
- **Establish Standards**
- **Issue Permits**

for Construction, Repair, Operation and Maintenance of New and Existing Dams.

Purpose of Study

Run-of-River Dams Pose a Public Safety Hazard to Recreational Users.

Illinois Commissioned this Study to:

- Evaluate Existing Public Safety
- Consider Additional Public Safety Measures
- Evaluate Dam Removal/Modifications.

Scope of Study

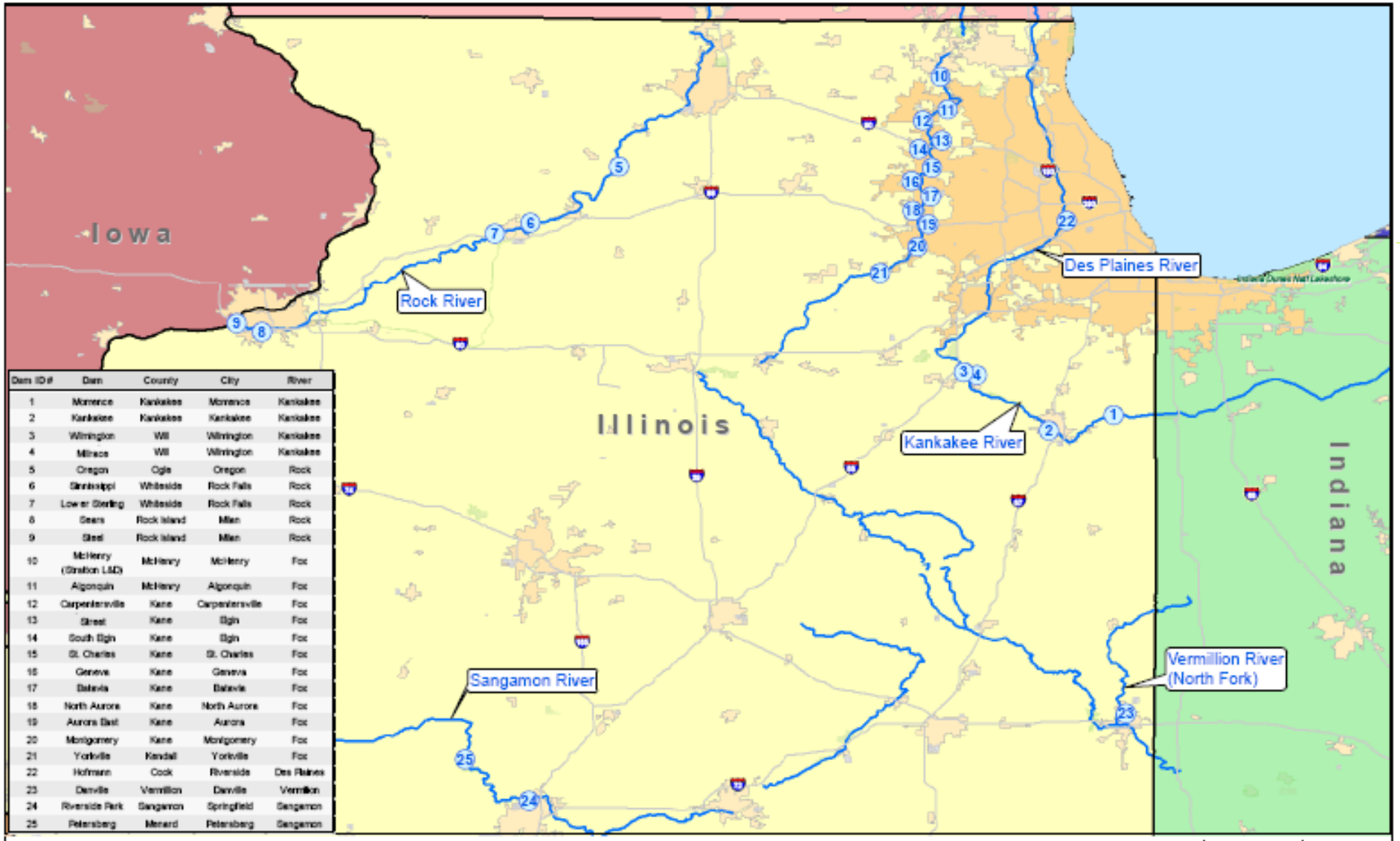
Document:

- Existing Public Safety Measures
- Condition of the Dams
- Access for Emergency Services
- Portage and Launching Facilities
- Riverbed Conditions 500 Feet U/S and D/S
- If Hydropower Operations Impact Public Safety

Scope of Study

Develop:

- Non-structural Public Safety Options
- Temporary Structural Options
- Permanent Structural Options
- Temporary and Permanent Options for Each Dam



Dam ID #	Dam	County	City	River
1	Momence	Kankakee	Momence	Kankakee
2	Kankakee	Kankakee	Kankakee	Kankakee
3	Wilmington	Will	Wilmington	Kankakee
4	Milnes	Will	Wilmington	Kankakee
5	Oregon	Ogle	Oregon	Rock
6	Sinnissippi	Whiteside	Rock Falls	Rock
7	Lower Sterling	Whiteside	Rock Falls	Rock
8	Sears	Rock Island	Milan	Rock
9	Steel	Rock Island	Milan	Rock
10	McHenry (Stratton L&D)	McHenry	McHenry	Fox
11	Algonquin	McHenry	Algonquin	Fox
12	Carpentersville	Kane	Carpentersville	Fox
13	Street	Kane	Elgin	Fox
14	South Elgin	Kane	Elgin	Fox
15	St. Charles	Kane	St. Charles	Fox
16	Geneva	Kane	Geneva	Fox
17	Batavia	Kane	Batavia	Fox
18	North Aurora	Kane	North Aurora	Fox
19	Aurora East	Kane	Aurora	Fox
20	Montgomery	Kane	Montgomery	Fox
21	Yorkville	Kendall	Yorkville	Fox
22	Hofmann	Cook	Riverside	Des Plaines
23	Danville	Vermilion	Danville	Vermilion
24	Riverside Park	Sangamon	Springfield	Sangamon
25	Petersburg	Menard	Petersburg	Sangamon

0 5 10 20 Miles

1 inch equals 20 miles

Dams and Locations

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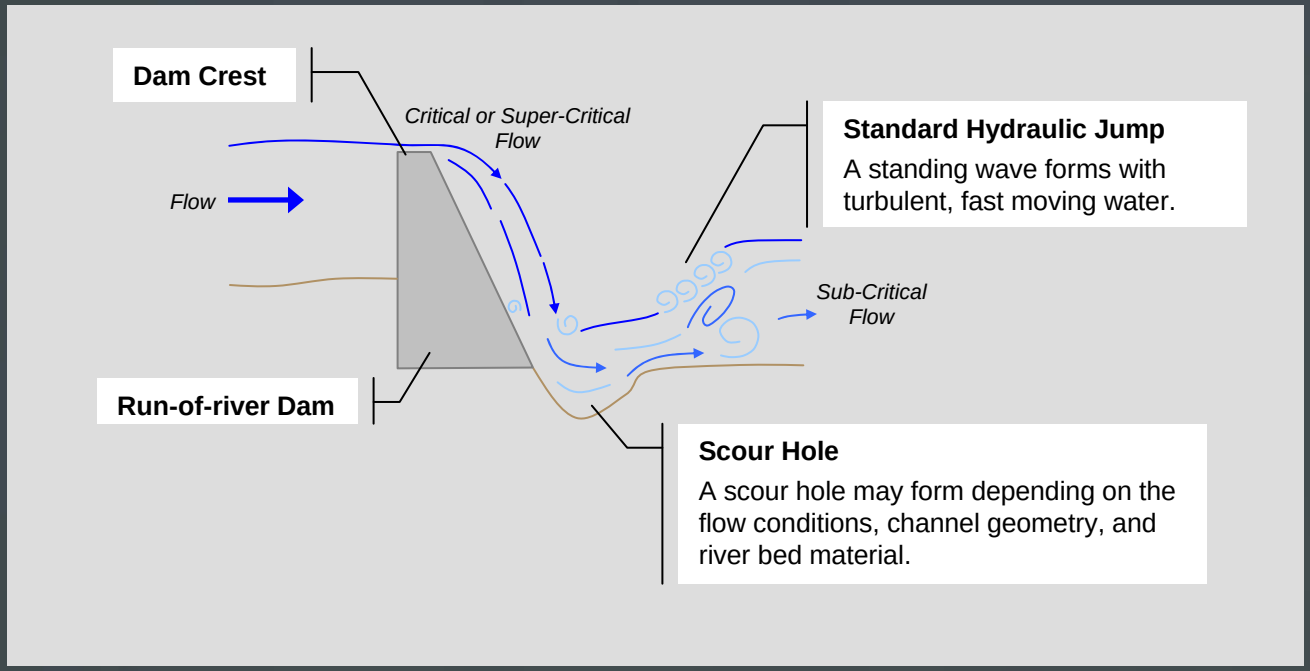
Figure 1.6-1
Dams and Locations

Why a Hazard?

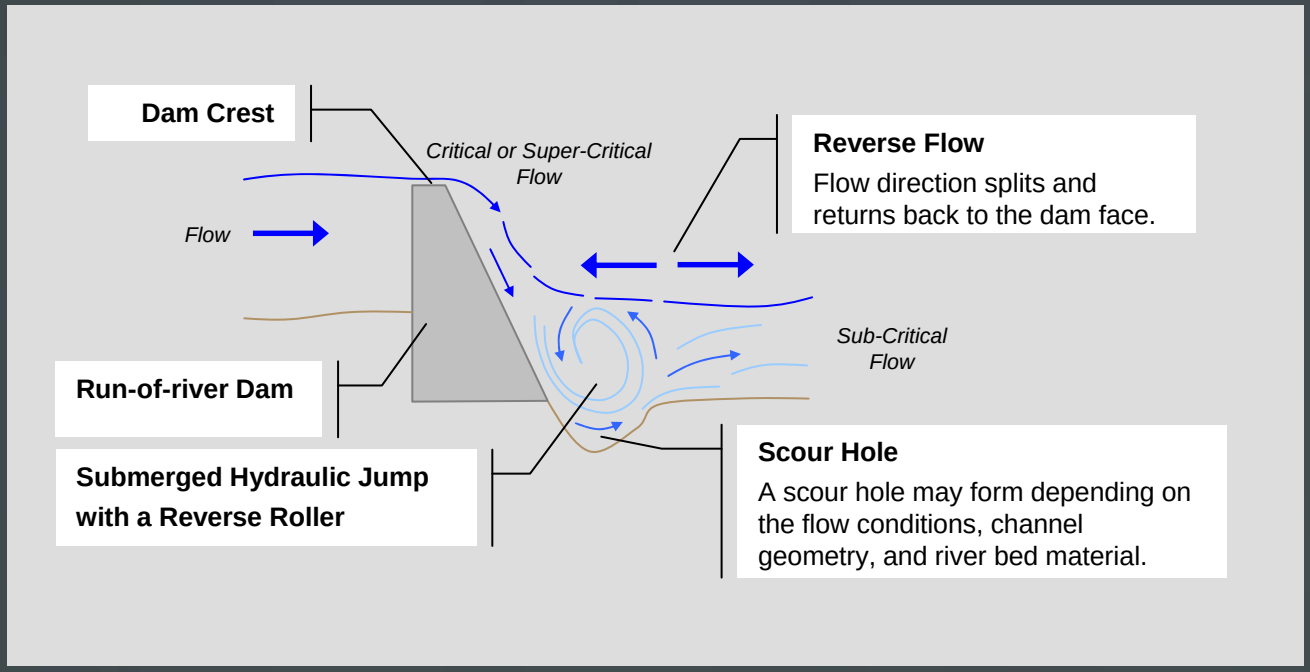
Standard Hydraulic Jump



A Safety Hazard Due to Turbulence

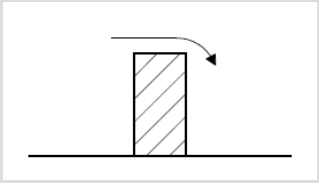
Why a Hazard?

Submerged Hydraulic Jump

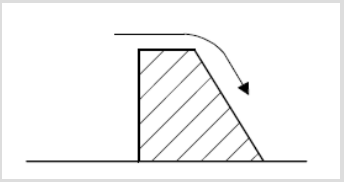


A Safety Hazard Due to a Strong Circulatory Nature

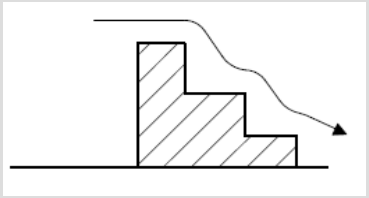
Dam Spillway Types



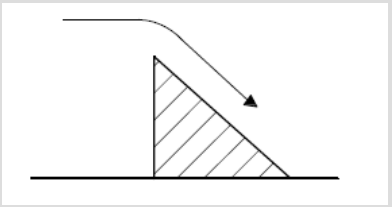
Broad Crest with Vertical Face



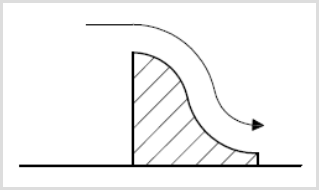
Broad Crest with Sloping Face



Broad Crest with Stepped Face



Narrow Crest with Sloping Face



Rounded Ogee Crest with Sloping Face

Sample Inspection Figure

Public Safety Measures

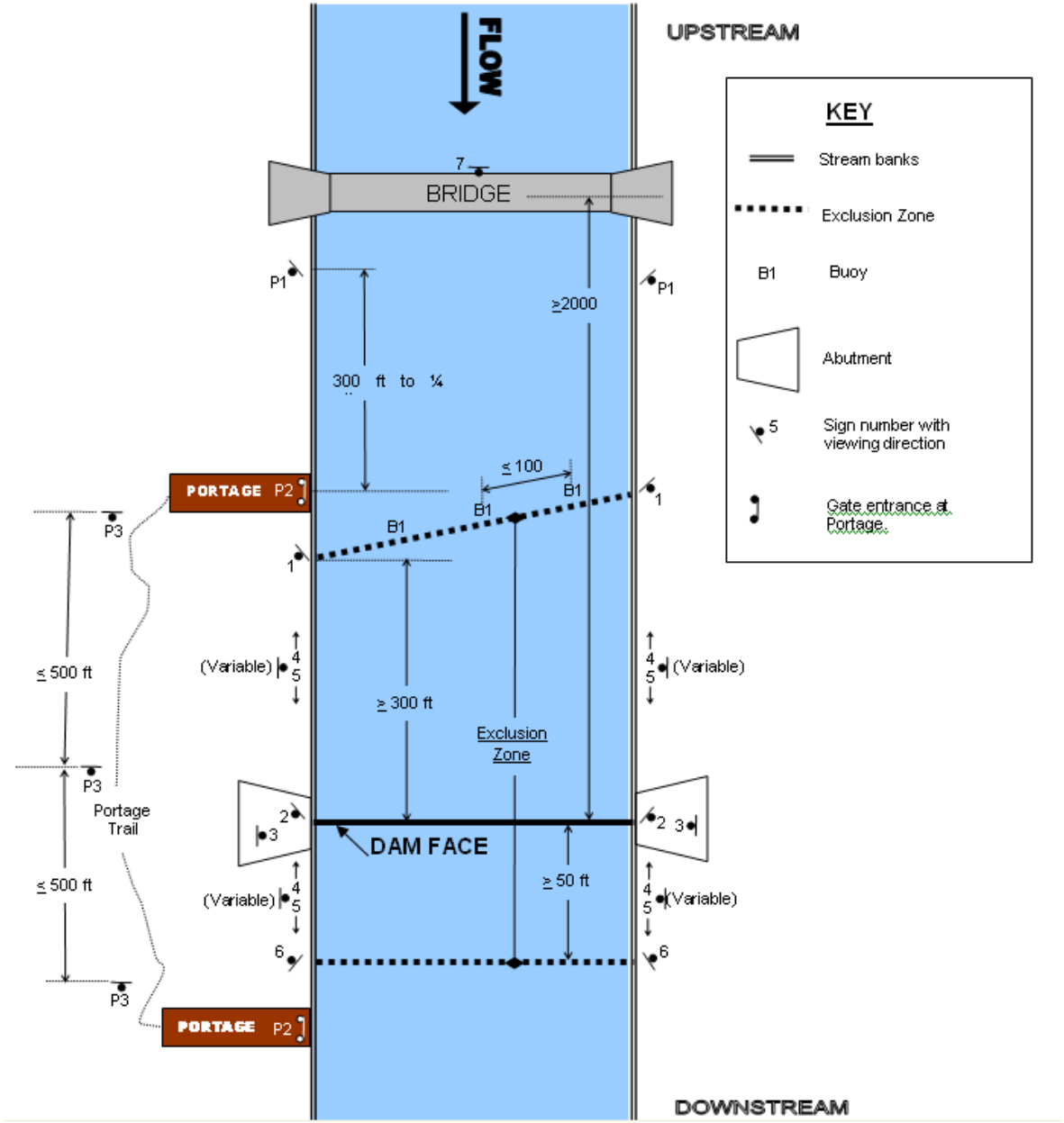
- Signage
- Public Awareness Programs
- Temporary Structural Options
- Permanent Structural Options

Study Limitations

Not Considered:

- **Right-of-Way (ROW) Acquisition**
- **Access for Construction**
- **Maintenance and Replacement**
- **Alternative Signage for Unique Situations**
- **Community Acceptance**

General Signage Schematic



Example Signage

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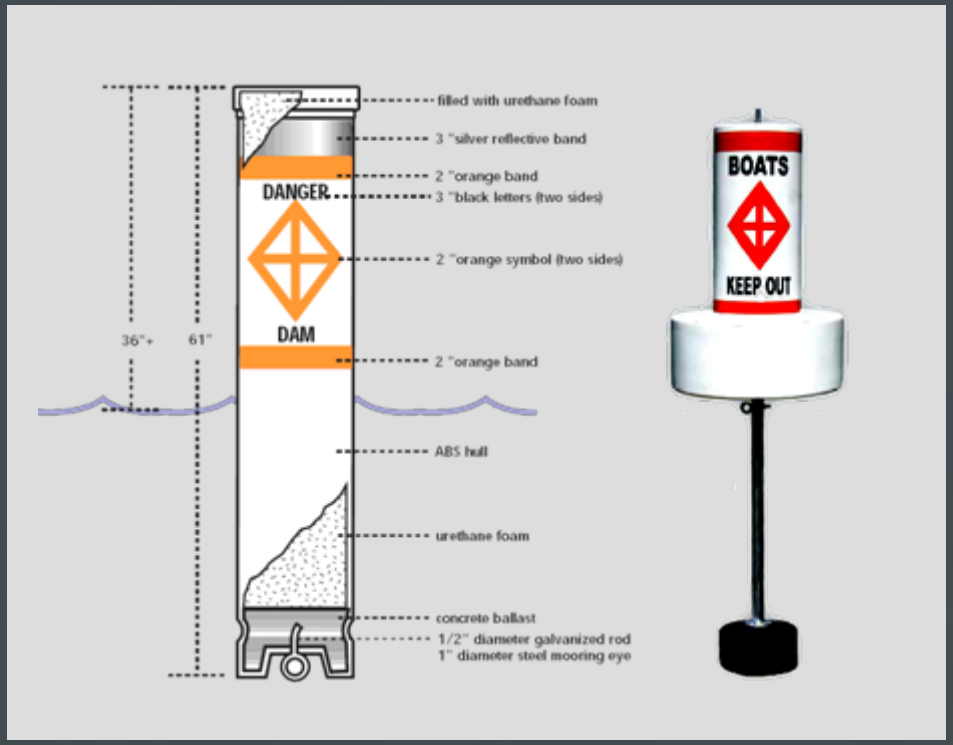


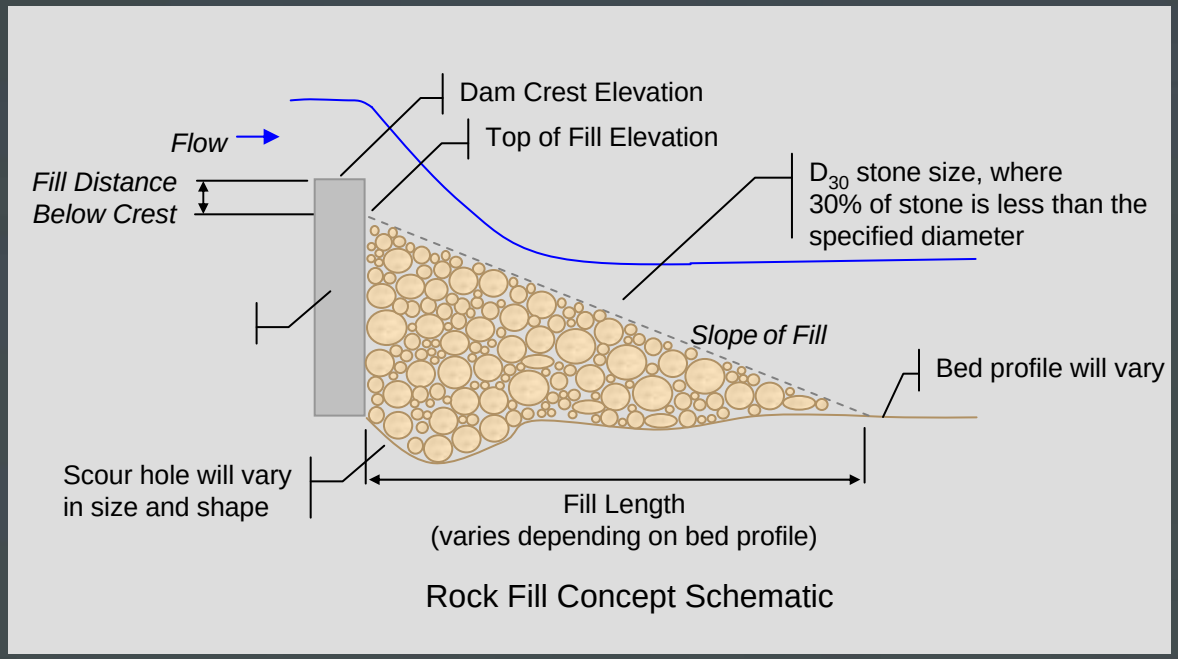
Can Buoy Collared Buoy

Example Signage

Public Awareness Program

- Inform Recreational Users
- Target Owners and Emergency Responders

Temporary Rock Fill Structural Option



Rock Fill Concept Schematic

USACE Guidelines were used to Size the Rock Fill

Rock Fill Concept Criteria

- No U/S or D/S Increase in the 100-year Water Level
- Maintain Sub-critical Flow for the 1-, 2-, and 5-year Flow Events
- Must Prevent Formation of a Submerged Hydraulic Jump for the 1-, 2-, and 5-year Events

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Permanent Structural Solutions

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Growing AECOM Water while making a positive difference in the environment

Full Bypass Channel

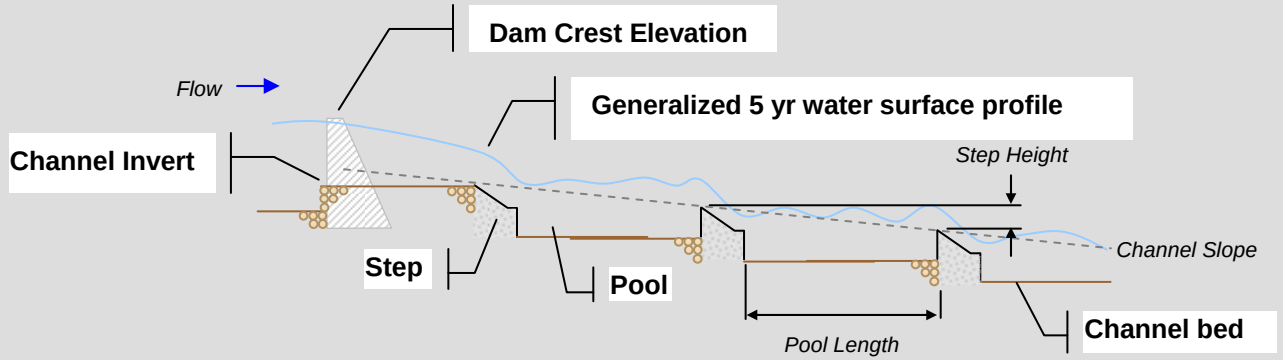
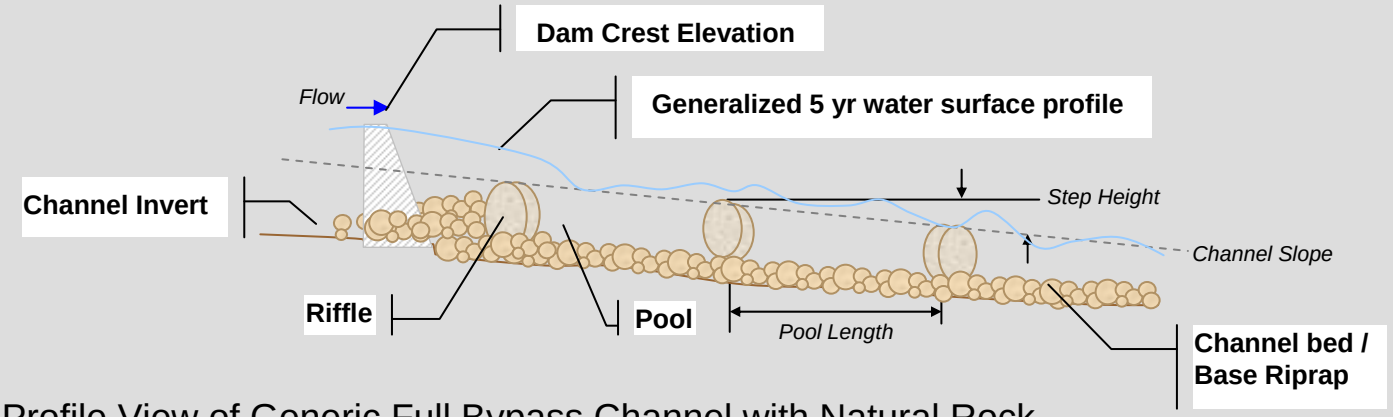


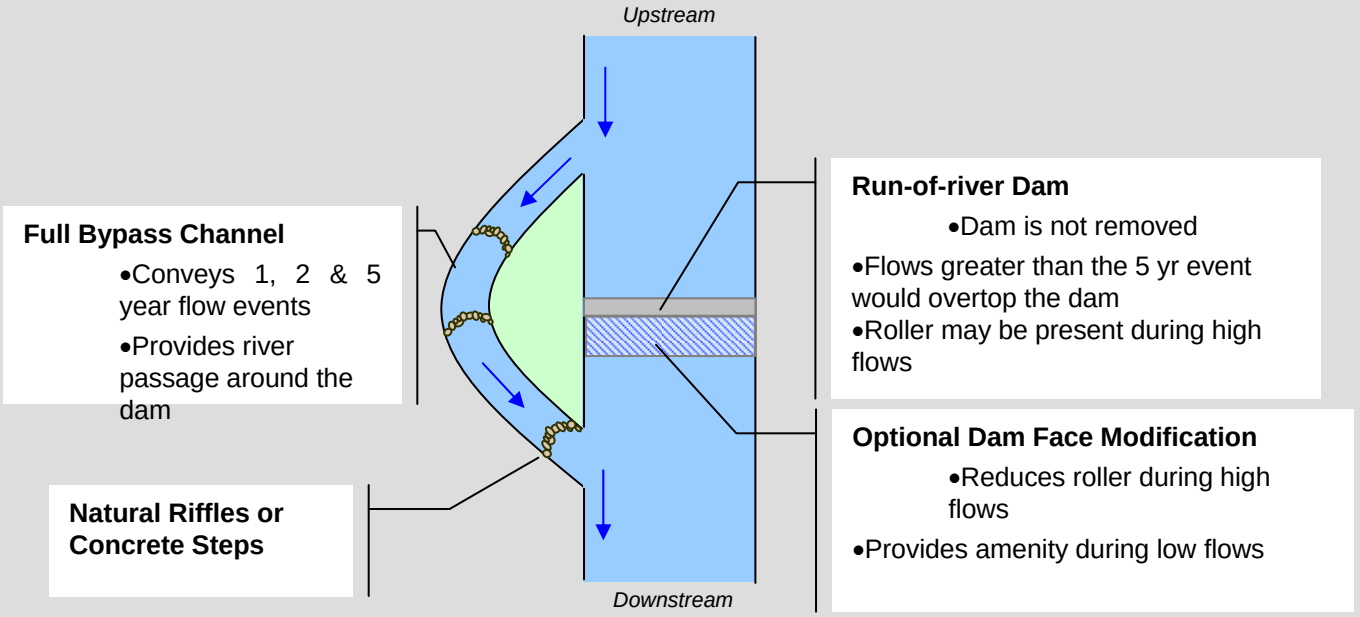
Figure based on *Garcia, et. al., 1999*

Generic Full Bypass Channel with Concrete Steps



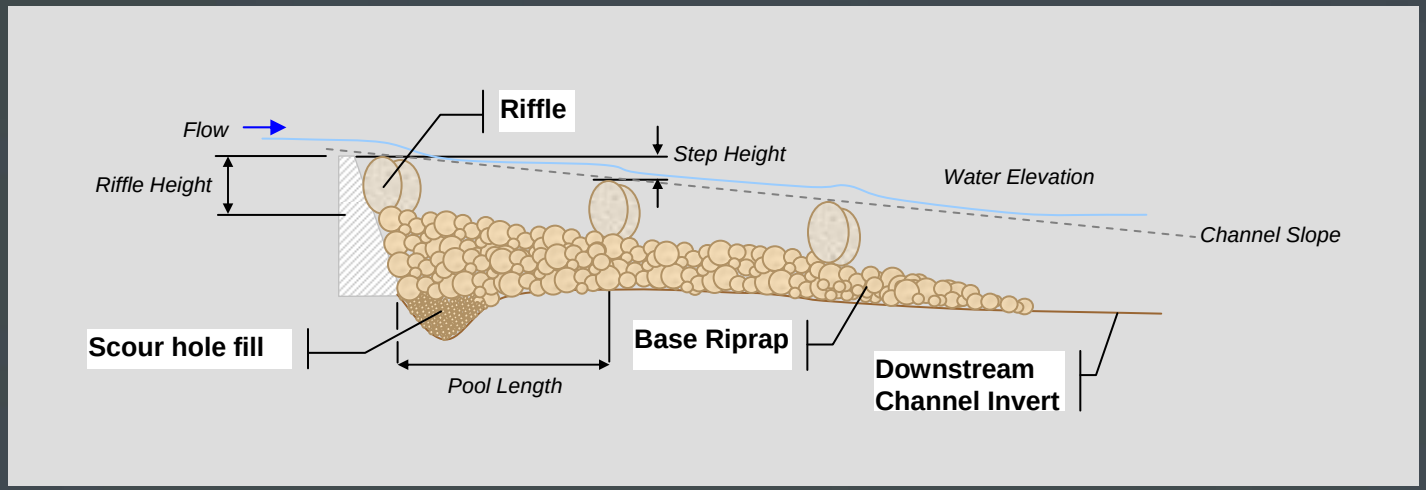
Profile View of Generic Full Bypass Channel with Natural Rock

Full Bypass Channel



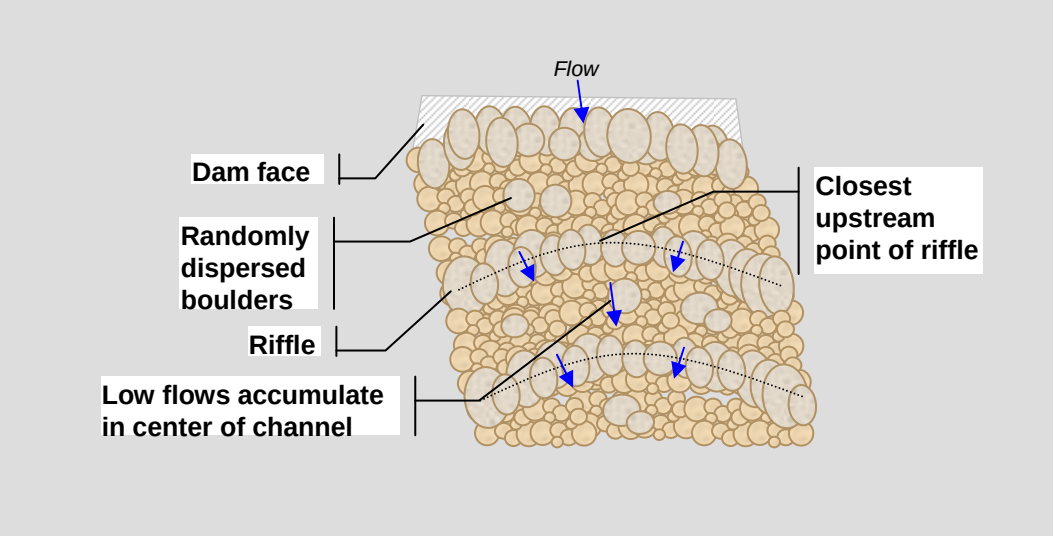
Full Bypass Option with Riffle Boulders

Riffle Pool Rock Ramp

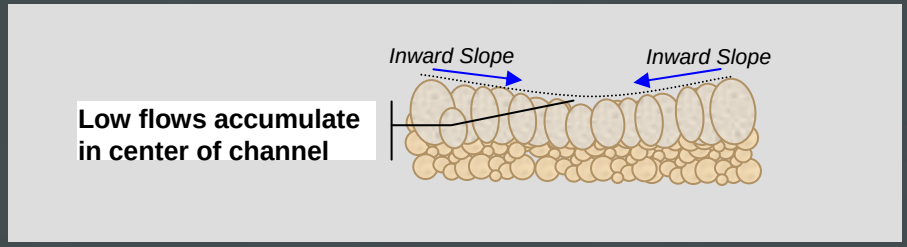


Profile View of Riffle Pool Rock Ramp (Parallel to Flow)

Riffle Pool Rock Ramp

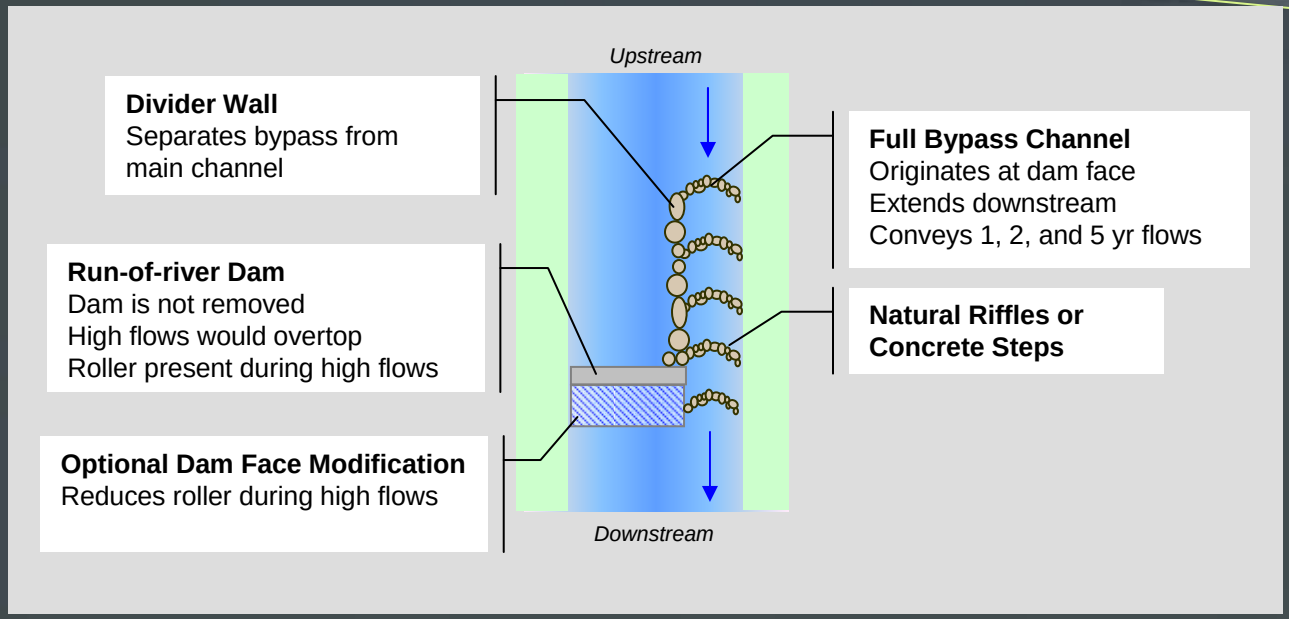


Plan View of Riffle Pool Rock Ramp



Section of Riffle Pool Rock Ramp (Perpendicular to Flow)

In-Stream Bypass Channel



In-Stream Bypass Channel Generic Layout

Additional Structural Options

- Dam Face Modification
- Dam Removal

Acknowledgements

Dam Owners and Emergency Responders

Lieutenant Governor Pat Quinn's Office

Capital Development Board of Illinois

Illinois Department of Natural Resources – Office of Water Resources

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