



Department of Conservation & Recreation
Division of Dam Safety & Floodplain
Management

Rappahannock-Rapidan Regional Commission

Emergency Action Planning & Other Information

November 18, 2014

Presented by: Ken Turner, PE

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Presentation Contents

- DCR Division of Dam Safety Programs
- General Information About RRRC Dams
- Flowing Spillway Video
- Emergency Action Plans
- Time Permitting
 - ❖ Dam Break Inundation Studies
 - ❖ Table Top Exercises

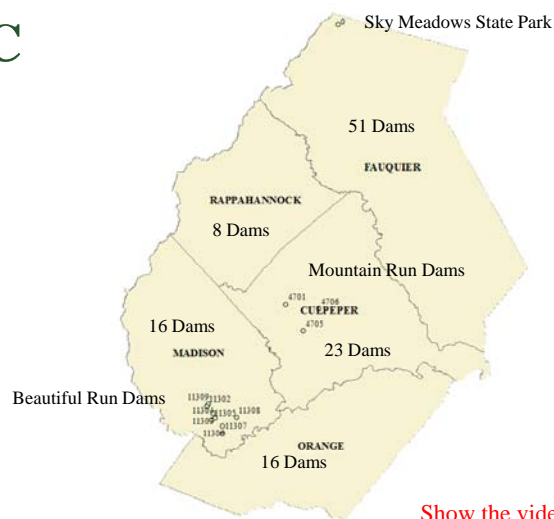
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DCR, Division of Dam Safety Programs

Dam Watch – Floodplain & Dam Information with warning system
 Dam First Aid – Siphon equipment in trailer to draw down a pond
 Dam Dragnet – Program to locate & identify dams in Virginia
 PMP Study – Determines what the worst case scenario for rainfall statewide as a guide to spillway design

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RRRC



[Show the video](#)

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White Oak Dam During Flood Event



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White Oak Dam During Flood Event



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White Oak Dam Aftermath



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With the weather reporting capabilities we have access to, hurricanes, tropical storms and tropical depressions should never be a surprise. Their path may change slightly but that is all.

National Hurricane Center
<http://www.nhc.noaa.gov/>



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Laws & Regulations

Title 10.1. Conservation, Chapter 6, Article 2.

Dam Safety Act, § **10.1-604. -613.5**

4VAC50-20, Section 10-400

Section 175 Emergency Action Plan for High &
Significant Hazard Dams

Section 177 Emergency Preparedness Plan for
Low Hazard impounding structures

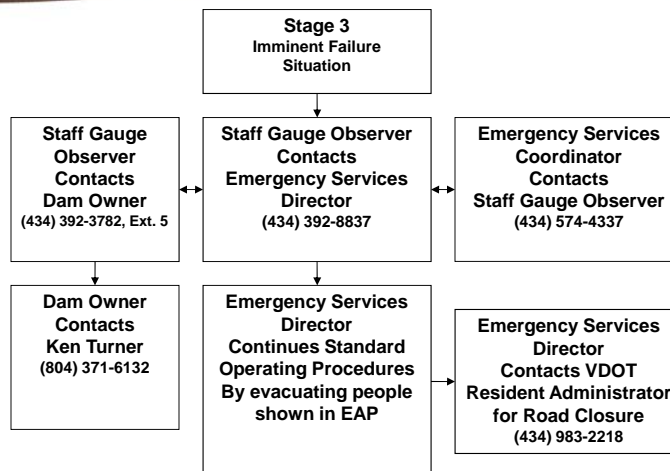
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EAP/EPP Overview

Step 1: Emergency Condition Detection	Event Detection See § V.		
Step 2: Emergency Level	Assess Situation: Determine Emergency Level See § V.		
	Emergency Stage 1 Non-Emergency Incident; Slowly developing situation See Definition Below	Emergency Stage 2 Potential dam failure situation; Rapidly developing situation See Definition Below	Emergency Stage 3 Urgent; Dam failure is imminent or in progress See Definition Below
Step 3: Notification & Communication	Stage 1 Notification See Diagram Pg 5	Stage 2 Notification See Diagram Pg 6	Stage 3 Notification See Diagram Pg 7 & Page 17
Step 4: Expected Action	Inspect Dam: Increased Monitoring	Save Dam: Expected Actions	Save Lives: Evacuation
Step 5: Termination and Follow Up	Termination and Follow Up		

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Calling Diagram



Message from staff gauge observer to ESC: *I am at Sample Dam #1, aka Swimming Hole Lake Dam (or have been to the dam) and the water level has risen in the emergency spillway to the threshold established in the emergency action plan to increase to the Stage 3 hazard level. Please have your personnel evacuate the people listed in our emergency action plan and close the roads downstream from our dam. I will remain at the dam until the dam breaks or the water level recedes to safe levels to provide you with additional information as necessary.*

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Emergency Preparedness Plans

Low Hazard Dams, only

4VAC50-20-177

This form and other dam safety related forms can be found on DCR's web page at:

<http://www.dcr.virginia.gov>



Department of Conservation & Recreation
CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES



Date Prepared: _____
Prepared By: _____

EMERGENCY PREPAREDNESS PLAN FOR LOW HAZARD VIRGINIA REGULATED IMPOUNDING STRUCTURES

Reference: Impounding Structures Regulations, 4VAC 50-20-17 et seq., including 4VAC 50-20-175, Virginia Soil and Water Conservation Board

1. Name of Impounding Structure _____
County: _____
State: _____
City/Town: _____
Latitude: _____
Longitude: _____
2. Name of Owner: _____
Address: _____
Telephone: _____
Other means of communication: _____
(24-hour telephone number required)
3. Name of Impounding Structure Operator: _____
Address: _____
Telephone: _____
Other means of communication: _____
(24-hour telephone number required)
4. Name of Resident and Self-Inspection Officer: _____
Address: _____
Telephone: _____
Other means of communication: _____
(24-hour telephone number required)
5. Name of Resident and Self-Inspection Officer: _____
Address: _____
Telephone: _____
Other means of communication: _____
(24-hour telephone number required)
6. Name of Resident and Self-Inspection Officer: _____
Address: _____
Telephone: _____
Other means of communication: _____
(24-hour telephone number required)
7. Name of Resident and Self-Inspection Officer: _____
Address: _____
Telephone: _____
Other means of communication: _____
(24-hour telephone number required)

(DCR/SP-102) (09/08)

Page 1 of 3

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Emergency Action Plans

High & Significant Hazard Dams

4VAC50-20-175

EMERGENCY ACTION PLAN

FOR

Dam Name _____
Inventory Number _____
a.k.a. Common Name _____
County/City, Virginia _____

EMERGENCY ACTION PLAN TABLE OF CONTENTS

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Definition of an EAP

- **Formal Document**
- **Identifies potential emergency conditions at a dam**
 - **Accident at a dam or failure of part of a dam**
 - **Impending flood condition**
- **Specifies procedures to:**
 - **mitigate problems at a dam**
 - **for early notification**
- **Provides information for local emergency managers**

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Basic Assumptions/Truths

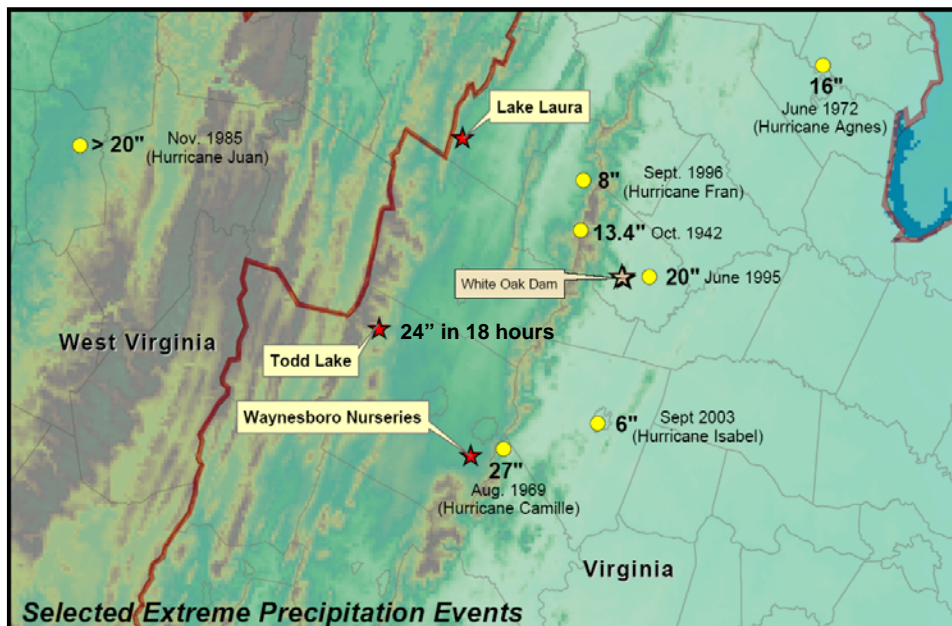
- **EAP's are needed to provide early warning and notification of an emergency.**
- **Exercises are beneficial and worth the effort.**
- **Dam owners and jurisdictions do not have equal emergency management capabilities and requirements.**

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Basic Assumptions Cont'd

- **EAP exercises are part of a dam owner's commitment to improving the overall EAP program.**
- **The lack of an EAP may be interpreted as negligence on the part of the dam owner.**

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Slide provided by Gannett Fleming

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Basic Failure Mechanisms

The primary failure mechanism for most dams in the United States is erosion. Dam over topping erosion causes the most dams to fail, while internal erosion sometimes called piping erosion can also cause a dam to fail. Failure due to piping is also called a sunny day failure.

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Sunny Day Failure

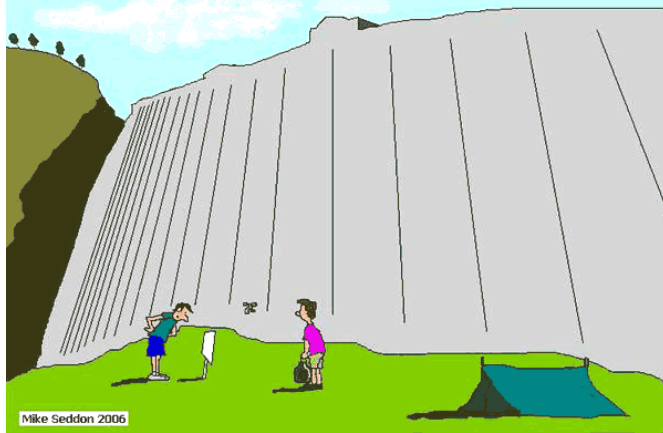
Why is a sunny day failure noteworthy?

Because it occurs with little or no warning.

Said another way; It may be impossible to evacuate people or close roads in time before the flood wave passes.

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Questions?



Mike Seddon 2006

It says "Caution: the water coming out of this tap might be under high pressure."

The End

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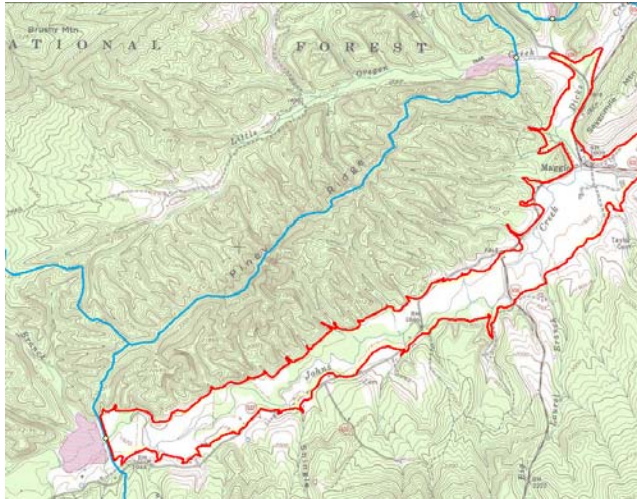
Dam Break Inundation Zone Study, Spillway Design Flood (SDF) & Mapping

The dam break inundation zone mapping, by regulation, shows the water level rise downstream after the dam breaks.

It may refer to the Probable Maximum Flood (PMF), the ½ PMF, the 100 year storm or an increment between the 100 year storm and PMF.

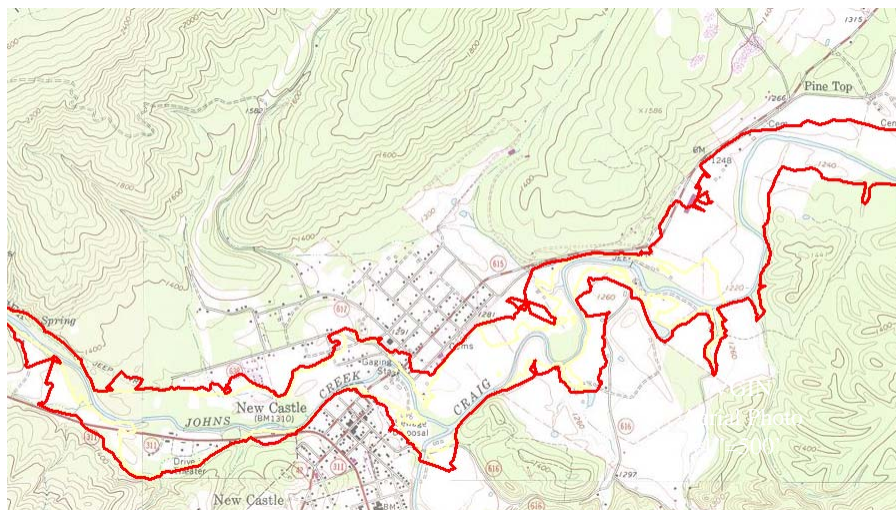
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**SDF = PMF with Break (Red) & Sunny Day Failure (yellow)
Watershed (blue)**



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SDF = PMF with Break (Red) & Sunny Day Failure (yellow)



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What Roads/Bridges were identified in the study?

Summary Table of Insulated Road Bridges																
Structure Information			Owner Information			Foundation Information										
Cross Section Profile No.	Bridge Location	VA Structure ID No.	Crossing	Owner	Owner Information	File Path ID Number	Station	Distance from Jct (ft)	Deck Elevation (ft)	Water Surface Elevation (ft)	Sunny Day Breach			PMF Breach		
											Initial Flow (cfs)	Peak Flow (cfs)	Maximum Depth at Deck (ft)	Initial Flow (cfs)	Peak Flow (cfs)	Maximum Depth at Deck (ft)
93-7	Jubbs Creek Rd. / Rt. 632	0037	Jubbs Creek	USDOT			128090.0	0.79	1085.0	1085.3	12.6	12.6	10.3	1085.0	12.4	12.8
93-8	Route 638	0040	Jubbs Creek	USDOT			138850.0	3.38	1080.0	1089.3	16.2	19.8	15.5	1080.0	15.0	17.4
93-10	Jubbs Creek Rd. / Rt. 632	0038	Shilo Creek	USDOT			122420.0	4.52	1087.0	1088.0	12.0	17.0	10.0	1087.0	12.8	12.8
	Oriskany	NA	Jubbs Creek	Private	VA Hunter LLC	70A-1-04	138930.0	4.62	1080.0	1018.0	19.4	28.2	15.3	1021.4	20.4	18.4
	Oriskany	NA	Jubbs Creek	Private	VA Hunter LLC	70A-1-04	133000.0	5.40	1780.0	1810.0	29.4	37.2	19.5	1817.0	27.0	27.0
93-14	Jubbs Creek Rd. / Rt. 632	0039	Jubbs Creek	USDOT			133000.0	7.32	1780.0	1793.0	41.4	60.0	27.3	1804.6	36.4	36.6
93-17	Jubbs Creek Rd. / Rt. 632	0040	Jubbs Creek	USDOT			126400.0	8.82	1740.0	1761.4	52.2	78.6	36.4	1771.4	48.6	48.6
93-20	Jubbs Creek Rd. / Rt. 632	0041	Jubbs Creek	USDOT			104030.0	9.21	1738.0	1760.0	57.0	87.0	22.0	1768.6	52.2	76.6
	Oriskany	NA	Jubbs Creek	Private	A South McClelland 8013 Jubbs Creek Rd. 140-864-0107	80-1-9	99500.0	10.08	1739.0	1742.0	61.8	97.2	12.0	1756.2	55.8	84.0
93-23	Jubbs Creek Rd. / Rt. 632	0130	Jubbs Creek	USDOT			99500.0	11.22	1717.0	1722.1	67.8	106.2	5.1	1751.0	61.2	91.2
	Oriskany	NA	Jubbs Creek	Private	Agnes V Hoffman 10304 Jubbs Creek Rd.	87-A-465	88000.0	12.38	1707.0	1713.7	76.8	118.2	8.7	1737.6	72.6	105.2
	Oriskany	NA	Jubbs Creek	Private	Samuel A Day	87-A-18	84030.0	12.53	1706.0	1714.9	82.2	126.4	10.9	1706.7	77.4	111.0
	Oriskany	NA	Jubbs Creek	Private	Elizabeth Canale Estate	87-A-14	83820.0	13.05	1686.0	1713.4	94.2	144.0	17.4	1705.6	86.4	123.0
	Oriskany	NA	Jubbs Creek	Private	Unknown	Unknown	38810.0	21.57	1602.0	1624.7	162.6	268.8	22.7	1612.8	125.6	216.4
	Oriskany	NA	Jubbs Creek	Private	Jennifer Jones	15-A-11	37050.0	21.91	1586.0	1611.1	167.4	279.6	17.1	1627.0	140.4	228.2
93-37	Route 311	1012	Jubbs Creek	USDOT			128030.0	26.91	1224.0	1264.0	216.6	303.4	10.9	1263.0	172.8	261.4
93-52	Market St. / Rt. 631	0171	Jubbs Creek	USDOT			21760.0	32.34	1275.0	1275.0	282.0	466.4	0.0	1280.7	362.0	263.4

Table Top Exercise Definition

“means a type of emergency action plan exercise that involves a meeting of the impounding structure owner and the state and local emergency management officials in a conference room environment. The format is usually informal with minimum stress involved. The exercise begins with the description of a simulated event and proceeds with discussions by the participants to evaluate the EAP and response procedures and to resolve concerns regarding coordination and responsibilities”.

You will receive news bulletins in blue typeface and react in accordance with the EAP. Remember the purpose here is to improve the EAP without over reacting.

Development in DBIZs

§ 10.1-606.3. Requirement for development in dam break inundation zones.

A. For any development proposed within the boundaries of a dam break inundation zone that has been mapped in accordance with § [10.1-606.2](#), the locality shall, as part of a preliminary plan review pursuant to § [15.2-2260](#), or as part of a plan review pursuant to § [15.2-2259](#) if no preliminary review has been conducted, (i) review the dam break inundation zone map on file with the locality for the affected impounding structure, (ii) notify the dam owner, and (iii) within 10 days forward a request to the Department of Conservation and Recreation to make a determination of the potential impacts of the proposed development on the spillway design flood standards required of the dam. The Department shall notify the dam owner and the locality of its determination within 45 days of the receipt of the request. Upon receipt of the Department's determination, the locality shall complete the review in accordance with § [15.2-2259](#) or [15.2-2260](#). **See Handout.**

<https://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+10.1-606.3>