

# Hazard Warning Guidance for Low Head Dams

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### Hazard Warning Guidance for Low Head Dams

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#### What are low head dams and who is responsible for them?

Low head dams are extremely dangerous man-made river barriers that often were installed to stem or hold back the flow of water for use in industrial manufacturing. In fact, they are so dangerous they are often called “drowning machines.”

Low-head dams are usually more than one hundred years old and most were installed in rivers throughout Virginia by mills and other industrial factories in the late 1800's. As these industries slowly faded and closed down throughout the twentieth century, many of the dams were deeded to local governments and are now considered legal municipal property. The responsibility for maintaining a safe dam rests with the owner, which more often than not is a local governmental entity.

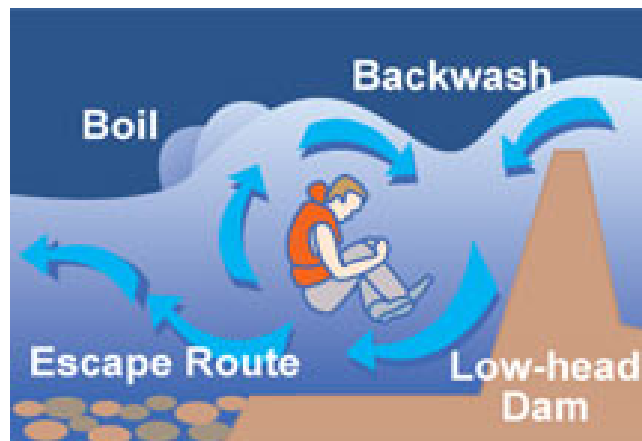
#### What are the hazards?

Low head dams are difficult to see if approaching from upstream. Their small size can make them appear harmless. A boater or swimmer may not realize the danger presented by a low-head dam until it's too late.



Low head dams are difficult to see from up stream

Water flowing over low-head dams forms a backwash that can trap boaters, swimmers, and rescuers against the face of the dam. Water pouring over the top of the dam then forces them under again. The resulting continuous cycle is like being trapped in a continuous washing machine and has deadly consequences.



Dangerous hydraulic forces formed by water pouring over the dam can trap individuals

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#### What are the liability risks to your local governmental entity?

If your local governmental entity is the deed recipient of an old low head dam, the amount of risk depends on the height of the obstruction, distance the water falls, shape of the river bed, velocity of the river, and volume of water passing over the dam. Often low head dam hydraulics require outside assistance for escape. Many of the fatalities caused by low head dams are individuals attempting to rescue others. When fatalities or serious injuries occur, liability lawsuits will almost surely follow.

#### Should removing a low head dam be considered?

Several low head dams have been removed in Virginia to eliminate the risk of ownership. Removal can take several years, depending on the project's specifics. Typically, the first step in the process is for a consensus between the owner and the public to occur. Second, the owner must study the effects of the dam on the river; such as the ecological impact, impact on fishing, contamination, and how to safely remove the dam. A design firm usually is hired to conduct these studies. Once the studies are complete and a plan is in place, the final step is to obtain state permits and approval. Localities have used federal and state grants to assist with dam removals.

#### Recent legislation helps low head dam owners avoid liability

Local government entities can help reduce potential dam failures and liabilities by properly operating and maintaining their dams - this includes providing large, written warnings signs for boaters and swimmers.



**Mark areas above and below the dam to warn the public of the hazards**

The Virginia General Assembly has addressed some of the low head dam liability issues in **Virginia Code Section 29.1-509. Paragraph F** stating:

“Any owner of a low-head dam may mark the areas above and below the dam and on the banks immediately adjacent to the dam with signs and buoys of a design and content, in accordance with the regulations of the Board, to warn the swimming, fishing, and boating public of the hazards posed by the dam. Any owner of a low-head dam who marks a low-head dam in accordance with this subsection shall be deemed to have met the duty of care for warning the public of the hazards posed by the dam. Any owner of a low-head dam who fails to mark a low-

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head dam in accordance with this subsection shall be presumed not to have met the duty of care for warning the public of the hazards.”

#### Virginia Department of Game and Inland Fisheries (DGIF)

Keep in mind that the placing of water markers (buoys/signs) in navigable waterways is regulated by the DGIF ([www.dgif.virginia.gov](http://www.dgif.virginia.gov)). Appendix A of this document contains the “*Rules for Establishment of Uniform Regulatory Markers on the Public Waters of Virginia*.” This document should be used when placing markers (buoys/warning signs) on public waterways. It is recommended that you contact them for assistance and approval with the placement of markers.

#### Safety signage plan

While the specific approach of each local government to safety may vary, the basic elements of an effective safety signage program are the same:

- Assess the need for signage;
- Use an effective design and message;
- Properly place and locate signs; and
- Perform regular maintenance.

All of the elements together form a complete and comprehensive safety signage plan. In the following section, we examine each of these elements and describe associated pitfalls in an effort to identify and identify the most important components of each.

#### Assessing the need for signage

When developing or updating the safety signs, the dam owner must identify the type of users that could face exposure to the hazards from the dam and inventory the ways in which individuals could potentially gain access to hazardous areas at the dam site. Consider the following steps when assessing signage needs:

- Identify the areas where individuals typically or could potentially gain access to the dam site. Nearby boat ramps, trails and parking areas are examples.
- Document existing signs, including construction materials, text, placement, condition, and projected replacement times. A digital camera and a map of the area are helpful documentation tools.
- Review local, state, and federal signage regulations.
- Assess any future recreational/project changes that may require new signs such as creation of a new access area, increased traffic, or trail construction.
- Review any recent accidents or safety issues at the project or nearby facilities to identify possible problem areas.
- Examine any public safety concerns received.



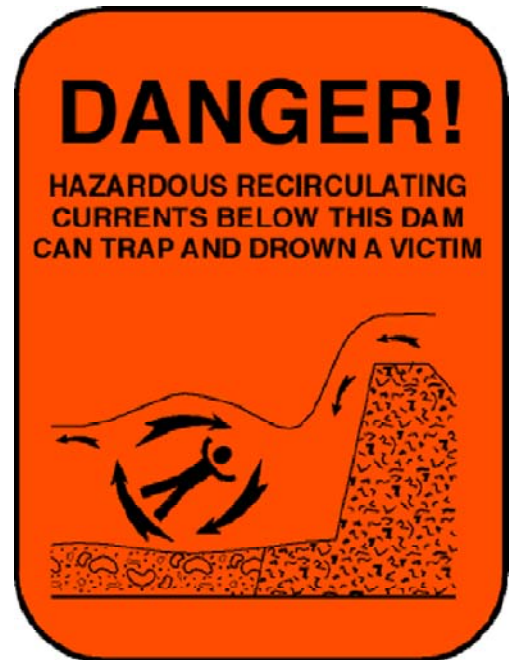
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#### Sign design and message

A warning sign's effectiveness can be influenced by a number of factors. Generally, warning signs should have the following key elements:

- Signs should be designed for the first time viewer assuming no prior knowledge. They should be easy to understand by all and, when possible, include symbols for those with limited language skills.
- A signal word such as *CAUTION*, *WARNING*, or *DANGER* should be used to draw people's attention to the sign so that they read and understand the rest of the sign's message. The word *DANGER* is generally recommended for extreme hazards, followed by *WARNING* and *CAUTION* for lower hazard levels.
- Use symbols and pictures as they attract attention and send a clear and easy to understand message.
- Design your signs so that the text size is adequate for viewing at appropriate distances.
- Keep signs free of sharp edges and protruding screws or bolts as the signs themselves can create hazards.



#### Sign placement and location

The location of hazard warning signs is every bit as important as the sign design and message. Signs should be in clear view and located where they will be seen by anyone approaching the hazard. Typically, a combination of signs posted on land and floating signs or buoys in the water is often most appropriate.



Buoy provides warning and the barrier system limits access



Sign is placed in clear view on the shore

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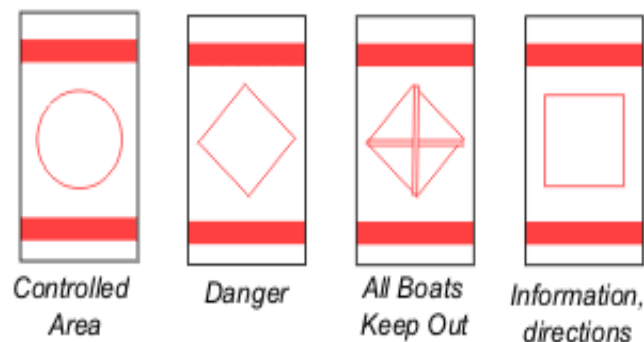
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### Regulatory or informational markers

The Uniform State Waterways Marking System (USWMS) prescribes regulatory markers and aids to navigation which mark navigable state waters. The USWMS may also mark the non-navigable internal waters of a state. Regulatory or informational markers are used to advise you of situations, dangers, or directions. They may indicate shoals, swim areas, speed zones, etc.

Buoys with the orange belt around their tops and bottoms provide information of various types.

- The orange circle = controlled area
- The diamond = danger
- Diamond with cross hatches = boats keep out
- Orange square = general information



**Controlled Area:** Type of control is indicated in the circle, such as slow, no wake, anchoring, etc.



**Danger:** The nature of danger may be indicated inside the diamond shape, such as rock, wreck, shoal, dam, etc.



#### **Boat Exclusion Area:**

Explanation may be placed outside the crossed diamond shape, such as dam, rapids, swim area, etc.



#### **Information:**

For displaying information such as directions, distances, locations, etc.

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### Sign placement and location

Some other things to consider when deciding on where to place signs are:

- Post signs consistently from one point to another.
- Post signs at heights that are most effective. Heights may need to vary when high water/flooding can occur where signs are posted.
- Post signs at public access points. Signs at boat ramps, fish cleaning stations, rest rooms, etc. can be effective at ensuring individuals are properly warned.
- Signs should stand out from their background. Signs that blend in are likely to go unnoticed.
- Avoid “sign clutter.” This situation arises when too many signs are located in one area and visitors miss the messages you are trying to convey.
- Boat barriers, fences and other barrier devices may be helpful. These types of devices can be helpful as they can make it more difficult for visitors to put themselves in a dangerous situation. Although the discussion of these devices is beyond the scope of this guidance document, it may be helpful for dam owners to investigate these devices on a case-by-case basis.

### Sign maintenance

Sign maintenance is critical to ensure you are effectively minimizing the liabilities that come with owning a low head dam. Effective sign maintenance will help ensure the signs are fulfilling their original purpose, which is to keep visitors and the community informed and safe. It will also send the message that the dam owner is actively monitoring the risks the dam presents. Keep your signs/markers well maintained by:

- Conducting regular inspections to ensure signs are in place and to determine if maintenance is needed.
- Checking the reflectivity of signs that are meant to be seen at night.
- Being prepared to repair or replace signs/markers that are physically damaged, faded or missing.
- Encouraging the public to report any damages or deficiencies they identify.
- Using law enforcement to patrol areas where vandalism to signs or trespassing is an issue.
- Marking signs/buoys with ownership information so they may be returned if they go missing.

Properly managing all elements of a sign safety plan will help ensure that visitors and the community are adequately warned of the hazards created by low head dams.



Example of a poorly maintained sign

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#### **VML Insurance Programs Support**

VML Insurance Programs' Division of Safety Services is available to assist you with reviewing your low head dam safety program to provide assistance with loss control measures and safety signage concerns. Please contact us at 1(800) 963-6800 and ask for someone in the safety department.

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### Appendix A

#### RULES FOR ESTABLISHMENT OF UNIFORM REGULATORY MARKERS ON THE PUBLIC WATERS OF VIRGINIA

This document should be used when placing markers (buoys/warning signs) on public waterways. It is recommended that you contact the Virginia Department of Game and Inland Fisheries ([www.dgif.virginia.gov](http://www.dgif.virginia.gov)) for assistance and approval with the placement of markers on waterways.

#### 1. PURPOSE

In order to promote boating safety and minimize interference between users of public waters, a system of uniform regulatory markers has been adopted by Virginia and other states. This system, to be administered by the Department, has been developed as a supplement to the Coast Guard system. Its principal purpose is to convey to the small craft operator, without the need for reference charts or published regulations, the presence of natural or artificial hazards and zoned areas where boat operation is, in some manner, restricted or controlled.

#### 2. APPLICATION

On public waters of the State not marked by an agency of the United States, application may be made (form attached) for regulatory markers or aids to navigation as permitted by the following:

##### CODE OF VIRGINIA

§ 29.1-744. Local regulation; application for placement or removal of "no wake" buoys, etc.

- A. Any political subdivision of this Commonwealth may, at any time, but only after public notice, formally apply to the Board for special rules and regulations with reference to the safe and reasonable operation of vessels on any water within its territorial limits and shall specify in the application the reasons which make the special rules or regulations necessary or appropriate.
- B. The Board is authorized upon application by a political subdivision or its own motion to make special or general rules and regulations with reference to the safe and reasonable operation of vessels on any waters within the territorial limits of any political subdivision of this Commonwealth. Without limiting the generality of the grant of such power, a system of regulatory or navigational markers may be adopted by the Board. Nothing in this section shall be construed to affect the application of any general law concerning the tidal waters of this Commonwealth.
- C. Any county, city or town of this Commonwealth may enact ordinances which parallel general law regulating the operation of vessels on any waters within its territorial limits, including the marginal adjacent ocean, and the conduct and activity of any person using such waters. The locality may also provide for enforcement and penalties for the violation of the ordinances, provided the penalties do not exceed the penalties provided in this chapter for similar offenses.

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- D. After notice to the Department, any county, city or town may, by ordinance, establish "no wake" zones along the waterways within the locality in order to protect public safety and prevent erosion damage to adjacent property. However, any county that is adjacent to an inland lake (i) more than 500 feet above sea level and (ii) of 20,000 acres or more and wholly located within the Commonwealth may, by ordinance, establish "no wake" zones along such lake within the locality in order to protect public safety or prevent erosion damage to adjacent property. The markers and buoys designating a no wake zone shall conform to the requirements established by the Board. Any marker or buoy which is not placed in conformance with the regulations of the Board or which is not properly maintained shall be removed by the locality. The locality may provide for enforcement and penalties for the violation of the ordinance.
- E. Any person who desires to place or remove "no wake" buoys or other markers relating to the safe and efficient operation of vessels pursuant to any local ordinance shall apply to the local governing body. The local governing body shall approve, disapprove or approve with modifications the application and forward it to the Director, who shall approve, disapprove or approve with modifications within thirty days the placement and type of marker to be used or the removal of "no wake" buoys or other markers. The cost of the purchase and placement or the removal of the buoys or markers shall be borne by the person requesting the placement or removal of the buoys or markers. Any marker or buoy which is not placed in conformance with the regulations of the Board or which is not properly maintained may be removed by the Department. "No wake" buoys or other markers placed prior to July 1, 2001, shall only be removed when no longer required for the safe and efficient operation of vessels pursuant to any local ordinance.

§ 29.1-734. Authorization for and placing of markers in waters of the Commonwealth used for public swimming areas; no motor boating, waterskiing in marked area.

- A. Any owner of real estate which touches any of the waters of this Commonwealth or the agent of the owner may petition the Board to authorize the placing of markers approved by the Board around a public swimming or bathing area.
- B. The Department, upon receiving the petition and sufficient proof that the water adjacent to the real estate is used in whole or in part as a public swimming or bathing area, may authorize the placement of the markers to designate the area as a swimming or bathing area.
- C. The cost of the purchase and placement of the markers shall be borne by the party requesting the placement of the markers.
- D. No person shall operate a motorboat or manipulate skis within the area of the waters of the Commonwealth marked under this section. Persons violating this subsection shall be guilty of a Class 4 misdemeanor.



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### DEPARTMENT REGULATION

#### 4 VAC 15-370-50. Regulatory markers and aids to navigation.

- A. Under the provisions of Chapter 7 of Title 29.1 of the Code of Virginia a system of regulatory markers and a lateral buoyage marking system of aids to navigation are hereby adopted on all public waters of the Commonwealth not marked by an agency of the United States. Regulatory markers will be white with international orange bands. A vertical open-faced diamond shape with a white center shall denote danger. A vertical open-faced diamond shape with an inside cross shall denote a prohibition of all vessels. A circular shape with a white center shall denote a control or restriction. A rectangular shape shall denote information other than a danger, control or restriction. No regulatory marker, aid to navigation or other waterway marker affecting the safety, health or well-being of a boat operator, excepting those placed by an agency of the United States or a political subdivision of this Commonwealth as authorized in §29.1-744 D of the Code of Virginia, shall be placed in, on or near the water unless authorized by the department.
- B. When buoys are used as regulatory markers, they shall be white with horizontal bands of international orange, having a minimum width of three inches, placed completely around the buoy circumference. One band shall be at the top of the buoy, with a second band placed just above the waterline so that both bands are clearly visible to approaching watercraft. The area of the buoy body visible between the two bands shall be white and not less than 12 inches in height. No buoy shall be less than 24 inches in overall height from the waterline.
- C. Where a regulatory marker consists of a sign displayed from a marine structure, post or piling, the sign shall be white, with an international orange border having a minimum width of three inches. The geometric shape associated with the meaning of the marker shall be centered on the signboard.
- D. The size of the display area shall be as required by circumstances, except that no display area shall be smaller than one foot in height. The outside width of the diamond, the inner diameter of the circle, and the average of the inside and outside widths of a square shall be two-thirds of the display area. The side of the diamond shall slope at a 35° angle from the vertical on the plane surface. Approximate adjustments for curvature may be made when applied to a cylindrical surface.
- E. Explanatory words may be added outside the diamond with a center cross, the open diamond and the no wake circle on fixed markers only, and shall be added to the inside of the circle, square and rectangle. The letters of such words shall be black, in block characters of good proportion, spaced in a manner that will provide maximum legibility, and of a size that will provide the necessary degree of visibility. Applicable words include, but are not limited to:
  - 1. Open faced diamond: rock, snag, cable, dam, dredge, shoal, reef, wreck.
  - 2. Diamond with cross: dam, swim area, rapids, no boats.
  - 3. Circle: no skiing, no wake, no anchoring, no fishing, no scuba, no boats, ski only,

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- fishing only, for wording inside the circle; and entering no wake zone, leaving no wake zone, for wording outside the circle.
4. Square or rectangle: information other than a danger, control or restriction, which may contribute to health, safety, or well-being of boaters, such as place names, arrows indicating availability of gas, oil, groceries, marine repairs, limits of controlled areas, or approaching controlled area.
- F. Waterway markers shall be made of materials that will retain the characteristics essential to their basic significance, such as color, shape, legibility and position, despite weather or other exposures.
- G. Regulatory markers shall be placed where they are reasonably visible from boats approaching the marker and the visibility of the marker shall be maintained.
- H. Written approval of the department must be obtained before relocation of any marker.
- I. The person responsible for the marker shall immediately notify the department when any approved marker is removed or destroyed. Such marker shall be replaced without unnecessary delay.
- J. After notification to the person responsible for the marker, the department may cancel for reasonable cause any marker authorization. Such marker shall be removed by the person responsible for the marker without unnecessary delay. Should the marker not be removed within a reasonable amount of time, the department may remove the marker or have it removed at the expense of the person responsible for the marker.
- K. The political subdivision or agency making application shall certify that the markers to be installed conform to the above provisions.
- L. It shall be unlawful to enter, use, or occupy public waters for a purpose contrary to the use indicated on markers authorized by the department, or placed by an agency of the United States or a political subdivision of this Commonwealth.
- M. It shall be unlawful to moor or attach a vessel to a marker other than an approved mooring buoy, or move, remove, displace, tamper with, damage or destroy a marker authorized by the department, placed by an agency of the United States or placed by a political subdivision of this Commonwealth.

### 3. NECESSITY FOR MARKERS

A letter of necessity must be submitted with the application and must state clearly the need for regulatory markers.

### 4. LOCATION

- A. All regulatory markers shall be colored white with international orange bands.

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- B. When buoys are used as regulatory markers they shall be white with horizontal bands of international orange, having a minimum width of 3", placed completely around the buoy circumference. One band shall be at the top of the buoy, with a second band placed just above the waterline so that both bands are clearly visible to approaching watercraft. The area of the buoy body visible between the two bands shall be white and not less than 12" in height. No buoy shall be less than 24" in overall height from the waterline.
- C. The geometric shape displayed on a regulatory marker is intended to convey specific meaning to a vessel. Geometric shapes shall be placed on the white portion of the buoy body and shall be colored international orange. The authorized geometric shapes and meaning associated to each shape are:
1. A vertical open faced diamond to mean danger;
  2. A vertical open faced diamond shape having a cross centered in the diamond to mean prohibition of all vessels.
  3. A circular shape to mean that watercraft operated in an area so marked is subject to certain operating restrictions.
  4. A square or rectangle shape with information or directions lettered inside the borders.
- D. Where a regulatory marker consists of a sign displayed from a structure located on a marine site, the sign shall be white, with an international orange border having a minimum width of 3". The geometric shape associated with the meaning of the marker shall be centered on the sign board.
- E. The size of the display area shall be as required by circumstances, except that no display area shall be smaller than one foot in height. The outside width of the diamond, the inner diameter of the circle, and the average of the inside and outside widths of a square shall be two-thirds of the display area. The side of the diamond shall slope at a 35 degree angle from the vertical on the plane surface. Approximate adjustments for curvature may be made when applied to a cylindrical surface.
- F. Explanatory words may be added outside the diamond with a center cross and the open diamond, and shall be added to the inside of the circle, square and rectangle. The letters of such words shall be black, in block characters of good proportion, spaced in a manner that will provide maximum legibility, and of a size which will provide the necessary degree of visibility. Suggested words are:
1. Open faced diamond: rock, snag, cable, dam, dredge, shoal, reef, wreck, etc.
  2. Diamond with cross: dam, swim area, rapids, no boats, etc.
  3. Circle: no ski, no wake, no anchor, no fishing, no scuba, no prop boats, ski only, fishing only, etc.
  4. Square or rectangle: information other than a danger, control or restriction,



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which may contribute to health, safety, or well-being, place names, distances arrows indicating availability of gas, oil, groceries, marine repairs, etc.

- G. Materials. Waterway markers shall be made of materials which will retain, despite weather or other exposures, the characteristics essential to their basic significance, such as color, shape, legibility and position.
- H. Certification. The political subdivision, agency, or individual making application shall certify that the markers to be installed conform to the above provisions.
- I. A suggested list of manufacturers from whom approved markers may be obtained is available from the Department.

#### **5. COST AND MAINTENANCE OF MARKERS**

All costs connected with the establishment and maintenance of uniform waterway markers shall be assumed by the political subdivision, agency or individual making application and requesting authorization to install same. All markers shall be maintained in proper condition.

#### **6. CANCELLATION OR CHANGE OF MARKERS**

- A. Written approval of the Department must be obtained before effecting the relocation of any marker.
- B. If any marker is removed, by the permittee for any reason, the Department shall be notified within 10 days of such removal.
- C. The Department may cancel for reasonable cause any marker authorization after notification to the permittee. Such marker shall be removed without expense to the Department.

#### **7. ENFORCEMENT**

Every game warden and every other law enforcement officer of this state and its subdivision may enforce proper observance by watercraft operators of any marker installed under authorization by the Board under Department Regulations 4 VAC 15-370-50.

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**BUOY MANUFACTURERS, DISTRIBUTORS OR DEALERS**

Allen-Morrison, Inc.  
P.O. Box 11613  
Lynchburg, VA 24506  
(804) 846-8461

Smith & Nephew Rolyan, Inc.  
P.O. Box 555  
Menomonee Falls, WI 53052-0555  
(414) 251-7840

Major Signs  
801 N. Main Street  
P.O. Box 1382 Suffolk, VA 23434  
(804) 539-6611

Norfolk Marine Co.  
5221 Virginia Beach Blvd.  
Norfolk, VA 23502  
(757) 461-3391

Tideland Signal Corporation  
4310 Directors Row (77092)  
P.O. Box 52430  
Houston, TX 77052  
(713) 681-6101

Land 'n' Sea Distributing, Inc.  
1340 Azalea Garden Road  
Norfolk, VA 23502  
(757) 853-7658

Paxton Company  
P.O. Box 12103  
1111 Ingleside Road  
Norfolk, VA 23502  
1 (800) 234-7290 (Wholesale only)

Overton's  
111 Red Banks Road  
P.O. Box 8228  
Greenville, NC 27835  
1 (800) 334-6541

Topper Industries, Inc.  
P.O. Box 2439  
Battle Ground, WA 98604-2439  
1 (800) 332-3625

Penwalt Corporation  
Automatic Power Division  
P.O. Box 230738  
Houston, TX 77223  
(713) 228-5208

Travis Blair, Sales Representative  
Curd Enterprises, Inc. (Buoys & Floats)  
475 Long Point Road  
Mount Pleasant, SC 29464  
(803) 881-0323  
Fax: (803) 881-0655

Paul W. Goodwin  
Watermark Navigation Systems, LLC  
12 Gilford East Drive  
Gilford, NH 03246  
(603) 524-6066  
Fax: (603) 527-0666

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**COMMONWEALTH OF VIRGINIA**  
**DEPARTMENT OF GAME AND INLAND FISHERIES**  
*Application for Establishment of Regulatory Markers on Public Waters of Virginia*

Date of Application \_\_\_\_\_ Proposed Date of Installation \_\_\_\_\_

**A. APPLICANT**

1. Name of Political Subdivision or Agency \_\_\_\_\_  
Telephone Number \_\_\_\_\_

2. Name and address of individual to be responsible for installation and maintenance \_\_\_\_\_

Daytime Telephone Number \_\_\_\_\_

**B. NECESSITY OF REASON FOR REQUESTED MARKERS**

1. Attach a letter, with two signed copies, addressed to Boating Coordinator, Department of Game and Inland Fisheries, P.O. Box 11104, Richmond, VA 23230, explaining conditions which make such markers necessary.
2. Political subdivision – attach three copies of public notice and proposed regulation or ordinance, which has been issued prior to this application.

**C. LOCATION OF MARKERS**

**Body of Water:** \_\_\_\_\_ **County:** \_\_\_\_\_

Attach three copies of a map, chart section, or drawing to a scale which will readily depict the proposed zoned area to its surroundings showing the location of each marker to be placed in the water and its relation to nearby channels and water patterns. Have inset or attachment showing type of marker to be used at each location.

**Latitude:** \_\_\_\_\_ **Longitude:** \_\_\_\_\_

**D. MARKERS**

Type and Number of Markers: \_\_\_\_\_

All markers must conform to specification as listed in Rules of Establishment of Uniform Regulatory Markers. State below names of manufacturer of commercial markers that will be used, or, if obtained otherwise, indicate source.

\_\_\_\_\_



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**E. CERTIFICATION**

The applicant hereby agrees and certifies that all markers authorized by the Department will be installed and maintained at no expense to the Department; that all such markers will conform to the specifications, standards and conditions set forth in “Rules for Establishment of State Uniform Regulatory Markers on Public Waters of Virginia” and may be inspected at any time, without prior notice, by authorized personnel. Should markers not be maintained in satisfactory condition, the Department may order them removed at no expense to the Department. The applicant agrees that the Department of Game and Inland Fisheries will not be held liable with respect to any and all claims that may result from the installation and maintenance of such markers and the marking of any waters does not convey any exclusive privileges.

---

(Signature)

---

(Title)

**INSTRUCTIONS:**

Complete four copies. Mail three copies with supporting documents to:

Law Enforcement Boating Coordinator  
Department of Game and Inland Fisheries  
P.O. Box 11104  
Richmond, VA 23230

***Updated July 12, 2006***

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**Appendix B - Low Head Dam Signage Examples**

**Upstream Sign**



An example of signage that can be placed *upstream* of the dam to warn and/or exclude activities.

**Downstream Sign**



Another example of signage that could be used *downstream* from the dam to warn and/or exclude activities.

# VML INSURANCE PROGRAMS

## Hazard Warning Guidance for Low Head Dams

### Danger Sign



An example of a sign that could be used along pathways leading to the dam.

### Other Samples of Signs Found at Low Head Dams



Orange triangle indicates danger;  
verbage describes the type of danger



Signs posted above a low head dam in a high  
pedestrian traffic area

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## Hazard Warning Guidance for Low Head Dams



Sign posted above a low head dam instructing river users to exit



Warning



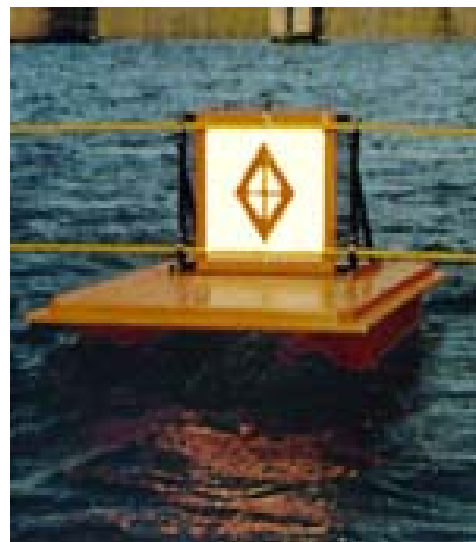
Danger sign placed in a highly visible location upstream from the dam



Danger sign placed below the dam, downstream to warn users approaching from below the dam



Danger sign with a picture sends a clear message



Waterway marker with barrier system

# VML INSURANCE PROGRAMS

## Hazard Warning Guidance for Low Head Dams

### References

2001. *Safety Signage at Hydropower Projects*. Division of Dam Safety and Inspections, Office of Energy Projects, Federal Energy Regulatory Commission, Washington, DC 20426

*Sign and Buoy Guidelines for Run-of-the-River Dams*. Pennsylvania Fish & Boat Commission, Harrisburg, PA 17110-9217

Code of Virginia. 4VAC15-370-50. Regulatory markers and aids to navigation.