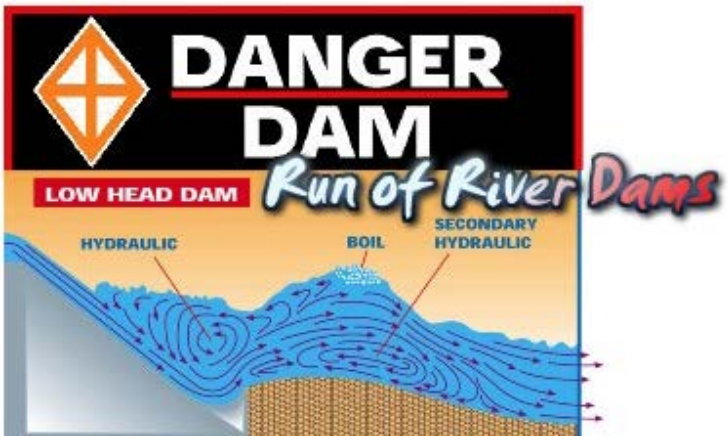
Hazards to boaters appear in many forms; dams, submerged objects, cold water, fast-changing weather, sun stroke and current. These hazards aren't always obvious. Boaters need to recognize these dangers and be ready to avoid them at all times. Developing a keen appreciation and understanding of the overall "boating environment" lets boaters avoid hazards on the water.

Dams

Boaters must stay clear of dams. Failure to do so often results in tragedy. Dangerous currents above the structure can draw boats into water going over or through a dam. Boaters should immediately deploy an anchor if they find themselves in an emergency situation upstream of a dam. Areas below dams are also hazardous because of strong recirculating currents and turbulent water. Many dams are not marked. Sometimes dams can be spotted by looking downriver for a discernible horizontal line going across the water, but dams are not always evident. Boaters should know the locations of all dams on a waterway before they launch their boats.



The most dangerous kind of dam on a river or stream is a low-head dam. Pennsylvania law requires marking of those low-head dams that meet a statutory definition of "run-of-river dams." There are about 250 dams identified by the Department of Protection as "run-of-river dams. Click here for a list of these dams. These dams are defined as dams:

1. Regulated or permitted by the Department of Environmental Protection (DEP) pursuant to the act of November 26,1978 (P.L.1375, No.325), known as the Dam Safety and Encroachments Act;
2. built across a river or stream for the purposes of impounding water where the impoundment at normal flow levels is completely within the banks and all flow passes directly over the entire dam structure within the banks, excluding abutments, to a natural channel downstream; and
3. determined by DEP to have hydraulic characteristics such that at certain flows persons entering the area immediately below the dam may be caught in the backwash.

In addition to the dams that meet the definition in the law, many other dams may have dangerous hydraulic characteristics under certain flow and weather conditions. A dam that might seem completely safe at one minute can be turned into a dangerous low head dam the next if, for example, a sudden storm increases flows. There are more than 2,000 dams on rivers and streams throughout Pennsylvania that have the characteristics of low-head dams under certain conditions. Under the right (or, more aptly, the wrong) conditions, these dams can become true "drowning machines." Water going over a dam creates a back current, or undertow, that can pull a boat into the turbulence and capsize it. This hydraulic can often trap and hold a person or a boat.

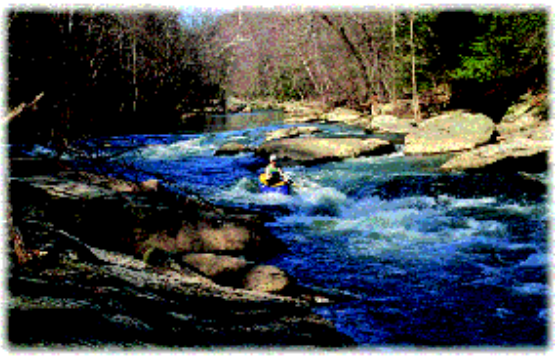
Dams do not have to have a deep drop to create a dangerous backwash. During periods of high water and heavy rain, backwash current problems often become worse, extending farther downstream. A small low-head dam that may have provided a refreshing wading spot at very low water can become a monstrous death trap when the water level rises. Becoming familiar with a river's worst dangers and knowing the waters they plan to visit is vital information all boat operators must understand.

Submerged objects

A submerged object in the water can be a hazard to an unwary boat operator. Rocks, stumps, logs and other objects can greatly

damage a boat's hull or motor, sometimes resulting in injury or death to people on board.

Water levels vary on almost every waterway in the state. Even a few inches difference in depth can make the difference between "smooth sailing" and an abrupt end to the boating day. Running aground at high speed can result in people being ejected from the boat. Boaters can protect themselves by keeping a sharp lookout for objects in the water and changing bottom structure. A depth finder or fathometer can keep a boater informed of the depth of the water. Operators who are not sure of the bottom should reduce speed.



Current

Safety on the water depends on developing respect for the power of water. Current can be deceptive and boaters should never underestimate its power. Even a moderate current can exert a force of several tons on a capsized canoe, pinning it against a rock. Boaters venturing out in strong current must stay within their abilities and skill levels, especially in unpowered boats.

A strainer is an obstruction, like a tree or fence in the water, that allows water to pass through but holds and traps boats and boaters. Boaters in current need to keep a safe distance from strainers that they could be "pinned" against.

When anchoring in current, boat operators should always anchor from the bow. This allows the boat to ride up and over oncoming waves. Anchoring from the stern can cause water to rise over the transom and flood or even capsize the boat.

Tidal currents can be very powerful. Tides are the vertical rise and fall of ocean water (and waters affected by the ocean) caused by the gravitational pull of the moon and sun. Boaters venturing out onto tidal waters such as the lower Delaware River should understand how tides work. Tides affect where a boater can travel and anchor safely.

Waves

Large waterways such as oceans and Lake Erie provide different challenges and dangers than moving water. Wind acts on the surface of the water, creating waves. The greater the force of the wind and the deeper and larger the waterway, the bigger the waves can be. Large waves in big water often develop quickly and can endanger small craft. Boaters should not venture out on large waters such as Lake Erie in small inland boats. Even smaller lakes can be hazardous to small craft when wind and waves combine to create dangerous conditions.

Weather

Factors that determine weather include temperature, barometric pressure and wind. Weather affects the condition of open water and can change suddenly. Smart boaters check the local forecast the night before going boating and again in the morning. The National Weather Service (NWS) issues a new marine forecast at least every six hours on designated VHF radio channels, or NWS can be telephoned for the latest forecast. The phone number appears in the phone book's US Government section under "Department of Commerce."

Be alert to weather you can see. Signs that the weather may worsen include:

- Clouds gathering, darkening and increasing in size.
- Sudden temperature drop.
- Rapid wind shift or change in speed.
- Static on the AM radio, which might indicate an approaching thunderstorm.
- Drop in barometric pressure (check a barometer).

If a storm is near:

In a small boat, everyone not already doing so should don a life jacket. The operator should head for the nearest shore and beach the boat, if necessary. It is best to find a shore on the downwind (leeward) side of the land.

In a large boat, after making certain everyone is wearing a life jacket, the operator should start the engine or secure the sails (whichever is applicable). All unnecessary gear should be stowed or secured, and the running lights should be turned on. After the boat is closed up, the operator must decide what to do. If land is near, it is best to head for it. If not, it may be necessary to ride out the storm. If forced to do so, the operator should keep the bow headed into the waves, wind and/or current. If the motor fails, a sea anchor on a line from the bow will keep the boat into the waves. A bucket will work as a sea anchor in an emergency.

Lightning is a dangerous part of bad weather. At the first sign of lightning boaters should lay fishing rods flat on the deck and lower or remove antennas. If possible, get to a safe harbor. Being on open water during a lightning storm can be a terrifying experience.

Cold water

Sudden immersion in cold water places a severe strain on bodily systems that can lead to cardiac arrest. Survivors of cold-water accidents have reported their breath driven from them on contact with the water. Anyone falling into cold water should immediately cover the mouth and nose with the hands to prevent inhaling water.

Total disorientation may occur. The shock to the system may not allow the person to think or act clearly. Cold water can quickly numb the extremities. Cold hands may be unable to fasten the straps of a life jacket, grasp a rescue line, or hold on to an overturned boat. Everyone should always wear a life jacket. This becomes especially critical when boating on cold water.

Cold water causes the body's temperature to drop. Lowering of the body's core temperature is called hypothermia. It can render a person helpless in minutes.

Hypothermia begins with shivering.

Judgment becomes clouded and unconsciousness sets in. Death can occur if hypothermia is not treated.

Hypothermia treatment

Remove the person from the water and replace wet clothes with warm, dry clothing and/or a blanket. Do not massage the extremities. Do not give the victim alcohol or caffeine. If the victim is unconscious, transport the victim to a medical facility immediately.

To be prepared for cold water, boaters should . . .

- Make sure the boat and equipment are in first-class condition.
- Always wear a life jacket or vest. It will keep you afloat and help keep you warm.
- Dress properly for the cold by wearing a hat, several layers of clothing, and warm boots. Wool, pile and polypropylene provide warmth even when wet. Avoid cotton fabrics, which are poor insulators when wet.
- Tell someone where you are going and when you expect to return.
- Never boat alone.

Practice capsizing and righting small boats in the warm-weather months.
- Never panic if you fall into cold water. Air trapped in clothing can provide buoyancy as long as you remain still in the water.

Overheating and sunburn

Just as hypothermia can be fatal, so too can hyperthermia. Hyperthermia is an increase in the body's temperature. The body normally cools itself through the evaporation of perspiration. On hot days, continuous fluid replacement is required to avoid dehydration and keep the body supplied so it can sweat. High humidity on hot days makes sweating less efficient as a means of cooling. On the water, boaters are in a more humid environment than when on dry land. Persons suffering from heat illness often feel faint, or are nauseous. They may have a rapid heart rate, and/or a headache. The young and elderly are usually more easily overcome by heat. A well-rested person who has had something to eat recently is better able to cope with the stress of excessive heat.

Treatment requires stopping any exercise and moving to a cooler environment. It is important to get out of the sun and heat. Drinking fluids is also important, although carbonated beverages and alcoholic beverages should be avoided. If untreated, mild heat stress can progress quickly to severe heat stroke, which can be life-threatening. Persons suffering from heat stroke usually have a deterioration in mental function and coordination, as well as the above symptoms. It is important to begin cooling and get medical treatment immediately.

Sunburn is another danger that everyone, especially boaters, must never forget. Even when wearing a hat or in the shade of a boat's awning, ultraviolet rays are reflected from the water to a boater's skin.

The key to avoiding sunburn is to cover the skin. A hat and light protective clothing create a protective barrier to the sun's rays. Sun blocks with an SPF (sun protection factor) of 30 are effective when applied at regular intervals. Sunglasses are also a very good idea. They protect the eyes from damaging ultraviolet rays, as well as lessen eye fatigue from constant squinting.

Prevention is the best approach to dealing with heat and the sun. Important ideas to remember are:

- Wear light clothing and a hat.
- Drink fluids regularly.
- Reduce physical activity.
- Apply sun block at regular intervals.
- Wear sunglasses.

Boaters must understand that the effects of a day on the water exposed to bright sunshine and high humidity will have a cumulative, possibly dangerous effect. This could affect a boater's judgment and the ability to keep a proper lookout, thereby increasing the possibility of an accident.

Alcohol and boating

Alcohol is a hazard to boaters. Its use increases the chances of a boater having an accident. Alcohol affects balance, coordination and judgment. Instead of making a person warmer, body temperature actually cools faster because alcohol dilates blood vessels. Use of alcohol also results in increased risk-taking.

It is illegal to operate a watercraft on all waterways of the Commonwealth while under the influence of alcohol or a controlled substance.

Other boaters

One of the least expected hazards on our waters is other boaters. Even an experienced, competent boater may be involved in an accident because of another boater's mistake or irresponsible action. Whenever possible, boaters should steer clear of other boaters. Report violations to a Waterways Conservation Officer (contact the Commission's Region Office in your area) and stay alert. Keeping a sharp lookout while boating is the best defense against an irresponsible operator on the water.

For more information on hazards on the water, take a boating course.

Hazards on the Water -- PFBC Home

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