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BOAT

Pennsylvania



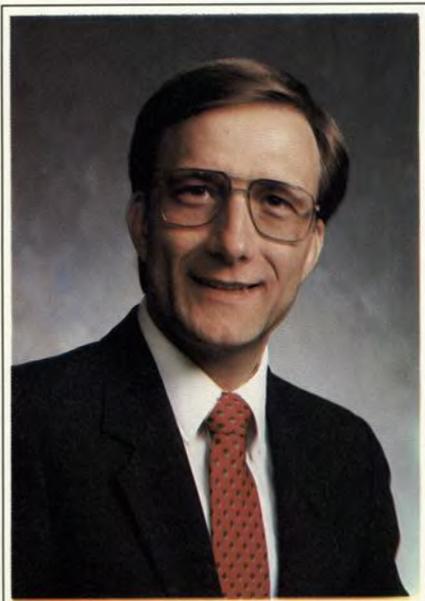
The Keystone State's Official Boating Magazine



Viewpoint



The U.S. Recreational Vessel Fee



John Simmons
Director
Bureau of Boating
Pennsylvania Fish Commission

As many of you know, Congress included an onerous tax on boaters in its Omnibus Budget Reconciliation Act of 1990. This tax requires the owners of certain recreational boats used on the navigable waters of the United States to pay an annual Recreational Vessel Fee (RVF) ranging from \$25 to \$100. This fee is effective now through 1995. Generally, it is intended to help decrease the federal deficit by raising some \$718 million over the five years of the program. None of the money collected goes to the Coast Guard to increase or improve services.

The Recreational Vessel Fee applies to any vessel over 16 feet in length that is manufactured or operated primarily for pleasure. Exempt are boats powered solely by oars, paddles or poles; vessels owned or operated by volunteer fire departments, rescue squads or similar organizations; those used for public safety purposes; and those owned by the Boy Scouts of America, Girl Scouts of America or the YMCA primarily for training youth in boating, seamanship and navigation skills.

The most often asked question is, where does the fee apply? The Coast Guard, charged with administering this fee, has determined that the fee applies in: a) territorial waters of the U. S. (coastal waters or ocean out to three miles); b) internal tidal waters (high and low tides daily); c) navigable non-tidal waters from which a 16-foot powered boat with a displacement type hull can navigate to tidal waters (connecting waters, canals, locks, etc.) during most of the boating season.

In Pennsylvania, the fees apply in the following areas: a) the Delaware River to Trenton Falls and all tributaries to the extent of navigation; b) Lake Erie including Presque Isle Bay; c) the length of the Ohio and the Monongahela rivers; d) the Allegheny River to Mile 70 just north of East Brady; and e) the Youghioghny River to Mile 3.0; the Beaver River to Mile 2.0; the Little Beaver River to Mile 1.0; the Cheat River to Cheat Dam; Redbank Creek to Mile 1.5; and Crooked Creek to Mile 1.5.

All boats subject to the Recreational Vessel Fee must display a pair of RVF decals within six inches of the location of the vessel's registration or identification numbers on the forward half of the vessel. An individual set of decals must be purchased for each boat subject to the provisions of the act.

The Recreational Vessel User Fee became effective on July 31, 1991. A lenient enforcement policy was followed by the Coast Guard until October 1, 1991. From now on, Coast Guard boarding officers will enforce the fee and civil penalties up to \$5,000 may be imposed on boaters who fail to obtain the required decals.

This is a federal user fee and the Fish Commission has no part in the collection or enforcement of the provisions of the act. Fish Commission officers will not look for the decals, nor will they in any way assist the Coast Guard in its enforcement. We have also been assured that the U.S. Coast Guard Auxiliary will not participate in reporting boats without decals and that decals won't be required for Courtesy Marine Examinations.

Although efforts are under way in Congress to repeal this fee, quick action is unlikely and any repeal will probably not affect the need for a 1992 decal. Pennsylvania boaters who use waters with regular Coast Guard patrols are encouraged to purchase their decals to avoid an unpleasant encounter with federal authorities.

You can obtain information on how to get the decals by calling the Coast Guard toll-free Boating Safety Hotline at (800) 368-5647. Persons wishing to purchase the decals using a credit card can call (800) 848-2100.

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The covers

This issue's front cover shows paddlers plying the swirling, inviting Brandywine Creek in Chester County. The photo was taken by Bill Schill. The back cover shows Mike Fogg humming along on the lower Susquehanna River. Art Michaels snapped the picture. And speaking of humming along, the article on page 6 provides the lowdown on some fine southwest Pennsylvania cruising, and paddlers should check out the article on page 16 for advice on picking a perfect canoe for Pennsylvania waters. If you plan to send your child to summer camp next year, don't miss the vital information on page 4, and if you tow a boat, the results of the experiments detailed in the article on page 23 may surprise you.

Exploring Boating Opportunities at Summer Camps

by Cheryl Hornung

Spending time away from home at summer camps is a part of many young peoples' growing-up process. Camps provide a learning environment in which children discover more about themselves. Children learn to develop trust, responsibility, new skills and just to have fun.

The American Camping Association (ACA) says that more than five million young people attend camps nationwide each summer. ACA has also determined that water skiing, canoeing, rowing, sailing, windsurfing, swimming and scuba diving are included in the 50 most popular camp activities. Make sure the boating and aquatics staffs of your child's camp are qualified to teach and supervise these activities.



With more than 8,500 day and resident camps in the U.S., selecting a camp may seem overwhelming. Current ACA estimates indicate that over five million young people attend camps each summer. With this many camps in the country and with camping attendance on the increase, how do you look for a camp that is best for your child?

One way is to check to see if the camp is accredited. The American Canoe Association is a 5,000-member not-for-profit education association with a voluntary peer-administered accreditation program. This accreditation system is based on standards that camp professionals have determined to be desirable program practices. Camps are visited while in operation by two or more trained volunteers who compare the camp's practices against the industry standards. Over 300 nationally recognized standards are grouped into categories that evaluate a camp site and facilities, administrative practices, transportation, personnel, programs, health care and

activities at camps vary widely. What makes a camp special is the emphasis placed on developing group living skills in an outdoor setting. Some camps might specialize in certain areas such as aquatics or arts, and others might offer a broad base of activities. According to the American Camping Association (ACA), water skiing, canoeing, rowing, sailing, windsurfing, canoe tripping, swim instruction, recreational swimming and SCUBA/skin diving make up some of the 50 most popular camp activities.

activities. Camps must comply with all mandatory standards and earn a minimum score of 80 percent to be accredited. Fifteen percent of camps visited for accreditation do not meet the minimum requirements. These camps need to make improvements or changes before accreditation is issued.

Accreditation is a voluntary program and there are camps that may have fine reputations that choose not to meet ACA standards. Pennsylvania currently has 165 accredited camps.

Boating, aquatics staff

Another way to select a camp is to check the credentials of the boating and aquatics staff. In ACA-accredited camps, aquatic programs must be supervised by staff meeting one of the following certifications: American Red Cross Lifeguard Training, YMCA Lifeguard, Boy Scouts of America Lifeguard, Royal Lifesaving Bronze Medallion, or equivalent certification. In addition to the



Cheryl Hornung

lifeguard, ACA-accredited camps must have written documentation that a person is qualified to teach that particular craft such as sailing or canoeing. This could include a certificate from almost any boating program or course.

The ACA-accredited Girl Scout camp's aquatic staff, in addition to the lifeguard, must have a Red Cross-certified small craft instructor or equivalent for whichever type of craft they are teaching. The most common courses are sailing and canoeing. The equivalent could include U.S. Coast Guard Auxiliary, U.S. Power Squadrons or Pennsylvania Fish Commission courses.

The majority of campers are from New York, New Jersey and Maryland along with Pennsylvania. These states have some type of mandatory boating education programs, and at press time Pennsylvania has similar pending legislation. Wouldn't it be beneficial for these camps to teach a certified boating education program that meets the requirements of mandatory education? Wouldn't you like your child to complete a certified boating course at camp so that when you vacation at the shore next summer, the youngster could operate your boat? Why do so few camps in our area teach such programs?

The Fish Commission's Boating and Water Safety Awareness Course is taught in some camps across the Commonwealth. It is an eight-hour in-water course approved by the National Association of State Boating Law Administrators (NASBLA). It is a practical course because it requires both classroom time and in-water experience that focuses on survival skills. Topics covered include required safety equipment, rules of the road, navigation aids, environmental concerns (weather, wind, waves, currents), safe boat operation, basic rescue, hypothermia and alcohol.

In-water skills to be practiced include swimming while wearing personal flotation devices (PFD), cold water survival skills, boating accidents (swamped boats) and basic rescue techniques. These in-water skills are what makes this program a big plus at summer camps. Teens in small boats are going to get wet. Why not teach them the laws regarding boating first and then have them practice safety techniques such as swimming with PFDs on in the water?

The Commission believes that this hands-on training will make these youths safer boaters. They learn the basic safety require-

ments such as what they need to carry aboard their boats, which way to turn to prevent a collision and what buoys represent. Perhaps most importantly, they've had hands-on in-water training on what to do if they or someone else were in a boating accident. Most boating fatalities in Pennsylvania occur when people capsize or fall overboard. Hopefully the safety techniques practiced in this class will prevent this from happening.

This course was developed in 1980 and has been a very successful program not only in camps but also in schools, parks and recreation departments. According to Virgil Chambers, Chief of the Commission Boating and Water Safety Division, the program was originally developed to expose students to those situations and conditions that reflected real experiences in which people have lost their lives in boating accidents.

This past year, Bear Creek Camp (near Wilkes-Barre), Sarah Heinz House Camp (near Pittsburgh) and Camp Louise (near Schickshinny) were the only known camps with aquatic staff who are certified instructors in boating education programs approved by the National Association of State Boating Law Administrators (NASBLA). Several other camps requested Fish Commission employees to come in and teach the basic program to their campers.

In Pennsylvania, NASBLA has approved courses (eight-hour minimum) taught by the U.S. Coast Guard Auxiliary, U.S. Power Squadrons and the Pennsylvania Fish Commission. These courses meet the basic safety standards. The two Fish Commission courses approved by NASBLA are the eight-hour Basic Boating (classroom) course and the eight-hour Boating and Water Safety Awareness (classroom and in-water) course. Most camps prefer to teach the awareness course as part of their aquatic programs.

With four different boating courses in Pennsylvania meeting the NASBLA guidelines, why aren't more camps teaching these programs? This winter when you're looking at camps for your child next summer, make sure the camp offers a NASBLA-approved boating course. It will supply a peace of mind found with knowing that your child understands proper boating procedures. These skills can make all the child's boating excursions safer and more enjoyable.



Don Martin

Cruising the "Mon"

by John E. Mahn, Jr.
photos by the author





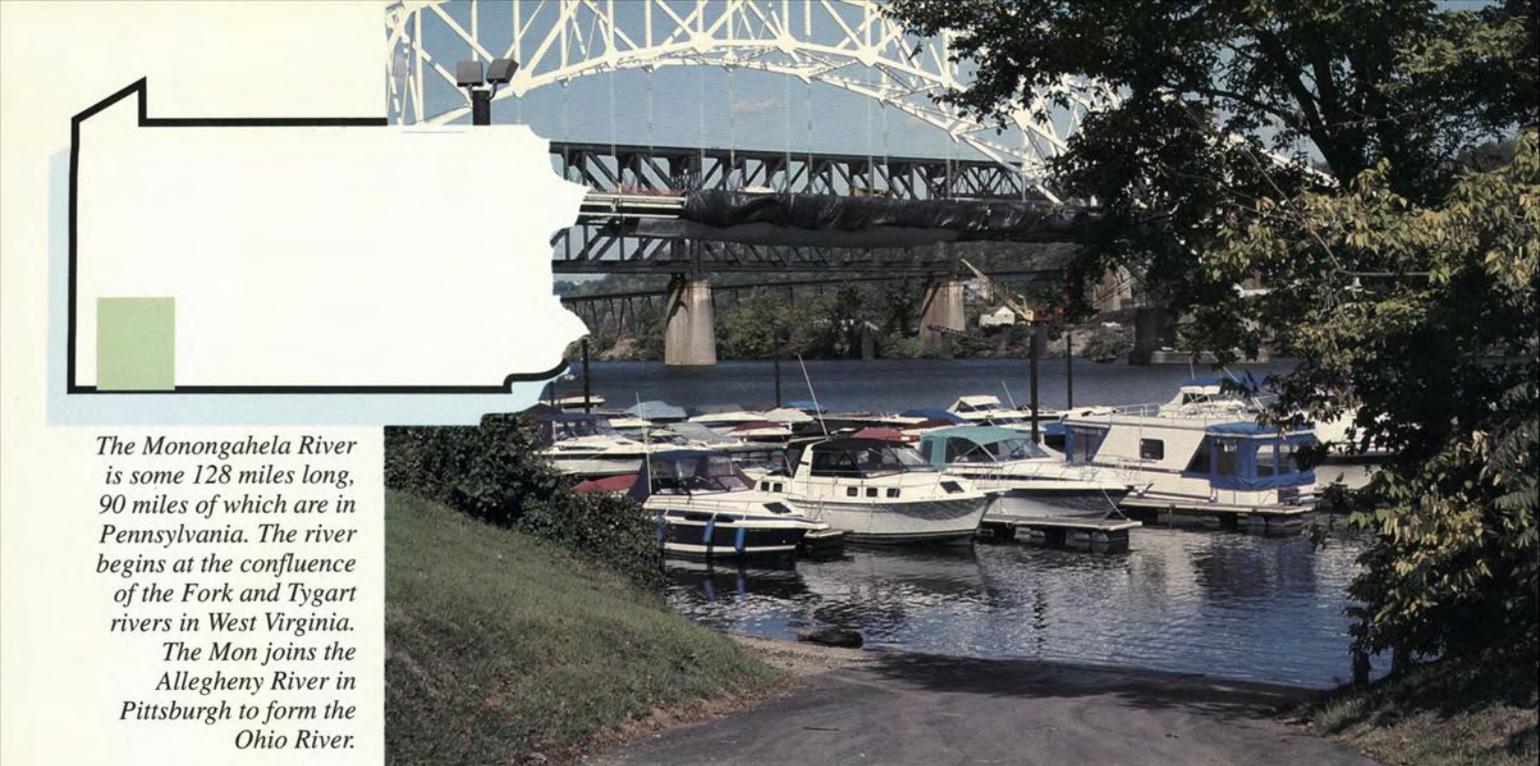
An Indian name, *Monongahela* means “the river with high banks that fall in.” Eighteenth century explorers spelled it “Monongahelo” or “Minaugelo,” but it was George Washington who gave the river the spelling that is used today. The youthful Washington first saw the river in 1753 as a representative of British interests. He was sent to southwestern Pennsylvania to protest the French occupancy of the region.

Cruising the river more than 200 years later, boaters can see not only the natural beauty of the river and the surrounding valley, but they can look back and see how the Monongahela shaped the development of one of America’s great industrial centers.

The Monongahela, also called the “Mon,” is formed by the confluence of the West Fork and Tygart rivers, about a mile south of Fairmont, West Virginia. The Mon flows into southwestern Pennsylvania in a northeasterly direction, then in a northerly direction to Pittsburgh, where it joins the Allegheny River to form the Ohio River. The total length of the Monongahela River is about 128 miles, 90 miles of which are in Pennsylvania.

An abundance of access points, marinas and restaurants along the river’s length means boaters can tailor a cruise to their tastes. Depending on the type of craft and boater’s timetable and interests, planning an enjoyable cruise is easy. Marinas usually have their docks in from mid-April through October. The Mon is home to all kinds of motorboats, from 14-foot aluminum fishing boats to 60-foot cruisers. Runabouts probably outnumber other types of craft, but pontoons, houseboats, bass boats and jet skis can all be seen using the river. For day cruises, a 17-foot runabout is all that’s needed. For overnight or extended cruises, larger craft with bunks and a head are more suitable. Even though meals and guest docks are common along the river, overnight accommodations are limited.

A good jumping off point for a Mon River cruise is the Fish Commission Speers Access, located on Route 88 near the borough of Charleroi. From the east or west, take Interstate 70 to Exit 16. The access is less than a quarter-mile from the exit. From the north or south, take either I-79 or Route 51 to Interstate 70. The Speers Access is some 43 miles upriver from (south of) The Point in Pittsburgh, making it about the halfway point on the Monongahela. From here boaters can head north toward Pittsburgh or south to Point Marion. By starting in the morning at the midpoint, day



The Monongahela River is some 128 miles long, 90 miles of which are in Pennsylvania. The river begins at the confluence of the Fork and Tygart rivers in West Virginia.

The Mon joins the Allegheny River in Pittsburgh to form the Ohio River.

cruisers can reach the city of Pittsburgh or the West Virginia state line and make the return trip before nightfall.

Navigating the Mon

Navigating the Mon is not difficult, but boaters should understand some basics of river navigation. On the Monongahela, all distances are designated in miles from The Point, in Pittsburgh. To avoid confusion, the riverbanks are referred to as if one were always heading toward the Point (downriver), either the right descending bank or the left descending bank. Lights and daymarks are located along the banks to aid navigation. Daymarks on the right descending bank are square and green. Daymarks on the left descending bank are triangular and red. Daymarks also show the distance from The Point in miles. In some areas, buoys are used to mark the river's channel. Buoys on the left descending side of the channel are red. Buoys on the right descending side of the channel are green.

The U.S. Army Corps of Engineers operates six locks and dams on Pennsylvania's portion of the Monongahela. The Mon is a recreational resource, but it also carries some 30 to 40 million tons of cargo each year, mostly coal, steel and petroleum. Commercial traffic, barges and tow boats take precedence over pleasure boats when passing through the locks. A short cruise may be delayed an hour or so if there are tows on each side of the lock waiting to pass through. On busy summer weekends, a lockmaster may wait until several pleasure boaters arrive to lock through, rather than lock each boat through individually.

Boaters planning to travel from one pool to another should allow extra time for locking through.

River depths typically run from 15 to 30 feet in the main channel. The Corps maintains a minimum depth of nine feet, more than enough for most pleasure boats. Generally speaking, the outside bends of the Mon drop off sharply. The inside bends tend to be more shallow and gently sloped. The river's current is stronger on the outside bends, so it cuts away at the bank. Current on the inside of the bend is slower, so sediment settles there, creating a gradual slope. The bottom composition runs the gamut from mud to solid rock.

Effects of heavy rain

Boating on the Monongahela is not without its dangers. Common sense should guide a boater's actions. Heavy rains raise the level of the river, creating unsafe boating conditions. Not only does the current increase in times of high water, but the rising water floats off debris that has collected along the banks. Submerged logs are a significant hazard when the river rises. Depending on the actions of the Corps and the amount of rain, the Mon usually clears up and returns to its proper level in three to four days.

Commercial traffic is another concern boaters on the Mon should consider. A tow pushing six coal barges cannot maneuver as a pleasure craft can, and barges may take more than a mile to stop. Boaters should give tows a wide berth when passing or overtaking. Needless to say, the center of the river channel is not the place to anchor

or work on your engine. The wake from these boats can also be dangerous, causing problems for the small-boat operator who hits one at high speed.

Cruising at night or in the fog should be avoided if at all possible. Commercial boats are equipped with radar and travel day and night, regardless of weather. They become moving hazards to pleasure boaters blinded by the dark or the fog. It would also be very easy for a cruising boater to go right past a marker in the fog. At Lock 3 in Elizabeth, for example, the lowhead dam would make such a move potentially fatal.

Useful items

In addition to the required safety equipment, cruisers should also carry two 50-foot lengths of dock line, a suitable number of fenders, a pair of anchors designed for river use, a plastic gas can and a small tool box. The dock lines and fenders can be used in locking through. Mushroom-type anchors, especially the fluted ones, seem to work best on the river bottom. A pair of anchors keeps the wind from blowing your boat back and forth. Cruisers who anchor along the bank for the night must display an all-around anchor light where it can be seen. Avoid unsafe anchorages such as gas or water pipelines. Signs on shore warn boaters to stay out of such areas. A VHF radio lets you monitor work boats as well as weather reports and river conditions. An old pair of tennis shoes comes in handy when exploring the bank.

Which way should you cruise—up the river or down? It depends on your frame

of mind and what you want to do. To the north lie the bright lights and fast pace of the city of Pittsburgh. To the south you find quiet river towns, striking scenery and an almost laid-back atmosphere.

Cruising north from the Speers Access, you soon get a feel for the industrial might the Monongahela River gave the region. In 1949, Richard Bissell wrote of traveling this stretch of the Mon "surrounded by the smoke and uproar of 62 glass factories, 350 coal mines and 35 steel mills, plus uncountable other noisy enterprises all blamming away." Most of the mills are now silent.

The Dam #3 light and daymark at river mile 24.8 is just upstream of the site of this country's worst inland oil spill. On January 24, 1988, a tank at the Ashland Petroleum Company's Floreffe storage facility collapsed, sending one million gallons of diesel fuel into the Monongahela.

At river mile 21, the town of Clairton is the site of U.S. Steel's huge coke works. The largest byproduct coke plant in the United States, Clairton Works covers 175 acres along two miles of the Monongahela's banks. Six miles down river is the city of McKeesport. The now-defunct National Tube Company, at one time the largest of its kind in the world, made McKeesport a boom town during World War II.

Many towns along the Monongahela are rich in history. Homestead, at river mile 6, is the town where Andrew Carnegie started his Bessemer Steel Company, and the scene of the bloody 1892 steel strike. Three hundred Pinkerton detectives hired by H.C. Frick opened fire here on the striking union. Strikebreakers, carried by barges on the Monongahela, waited to enter the plant.

The town of Munhall, next to Homestead, was where the first open hearth furnace in the United States was opened. Almost directly underneath the Glenwood Bridge sits Sandcastle Water Park. The park has 15 water slides, a pool, a hot tub and a restaurant. There are 50 slips for those arriving by boat.

Pittsburgh

Cruising past these old mill towns and rusting steel plants is like traveling back through time. Once you dock in Pittsburgh, the history lesson is over. Welcome to the big city.

In addition to the private marinas and yacht clubs on the Allegheny and Ohio rivers, the city of Pittsburgh operates two parks where boats can be docked while passengers enjoy a much needed shore leave. Point State Park, which is in walking distance from the down-

town area, has room for 25 to 30 boats. Museums, restaurants, theatres and jazz clubs are just a subway ride away.

Across the Allegheny River from The Point, on the city's north side, is Clemente Park. With room for 15 to 20 boats, Clemente Park is close enough for you to hear the crowd roar at nearby Three Rivers Stadium. Besides the usual cultural and athletic events, an annual regatta and the July 4th fireworks display usually draw boaters to The Point from far upriver.

If the city's bright lights and fast pace are what you hope to avoid when you go boating, then head south, upriver, from the Speers Access. This is the back-to-nature cruise. The towns are smaller, quieter and farther apart.

Between them are the high banks from which the river gets its name. At river mile 52 is California University of Pennsylvania. The university's public relations office (412-938-4195) or the student association (412-938-4306) can tell you which cultural or athletic events are taking place. Most events are open to the public. The California Boat Club is just a short walk from the small college town of the same name.

The section from California to Brownsville is one of the most scenic of the entire river, with little evidence of people visible from the water. Swim, water ski, eat or just relax. There is little else to do from here to Point Marion. If you enjoy fishing, the Monongahela has ample populations of black bass (both largemouth and smallmouth), white bass, walleye, sauger, catfish, carp and muskies. Many boaters cruise this river section during the fall, when the foliage makes the scenery even more striking.

From Brownsville it is a quiet cruise upriver to Millsboro, where Ten Mile Creek flows into the Mon. Although much smaller than the Mon, Ten Mile has several marinas, a campground and a county park along its banks. From river mile 66 at Millsboro, the river remains much the same for the next 15 miles.

At river mile 81, Gray's Landing, the Corps of Engineers is constructing a new lock and dam. Although construction of the new lock and dam at Gray's Landing is expected to take several years, it should have little effect on recreational boating. The Cheat River enters the Mon at Point Marion. Just upriver from this confluence is Lock and Dam #8 and the West Virginia state line.



Accesses, marinas, maps

Accesses

Most communities along the Mon have at least one launch ramp. In some cases the ramps are simply old ferry landings, and others were built to give fire companies access to a water source for their pumps. Local ramps vary in quality and state of repair. Docks and parking are usually not available.

The Fish Commission maintains several accesses on the Monongahela. All are suitable for launching large boats. Parking is available. Accesses are located in McKeesport, Monongahela, Speers, Fredericktown and Rices Landing.

Marinas

Beach Club Marina, New Eagle. (412) 258-2088. Gas, repairs.

Boat World, Speers. (412) 483-3337. Gas, repairs, guest docks, travel lift.

Bradish Riverport, Inc., Allenport. (412) 326-4444. Gas.

California Boat Club, Coal Center. (412) 938-9913. Gas.

Engles Holiday Harbor, Millsboro. (412) 377-0151. Gas, repairs, guest docks.

Green Cove Yacht Club, Ten Mile Creek. (412) 377-0184. Gas, repairs, travel lift, guest docks.

Maps

Maps of the Monongahela River are easily obtained and contain a wealth of information. The Corps of Engineers sells a set of 21 maps bound in a convenient book. Keep in mind that even the latest maps may not show all the current information. To obtain maps, contact: U.S. Army Corps of Engineers, Pittsburgh District, 1000 Liberty Avenue, Pittsburgh, PA 15222. Cost: \$8.00.

Allegheny Design and Map Co., 147 Walnut Strand, Imperial, PA 15126. (412) 695-1428.—JEM

Deep-Cycle Batteries: The New Breed

by Steve Henkel

Shopping for a deep-cycle marine battery? You'll find that today's storage batteries—particularly the deep-cycle kind—have more compact power, easier maintenance, and longer battery life than ever. Still, trying to choose from the dozens of available brands, types and sizes can be confusing. With all the new technology appearing on the market, and new ways of rating capacity, it's tough to evaluate what you're buying to be sure you're getting your money's worth. This article provides some guidance.

Picking a type

Unlike marine "cranking" or "starting" batteries, which on the inside are indistinguishable from ordinary automotive batteries, marine deep-cycle batteries are designed for situations where current must be used for hours or days at a clip without recharging. Thus, they're perfect for sailboat use, where turning on the engine to recharge the batteries is the last thing on the mind of skipper and crew.

The term "deep cycling" refers to discharging a considerable portion (at least 50 percent) of the total rated capacity of a battery, and then recharging back to the full capacity. Any deep-cycle battery worthy of the name should be able to go through at least 100 such cycles; some are capable of 400 cycles or more.

Within the marine deep-cycle category, there are four general types, each with its own maintenance requirements.

The "regular maintenance" type features antimonial lead plates immersed in a liquid electrolyte of dilute sulfuric acid. This type can "self-discharge" at the rate of four

percent to 10 percent of its capacity each month, making it necessary to recharge regularly, even when the batteries aren't used, to avoid permanent loss of capacity. Moreover, during charging, electrolyte is lost to the surrounding atmosphere fairly rapidly, requiring regular replenishment with distilled water to keep plates covered. If you store this kind of battery over the winter, it's necessary to check the charge and fluid levels every 45 to 60 days.

The "low maintenance" type uses calcium lead instead of antimonial lead for some or all of the plates. The calcium tends to inhibit the loss of electrolyte, thus reducing maintenance of the electrolyte level.

fully charged in the fall, a maintenance-free battery usually lasts without further attention until spring. If the battery isn't labeled "maintenance-free," it almost certainly isn't, despite the apparent absence of openable caps or pads.

The "maintenance-free" type using gel-cell technology is also sealed, except for venting dividers. Like the liquid electrolyte type, you can hook it up, use it and forget it, as long as it's brought to a full charge every 30 days or less. Once fully charged, it can go as long as 16 months (at 68 degrees) without attention. An added plus for those who like to run their engines as little as possible is that gel cells have substantially quicker recharging rates compared to conventional batteries.

Capacity, size

Once you've decided the kind of maintenance requirements you're willing to live with, you can turn your attention to capacity.

"Reserve capacity" is gradually replacing "ampere hours" as the basic performance measure for marine deep-cycle batteries. "Ampere-hours" (AH) is defined as

the amps that may be withdrawn over an extended period (usually 20 hours) at 80 degrees, without dropping below 10.5 volts on a 12-volt battery.

For example, a battery rated at 100 AH theoretically should be able to handle a load of 25 amps for four hours or one amp for 100 hours while delivering at least 10.5 volts. But in practice, it's not a linear relationship, so you may be able to count on one amp for 100 hours out of a 100 AH bat-



Self-discharging may be only one percent to three percent per month, or more in some cases.

The "maintenance-free" type using liquid electrolyte is usually (but not always) totally equipped with calcium lead grids. The battery case's top is sealed, except for devices to vent any excessive gassing during charging. Replenishment of electrolyte is not required. Self-discharging is usually about one percent to three percent. If

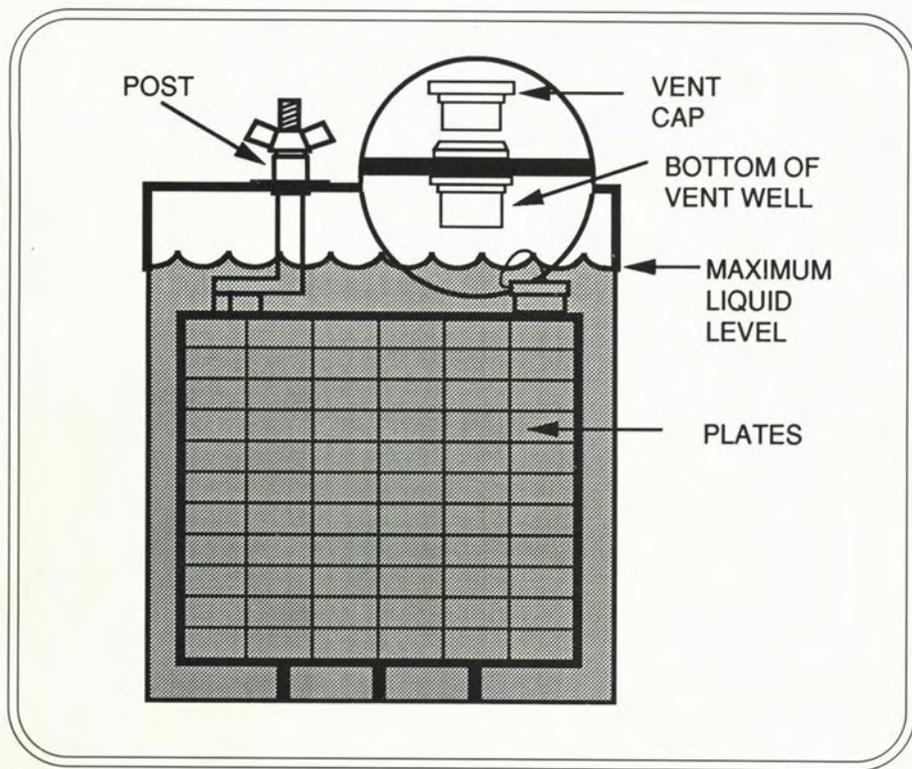


Figure 1.

A deep-cycle battery (right) can withstand many more discharge-recharge cycles than a starting battery. This quality makes it ideal for use with electrical equipment that requires continuous low voltage, like a trolling motor, depthsounder, VHF radio and other electronics.

some models provide more reserve capacity per pound than others. The range I checked runs from Surrrette's 160-minute, 89-pound model (1.80 minutes per pound) to several Prevaier (R) models with over three minutes of capacity per pound of weight.

Value

How much your new battery will cost is mainly a function of two things: (1) the initial cost, and (2) how many years of useful life you can wring out of it. After all, a \$200 battery that lasts five years is cheaper in the long run than two \$100 batteries of equal capacity that each lasts only two years.

Measuring longevity isn't easy. You can't always rely on a manufacturer's claims, especially when comparing their "apples" with some other manufacturer's "oranges."

The warranty period can be a rough indicator of longevity, but that's generally less true for boats than for cars. Auto batteries are often warranted (on a pro rata basis) for 36, 48 or even 60 months, and hopefully the 60-monthers last longer than the 36-monthers. But for deep discharge marine batteries, in many cases the warranty is a scant 12 months, and 30 months is the best you'll find for almost any marine battery except the new gel-cell type.

"That's because marine people don't maintain their batteries," says an industry spokesman. "They abuse them, let them sit all winter long, and don't keep them charged. Automobile batteries, on the other hand, are pretty much charged continuously and the maintenance is out of the hands of the consumer."

Sonnenschein's Prevaier (R) gel cells at this writing are in a class by themselves with a 60-month warranty. That's partly because of the gel cell's ability to handle considerable consumer abuse, and partly because of the unusually high number of deep-discharge cycles the battery is capable of sustaining before it dies.

On any battery, good maintenance will extend its life. Obviously you'll want to take good care of it, by keeping the terminals clean, the electrolyte reservoirs filled (if they're not sealed), using only distilled water (despite some battery manufacturers' ad-

tery, but not 25 amps for four hours.

To solve this problem, the battery industry devised "reserve capacity," defined as the number of minutes a battery at 80 degrees can be discharged at 25 amps without dropping below 10.5 volts. The 25 amp level was chosen because it's a typical size for loads placed on deep-cycle batteries.

Knowing reserve capacity is crucial. If it's not on the label and the store salesman can't supply this information for the brand he sells, think twice before buying that brand.

Cold cranking amps or "CCA" is defined as the number of amperes a battery can deliver for 30 seconds at 0 degrees without dropping below 7.2 volts. For example, a typical 12-volt starter motor may draw 400 amps, and can operate on as little as 7.2 volts (which is why the 7.2 volts was chosen as a standard). Thus, a battery rated at 600 CCA can crank the 400-amp starter for 30 seconds and still have some reserve capacity left.

Small "cranking" or "starting" batteries commonly have 400 CCA of capacity or more, but aren't suitable for deep-discharge service needed on cruising sailboats—whether they're labeled "marine" or not. And most marine deep-discharge batteries rate at 400 CCA or above, too. That's plenty for most applications.

You should know, however, that even though CCA has been the industry standard for years, not all marine battery manufacturers report it. Some report "MCA"

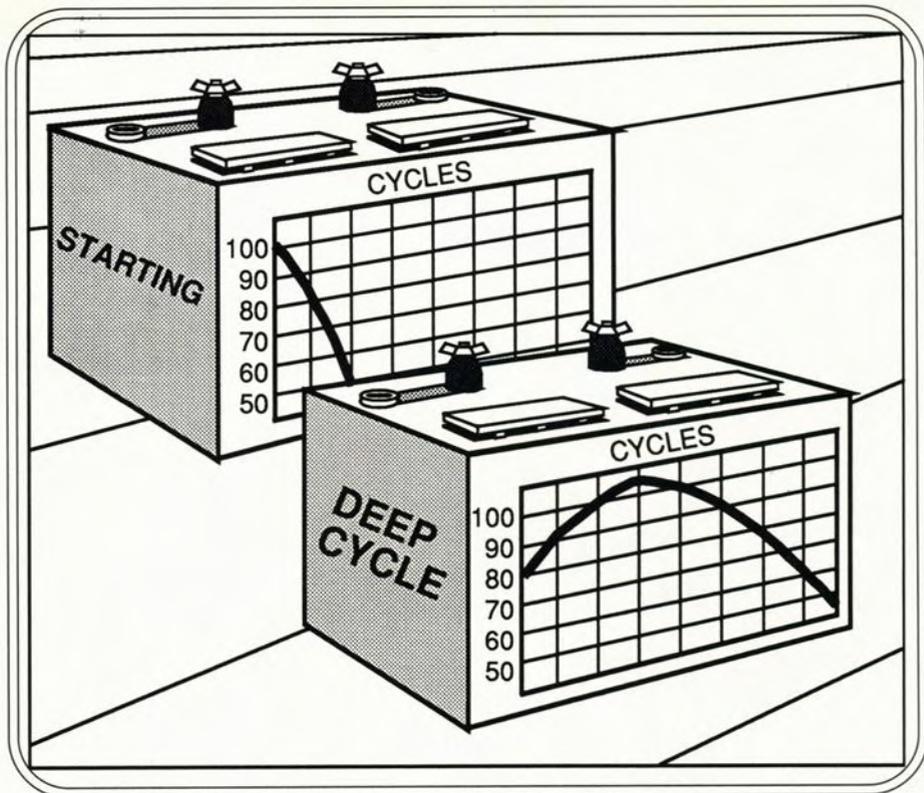
(marine cranking amps) instead. An MCA higher than a CCA on another battery does not mean it's more powerful; indeed, it may be less powerful. That's because a battery's ability to discharge rapidly improves as its temperature goes up, and the MCA is based on cranking tests at a higher temperature, giving a cranking number that's automatically higher than the CCA for an otherwise exactly equivalent battery. It can be misleading to the unsuspecting shopper.

Physical size and weight are important, but the old rule of thumb that capacity is roughly proportional to size or weight is no longer valid. And the "BCI Group" size designations that are often used today in describing batteries are strictly concerned with length, width, height, and terminal type. They do not denote capacity in any reliable measure of power availability.

While evaluating weight, consider that

Knowing a battery's reserve capacity is crucial. If it's not on the label and the seller can't supply the information, think twice before buying that brand.

Figure 2.
The electrolyte level in a battery should always be maintained between the top of the plates and the bottom of the vent wells. Never let the water level drop below the top of the plates.



vice that any water fit to drink is okay), keeping the battery charged but never overcharging it, and locating it in a place that's cool and relatively dry (not in a hot engine compartment, which tends to shorten cycle life). The less fussy you are about maintenance, the more you should lean toward a true maintenance-free battery, which will tend to last longer under a casual—even sloppy—maintenance routine.

Price

Prices for marine batteries can vary widely. Discounts are widespread, but not universal; the higher quality the battery, the less likely you are to find one at a significant discount. You'll need to shop around for the best price.

One route to savings is to buy in the months of February through May, when battery manufacturers offer promotional discounts to wholesalers and retailers to build stocks for the coming season, and sale prices abound.

Another way to save money on first cost is to buy automotive cranking batteries when they're on sale and hook up several in parallel to give you the required power, and accept the fact that you'll have to replace them several times as often as the single deep-cycle battery with the same power. But I don't recommend doing this; the hassle of constant replacement just isn't worth the few dollars saved.

All in all, to get the best deal, shop around, check out the specs, pinpoint the reserve amps you need, and then buy the lowest-cost battery that seems best suited to your particular needs and maintenance habits. The next time around, you can decide whether or not to stick with the same type and brand, based on the actual performance of the battery you buy this time, and your own performance in maintaining it. And during the interim, make a point of keeping up with new technology; every day in every way, batteries are getting better and better.



Some Suppliers of Deep-Cycle Marine Batteries

- Delco (Voyager), General Motors Corp., 400 Renaissance Center, Detroit, MI 48243.
- East Penn Mfg. Co., (Deka), Lyon Station, PA 19536.
- Exide, (Commander's Edge, Mariner's Edge, Angler's Edge), 101 Gibraltar Road, Horsham, PA 19044.
- Sears, Roebuck & Co., (Die-Hard), Sears Tower, Chicago, IL 60684.
- GNB Inc., (Stowaway, Action-Pak), P.O. Box 64100, St. Paul, MN 55164-0100.
- Rolls Engineering, (Rolls), 8 Proctor Street, P.O. Box 671, Salem, MA 01970.
- Surrette America, (Surrette), P.O. Box 249, Tilton, NH 03276.
- Sonnenschein, (Dryfit Prevailer), P.O. Box 339, Cheshire, CT 06410.
- W.H. Den Ouden (USA) Inc., (Vetus), 7170 Standard Drive, Parkway Industrial Center, Dorsey, MD 21240.

Gel cells

The gel used in some batteries is a gooey substance containing, among other things, silica, sulphuric acid and phosphoric acid. This combination of ingredients gives several advantages.

First, you don't get stratification with gel, and with uniform exposure of electrolyte to the plates, you maximize the efficiency of the design. That in turn results in a faster charging capability—to be exact, 35 percent faster than a conventional deep discharge lead-acid wet-cell battery. For example, if it takes six hours to charge a conventional battery, a gel cell will accept the same charge in 3.9 hours using the same charger.

Second, the phosphoric acid in the electrolyte (a patented feature) gives the battery a very high cycling capability, upward of 400 cycles under typical marine cycling conditions (50 percent discharge followed by full recharge).

Third, the phosphoric acid allows the battery to be taken down to virtually zero charge, left there for up to 30 days, and then completely brought back to full charge, a torturous regime that is not possible with conventional batteries.

Fourth, the gel provides consumers with a true no-maintenance product.

Fifth, in the event of a capsized, no acid will escape from the battery.—SH

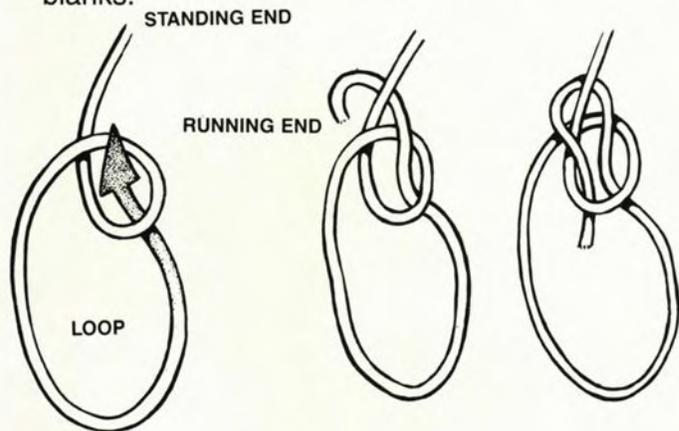
Kids Page!

by Cheryl Hornung

When do you use lines when boating? Boaters use lines for docking (mooring), anchoring and water skiing. Canoeists use lines to tie down their boats to their cars and to rescue boaters who tip over in the water. Sailors use them to set their sails.

Boaters must know the basic knots, when to use them and how to tie them. Once a knot is learned, it must be practiced so it is not forgotten. Carry a short piece of line in your pocket and practice tying knots. How many knots can you tie?

Learning to tie knots is easier when you learn the names of a line's different parts. Read the descriptions below. Then look at the picture and fill in the empty blanks.



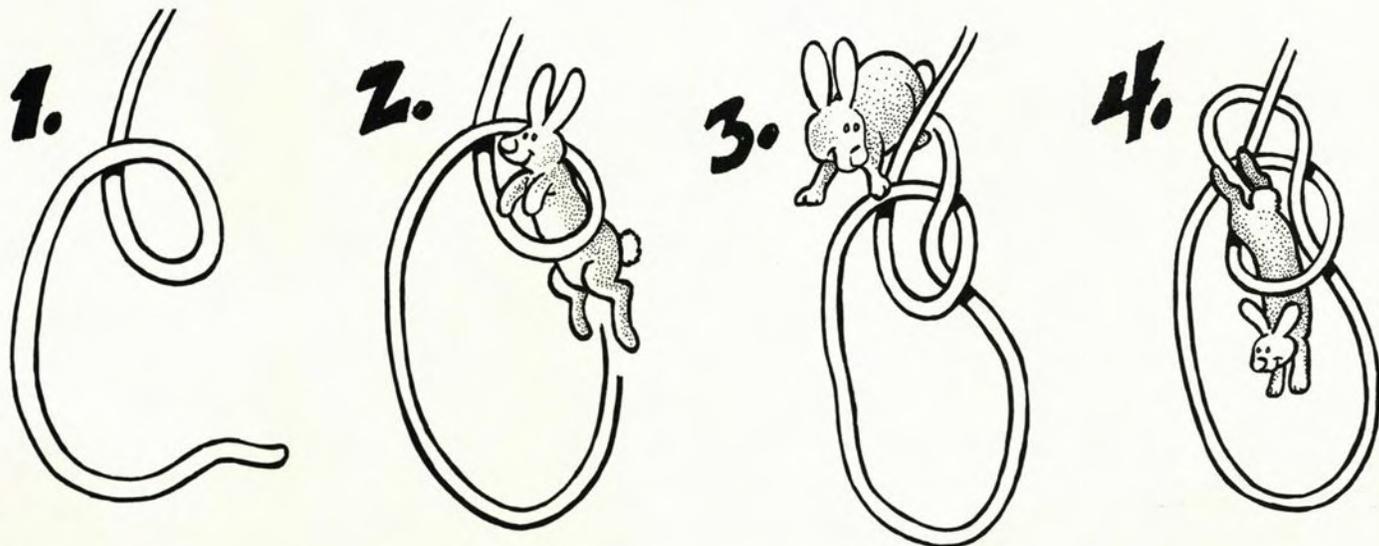
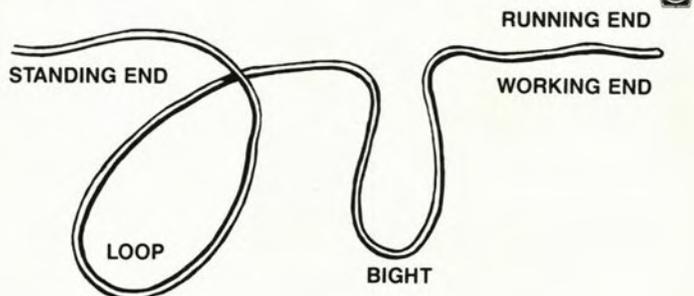
Lines and Knots

1. The working end or running end is the free end of the line.
2. The standing end is the whole line or the section that is turned to form a knot.
3. A bight is a slack section in the middle of a line. It is also a bend in the line that does not cross itself.
4. A loop or turn is a bend in the line that does cross itself.

The "bowline" is the handiest knot. It is one of the most difficult to tie. This knot will never slip or jam. It is used by boaters whenever an eye or loop is needed.

The bowline is taught using the rabbit story. Make an overhand loop in the line. This is the rabbit's hole. The rabbit (running end) comes up through the rabbit hole. The rabbit circles back around the tree (standing end) and goes back down the hole (overhand loop).

Follow the illustrations as you practice tying the knot. When you have completed the knot, pull on the running end (rabbit) and standing end (tree) to tighten it. If the knot slips, it is not a bowline, so untie it and try again.



TIMBER on the Delaware

on the Delaware

by Frank T. Dale

Main Street, Broadway, Route 80—as transportation arteries, these all fade into insignificance when compared to our Delaware River of by-gone years.

The needs of the British Navy and merchant marine provided an early and powerful impetus to river commerce. This armada existed to protect and serve a far-flung empire, and it was the largest fleet of its time. Unfortunately, it was made of wood. Ships were constantly destroyed by war, wreck or worm. This last, a wood-boring gourmand, consumed as many hulls as either of the other two. Hapless admirals were constantly calling for replacements.

By the early 18th century, the fabled forests of England were used up, hill and dale bereft and denuded in the service of His Majesty's flotillas. The admiralty's demand for timber, always insatiable, was now desperate. British shipyards would take all the timber the colonies could supply, and pay top shilling.

The American colonies met this demand. The Delaware Valley was densely forested with mature, straight trees, mostly pines and hemlocks. This area would become, in time, the lumbering center for the entire eastern United States. Only two things were needed to realize this tremendous potential. One was sufficient manpower in the wilderness to cut timber and drag it to the river. The second need was for a breed of riverman both crazy and lucky; crazy enough to ride a heaving mass of slippery logs through the rifts and over the falls of the river in spring flood, and lucky enough to get to Philadelphia alive to collect his money. Such men were available.

Daniel Skinner

The earliest recorded commercial raft trip down the river was made by Daniel Skinner who owned woodland near Callicoon, New York. In 1764, he put his timber in the water just below the falls that still bear his name. He floated these loose logs downstream, following in a canoe. The logs scattered all over the river and many were lost. The trip to Philadelphia was a nightmare and a financial disaster, but Skinner tried again.

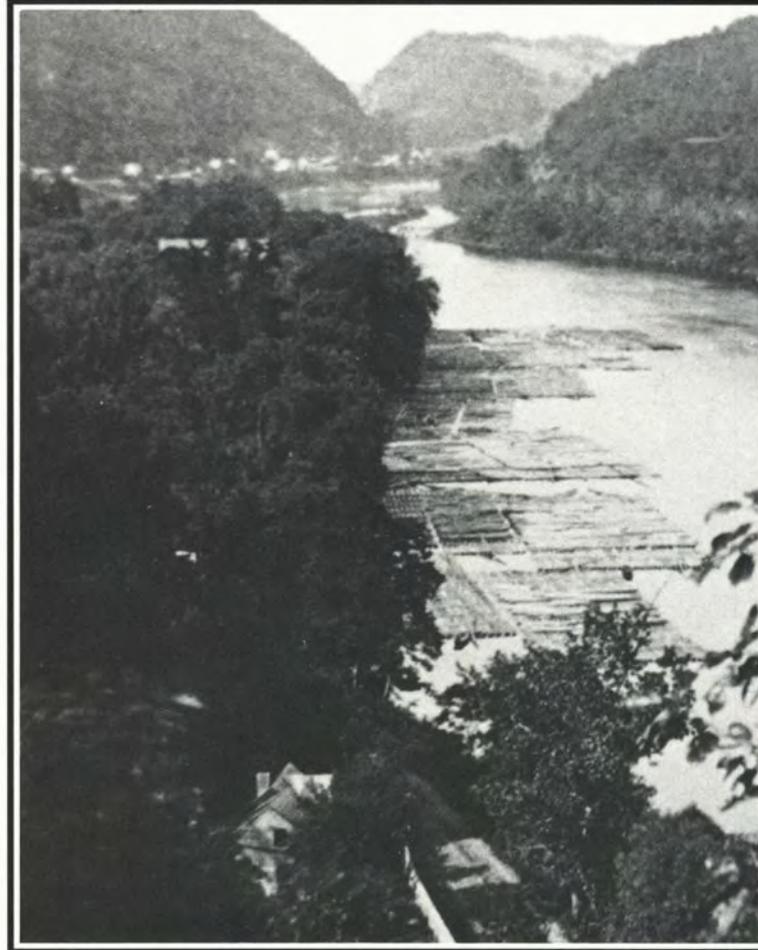
This time he fastened 10 logs together to form a raft, mounted a steering oar on the back of it, and climbed aboard. He took two crew members with him, but early in the trip one of them fell overboard and drowned. Skinner and the surviving crew member, a man named Parks, completed a successful trip.

When the raft was sold in Philadelphia, Skinner and Parks had to walk back to Callicoon—there was no other transportation. Raftsmen of a later age would return to their upriver homes via stagecoach, Durham boat or railroad.

After this initial success, Skinner followed up with ever-larger rafts that yielded ever-larger profits. So pleased were British authorities in Philadelphia that they dubbed Skinner "Lord High Admiral of the Delaware," a title he bore with pride until his death in 1813. Soon, other rafts and raftsmen appeared on the river, and a thriving commerce was under way.

"Old Ironsides"

In 1785, Simeon and Franklin Westfall accepted a \$100 commission to supply a mast or "stick" for a 44-gun frigate under



construction at a Philadelphia shipyard for the new United States Navy. The mast had to be of extraordinary length and perfectly straight. After a long search, they found what they wanted along the Delaware River shore near Milford, Pennsylvania, and floated it down to the shipyard. This mast carried its ship's ensigns through battles with Barbary pirates at Tripoli and against several British men-of-war in the War of 1812, without a defeat. Because of its indestructibility, the crew nicknamed it "Old Ironsides." It is still afloat.

Timbermen did their lumbering in the winter. The trees were cut as near to the water as possible and dragged to the closest eddy. Here, logs were accumulated all winter and with "ice out" in the spring, they were pinned together into rafts. These craft were 30 to 40 feet wide and up to 200 feet long. A steering oar or "sweep" was fastened fore and aft.

In the spring, when water was high, the rig was launched. High water was essential to get the rafts through the many rapids of the upper river. Accidents and loss of life were commonplace. Many riverbank dwellers made a good living salvaging and selling derelict rafts and pieces of rafts.

Foul Rift

Foul Rift, below the Riverton Bridge, was the most feared stretch of the river. A raftsmen, P.P. Miller, told of entering these rapids and of his craft taking on a plunging, bucking motion, "like a stung horse." A crew member was thrown off the front of the raft and the entire 150 feet of it passed over him. The next thing Miller knew, the lost crewman was clinging to the stern sweep, bellowing to be pulled aboard. Many were not so fortunate.



A moonshiner living just below Foul Rift became prosperous selling whiskey by the drink to shaken survivors of the rapids. Nearby, at the hamlet of Hutchinson, damaged craft could put in for repairs.

To Frank Walker of Walton, New York, life on the river was a circus, literally. The Barnum and Bailey entourage was on its way to Port Jervis, but it was feared that the old covered bridge over the river there wouldn't hold the weight of the elephants. The creatures would have to wade across the river. Walker's raft, when it came upon the pachydermal parade, couldn't be stopped and it smashed into one of the beasts, badly cutting its ear. The enraged elephant attempted to climb up on the raft to get to the malefactors, at the same time blowing water over the crew. The stern end of the craft was totally submerged by the animal's weight, but a timely jab or two with an oar discouraged it. The badly traumatized crew escaped unscathed.

With thousands of these log dreadnoughts competing for space on the river each spring, conflicts were bound to occur. The Easton *Argus* reported one such incident in 1857, in which the crews of two rafts opened fire on each other. Five men were shot. The

victors confiscated the tools, weapons, and raft of the losers.

The timbermen traveled on the river only during the daylight hours. At night, they anchored in groups in eddies where there was a tavern or hotel nearby. Sometimes, tethered craft stretched almost across the river. Dingman's Eddy, Upper Black Eddy and Sandt's Eddy were frequently used, as well as the villages of Portland, Easton, Riegelsville and Lumberville.

Taverns and hotels opened to accommodate these rough-and-ready customers. The Riverton Hotel, the Black Bass Inn and The Upper Black Eddy Inn catered to the rivermen over a hundred years ago and are still serving the public today.

Stone Tavern is mentioned by Sarah Gallagher in 1873, in her history of the Hunterdon-Bucks County area, as a place "where the watermen are wont to pause to refresh after the perils of The Rocks....The tavern was a great place for card playing, drinking, and fisticuff fighting."

Leviathan

By the middle of the 19th century, as many as 1,000 rafts a year passed down the river. In April of 1861, Bill Parks, apparently related to Skinner's mate, captained a timber leviathan 60 feet wide and 190 feet long, containing over 120,000 board feet of lumber. He stopped at Wallpack Bend near Bushkill and put aboard 3,500 railroad ties made of unfloatable green oak. This monster required a 13-man crew to get it down the river.

In 1875, 3,140 rafts were counted on the Delaware River. Large fleets of them would collect below the last rapids, at tidewater, and be taken in tow by tugs for the final lap to Philadelphia.

Sometimes rafts would be sold along the way. Easton and Portland were towns where brokers negotiated for timber. New Hope became a trading center and several sawmills were constructed there and across the river at Lambertville to convert the logs into finished lumber.

Toward the end of the century, commercial timber rafting began to decline on the Delaware River. The railroads were taking some of this trade, and in addition, their river bridges were becoming a serious hazard to the rafts. The river at Easton became particularly perilous with the advent of the railroad. The already existing pedestrian covered bridge provided little clearance for craft and crew at high water. Just beyond this bridge, a captain was confronted with the staggered piers of two railroad bridges while simultaneously having to deal with a strong cross-current caused by the entrance of the Lehigh River from the right shore. Many rafts did not survive this nautical nightmare.

The canals that were dug on both sides of the river drew their water from it and diminished the river's flow, making the rapids even more difficult to negotiate. The diameter of the logs in the rafts became smaller and smaller, and by 1900, the sight of a timber raft on the river was rare.

The forests had disappeared. In 1917, during World War I, a single raft appeared on the Delaware, its logs used for pilings at Bordentown. And that was the end. The valley and the foothills had become as bare as their English counterparts.

Sarah Gallagher wrote of her beloved river valley:

**The hillsides are shorn of their forests,
Handsome dwellings adorn the plateau;
What'er was romantic or rustic,
There is naught of it left, that I know.**



A Multipurpose Pennsylvania

by Cliff Jacobson

Pennsylvania rivers vary from barely negotiable trickles to thundering rapids. Between these extremes are deep, clear channels, bubbly riffles, windy bays and dangerous dams and falls that paddlers must portage. One minute you're threading a course between obstacles in a boulder-strewn drop; the next, you're pumping wood to make headway in wind-blown waves or portaging around an impassable ledge or downed tree.

A multipurpose Pennsylvania river canoe isn't blistering fast or a pig on the flats. It won't run brawny rapids, win down-river races or hang together if you capsize and wrap it around a mid-stream boulder. But if you do your part, it will negotiate all but the most difficult waters in fine style. And the best part is that it's also fun to paddle on all types of water, whether you're out for a few hours or a few days, alone or with a friend.

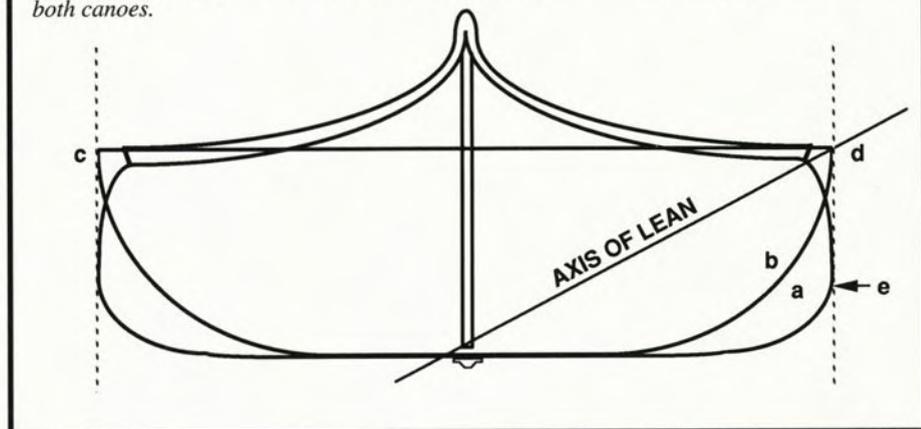
If there's one thing that describes a multipurpose river canoe, it is versatility. Like a good sedan, it sacrifices brilliant single-parameter performance for wide-range competency. But in the process of "robbing Peter to pay Paul," it is never—absolutely never—boring to paddle or ugly to look at.

Does such a canoe exist? You bet. There are dozens of commercial models that qualify. But to find one you need to understand how one design variable complements and moderates another.

It's customary to begin a discussion of canoe design with a treatise on building materials. Fact is, what a canoe is made of should be your last concern. Ease of paddling, seaworthiness, cruising speed, ability to turn and carrying capacity are

Figure 1

Canoe "b" becomes more stable as it is leaned. Canoe "a" loses buoyancy when it is heeled past point "e." The inward curve of the canoe above the waterline is called "tumblehome" (canoe "a"). Canoe "b" has flared sides, which deflect water away from the hull, rather than into it—which is much more seaworthy. Note that the maximum beam (c-d) is the same for both canoes.



determined solely by hull design. Whether the craft is constructed of aluminum, Royalex, polyethylene or fiberglass becomes important only after you've blue-printed the specs.

So first determine the overall length, bottom configuration, depth, rocker, flare and shear. Then get down to the technicalities of fabrics, metals and plastics. In keeping with this revelation, we'll leave our mini-discussion of canoe building materials to last.

As a rule, the longer the canoe, the faster it runs and the more difficult it turns. Canoes are displacement hulls, so the maximum speed is directly proportional to the length. You can compute the relationship mathematically by applying the over-simplified formula: Speed = 1.55 times the square root of the waterline length, measured in feet.

Thus, an 18 1/2-footer peaks out at around 6.7 miles per hour, and a 16-footer runs about

6.2 miles an hour. The difference is 7.5 percent—significant only at the end of an eight-hour day or when you're pushing hard into the wind.

However, speed and ease of paddling are not the same. The formula tells you only the maximum hull speed, not the amount of effort required to get it there. It's quite possible for a sophisticated 16-footer to paddle more easily than a workhorse 18-footer. But the longer canoe will, if pushed hard enough, always run faster.

You can't beat a skinny 18 1/2-footer for making time on open water. But watch out if you have to turn! Those long, deep ends act as rudders that restrict maneuverability. One solution is to curve the keel line of the canoe upward, like the rails on a rocking chair. Such "rocker," as it's called, frees the ends of the canoe from the grip of the water and allows easy turns. Substantial rocker also enables the craft to rise more easily to waves.

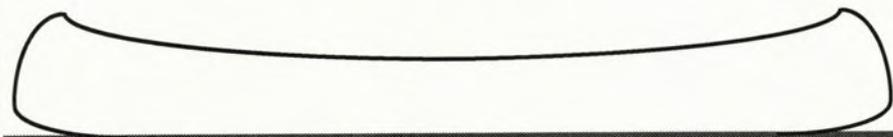
However, remember that canoes are displacement hulls. So when you substantially rocker a long canoe, you effectively shorten its waterline length and decrease its running speed.

It follows that 16 to 17 1/2 feet is the ideal length for a multipurpose river canoe. Add an inch or two (no more) of rocker to each end and you have the best compromise between straight-line tracking on open water and the quick turns you need to avoid rocks in rapids.

Use a tape measure to determine the

Figure 2

The curve of the gunwales from stem to stern is called the "shearline." A uniformly rising shear is better than one that rises abruptly at the ends.



Rocker

One to two inches of rocker is best for a multipurpose river canoe.

a River Canoe

amount of rocker in a canoe before you buy it, or spin the canoe around on the ground. If the canoe spins easily and is a keel-less model (more on this later), it probably has enough rocker. To gauge the effectiveness of this test, try several canoe models and compare them.

Keels

A keel makes any canoe hold its course better. But it also hangs up on rocks and causes upsets in rapids. A craft that requires a piece of one-by-two tacked on below to make it paddle straight belongs back on the drawing board. Indian and voyageur canoes did not have keels and neither should yours. Straight-line tracking is achieved by combining a round or vee-bottom deep, narrow stem below the waterline, and a straight keel-line.

The real reason for keels is to stiffen the flat, floppy bottoms of low-performance hulls.

Avoid canoes with keels, especially for river (any river) work. As you shop around, you'll discover that good canoes—even those designed expressly for lake travel and flatwater racing—never have keels.

Hull shape

Lean a flat-bottomed canoe a few inches off center and it will turn turtle without warning. Do the same with a shallow arch (slightly rounded) or subtle vee-bottom hull, and it will become more stable as it is leaned. Figure 1 shows the relationship. For this reason, all the best river canoes—and lake ones, too—have a curved bottom. Flat bottoms are for rafts and john boats, not for canoes, which rely on leans and braces to stay upright in waves or currents.

A high-performance river touring canoe will have a beam measurement of around 32 inches at the four-inch waterline. A multipurpose river craft can be an inch or two (but no more) beefier here.

Choose a canoe with a bottom that resembles a subtle vee or shallow arch. Overkill here may make the craft too tender for all-around use. On the other hand, walk away from any canoe that has a dead flat bottom, more so if it also has a rock-grabbing keel. If tracking speed is important, look for a "4 and 32" bottom beam. For all around use, add one or two inches (no more) to these spaces.

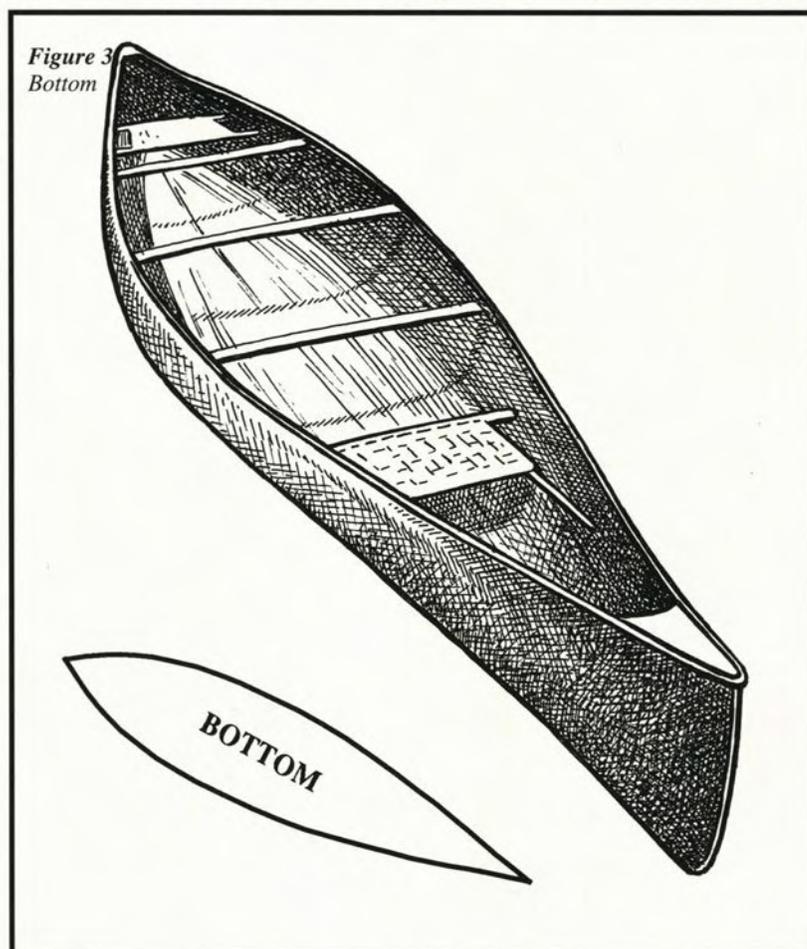
Depth

Depth is measured at two places on a canoe—at the waist (beam) and at extreme ends. The beam measurement is most meaningful because it provides an indication of the safe "freeboard," or amount of sidewall above the water. Because high sides add weight and act as sails when the wind comes up, shallow (12 inches or so) depth is a feature of all the best racing and fast cruising

depth of the canoe plus 10 inches. Thus, a canoe with a 14-inch center depth should have a maximum end height of 24 inches.

Tumblehome

Tumblehome is the inward curve of the sides of a canoe above the waterline. Tumblehome is used for two reasons: 1) The canoe can be made wide at the waterline for stability and narrow at the rails for ease



of paddling, and 2) curved sidewalls are stronger than broad, flat areas, which often need to be reinforced with ribs or cross braces.

canoes. But what's good for the goose is not good for the flock. Recreational canoes are often heavily loaded with kids and dogs and coolers, so they need higher than average (13 to 14 inches) sides to negotiate rough water safely.

End height

The seaworthiness of a canoe depends on its hull design, not the height of its ends. High bows and sterns simply make the canoe hard to handle in crosswinds. Generally, ends should be no higher than the center

of paddling, and 2) curved sidewalls are stronger than broad, flat areas, which often need to be reinforced with ribs or cross braces.

Nonetheless, the most seaworthy configuration of any watercraft consists of sides that flare boldly to the gunwales, as exemplified by a wild river dory. But for the reasons stated, most of the best canoes have some tumblehome. Tumblehome is a necessary evil, though one best kept in moderation.

Shearline

The curve of the gunwales from stem to stern is called the "shearline." Canoes usually take on water just forward of the bow seat, not over the bow deck, as is commonly believed. It follows that a uniformly rising shear is a more seaworthy configuration than one that rises abruptly at the ends (see figure 2 on page 16).

The canoe should be 13 to 14 inches deep at the center, eight to 10 inches higher at the ends. The gunwales should rise gradually and the bows should flare uniformly to the rails. Tumblehome (if any) should be confined to the mid-section of the craft. Any tumblehome at the ends—like the typical buff-bowed aluminum canoe—will cause the canoe to pound and splash in waves.

Asymmetry.

The long, narrow bow cuts the water more easily than a fuller one, and it makes the canoe easier to paddle, especially in shallow water. For this reason, nearly all the best canoes (regardless of use) are slightly asymmetric below the waterline (see figure 3). However, too much asymmetry—like that designed into racing canoes of the 1970s—can cause problems in tricky currents and when paddling backwards. But some judiciously applied asymmetry improves just about every performance variable. All the very best modern canoes—even those used in severe whitewater—feature some asymmetry.

Seats

There are bench seats, tractor seats and pedestals. For running heavy whitewater where the position is kneeling and only kneeling, a foam pedestal that keeps your torso and knees in place is preferred. When the game is downriver racing, a form-fitted fiberglass tractor seat is better. But for all-around canoeing where you alternately sit and kneel, a caned wood-framed bench seat is best. The seat should be suspended from the gunwales on dowels, not bolted to aluminum rails that are pop-riveted through the sides of the hull. Pop-riveting weakens the sidewall and the seats may pull loose, and there is no latitude for height adjustment.

Thwarts

A working river canoe should have three thwarts—a curved, padded one (carrying yoke) in the center, and structural members forward and aft. No biggie if your canoe doesn't come so equipped. You can always add extra thwarts to any canoe.

Trim

American white ash is the best trim for a multipurpose river canoe. This wood is strong, light and supple. As mentioned, a canoe should never be boring to paddle—or to look at. Oiled wood trim is a practical luxury you can afford. Like a wood-rimmed Nardi steering wheel on a vintage Porsche, gleaming woodwork adds class to the event. Canoeing is supposed to bring you joy, remember?

Granted, it's an hour's work once or twice a season to sand and oil wood rails and thwarts lightly. And you can't store a wood-railed craft out in the weather. The alternative is to use aluminum or vinyl-covered aluminum gunwales—a less aesthetic option that adds six to 10 pounds to the finished weight of the canoe. Try portaging a canoe that's 10 pounds lighter than the one you currently own and you'll discover the real beauty of wood.

American white ash is stronger than most people think. I once wrapped a Kevlar canoe 90 degrees around a mid-stream boulder on a fast-flowing, wild Canadian river. The Kevlar hull broke in six places but the ash trim held.

Weight

A well-designed multipurpose river canoe weighs 55 to 70 pounds. Unless you relish low performance and will never portage, don't consider any canoe that weighs more than this. Conversely, any deep-hulled 17-footer that weighs less than 50 pounds may be too fragile for river work.

An ultralight (45 to 55 pounds) Kevlar canoe may be right for you if your skills are very good and you are willing to make small repairs at the end of every trip down the Keystone State's many rocky rivers. The lighter the canoe, the more fun it is to paddle, so frequent maintenance is rewarded with every paddle stroke you take.

Color

Try to find a capsized lime-green canoe in a green river and you'll understand why whitewater folks prefer bright colors. However, if fishing is your main concern, you may be happiest with an "earth tone" canoe.

Materials

As mentioned, good design is everything, so materials that can't be formed into the tight curves that spell performance are out. For this reason, eliminate from consideration buff-bowed aluminum canoes of the past and concentrate instead on modern craft made from fiberglass/Kevlar composites,

wood and Royalex. Several canoe companies now use new technology and fabrication techniques to produce Royalex canoes with fast, sophisticated lines. Canoes like the Dagger Interlude and Venture, Old Town Penobscot, and 17-foot Mad River Explorer suggest what can be done with this strong, versatile material.

As to foam-cored polyethylene, the jury is still out. Fine lines are possible in this material, though to date, adventurous designs have not appeared. Even the best polyethylene canoes are too heavy, too slow and too unresponsive to qualify as "canoeist's" canoes. Begin your apprenticeship with a polyethylene canoe if you like, but once you have the basic skills down pat, graduate to a more rewarding material.

Pennsylvania is a microcosm of what canoeing is all about. Fast-flowing rivers, shallow creeks, challenging whitewater, quiet ponds, windswept bays and obstacles that must be portaged all suggest that a multipurpose Pennsylvania river canoe be large enough to weather difficult water, small enough to twist down a beaver stream, fast enough to make good time on wind-blown water, light enough to carry around falls and strainers, and have sufficient performance to reward good paddling technique on all types of water.



Parameters of a Multipurpose Pennsylvania River Canoe

- Length: 16 to 17 1/2 feet.
- Rocker: one to two inches at each end.
- Bottom configuration: shallow arch or gentle vee to encourage speed and good manners in waves and currents. Cross-sectional beam should measure 32 to 34 inches wide at the four-inch waterline.
- Center depth: 13 to 14 inches. Let the maximum end height equal the center depth plus 10 inches.
- Shearline: uniform rise from stem to stern.
- Tumblehome: okay at center, but bows should flare right to the rails.
- Thwarts: two, plus a fitted yoke in the center.
- Seats: caned or webbed "bench" style, dropped on dowels from the rails, not pop-riveted through the sidewalls.
- Weight: 70 pounds maximum. The lighter the better.
- Color: bright enough to see when capsized in a foamy rapid.
- Aesthetics: pretty enough to please you. No canoe should ever be ugly or boring.—CJ

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Dedicated to the sound conservation of our aquatic resources, the protection and management of the state's diversified fisheries, and the ideals of safe boating and optimum boating opportunities.

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What Do Boat Registration Code Numbers Mean?

Have you ever looked at your boat registration renewal notice or your registration card and wondered what all those code numbers mean and why they are listed on the renewal notice and registration card?

The coding identifies each individual boat registered in the state. The coding assists waterways conservation officers in the same way your vehicle registration card assists state and local law enforcement officers. The coding describes the boat and can alert the conservation officer to any discrepancies.

The boat coding is compiled at the end of each boating season in a report to the U.S. Coast Guard. The coding identifies each boat type, length, hull material, and the type of propulsion used for every boat registered in Pennsylvania. We compile this report according to boat owners' county of residence. The Coast Guard then provides a grant (based in part on the number of registered boats) to the Fish Commission to help fund Commission boating education programs.

In addition, we produce various reports at the end of the boating season for each particular "usage" category. This report helps the Boat Registration Division ensure that

boats are registered and used under the proper category. It also enables the Commission to identify and track changes in the makeup of Pennsylvania's boat fleet to adjust programs to meet the needs of our citizens.

The Fish Commission has several reasons why these code numbers appear on the renewal notice and on the registration card. The first is space availability. A limited amount of space is available on each card, so the coding takes up less space than spelling out the information for each code.

The second reason concerns data entry time, or keystrokes. It takes less time, keystrokes, to enter a one- or two-digit code than it does to type all this information.

A third reason involves printing time. It takes less time to print the cards in this format. It may not sound like much, but when you look at the number of registered boats in the state, currently more than 286,000, the coding saves much time. This year, there will be over 650,000 boat registration renewals and registration cards printed by the Information Systems Section.

Take a look at your boat renewal notice or registration card to be sure the information listed matches your boat. If there is an error, contact the boat registration office.

—Andrew Mutch.



Boating Pamphlet

The Keystone Aquatic Club publishes an informative pamphlet titled *Susquehanna River & Harrisburg City Island Boating and Safety Guide*. The pamphlet describes the Harrisburg area of the Susquehanna River. It includes sections on general boating safety and emergency information with detailed illustrations. To receive a single copy of this free pamphlet, contact the Keystone Aquatic Club, c/o Steve and Jen Boyer, 130 South Front Street, Wormleysburg, PA 17043.

Publication for New Boat Owners

Where can I register my watercraft? What forms do I need? Are there any other user fees? How do I display my PA numbers and decals? Will my Pennsylvania registration be honored when boating in other states or in Canada? The Fish Commission's Bureau of Boating now offers a free, helpful pamphlet, *I Just Bought a Boat! Now What Do I Do?* It provides essential information concerning boating policies, and it answers these typical questions.

For a free single copy, contact: Publications Section, Dept.

F., Pennsylvania Fish Commission, P.O. Box 1673, Harrisburg, PA 17105-1673. Please include a business-sized self-addressed, stamped envelope with your request.



National Water Safety Congress Awards

The National Water Safety Congress at its conference last spring handed out several Certificates of Appreciation to local boating and water safety volunteers. Those honored include:

- Gail Thieret, a Bureau of Boating volunteer, is a health and physical education teacher in the Spring Grove (PA) Intermediate School. She has taught the Pennsylvania Fish Commission's youth boating program since 1987 both at her school and in her community. She was recognized for her patience, her ability to adapt to any situation and for her programs that reflect her concerns that students have fun learning. She has opened the eyes of hundreds to boating and water safety.

- George Smyth, another recipient, has served as the Coast Guard liaison to the Fish Commission for over five years. George has spent thousands of hours as a volunteer for boating safety. He has taught hundreds of public classes on piloting, legal requirements for boating, marlinespike and most other boating subjects. George assists the Fish Commission whenever possible by helping instructors teach students at conservation camps to shutting reporters on the water below a killer low-head dam to report a boating accident.

- Dr. J.W. Shiner is chairman of the Department of Parks and Recreation and Environmental Education at Slippery Rock University. Boating and water safety play an important role in the curriculum at this university. Recognizing that most parks and recreation areas have a water attraction, he believes it is important that his students have a background in water safety. Consequently, courses such as the Boating and Water Safety Awareness Instructor's Workshop, Water Rescue and Ice Rescue are options for his students.—Heidi Milbrand.

**U.S. Coast Guard
Boating Safety Hotline
800-368-5647**

- ☎ For Boating Safety Recall Information.
- ☎ To Report Possible Safety Defects In Boats.
- ☎ For Answers To Boating Safety Questions.

Call Toll-Free!



Meet the National Marine Manufacturers Association

Members of the National Marine Manufacturers Association (NMMA), more than 1,700 companies, produce most of the products used by the nation's recreational boaters, from sail cloth to engines, from humble dinghies to luxurious floating palaces—everything from anchors to zincs. It's estimated that NMMA members produce 80 percent of the marine products used by recreational boaters and fishermen in the United States.

Formed in 1979, the result of a merger between the Boating Industry Association of Chicago and the National Association on Engine & Boat Manufacturers of New York, roots to the non-profit association actually go back to 1904.

Then, as now, the boat building community needed a central source to serve as industry spokesman, offer programs and services to benefit members, and to provide forums—boat shows—for the display and sale of industry products.

NMMA today provides a wide variety of programs and services tailored to member needs. These range from providing technical expertise and standards monitoring for an array of manufactured products, to establishment of group insurance programs covering employee health and life, and product liability. A government relations department advocates fair and reasonable legislation at state and federal levels to benefit both members and American boaters.

Other departments generate industry statistics, promote the sport of boating and advocate safe boating practices with the

public and press.

The Westlawn Institute of Marine Technology, Stamford, Connecticut, a not-for-profit education affiliate of NMMA, instructs students how to merge technical requirements and innovative vision to produce new generations of sailboats and powerboats.

Boat shows have become the industry's premier marketing tool, and the NMMA produces shows to provide quality show-places for cost-conscious exhibitors and consumers. Shows are held across the nation in areas including New York, Chicago, Philadelphia, Tampa, New Orleans and San Diego.

To bring retailers and wholesalers together with American and international marine manufacturers, the NMMA stages the world's largest marine trade show, the International Marine Trade Exhibit & Convention (IMTEC), in Chicago each September.

NMMA's staff operates from offices in Chicago, New York, Philadelphia, Washington D.C., Miami, New Orleans, Tampa, St. Louis and San Diego.

Directed by President Jeff Napier, the staff implements policies and objectives of the association's 24-member board of directors. Executive Vice President Frank Scalpone serves as director of shows.

On the international scene, NMMA is an active participant with the world's marine trade organizations to encourage exporting, share advances in technology, solve common problems and promote and protect the growing sport of recreational boating.

NOAA Weather Radio

NOAA weather radio is a service of the National Oceanic and Atmospheric Administration (NOAA) of the U.S. Department of Commerce. The "voice of the National Weather Service" provides continuous broadcasts of the latest weather information directly from National Weather Service offices. Taped messages are repeated every four to six minutes and are routinely revised every one to three hours or more frequently, if needed. Most stations operate 24 hours daily. The broadcasts are made on one of seven high-band FM frequencies, ranging from 162.40 to 162.55 megahertz (MHz).

NOAA weather radio broadcasts are vital to boaters. Listed below are the Pennsylvania NOAA weather radio network sta-

tions and their frequencies. For more details, and to receive a listing of NOAA weather radio receiver manufacturers, contact the National Weather Service (Attn: W/OM15x2), National Oceanic and Atmospheric Administration, Silver Spring, MD 20910.

Allentown	162.400 MHz
Clearfield	162.550 MHz
Erie	162.400 MHz
Harrisburg	162.550 MHz
Johnstown	162.400 MHz
Philadelphia	162.475 MHz
Pittsburgh	162.550 MHz
State College	162.475 MHz
Wilkes-Barre	162.550 MHz
Williamsport	162.400 MHz

Tow Vehicle Troubleshooting

by Bob Stearns



If you keep your boat on a trailer, count yourself fortunate if you haven't had tow vehicle problems on the way to or from the ramp at one time or another. In spite of the best scheduled maintenance, things can go wrong at inopportune times. And the thought of having to unhitch the trailer, leaving it alone and vulnerable while scrambling to get the car or truck fixed, is the stuff nightmares are made of. Fortunately, you can avoid such a situation 99.9 percent of the time if you pay close attention to how your tow vehicle behaves when it's not dragging the boat.

You don't have to be a mechanic or even know how to change a spark plug to avoid most problems. But you must be able to recognize the difference between optimum performance and a significant decline. Otherwise, when the pulling power gradually begins to diminish, the small loss of performance goes unnoticed. If the process continues, each time in small steps and therefore still unheeded, before long there just isn't enough power available when its need suddenly becomes critical—like the ability to pull the boat out of the water on a ramp that's a tiny bit steeper than the one you've been using lately.

If the trailer is heavy and there is even a slight loss of horsepower, you may not be able to negotiate some roads.

A worse situation is the engine just quitting with little or no warning while you're on the road.

Chances are, if you're driving a car or truck with lots of horsepower and the boat you're towing is relatively light, you'll probably never run into this problem without plenty of warning. Even a noticeable miss because one cylinder isn't always firing probably wouldn't severely cripple your ramp power.

What's "relatively light"? If your tow vehicle's engine has one horsepower for every 50 pounds (or less) of gross boat, trailer and tow vehicle weight, then you could consider the trailer rig to be "light."

But because of the downsizing trend in tow vehicles, it's not uncommon for the gross weight of the tow vehicle plus the boat and trailer to run as much as 70 to 100 pounds for every one horsepower of the tow vehicle. Even at 65 pounds per horsepower you might be at about the practical limit for dragging up long, steep mountainous grades on a hot summer day. And that's assuming that the tow vehicle is equipped with a high capacity radiator and a transmission oil cooler.

If the trailer weight is on the heavy side and there is even a slight loss of available horsepower in the tow vehicle (as little as 10 percent), you are on the thin edge of not being able to make the grade (pun intended). A loss of 20 percent could put you on the side of the road a long way from the top, looking for help or at the very least waiting for a badly overheated (and strained) engine to cool.



Art Michaels

Several years ago I participated in an experiment to determine the specific results of relatively small tow vehicle power losses in mountainous terrain. I was surprised when I found out how many problems just a little power decline could cause.

Misfire simulator

We hooked up a misfire simulator to the engine of each of the five tow vehicles we tested. A misfire simulator is a device that shorts out the spark plug wires on as many cylinders as we wished at the flick of a few switches. This device made it possible for the occupant of the passenger seat to dial in the amount of misfire desired without the driver knowing. Turning a dial allowed the user to create various amounts of misfire from 0 to 33 percent or more. Most of our tests were run at 5, 10, 14, 20 and 33 percent misfire.

The tow vehicles consisted of popular cars and small truck/RVs with four- to eight-cylinder engines. We tested on two courses: a long, uphill grade, and a moderately steep boat ramp. The uphill test course started at 1,486 feet of elevation and ended at 2,786 feet, a climb of 1,300 feet.

Each rig entered the test course at the legal speed limit of 55 mph. The V-6 powered truck/RV I drove pulled 2,260 pounds of trailer for a total gross weight of 6,600 pounds, (including the four adults in the tow vehicle. Powered by 110 horsepower that yields a weight/horsepower ratio of 60 to 1.

When we dialed only five to 10 percent misfire, (without my knowing it), I could not easily detect any difference in engine smoothness—neither could any other members of the test group when each was behind the wheel. But the tow vehicle sure knew the difference!

All the tow vehicles had been carefully tuned before the two-day tests. The V-6 rig, with no misfire dialed in, entered the bottom of the grade at 55 mph, and by the time we crossed the finish line, it plodded along at 39 mph.

Fuel economy

Even a virtually unnoticeable 10 percent misfire cost us significantly in fuel economy. It made for a whopping 24 percent speed loss through the course. A 20 percent misfire (we all could definitely tell when that was happening) reduced speed by almost half (44 percent). Other tow vehicles pulling near their maximum rated capacity yielded similar results. The big V-8 with a light trailer barely managed the course with as much as 33 percent misfire.

Ramp ruminations

Maybe you never have the occasion tow up long grades, so all this might not seem so significant. But consider what happened at the boat ramp before dismissing all this as unimportant in your case.

The ramp we used had a 10-degree slope. We tested a four-cylinder, V-6, and V-8 tow vehicle on the ramp, in each case with the weight/horsepower ratio in the neighborhood of 60 to 1. First we tried pulling up the ramp with no obstructions at 0, 5, 10, 14, 20 and 33 percent misfire. Then we tried the same procedure with just a one-inch board as an obstruction. Later on the experiment was repeated with two-, three- and four-inch obstructions.

All three vehicles negotiated the unobstructed ramp with misfires up to 33 percent, but it became increasingly difficult for all the vehicles at 20 percent misfire. It took 100 percent power for the four-cylinder tow vehicle to crawl over just the one-inch board at only a 10 percent misfire, even though the vacuum gauge indicated only 55 to 60 percent of the engine's total available power was needed with an unobstructed ramp.

In some cases it took 100 percent power with no misfire to pull the trailer over the two-inch obstruction, and even a 10 percent misfire made such a task impossible. Even the most powerful vehicle couldn't pull the trailer over the three-inch block with as little as 10 percent misfire.

Many ramps drop off at the end, and changing impoundment and river water levels can frequently become an insurmountable obstacle if the tow vehicle loses any of its punch. Other ramps have a sharper slope at the lower end and a milder slope at the top—which might not seem such a great obstacle, but that's often just enough to make pulling a tricky situation in cases where the tow vehicle suffers from a small power loss.

We discovered that only a 10 percent misfire caused the V-6 truck/RV used in that test series to lose as much as 32 percent of its full throttle power.

What it all means

In everyday terms, if a six-cylinder auto or truck loses only one cylinder, the power loss is in the neighborhood of 17 to 20 percent. So unless you were towing a heavy rig at the time, you'd probably conclude that you had a "slight miss."

There's a lot more than long uphill grades and ramp pulling involved in a significant loss of towing power. Consider highway safety, such as not being able to pass a slow-moving vehicle quickly enough.

Under-par engines are also more prone to stall, a condition that steadily worsens if the problem continues to be ignored. On a busy thoroughfare either situation considerably increases your accident potential.

Fortunately, in most cases the "cure" for misfire is simple and not terribly painful to the bank account: a tuneup. This certainly costs less than towing service for both your car and trailer. Most auto manufacturers recommend a tuneup every 18,000 to 30,000 miles, but my experience has been that it's better to have it done a little more often if you trailer a boat often. In the long run, if you keep accurate, complete records, you'll soon find that this actually saves you money in both fuel and maintenance. 

ENJOY YOUR WATER SKIING

BY JOHN M. CORNISH II



Art Michaels

Everyone enjoys an afternoon of water skiing. Family and friends pile into the boat and head out for the open water. Invariably, every person must get up or move around in the boat at least once to get out the skis, rope and the personal flotation devices with an additional 15 minutes used to untangle the rope that became knotted while in storage. The skier jumps into the water, splashing those in the boat who aren't interested in getting wet, adding to the aggravation.

You're finally ready to start skiing, and after two or three attempts the skier finally makes it up. The problem the skier encountered was caused by loading the boat so heavily that it was slow on the initial pull.

A while later the skier is still going strong and the group of observers in the boat is becoming bored. When the first skier does finish, the next individual gets ready to go. Besides disturbing the group in the boat by adjusting the skis, the next skier also complains about wearing a cold, wet personal flotation device. The previous skier is now cold and does not want to sit and ride in the boat.

Does this scenario sound like the joys of water skiing and boating or does it sound more like the woes of water skiing? If this episode sounds familiar—similar to your weekend afternoon, follow these few tips to increase your water skiing fun. These ideas focus on daily planning and equipment monitoring.

Agenda

As with any family activity, some planning and preparation need to be in place to ensure that each individual's desires are considered and hassles are cut to a minimum, resulting in family fun and harmony. Every family member has an agenda

for a pleasurable, recreational day. With this in mind, an outlined schedule of the day may be useful. Consider that mom or some other member of the group wants just to take a leisurely, scenic boat ride without any hassles or splashing. Maybe she wants to take a quiet ski ride without a large audience. You know the kids will want to go swimming, skiing or tubing during the day and they don't want to be bothered by the afternoon boat traffic. They also don't want to go too early in the day because of the morning chill in the air. Don't dare forget dad who may want just to sit and do a little snoozing and fishing in a quiet cove.

Dad would probably enjoy getting away first thing in the morning. He can find a peaceful area while it's cool, sip his coffee, wet a line and enjoy nature. After dad's two or three hours of relaxation and fishing, the "water bugs" can get their turn.

The sun should be up, the fog gone and the crowds just beginning to invade. The skiers should also be able to get a couple of hours of water time. Lunch and picnic activities are best done in the early afternoon, rather than the noon hour, when the greatest amount of boat traffic is on the move.

Mom is entitled to get her reward after a full day of activities with the family. A good time for her to take a ride is late in the afternoon, one of the most pleasant times of the day. Your planning could also include a few hours of evening activities on the water. The few hours before sunset are a very nice time to be on the water.

This type of planning can be beneficial to maintaining the emotional stability of both mom and dad. Dad isn't saddled with driving the boat for eight straight hours and mom knows when to plan lunch and other details. An agenda such as this





Russ Gertrix

Some preparation and planning for family boating best ensure that each person's desires are considered and hassles are cut to a minimum.

offers consideration for every member of the family, giving them time to enjoy themselves and keeping the family happy. Each family member must be considerate of others. Every family has to make its own plans depending on common interests.

Your boating situation on the water can be a vital factor in making your boating and skiing more fun. If you are a commuter and tow your boat, you normally find yourself at a public beach or picnic area as your base headquarters for the day. Some families find a nice area to picnic and swim in a cove or quiet bay. People with lakefront property may have an easier time when their boat dock is just across the yard or down a path through the woods.

In either setting, the planning also assists in keeping the boat from being overloaded or weighted down. A base of operations needs to be established within the plan, taking different crews at different times or in shifts.

Different interests

For example, consider two groups of water enthusiasts with different interests. One group is primarily interested in skiing and the other group is excited about tubing or kneeboarding. Trying to load all the equipment in the boat at one time, such as the tube, kneeboard and skis, does not allow enough room for people, nor is it safe.

Separate the groups into shifts. Operate from an established base, changing the ropes, people and cluttering apparatus to allow for a safer and more enjoyable time. Shifts can also help cut down on observer boredom. The observers are out for a shorter period and have a common interest while watching one another.

Equipment

Equipment concerns are a major factor in the success of making water skiing and boating more fun. Having the proper equipment, the right amount of equipment and storing the equipment can help make boating more fun and easier. Satisfying these first two concerns can be costly. Keeping things simple and easy while limiting the aggravation automatically makes things fun. Families often try to consolidate equipment, trying to save a few dollars.

Ropes are an essential item of equipment, but many boaters purchase inexpensive lines for their weekend activities. There are several problems with cheap lines that can spoil the joys of water sports. One problem with cheap ropes is that they stretch, or spring, which causes them to twist and tangle. Nothing is more frustrating than a knotted, tangled rope. Once you have a quality rope, the stretch factor is greatly reduced and the chance of entanglements should be lessened if you store and maintain it properly.

It is a good idea not to use your ski rope for dragging a tube. The activity of tubing can cause excessive twisting of a rope, thus giving you more knots and wear. Many tubes also don't require

a handle. If your rope has a permanently fastened handle, it is necessary to tie off the rope just ahead of the handle, adding wear and tangles along with a dangerous, unnecessary handle. It is possible to purchase ropes without handles, which can be attached with loops or connectors. This allows you to use them more easily. You have to remember not to abuse your lines.

Storing your ropes is a difficult task. If your boat has a compartment for storing ropes, it is sometimes best just to reel the rope into the compartment, laying the handle on top. When it's time to use it, you simply pick up the handle and throw it out. It normally feeds out easily without tangles. If you must wind your rope, learn the proper method to avoid tangles or purchase a reel. A reel is fairly inexpensive and will keep your lines orderly. The biggest aggravation is then simply the effort of winding it up.

Cold, wet ski vests?

Another imperative and possibly the most important item of equipment is your PFD, or personal flotation device. These are required by law and can save your life, yet people try to save money and buy a "one size fits all." Besides the lack of safety in improper or loose-fitting personal flotation devices, they are very uncomfortable. Sharing them is even more disturbing as you don a cold, wet ski vest. It is much easier if every member of the family can have one's own PFD. This can be costly, but each family member is comfortable and safe, making all boating activities more enjoyable.

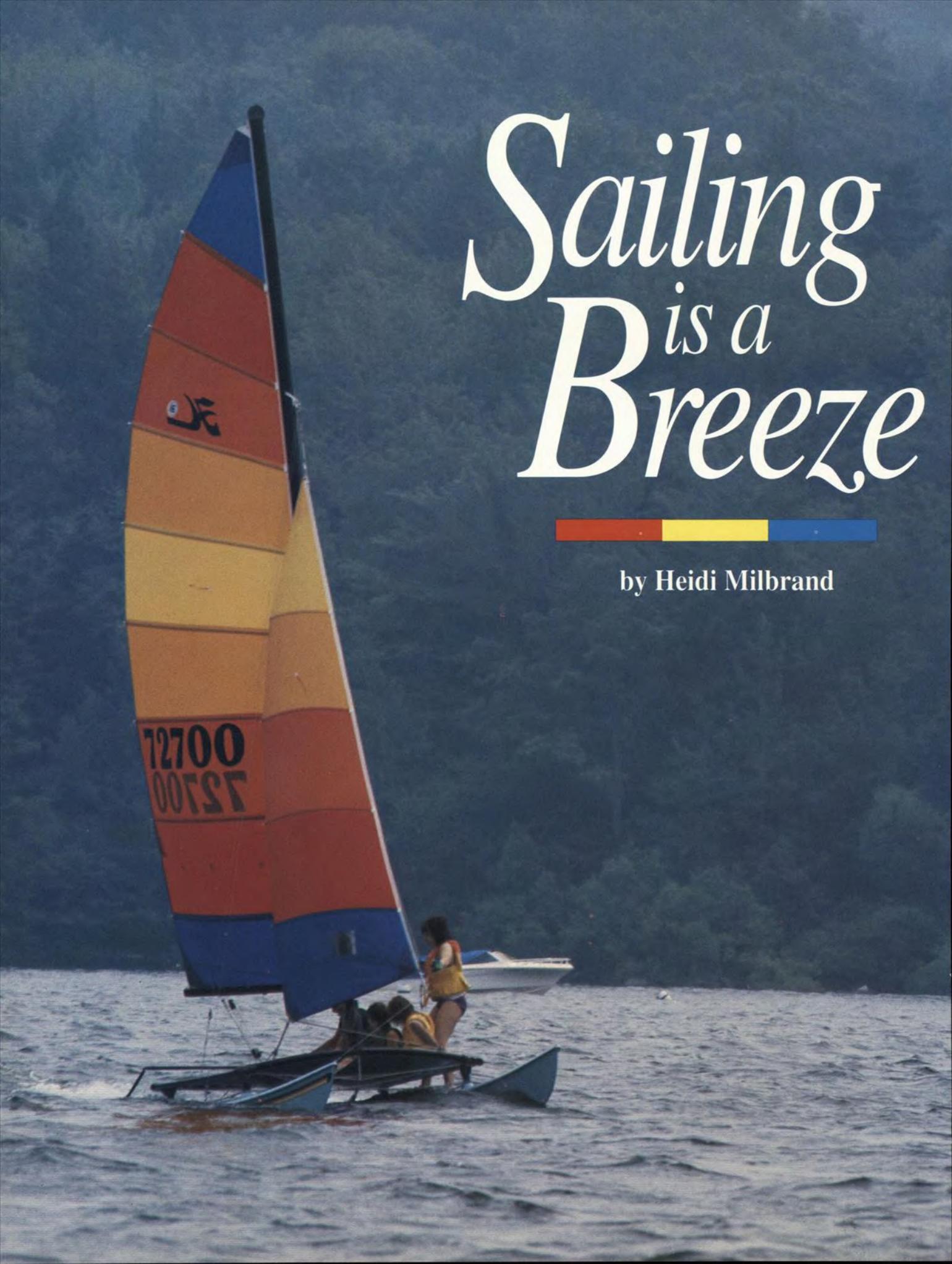
Each family member being considerate of others is especially important while you are skiing or participating in other water sports. A good practice is to ski and ride for short periods rather than long stints. This gives others a chance to enjoy the outing, and it lets you rest and more safely participate in your favorite activity again. Long periods of exertion lead to injury, which can be avoided by rotating the participation.

Interaction among the skier and the observers can also help make the activities more enjoyable. Learning to communicate from the boat to the end of the tow rope through signals allows for such interaction. This can lead to challenges and friendly rivalries that offer more for the observers to view. Observers offer encouragement, which results in improved performance and added enjoyment from the camaraderie.

Skiers always have to remember the driver, the person who is in control and alert at all times. The driver's duty is not always fun but possibly stressful. Shorter ski rides assist in breaking up this demanding task, and allow for conversation and interaction. A thank-you to the driver is an appropriate gesture. This shows your appreciation and understanding of the job.

Using these few hints, some common sense and safety practices can equate to many years of enjoyable water sports.





Sailing *is a* Breeze

by Heidi Milbrand

Have you ever been sailing? If not, you should make it a point to get out this season. My first sailing experience was on a balmy spring day with a gentle breeze. It was a day I'll never forget—the sky was blue, the water not too cold and nobody else was on the water. As the sailboat glided across the lake, the only sound was the changing wind gently luffing the sails. What a calm and peaceful experience!

Even though the water will likely still be cold, if you dress properly, you can stay warm and dry all day long.

Sailing is a sport that continues to grow in popularity, and even though it requires a high level of skill, anybody can learn. It doesn't take years of lessons. Some people can learn by reading a good "how-to" book, and by getting into a sailboat and practicing what they have learned. Most people learn by taking sailing lessons from a sailing club or the local Red Cross chapter. You must learn not only why a sailboat sails, but how to rig it, how to right it and how to apply the rules of the road.

How to be safe on the water

Look at required safety equipment and some common sailing hazards. Capsizing and falling overboard are the leading causes of boating fatalities. Everyone will capsize while learning to sail—it's part of learning the sport. Wear a personal flotation device (PFD) when you sail, no matter what your sailing/boating experience or swimming ability. Wearing a PFD can be a lifesaver when you take that unexpected plunge.

Pennsylvania law requires that all vessels have a U.S. Coast Guard approved PFD on board for each person. Sailboats less than 16 feet in length can satisfy legal requirements by carrying one approved wearable device (Type I,II,III) or a throwable (Type IV) device for each person on board, even though wearing a device is far safer. Boats 16 feet and larger must have one approved wearable device (Type I,II,III) on board for each person, and in addition, one throwable device (Type IV) must be aboard.

A sailboat equipped with an auxiliary engine, either outboard or inboard, is considered by law to be a motorboat as far as equipment requirements are concerned. If your boat is propelled by engine alone or by engine and sail, you must operate in accordance with motorboat rules and show the lights of a motorboat. If it's propelled by sail alone, lights of a sailboat must be shown and be operated in accordance with sailing rules.

Some type of sound-producing device must be on board as well as visual distress signals (if you sail on Lake Erie) and a fire extinguisher.

Some hazards you might run into while out on the water are thunderstorms with lightning because sailboats carry tall metal masts, high-voltage wires when rigging your boat at the launch area or even when on the water, and other boats—you must obey all rules of the road at all times.

The risks include inexperience, unfamiliarity with the boat, improper clothing, not wearing a PFD, cold water and air (hypothermia—lowering of the body's core temperature), choppy water and high winds. All these hazards and risks must be taken into consideration when sailing.

Why a sailboat sails

To be a good sailor, you must understand how a sailboat moves in the wind and why it can sail only in certain directions and not others. There are three positions a sailboat can sail using the wind—running, reaching and beating. The positions are determined by the direction in which the wind is blowing relative to the boat's direction of travel and the position of the sail.

- **Running.** The boat sails with the wind blowing directly over the boat's stern. The sail is positioned at a 90-degree angle to the boat so that the wind pushes the boat forward. The speed of the boat is slower than the wind speed because of resistance as the boat moves through the air and water.

- **Reaching.** The boat sails across the wind. The sail is positioned at a 45-degree angle to the boat.

- **Beating.** When beating, the sailboat travels at close to a 45-degree angle to the wind. The boom is positioned over the rear corner of the boat.

Now that you know why and how a sailboat travels, it is important to understand the points of sail. To determine the point of sail, you need to ask yourself three questions: From which direction is the wind blowing; in which direction is the boat traveling in respect to the wind; and what is the position of the boom and sail?

A direction of sail is often referred to as a "tack." Sailing on a port tack means that the wind is blowing over the port side of the boat and the sail is out on the starboard side. Sailing on a starboard tack means the wind is blowing over the starboard side of the boat, so the sail is out on the port side.



Don Carey

Rules of the road

Sailboats are classified as vessels of limited maneuverability. For this reason they generally have the right of way over motorboats. There are, however, some exceptions to this rule, which all sailors should thoroughly understand. Should a sailboat overtake another vessel, the overtaking situation rule prevails and the sailboat does not have the right of way regardless of the other boat's means of propulsion.

Motorboats and sailboats should give way to vessels not propelled by sail or mechanical means (for instance, rowboats and canoes).

A sailboat should take the necessary action to avoid an encounter with boats engaged in fishing with nets, lines or trawls.

The usual right-of-way status of a sailboat over a large power-driven vessel does not give it the privilege in a narrow channel. Remember that the power-driven vessel's ability to navigate because of its deep draft is restricted within the limits of the channel.

When two sailing vessels approach each other, to avoid collision, one of them should keep out of the way as follows: When each has the wind on a different side, the vessel that has the wind on the port side should keep out of the way of the other. When both have the wind on the same side, the vessel that is to windward should keep out



of the way of the vessel that is to leeward (downwind). Or if a vessel with the wind on the port side sees a vessel to windward and cannot determine with certainty whether the other vessel has the wind on the port or on the starboard side, it should keep out of the way of the other. For the purpose of these rules, the windward side is the side opposite that which the mainsail is carried.

Also, to aid you in your waterway travels are marker buoys (uniform waterways marking system). They are floating signs to help make sailing safer. The ones in Pennsylvania are white with orange markings. Control buoys have a circle on them and regulate ski zones; slow, no-wake zones; and speed zones. Danger buoys have a diamond on them. They warn boaters to use caution near shoals, rocks and dams. "No boats" buoys have a diamond with a cross in them. They are usually found at swimming areas and low-head dams. The information buoy has a square on it and tells you things like where the fueling station is or where the marina is.

Buying a sailboat

Once you've taken your class and tried out several different sailboats, like your friends' boats or the local sailing club's vessels, you might want to buy your own. The sailor considering a new boat needs to make an informed judgment on the size, type and cost of a sailboat.

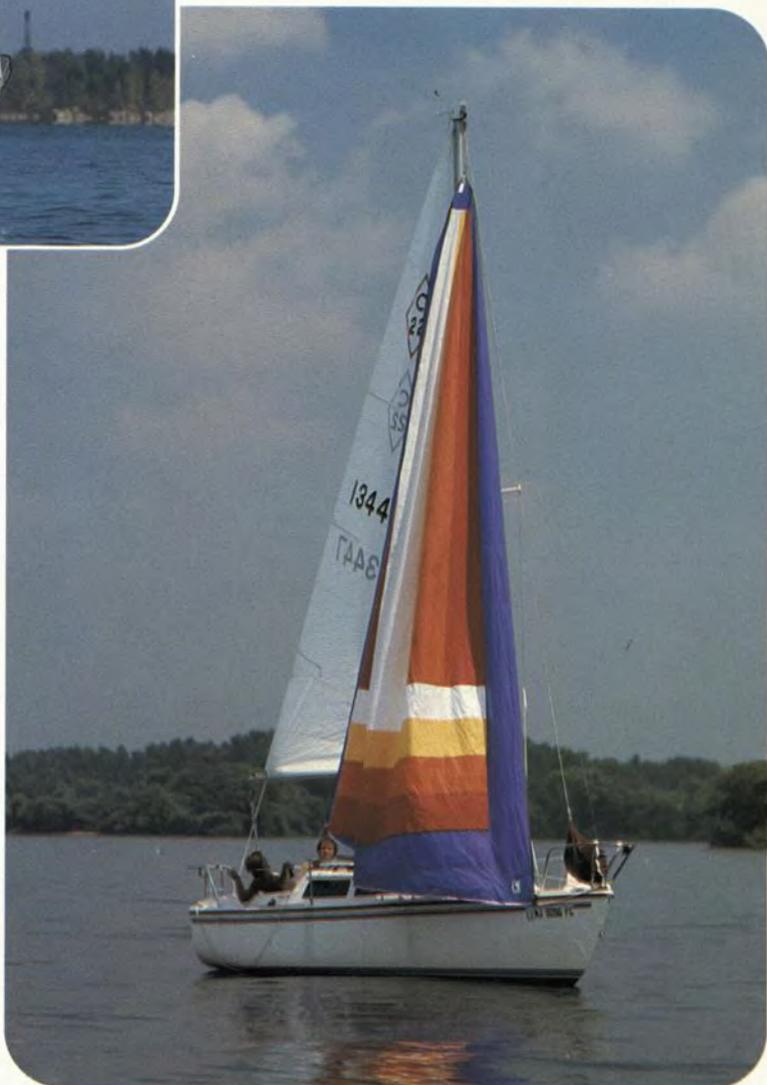
For now, consider boats in three basic categories—daysailors, club racers and pocket cruisers—all 24 feet or

less in length. These three categories account for about 80 percent of the sailboats on Pennsylvania waters.

When searching for a boat to buy, you need to separate your dreams from reality by using all the available resources, including local sailing clubs, boat dealers and competent friends' opinions. People get caught up in the romance of boats and overlook certain fundamentals that can help them make an informed judgment. Once you've fallen in love with a boat and bought it, you often find out you can't live with it. Suppose you buy a really nice sailboat with a large cockpit but discover that the cabin is too small and you wanted more room for cruising—now what?

In looking for a boat you must identify your requirements and establish some priorities for shopping. How will your boat be used—family fun, day trips, weekend cruising or sailing on bays? Are you willing to accept a boat that needs minor repairs to save \$2,000? Will you want to trailer it wherever you go or will you keep it in a marina? How much money are you willing to shell out?

When you accurately identify your requirements, the easier it is to find a boat that suits you and the more likely you will stay pleased with the choice.



After you specify exactly what you want, boat shopping becomes a systematic search for an affordable boat that meets your needs. Obviously, you need some organization here to eliminate wasting time and unnecessary trips. Start your organization now. Look at several acceptable designs before deciding which one best fills your requirements. Check out boat shows this winter. A "looking only" phase lets you suffer through that "buying lust" and lets you recover before writing a \$75,000 check for a boat you don't really want.

A good idea is to make up a form with all the pertinent information you know you want for your boat, such as identification of the boat (manufacturer, size, year, model, price), basic characteristics and dimensions of the boat, list of equipment included with the boat, list of features you want on the boat, and a remarks and evaluation section for boats you inspect.

Remember the adage, "All things come to him who waits." It might take a long search to find an affordable boat that meets all your requirements.

Where to go, sailing resources

There are many places to go in the Commonwealth where you will not run into powerboats (i.e., pontoon boats, fast boats and personal watercraft). Several state park waterways allow only non-motorized or electric-powered boats. These include:

Codorus State Park (1275 acres), (717) 637-2816; Frances Slocum State Park (165 acres), (717) 696-3525; Gifford Pinchot State Park (340 acres), (717) 432-5011; Little Buffalo State Park (88 acres), (717) 567-9255; Marsh Creek State Park (535 acres), (215) 458-8515; Memorial Lake State Park (85 acres), (717) 865-6470; Tobyhanna State Park (170 acres), (717) 894-8336; and Presque Isle State Park (Lake Erie), (814) 871-4251.

The Fish Commission has available several publications for sailors. There are four free brochures: *I Just Bought A Boat, Now What Do I Do?*; *Sailing in PA*; *Boat Trailing*; and *Survival in Cold Water*. You can obtain each by sending a self-addressed, stamped business-sized envelope with your request to: Pennsylvania Fish Commission, Publications Dept. F, P.O. Box 1673, Harrisburg, PA, 17105. If you want three or more pamphlets, please place two stamps on your envelope. Also available is *Guide to Public Waters and Boating Accesses* for \$2. Checks should be made payable to Pennsylvania Fish Commission, and payment must accompany orders.



Sailboat nomenclature

Knowing what you are doing is as important as knowing the terms. That way you don't look like a fool when yelling one term and actually meaning another. It does help to know what you are talking about. Learn these common sailing terms:

Beam—widest part of the boat.

Blocks—pulleys on the boat through which the line is fed.

Boom—metal pole that attaches horizontally to the mast; the bottom of the sail is attached to the boom.

Bow—front of the boat.

Cockpit—sunken area where you sit.

Daggerboard—board inserted into the daggerboard trunk in at least two feet of water.

Deck—covered area near the bow.

Foot—bottom edge of the sail that attaches to the boom.

Gooseneck—place where the boom is secured to the mast.

Gudgeon—fittings on the transom where the rudder is inserted.

Gunwale—upper edge of the side of the boat.

Halyard—line used to raise the sail up the mast.

Head—top of the sail.

Hull—bottom portion of the boat.

Luff—leading edge of the sail that attaches to the mast.

Mainsail—large sail hoisted directly on the mast.

Mainsheet—line that controls the boom and the position of the sail.

Mast—metal pole mounted vertically at the tabernacle.

Pintles—pins that attach the rudder to the hull.

Rudder—fiberglass piece attached to the stern of the boat; used for steering.

Running rigging—parts of the rigging that are movable on the boat, such as the lines used in setting and trimming the sails.

Standing rigging—part of the rigging that is permanently secured, such as the wires that support the mast.

Stern—back of the boat.

Tabernacle—place to mount the mast in the deck of the boat.

Tiller—handle that turns the rudder and steers the boat.

Transom—rear edge of the boat.

Traveler—line and blocks to which the mainsheet is attached.

