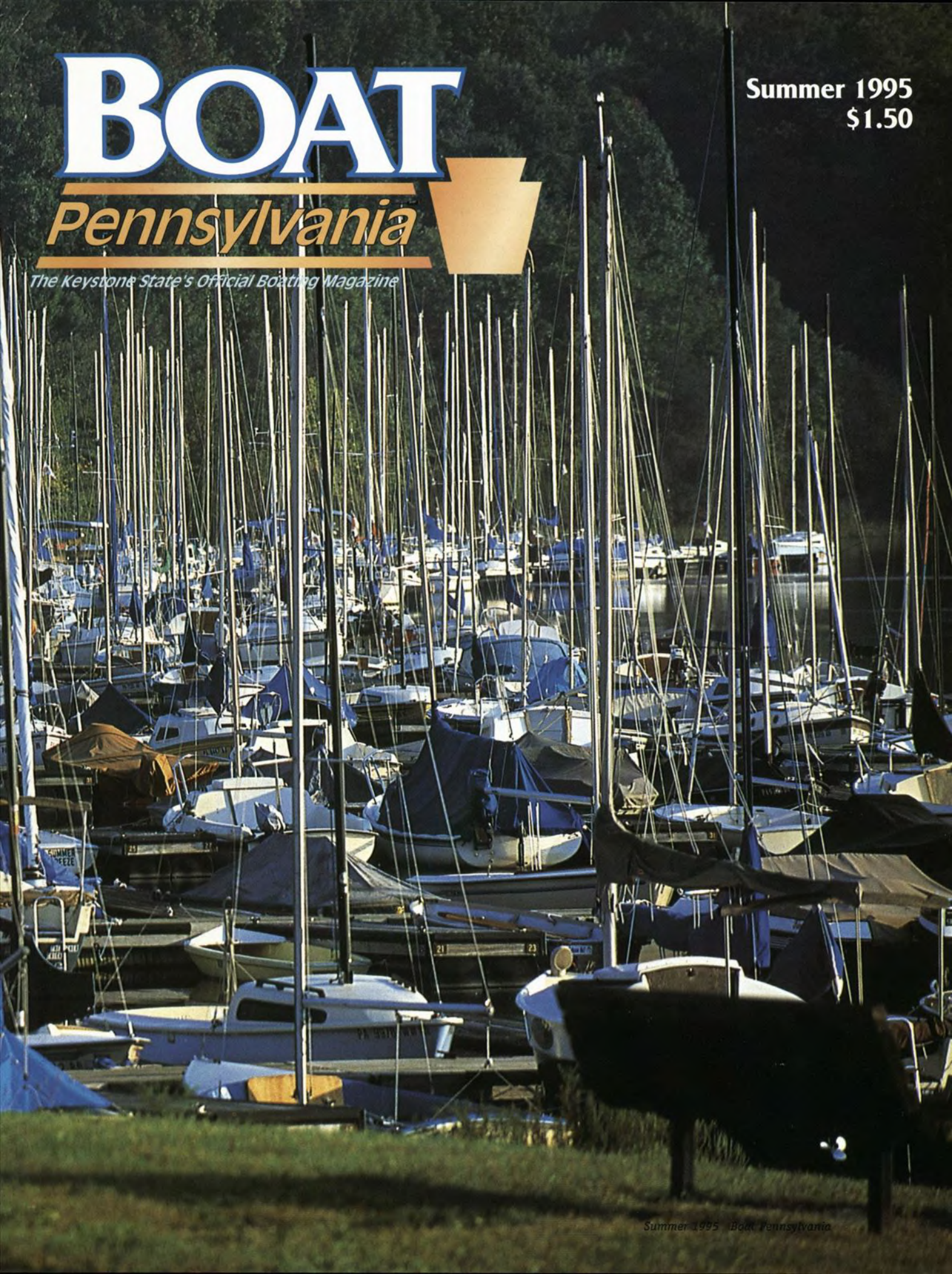
BOAT
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Viewpoint

Personal Watercraft

John Simmons
Director
Bureau of Boating
Pennsylvania Fish & Boat Commission

Finally, the boating season is here. The spring cleaning is completed. We have mowed the grass, cleaned out the garage and washed the windows. Now it's time to get out on the water and enjoy boating.

Ah! The thrill. The exhilaration. The solitude. But wait a minute. I'm not alone out here. Where did all these other people come from? Don't they know that this is my lake? What are they doing here?

For some, the new boating season is an awakening. We all like to remember the times when we had the waters all to ourselves. Unfortunately, there are fewer and fewer places where we can go in Pennsylvania to be truly alone. Last year, the Commission registered more than 322,000 boats. This represents another of the 4 percent annual increases in boat registrations experienced over the past decade. It reflects an increase of more than 12,000 boats from the previous year. No new waters are open for boaters, so the demand on the available waters is increasing.

Personal watercraft (PWC) are becoming a major factor in recreational boating. The 12,000 PWC registered in Pennsylvania represent almost 4 percent of all registered motorboats. Dealers sold 3,000 of these devices last year. Nationally, more than one-third of all new boats sold were personal watercraft. At this rate, personal watercraft could dominate the recreational boating scene in a few short years.

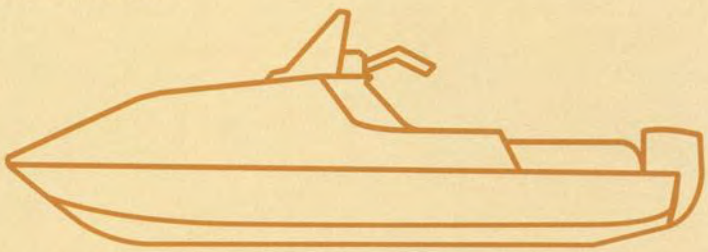
The entry of the personal watercraft has presented a dilemma to boating administrators and providers. Boaters operate these craft differently than traditional craft. Operated only by one or two passengers, more PWC are required to support the same number of participants as a traditional boat. They are both fast and extremely maneuverable, leading to operation characterized by many as unsafe. Statistically, these boats present little danger to other boaters. Accidents tend to occur with single boats or with other personal watercraft. Seldom are other boaters or water users in danger from these craft. Nevertheless, their operation is often an annoyance to other users of the waters, particularly owners of property near congregations of these craft.

Personal watercraft, however, are not the only problem. The number of other boats also creates a share of conflict. Boats today tend to be bigger and more powerful than ever before. A common perception is that the goal of many boaters is to see how fast they can go. Fortunately, we know that most boaters are extremely careful about their operation. The operation of a few, however, is all that it takes to turn opinion against everybody else.

Does this mean that we can no longer have fun on the water without being hassled or regulated every time we turn around? Not at all. What it does mean is that we have to be more careful about our boating. We have to look out for the other guy more than in the past. We have to ensure that safety directs our every action, and we have to be vigilant. We have to be good captains of our boats. We have to watch out for our crew and for our fellow boaters.

All boaters should take the time to assess the consequences of their actions. If we fail to take personal responsibility for our actions and of those around us, we will see an increase in conflicts, accidents and regulation.

Boating is one of the state's most important recreational pursuits. If we all contribute in our own small way, we can ensure that boating will be safer and enjoyable for everyone.



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On the cover
Boats await the day's activity early in the morning at Lake Nockamixon, Bucks County. Photographed by Darl Black.

If you're looking for the lowdown on central Pennsylvania's best open-water boating, check out the article that begins on page 4. Along these lines, powerboaters will want to read about "the elastic solution," on page 6, how to avoid severe weather, on page 20, what happens when a WCO boards your boat, on page 24, and how to maintain your outboard, on page 30. Furthermore, water skiers should turn to page 14 for advice on how to choose a slalom ski. On page 8, paddlers can find sound advice on how to buy that first canoe, and on page 16, read up on how to plan a successful overnight canoe trip. Lastly, is a jetboat right for you? The information on page 12 can help you decide.–*Art Michaels, Chief, Magazines and Publications.*

PRINTED ON RECYCLED PAPER

Boating on the Lower Susquehanna

by Heidi Milbrand

The Susquehanna River is the longest and largest river on the East Coast of the United States. The Susquehanna has the highest average flow and the second largest drainage area, over 28,000 square miles, of any river in the eastern United States. The river begins as an overflow at Otsego Lake in New York and runs 444 miles through Pennsylvania to the Chesapeake Bay. The North Branch enters Pennsylvania in the northern reaches of the Allegheny Mountains and flows through the northeast corner of the state to the city of Sunbury, where it joins the West Branch. The West Branch begins in Cambria County and is almost perfectly centered in the state as it cuts an irregular arc to Sunbury.

From this point, it continues flowing south to Duncannon, where the Juniata joins the Susquehanna, and continues its journey south. Below Harrisburg, the river flows through a series of four hydroelectric power facilities. These four facilities form large manmade lakes that offer opportunities for powerboating, waterskiing and sailing.

We will focus on these four pools located in Pennsylvania: York Haven Dam (Lake Frederic); Safe Harbor Dam (Lake Clarke); and the Holtwood Dam (Lake Aldred). The fourth pool is created by Conowingo Dam in Maryland. The pool is in both Pennsylvania and Maryland.

Lake Frederic

Lake Frederic is formed by the York Haven Dam, and you will find yourself boating in the shadows of the cooling towers at Three Mile Island. To get to Lake Frederic, take Route 83 south to the Newberrytown exit and follow the signs to Goldsboro, or follow Route 441 south to Middletown. York County launching sites include the Commission's Goldsboro Access. After going through the town of Goldsboro, cross the railroad tracks and immediately turn left. There are two launching areas here. To get to Goldsboro Marina, after crossing the railroad tracks immediately turn right.

On the Dauphin County side, there are three accesses. The first access you encounter, the Commission's Middletown Access, is located at the foot of Union Street in Middletown, where the Swatara enters the Susquehanna River. It is ideal for launching shallow-draft boats, lightweight fishing boats and canoes. The second access, called the Canal Lock Access, owned and operated by the Metropolitan Edison Company (MET ED), is located along Route 441 south of Royalton. The third access, the Tri-County Boat Club, is also located along Route 441 north of the entrance to Three Mile Island. There is a charge to launch your boat here.

There are some shallow places in this part of the river, especially above the upper accesses, which can be hazardous during periods of low flow. Call the National Weather Service in State College at 1-800-362-0335 (best number to call) or 814-234-9861 to learn the river depth at Harrisburg in a recorded message. A reading of 4.0 feet or lower requires more caution than usual.

If you look at the river in this area, you would see that it splits into three channels. The water in the first channel, from the west shore to Shelley Island, and the second channel, from Shelley Island to Three Mile Island, is held back by York Haven Dam. The water in the third channel, from Three Mile Island to the east shore, is held back by the Red Hill Dam. This area is sometimes neglected by boaters and can be quite pleasing to boat in. Water skiers might enjoy this spot because TMI shields the area from common westerly winds.

Lake Clarke

Lake Clarke stretches approximately eight miles in length and it is a very popular place to go boating. From the west side of the river, take Route 30 east to Route 462 into Wrightsville. Look for Route 624–it veers off to the left. Do not cross the Columbia-Wrightsville Bridge. As you travel 624 south, you encounter the Commission Wrightsville Access, approximately 100 yards below the Columbia-Wrightsville Bridge. This access is in the extreme backwaters of the dam and suitable for small boats only. There are several public marinas and private "yacht clubs" located along this stretch of the river, as well as many private residences. Your best area to launch is to go to the Safe Harbor Water and Power Company access. Stay on Route 624 and go approximately five miles to where Route 624 turns right. Do not make the turn. Continue straight for $^1/_2$-mile and the rigging area and parking lot is on the right. Launch lanes are on the left. There is even a guard there to assist with traffic. This area gets extremely busy, so exercise caution when launching.

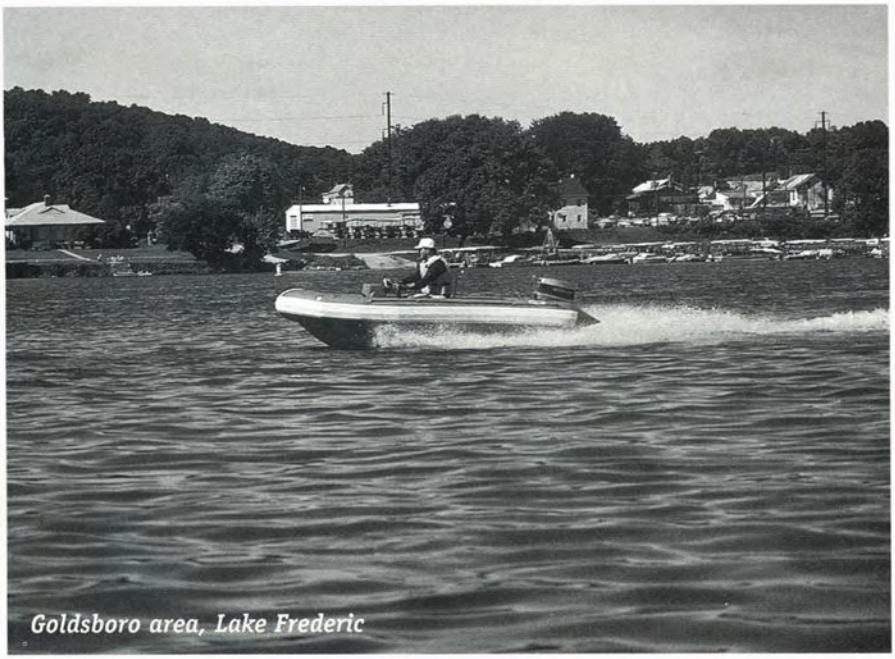
On the Lancaster County side of the river, there is only one public access. The Commission's Columbia Access is just south of Route 462 in Columbia. There is limited parking available. There are other launching areas, but they are either privately owned or maintained by boat clubs.

As you travel upriver toward the bridge, the water becomes shallow, so please be careful when boating the upper stretches. There is also a big slow-no-wake zone on the east side of the river. This is a popular area where boaters hang out. There is also a "Boats-Keep Out" zone, which is designated a migratory bird area.

Lake Aldred

The third pool, Lake Aldred, can be trying to get to. On the Lancaster County side of the river there are two accesses. The PP&L access area is at the mouth of Pequea Creek, just off Route 324. There is a surfaced ramp, a picnic area and a playground. Please exercise caution at low water levels. This access is ideal for

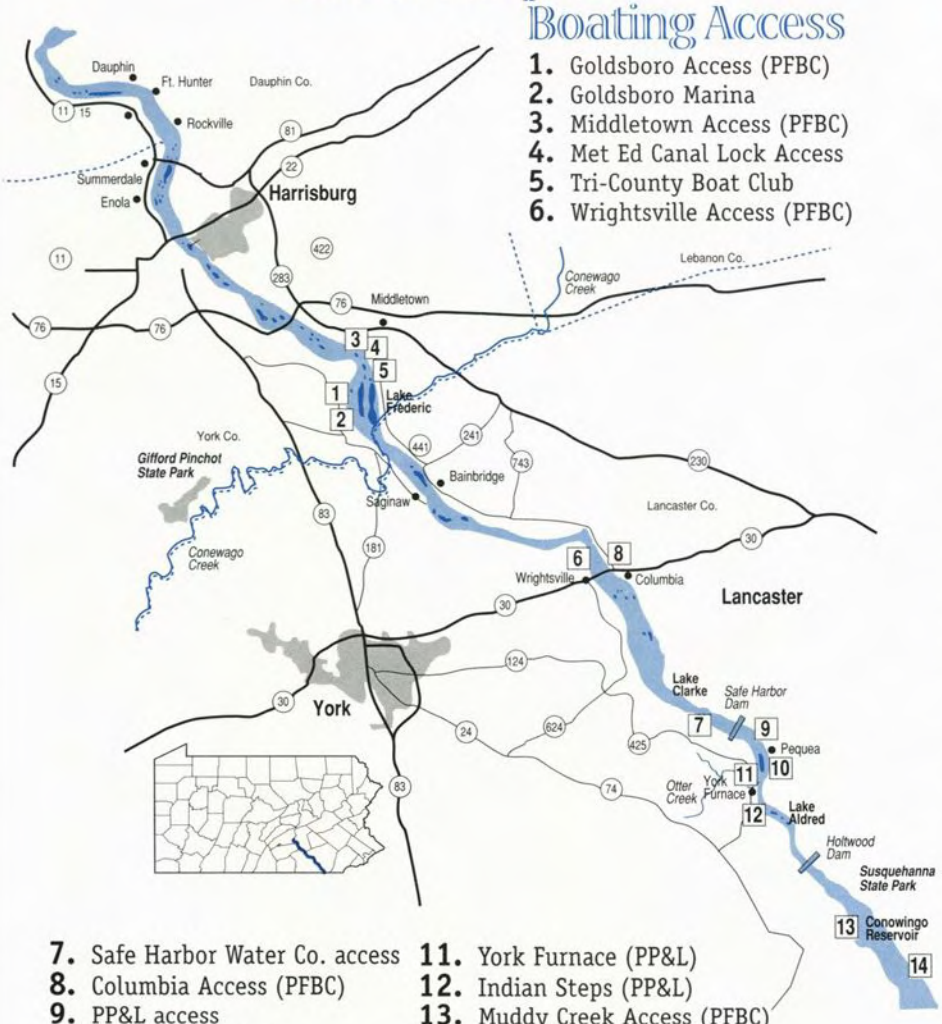
photo-Art Michaels; map graphic-Ted Walke



Goldsboro area, Lake Frederic

Lower Susquehanna River Boating Access

1. Goldsboro Access (PFBC)
2. Goldsboro Marina
3. Middletown Access (PFBC)
4. Met Ed Canal Lock Access
5. Tri-County Boat Club
6. Wrightsville Access (PFBC)



7. Safe Harbor Water Co. access
8. Columbia Access (PFBC)
9. PP&L access
10. Arrowhead Marina
11. York Furnace (PP&L)
12. Indian Steps (PP&L)
13. Muddy Creek Access (PFBC)
14. Peach Bottom Marina

shallow-draft boats, lightweight fishing boats and canoes. Arrowhead Marina is on the opposite side of Pequea Creek from the PP&L area. The marina has a hoist and a surfaced ramp, and groceries, boat rentals and a snack bar is readily accessible.

On the York County side, there are also two access areas, both owned by PP&L. The York Furnace access is at the mouth of Otter Creek. Take Route 74 south from Red Lion to Route 425. Turn left onto Route 425 for about 4 $^1/_2$ miles to the access area on the right. The second access is near York Furnace at Indian Steps (a museum), which is approximately $^1/_2$-mile down on the left from the York Furnace access area. There are also several privately owned marinas and campgrounds on Lake Aldred.

Conowingo Lake

Finally, Conowingo Lake, which stretches into Maryland, offers two access areas in Pennsylvania. On the York County side, there is the Commission's Muddy Creek Access. Take Route 74 south from Red Lion and turn left onto Route 372. At the western end of the Norman Wood Bridge turn right and go approximately 1 $^1/_2$ miles, and turn left into the access area.

On the Lancaster County side is the Peach Bottom Marina. Follow Route 272 about four miles south of the village of Buck and turn right onto Spring Valley Road. Follow this road for $^1/_2$-mile to the "T" intersection and turn left onto Slate Hill Road for approximately five miles to the marina. There is mooring over the summer months and a hoist is available at the boat house. There are groceries, fishing supplies and bait available.

All four of these pools offer excellent unlimited horsepower boating. As with any on-the-water experience, keep safety in mind. Make sure you have all the required legal equipment–PFDs, navigation lights, a sound-producing device and a fire extinguisher. Remember that you are not the only boater out on the water. You have to respect the rights of others on, in and about the water. You must obey the rules of the road–no exceptions! If you remember to use common sense, your day on the water will be much more enjoyable.

The ELASTIC SOLUTION

by Lee Shore

I remember fishing aboard a small open-back country skiff a few years ago that had its entire interior decked over from stem to stern to a height just a few inches below the gunwales. The theory behind this unusual construction was that absolutely nothing would be underfoot. Everything was to be stowed completely out of sight in one of the numerous compartments below decks. A great theory, but at least for me, out of sight is sometimes out of mind.

Finding something was a bit like one of the old TV game shows with lots of doors wherein the contestant took some sort of a chance with the one he or she chose to open. Rod storage was a problem, too. And you had to get down on your knees and then stand on your head to reach whatever it was that you were after. And by the time you did find it, you had often forgotten just what it was you were looking for in the first place. You also had to open two lids to get to the contents of an ice chest, of which there were always at least two—one for food, the other for fish.

There were, as best as I can remember, no less than 11 or 12 separate hatches in that deck! And every one of them clattered loudly each time the boat got on plane in even the mildest chop. Intelligent conversation was usually impossible. That's when I began to think of all the wonderful little things elastic shock cord (e.g., bungee) could do around a boat–like keeping hatches from rattling or flopping open when you're bouncing from wave to wave in a nasty chop. Mechanical closures don't always ensure a tight fit, and even if they did when the boat was new, before long things tend to loosen up a bit. There is, for instance, a plastic ball-and-socket closure device on the market, and I've used them on some of the hatches on my center console skiffs for years. But they tend to squeak loudly when the hatch is stepped on. Thus, many of them have long since been removed in favor of the "elastic solution" I'm about to discuss here.

The way I solved the flopping hatch problem is simple. I fastened a small panhead stainless steel screw to the underside of the hatch, somewhere between the center and the edge opposite the hinge, allowing 1/8-inch of exposed threads between the screw head and the hatch surface. On the underside of the deck, and about the same distance from the hatch hinge as the screw head, I fastened a sturdy stainless steel screw eye. The screw eye must have an inside opening large enough for two pieces of the shock cord of the size you'll be using.

I found it takes 3/16-inch to 1/4-inch bungee to hold down a medium-size hatch, and up to 3/8-inch for a bigger hatch. For a small hatch, like the five-incher that provides access to my rope locker, 1/8-inch bungee is fine. All of this assumes relatively light, small boat hatches that range in size from four or five inches up to perhaps 18 or 20 inches wide.

If you cannot find stainless steel or brass "S" hooks of the right size, you can make your own with suitable stainless steel or aluminum wire. You'll need one for each hatch, big enough to pass the elastic cord through. The idea is not only to make the installation simple in the beginning, but to make replacement of the shock cord even easier when it finally wears out. It's just a matter of cutting to length and tying a couple of overhand knots.

Tie a knot in one end of the shock cord and pass it through the screw eye. Then slide the "S" hook over the other end. The "S" hook should be closed just enough so that it cannot fall off the bungee, but not so tight that it will not slide easily along the cord.

Open the hatch as far as it will go, and attach the "S" hook to the screw head. Then bring the other end of the bungee back through the screw eye. Now carefully pull it through that eye until it is as tight as you can make it, marking that spot at the screw eye—on the cord—with your fingers. Close the hatch, and pull enough bungee through the eye so that you can now tie an overhand knot in the spot marked with your fingers.

This results in doubled shock cord to hold the hatch down, yet it can still be completely opened—even 180 degrees, if it will swing that far.

As long as the hatch can be opened reasonably well beyond the 90-degree angle, the sharp bend of the bungee around the hinged edge will prevent it from pulling the hatch closed before you want it to. And when the boat is not used, simply detach the "S" hooks from the screw heads and allow the elastic shock cord to relax completely. It will last a lot longer that way.

Happily, bungee is available in lots of sizes, from 1/8-inch in diameter to over 1/2-inch, and it's inexpensive. You can also use it to anchor ice chests in place, serve as part of a shock-mounting system for electronics to lessen the beating they'll take on a rough day, to keep fishing rods in place, and hold down a lot of otherwise loose items. Best of all the system is flexible, as opposed to rigid and therefore more subject to stress breakage.

It has lots of other uses. For instance, I carry three fiberglass antenna whips in my boat. Two of different lengths for VHF, and one for loran C. Most of the time I can get the usually short range (up to seven or eight miles) I need with just the five-inch stub of my VHF antenna system, so both of those whips are usually stowed. The loran C only needs its whip attached to the coupler when I'm using that unit. But casting room is far too precious in any small

boat to be impeded by a bunch of tall verticals poking skyward, so I keep all three whips safe and handy by strapping them to the underside of the gunwales with elastic shock cord. That way I can have the whip I need out and attached to the proper antenna base in seconds.

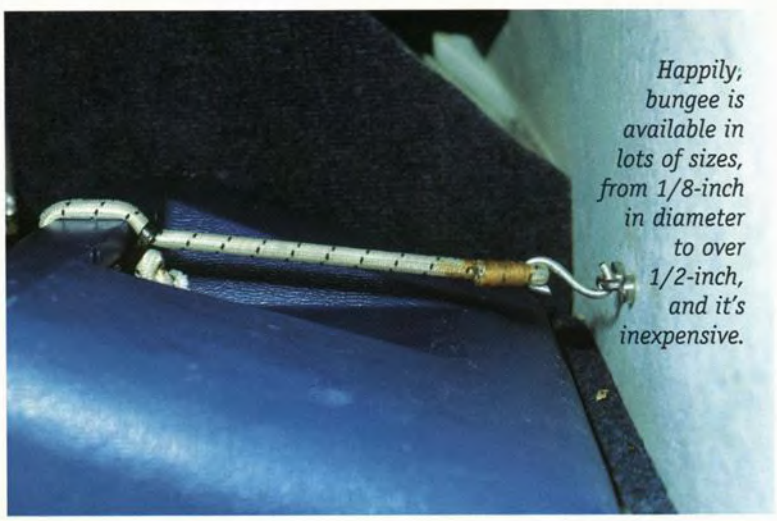
Bungee is great stuff for keeping even large ice chests securely anchored in place. I use a big 85-quart plastic cooler, and it's mounted way forward, at the aft end of my foredeck. First I improved its non-skid potential considerably by gluing a piece of outdoor carpet to the bottom of the ice chest. Then I used a short piece of 1/2-inch bungee and an "S" hook tied to each handle, and a stainless steel eyestrap screwed securely to the deck at each end of the ice chest. The "S" hooks attach quickly to the eye straps, thus creating a lot of downward tension at each end of the ice chest. Combined with the non-skid behavior of the carpet on the bottom, the ice chest doesn't move an inch—even when it's choppy.

I have another smaller ice chest strapped to the forward side of my center console–with elastic shock cord, of course. Since there's a solid "wall" behind the ice chest (the front of the console), it wasn't necessary to use the system I used for the big chest. This time I mounted the stainless steel eyestraps on the forward corners of the console and simply ran the bungee tightly around three sides of the ice chest. Carpet glued to the bottom of the chest helps here, too.

The horizontal racks under my gunwales use bungee to keep the rods securely in place, no matter how rough it gets. Instead of doubled shock cord and "S" hooks, I use rustproof circular electrical connectors, the crimp-on type you can buy in almost any hardware store, and the same panhead screw system that works so well for the hatches. One end of the elastic cord is passed through that part of the electrical connector where the wire is supposed to be crimped, and an overhand knot tied to prevent slippage (rather than crimp the connector so that it cannot be used again later with replacement elastic cord). A hole drilled through the top of the rod rack, or a suitable screw eye in the right location, provides the anchor point for the upper end of the bungee. This system should be under just enough tension to keep the rods securely in place, but not so much that there's any risk of damage to the rods.

How about bungee as an electronics tiedown system? Many years ago I gave up using the mounting brackets that come with some marine electronics. Many of them are not made of stainless steel and soon rust anyway, and they all offer poor shock protection at best. My system, used inside the center console for my VHF, consists of two pieces of shock-absorbing foam, such as Ethafoam. That's the foam blocks used to pack many fragile electronics items. It comes in black or white. I glue it to the shelf in the console. Ethafoam is usually available from packaging outlets that sell foam, or as discard from some electronics shops. The VHF is mounted on top of the foam blocks, and two pieces of 1/4-inch shock cord criss-cross its top, holding it firmly down on the foam.

The elastic cords can be anchored at both ends with circular electrical connectors and screw hooks, or with screw eyes and the spring-like hook ends made especially to be used with bungee. These hook ends are also made in stainless steel, but the stainless steel variety is not always easy to find.



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Obviously there are a lot more potential applications for elastic shock cord than I've mentioned here. And sometimes it's necessary to use your imagination and improvise a little in these matters.

Buying Your 1st FIRST CANOE

by Cliff Jacobson

For most people, a "first" canoe is like a "first" car–functional and reliable, but often stodgy and in need of repair. Size, shape, material, resale value and least of all, "performance and purpose" usually take a back seat to affordability. Besides, there's the motive that if you become disenchanted with the sport, you can bail out inexpensively.

Then there's the matter of strength. Beginners are certain they will hit every rock in the river and that these rocks will destroy their canoes. So a "strong boat becomes a good boat," even if it weighs a ton and wags its tail as it wallows downriver.

Learning to paddle well, to avoid obstacles, is seldom a concern. This is surprising, because in other sports, mastery of skills is an important part of the game. The majority of people who buy cross-country skis and touring bikes probably believe that they–and their equipment–will grow with the sport. Newcomers to canoeing, on the other hand, are often convinced that their first canoe will be their last canoe–an axiom that applies only to those who never learn to love canoeing.

Low price is often a top concern, even for those who can afford the best. I've seen Cadillacs and BMWs with cheap, poorly designed canoes strapped on top. Conversely, I've observed the most magnificent canoes on the least desirable cars. Skis and bikes are easy to transport and store, so they quickly command a loyal following. But "love of canoeing" develops slowly, even when the paddler's heart is mated to the right craft. Love may grow to ambivalence or even hatred when the craft is unresponsive and boring to paddle. Witness the number of canoes that never leave the garages in which they are stored!

It follows that if you want to learn canoeing, and learn to *love* canoeing, you'll keep uppermost in mind what it was that attracted you to these craft in the first place.

If you said "fun," you're in the ball game, smiling and confidently standing on home base with ball in hand. Fun, my friends, is what canoeing is all about. All else is secondary.

Money matters

If you read canoeing magazines you know the price of today's canoes. If you don't, your parameters may be clouded by low-priced ads in newspapers, hunt-

photo-Cliff Jacobson

ing and fishing publications and discount store fliers. Most really good canoes today cost $1,000 to $2,000. Those in the $300 to $500 range are the Geo Metro's of the paddling world. Solid citizens, all, but relatively unexciting to drive. Are these "cheapies" bad canoes? No: They all float; they are cartopable, and they are usually built much stronger than most people will ever need. But they are not fun to paddle! They do not accelerate smoothly or turn precisely. Paddle them hard and their bows push water and make an ugly plopping sound. They "pound" in waves and they are unmannerly in currents. They follow the flow of the water, not the path of the paddle. They are tired, practical beasts, cheaply built by those who neither understand nor love canoeing.

A platform to drift on? Yes. A stable raft from which to fish and photograph? Of course. A no-maintenance boat that you can leave overturned on the shore for weeks or months? Absolutely! A skiff with pointy ends? Yes! A canoe? No!

If a double-ended boat will satisfy your dreams, your local marina or discount store is the place to shop. However, before you write the check, know that good canoes hold their value (or even appreciate) over time, while bad ones lose up to 30 percent of their retail price as soon as they leave the store. After each trip downriver they depreciate further.

Canoes are like cars: There's a model for every purpose. To simplify this discussion, we'll define three categories–whitewaters, general cruising/canoe camping, and racing.

Whitewater

Don't buy any purebred whitewater canoe until you have paddled it and have sought the advice of others who know it intimately. Invariably, hot, highly rated whitewater hulls are "experts' boats." It's a rare novice who can handle them.

High-performance canoes are not like high-performance tennis rackets. A top-rated racket may provide a beginner with a light tournament advantage. But a superior slalom hull may capsize your dreams in the first drop and place you at the back of the pack. Better to choose a more forgiving craft that gets you downriver and makes you look good. Rely on the advice of manufacturers. They want your business for life, so they won't put you in a boat you can't handle!

Royalex™ is the natural material or a rock-beater whitewater canoe. Royalex™ is tough, flexible and relatively inexpensive. All the best whitewater hulls are built of this material.

Where to shop. You'll find serious whitewater canoes at canoe specialty stores and advertised in the pages of *Canoe & Kayak* and *Paddler* magazines. Subscribe to these publications if you're serious about riding rapids.

You should also join all the canoe clubs you can find. You'll find the best deals on used whitewater canoes in club newsletters. Call the seller and explain your needs. Experts won't steer you wrong, even if it means losing a sale.

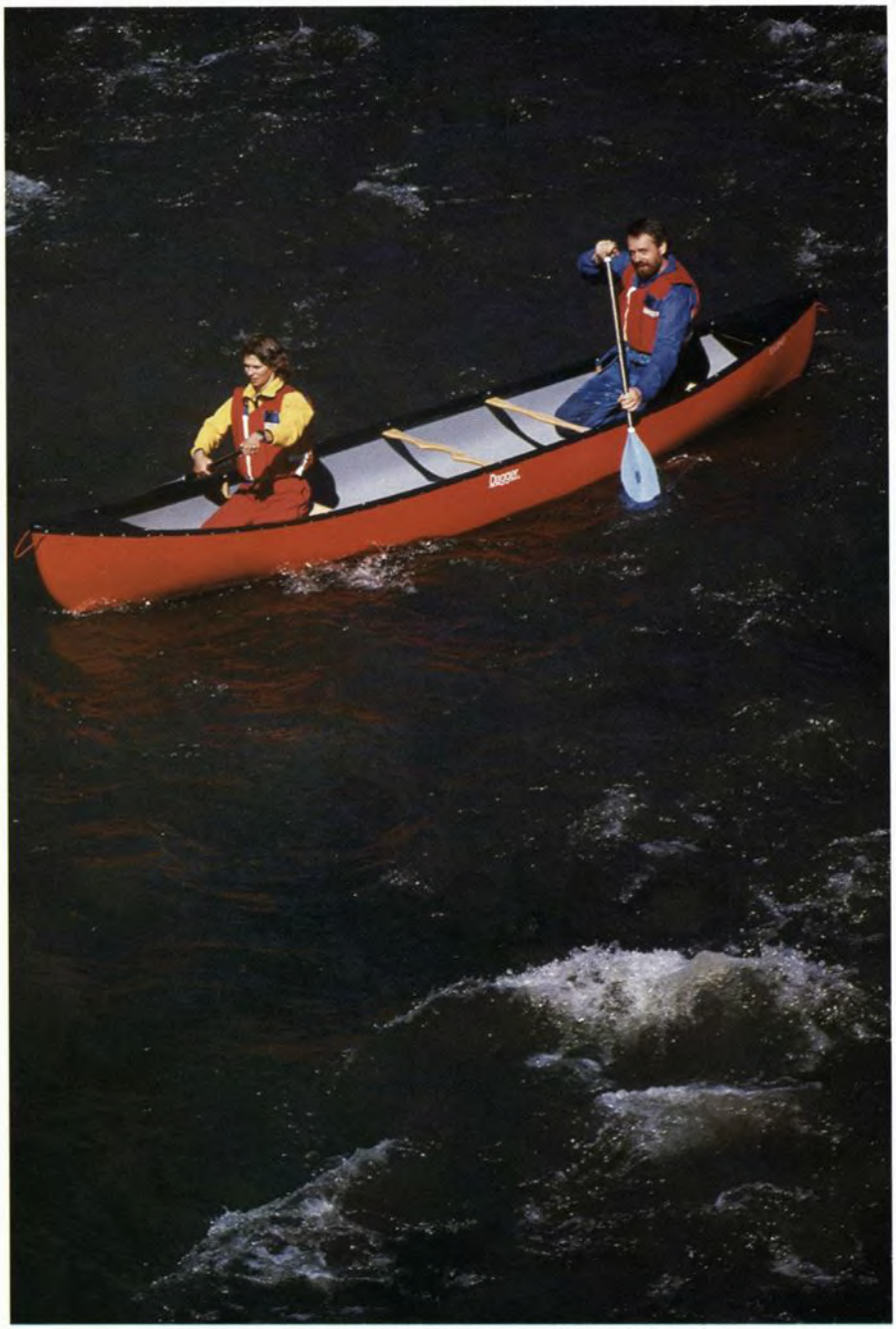


photo-Bill Burger

General cruising/ canoe camping

These canoes need no introduction. With some notable exceptions, they are the meat and potatoes craft of the canoeing trade.

However, the design factors–length, width, hull form, etc.–that characterize performance are so complex that space defies description. But to keep it simple (KISS) for first-time buyers, I offer these options. Pick your poison and read on.

1. I prefer day or weekend tripping on calm lakes and easy rivers.

2. As above, but we'll carry three plus a dog in our canoe.

Buying Your 1st FIRST CANOE

"Blems" (blemished) are always a good deal. First trip down a river you'll scratch and gouge your canoe. The $50 to $100 you save at the outset will pay for a fine paddle or PFD. I would never buy a factory "first" if I could save $50 on a "second."

3. Fast is fun. I want a speedy canoe.

4. All of the above, but add some exciting rapids.

Choice 1–Easy Day Trips. A lightweight (over 75 pounds is the kiss of death), narrow, fine-lined canoe is right for you. These high-performance "cruisers," as they are called, range from moderate to high priced, though there are enough used models around to encourage good deals. Check out canoe club publications and canoe magazine "personals." It's doubtful you'll find a nice lightweight cruiser listed in the newspaper. Can you buy a used canoe from a private party in Minnesota and have it shipped to Pennsylvania? You bet! Crating and shipping (slow freight) seldom amount to over $100.

New purchases. Look for a lightweight fiberglass or fiberglass/Kevlar™ laminate. Fiberglass/Kevlar™ composite boats cost hundreds less than pure Kevlar™ ones and weigh only about 10 percent more. The strength advantage of "all-Kevlar™" construction is over-rated. You will scratch and gouge your first canoe on rocky rivers as you proceed along the learning curve, and this will seriously erode i resale value. A high-priced, exquisite cruising canoe makes sense only if you are deadly serious about the sport.

There's a low-cost, lightweight technology on the wind. A few canoe makers now build sophisticated cruisers from R84 Royalite™–an ultralight version of Royalex™. R84 canoes are almost as light as those built from fiberglass composites, but they are much less expensive. And performance is designed in. For example, $940 will buy Dagger's new 65-pound R-Lite™ cruiser, the *Passage*.

Choice 2–Three and a Dog. Bigger is naturally, better. But be aware that the bigger the canoe the more doggy it is to paddle. With few exceptions, eliminate from consideration any canoe that's less than 17 feet long. Some suitable craft include the venerable 18-foot Grumman, 18 1/2-foot Alumacraft, 169 and 172 Old Town Discoveries (the 169 is a nicer boat) 17-foot Old Town Tripper, 17-foot Mad River Explorer and 17-foot, 2-inch Dagger Venture. There are bigger canoes for bigger families and humongous loads. However, there is limited demand for these giant "war

photo-Bill Burger

canoes," so you'll take a beating at resale time. Two moderately sized, used cruisers are a less expensive and more practical option.

Choice 3–Fast is Fun. You bet it is! But the canoes that qualify are long (17 $^1/_2$ feet to 18 $^1/_2$ feet), skinny, tippy, very light (fragile) and frightfully expensive. They also require a higher level of skill to operate than most beginners possess.

Materials: R84 Royalite™ is a practical low-cost option, though model choices are limited. Canoes built of Kevlar™ and foam composites are the clear choice where light weight and stiffness is the priority. Fiberglass/Kevlar™ composite canoes are relatively inexpensive. The Alumacraft 18 $^1/_2$-footer is the sleekest aluminum canoe in production.

Don't turn up your nose at cedar-strip/fiberglass-covered canoes. They are lighter and stronger than most people think. A typical 17-footer may weigh 45 to 60 pounds. Anyone can build a wood-strip canoe. All you need is a table saw, hand tools and patience. All modern canoes begin life as a cedar-strip prototype, which later becomes the "plug" from which the Kevlar/fiberglass or Royalex mold is made.

The Minnesota Canoe Association, P.O. Box 13567, Dinkeytown Station, Minneapolis, MN 55414 is the largest "canoe building club" in the world, with members in all 50 states and Canada. The MCA publishes at least a dozen different canoe-building plans, plus the best canoe-building book available. If you can read and follow directions, you can build a "stripper" canoe. You'll need 20 feet of heated space, 80 to 100 hours of time, and a cold, cruel winter to keep you on task.

Don't be afraid to use your wood-strip canoe on rocky rivers. These boats are surprisingly strong. Repairs are easy and cosmetically imperceptible!

Search the pages of club newsletters for used wood-strip canoes. Spectacular buys are possible, especially after the first snowfall.

Choice 4–I want it all, whitewater, too! Canoes are like cars. A sedan will get you around in fine style but it won't carry lumber or win races. Life is choices!

If you're willing to modify your dreams, any medium-volume canoe should suit your needs. Whitewater canoes typically measure less than 16 feet, while fast cruisers are 17 or more. A high volume 17-foot canoe may be your best choice.

Racing

If you're into racing, you already have definite preferences. If you're just getting started, frequent some canoe races and spread the word that you want to buy a good used canoe. The key here is "good, used," not highly competitive. Canoe racing is as competitive as other sports. Small changes in canoe design frequently transfer to a minute performance edge that can be appreciated only by the very best paddlers. Experienced racers often blame a losing streak on an "outdated" canoe. As a result, you can often buy their "dish pans" for a song.

Should an inexperienced racer buy a new, state-of-the-art racing canoe? Only if he or she has money to burn. Racing canoes depreciate logarithmically with time, even if they are never paddled. In the mind of the beholder, a faster rocket is already on the drawing board!

Getting a good deal

1. Outdoor shops start gearing for winter about the first of October. Unsold canoes must be stored for the winter. An $800 canoe consumes as much space as several dozen expensive parkas. See the problem?

Canoe prices go down in October, way down in November. Once stored for the winter, prices hold until spring and then climb again. Fall savings may amount to several hundred dollars on top-line canoes.

2. You'll find the best deals on state-of-the-art Kevlar™ and wood-trimmed canoes that can't be stored outside.

3. "Blems" (blemished) are always a good deal. First trip down a river you'll scratch and gouge your canoe. The $50 to $100 you save at the outset will pay for a fine paddle or PFD. I would never buy a factory "first" if I could save $50 on a "second."

4. Wood-strip (fiberglass/cedar) canoes from professional builders often retail for up to $2,000–a fair price considering the intensive labor involved in building them. However, new home-built canoes from private builders that are nearly as nice can often be purchased for one-fourth this price.

Be aware that wood-strip canoes are easily repairable. The MCA "builder's book" tells how. I can't emphasize enough the real value of a good cedar-strip canoe. Example: Consider two similarly styled, 50-pound canoes–one state-of-the-art Kevlar™, the other cedar/epoxy-fiberglass. The Kevlar canoe costs $1,600. The used stripper costs $400. Both canoes paddle and portage equally well. Neither craft can be abused or stored outdoors. If there's wood trim, there's maintenance. If there's not, there's weight and ugliness. You be the judge as to which is the real bargain.

The verdict

Your passion and pocketbook determine the nature of your choice. Shrewd buyers realize that a bargain canoe now may be a bad investment later. Join a canoe club and read their publications. I recommend the Minnesota Canoe Association on the strength of its monthly magazine. Canoe knowledge helps you temper your dreams and refine your needs.

Call the owners who have advertised boats for sale in canoe club newsletters. It makes no difference whether or not you plan to buy. Seek their advice and trust their judgment. They will be flattered by your call. One phone call may save you hundreds on the purchase of your first canoe.

Warnings: Stay away from specialty canoe auctions unless you absolutely, positively know the value of what you're buying. Auctioned canoes often go for much more than they are worth.

Finally, don't go bonkers over the issue of "strength." Canoes usually die from abrasion, not from being wrapped around mid-stream boulders. Resistance to punctures is important only if you paddle rock-bashing rapids–even then, its value is overrated if your skills are good. As a beginner, you will start at the beginning–easy currents, gentle waves and warm sunshine. Select a craft that brings you joy every time you climb aboard. Leave the "river-beaters" to whitewater crazies and those who will never learn to paddle.

Some years ago, I watched a young couple artfully pilot a new Old Town wood-ribbed canoe through a shallow rapid. There simply wasn't enough water to encourage a clean run. When the pair put ashore, there were dozens of scratches on the green canvas hull.

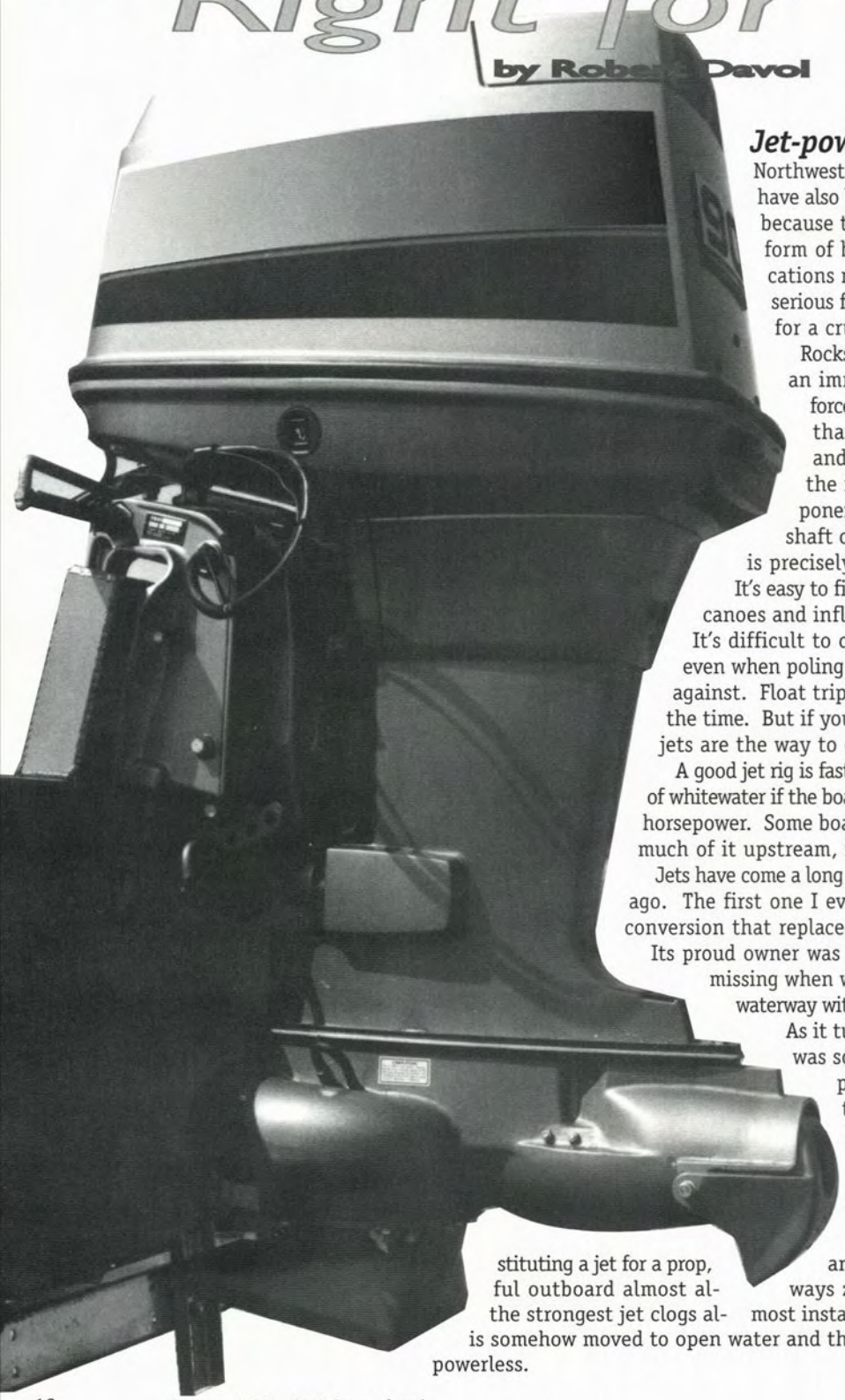
I shook my head and with a concerned smile asked why they didn't just portage the rapid?

"Paddling this canoe brings us joy," replied the woman. "Here's hoping we live long enough to wear it out!"

The message is clear: Your first canoe should make you smile. And so should your last!

Is a JET BOAT Right for You?

by Robert Davol



Jet-powered boats have been popular in the Pacific Northwest for over 30 years. But during the last decade they have also been gathering a following well east of the Rockies because they offer capabilities not matched by any other form of boat propulsion. And that means getting to locations not accessible by other means, whether for some serious fishing, a family picnic far from the crowds, or just for a cruise on a shallow Keystone State waterway.

Rocks and propellers just do not get along at all. When an immovable object is struck by a nearly irresistible force, something has to give. Most rocks are a lot harder than any propeller blade materials available today, and in many cases even if the prop were to survive the impact, most likely some other expensive component in the powertrain would give, such as the prop shaft or gears. But this otherwise hostile environment is precisely where the jet comes into its own.

It's easy to fish or float along very shallow rivers via drift boats, canoes and inflatables, but only in one direction–downstream. It's difficult to cover long upstream distances of shallow water, even when poling a canoe, if there's any significant current to beat against. Float trips are a wonderful way to see a river, if you have the time. But if you have only a few hours to do your boating, then jets are the way to go.

A good jet rig is fast. It even quickly ascends rapids and long stretches of whitewater if the boat is properly designed and the engine has sufficient horsepower. Some boats I've been aboard could cover 50 miles of river, much of it upstream, in little more than an hour.

Jets have come a long way since they were first introduced several decades ago. The first one I ever saw was back in the mid-1960s, an outboard conversion that replaced the lower unit and propeller with a jet pump. Its proud owner was going to show us locals just how much we were missing when we tried to get around in the shallows of a nearby waterway with our "conventional" outboard-powered small boats.

As it turned out, we had the last laugh. That early unit was so innefficient that it required a 100 hp motor to produce less than 55 hp of jet thrust. And even though the horsepower tradeoff would be acceptable in a shallow, rocky river if that were the only way to get around, in an enviroment where the bottom is soft mud and there are lots of rooted aquatic vegetation, the prop rules the roost.

There are several tradeoffs that come with substituting a jet for a prop, and aquatic vegetation is one of them. A powerful outboard almost always zips through the stuff with impunity, but even the strongest jet clogs almost instantly and quickly comes to a halt. Until the boat is somehow moved to open water and the copious green stuff is removed, the jet is now powerless.

photo-Yamaha Outboards

A good jet rig is fast. It even quickly ascends rapids and long stretches of whitewater if the boat is properly designed and the engine has sufficient horsepower.

Jet rigs come in basically two versions–inboard and outboard. The inboard version is rigged more like a stern drive than a "straight" inboard, with the jet nozzle protruding from the transom where the outdrive unit would be for an I/O.

The outboard jet is essentially the same as a prop engine, except a jet pump now replaces the propeller-driven lower unit. Until a few years ago you had to buy a standard outboard and then discard the expensive lower unit and replace it with an equally expensive jet pump made by an independent manufacturer. Nowadays most of the major outboard makers offer jet models built right at the factory.

They range in horsepower from 20 to almost 200, and are much more efficient than their predecessors of 30 years ago. You still can, of course, buy independently made jet pumps and convert many older outboards to jets, if you wish. You lose about 35 percent power when you convert any given outboard from prop to jet.

Inboard jets produce their power in an almost straight line from the intake in the hull to the nozzle at the stern. As a result, their efficiency is virtually as good as a prop. Outboard jet pumps work by picking up the water at the bottom of the unit, and then pumping it around in a complete circle to reach the desired exit velocity at the nozzle. During the process some horsepower is lost to the turbulent "friction" between the water and the walls of this circular channel.

Hull designs for jets

The technology of jet boat hull design for both outboard and inboard has improved to the point of increasing the efficiency quite a bit, as well as significantly improving the overall performance characteristics. One of the most popular outboard hull designs, for instance, incorporates a small, shallow fore-and-aft tunnel to channel the water directly into the jet's intake. This allows even better shallow-water performance, as well as sharply reducing the tendency of the boat to slide in a tight turn.

Aside from the tunnel, the best hulls for jet use are otherwise flat or have only a very slight vee. Most builders I've talked to definitely agree that a deep vee is not suitable for this type of power. On the other hand, the lowly john boat makes a pretty good jet sled if it's not overpowered–as long as you learn to handle its tendency to slide in all but the widest turns.

Aluminum seems to far outstrip all other materials combined as the most popular for both outboard and inboard jetboat use. Inflatables also can be used, although they don't seem to be quite as efficient as a well-designed aluminum hull, probably mostly because of air entrainment under the hull that mixes with water in the jet's intake.

Jets are not efficient unless they are capable of keeping the boat, when fully loaded, easily on plane. As we all know only too well, a hull that is on plane draws much less water than when plowing through the water at displacement speeds. Because the jet unit does not project significantly below the bottom of the boat, it works just fine as long as there's barely enough water for the boat to plane through.

Mechanics

As for their mechanics, jet units aren't complicated. Even the highly efficient three-stage Hamilton (designed and built in New Zealand but installed by many U.S. jet boat manufacturers) really isn't difficult to disassemble. After all, a jet is just one or more "propellers" (actually called *impellers*) in a cylindrical housing. The system works on the same principle as a jet aircraft, using water as the thrust medium instead of air.

The lowest point of a jet unit, either outboard or inboard, is the intake, which when properly installed projects only an inch or so lower than the bottom of the boat. When the rig is on plane, the rear nozzle directs a high-velocity stream of water backward through the air, much like a fire hose. Only the skimming intake grill touches the water. The greater the volume of water and the faster it is propelled out of the nozzle, the higher the horsepower.

Jet boat power's only weakness, like the jet airplane, is reverse. It cannot match the efficiency of a good prop in this mode, although that seldom seems to be a significant problem as long as this shortcoming is understood and taken into account. Actually, reverse is accomplished by a gate that deflects much of the nozzle discharge forward. There is also no true "gear" for neutral. That's just a situation that occurs when the reverse gate is in the right position to deflect the same amount of energy both forward and aft at the same time. An adjustable cable connects the reverse gate to the engine's (or outboard's) regular gearshift lever so that forward-neutral-reverse can be accomplished in the same manner as a prop boat.

Driving a jetboat is quite a bit different from a more conventional prop rig. Except for the shallow tunnel in some models, the hull has no significant keel. The jet unit itself has no "rudder" in the water (the skeg and lower unit of a conventional outboard lower unit or stern serve as a rudder), and must steer by thrust only. This means a certain amount of planning is required when under way. For example, when making a quick turn, it's sometimes necessary to reduce power a little, momentarily, to allow the hull to sink a tad deeper into the water and thus reduce, or possibly even prevent, sliding. It's also necessary to start each turn a little early because of the boat's tendency to slide sideways.

If you buy an outboard with the jet pump already installed, you pay about the same price as a prop model. Inboard jet power is always installed by the boat builder. Outboard jet conversion units unfortunately aren't cheap, usually running from about $700 to $1,500, not including installation. However, with proper operating precautions and routine maintenance, they'll last many years. Inboard jetboat prices are for the most part reasonably comparable to stern drive rigs of similiar design, construction, and engine size.

Choosing the Right Slalom Ski

Contrary to what you might expect, and despite the commercial hype designed to make you think otherwise, the more expensive slalom ski is not necessarily the best one for you.

by Bruce Kistler

There are hundreds of brands and models of slalom skis on the market. How do you pick the one that's best for you? It's foolhardy to buy a ski because you like its racy look or jazzy graphics, or because some champion skier's name is on it. Contrary to what you might expect, and despite the commercial hype designed to make you think otherwise, the more expensive slalom ski is not necessarily the best one for you. Top-of-the-line slalom skis with the heavyweight price tags are designed for serious "short line" tournament use and are too much ski for the average skier. Buying one of these for recreational use is like using an Indy car to commute to work. If your objective is to impress people with expensive equipment, then go ahead and spend a bundle on the super ski. But if you want the best performing ski for the money, read on.

Basic board, family use

If you ski only occasionally and are content to ride leisurely without drastic turns or cuts, you probably want to stick with what might be called a "basic board." These least-expensive skis are usually made of wood or wood-plastic laminates. In an industry that has gone overwhelmingly to manmade materials, quality wood skis are still an extraordinary value and will last a long time if properly cared for. Skis in this category generally have flat bottoms, square edges and wide tails, a combination of features that makes them easy to get up on and stable to ride straight ahead. They are equipped with adjustable binders so that more than one person can use them and consequently are the best choice for family use.

Included in this category are the "slalom" halves of combination pairs. In recent years the major ski companies have begun producing higher-priced fiberglass combination pairs that include more advanced design features such as concave bottoms. These skis bridge the gap between the "basic boards" and the intermediate-level slaloms.

Top-of-the-line models

Before discussing the intermediate slaloms, let's look at the other end of the spectrum–the top-of-the-line tournament models. These exotic machines incorporate the most sophisticated design features with only one limited purpose in mind–to help the skier negotiate the zig-zap slalom course at the highest speed and the shortest line length under tournament conditions. Made strictly for turning sharply and accelerating and decelerating quickly, skis of this type are difficult to get up on and uncomfortable to ride flat, and consequently are of little value to the recreation rider.

The evolution of the tournament-grade slalom ski is interesting. Back in the 1950s, when tournament water ski competition first began to grow significantly, slalom skis were simply standard square-backed skis with double binders. These planks rode high and fast but were impossible to slow down to turn quickly and tended to pop out of the water if forced through the turn.

To solve these problems, skiers mounted bigger keels on their skis. This met with little success. Then they discovered that if the skis were tapered toward the back, they would perform better. A narrower tail allowed the back of the ski to ride deeper in the water in the turn, so it held better. It was also discovered that a moderate level on the bottom edges helped the ski slow down at the buoy and therefore made it easier to turn. Too much bevel, however, made the ski sluggish.

The next innovation may have been discovered by mistake. The story goes that one particular skier's slalom warped in such a fashion that the bottom took on a concave shape. Not wanting to give up his favorite ski, the skier used it anyhow and found to his astonishment that it worked much better than before. For many years the concave bottom design was the standard for tournament skiers everywhere.

Then in the mid-1960s, a West Coast ski builder milled a much deeper but narrower concave in a ski that left a flat running surface on either side for greater acceleration out of the turn. Thus was born the famous tunnel concave that revolutionized slalom ski design, and with continued improvements in the edge bevels, led to an amazing string of new national and world records.

The next advance came in materials. Wood skis had the advantages of being inexpensive the easy to shape, but they were heavy and were not "dimensionally stable." They would warp, split, swell and twist. This quality frustrated the ski makers because even a minor change in a ski's geometry can radically affect its performance. By the end of the decade, however, a number of manufacturers had perfected the technology to produce tournament model fiberglass skis with aluminum honeycomb or polycarbonate reinforced cores. These skis, which were light, fast, durable and maintenance-free, soon dominated the market. Although there was a lag, the quality of the binders eventually also improved.

Bottom configurations have continued to change. While tunnel designs are still

a major factor, manufacturers have returned to a version of the edge-to-edge concave on at least some of their models, and more recently hybrid designs with compound radius curves have appeared that seek to combine the best advantages of both the concave and tunnel concave bottoms.

Another recent milestone has been the introduction of wings, or foils, on the keels. Somewhat resembling the wings of a jet fighter, these protrude from the keel at a critical angle that creates drag and slows the ski down when the skier is coming into the buoy, yet provides no resistance to acceleration when the skier leans back to pull out of the turn. The size and shape of the keels have also received attention. Smaller keels are now the trend in tournament models.

Slalom designers have also added high-tech fibers such as carbon graphite, kevlar, boron and titanium to the fiberglass for added strength and improved dampening–that is, to smooth out the unwanted vibration caused by crossing the wake or skiing in choppy water.

The binders on tournament-grade skis are fixed to the wearer's foot size and have high heel pieces, usually with "double wrap" reinforcing straps that provide extraordinary support for the ankle. Many competition skiers also prefer to mount a heel piece on the rear binder to prevent the back foot from coming out during short-line runs.

Intermediates

So what if you are somewhere in the middle as far as ability is concerned? You're not a seasoned trounament competitor but you do want a ski that lets you turn on a dime and cut aggressively, one that will serve you well if and when you do get to running the slalom course and entering tournaments.

Fortunately, the makers of water skis realize that skiers like you are one of their biggest market segments, and they have produced the widest assortment of skis in this price/performance range.

Almost all of the "intermediates" are made of fiberglass, mostly from foam cores but some with aluminum honeycomb cores. Most have some type of modified concave or tunnel concave bottom that combines high performance with smooth, easy manners. There are longer models and some with extra-wide tails for heavier skiers and those who want an easier-starting ski. Intermediate-grade skis can be purchased with good quality adjustable binders or with fixed binders. High wrap or double wrap binders are not recommended for other than experienced tournament competitors. Unless you are running short-line slalom, do not waste your money on keel wings.

The right size

Regardless of which price/performance category you are looking at, most slalom models come in three or four different lengths. It is critical to get a ski that is the right size for your weight. There is no absolute rule, but generally speaking, if you are 125 pounds or less you should consider a ski in the 64-inch range; 125 to 175 pounds, a ski in the 66-inch range; and over 175 pounds, a ski in the 68-inch range or longer. It is better for recreational skiers to choose a larger ski if they are on the borderline. Check the manufacturer's recommendations on ski size if you settle on a particular model.

There is one sure-fire way to see if a particular model ski suits you, and that is to try one before you buy. If another skier in your area owns one, ask if you can take it for a spin. Specialty water ski shops often have demonstrators for this purpose, but few marine dealers and no discount stores provide such a service. In just a few minutes you will be able to tell if the "ski fits." Keep in mind, however, that a new ski may take some time to get used to , but if the ski feels too awkward, chances are that it doesn't fit your style and you may never get used to it. Try the ski several times if you can.

When shopping for a new slalom ski, be wary of salespeople who may try to "snow" you into purchasing more ski than you need. If, however, you find one who is honest and knows the business, he can be very helpful in making a selection that suits your particular situation.

Examine the ski closely and compare it with others for quality materials and workmanship. Generally, the binders are an excellent gauge of the overall quality of the ski. Look for sturdy binder materials and hardware. Even though you may find a few bargain store skis of dubious quality, it is a credit to the industry that most of the skis produced today are made to high standards. Therefore, the critical factors are finding the right design and the right size.

By matching the ski to your needs and suppressing the urge to buy the "name," you can pick a ski that will seem like a best friend and will provide many hours of skiing enjoyment.

Generally, the binders are an excellent gauge of the overall quality of the ski. Look for sturdy binder materials and hardware.

photo-Tom King

Planning the Canoe Trip OVERNIGHTE

by Cliff Jacobson

In his wonderful book, *Survival of the Bark Canoe*, John McPhee pokes fun at master canoe builder Henri Vaillancourt. McPhee describes Vallaincourt as a talented man who is so consumed with his canoes that he is unable to focus on the mundane chores of preparing for an overnight canoe trip.

Minutes before the event, Henri allegedly dashes about and haphazardly stuffs his pack with whatever he can find. No margarine? Jam will do! Can't find the cooking oil? We'll bake instead of fry!

Repair materials for Henri's precious canoes, however, are another matter. Whatever he needs—which, fortunately, isn't much—is carefully packed away, "just in case."

It's a fact that Henri Vaillancourt has survived every overnight canoe trip he has made. Whether he has "enjoyed" them all is another question!

It takes courage to cancel a canoe trip that has been planned for weeks. Later, when everyone is safe at home, the wisdom of your decision will be openly applauded.

photos-Cliff Jacobson

Admittedly, if the weather is grand and there are no upsetting experiences, camping out along a favorite waterway can be delightful, even if the food is bland and you have no tent. But if things don't go according to plan, the scenario could read much differently!

Many paddlers cling to day tripping, because it is easy. A change of clothes, rain gear and lunch is all you need. These can be assembled at the last minute, Vaillancourt style. If it rains while you're on the river, you can skip lunch and power on to the take-out. If it's nice, you may sunbathe and lollygag along.

Overnighters, however, require substantial preparation. At the very least, you need a tent and sleeping bag and food for several meals. Boiling doesn't remove chemicals from agricultural runoff, so you may have to carry your own drinking water. A gallon (eight pounds) per person per day is probably adequate for all your needs.

If you don't have permission to camp on private land (high ground), you have to set up on a passing sandbar and take your chances with rain and flooding. In either case, an open fire may be difficult because of landowner concerns, the law, or lack of firewood. Better carry a stove. Make it two in case one goes on the blink.

If it rains on your camp, you'll wish you'd brought a tarp. A 10' x 12' model is big enough for four. For larger groups, you may want to bring a second tarp. Carry aluminum poles so you can set up where there are no trees.

Don't forget waterproof packsacks, extra warm clothes, first-aid gear, knife, matches and toiletries. Use a checklist so you don't forget anything. Note that, except for less food and fewer clothes, you need the same gear for an overnighter as for a week-long stay. Rounding up and packing everything will take some time.

Yes, it takes more than a few hours to prepare for an overnighter. But the chore will make you smile. Indeed, many people begin to assemble their outfit weeks before the grand experience—not because they must, but because it's so much fun!

Of course, skills are more important than things, so don't neglect your homework. Read some books on canoe camping so you know how to do things right. You'll earn real respect if you can rig a storm-proof camp and make fire in persistent rain, or serve a delicious meal that is easy to prepare. Here are some

Planning the

Canoe Trip OVERNIGHTER

tricks that will wow your friends and smooth the way to a successful outing.

Prepare for worst-case scenarios

These include cold, persistent rain, a capsize, sweepers (downed trees) in the channel, high, fast water and low, impassable water. Develop a battle plan for each. Here's mine.

Cold, persistent rain: Everyone has a two-piece rain suit. A plastic poncho won't do. Rain gear must be instantly accessible—preferably at the top of a packsack or just under a pack flap. I usually carry an extra rain parka to supplement leaky or forgotten gear.

Capsize: Two changes of clothes from nose to toes is the rule. Each set of clothes is separately packed in doubled plastic bags. Everyone who wears glasses must wear a security strap. Ropes are coiled and secured under loops of shock cord or stuffed into packs. Packs are secured so tightly to thwarts that they can't bob out and catch on debris, or they are left loose in the canoe. Everyone is reminded to kneel in rough water.

Sweepers: Most river obstacles are easily avoided by back-ferrying the canoe. A gentle current and 15 minutes are all you need to teach the technique. I introduce the back-ferry technique within minutes after the start of a canoe trip. Most people eagerly practice the procedure at every opportunity.

High, fast water: Twice over the last decade I've hauled my gear to the river and wonderingly looked at the power of the high, moving water. Then, after considerable thought, I've abandoned my canoeing plans for the day. I suggest you do the same. Don't let an adrenalin junkie talk you into doing something you (and everyone else) knows is dangerous and stupid. It takes courage to cancel a canoe trip that has been planned for weeks. Later, when everyone is safe at home, the wisdom of your decision will be openly applauded.

Low, impassable water: Low water may double your time on the river, so the call may be to cancel the run. Everyone should know the consequences if you decide to go with the meager flow.

River camping tips

Use a plastic groundsheet inside your tent. River camps are often pitched on low sites where rain can swamp your tent. An ancient solution was to dig a shallow trench (gutters) around the tent to drain ground water away. But "ditching" causes serious erosion and loss of soil. It should never be done, even on sandbars where it is legal.

Instead, place a four-mil-thick plastic groundcloth inside your tent. Make the groundsheet large enough so it flows slightly up the sidewalls of the tent. Water that gets into your tent while you sleep will be trapped between the tent floor and plastic, and you'll stay dry. Do not put the ground cloth under the floor, as suggested by some tent makers. Flowing ground water will be pressure-wicked by the weight of your body through worn floor fabric and stitching. You'll really have a sponge party!

Using a groundcloth inside your tent is the best wet-weather advice I can provide.

Fire-making tricks

You need a folding saw, hand-axe (hatchet) and some fire-starters to make fire on a rainy day. You can buy commercial fire-starters or roll tiny logs from newspaper and saturate them with paraffin.

Here's how to make a cheery blaze when the woods are soaking wet.

1. First, erect a shelter. If you don't have a rain tarp, invert a canoe on paddles.

2. Find a two-inch to six-inch diameter log that is not on the ground or in water. Saw the log into 12-inch lengths and haul the pieces back to your shelter.

photo-Dari Black

3. Place each piece upright on a log base and set your axe blade lightly into the end grain. Hold the axe firmly with both hands while a friend pounds the head on through with a heavy log chunk. Note that the hand axe is used as a splitting wedge, not for chopping, so there is no danger of cuts.

4. Continue to split the wood in this manner until you have a supply of dry kindling.

5. Whittle a handful of shavings from the dry heartwood. Set a chemical fire-starter under the shavings and strike your match. The rest is academic.

Storm-proof your tent

Canoe camps are often pitched near the river's edge, in the direct path of high winds. When storms blow up, attach extra lines to wind-stressed areas of your tent. Where possible, tie guy lines to the tent frame instead of unsupported fabric. Sew loops of nylon webbing to the hem and face of the fly and attach storm lines (as needed) to the loops.

Waterproof the seams of your tent

Tent seams should be waterproofed so they don't leak. I prefer Thompson's Water Seal—an industrial-strength compound designed for waterproofing concrete blocks. Every hardware store has it. TWS doesn't crack when cold or get sticky in summer. One coat, applied to seams with a foam varnish brush, does the trick. The product also works great on maps, journals and hats.

Cooking tricks

You're preparing spaghetti for six on a one-burner trail stove. When the water boils you dump in the pasta, turn down the heat, then stir like mad to keep the spaghetti from burning. In 10 minutes the noodles are done and solidly glued to the pot bottom. What to do?

Re-program the scenario to read: When the water boils, dump in the pasta and turn down the stove. Stir vigorously for half a minute until the spaghetti is absorbed into the water; then turn off the stove. Cover the pot immediately and place it on an insulated closed-cell foam pad. Cover the pot with an insulated tea cozy or a warm jacket (not nylon—it melts!). The spaghetti will cook from retained heat in about 15 minutes. No fuss or burned food. You'll conserve stove fuel and free up time to do other chores.

Use the "cozy method" whenever you prepare pasta, hot cereals, soups and stews in cold, windy weather and/or for large groups.

Bear up to bugs

Rivers can be buggy, especially after a rain or when the sun goes down. Repellents are a solution, and so is a smoldering fire that burns your eyes. I dislike the feel of oily repellents, so I usually just daub the chemicals on my clothing—shirt cuffs, pant leg hems, inside hat brim, and a large red handkerchief which I wear around my neck. This keeps most insects away from my face, wrists and ankles.

Frankly, an oblivious attitude is your best defense. Think "bugs don't bother me, bugs don't bother me!" and you won't notice if they do. But mix bad psychology with an ornery disposition and the pesky critters will devour your hide.

When repellents and attitude fail, there is science, and the usual array of protective measures. Topping the list is a compact head net. One which can be wadded to fist size and stuffed into your hat or shirt pocket is best. Clothing should be relatively bug-proof. GI fatigues, chinos and tightly woven nylon river wear defies most punctures.

Surprisingly, the color of your clothes is important. Generally, dark hues attract insects. Tans, grays, greens and powder blues are neutral, but darker shades of blue, black or deep red drive bugs wild. Navy blue—the most popular outdoor color—is the worst of all!

Dangers

Ask people what they fear most about canoe camping and many will answer "bugs and bears." Experienced canoe campers know that the real dangers are lightning storms and white caps, capsizing far from shore in frigid water, high winds, falling trees ("widow-makers"), hypothermia-producing cold, wrecking your canoe in a rapid, and becoming injured while swimming or portaging. There are also burns, cuts, water-borne parasites and eye injuries. These rules can help you avoid the most common dangers:

1. Wear low-top shoes whenever you swim or wade. Many years ago, I bandaged the foot of a 12-year-old girl who had stepped on a broken bottle while wading a canoe through a shallow riffle. Since then, I have required that shoes always be worn while swimming and wading.

2. Absolutely no diving, ever! I once reprimanded some teenagers for diving off a high cliff along a popular canoe route. Their leader advised me to "stay out of their business," so I shut my mouth and paddled on. Later, I learned that one of the boys dived head-first into a rock and was killed. This solitary event suggests that diving of any kind is unsafe on a canoe trip.

3. Don't swim until you have identified a safe escape route to shore. I've watched tired swimmers struggle in the current to obtain a secure foothold on sharp or slippery rocks—another reason to wear shoes while swimming. I sometimes tie a long "exit rope" to a heavy rock or tree to help swimmers climb ashore.

Widow-makers

"Widow-maker" is forestry slang for a wind-downed tree that gets caught in the branches of another tree as it falls to the ground. The first good breeze drops some widow-makers. Others remain hung up for years. Occasionally, you'll find these dangerous snags poised menacingly over a beautiful tent site. I caution you to resist the urge to cut down or remove branches from these trees, or to pitch your tent in the probable path of their fall. Widow-makers are under tremendous tension. If one splits under the pressure of a saw, or comes crashing down on you at night, you may awaken to another world!

Don't let your canoe become a kite

I was napping on a river bank on a testy June day when a sudden squall came up. I always make it a practice to tie my overturned, beached canoe to a tree before I wander off or retire. However, this time I did not follow my own advice.

Suddenly the wind lashed out with uncommon fury and turned my canoe into a kite. The craft sailed overhead, end-for-end, and then dropped into the water about 100 feet from shore. Barefoot and clad in a swim suit, I quickly zipped on my life vest and dived after it. Thank goodness there was a lining rope with which to tow the canoe to shore. I suffered a bruised foot and badly injured pride. I also learned to practice what I preach!

Tying unattended canoes to a tree or boulder is an expedition axiom that every canoeist should embrace. Every season, canoes blow out to sea. And red-faced canoeists swim after them!

Plea for conscience

Space does not permit a thorough treatment of environmental concerns. The very least, every backcountry paddler should embrace the "leave no trace" philosophy: If you bring it in, pack it out! Clean your campsite thoroughly to eliminate all evidence of your presence. Fires should be dead out and all wood burned completely. The ashes should be buried so future travelers won't see the fire place.

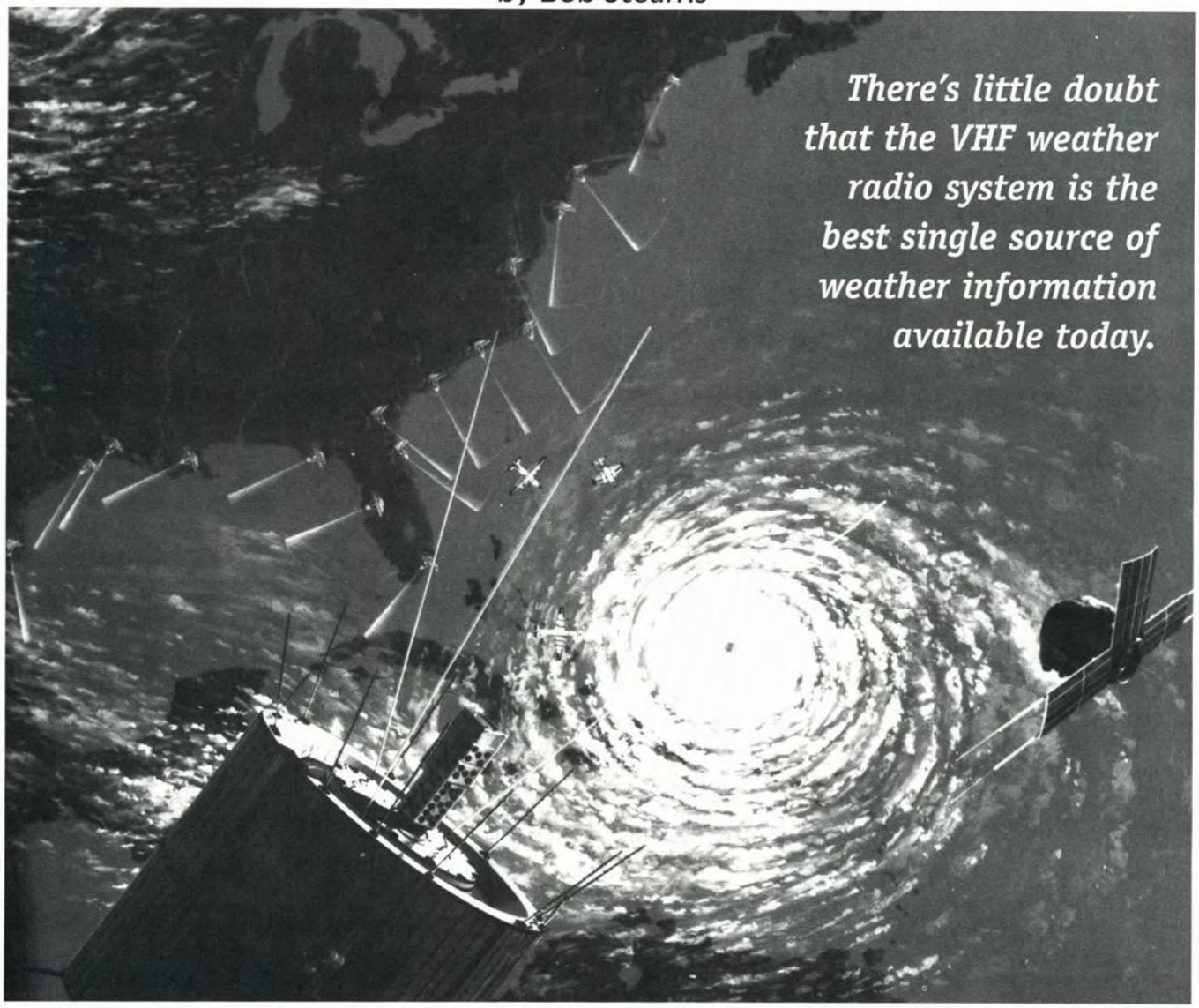
When nature calls, dig a shallow hole, 150 feet from water. When you have finished, burn the toilet paper and douse the ashes with water from a canteen you should carry. Bury the remains under a three-inch cover of soil.

An overnighter blends the beauty of twinkling stars, flickering campfires and warm friendships. It simmers together the joy of paddling with the wonder of an unprogrammed environment that is free from the noise of television and radio. Anyone can pull off a successful overnighter if the weather and river cooperate. However, if things go awry, dangers and inconveniences plague the unskilled and unprepared.

My dad was a quality-control engineer. In his office hung a large sign which read: "Accidents don't happen; they are caused!" Ditto, a successful overnight canoe trip.–*CJ.*

AVOIDING SEVERE WEATHER

by Bob Stearns



Most of us live and work indoors during the week and then flee to the water's edge for the weekend or yearly vacation. Thus, most of us tend to ignore the weather except when on the water, or just before departure. Of course, we always notice when we have to go to work in the rain or snow, and we certainly never forget when a weather forecast goes bust! It's not surprising then that we fail to understand basic weather patterns and cycles that are part of the everyday life of one who makes his living outdoors. In other words, our typical daily routine tends to make us "otherwise" instead of weatherwise.

You certainly don't have to have a degree in meteorology to acquire the habit of always watching the sky for signs that warn of severe weather on the way. Almost all farmers, professional fishing captains and commercial fishermen have developed this instinct without tutoring, and it serves them well.

The point I'm trying to make is that you should not wait until you are actually ready to go boating before trying to "catch up"

photo-NOAA

photo-Bob Stearns

on what the weather is doing. Get in the habit of keeping up with the weather on a day-to-day basis, watching the various weather patterns all around the country that might ultimately affect your intended boating area. Then, by the next trip out, you should have a much better feeling about what is likely to happen. You still make some bum guesses from time to time, no matter how proficient you become, but your batting average will be much higher in the long run. And that will add up to a lot fewer boating days lost each year.

Part of the secret to developing a good weather sense, even if you are tied to a desk in a windowless office throughout the entire work day, is learning the best sources of weather information—and then keeping up with what they have to offer.

NOAA VHF weather radio

Unquestionably the best single source of routinely available weather information is the VHF weather radio. This is a continuous broadcast, 24 hours a day, 365 days a year, on any of three frequencies: 162.4, 162.475, and 162.55 MHz. Because this weather broadcasting system now blankets almost the entire 50 states, especially those areas bordering large waterways, you should be able to receive one or more of these stations almost anywhere.

Weather forecasts for very specific areas are prepared by local National Oceanic and Atmospheric Administration (NOAA) weather offices at no less than six-hour intervals, and updated whenever needed. There's a wealth of information to be had by carefully listening to these broadcasts.

Included is a general synopsis of prevailing weather patterns, which most of us tend to ignore as we wait for the forecast itself. Get in the habit of paying close attention to this synopsis, because these are the patterns that affect the weather in your area. The details of that synopsis can assist you considerably in making your own specific forecast. You don't have to be a professional weather guesser to know that wind makes waves and rough seas. Or that a "tight pressure pattern," either high or low pressure, generates high winds, and a "loose" or "weak" pressure pattern means little or no wind.

Obviously, a slow-moving weather system with a tight, intense or strong pressure pattern means lots of wind that will be around until the system weakens or moves out of the area. And you quickly learn, after a bad experience or two on open water, that knowing in advance about an intense, fast-moving weather system headed your way (and certain to produce severe weather when it arrives) is a sure way to avoid nasty surprises.

Besides the regular forecasts, there's quite a bit of additional information you can glean from the VHF weather radio. Radar summaries can be a great help, because they pinpoint geographically thunderstorms and other dangerous small-scale weather features by providing summaries of location, size, intensity and direction of movement. These summaries are updated as often as needed, and provide a great assistance in dodging or preparing for severe weather.

Hourly weather observations from selected stations are broadcast constantly, providing up-to-the-minute information about wind, temperature and in some situations where the station is near the water, even water temperatures. For example, even if you live only a few miles inland, you still cannot always guess what the wind is like on the water as you step out of your front door. I've seen it dead calm at my house many times (especially early in the morning or late in the afternoon), only to learn from the VHF weather radio that winds along the shore where I had intended to launch my boat were over 20 knots! And the distance between my house and the water is only about five miles.

At other times there's been a discouraging amount of wind blowing where I live, yet I've left home with the confidence that there would not be much wind where I planned to launch, all because of timely information from that same VHF broadcast.

Local severe weather warnings, such as squall lines, strong cold fronts, tornadoes, waterspouts, etc., are also routinely transmitted on VHF, plus major warnings, such as hurricanes, severe storms and gales, along with current locations and forecast movements.

A few years ago an additional feature was added to the NOAA VHF weather radio

AVOIDING SEVERE WEATHER

system. It's called weatheralert, and it's designed to operate as an integral part of those receivers that offer it as a feature. It works this way: The receiver is turned on, but the volume is kept so low that the receiver is silent. When a potentially dangerous weather situation is indicated for your area, such as a tornado, severe squall line, etc., the station transmitting the normal weather broadcast sends out a special signal that triggers a very loud audible alarm in your receiver, regardless of the volume setting. On hearing that alarm, you simply turn up the volume on your receiver and listen to the warning message. Weatheralert is available as a feature of many receivers that sell for under $50.

The advantage of the weatheralert system is that you don't have to listen continuously to the VHF weather radio to be warned about a sudden dangerous weather situation. And you don't have to choose a radio with the weatheralert feature if you don't want it. I've seen just the basic receivers available for well under $15. Regardless of which type of receiver you choose, there's little doubt that the VHF weather radio system is the best single source of weather information available today.

The range of the less expensive receivers is about 40 miles. Some of the better radios, such as the weather channels on regular VHF marine radiotelephones, can up that range to well over 100 miles when coupled with a good antenna. Even the "bargain" handheld receivers with a built-in telescoping antenna can do a surprisingly good job.

Cold front

Everyone takes the warning of an approaching hurricane seriously, but all too often over-eager boaters fail to heed the forecast of a strong approaching cold front with sometimes fatal results. You can bet that anyone with a well-developed weather sense isn't going to take any chances with a swift, intense cold front because he's already been watching it for a day or two and thus has a pretty good idea when it will arrive in his area.

Actually, the front itself isn't the problem. It's the severe weather that a fast, strong front can create. The front merely represents a boundary line between two different air masses. The forward motion of this boundary line creates bad weather, usually in the form of a squall line. As a rule, the faster the front moves, the more intense (and potentially dangerous) the squall line. Cold fronts in particular often travel at forward speeds of 30 to 40 mph, so the accompanying squall line will move just as rapidly. Thus, it's possible to have clear skies and calm winds one hour and a howling gale with slashing sheets of rain the next.

Although I believe that many weather "thumb rules" are acceptable only with liberal doses of salt, the adage "fast coming soon passing, slow coming long passing" certainly is accurate when it comes to frontal squall lines. But remember that a fast coming squall line is usually the most dangerous because of its intensity, even though it won't last long. So don't get caught in open water in a small boat and simply wait for it to be "soon passing." You might not be around after it goes by.

While we're on the subject of weather proverbs, keep in mind that most of them were developed to fit certain conditions in specific geographical areas, and thus don't always work everywhere.

Typical of such proverbs are "red sky in the morning, sailors take warning" and "mare's tails and mackerel scales make tall ships take in their sails." The first refers to the probability of rain (or possibly even a storm) during the day, because of the presence of enough moisture in the atmosphere at sunrise.

The "mares tails and mackerel scales" bit refers to cloud patterns, particularly the family of high altitude clouds called cirrus. The shapes of these sometimes wispy clouds tend to resemble their namesakes, and frequently in northern latitudes they often herald the approach of a cold front from the west or northwest (especially during late fall, winter and early spring).

Visual signs

There are definite visual signs that you can see on a daily basis that can often help you anticipate weather changes within a few hours or perhaps a day, but they don't always mean the same things in all parts of the country. Cloud patterns and wind shifts (changes in direction and/or velocity) frequently offer valid clues, but for them to have real meaning you must learn to understand them as they apply to your area. This is simply another facet in the development of a real "weather sense." What really makes the system work is when you acquire the ability to combine visual signs with knowledge gained from the other sources available, such as VHF weather radio, TV weathercasts and newspaper maps.

Learn to understand typical weather patterns and situations that are unique to your area. For example, years ago I learned that the frequent summertime air mass thunderstorms—these are thunderstorms formed because of rising air heated by a hot underlying surface and are not associated with a front or other moving weather system—are most likely to form in certain specific areas near where I live if conditions are right. So if I wish to plan a late-afternoon trip or an all-day outing that is likely to keep me on the water into the usual thunderstorm period of the afternoon, I try to pick one of those areas where the big black clouds are far less likely to form.

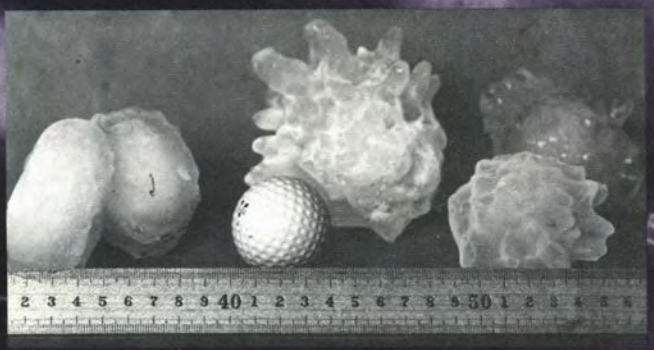
In a nutshell, it boils down to this: Most severe weather systems are easily avoidable if you become "weatherwise." And even if you are caught in bad weather, the more you know about how the beast operates, the better your chances are of getting out of it in one piece. With all of the good weather information that's now continuously available, there's no reason to be "otherwise."

Mechanics of a thunderstorm

The best way to stay out of trouble with dangerous doses of atmospheric electricity is to keep clear of the source. Sometimes that's not possible, and I'll deal with what to do if you're caught in such a situation shortly. But first, a quick course in lightning avoidance.

Air mass thunderstorms are especially dangerous because they are often the most violent of all, as well as difficult to predict in terms of time (when) and space (where). They can form with frightening speed at any time of the day or night during warm weather, even if the weather map is completely void of any significant weather systems in that area.

What makes them even more difficult to deal with is their irregular movement. They may or may not form as squall lines, and they don't have the easily determined direction of motion typical of frontal storms. They may not move at all, or they may move erratically. And they often expand rapidly sideways, catching the unwary completely by surprise.



During daylight it is usually possible to estimate the direction of movement visually, but rarely the direction of expansion. As for speed, most of us tend to underestimate the storm's rate of advance, especially if the day on the water is pleasant. At night the entire event becomes mostly a blur of jagged lightning flashes that offer no help at all in guessing movement and speed.

Your ears can help. Sound travels very close to a fifth of a mile per second, which means that if the bang follows the flash by 15 seconds, it's three miles away. Use this to estimate the distance again at intervals of five or 10 minutes. From that you can get some idea of the storm's rate of advance in your direction. For example, if it's three miles away when you first timed the flash, and then just two miles 10 minutes later, it doesn't take a rocket scientist to estimate it will be overhead in another 20 minutes, and you'd better start doing something right away.

This procedure works just as well in the daytime, too. Just for practice, every so often when you see a flash of lightning, start counting "one thousand and one, one thousand and two..." and so on until you hear the bang. You'll be pleasantly surprised how quickly you can become comfortable with the procedure.

The average thunderstorm cell lasts about 20 to 30 minutes or so. But as one dies out, another in the cloud mass may be forming. It is not uncommon for this phoenix-like rebirth to go on for hours, possibly even all day in some instances. Successfully dodging one doesn't mean you're clear for the rest of the day.

Dangerous cloud-to-ground lightning can take place not only directly under the thunderstorm cloud, but also in the clear air (and often bright sunshine) up to a mile away from the edge of the cloud. In fact, for someone in a small, open boat, the area around the outside edge of the cloud is the most dangerous of all.

Outrunning thunderstorms requires some understanding of their nature. Heading out into open water in an effort to get away from a line of black clouds forming over land and moving seaward could lead to getting caught in violent weather dangerously far from land. Also, don't forget the hurricane force winds that can go with especially strong storms. Often heading sideways (at right angles) to the storm's path of travel is the best bet. And if there is no escape, at least get as close to land as possible (and as close as is safe) before riding it out.

Remember, when you're on the water, even in a canoe, you become the tallest object around. You are now the tree that is the subject of so many electrifying golf jokes. The most prudent action is to get as low in the boat as possible, because lightning is usually attracted to the tallest object in the area. Put all antennas, fishing rods, and other lengthy objects as low as possible (e.g., in a horizontal position), so they don't become lightning rods.

If you can reach shelter, that's the safest action to take. Even a row of low bushes is better than being out in the open. Just stay away from all tall trees and other elevated things in the process of finding a place to hide. Avoid contact with any metallic objects, especially the hull of an aluminum boat, because a dangerous charge of electricity may reach you from a bolt hitting the water close by.

Most important of all, don't wait until the storm is almost on you to start taking evasive action.

hail photo-Bob Stearns; lightning photo-NOAA

What if My Boat is Boarded by a WCO?

by Mike Roush

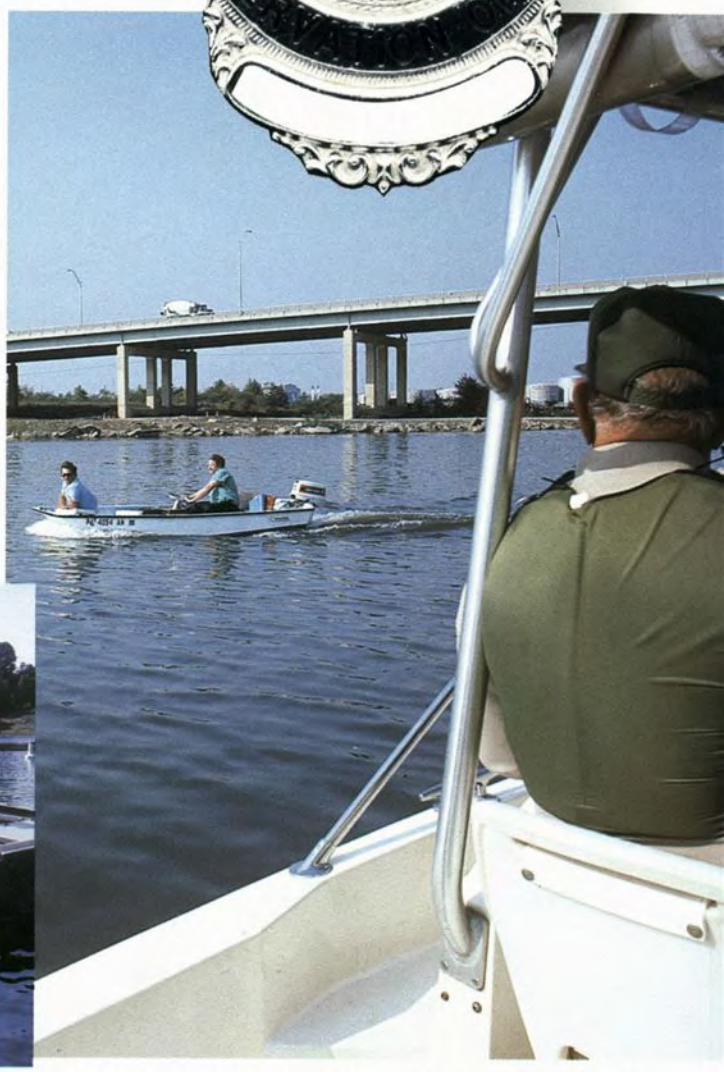
The boating season is in full swing. Any time you take your boat out onto Pennsylvania's waters there is a chance you will be stopped and boarded by a Pennsylvania Fish and Boat Commission Waterways Conservation Officer (WCO). Of all the responsibilities these officers have, boarding and inspecting your boat for compliance with safe boating laws is one of the most important and one that they take very seriously. You should feel better knowing that. Not only does this mean that you may be alerted to a potentially dangerous situation, but other boaters who are boarded will be safer boaters, too.

With that in mind, I want to describe what to expect if you are boarded so that you can understand the importance of this procedure and realize what a beneficial experience it should be.

First of all, a WCO cannot randomly pick your boat out of the crowd and board it. He or she must have a reason to stop you. If your registration numbers are not properly displayed or you do not have a current registration sticker displayed behind your registration numbers, you might be stopped. Perhaps you are operating your boat in an unsafe manner, such as allowing a passenger to ride with his feet hanging over the bow of the boat. Or maybe you forgot to turn on your lights between sunset and sunrise.

PFBC photo

You should realize something at this point. If you want to avoid being stopped and boarded by a WCO, simply know and comply with safe boating laws. It's as easy as that. If you fish from a boat, make sure you have a fishing license. If you operate a boat, make sure you know and obey the rules of the road and safe operating regulations. Despite your best efforts, if you do get boarded, view it as a learning experience and make the most out of it.



Suppose the WCO has stopped you, informed you what the situation is, and begins the boarding. He or she will want to check all the equipment you are required to carry on board your boat. At first this may seem an inconvenience to you, but take a moment to think about it. You are required to take your automobile to a licensed inspection station to have it inspected once a year at a substantial cost in time and money to you. This inspection of your boat takes maybe 15 minutes. All your required safety equipment will be checked, and you will have the chance to ask questions and learn more about your boat in the process–not a bad price to pay for what you receive.

photo-Art Michaels

photo-Dan Martin

Registration

Before the WCO boarded your boat, he or she already checked the registration numbers on your boat for proper display. These letters and numbers must read from left to right, be permanently affixed to the forward half of your boat, in block shapes, and be of contrasting colors to the color of the hull. In other words, don't put dark-blue numbers on a black hull. Keep them simple and readable.

The first thing the WCO will ask to see is your boat registration. You are required to carry this card with you when you are operating the boat. The WCO wants to verify that your registration has not expired. Sometimes boaters receive their new registration cards and stickers but forget to put the stickers on the hull. If the current registration card is carried on the boat, then at least the WCO knows that your registration is current but that you simply forgot to put the stickers on your boat.

PFDs

Next, the WCO will ask to see all the required personal flotation devices (PFDs). The law has changed this year concerning these essential items. If your boat is a Class A vessel (less than 16 feet long) you must carry at least one wearable (Type I, II, III, or V) PFD of the correct size (adult or child) for every person on the boat. If your boat is over 16 feet long, you have to have at least one wearable PFD for every person on the boat and at least one throwable (Type IV) PFD on the boat. Ideally, everyone aboard will be wearing a PFD, but at least make sure the wearables are "readily accessible" and the throwable is "immediately available" as required by the law.

The WCO will judge your compliance with the law by observing where you go to retrieve your required PFDs. If you have to unlock a locker to get to your PFDs, or if they are still in the plastic wrappers they came in when you bought them, they are not "readily accessible." The throwable PFD (most boaters favor the seat cushion type) must be within arm's reach of the operator of the boat to be "immediately available."

Just having PFDs aboard is not enough. All of them must be in "good and seviceable" condition. All the straps must strap and all the zippers must zipper. The Coast Guard approval number must be legible and the flotation and outside material must be in good shape. The WCO will take the time to check every one of your PFDs for compliance.

Although all the safety items on your boat are important, common sense should tell you that PFDs are absolutely essential. If you do not have the required number and type of PFDs on board, or if any of your PFDs fails to pass inspection, you will be asked to return to the dock and you will probably be cited. Warnings are not usually given for this violation because it is too important a safety item to do without.

Fire extinguisher

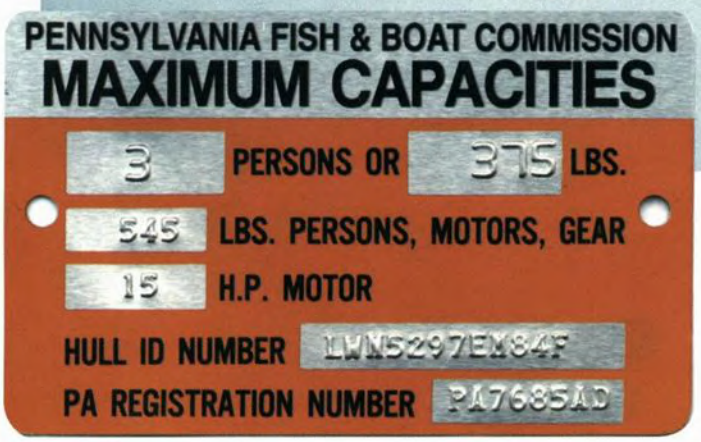
Next, the WCO will ask to see your fire extinguisher. If your boat is powered by a gasoline engine and is of closed construction, you need a fire extinguisher. "Closed construction" simply means that there are closed spaces somewhere on the boat where fuel vapors can collect. Outboard-powered boats of open construction are not required to carry a fire extinguisher but it is highly recommended that at least one is carried anyway.

The WCO will observe where you have the extinguisher in your boat. It, too, must be within arm's reach of the boat operator. In addition, it must be securely mounted in a horizontal position. The fire extinguisher cannot haphazardly roll around

What if My Boat is Boarded by a

WCO?

photos-Dan Martin



Sound-producing device

The next piece of safety equipment that will be checked is your sound-producing device. All boats must carry some means of making a sound signal. A hand-held whistle is fine. Many boaters attach whistles to the zippers or straps of all the PFDs in the bottom of a storage locker or loosely sit on a side shelf. Above all, do not mount it in the engine compartment or next to a fuel tank.

The fire extinguisher must be Coast Guard approved, fully charged, at least a "B" type that will extinguish a flammable liquid fire, and it must be the correct size. Though you are required to carry only a minimum number of extinguishers, always carry a few extra. Anyone who has attempted to extinguish a fire can attest that it is always better to have more extinguishers than not enough when your boat is blazing.

on board. This serves two purposes: They know they will have at least one sound-producing device on the boat at all times, and if someone falls in the water with the PFD, the unfortunate person will have a way to attract attention and be rescued.

If you have only an electric horn on your boat, you will be asked to sound it. This is another good reason to attach plastic hand-held whistles on all of the PFDs. You may have used your electric horn many times previously, but you can bet the one time when you need it to work during the safety inspection, it won't. The hand-held whistles are great back-ups.

Backfire flame arrestor

If you have a boat with an inboard engine, you will be asked to raise your engine cover so that the WCO can inspect your backfire flame arrester. This device sits on top of your engine's carburetor. It helps to prevent an engine backfire from starting a fire in the engine compartment. The WCO will ask you to rub your finger across the arrester's screen. If your finger comes away covered with soot and grime, then it's time to clean the arrester by removing it and scrubbing it with soap, water and an old toothbrush. The backfire flame arrester must have either a Coast Guard, UL, or SAE approval number on it.

Ventilation system hoses

While your engine cover is up, the WCO will check the hoses on your ventilation system. The hose attached to your exhaust blower (if you have a powered ventilation system) must be in good shape and extend to the lower areas of your bilge. You will be asked to turn the blower on to check for proper operation. If your boat has a natural (non-powered) ventilation system, the WCO will make sure the intake and exhaust vents are designed properly and installed correctly to provide adequate ventilation of your boat.

Fire extinguishers, backfire flame arresters and ventilation systems are all required to reduce the risk of fire aboard your boat. A careful inspection of these systems by the WCO will alert you to a potentially dangerous situation if something is not installed correctly or is missing.

If you are stopped and inspected while on Lake Erie, you will be asked to produce visual distress signals (VDS). Lake Erie is the only waterway in Pennsylvania on which you are required to carry visual distress signals, but it is recommended they be carried on all boats. If you need help on the water, these flares or flags may be your only means of attracting attention. If your boat is less than 16 feet long, you must carry night-type flares when operating from sunset to sunrise. Bigger boats must carry both day and night-type flares.

Day-type VDS include orange smoke flares, bright red flares, or a distress flag that is simply a black square and circle on an orange flag. Night-type VDS are the bright red flare type. Flares can be either hand-held or aerial types, but they all must be Coast Guard approved and have a current expiration date stamped on them. If you carry the flare type you must have at least three of them on board.

Running lights

If you are stopped between sunset and sunrise the WCO will want to see your running lights. Because you are required to have them on during the period between sunset and sunrise and during periods of restricted visibility (such as when it is foggy), and assuming you are being stopped at night, you should already have them on.

Remember that in addition to running lights you will need an anchor light if you plan to anchor at night. Be sure this all-around white light is also working.

Marine sanitation device

If you have a marine sanitation device (MSD) on board, the WCO will check it. The MSD must be Coast Guard approved. All waters in Pennsylvania are "no-discharge" waters. Therefore, if your MSD has an overboard discharge valve, it will have to be locked in some manner to ensure that the contents of your MSD cannot be pumped overboard while you are under way. Many marinas are installing pumpout stations for you to empty the contents of your MSD.

Boats are not required to have an MSD on board, but if yours does, take the time to be sure it complies with the law and be sure to dispose of its contents properly.

Exhaust system

If your boat's exhaust sounds exceptionally loud, the WCO will inspect the muffler system. He or she will look for modifications to the exhaust such as cut-outs or straight pipes. Modifications like these are illegal and also produce undesirable noise levels that bother other boaters.

Capacity plate

Finally, if your boat is less than 20 feet long the WCO will check for a capacity plate. This small but important plate is usually provided by the manufacturer and displays important safety information. At a minimum, the plate tells you how much weight in pounds you may carry and how big an engine you may have powering the boat. Other information that may be on the plate includes the maximum number of people that can be safely carried on the boat, and the maximum combined weight of these people.

The capacity plate must be permanently affixed to the boat and located where the operator can see it. Some boats, such as canoes, kayaks, pontoon boats and inflatables, are not required to have a capacity plate. If your boat is required to have one but doesn't, call the Fish and Boat Commission and they will send you an application form for one.

That's it. That is all the equipment you are required by law to carry on your boat. In about 15 minutes the WCO will inspect all of these important items and you will be that much wiser for it.

Unfortunately, if you are missing one or more of these things you may be cited. The WCO will do one of several things. He or she will give you a warning or a citation. You have the choice of paying the fine on the spot, mailing it in, or fighting the citation. The choice is yours. Whatever the outcome, however, you should consider the consequences of what might have happened to you or the people on your boat had something happened that required the use of one of these safety items. Better to find out now and take steps to prevent a catastrophe than wait for after the fact.

If any of this information is new to you, you should take the Pennsylvania Fish and Boat Commission's Basic Boating course. This course will enable you to safely and confidently enjoy your boating recreation.

Mike Roush is the Commission Eastern Area Boating Program Specialist.

Dan Martin Wins National Water Safety Congress Award

Commission Boating Safety Education Specialist Dan Martin won the National Water Safety Congress Award of Merit for his outstanding contribution to water safety.

Dan Martin

One of Martin's primary Commission functions is to act as the Commission's liaison with the Coast Guard Auxiliary and the U. S. Power Squadrons. His outgoing personality and ability to understand the operational intricacies of these organizations have enabled Pennsylvania's collaboration to be foremost in the nation. Through Dan's leadership, the Pennsylvania Auxiliary partnership has become the model for the nation. These groups conduct dozens of boating safety classes each year certifying thousands of students who receive boating safety certification from the Commission. Dan creates instructor outlines and teaches in a variety of situations. He ensures that all material is up to date and accurate.

Dan also serves as the Boating Accident Review Officer for Pennsylvania. When assigned to this position, he worked with the Bureau of Law Enforcement to revise all the forms and procedures used to prepare an accident investigation. After an accident report is received, Dan analyzes the data and prepares detailed reports. These reports are used by law enforcement personnel, educators and regulators to devise methods of decreasing the number of individuals injured or killed in boating accidents. Through Dan's efforts, Pennsylvania has a means to track the trends in boating accidents. Pennsylvania has a very thorough knowledge of its accidents as a direct result of Dan's efforts.

The creation of training plans is another of Dan's strong points. He has been directly responsible for the creation and presentation of many professional training programs. He is a primary instructor for the Commission's Employee Boating Safety Training Program and has presented many courses to other state agency personnel with the goal of improving boating safety.

Dan coordinates the Commission's boating publications program. He writes brochures, news releases and other publications in a form that is easily understood by the public. He strongly influenced the development of the very successful *Boater's Handbook*.

The award was made in May during the National Water Safety Congress annual meeting in Florida.

Make a Free Phone Call for a Free Sailing Lesson

The National Sailing Industry Association calls it "Discover Sailing." It's a national program designed for everyone who has ever wondered how it feels to breeze through the water in a modern sailboat but who has never been farther from shore than the end of a dock. It all begins with a free phone call to 1-800-535-SAIL.

When the call is made and the operator gets specifics about where the caller lives or plans to vacation, the caller is sent a list of participating sailing schools or dealers. A date and time can be established and another fledgling sailor can get a hands-on taste of what they ve been missing.

The sailboat ride (with a professional skipper at the helm), like the telephone call, is free and best of all, there are no strings attached–no sales pitches. There s nothing but the cool, clean sound and feel of wind and water.

Carey Named Officer of the Year

The Fish and Boat Commission has named Waterways Conservation Officer (WCO) William C. Carey its 1994 "Officer of the Year." Carey, a seven-year Commission veteran, received the honor at the recent Northeast Fish and Wildlife Conference.

Carey's district contains portions of four counties, including sections of Pike, Wayne, Lackawanna and Monroe counties. He is responsible for patrolling Lake Wallenpaupack as well as nine approved trout waters, numerous wild trout streams, and three state park lakes. Because of the diverse nature of the district and the numerous recreational opportunities it offers, there is no so-called "slow season."

Bureau of Law Enforcement Director Edward W. Manhart praised the award winner's exceptional attitude and approach to his multi-faceted duties. "Bill Carey's efforts go above and beyond the normal call of duty," Manhart said. "Carey diligently serves the best interests of the angling and boating public."

Carey is no stranger to awards. He was nominated twice before for the "Officer of the Year" award. Recognized earlier for his volunteer work with the Pennsylvania Game Commission, he was named the Game Commission's Deputy Game Protector of the Year in 1984.–*Dan Tredinnick.*

Ford New Agency Planner

The Fish and Boat Commission recently named Thomas P. Ford as the agency's new resource planning coordinator. Ford is responsible for overseeing the Commission's strategic planning process and assisting in developing the agency's resource-based programs. He is a graduate of Carnegie-Mellon University, holding a bachelor's degree in industrial management and a master's degree in public management and policy.

Immediately before joining the Fish and Boat Commission, Ford was employed by the Pennsylvania Department of Environmental Resources (DER) as an Environmental Policy Specialist. As a participant in the Office of Administration's Pennsylvania Management Intern Program before joining DER, Ford had also worked with the Pennsylvania Game Commission, Department of Transportation, Office of Administration and the Department of Agriculture.

Faces Changing in Commission's Law Enforcement Bureau

Some familiar faces are missing along our streams in 1995 because a dozen Pennsylvania Fish and Boat Commission Waterways Conservation Officers (WCOs) have retired.

The 12 include 10 field officers, a regional supervisor and an assistant to the director. The retirees leave with 342 years of combined experience, averaging 28.5 years apiece with the Commission. Lycoming County WCO James H. Lauer leads the group with an amazing 41 years of employment with the agency. Lauer began as a fish culturist in 1953 before his appointment in 1966 as Lycoming County WCO. He has served there for the last 28 years.

Other retiring WCOs include:

H. Porter Duvall, 29 years of service. York County, 1965-1969; Jefferson County, 1970-1994.

Stanley G. Hastings, 30 years of service. Cameron County 1964-1994.

Jay Johnston, 27 years of service. Bucks County, 1967-1978; Clinton County 1978-1994.

Robert Kish, 20 years of service. Cambria County, 1974-1994.

E. William Mantzell, 27 years of service. Washington County, 1967-1975; Lycoming County, 1976-1994.

Richard R. Roberts, 30 years of service. Susquehanna County, 1964-1994.

Eugene Scobel, 28 years of service. Butler County, 1966-1994.

John W. Weaver, 27 years of service. Northampton County, 1967-1975; Columbia County, 1975-1994.

Ammon F. Ziegenfus, 27 years of service. Berks County, 1967-1994.

Also retiring are Southwest Region Supervisor Thomas F. Qualters, Sr., and James R. Smith, Assistant to the Bureau Director. Qualters takes with him 30 years of law enforcement experience. He started his career as a district officer in Cambria County during 1964. In 1966 he was named assistant regional supervisor in the Southwest. He assumed the regional manager position in 1972.

Smith started in Allegheny County in 1968. He moved to Armstrong County in 1975 where he remained for 10 years. He finished his career as an assistant to the bureau director, where his primary duties involved overseeing the law enforcement training programs.

Bureau of Law Enforcement Director Edward W. Manhart praised the retirees, noting they take with them a wealth of experience. "Many of the successes the Fish and Boat Commission has experienced over the past three decades can be credited to these and other fine WCOs, particularly in areas such as pollution control and law enforcement technique. We can all take pride in knowing their untiring efforts have enabled millions of Pennsylvanians to enjoy superior fishing and boating opportunities," said Manhart.

Manhart has also announced replacements for the two vacant administrative posts and the Southwest Region positions. Smith's post was filled by Jeff Bridi. Bridi, who holds a bachelor's degree in biology and a master's degree in ecology, began his law enforcement career with the Commission in 1988. After his initial assignment in Montgomery/Berks County, Bridi moved to northern Luzerne County in 1992.

Qualters was replaced by long-time Southwest Region Assistant Supervisor Anthony B. Murawski. Murawski served as WCO for Cambria County from 1967 to 1974. He was named the Southwest Assistant Supervisor in 1974. Replacing Murawski as Southwest Region's Assistant Supervisor is Emil T. Svetahor. Svetahor was the E. Armstrong/Indiana counties WCO since 1984.

WCOs move to new districts

In addition to these changes, 10 Fish and Boat Commission WCOs have been assigned new districts. The new assignments were prompted by recent WCO retirements.

New assignments include: Berks Co.: John V. Sabaitis; Cambria Co.: Christopher D. McDevitt; Clinton Co.: Robert F. Mader; Columbia/Montour/E. Northumberland Cos.: Mark T. Pisko; E. Crawford Co.: Terry J. Crecraft; N. Luzerne Co.: James C. Stout; Indiana/E. Armstrong Cos.: George J. Kavish; Jefferson Co.: Richard M. Valazak; Lycoming Co.: Lawrence. P. Dvorshock; and Susquehanna Co.: Bryan C. Bendock.

Boating Participation Grows: Sports Survey

Adding up boating-related category figures in the National Sporting Goods Association's (NSGA) 1994 Sports Participation Survey shows widespread gains. Certain sectors were clear outperformers including canoeing, which grew by 31 percent to 8.5 million participants. Powerboating increased 28 percent, bringing total participants to 26.4 million, while sailing enjoyed an 8 percent gain for a total of 4.1 million participants. Mix in 7.4 million water skiers, 0.7 million windsurfers, a high percentage of total fishing participants (45.7 million) and a fair number of snorkelers (5.9 million), and it s easy to see how the National Marine Manufacturers Association estimates that 76 million people participated in boating last year.

Canoeing and powerboating (which ranks tenth in the NSGA's top 10 most popular sports activities in '94) were also in the top 10 category of participant growth last year, with gains of 31 and 27.6 percent, respectively.

Boating activities were among several outdoor categories showing significant growth in 1994 after suffering bad weather patterns the past two years, according to Thomas B. Doyle, NSGA Director of Information & Research. "In the last couple of years, canoeing dropped down quite a bit below its historical levels, from 7.5 million to 6.5 million participants. But with last year, we saw a big bounce back with 8.5 million participants."

Sailing followed a similar trend, dropping to its lowest level of participants in 1992 from a peak of 6.7 million in 1988. "But now people are buying boats again," Doyle says, "and they re vacationing more."

Some types of boating-related activities experienced lower participation levels for 1994. "Fishing was down for 1994, but the numbers were abnormally high for 1993, so participation levels still remain on par with historical averages of a five-year period," Doyle says. Shifting age demographics may have contributed to water skiing s 8.5 percent decline in '94, he suggested. "The fastest growing segment of the population is 45 and older, but most water skiers are age 12 to 34, so there could be a revival of water skiing as the 7 to 11 age group matures. Or personal watercraft may be cutting into water skiing the same way that roller hockey has cut into baseball."

Outboard Maintenance TIPS

by Walt Stearns

AS FOR OUTBOARD OILS, BY ALL MEANS USE THE TC-W3 OILS, EVEN IN OLDER OUTBOARDS. THE PROBLEM TODAY IS THAT CURRENT GASOLINES CONTAIN ELEMENTS THAT LEAVE A LOT OF CARBON BEHIND IN 2-CYCLE ENGINES.

Although outboard engines are designed to take a beating in both freshwater and saltwater, as a rule they still require more attention than an inboard or stern drive, particularly when exposed to the watery environment. Given a little TLC in the form of reasonable care and preventive maintenance, an outboard is good for more than 1,000 to 1,500 hours of cruising before replacement or major overhaul.

External components

Until the last few years, all the paints used on outboards were similiar to those on most automotives. This is still generally true of engines not designed specifically for water use. But any finish is subject to chipping, scratching or blistering after exposure to the harmful effects of both sun and water. Even brackish or polluted freshwater can have a detrimental effect on your engine's finish. Ditto some atmospheric pollutants.

A soap-and-water washdown after each trip is your first line of defense. This should include the engine's outer cover, bracket and lower unit. You can spray soapy water over the engine with any simple, inexpensive hose attachment like the lawn sprayer kind found in almost any hardware store. Inexpensive liquid dishwashing detergent is perfect for the job. Then rinse with a spray nozzle.

Flushing the cooling system after each use is always a good idea, but it's absolutely essential before off-season storage.

If your outboard is mounted on a transom bracket, it'll get splashed more than if hung directly on the transom. Regardless, if you boat in the Delaware's brackish water, it is always worth the few minutes needed to pull the covers and check for salt buildup after a trip. If you find any, rinse the powerhead carefully with water after the engine has cooled, and then spray everything with a moisture displacing lubricant like CRC, WD-40, Corrosion Block or Corrosion X. Otherwise, be prepared sooner or later to face some big repair bills.

And while you have that spray can in hand, hit any bolts, cable linkages and other external moving parts that might be subject to rust or corrosion.

Oil and injection systems

That oil injection reservoir might be out of sight, but it had better not be out of mind. Beside checking to ensure there's enough oil for the next outing, you also want to make sure that it is not in a location where water can accumulate. If water gets inside the oil reservoir, it goes right to the bottom where it most likely will be picked up and sent to the engine. Water makes a lousy lubricant and will cause powerhead failure in a matter of minutes.

A poorly maintained or contaminated oil system will lead to problems such as scuffing of the cylinder walls, enough to reduce compression. Lower compression causes a reduction in top-end performance from the motor. A typical warning sign might start with the engine beginning to run rough at idle speeds, or not reaching normal full throttle rpms.

As for outboard oils, by all means use the TC-W3 oils, even in older outboards. The problem today is that current gasolines contain elements that leave a lot of carbon behind in 2-cycle engines. Carbon buildup under the piston rings forces them outward against the cylinder walls, and eventually there goes the powerhead. Only TC-W3 oils have carbon buildup inhibitors. Many new engines now require TC-W3. Check with your dealer if you have an older engine. You may need to use a carbon eliminator first.

Mixing different grades of oils is also unwise. Try to stay with one type of oil, because switching back and forth between high-grade and low-grade oils can cause damage in the form of excess engine wear from the incompatability of the different grades. Furthermore, lower grades will not do the job as efficiently in the first place. In no case should any oil that does not meet the engine manufacturer's specifications ever be used.

Regular service

Most manufacturers require a 20-hour service check on a new engine. They also recommend routine service every 100 hours or so of operation at cruising speed. But how do you know when you've put that much time on your kicker?

Small-engine owners can estimate with reasonable accuracy, based on the average number of running hours per day multiplied by the number of days of use. If you have a larger, more expensive engine, invest $50 or so in an hour meter. You'll get that investment back many times over the years.

How about trolling vs. cruising? If you do a lot of trolling, figure every two hours at that speed are equivalent to one hour at cruising.

Like anything else, parts do wear out and need to be replaced when they show signs of excessive wear or corrosion. This is even more important when considering that these parts might be the water-tight seals in your lower unit. The lower unit of

an outboard, much like the transmission in an automobile, consists of a drive shaft and several gears encased in a metal housing. To protect the parts inside from the damaging effects of moisture, the lower unit incorporates a series of very tight seals to keep water out and the unit's lubricating oil in. If they become worn to the point that water begins to leak in and the problem goes undetected too long, repairs can be very expensive. The gears rapidly become corroded or crystalized, and typically everything in the lower unit has to be replaced.

Lower unit

Damaged skegs and props: Skeg damage can result not only in a loss of steering ability, but also sharply reduced impact protection for the prop and/or the prop shaft if you hit something even moderately unyielding. A thick piece of wood, for instance.

Regardless of how the prop is damaged, anything from chipped to bent blades will cause accelerated engine wear if left uncorrected. It takes only one damaged blade to put the whole prop out of balance, which means higher than normal vibration. This rapidly wears engine bearings, seals and gears.

Discarded plastic bags and monofilament fishing line pose a special threat to lower units. Plastic bags and other trash, including aquatic vegetation, can instantly shut off cooling water. The overheating that quickly follows can seriously damage the powerhead. If the problem is detected in time (before the engine seizes), disaster may be averted by immediately slowing and going right into reverse to clear the intake blockage.

If the flow of cooling water is restored by this maneuver, do not shut the engine off, or it will overheat rapidly and serious damage is possible. Your best bet is to shift into forward gear and proceed at a fast idle until everything cools down to normal.

Monofilament fishing line can be extremely dangerous to the seals if it gets wrapped around the prop shaft, where it fuses into a hard-plastic ring with sharp edges that can cut the seals like a razor. Take a minute or two periodically to remove the prop and check for mono line, and at the same time regrease the shaft very lightly, if needed. Too much grease can work its way into the prop's rubber hub, so be careful not to overdo the greasing.

Constant corrosion protection is essential if the engine is used in salty or brackish water. Nowadays almost all outboards come with sacrificial anodes built in. Your owner's manual will show you the anode's location. Replace any sacrificial anodes (e.g., "zincs") as soon as they become half eaten away by corrosion. If there aren't any anodes and you use the boat in salty or brackish water even part-time, by all means add one or two in critical places. Your boat dealer can help you with this.

Instrumentation

Last, but not least, consider instrumentation. If you have an engine of 50 hp or more, most likely you at least have a tachometer (if not, add one). A voltmeter to monitor your battery's condition (and whether or not the alternator is working) is a good idea. Any other gauges are a matter of personal requirement.

The tach is especially critical, because it can warn you before you spend a lot of hours with engine revs so high that powerhead wear goes out of sight and something bad happens. It can also tell if you have the right prop. And if you'll throttle up to max rpms for a minute or two each time you're on the water, a loss of top-end revs could warn of an impending problem.

None of these suggestions takes much time. But the few minutes thus invested could save you many lost hours or days on the water later on. And by all means take a few minutes for a quick review of the owner's manual. If you're still uncertain about what type TLC is best for your outboard, ask for pointers and tips from any competent outboard technician. After all, asking is free. Paying for unnecessary repairs–that's going to cost.

photo-Walt Stearns

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