

# BOAT

*Pennsylvania*

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# Viewpoint

## The New PFD Rules



**John Simmons**  
Director  
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Pennsylvania Fish & Boat Commission

In the previous issue, you read an article by Magazines and Publications Section Chief Art Michaels explaining some recent changes in personal flotation device regulations. He also gave 10 important tips to follow in choosing the right PFD. I hope you enjoyed his article and put his suggestions to good work.

Choosing the right PFD is very important. It could be the most important piece of equipment that you ever buy for your boat. PFDs used to be called "life jackets" and "lifesaving devices." And for good reason. A good PFD worn at the right time has saved many lives. We know how many have died in boating accidents, but we do not know how many lives may have been saved as a result of proper use of PFDs. From stories I've heard, the number could be quite large.

Art told you about a recent change in the federal regulation concerning the use of the traditional Type IV PFD. After May 1, 1995, this type of PFD will no longer be acceptable as a primary lifesaving device. After that date, all boats will have to carry wearable devices.

This classification of PFD is known to most of us as the seat cushion. Over the years since its approval it has served small-boat owners well. It has kept our bottoms warm, dry and comfortable. It has been ready for use when needed and has most likely saved a few lives in its time. But there are drawbacks to the cushion. First, it is not always available in an unexpected fall from the boat. The cushion stays in the boat while the operator floats down the lake. The device often does not provide a sufficient amount of flotation for larger individuals. Some people, especially in cold water, could not hold on to the devices long enough for help to arrive. After several seasons of use, it is often squashed, torn and not functional, leading to unwanted citations for unserviceable PFDs. What is most important, they could not be worn even when the boater knew the conditions were bad enough that a wearable device would have made sense and would have made him feel much more safe and secure.

It was only after much debate over the merits of a readily available throwable device versus the benefits of having all boats equipped with wearable devices that the Coast Guard adopted these new regulations. In Pennsylvania, most boating deaths occur in boats less than 16 feet in length.

Even though there is no absolute way to know, we think that many of these tragic deaths could have been averted had the operator had the choice of putting on a Type III wearable device. The new regulation should result in fewer of these types of deaths.

There are other reasons for our support of the new regulations. In recent years, we have been faced with increasing calls for stricter regulations concerning the wearing of PFDs. The Corps of Engineers in the Pittsburgh District issued a decree that all persons on board boats less than 16 feet wear a PFD at all times. We believe that this is unduly restrictive. There are times during the hot summer months when wearing a PFD would be unbearable. We agree that all boaters should wear a PFD when the weather and water conditions warrant such use. We also believe that there are circumstances in which a requirement to wear a PFD is not necessary or at least should not be mandated by government. The new requirement that boats carry a wearable device for each person on board should encourage boaters to wear a PFD when needed and thus lessen the call for more restrictive requirements. Common sense should apply and if given the option to wear or not to wear, we believe that boaters will choose to wear.

The Coast Guard is also moving ahead with a rulemaking project that will, for the first time, approve the use of fully inflatable PFDs. These PFDs will be very low-profile. The types I have seen so far are made in the form of suspenders and pouches worn on the waist. Both types, when inflated, look and work like a Type II horseshollar. They are very effective but are not at all uncomfortable when stowed. Other devices in development look like windbreakers and thus serve two purposes. The Coast Guard hopes to have final rulemaking completed by year's end. The first approved devices should be on the market in early 1995. Look for more information on inflatable PFDs in future issues of *Boat PA*.

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**The covers**

This issue's front and back covers were photographed by Tom King. As the new boating season begins, it's time to rip the cover off the runabout, wave the spider webs off the boating gear, hook up the trailer and hightail it to the water. Well, not exactly... To help you get your runabout ready efficiently and safely, check out the information beginning on page 20. Powerboat owners will also need to know the details in the article on security, on page 30, and do brush up on identifying aids to navigation, on page 23. If paddling is your sport, find out the best central Pennsylvania places starting on page 4, and read up on what's new on page 24. If you're a water skier, please turn to page 14, and pontoon boat enthusiasts will want to scan the vital information on page 13. Lastly, read up on the sport of sculling, beginning on page 8.



# Day-Tripping in Central PA

by Heidi Milbrand

## Day Trips in Central PA

1. West Branch Susquehanna
2. Pine Creek
3. Moshannon Creek
4. Juniata River
5. Main Stem Susquehanna
6. Penns Creek
7. Towanda Creek
8. Loyalsock Creek
9. Bald Eagle Creek

As you sit in your easy chair with your feet by the fire and a football game on the tube, you find yourself thinking about springtime and canoeing. Canoeing? Yes, canoeing. This is the time of the year to start thinking about where to go—maybe a new stream you've crossed over several times or maybe the same one, just a different section.

Just about anywhere in Pennsylvania you can find water—streams, rivers, creeks and lakes. Pennsylvania has over 200,000 acres of flat water and over 45,000 miles of moving water. It also has some of the finest whitewater rivers in the east. The Lehigh and the Youghiogheny rivers are two of the most popular. Besides whitewater, Pennsylvania has lakes that offer quiet coves and tranquil scenes. It has babbling brooks and spring-fed streams that have an abundance of wildlife and some of the finest fishing you have ever seen.

And what a better way to get to it all—or away from it all—than canoeing. Pennsylvania is recognized as having some of the most beautiful wilderness areas in the nation. And canoeing remains one of the

best and most popular methods of exploring the wilderness. In addition to the breath-taking scenery and wildlife visible on the shore, there are many other marvelous things to be seen in Pennsylvania by canoe. Many of the waterway locations lie near other noteworthy cultural, historical and big-city sights.

If you've never gone canoeing before or you are looking for a new stream to paddle, let the following serve as a guide. Focusing on trips not more than a day in length and recommended for the novice paddler to the experienced, this information tells you where to go, access points, approximate time for trip, trip description and hazards/water conditions.

### West Branch Susquehanna River

Looking at a map of Pennsylvania, you can see that the West Branch is almost a perfectly centered arc within easy reach of just about everybody. Its 230 miles offer an outstanding canoeing river that flows through forests, mountains and fields, and offers paddlers solitude, the beauty of the land and peace of mind.

**1. Frenchville Station to Karthaus—**17 miles; Class I,II water; scenery, excellent. Put in at the highway bridge in Frenchville Station. The river continues through a deep canyon as rapids become more numerous. Moshannon Falls begins opposite the Karthaus railroad tunnel, located on the left river bank. This is the most difficult set of rapids on the West Branch, but still only Class I. Enter Moshannon Falls on the left side and then paddle to the center of the river. Paddlers may leave the river on the right side just before the State Route 879 bridge at Karthaus. Canoe access is provided by the PA Bureau of Forestry.



The Juniata is the perfect river to kick back on, soak up some rays and forget about the civilized world. Pack your guitar and shades, and take your dog.



photo-Dan Martin

**2. Karthaus to Renovo**—30 miles; Class I water; scenery, excellent. This section can be done in two days, with excellent camping spots available. Put in at the State Route 879 bridge. The stretch from Karthaus to Keating is the most isolated on the West Branch. The right side is primarily public forest land in the Sprout State Forest and state game lands. A railroad does follow the canyon but is lightly traveled. Some camps appear, but they are few and far between. There are a few mining scars visible and tornados ripped through here in 1985 and signs of the damage are still present. Take out at the State Route 144 bridge.

## Pine Creek

This waterway carved out Pennsylvania's "Grand Canyon" and is probably one of the most popular streams in the state. This creek is gentle and forgiving, with a spot or two on it that will need some knowledge and maneuvering on your part. Scenery along this stream is rugged and unspoiled. Canoeing facilities along Pine Creek have been developed and are maintained by the PA Bureau of Forestry.

**1. Blackwell to Slate Run**—11 miles; Class I,II water; scenery, excellent. Put in at the Blackwell Access area located along Route 414 just south of the Pine Creek bridge in Blackwell. The creek flows through steep, gorge-like places although not as undeveloped as northern sections of Pine Creek. Route 414 parallels the creek most of the way. Take out at Slate

Run Access area on the left side of the creek just north of the Slate Run bridge.

**2. Slate Run to Waterville**—17 miles; Class I,II water; scenery, good. The put-in is the same as the take-out in the previous section. The creek flows through steep-sided valleys with cabins, cottages and full-time residences dotting the shorelines. The village of Cammal is approximately the halfway point on this stretch with a historic bridge crossing the creek. Take out at the junction of Little Pine Creek on the left at Waterville, but be aware of possessive landowners.

**3. Waterville to Torbert**—9 miles; Class I,II water; scenery, good. The put-in is the same as the take-out in the previous section. The high mountains start to recede, giving way to wide floodplains and finally breaking out into a wide valley at Torbert. Take out at the Torbert Access area located two miles north of Route 22 or Route 44, or you can paddle down to the confluence with the West Branch of the Susquehanna and take out at Jersey Shore.

## Moshannon Creek

Commonly known as the "Red Mo," this stream delights a wide range of paddlers with smooth water, nice scenery and novice to intermediate whitewater. It is conveniently located in the center of the state. It is a wilderness stream with an acid-iron pollution problem from abandoned coal mines, which has turned the streambed reddish-yellow.

**1. Osceola Mills to Munson**—16 miles; Class I water; scenery, good. Put in at the bridge between routes 970 and 53. The Red Mo wanders on a plateau before it cuts into canyons and creates some small, easy rapids. The creek is smooth, deep and swift. Before Phillipsburg, the stream loses itself in an almost swamp-like forest. Then the mountains start to rise and the only eyesores are a railroad, a few strip mines and buildings. Take out at the township road 864 bridge.

**2. Munson to Peale**—13 miles; Class I,II water; scenery, good. The put-in is the same as the take-out in the previous section. Below Munson, a gorge forms and except for an occasional strip mine, the gorge is wild. Riffles become more frequent. As the miles continue, the gradient increases. Smooth but fast-flowing sections are mixed with relatively easy rapids. Take out at the Peale bridge on a small dirt road between Grassflat and Moshannon.

## Juniata River

The Juniata has over 100 miles on which to canoe. It is a slow-moving river that provides beautiful touring opportunities for the novice. It is easily accessible from Routes 22/322 and is free of just about anything—fences, strainers, big rapids. Boulders, shoals and eel traps can be a nuisance during low water. It also offers year-round canoeing. The Juniata is the perfect river to kick back on, soak up some rays and forget about the civi-

lized world. Pack your guitar and shades, and take your dog.

**1. Raystown Branch to Mapleton**—10.5 miles; Class I water; scenery, good. Put in at the U.S. Army Corps of Engineers Raystown Branch Access located just below Raystown Dam. The river flows through mountains in a twisting, lazy way. Riffles lie far apart. You can take out at the Route 655 bridge in Mapleton.

**2. Mapleton to Newton-Hamilton**—12 miles; Class I water; scenery, good. Put in at the 655 bridge and take out at the Fish and Boat Commission access at Newton-Hamilton.

**3. Newton-Hamilton to Lewistown**—22 miles; Class I water; scenery, good. Put in at the Fish and Boat Commission access at Newton-Hamilton, take out at the Victory Park access on the left, just before the Route 103 bridge, east of Lewistown. This section can be broken into two sections, ending the first section and starting the second section at McVeytown.

**4. Lewistown to Mifflintown**—10 miles; Class I water; scenery, good. The put-in is the same as the take-out in the previous section. This section takes you away from 322/22 and lets you drift through rolling mountains. Take note—about one mile downstream from the Victory Park access is a section of fast-moving riffles when the water is high. If not prepared for this section, you could be going for a swim. Take out at the Fish and Boat Commission access at Mifflintown.

**5. Mifflintown to Thompsettown**—10 miles; Class I water; scenery, good. The put-in is the same as the take-out in the previous section. Take out at Thompsettown.

**6. Thompsettown to Millerstown**—7 miles; Class I water; scenery, good. The put-in is the same as the take-out in the previous section. This section puts you at the base of a mountain on one side and gently rolling fields on the other side. Take out at the Commission Greenwood Access 2.5 miles south of Millerstown on the left side.

**7. Millerstown to Amity Hall Access**—13 1/2 miles; Class I water; scenery, good. The put-in is the same as the take-out in the previous section. Exercise caution in lifting your boat over eel traps along this section. Several small, eroded ledges make great playing spots. Take out at the Commission's Amity Hall Access (about a half-mile before the 11/15 bridge), or continue down to the main branch of the Susquehanna and take out at the point.

## Main Branch Susquehanna River

The Susquehanna River basin stretches through central Pennsylvania, flowing over 440 miles from Cooperstown, New York to Havre de Grace, Maryland. The Susquehanna provided the main north-south travel route for six Iroquois nations and even today, the river basin is still a major corridor of travel for cars, trucks, trains and migrating waterfowl.

**1. Sunbury to Commission Sunbury Access Area**—7.7 miles; Class I water; scenery, good.

**2. Sunbury Access Area to Swigart Island Access**—11 miles; Class I,II water; scenery, good.

Put in at the Sunbury Access Area along Route 147 at the south end of Sunbury. These two sections are pretty, surrounded by ends of mountains, rocky cliffs and valleys. The river is gentle and forgiving, but the most interesting spot is below Liverpool. A series of ledges, rocks and chutes, known as McKees Half Falls, breaks the trip up and makes it a good place to play. Take out at the Game Commission Swigart Island Access, three miles north of Liverpool.

**3. Swigart Island to Commission Halifax Access**—10.5 miles. Class I water; scenery, good. Unfortunately, this section is wide and you can spend a half-hour just paddling to the other side. In this section you definitely just float. Take a good book and suntan lotion. Take out at the Fish and Boat Commission access in Halifax on the left side.

**4. Halifax to confluence of the Juniata**—10 miles. Class I water; scenery, good. This section allows you to catch glimpses of bald eagles, with a nesting pair on Haldeman Island near the end of the trip. Take out at the point, just under (south of) the Clark's Ferry bridge (322/22).

## Penns Creek

This waterway is a pretty stream that starts in "Happy Valley" and flows to the Susquehanna at Selinsgrove. The upper stretch is overlooked by paddlers. It is a fairly easy stream, with a stretch of whitewater during the spring melt. Unfortunately, this creek is one of the more popular streams on which to build that rustic summer getaway home. If you do not mind looking at a lot of homes, the water runs clear and cold and will prove to be an enjoyable trip.

**1. Swamp Church Road to Coburn**—11 miles. Class I; scenery, pretty. Put in at the bridge and with the cold, clear water from Penn's Cave, you find yourself bouncing through farm country. There is a dam about two miles above Coburn, which will require you to portage. Take out at the bridge in Coburn.

**2. Coburn to Poe Paddy State Park**—6 miles. Class I,II; scenery, very good. Put in at the bridge in Coburn. This is a very popular run on Penn's Creek. It winds through an attractive canyon with a consistent gradient. Call it a day at Poe Paddy State Park.

## Towanda Creek

Towanda Creek runs a straight 25 miles through Bradford County. Most of you might think, "Bradford County, that's too far." But paddling the Towanda is worth the trip. This trip is purely a novice run with a few (mostly strainers) to no hazards.

**1. East Canton to West Franklin**—9.5 miles. Class I; scenery, good. Put in at the bridge in East Canton. Although the creek starts small and somewhat shallow, it gains width and water with the introduction of some tributaries. Wooded banks and well-kept farms keep you company on the way down. Take out at the bridge in West Franklin.

**2. West Franklin to Powell**—7.6 miles. Class I; scenery, good. Put in at the bridge in West Franklin. There are some longer riffles near Franklindale, all straightforward, but be prepared to paddle and maintain control of your boat. Take out at the bridge in Powell.

**3. Powell to N. Branch Susquehanna**—5.9 miles. Class I; scenery, good. Put in at the bridge in Powell. With the influx of Schrader Creek and the South Branch, Towanda Creek doubles its size and flows through a wide valley with the mountain skyline in the background. Take out at the bridge approximately a half-mile upstream of the North Branch.

## Loyalsock Creek

The Loyalsock is a long creek that pleases the novice paddler as well as the whitewater enthusiast. Most people think of the Loyalsock as only a whitewater run that attracts an early spring slalom race at Worlds End State Park. When settlers first arrived in this area, they actually thought they were at the "world's end," with high mountains forming a steep,



**Pennsylvania has over 200,000 acres of flat water and over 45,000 miles of moving water. It also has some of the finest whitewater rivers in the east.**

narrow valley. But you are not at the world's end, just a beautiful area in the state that deserves more than a quick run down some fast-moving water.

**1. Lopez to Ringdale**—6.9 miles. Class I,II; scenery, excellent. When first finding Lopez, I thought I was back in Vermont, especially when paddling this creek in the fall. Put in at the bridge in Lopez and be prepared for a novice whitewater run. The rapids are short and rocky with clear pools linking them. There is a long rapid right before the take-out at the bridge in Ringdale.

## Bald Eagle Creek

If you are lucky, you might get to see the namesake of this creek. Paddling it several times, I have encountered three bald eagles. Not only will you have various wildlife accompanying you on your journey, but you'll enjoy a pleasant view of Centre County. This creek is straight-flow-



photo-PRBC file photo

ing and long with smooth water and easy fast-moving waters. Bald Eagle Creek is also a prime trout fishing stream, so if you paddle in late April, be prepared to share the stream.

**1. Port Matilda to Unionville**—13.2 miles. Class I; scenery, good. Put in at the bridge in Port Matilda. This is a fairly easy novice whitewater run, with the waters bouncing over gravel bars. As you near

Unionville, look skyward and you will see gliders catching the updraft off the mountain. Take out at the bridge in Unionville.

**2. Unionville to Curtain**—9.4 miles. Class I; scenery, good. Put in at the bridge in Unionville. As you approach Milesburg, look right and the cold waters of Spring Creek add to the volume. Bald Eagle becomes a bit more bouncier but no more difficult. As you head away from the road, you enter into farm country and I-80 crosses over you. Take out at the single-lane bridge at Curtain.

Please keep safety in mind on all your canoe trips. Always wear a personal flotation device, dress appropriately for the weather, take dry clothes in a dry bag and plenty of fluids and food. If you have never paddled any of these waterways, check with local paddling clubs, outfitters or locals to become more familiar with the stream or creek. By heeding these basic safety rules, your trip will be more enjoyable.

*The Juniata River offers more than 100 miles of slow-moving Class I water.*



photo-Dan Martin

# ROWING BASICS

by Ann M. Carretto

In the last 25 years, the number of recreational boaters has increased by some 50 percent. The Coast Guard has estimated that there are 16 million powerboats, sailboats and canoes. In Pennsylvania the number of registered powerboats has increased from just over 100,000 in 1970 to 312,000 in 1994. The Fish and Boat Commission estimates that at least another 75,000 non-powered boats are used in the Commonwealth. The Commission has no data on non-powered boats. Estimates from boat dealers show that as many as 200,000 non-powered boats may be owned and used by Pennsylvanians.

Recent statistics gathered from rowing and paddling associations have shown increasing participation in all age groups. According to the United States Rowing Association (US Rowing), rowing club memberships have increased an average of 35 percent across the state in the past five years. Nationally, membership in US Rowing has gone from 12,000 members in 1985 to 32,000 in 1991. The United States Canoe and Kayak Association has noted a 20 percent increase in national membership since 1990. Canoe and kayak outfitters have also reported increased sales over the last several years.

## What is paddling and rowing?

These new boaters have turned to rowing and paddling for a variety of reasons. Participants tend to be interested in physical fitness and have a desire to spend time on the water. They prefer the peace and quiet of paddling over the sounds and smells of motor power.

Both rowing and paddling are good forms of exercise. Of the

two activities, rowing is more aerobic because it involves the entire body in an endurance-style workout. The rowing stroke uses the leg, abdominal, back, shoulder and arm muscles. Many people consider rowing a lifetime sport. It's not unusual for people in their 60s, 70s and 80s to participate in competitive

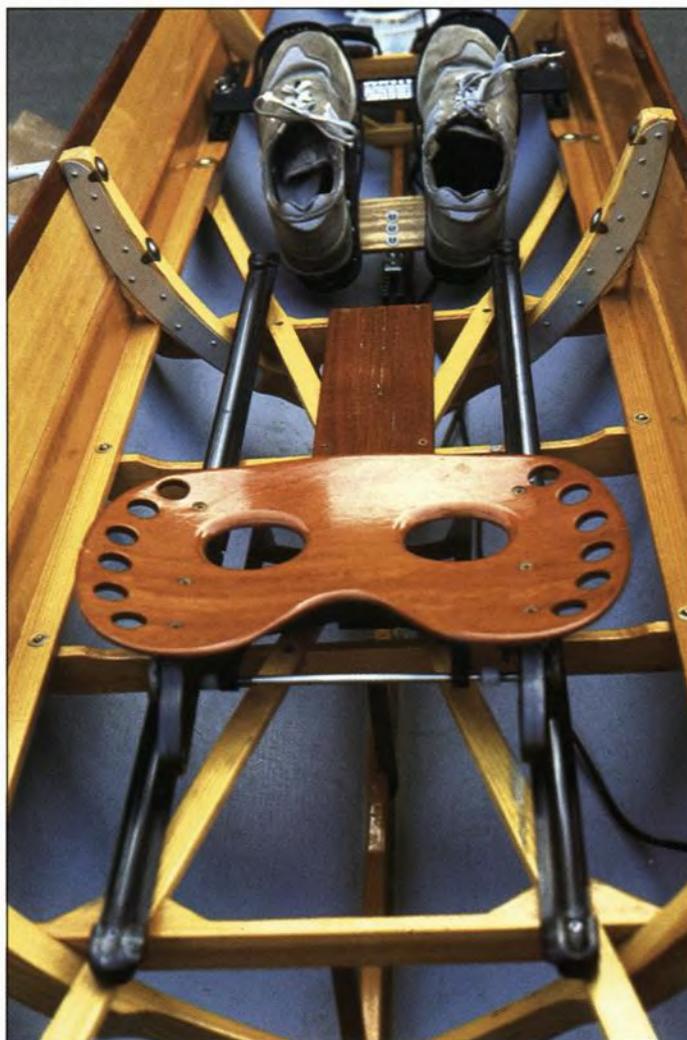
rowing. Canoeing and kayaking primarily use the shoulder and arm muscles.

Both paddling and rowing provide people with the opportunity to spend time outdoors with family and friends or alone. Canoeing and kayaking are possibly the least expensive forms of boating, making them an enticing family activity. A decent canoe outfit can cost as little as \$600.

Conversely, rowing has traditionally been an expensive activity because of the high price of shells. The process of manufacturing shells involves a lot of hand construction and is very labor-intensive. Historically, rowing has generally been limited to college athletic programs. Over the last 30 years, however, this has begun to change. Many cities have established community rowing centers that require membership dues and operate the same way as health clubs. More and more public and private high schools have developed rowing programs, and rowing scholarships are on the increase as well.

## Who started all this?

Canoes and rowing shells were originally designed with competition in mind. American Indians used canoes for racing almost as much as they used them for transportation. Similarly, rowing as we know it today developed from the competition between barge companies. To prove which company was the best, men would row their barges against one another in organized races.



Here is a sweep-style four-person racing shell. (Top center) Closeup of an oar lock. (Top right) Examples of the different kinds of paddles and oars used in rowing.



Racing shells are long and narrow. They are built around a keel and a system of ribs and cross members.

# ROWING BASICS

Today many people are drawn to these sports in search of competition. Rowing has been recognized in the Olympics since the early 1900s and has also been integral to Ivy League college life since then. Rowing fields the biggest contingent of athletes in the Olympic Games. In the 1996 Summer Olympic Games, canoeing and kayaking will also become a part of the water sport events.

## How people-powered boats work

The basic characteristics and nomenclature of different types of boats are important to know to understand their uses and limitations. Maneuverability, handling and safety are all affected by the limitations of each type of vessel.

The fundamental difference between rowing and paddling is in the direction the operator faces when propelling the boat. In all paddling sports the operator faces the bow of the boat, either in a sitting or kneeling position. Although many canoes have seats, generally the person paddling kneels on the canoe floor. This keeps the center of gravity lower and makes the canoe more stable.

Both canoes and kayaks use paddles for propulsion, but the style of paddle differs significantly with each sport. The canoe

In comparison, a kayak is operated from a seated position with the legs out in front toward the bow. This lowers the center of gravity even more than in a canoe.

paddle has one blade. The paddler holds the grip (top) of the paddle in one hand, and places the other hand on the shaft, closer to the blade. The kayak paddle is double-bladed, with the blades offset at 90-degree angles to each other. The kayak paddle is held with both hands on the shaft. One hand feathers, or rotates, the paddle during each stroke, thereby placing the paddle in a perpendicular position to the water at the catch of each stroke.

The hands maintain a relaxed yet firm grip on the paddle to control it, allowing it to rotate with each stroke.

Another difference between canoes and kayaks is the deck design and shape of the hull (the deck prevents water from splashing into the boat). Most kayaks are decked. Most canoes are un-decked, or open. An open canoe offers more usable space



*A deck (left) prevents water from entering the boat. Sweep-style racing shells (above) are long, sleek and narrow, and like this eight, are actually stable craft. The oars act as outriggers.*

photos-Ann M. Carretto

to store gear. Some canoes used in competition (called C-1 and C-2) have decks. The major difference between decked canoes (C-1 and C-2) and decked kayaks (K-1 and K-2, and new K-4s) is the width and curvature of the hull. Racing canoes have wide, flat bottoms. Kayaks have more narrow, rounded hulls. The numbers after "C" and "K" indicate the number of people the boat accommodates.

## Rowing vs. paddling

The major difference between rowing and paddling is the direction you face. A single rower faces the stern and steers by glancing over the shoulder while rowing. Larger rowing shells have a person (called the *coxswain*) who sits in the stern facing the direction of travel and controls a rudder.

Oars are significantly longer than paddles and have either a collar or pin that fits into an oar lock. No matter which kind of rowing vessel you use (rowboat or shell), the oar requires a pivot point, called the *oar lock*. The shaft of the oar at the collar pivots around a pin, allowing the rower to apply the pressure needed to move the oar through the water. It also allows a rower to increase the amount of leverage on the oar blade.

As with paddling, rowing has several different types of boat designs. The term *racing shell* is a generic term that can apply to both styles of rowing—sweep and sculling. There are also recreational and open-water single- and double-person boats. In a sweep-style shell, each oarsman holds an oar that is situated on either the port or starboard side of the boat. Sweep boats have either two, four or eight rowers. In a two-oared sweep boat (called a *pair*), one oarsman holds an oar on port and one oarsman holds an oar on starboard. Likewise, in an eight there are four people who row on port and four people who row on starboard. They sit in an alternating fashion. Years ago, there were also six-oared shells but they are no longer manufactured.

The other style of rowing is called *sculling*. A sculler has two oars (one in each hand) and operates them simultaneously. Sculling boats are configured as singles, doubles and fours (called *quads*).

All larger rowing shells have a rudder for steering. Pairs and doubles may or may not have a rudder. A boat without a rudder is steered by applying more pressure on one oar or the other. If the boat is designed with a rudder but not steered by a coxswain, the rudder is manipulated by the rower sliding his foot either to the left or right.

## Boat design

The structural design of kayaks, canoes and rowing shells is different in each case and varies according to the manufacturer. Kayaks are generally made from molded fiberglass or ABS plastic. The strength of the kayak lies in its seamless design and the curvature of the hull.

Original canoe design and current shell design use a keel to provide structural integrity. Modern canoes may or may not have a keel. Most metal or wooden canoes have keels. If your canoe has a keel, it's that small ridge that protrudes down the center and along the bottom of the hull. The keel adds strength as well as stability to the boat by making it track better through the water. These boats are best suited for flat water, such as lakes and ponds.

Canoes without keels are constructed in a manner similar to kayaks. They are made of fiberglass or plastic and are pressure-molded into the form. The rounded or reinforced edge around the gunwale and the thwarts give the vessel its strength.

All racing shells are built around a keel and a system of ribs

and cross members. The keel is an integral beam that runs the length of the boat from bow to stern. The internal keel and ribs in the shell give the hull shape. The outer skin is made of wood or fiberglass or more recently of composite material such as carbon fiber. It is approximately 1/16-inch thick and can flex with the buoyant forces of the water. A special foot plate spanning the cross members must be used when stepping into a boat. Care must be taken not to put any pressure or body weight on the floor of the boat or your foot could go right through the shell.

The gunwales of a racing shell are the second strongest part of the boat. The gunwales support the riggers that in turn support the oarlocks and the oars. The gunwales and riggers are designed to support the tremendous amount of pressure applied by the rower(s) during the stroke.

Racing shells are very stable when the oars are out on the water. The oars act as outriggers. The stability of the shell is enhanced by the skeg. The skeg is similar to a keel or centerboard of a sailboat, except that it is fixed and is significantly smaller in proportion to the length of the hull. The surface area of a skeg is only some 50 square inches. The skeg is located near the rudder, and assists in steerage. If the skeg is lost during an outing, the boat becomes virtually impossible to steer.

## Getting on and off the water

Safety should be the primary consideration when it's time to go on the water. A small amount of information with preparation can make the difference between a safe and enjoyable outing and a disaster. Information such as the weather forecast, water temperature and understanding some characteristics of the body of water on which you will be boating can go a long way to ensuring a smooth outing. The weather forecast can help you plan what to wear and pack the proper types of clothing. Always take one more layer of clothing than you think you will need. You never know when the weather might change and you'll get wet. Having some knowledge of the local area can help you avoid dangerous situations. If you don't know the area, always err on the side of caution.

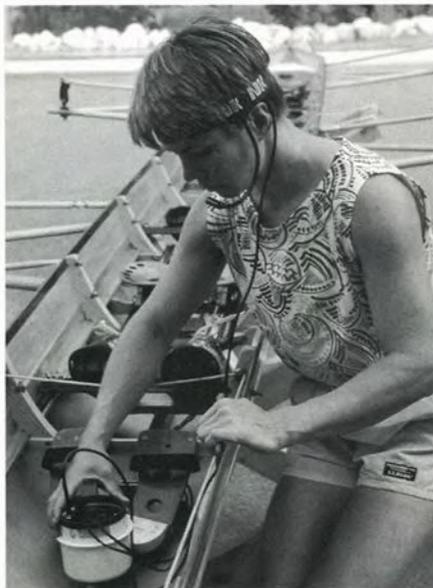
The most important safety item is the PFD (personal flotation device). Along with extra clothing, food and a first aid kit, you must carry a PFD. Before launching your boat, make sure your PFD fits properly. Know how to secure it properly on your body (practice putting it on in the water), and store it in the boat where you can reach it quickly. If you are not wearing your PFD, it must be easily accessible.

Currently, Type IV PFDs are required for each person on board recreational canoes and kayaks. The regulation is due to be changed in 1995. As of May 1, 1995, all people on all boats must have the appropriate size and number of wearable PFDs on board. This includes Types I, II, III and V. Type Vs must be worn to be considered serviceable. Canoes and kayaks are not required to have a throwable (Type IV) on board as all other boats must.

In the 1994 regulations (except on Commission lakes and in state parks) racing shells and racing kayaks (K-1, K-2, C-1, C-2) are not required to have PFDs on board. However, the regulation does state that safety boats accompanying the (racing) boats shall carry a sufficient number of PFDs for each occupant in the shell or kayak. Often, racing shells and kayaks are coached from an accompanying launch that carries safety equipment. But there are plenty of times when shells are not accompanied by a launch. The regulation makes no requirement for the use of PFDs when unaccompanied. The Coast Guard has made an exemption for

# Canoeing and kayaking are possibly the least expensive forms of boating, making them an enticing family activity.

*The coxswain faces the oarsmen in larger shells. This person controls the shell's rudder and directs the efforts of the oarsmen. These days, no one barks orders. Electronics have replaced the megaphone.*



having life jackets on board the boats because the oars are considered to be flotation devices. However, if the passenger is knocked unconscious or the oar shaft is broken, the oar is no longer a serviceable device. This can create an unsafe situation.

As of June 4, 1994, all boats were required to carry a sound-producing device, such as a coach's whistle. This requirement applies to racing shells, canoes and kayaks. If a dangerous situation arises, the operator should blow five short blasts on the whistle to call attention.

Much rowing and canoeing is done during the early hours of the morning when the water is flat and the fish are biting. If sunrise has not yet occurred, one all-around white light is required on every vessel, no matter which type, and must be visible for one mile.

It is advisable to carry a knife, first aid kit, extra line or throw bag, food and water on board for every outing. You may end up taking a longer trip than you planned or have a situation occur that requires first aid. Also consider carrying a small tool kit and duct tape for making emergency repairs on the water. Duct tape makes an excellent temporary patch for a boat.

Both the American Canoe Association and US Rowing recommend that all people involved in water sports know how to swim. US Rowing requires all active rowers to pass a swimming test before membership is approved. The test involves swimming 200 to 500 yards continuously, treading water for five to 10 minutes, and then securing a PFD on your body while treading water.

## Basic rescue methods

Besides knowing how to swim, it's also important to know some basic rescue skills. You should practice rescue techniques in a pool or in warm water during the summer. The basic techniques for canoe and kayak rescue are similar. The fragile nature of racing shells makes rescue techniques for this type of boat slightly more involved.

If you find yourself in warm water or very near the shore, the simplest thing to do is swim the boat to shore. Once on shore, drain the boat and if no damage has occurred, reenter the boat. Under no circumstance should you leave the boat and try swimming to shore alone. Use the boat as a flotation device on which you can rest if you become fatigued.

If the water is cold, the critical factor is maintaining your body temperature. It's important to reenter the boat as quickly as possible to reduce the effects of hypothermia. Here is simple canoe rescue technique:

1. Place your hands on the inside bottom of the canoe.
2. Push up until your hips are inside the gunwales. Then roll onto your back.
3. Bring your legs aboard last. The canoe will float even if it is filled to the gunwales with water.
4. Paddle yourself to shore.
5. Empty water from the boat while on shore.

If you are out with friends in several canoes, you can use the canoe-over-canoe rescue technique. This technique allows you to drain the swamped canoe completely before righting it. Below is an outline of the technique.

1. Maneuver the capsized canoe perpendicular to an upright canoe.
2. Lift and slide the bow (or stern) of the capsized canoe up onto the gunwales of the rescue canoe.
3. Allow the water in the canoe to drain.
4. Flip the drained canoe over while on top of the rescue canoe.
5. Slide the drained canoe off into the water.
6. Maneuver both canoes so they are parallel to each other.
7. Have the victim enter the canoe while the rescuer stabilizes the canoe.

## Rescue methods for rowing shells

Racing shells are remarkably stable when the oars are on the water. Flipping is not a usual problem for shells. The most common problem is swamping from high waves or motorboat wakes. The gunwales are designed to be very low to the water, so shells can be swamped in one-foot waves. Another common problem for shells is shallow water. The shell can be damaged, and begin to take on water if it hits bottom or a submerged object. Too much water weight in a shell can cause the keel to crack, a major repair problem. It's important to begin removing rowers from the shell as quickly as possible when it's swamped.

Rowers should leave the shell two at a time, one from the bow and one from the stern and to opposite sides to help maintain balance. The bow and stern of the shell have sealed compartments to provide it with a certain amount of flotation. After all occupants have moved into the water, they should gather at the bow and the stern and form buddy pairs on opposite sides of the boat. Reaching over the hull, the pairs can lock arms and rest on the hull until the rescue boat is available to remove them from the water.

Another procedure with small boats or with larger shells close to the shore is to swim the boat ashore. If the water is cold, participants should be pulled from the water as quickly as possible. Once the rowers are in the rescue boat or safely ashore, the rescue boat can tow the shell to shore. 

# ONE TON and No Brakes:

## Practical Ideas for Pontoon Boating

Pontoon boating is rapidly becoming a popular vacation and weekend activity. A pontoon boat can be your home afloat—but a home that moves. It's a comfortable, leisurely way to enjoy the water. Here are piloting and safety ideas you should know before boarding, to help you put more fun into your pontoon boating.

### Brakes

So you've handled a fishing boat or a cruiser, have you? That's very different from handling a pontoon boat that averages 24 feet in length, goes about 15 miles an hour, and weighs about a ton. Having "no brakes" means that if you goof, you may be the cause of a hull-banging, paint-scraping experience, not mention what can happen to whatever you hit! Remember, reversing your engine is the only braking mechanism you have for your pontoon boat.

### Docking

Docking can be a real thrill, especially if you forget about not having brakes. About 2,000 pounds of boat will not stop short when the power is cut. It's best to approach the dock while heading upstream, or into the wind, because the pontoon boat is easier to control that way. Use only enough power to maintain steerage. At only 2 miles an hour, your pontoon boat can flatten any respectable dock. Approach the dock at no more than one mile per hour. Practice working with the minimum speed needed to maintain response before you attempt your first docking.

### Keeping your bearings

Unlike a smaller motorboat, a pontoon boat needs plenty of room and time to maneuver. In fact, heading a pontoon boat requires practice. Going through tight spots like docks or into slips requires skill, quick action and physical strength—on the part of at least two crew members.

When you turn the wheel of a pontoon boat, the stern is the first boat part to react. Thus, if the wheel is turned to the right, the stern swings to the left. It's actually like piloting an airplane. This action may seem unusual at first, because an automobile responds in just the opposite manner.

It's always a good practice to have some backup person who can take over the helm

in case you become ill. There is nothing worse than having a pontoon boat drifting, perhaps into danger, because no one else can operate all the controls, the engine or the electronics.

### Rules of the road

Read and understand local, state and federal regulations governing the waterway on which you boat. Know the marking systems (buoys) and the signaling rules. Here are some general basic rules:

- Approaching an oncoming boat, keep to the right.
- Know the proper maneuvering signals and use them.
- Signal when approaching a blind bend in a river.

### In the still of the night

A new pontoon boater should tie up for the night at a marina or (with permission) at a private pier. A novice might not know whether a cove or quiet inlet is safe. Locks and dams on rivers can cause changes in the water level. A peaceful river can become a roaring torrent after a hard rain upstream.

If at dusk you can't reach a dock, anchor out of the main channel or tie up to trees near the bank. When about 75 feet from your anchorage, drop the stern anchor from the rear deck. Be careful not to foul your propeller. When the stern anchor is secure, tie the bow line to some fixed object on the shore, or secure the box anchor into the shoreline.

Two anchors are required to moor your pontoon boat adequately. Be sure the anchors you have are of sufficient weight. The owner's guide for your pontoon boat gives weight details for anchors.

### Refueling

The riskiest operation on a pontoon boat, strangely enough, is refueling. Smoking, naturally, is taboo during refueling, and electrical appliances and lights should be turned off. Pilot lights on any appliances and lights should be turned off. If the boat has built-in fuel tanks, keep all hatches closed to prevent heavier-than-air gasoline vapors from seeping inside the engine compartment.

If you detect the odor of gas, turn on the engine compartment blowers and leave them on until all vapors are gone. Do not

start the engine until the vapors are gone.

### First aid

A pontoon boat without a first aid kit aboard shows very poor planning. Keep a well-stocked first aid kit handy, and remember to replenish supplies as they are used.

At least one crew member should know first aid. First aid training is available at any Red Cross chapter and should be an essential part of training for all pontoon boaters.

### PFDs

Be sure you have the right size PFD (personal flotation device) for each person aboard. Fit your PFD snugly and know how to adjust it. Because there may not be time to put on your PFD while you are still on the pontoon boat, you and your crew will have to learn how to put your PFDs on in the water. That takes a bit of practice. If you and your crew are not good swimmers, think about taking a Red Cross swimming course. The best course is to wear your PFD, and a PFD is not a substitute for adequate swimming skills.

### Fire

Be sure you have the proper size fire extinguisher (minimum size is 5 pounds) and know how to use it. Fire extinguishers, by the way, are required by law to be on board.

With an engine compartment fire, the chance of explosion is present. If a fire breaks out in the engine compartment, turn the engine off at once.

### Towing

Although it is perhaps a bit embarrassing, at times it may happen that you have to be towed. If you are being towed, remember that the towline is under great stress, and if it breaks it can whip and cause serious injuries. Be sure that all crew members stay away from the line while your pontoon boat is towed. Many people will not tow you unless you provide the line. Be sure to have a stout towline for this specific emergency. 

*This article is adapted from Five Tons and No Brakes, a pamphlet on houseboating of The American National Red Cross.*

# B A S I C

# WATER SKI

## G E A R

by John M. Cornish II

What size boat and motor should you buy? Which skis are best for you? Is any old ski rope ok to use? What equipment do you need to begin water skiing? These are several questions that beginning boaters or water skiers ask as they embark on this new adventure.

Here are some answers to many of the questions that may arise about purchasing water skiing equipment.

An important point to keep in mind is that neither the most expensive items nor the least expensive items are the best value. Consider the quality of the equipment and longevity of its use. The equipment's ability to last also depends on the care, maintenance and manner in which it is used.

### Beginner's boat

Boats and motors are a major investment, a very expensive package when discussing water skiing equipment. Many families purchase a beginner's boat that can provide many hours of fun. This beginner's boat may not be as costly as some of the other boats that could be bought. This beginning boat normally has either a four-cylinder I/O motor or smaller horsepower outboard motor—just enough to tow a skier.

The new boater learns to operate the watercraft and may even learn to ski on two skis. Later, the owner must consider buying a larger horsepower motor if the outboard boat can handle it, or you might need a whole new rig in the case of the four-cylinder I/O. This problem arises when the family progresses to learning how to slalom or ride a single ski. The boat with the smaller power plant does not have the initial pulling power to surface the skier. A family that plans on being a skiing family may want to consider spending more dollars initially to avoid trading or having to purchase a new rig in a two-year or three-year period.

A minimum horsepower outboard to consider is 85, but 115 is strongly suggested. Your boat should be a 16-foot or 17-foot runabout with standard features. If water skiing is the main boating activity, avoid small cabins and boat designs that add weight to the structure, requiring extra horsepower.

Stories are told about the power of the four-cylinder I/Os and

how they perform. Again, the small engines are fine for family cruising and for skiing on two skis, but these engines may have a difficult time standing up to the demands of slalom skiing and more advanced skiing.

Boat buyers must also consider the number of family members and friends as well as the size of the individual family members. You should buy the boat and motor to accommodate these factors. The smaller I/O powerboats may suffice, but the six-cylinder or small eight-cylinder power sources are stronger and will continue to have pulling power as the family grows and your water skiing skills sharpen.

Any boat buyer must consider the boats that are recognized as "ski boats" such as the Ski Nautique, Master Craft and Ski Supreme, to mention just a few. These boats have sufficient power for any family's water skiing needs and can serve as a pleasure boat for many years.

### Life vest

Another purchase and probably the most important water skiing accessory is the life vest. The personal flotation device (PFD) is required by Pennsylvania law. This device is designed and tested to withstand the impact and abuses of water skiing and float an individual face-up. Most boaters spend very little time discussing which PFD to buy and in many cases base their purchases mostly on price. Ironically, this accessory may save someone's life.

When buying a PFD, be sure that it contains a label marked with the U. S. Coast Guard approval. PFDs range in price from \$25 to \$85. Any vest in this price range is suitable for skiing. There are two basic vest-type styles. Both are constructed of Ensolite foam covered with either a nylon material or a baked-on vinyl. Both use nylon straps with buckles and some have zippers to secure them on skiers.

The important factor here is that the vest must fit comfortably without the possibility of coming off. Do not try to save dollars by sharing one ski vest for all the members of a family. It is not going to fit everyone properly. The PFDs that are in the \$10 to \$25 category are the standard orange horse collar or yoke-type that are not comfortable or recommended for skiing.

Keep in mind that the PFD must be U.S. Coast Guard approved. It may save you or your child's life, so isn't that worth a little consideration and a \$30 to \$50 purchase?

More avid water skiers may be interested in a wetsuit for added warmth and protection. These are worn in addition to the PFD. Depending on style and colors, these suits range in price from \$40 to \$150. Many ski manufacturers have wetsuits and PFDs that match the colors of the skis. These color-coordinated outfits are nice to look at, but they do not improve your skiing.

You may see a skier on the water without a PFD donning a wetsuit. Most likely the wetsuit is a flotation or barefoot wetsuit that is approved for barefoot water skiing and practice for other water skiing competitions. This garment's average price is about \$200.

### Skis

Skis are found in all kinds, sizes and colors with varying prices.



*Neither the most expensive items nor the least expensive items are the best value. Consider the quality of the equipment and longevity of its use. The equipment's ability to last also depends on the care, maintenance and manner in which it is used.*

priced in the range of \$165 to \$200. A combo pair allows you to use one of the skis as a slalom ski in the future because these skis will last for years. These skis are also available with concave bottoms that allow the improving skier to advance his skills.

An individual may want to search for used skis to begin a program. Caution should be taken to find a pair of skis that are solid with bindings that will not need to be replaced immediately. Don't buy a pair of skis that are too light in weight. These skis are hard to control. Used skis normally cost about \$60 to \$75. This is a nice reduction in the price of new skis, but you own a used pair of skis that may need some repairs.

### **Ropes, handles**

Ski ropes and handles can be very confusing equipment to buy. There are several different grades of poly-type ropes that range in prices from \$9 (for a rope and handle) to \$45 only for a 70-foot section of rope.

Ropes are made of three basic materials—polyethylene, polypropylene and kevlar, or plyarmid. Look for a 12-strand 75-foot polyrope with a handle that sells for approximately \$20. Stay away from the \$9 ropes

because they twist, break and stretch. You'll see 70-foot sections of ski ropes (no handles) for \$35 to \$40 that are for advanced skiers. These ropes have little or no stretch. They usually last for three to four years while others are ready for replacement in 1 1/2 to 2 years.

When buying a handle, look for a floating aluminum-core handle with molded rubber covering. Handles can be very expensive, but the caliber of skier determines the cost of the handle that is needed. The average skier can buy any of the manufacturers' standard-package handles and be safe. These handles, if bought separately, cost approximately \$10. As a skier becomes more skilled and begins slalom skiing, he will require the more expensive, grip-designed handles that are added to the 70-foot section of ski ropes.

Beginning skiing families can have many days of fun and excitement with the proper equipment. Faulty gear or the wrong equipment can cause individuals to become frustrated when they are learning. Let this information help you in your quest for water skiing equipment and add to your enjoyment on the water. 

At one time all the skis were made of wood, with flat bottoms and you had very few choices. Today the majority of skis are constructed of fiberglass or ABS plastic with foam cores. They have different bottom designs such as the standard flat bottom or variations of the tunnel concave with bevels and tapers. Skis now have plastic or metal fins that drop through or mount on the bottom surface. The bindings come with or without foam linings and have pinch or cam-lock lever adjusters.

As in every other aspect of our world, skiing has also become hi-tech. There are a few easy hints to remember that may make your decision of which skis to buy a little easier.

The first questions to consider are: What is the plan of usage for the skis, and do you want them to last for years or just learn on them and store them in the garage forever? There are skis available and priced for both types of purchases. It is possible to buy a pair of wooden flat-bottom skis with economy bindings that are suitable for beginners for about \$50 to \$100. These are not the best buy if you want them to last for years.

Manufacturers offer combination pairs of skis constructed of ABS plastic with foam cores and comfortable bindings that are

# Custom Touches

by Cliff Jacobson

My friend Bob Brown once eyed my three impeccably maintained solo canoes and suggested that I was really a yachtsman at heart. "Canoes should show some battle scars," says Bob. "Shows you're a canoeist, not a canoer!"

In the event you disagree, here are some custom touches that will keep your canoe looking like a work of art.

## Oil your brightwork

Oiled wood rails are easier to maintain and more flexible (less likely to break in a wrap-up) than varnished ones. Strip away varnish and rub in a good grade of exterior marine oil. I've tried just about every formulation, from Watco™ and Djeks Olay™ to traditional linseed oil and quick-drying gun stock finishes like Birchwood Casey™ and GB Linspeed™. On rigorously maintained canoes, one oil works

about as well as another, though a tougher finish often results when high-gloss linseed and tung oil formulations are used on top of deep penetrating marine oils. Here's an easy way to get a rich, furniture-grade shine.

**1. Strip or sand away all factory varnish.** Then remove dents and gouges by "whiskering" the wood.

Procedure: Saturate a cotton rag with water and ring it dry. Fold the damp rag several times and set it over the dent or gouge. Use a hot steam iron (no steam) to press the cloth firmly over the damaged wood. Continue to "iron" the cloth until

it no longer steams. Whisker again, if necessary, to raise the wood grain fully to the surface. If wood fibers are broken, the dent may not surface completely, in which case you may need to level the void with epoxy.

**2. Sand (80-120 grit) the bare wood to a soft, even patina.** If your canoe has

finished coating the wood, immediately wipe off excess oil with a dry cotton rag (an old tee shirt works well). Lightly polish the wood with the cloth as you work. Leave the canoe right-side up, trim exposed to the sun for an hour or two before you store it away.



**5. One or more days later, wipe on a thin coat of oil and lightly polish it with a soft, lint-free cloth.** This should take less than five minutes. Repeat this step at your convenience as often as you like for several weeks or months. The wood grain will eventually fill and take on a deep, rich look.

**6. After about a dozen applications, cut the oil to the surface of the wood soaked with Watco™ or Djeks Olay™.** Rough spots may be sanded smooth with 400 grit sandpaper

heavily moistened with oil.

**7. If you prefer a spectacular high-gloss finish, apply a coat of boiled linseed oil or quick-drying gunstock oil over the Watco™ or Djeks Olay™.** Mirror polish the oil with your hands and let the finish dry for several days. A coat of furniture-grade lemon oil will further enhance the beauty of the wood and draw envious stares.

Note that the finish is built up slowly over a long period. If your canoe came from the factory with oiled rails, the initial sanding should require barely 15 minutes. After that, each application of oil takes only a few moments.

**4. Apply a liberal coating of oil to the wood with a lint-free rag.** As soon as you've

**Well-maintained, high-quality canoes appreciate over time. Ill-kept, low-grade craft do the opposite. Regular upkeep and thoughtful custom touches go a long way toward maintaining the value of your investment.**

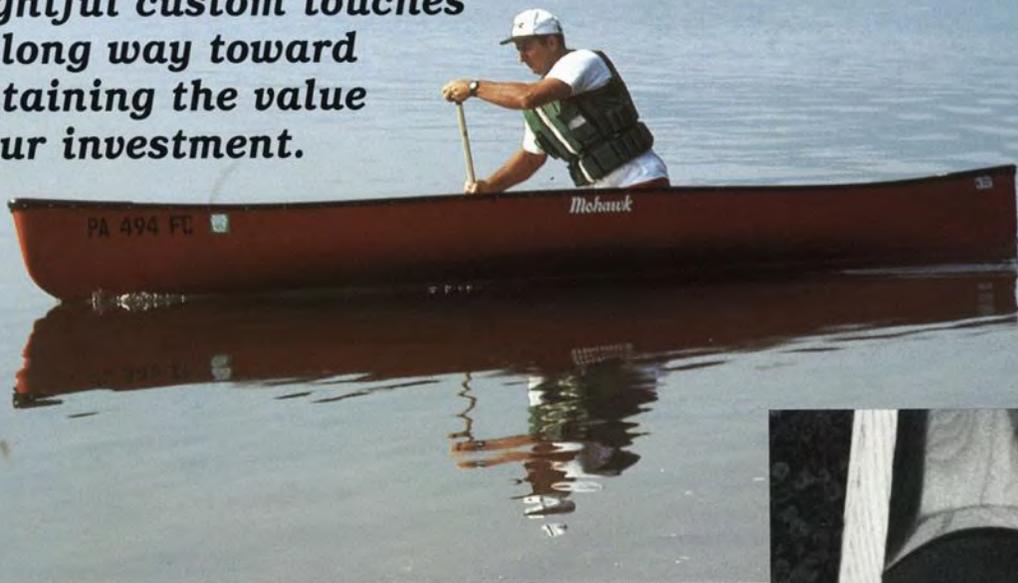


photo-Dan Martin

### To restore weathered woodwork

To restore gray, weathered woodwork, sand well and then apply trisodium phosphate (TSP) cleaner, available at hardware stores. Work in the TSP with a stiff brush and wear protective gloves. Rinse completely, allow to dry, then sand to silky smoothness. Afterward, apply a quality finishing oil in successive coats as suggested above.

### Classy lining holes for your canoe

Lining ropes should be attached close to cutwater, so the "pull" originates at the point of mass, not above it. High-mounted lines, like those secured to a ring on deck, can produce an upsetting experience!

Metal eye bolts and other fittings that protrude from the stems (ends) of a canoe look tacky and could bend or break if the canoe slams hard into a rock. The encased PVC water pipe fitting described below is strong and beautiful. You'll need an electric drill, a piece of 5/8-inch diameter PVC water pipe, sandpaper, rat-tailed file and instant epoxy. Allow 30 minutes to make and install each "lining hole."

**1. Mark a point mid-way down the stem and about one inch in.** Then drill a 1/8-inch diameter pilot hole through the boat. Caution: The drill must be held at an approximate 120-degree angle to the hull or the hole will be lopsided.

**2. Switch to a 3/8-inch diameter drill and complete the hole, drilling in to the hull from each side.** If the spacing of the small hole on the port and starboard sides of the stem is unequal, positioning may be corrected with the larger bit.

You now have a reasonably clean 3/8-inch diameter hole that you will now enlarge to accept a 1/2-inch diameter piece of PVC water pipe.

**3. Go to work with a rattail file, enlarging and smoothing the hole until the PVC pipe just fits.** Figure on five minutes of filing to true up gel coat or rough edges on Royalex™ and polyethylene canoes. Do not try to save time by directly drilling a half-inch hole. You'll have a jagged mess!

**4. Rough up the outside of the PVC pipe with coarse sandpaper.** Then epoxy it into the hole. Judicious use of hacksaw, file and sandpaper will produce a slick looking unit. The last step is to chamfer (I use a universal cartridge case inside neck reamer, available at gun shops) the inside of the pipe to a feather edge. Optional: Spray paint the "hole" for an imperceptible color match.

### Hide your lining ropes

As every sailor knows, loose lines and a rough sea don't mix. Lining ropes should be stored aboard the craft so securely that they can't possibly come loose in a cap-

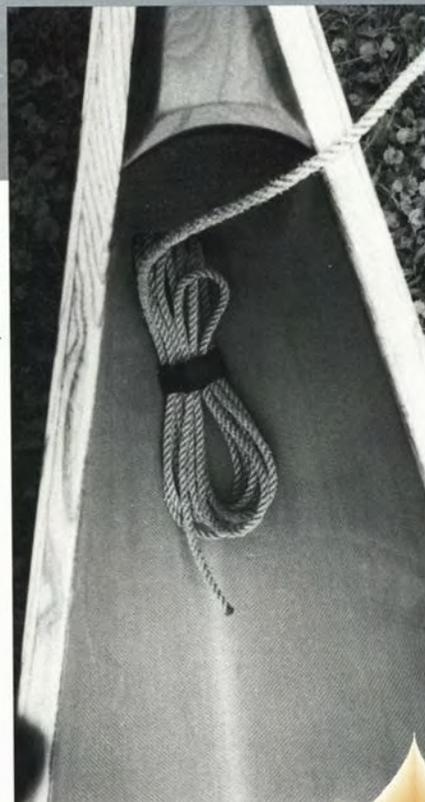


photo-Cliff Jacobsen

*Epoxying a long Velcro tab to the canoe floor is an effective way to secure your lining ropes.*

size and entrap you. Yet, they should be instantly available on demand. The classic solution is to thread heavy shock-cord through holes drilled in the deck plates and stuff your coiled lines under them. Shock-corded ropes stay put yet stream out, snag-free when needed.

## Custom Touches

This system is fast and reliable, but not very pretty. It's ideal for whitewater and wilderness tripping canoes, but not for classy wood-trimmed cruisers. For these, I prefer to epoxy a generously long Velcro™ tab (I first sew the Velcro™ to inch-wide nylon webbing) to the floor of my canoe. The lines stay put, release with a pull and don't mar the looks of a pretty canoe.

### Nose jobs

It's unlikely that you'll ever have to repair major damage to a well-built fiberglass or Kevlar™ canoe. However, you may need to mend chipped gel coat on the "nose" of your canoe after every trip down a rocky stream—easy, if you *don't* follow the manufacturer's directions. The recommended procedure calls for filling the break with color-matched liquid gel coat, then sanding and polishing to blend the repair.

Nothing could be more difficult or frustrating. Catalyzed liquid gel coat is runny. You must prop the boat at an awkward angle to "level the flow," then build a well of masking tape to contain the resin. Then you have to nurse the slowly hardening liquid with a flat stick to keep it from overflowing the well. If your patience holds out, the completed patch will hardly be noticeable.

There's an easier way. All you need is a can of white polyester or gray auto-body putty, matching paint, sandpaper, tape, mixing cups, paste wax, scissors and pumice.

### Procedure

1. Pick out the shards of damaged gel coat with the blade of your pocket knife.

2. Mask the work area. Then catalyze the putty (use extra MEKP to produce a "hot" mix) and work it into the break to overflowing. The putty is thick and won't run, so there's no need to prop the canoe or build a tape well.

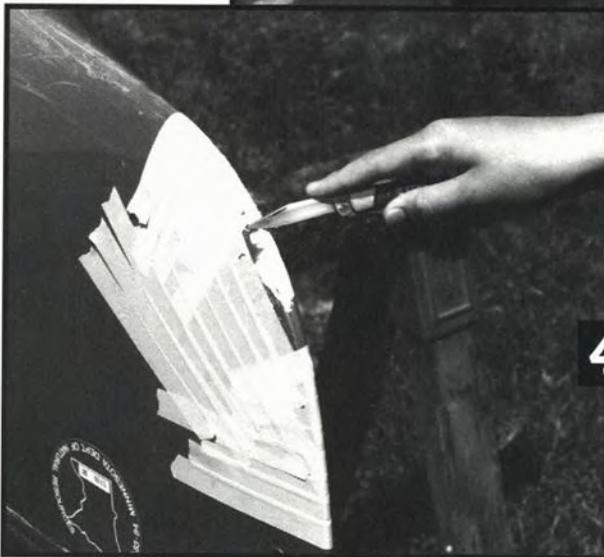
Caution: MEKP is toxic and can cause blindness if it gets in your eyes. Always wear safety goggles when mixing boat resins!

3. When the putty is firm (about five minutes), slice off the excess with your jack knife. Allow the remainder to cure for another half-hour. Then sand it level with progressive grits of sandpaper. Finish to silky smoothness with wet 400 grit sandpaper.

4. Spray paint the patch with matching auto acrylic. When the paint has dried, buff it out with a mixture of Johnson's paste wax and pumice. Or use a commercial



Photo 1 shows materials to mend chipped gel coat. Photos 2 and 3 show masking the work area and applying putty. Photo 4 shows slicing off the excess dried putty.



fiberglass boat wax (it contains pumice), which you can get at any marina.

Your "nose job" is now complete. Down time on the canoe is about an hour.

Follow this procedure if your canoe has a clear (no color) gel coat or a color that is difficult to match.

1. Make the gel-coat repair as suggested. Then mask a line at approximately 45 degrees to the hull.

2. Spray paint the enclosure flat black, dark brown or a contrasting color you like. The paint will cover the obtrusive gel-coat

patch. Observers will think your handiwork is a custom stripe or water line. This is the best way to effect a cosmetic repair on a clear, black carbon-fiber or honey gold Kevlar™ canoe.

### To keep gel-coat looking like new

Occasionally use a commercial hull cleaner (I've had good results with Star Brite) to remove scum lines and stains from fiberglass and Kevlar™ gel coat. Paste



4 Observe caution when working with these materials. Follow safety directions carefully.

wax will brighten and protect the hull, but it will also increase resistance (wax is hydrophobic) to the water. Canoe retailers often wipe on a coat of Lemon Pledge™ before they display their canoes in the store. The Lemon Pledge™ produces a deep, glossy shine on new and well-maintained plastic hulls.

## How to keep wood-trimmed canoes from coming apart at the seams

The gunnels and decks of modern wood-trimmed canoes don't have drain holes like those on traditional cedar-canvas craft. As a result, bilge water runs down the inwales (inside gunnels) of the canoe when it is turned over and becomes trapped in the ends, beneath the deck plates. The accumulated water remains there until evapo-

ration sets it free. Meanwhile, the thin wood at the apex of the decks rots and warps, and the canoe eventually comes apart at the seams. Over the years, I've owned four wood-trimmed Mad River™ canoes, all of which have separated at the ends.

Unfortunately, most canoe makers are insensitive to this problem. Those that aren't usually drill an ugly, vertical drain hole through the top of each deck. An equally easy—but more aesthetic solution—is to drill a 1/8-inch diameter drain hole through each stem just beneath the deck plate. This hole is invisible unless you view the canoe at eye level, “head on.”

The final touch is to varnish the inside decks and inwales where they meet. Best procedure is to stand the canoe on end (lean it against your house) and pour varnish into the constricted area. The excess should run out the hole you drilled.

Wipe off pooled varnish and later, clear debris from the hole with a tiny rattail file. Do this on your new fiberglass or Kevlar™ canoe and it will never warp and come apart at the seams!

## Drain holes for your canoe yoke

Whenever a yoke-equipped canoe capsizes or is washed, water seeps into the open-celled foam yoke pads. The wooden yoke pad blocks absorb the water and eventually rot. The solution is to drill generously sized drain holes through the wooden blocks. This invisible custom touch will pay rich dividends when, seasons later, your yoke doesn't break in the middle of a portage!

## Custom touches for aluminum canoes

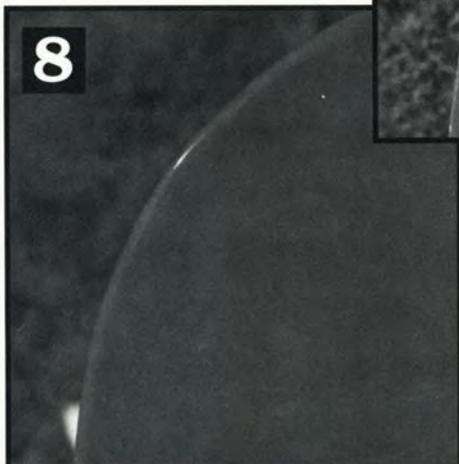
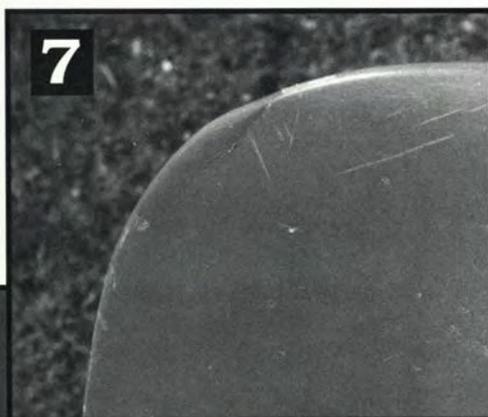
Flat-black paint cuts glare off the decks of aluminum canoes and gives these craft a custom look. Prime the metal with vinegar before you paint. Allow the vinegar to set overnight so it will have time to etch the aluminum.

Your aluminum canoe will slide over rocks with barely a murmur if you apply a heavy coat of Johnson's paste wax to the hull. There's no need to polish the wax.

For a serious custom touch, replace the dull aluminum thwarts, yoke and seats with brightly varnished wood. Pre-cut canoe parts are available at most outdoor stores.

One of my wood-trimmed canoes is a hard-used, honey-gold Kevlar(tm), Mad River “Slipper,” which I obtained around 1980. I've paddled this solo canoe hundreds of miles on rocky Canadian rivers. The little boat has plenty of battle scars in the form of broken ribs and skin lacerations. I've repaired the gel-coat at least 20 times, and a close look reveals five well-feathered patches inside the hull. But stand an arms length away and all you see is a picture-perfect canoe with polished furniture-grade trim that's nicer than new.

Well-maintained, high-quality canoes appreciate over time. Ill-kept, low-grade craft do the opposite. Regular upkeep and thoughtful custom touches go a long way toward maintaining the value of your investment. They also draw envious smiles that make you glad you took the time to do things right. ▾



*After the gel coat's repaired (page 18), mask a 45-degree line to the hull (photo 5). Photos 6, 7 and 8 show spray painting the enclosure with matching auto acrylic paint and buffing the area.*

# Get Ready for Spring Launching

by Bob Stearns

Now that the 1995 summer boating season is almost around the corner, it's time to start thinking about those little things that should be taken care of before launching to ensure trouble-free fun on the water right up until time for next winter's storage. Getting ready actually doesn't take much time, and even though the steps involved are important, they're not at all complicated.

## Your boat

If the hull is fiberglass, a thorough spring washing followed by a coat of wax not only makes it look much more pleasing, but it also helps protect the gel coat from the strong summer sun. A coat of wax once or twice per season can add years to the life of the original finish, especially if the boat is not kept under cover when not in use. A quality automotive wax certainly works, but those products designed for marine use last even longer.

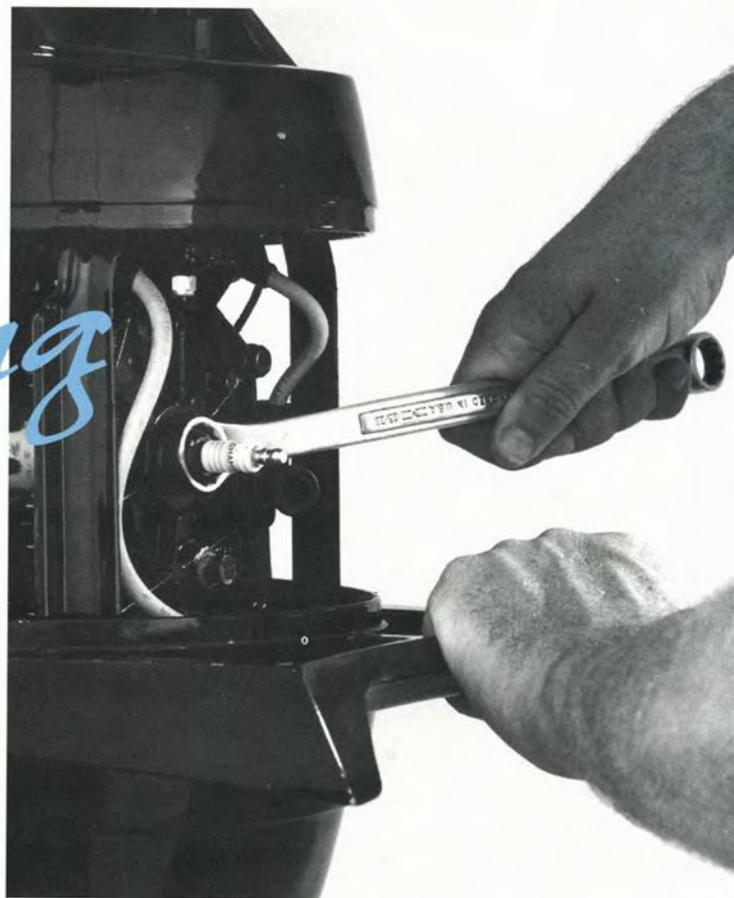
As for aluminum, even though paint is hardly essential for structural integrity or hull longevity, another coat could be added every few years for cosmetic purposes. Even if you don't repaint this year, you should at least check for loose rivets, which can be tightened by placing a heavy metal object, such as the head of another heavy hammer, against the inside end of the rivet and then repeatedly tapping the rivet head with a hammer.

Don't attempt to re-seat the faulty rivet with one hard blow. You might wind up damaging something instead of fixing the problem. Gentle tapping gets the job done.

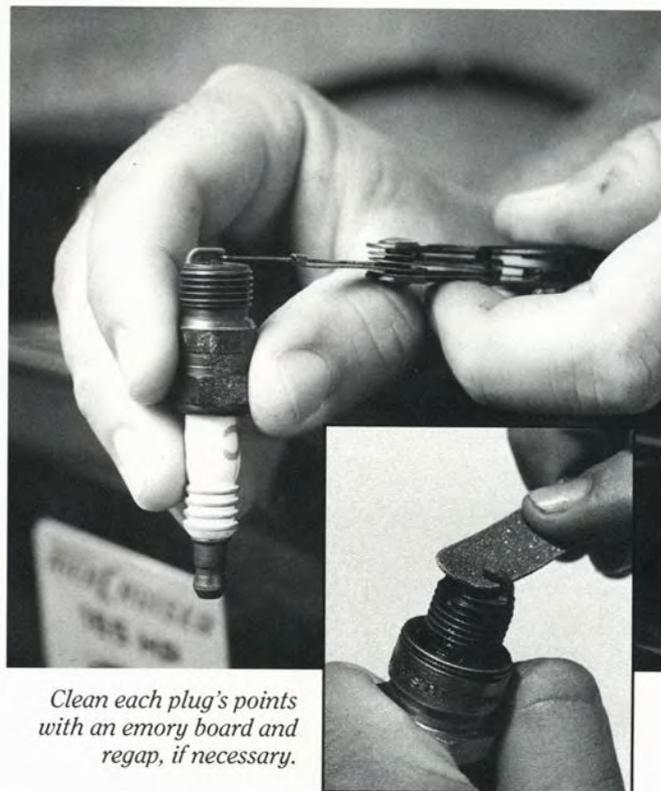
If the rivet is shot, replace it either with another rivet or with a stainless steel nut, bolt and two large washers. Don't use brass or bronze around saltwater or brackish water, like the Delaware Estuary, because of the corrosion potential.

Now is the time to check the equipment you should be carrying, and its condition. Pay careful attention to anchors, anchor lines, dock lines and so forth. Replace anything that looks suspicious. Take a critical look at the pressure gauge on the fire extinguisher to ensure it hasn't leaked. Check your flares or other emergency signal device for expiration dates. Make sure your personal flotation devices (PFDs) are aboard and in good condition to meet legal requirements.

If the gas tank is built in, it should have been filled to capacity before winter storage to prevent moisture condensation inside. Adding a can of fuel conditioner (sometimes called fuel stabilizer) at that time to protect the gasoline from deterioration throughout the long, damp winter is also a very good idea, because gasoline can eventually go bad. If somehow you failed to top



*Replace the spark plugs if they're worn. Otherwise, you waste a lot of fuel.*

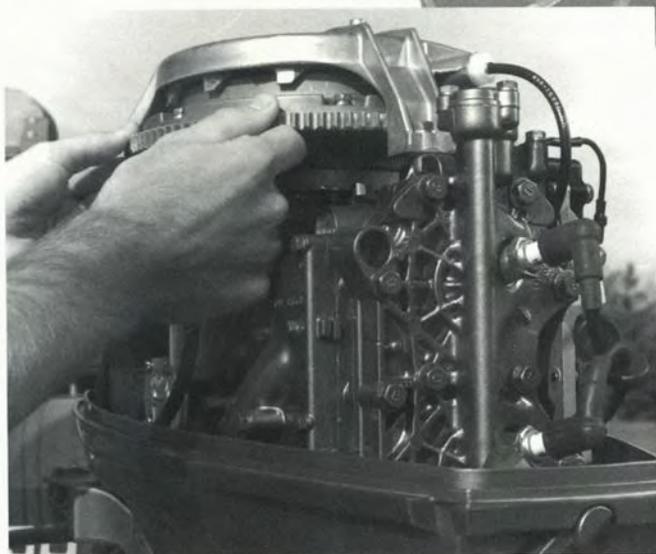


*Clean each plug's points with an emery board and regap, if necessary.*

photos-Bob Stearns



*Shoot grease into all the fittings (above). Check the flywheel (below) for excessive lateral play, indicating worn bearings.*



off the tank last fall, inspect it very carefully before filling it now. Looking into its interior with a strong flashlight helps, but the best way to make sure the fuel is still ok is to siphon or drain out a few ounces into a clear glass container, hold it up to the light, and look for contaminants.

If the "old" gas doesn't look or smell right, remove all of it and rinse the tank thoroughly with fresh gas. Then refill the tank. For a fixed tank, this involves some siphoning, which should be done with extreme care. Be sure to dispose of the "old" gasoline in a manner consistent with both safety and local ordinances.

In any event, whether replacing old fuel or simply topping off for the first trip on the water, adding the proper amount of fuel stabilizer/conditioner (for the capacity of the tank, per instructions on the can or bottle) ensures that any overlooked water condensate will be absorbed so that it cannot clog the carburetor and jets, or in any other way cause trouble.

The battery should be visually inspected, especially the exterior, for any signs of cracking that might lead to acid leakage. If the terminals show any signs of corrosion, clean them with a wire brush and apply a very thin layer of grease before reconnecting the cables. If it's not the sealed type, check each cell for proper water levels, and recharge.

If your boat has any electrical devices aboard, check them, too. Most important is the bilge pump, and you need to know for certain that it hasn't given up the ghost during winter storage, or that the wiring connecting it to its switch and battery has loosened. Pour a reasonable amount of water into the compartment where it's located, and check the volume of water discharged. If the pump has a float switch, make sure that it also works as it should.

As for electronics, if your boat has a depthfinder, VHF or CB radio, or other electronics, take a few seconds to examine the wiring before you place those items aboard for the summer. Look for poor connections, and cracked or broken insulation. If the connecting plugs are not so badly corroded or rusted that replacement is obvious, spray them with a moisture-displacing lubricant, such as CRC, WD-40 and P-38, to ensure better contact when everything is reconnected. Ditto any fuses, for the same reasons.

## The engine

Because outboards are by far the most common form of power used on small boats, I'm going to devote most of the space available here to them. If you have a stern drive, let me point out that most of the suggestions dealing with outboard lower units apply to the I/O's outdrive. In addition, keep in mind that the rubber boot designed to keep water from entering the hull through the joint between the outdrive and the transom deserves close scrutiny, and replacement if it shows any signs of deterioration.

External fuel filters, if any, should be cleaned. These filters include ones between the fuel pump and the carb, and the primer/filter type often mounted on the transom near the engine. Almost all outboards have one or both. If the straining element appears to be even slightly clogged or shows any signs of deterioration, replace it.

Remove the spark plugs, clean them and at the same time check the gaps if there are any signs of wear. If they show signs of considerable wear, especially severe "rounding" of the center electrode, replace them because they'll "steal" far more gas than they cost in just a matter of a few weeks. And while the plugs are out of the cylinders, rotate the flywheel gently and slowly by hand, just to make sure it's not frozen (a sign of serious internal rust).

# Spring Launching

Try to rock the flywheel from side to side. If the play seems excessive (that is, if it's more than just a tiny bit), that might mean worn top main bearings and a trip to the shop before serious trouble develops—as it certainly will—thereby avoiding a much larger repair bill.

Now is the proper time to shoot a little grease into all the fittings. Use only the type of grease recommended in the owner's manual, which also shows you where all of those fittings are located. Don't overlook any grease fittings for the steering cable, while you're at it.

Two other parts of the steering cable also deserve attention. It's always a good idea to smear a thin layer of grease along the entire exposed length of the slide tube, meanwhile turning the wheel back and forth a few times to make sure some of that lube also reaches the inside of the tube. And if you haven't already done so, wrap a layer of electrical tape over the joint where the outer sheath for the steering cable meets the sleeve for the slide tube. That helps keep water from getting inside the cable, thereby reducing the probability of rust and freeze-up.

Inspect the lower unit to ensure it is completely full of oil—with no water. The easiest way to do this is to first remove the lower plug, and then quickly insert the oil gun or filler tube's nozzle. Next, remove the top plug and add oil through the bottom hole until it runs out through the top hole. If the oil is discolored or milky, there's a possibility that worn or damaged seals may be allowing water to enter the gearcase, and the lower unit should be checked by a qualified repair shop before you run the engine. This is especially important if the boat is used in salty or brackish water, because those hardened gears rust quickly in that environment and soon become so brittle that gear teeth are easily broken off.

Do not, at any time except in a real on-the-water emergency, use any other lubricant in the lower unit gearcase other than that specified by the engine manufacturer, because it may not have the right specifications and long-term use could lead to serious damage.

The engine has been sitting idle all winter, so it's possible that some of the linkages, such as the throttle and gearshift, no longer have sufficient lubrication in them to move back and forth smoothly. A drop of oil here, and a dab of grease there, does wonders. As a final step, to ensure that everything is properly prepared, spray the powerhead with a moisture displacing lube before replacing the cover.

If you use your rig in salt or brackish water, there should be some sort of zinc anode attached somewhere to the lower unit to protect it from corrosion. Many engines nowadays have this already added at the factory. The anode is the adjustable trim tab at the rear of the cavitation plate, in many cases. If there is none, add one. They're inexpensive, and they can be quickly attached to the cavitation plate via one or two machine screws. If your engine already has one of these "sacrificial" zinc anodes, and it's more than half eaten away by corrosion, replace it. The idea is to let the salty water "eat up" the cheap zinc instead of the more expensive engine.

Check the prop. Small nicks can be filed, and very slight bends in the tips of the blades can be gently tapped out with a hammer and a block of wood. Anything more than that should be fixed by a prop shop. If you don't already have a spare prop aboard, now is the time to "retire" the old propeller as a spare and replace it with something new. Even if the prop is fine, it's a good idea to remove it and carefully spread a very thin layer of grease along the entire length of the shaft before replacing it. Be careful

not to overdo this, because too much grease could work its way into the prop's hub and cause the internal rubber bushing located there to start slipping, which usually means repair or replacement of the prop.

If at this point you're satisfied that the engine is in good shape, now is the time to test it on a hose connection or in a barrel of water, and if you do this before replacing the prop, you can also safely shift gears back and forth to test them while the engine is running. Don't run the engine for more than a minute or two, because even with a hose connection and lots of running water, the gearcase may eventually get warmer than it should.

Never run the engine, even for a few seconds, without water. The water pump, if run in a dry housing, can be seriously damaged or destroyed almost instantly.

Finally, if you would like to make the engine look almost like new, spraying a little touchup paint (available from most outboard dealers) over the scratched or worn areas does a lot to improve its overall appearance.

## The trailer

Check the tires for proper inflation and overall physical condition. If they're showing any signs of cracking and you'll be on the road for anything more than a short haul for spring launching and fall haulout, be safe and replace them.

Inspect the tire rims for rust, particularly where the inner edge of the rubber joins the outside metal rim edge. It doesn't take much in the way of flaking rust here to cause the tire to lose some air each time it hits any kind of bump. If the rust is bad, but the tires appear ok, you should consider replacing the rims—they aren't expensive. Otherwise, a moderate amount of rust can be quickly removed with a wire brush, and repainting offers enough protection for them to last another season or two.

Remove the lugbolts, one at a time, and coat their threads with a thin layer of grease. If the hub has a grease fitting, pump it full—but at the same time be careful not to overfill the internal reservoir to such an extent that grease is forced out past the inside seals where the axle enters the hub, or bearing damage through the intrusion of grit and/or water is eventually likely. If there is no grease fitting on the hub, you should remove the tire completely and repack the bearings by hand.

The trailer winch deserves some attention, too. A spot of oil on all of the working parts takes only a few seconds. Spray the cable (if it's wire) with WD-40 or a similar lubricant. Check the lights and all the attachment bolts to make sure nothing has worked loose.

The two areas most vulnerable to rust damage on any boat trailer are the springs and those exposed pockets in the frame where water can puddle. The springs last many seasons longer if you "paint" them at least every other year—just before that season's first trip to the water—with a mixture of very thick oil (STP, for example) that has a small amount of mineral spirits added. The slightly thinned mix quickly penetrates between the leaves, but after the mineral spirits have evaporated, the thicker oil remains as a protective coat for a very long time.

Once you launch the boat for the first trip of the season, before rushing out on the water, take a few minutes to check the trailer rollers for excessive wear, which usually means insufficient lubrication or improper adjustment, or both. Grease or replace as indicated, and at the same time look for any roller-supporting fastenings that might be loose.

# AIDS TO NAVIGATION

by Fred Menke

Unlike the roads and highways that we drive on, the waterways do not have road signs that tell us our location, the route or distance to a destination, hazards along the way, speed limits or lane markers. Instead, the waterways have aids to navigation. These waterways markers are most often buoys.

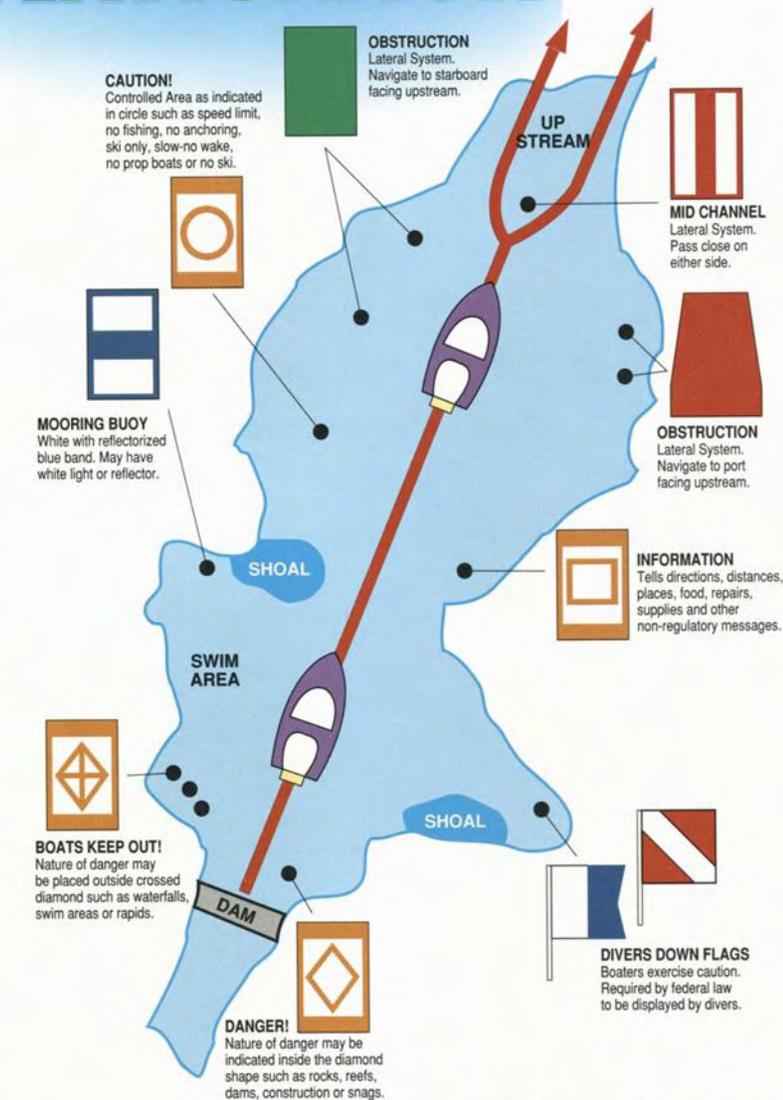
Two aids-to-navigation systems found in Pennsylvania are the "uniform state waterway marking system" and the "lateral system." The uniform state waterway marking system was developed to give the small-boat operator adequate guidance to safe boating areas by marking the presence of either natural or artificial obstructions or hazards. It is also used to mark restricted or controlled areas. The buoys in this system have orange geometric shapes against a white background. The meanings associated with the orange shapes are:

- a vertical open-faced diamond signifies danger.
- a vertical diamond shape with a cross centered within indicates that boats are excluded from the marked area.
- a circular shape indicates that certain operating restrictions are in effect within the marked area.
- a square or rectangular shape contains directions or instructions.

The lateral system is uniformly used in the United States to define the port (left) and starboard (right) sides of a route or channel. Wherever you travel in the country, the system is the same. You don't need to learn a new system for new waters. These buoys are red and green. The expression "red, right, returning" has long been used by the mariner to remember that red buoys are passed on the starboard (right) side of the boat when proceeding upstream. Conversely, green buoys are kept to port (left) side of the boat.

In addition to the uniform state waterway marking system and the lateral system, there are three additional distinctive buoys used in the state system:

• **Safe water marker buoy.** This buoy is commonly referred to as a "mid-channel" buoy. Mid-channel buoys indicate there is navigable water all around the buoy. Mid-channel buoys are colored with red and white vertical stripes.



• **Special marker buoy.** Special marker buoys are not primarily intended to assist in navigation, but to indicate special areas. They may be used, for example, to mark anchorages, cable or pipeline areas, and traffic separation schemes. Special marker buoys are colored solid yellow.

• **Mooring buoy.** This buoy is white with a blue horizontal band. This distinctive color scheme is used to facilitate identification and to avoid confusion with lateral and uniform state waterway marking system aids to navigation.

• **Signs** provide another way the state marks controlled, hazard and restricted areas on Commonwealth waterways under the uniform state waterway marking system. These signs can be found on bridge

abutments, at access areas and even in the water. They have the same importance and meaning as buoys—they are still aids to navigation for boaters.

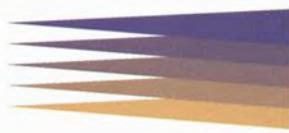
The uniform state waterway marking system and the lateral system have been developed for uniformity in marking channels and hazards to navigation. The system is designed to satisfy the needs of all types of small boats. Boaters should not rely completely on the position or operation of floating aids to navigation. Buoys can be carried away, shifted, capsized, sunk and vandalized. Know the waters on which you are boating and report any discrepancies to the Pennsylvania Fish and Boat Commission.

*Fred Menke is the Commission Aids-to-Navigation Coordinator.*

# WHAT'S NEW

*Americans are rediscovering the pleasures of the solo canoe—of being able to go paddling on a whim, when and where they want, and with no arguments from a reluctant partner.*

**IN  
SOLO CRUISING  
CANOES?**



by  
Cliff Jacobson

*Solo canoes of the 1990s are shorter, narrower and more forgiving than those of a decade ago. Solo canoe designs are getting better and prices are going down. At last, excellent solo canoes are available at prices that casual canoeists can afford.*



photos—Cliff Jacobson



*Dagger's new 33 pound Tupelo sets new standards in small canoe construction. Designed by world class paddler/designer Steve Scarborough, this "Rushton-inspired" canoe is just 10 1/2 feet long and a scant 27 inches wide. You can paddle it kayak-style with a double-bladed paddle as they did in Henry's day, or dart efficiently about with a classic straight blade.*

Two decades ago, the sight of a personally sized solo cruising canoe was a novelty. People who wanted to paddle alone either snuggled up to the center thwart of their tandem canoe or weighted the stern with gear and sat backward on the bow seat. Serious rapids demanded some modifications to the big canoe—knee pads, toe blocks and a lowered kneeling thwart about two feet behind the center. The beauty of the traditional two-person canoe is that, with skill and judgment, it can be paddled safely together or alone, on any reasonable watercourse from the tiniest stream to the largest lake.

Given the utility and versatility of traditional tandem craft, why are so many people suddenly rediscovering purebred solo canoes? I say "rediscovering" because one-person boats are nothing new. Check out your history books. Indian bark canoes were typically small—15 feet or so, and commonly paddled alone. The Eskimo kayak was a solitary craft, too, though occasionally, an ambitious Inuit might put the kids below deck for short trips. Sure, there were war canoes and umiacs and bull boats, but primitive man largely preferred to paddle alone.

Late 19th century Americans embraced the solo canoe with joy and gusto. Big canoes were for work. Little ones were for play. It was this lighthearted philosophy that earned Henry Rushton a flourishing

business building ultralight lapstrake canoes in the 1890s. (Rushton's nine-foot long "Sairy Gamp" weighed just 10 1/2 pounds!) Indeed, it wasn't until well into the 20th century that the efficiency of "paddling together" obsoleted the joy of going alone.

But that's old hat now, for Americans are rediscovering the pleasures of the solo canoe—of being able to go paddling on a whim, when and where they want, and with no arguments from a reluctant partner.

Henry Rushton had his facts straight. He believed it was impossible to design a good solo canoe by simply scaling down the dimensions of a popular tandem craft.

***The median length of today's solo canoes now hovers around 13½ feet. Width at the rails averages about 27 inches. Most modern solo canoes weigh less than 42 pounds, regardless of construction.***

Henry tenaciously believed that the rules for designing "little" canoes were different than those for big canoes. And why not? A paddler weights each end of a tandem canoe. The pilot of a true solo craft rides in the middle!

Rushton believed that solo canoes should be short (13 to 14 1/2 feet) and have a narrow waist (beam) and low sides to cheat the wind. So he made his "personal" canoes much shorter, shallower and thinner than conventional tandem craft of the day. He rounded and narrowed the hulls below the waterline for speed and progressively flared the sides to the gunnels for seaworthiness and stability. Like the ancient Vikings, he inverted or "cheeked" the stems at the waterline (see figure 1). The concave lines improved straight-line tracking, reduced paddling effort and noise, and allowed the hull to lift more gently with waves. Sharpen a pencil with a keen, concave-ground knife, then repeat the experiment with a wedge-ground blade of equal thickness and you'll get the idea.

The Vikings knew all about "inverted stems" and so did Henry Rushton. Only recently have modern solo canoe designers come around to understanding why, for a thousand years, boat builders have "cheeked" the stems of their paddle and sail-powered craft.

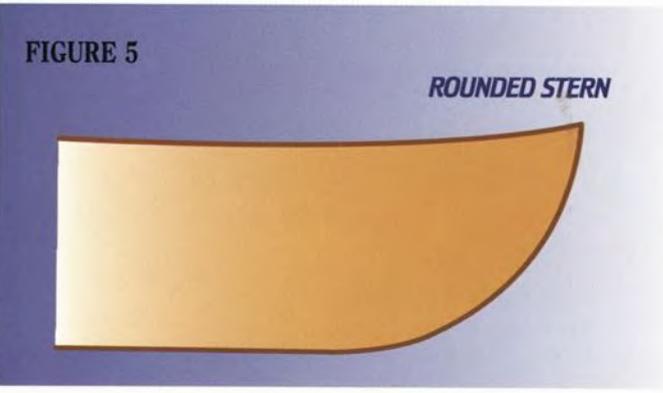
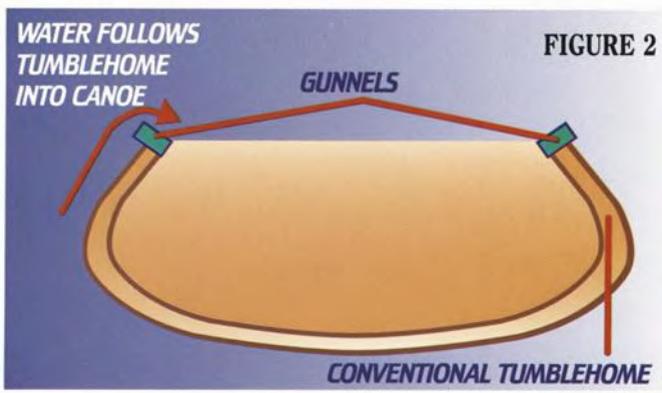
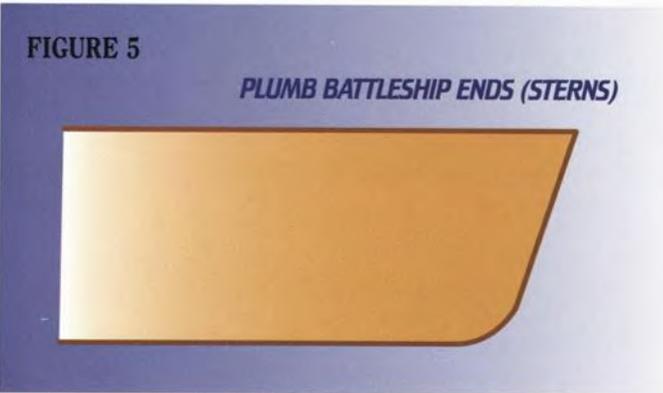
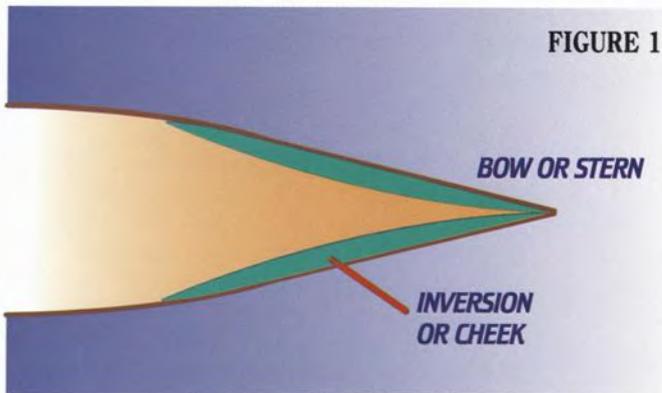
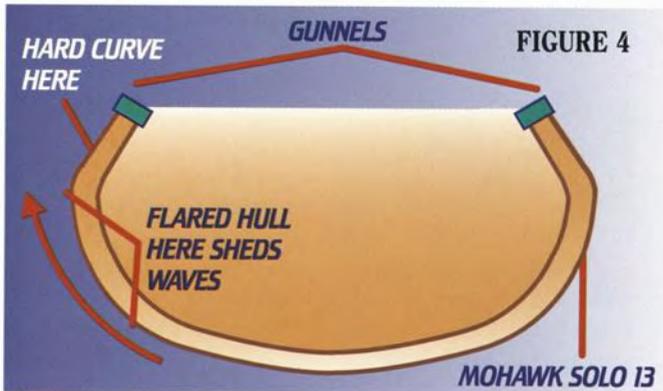
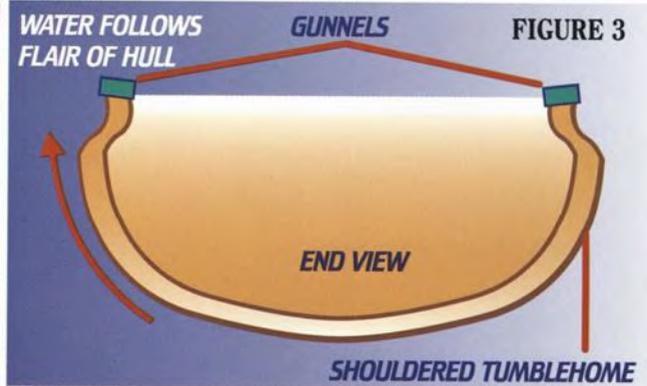
A century has passed since the time of Henry Rushton. From around 1910 to

# WHAT'S NEW

## IN SOLO CRUISING CANOES?



photo: Bob Firth



graphics: Ted Walke

1970, true solo canoes were largely non-existent. When they again emerged in the mid-1970s, few were very good. Most were simply scaled down tandem canoes—too long, too wide and too deep for efficient soloing. Many were squat, ugly beasts, designed for fishing, not paddling. At the other extreme were long (up to 18 feet) lean, zero-rockered hulls built to go fast. Very fast! A shame, they wouldn't turn. Too bad, their designers didn't review the works of Henry Rushton before they built their molds.

## And now

There's a quiet but determined revolution going on in solo canoes. Boats are getting shorter, narrower, lighter and more wholesome to paddle. "Cheek" is once again used on some of the best cruising canoes. A new feature—"shouldered tumblehome"—creates I-beam strength high in the sidewalls, shortens the distance across the gunnels for easier paddling, and allows the trim to be fitted perpendicular to the keel line, rather than angled with the inward flow of the tumblehomed sides.

Paddling styles have mellowed, and even righteous "freestyle" devotees who "never change paddling sides," now occasionally switch when no one is looking. Solo cruising canoes are becoming less tippy, quicker on the flats, smoother in the turns, quieter, more seaworthy, and beautiful.

Building materials continue to evolve: Today's most sophisticated solo canoes feature carbon-fiber/Kevlar<sup>tm</sup> and foam-core construction, polished hardwood trim, and angled cane seats. New on the scene is R-84 Royalite<sup>tm</sup>, which is well-suited to the fabrication of small canoes. Here's an in-depth look at "what's new in solo canoes!"

## "Shouldered tumblehome"

Everyone knows it's easier to paddle a narrow canoe than a wide one. That's because if you paddle closer to the keel line, you won't have to steer so often to keep the craft on track. Until recently, curving in the sides (called "tumblehome") was the traditional way to narrow a hull. However, tumblehome is an unseaworthy configuration because waves follow the curved sidewalls into the canoe (see figure 2).

Instability is another concern. Lean a tumblehomed canoe past its widest point and it becomes an upsetting experience.

Is it possible to flare a hull for seaworthiness without curving in the sides? You

bet! Dave Yost, whose 47 canoe designs are built by nine companies in four countries, discovered that by extending the canoe sides upward to a double radiused shoulder, the canoe could be made narrow at the rails yet flared below. *Voila!* "Shouldered tumblehome" was born.

"Shouldered tumblehome" (figure 3) is a hot, new design feature you can see. Many of the world's best whitewater canoes have had it for years, but now it is applied to high-performance cruising canoes. Higher manufacturing costs (you need a two-piece mold) is one reason for the delay. The untraditional look of the radiused shoulder is another. But the advantages of a radiused hull go beyond improved seaworthiness, and include:

- The rails (gunnels) can be mounted perpendicular to the keel line and flush with thwarts and seats. This produces a stronger trim joint and a cleaner, more pleasing look.
- The "shouldered curve" functions as an I-beam and strengthens the sidewall below the rails. The result is that lighter-gunned stock can be used.

Until the advent of shouldered tumblehome, short, slender people have had to make do with wickedly tumblehomed craft. Now, there is a variety of "intimately sized," flared canoes that are also stable and dry.

Modern paddling techniques call for heeling canoes to enhance their turning ability. Traditionally tumblehomed canoes capsize during these maneuvers. Fully flared craft with shouldered rails do not.

Nearly all of the best modern fiberglass and Kevlar<sup>tm</sup> solo cruising canoes now feature some measure of shouldered tumblehome in the sides. Royalex<sup>tm</sup> is hard to mold in narrow, tight curves, so to keep costs down, some liberties must be taken with boats that are built from this material. A hard curve just below the rail, like that used on the R-84 Royalite<sup>tm</sup>, Mohawk 13-footer, is an example (figure 4). The quick "turn-in" here preserves wave-shedding flare below the waterline and increases hull strength near the gunnels. The tucked in rail makes the canoe narrower and easier to paddle.

## New designs

Bell Canoe Works' 13-foot Flashfire and 14-foot Wildfire exemplify much of what's new in solo canoes. These two Dave Yost-designed hulls feature severe shouldered tumblehome, reasonable rocker, and soft, gently rounded, flared stems that stand in stark contrast to the plumb battleship ends

(figure 5) that were considered state-of-the-art two decades ago.

Square stems increase waterline length so they continue to be used on the fastest canoes. However, plumb stems resist turns and are easily deflected by side currents. They also break when the craft hits rocks. Gently snug a plumb-stemmed canoe head-on into a sandy beach and you'll discover how awkward this design is for all-round paddling.

## Smaller canoe than you think you need

My first solo canoe was a dinosaur. It measured 15 1/2 feet long and was a full 30 inches wide at the rails. Friend Bob Brown and I designed it to carry 600 pounds. I weigh 135 and commonly trip with a 65-pound kit. About 250, or maybe 300 pounds at the outside, is a reasonable "design maximum load" for a solo canoe that will be used by someone my size.

Nonetheless, after years of paddling brawny tandem canoes, I was convinced that "bigger was better." I believed that a solo canoe should have approximately half the volume of a tandem canoe.

Within the year, I was disenchanted with my new canoe. It pounded in waves, easily blew off course and was awkwardly wide to paddle. I simply did not need such a huge canoe. I slowly came to realize the merit of Rushton's philosophy that a solo cruising canoe should be "smaller than you think you need!"

## Depth, beam, rocker

Some of the most popular decade-old solo canoes combined a narrow hull with a nearly straight keel line. These canoes were fast but not seaworthy. Manufacturers responded by raising the sides (some downriver racing canoes were 14 to 15 inches deep) and ends to deflect waves and spray. These canoes were very tippy, so the seats were installed low in the hull—about eight inches off the floor. By applying severe tumblehome at the center, the paddling station was narrowed to a respectable 23 to 26 inches. The resulting canoes were fast on the flats and dry in head-on waves and chop.

On all other accounts, these high-sided solo canoes were a disaster. The pilot sat deep inside the hull with the gunnels near arm-pit height. Waves from abeam followed the inward curve of the tumblehomed sides and dumped water into the paddler's lap. The zero-rockered hull

## *Solo canoe designs are getting better and prices are going down. At last, excellent solo canoes are available at prices that casual canoeists can afford.*

plowed straight ahead, no matter what. These were awful canoes, pure and simple.

Fortunately, you'll find none of these horrible design features on modern solo canoes. They have been replaced with low (11 to 12 inches) progressively flared sides, moderately rockered ends and shouldered tumblehome. Overall length has settled at 13 to 14 1/2 feet. Shorter canoes are available for efficient "dinging around" on small waterways, and longer (15 1/2-foot) models are popular among lake country enthusiasts. Solo canoes much longer than 15 1/2 feet are unceremoniously passing into oblivion.

Judicious use of shouldered tumblehome has allowed solo canoes to be built quite narrow at the rails. About 26 to 28 inches is a comfortable width for an all-around cruiser. An 11- or 12-inch center depth discourages wind and keeps out waves. If you need more depth than 12 inches—as when heavily loaded, or running rapids—use a fabric splash cover on your canoe.

### **Weight, strength**

The lighter a solo canoe, the better. Something dies when the weight of a solo canoe climbs above 42 pounds. Except for whitewater or dead-serious bushwhacking, high strength is not necessary in a solo canoe.

Simple physics (force equals mass times acceleration) suggest that a 300-pound solo canoe (weight of canoe, paddler and gear) traveling at X miles an hour, will, on impact, incur half the damage of a 600-pound tandem canoe moving at the same speed. In fact, under typical field conditions, a well-built 35-pound solo canoe may actually be stronger than a well-built 70-pound tandem canoe. This is harsh news to paddlers who are convinced that lightweight solo canoes are not strong enough for use on rocky Pennsylvania streams.

Fortunately, for those of us who love canoeing, the idea that "lighter is better" is finally catching on.

### **Modern materials, new methods**

Except for a new Royalex formulation, that is, R-84 Royalite™, and a specially engineered modification, Dagger's R-Light™, there's not much new in canoe building materials. There are, however, significant differences in how resins and fabrics are now used to build solo canoes.

Two decades ago, an "all Kevlar™" solo canoe was considered state of the art, despite evidence that it was better to use selective materials in areas where high strength, flexibility, stiffness and light weight were a concern.

For example, Kevlar™ is very strong and light—a good overall foundation. Another material, S-glass (a form of fiberglass), is more abrasion-resistant and less expensive than Kevlar™. Closed-cell foam can be used in place of Kevlar™ or fiberglass to lighten and stiffen laminates. Jet-black carbon fiber is extremely light and strong. It's brittleness can be tamed by alloying it with other more flexible materials. Wenonah canoes in Winonah, Minnesota, and Bell Canoe Works in Minneapolis, have touted this "multi-laminate" building philosophy for years. Only recently has it begun to spread like wildfire to other canoe makers.

Bell Canoe Works' black-gold laminate reflects much of what's new in solo canoe construction. This high-tech layup uses S-glass, carbon fiber, golden Kevlar™ and honeycomb foam core material in the hull. Trim consists of spruce rails, ash-caned seat and walnut decks. Bell's new 14-foot Wildfire solo canoe weighs just 33 pounds in this unique black-gold construction. Cost is \$1,750.

At the low-cost end of the high-tech spectrum is Bell's unique fiberlar layup. You get hand-laid E-glass (conventional fiberglass), Kevlar™ reinforcement, composite core, aluminum gunnels and caned ash seat. A Wildfire canoe costs \$950 in fiberlar construction. Weight is a very strong 41 pounds.

### **R-84 Royalite™ and R-Light™**

Uniroyal's R-84 Royalite, and Dagger's

unique "R-Light," have the same foam core and ABS substrate as conventional Royalex™, but use a weatherable plastic skin in place of the usual vinyl outer layer. The new plastic skin is vulcanized to the ABS material so it won't come loose. The resultant "R-84" product is stiffer, and about 10 percent lighter, than conventional vinyl-covered Royalex™. To produce durable, fine-lined canoes, Dagger had to re-engineer the basic R-84 Royalite™ blank and production process—hence, the trade name "R-Light." The exciting news is that solo canoes built of these modified Royalex materials are only slightly heavier, and much less expensive than those built from state-of-the-art fiberglass composites.

Dagger's new 33-pound, R-Light™ Tupelo sets new standards in small canoe construction. Designed by world class paddler/designer Steve Scarborough, this "Rushton-inspired" canoe is just 10 1/2 feet long and a scant 27 inches wide. You can paddle it kayak-style with a double-bladed paddle as they did in Henry's day, or dart efficiently about with a classic straight blade. The boat retails for \$525.

In Tupelo's wake comes the Dagger Sojourn. It's the first R-Light™ solo canoe built in the grand "Minnesota" touring tradition. At 14 feet, 9 inches with a 27-inch beam at the gunnels, it will safely and comfortably carry up to 480 pounds of paddler and gear speedily across the biggest Pennsylvania lakes. Dagger is building the mold right now. They say the new cruiser will tip the scales at around 43 pounds.

As you can see, there's a lot that's new in solo cruising canoes. Boats of the 1990s are shorter, narrower and more forgiving than those of a decade ago. All-Kevlar™ boats are passe. The most advanced layups now feature a careful blend of Kevlar™, fiberglass, carbon-fiber and foam. Shouldered tumblehome is the norm, and rockered, gently radiused ends have all but replaced plumb stems and straight keel-lines. The median length now hovers around 13 1/2 feet. Width at the rails averages about 27 inches. Most modern solo canoes weigh less than 42 pounds, regardless of construction.

Most exciting is the clever use of low-cost, high-tech materials, like Bell's sophisticated but inexpensive fiberlar layup. Equally uplifting is the recent development of lightweight R-84 Royalite and R-Light™. Solo canoe designs are getting better and prices are going down. At last, excellent solo canoes are available at prices that casual canoeists can afford. ▀

Five Locks property  
Berks County

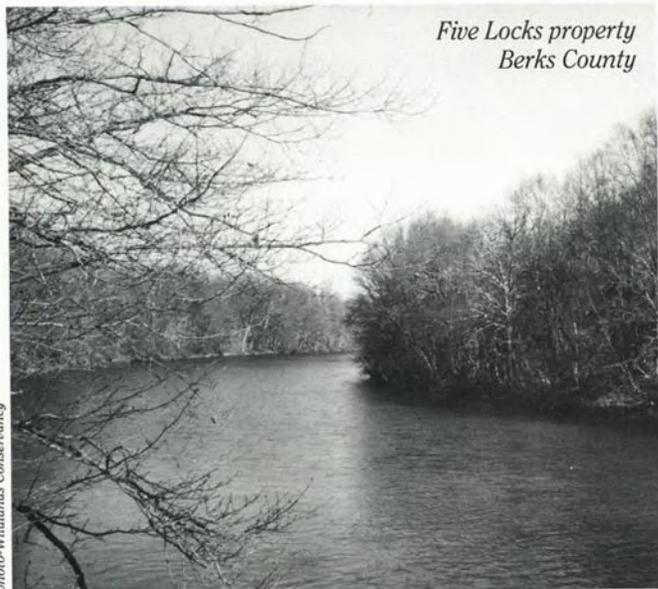


photo-Wildlands Conservancy

## Commission Obtains Five Locks Property

The Fish and Boat Commission, in conjunction with the Wildlands Conservancy/Wildlands Trust Fund, has acquired more than 20 acres of land in Berks County. The purchase secures much-needed public access to the Schuylkill River.

The Commission formally obtained the 21.58-acre tract in Perry Township on December 5. The property, commonly referred to as "Five Locks," is named after the series of locks once located nearby along the former Schuylkill Canal.

The Commission's immediate plan for Five Locks is the establishment of walk-in access for anglers and small-craft boaters. A small parking area is planned for the future, permitting vehicles with car-top boat carriers. This access is considered significant by the Fish and Boat Commission because it facilitates expanded recreational opportunities along the Schuylkill, a key southeast Pennsylvania river that previously offered only limited public access.

The purchase of Five Locks from the Berks County Conservancy was made possible through joint cooperation by the Fish and Boat Commission and the Wildlands Conservancy's land preservation arm, the Wildlands Trust Fund.

The Berks County Conservancy originally obtained the Five Locks tract in 1980 as a donation. To facilitate conveyance of the land to the Commission, the Wildlands Conservancy/Wildlands Trust Fund evenly split the \$1,000 per-acre asking price with the agency. The Wildlands Conservancy transferred its ownership interest to the Commission at a ceremony on the Five Locks property, last December.

"I'm very pleased to have had the opportunity to participate in this transfer," said Fish and Boat Commissioner Donald Lacy of Reading. "The Five Locks project is in keeping with our mission to provide fishing and boating opportunities through the protection and management of aquatic resources. This is the first of what I hope are many such joint efforts between this agency and these conservation groups."

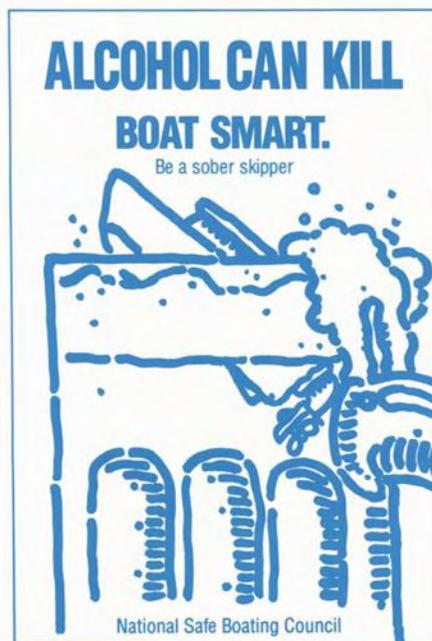
## Boating Maintains Congressional Committee

In the wake of Congressional committee cuts and efforts to streamline the legislative process, boat owners, builders, and the sportfishing and waterfront communities will still have a forum in the new Congress dedicated to their issues and needs. Previously under the jurisdiction of the House Merchant Marine and Fisheries Committee, boating and related issues will be the focus of a subcommittee in the reconstituted Transportation and Infrastructure Committee. That committee will be chaired by Congressman Bud Shuster (R-PA). Pennsylvania ranks 11th in the number of boat registrations nationally and is in the top 20 new marine products sales states.

Shuster has appointed Congressman Howard Coble (R-NC), a long-standing supporter of the recreational and commercial maritime communities, to chair the new subcommittee, which will oversee U.S. Coast Guard and related issues. Coble, a veteran of active Coast Guard service who has served 18 years in the Coast Guard Reserve, has been active in supporting boating issues, and he understands the importance of the industry to his state's economy. North Carolina is 14th in boat registrations and boasts \$152 million in annual new marine product sales.

Among other boating issues that will be considered by federal lawmakers in the new Congress are:

- Changes to hull identification numbers to combat theft and fraud and enhance lenders' security interests.
- Safeguarding the use of boating safety funds raised in the form of user fees paid by taxes on motorboat fuel and fishing gear.
- Reconsidering the fair cost of radio license fees applicable to boats.
- Determining realistic mileage standards for light trucks and utility vehicles that are often used to tow boats.
- Many environmental issues affecting boat use and production.



# BOAT TRAILER SECURITY



BY BOB STEARNS

Boat trailer theft is largely a matter of opportunity. The more vulnerable it is, the more likely it is to be stolen. And even though empty trailers at boat ramps do sometimes get stolen, they are not nearly as attractive to the thief when the boat is not aboard. Camper trailers fall into the same category as trailers with boats.

Anything at all that makes the "target" more difficult and time-consuming to move is going to reduce its theft potential. But don't consider a trailer parked right by your house and someone home all the time a sufficient deterrent. Many unfortunate former boat owners have learned otherwise the expensive way.

The best way to protect a trailer is to lock it up inside a building. Lacking that capability, there are a number of effective "slow-downs" that go a long way toward protecting your rig not only at home, but also on the road (that is, a motel parking lot) or at the boat ramp. Some of the new locks now on the market make moving the trailer virtually impossible.

## The trailer

The trailer's components need protection as much as the entire rig. Just having the winch handle disappear while you're on the water is bad enough, but if the winch is gone, too, the situation can become inconvenient and very troublesome. Fortunately, the easy way to keep those items in place is inexpensive. Just use a hammer and cold chisel to seriously deform the threads (the portion that projects beyond the nuts) of all bolts used to hold those items in place. That way the nuts cannot be removed without a hacksaw—which you can do yourself if replacement is ever needed, but would take more time than most crooks are willing to commit.

The next effort should be aimed toward immobilizing the trailer. It's worth the \$120 to \$200 cost of a specially designed super-hard locking system. If you live in an area where boat/trailer theft is really a problem, consider locking at least two trailer

**THE BEST PADLOCK, CABLE, OR CHAIN YOU CAN FIND IN YOUR NEIGHBORHOOD HARDWARE STORE WON'T LAST A HALF-SECOND. THE CUTTERS USED BY THE CROOKS ARE FAR BETTER THAN THE ONE THE CLERK USED TO CUT THE CABLE OR CHAIN WHEN YOU BOUGHT IT.**

wheels. Or use a lock on one wheel and a chain with a heavy eyebolt buried in the ground. The eyebolt can be the 3-foot to 4-foot screw-in house trailer-type anchor, or set it in a 5-gallon paint can filled with concrete and buried in the ground.

If your trailer has a dolly jack, that can also be used as an additional slowdown. When the trailer tongue is elevated to its highest position via the jack, attach a case-hardened padlock to the vertical support where it emerges through the top of the jack. You might have to drill a hole or two for this, but an elevated trailer tongue is hard to attach to a bumper or hitch ball for a quick getaway. Make sure all the bolts that hold the jack in place have had their threads chisled so they cannot be removed, either.

A self-contained trailer alarm might also help—in the right circumstances—but it in no way can replace real physical security measures.

The right locks for the trailer hitch coupler also serve as slowdowns. For example, a padlock for the lever that opens the coupler so that the hitch ball can be inserted. It should be the armored variety designed just for that purpose, and therefore leaves nothing exposed that can be snipped with a boltcutter.

Protecting the trailer tires from theft is simple. Most auto stores sell mag wheel locks for around \$35. They come as a set of four, along with the special key used to install and remove them. On an auto they replace one of the lug nuts on each tire. For the boat trailer with just two tires, use two on each wheel, as far apart as possible to preserve the wheel's balance. Choose the mag locks that have the lowest profile. And if your trailer uses lug bolts instead of lug nuts, the same store will likely have the threaded studs needed to convert the mag nuts to bolts, and they cost about a buck each.

## The boat

If the boat has one or more outboards and they're bolted on, consider heavy duty hardened chain and similar locks. Lock one end of the chain securely around the lower unit, and the other around the trailer frame. If the outboard is the removable type, use an outboard motor lock for the clamp screws.

## Tow vehicle

Most states require safety chains between the trailer and the tow vehicle. A hardened lock on them helps while the trailer is attached. So does a hidden ignition cutoff switch in the tow vehicle. That way both car and trailer are far less likely to disappear while you're out on the water.



*Chisel the thread ends so trailer components can't be removed easily.*



*A chain and padlock are useful deterrents if they are both made of cut-proof steel.*



*Spot-welding prevents the theft of expensive rollers.*



## TRAILER LOCKS THAT REALLY WORK

The best trailer locks aren't cheap, but they cost far, far less than the tab for replacing your entire rig. Keep in mind also that once your rig is gone, the recovery rate is very, very poor. And even if you do get it back, it will surely be stripped of everything that can be removed.

A boat on a trailer is an inviting target. Essentially, it's a theft waiting to happen. It already has its own ready-to-go transportation. And the serious thief arrives with massive five-foot bolt cutters that can sever anything except the most expensive hard steel—if it's thick enough. The best padlock, cable, or chain you can find in your neighborhood hardware store won't last a half-second. The cutters used by the crooks are far better than the one the clerk used to cut the cable or chain when you bought it.

But now there are some really good locks on the market. One system was developed by Miami insurance agent Bob Hammer and his son Rob in response to the continuing claims his company was paying out on boat thefts. It's called the Hammerlock, and it's one of the best boat trailer immobilizers I've seen to date.

One version is patterned after the famous Denver Boot that traffic cops all over the U.S. now use to keep autos stationary if they're not supposed to be used. It has yet to be defeated by the bad guys.

Made of extremely hard steel, its components are much too large and thick to be cut by any bolt cutters. It consists of a 5/16-inch-thick plate that covers the bearing hub, a one-inch-thick hardened bar that slides through one of the spoke holes in the trailer wheel, and a one-inch rectangular rod that slides through a receiver at the outside of the tire. A special hardened padlock, with 1/2-inch-thick hasp, fits inside a special cover where it cannot be reached with bolt cutters.

The Hammerlock (available in three models) isn't as complex to use as it sounds, and takes just seconds to install or remove. Provided you have the key, because the lock also cannot be defeated by drilling. Without a key, the only way it's going to come off is via cutting torch. That takes both bulky equipment and time. Everyone in the neighborhood will see it and hear the racket before the job is finished.

Besides the Bootlock model, the company also offers a "cork-screw" design that goes around the axle and through a hole in the wheel rim. They also have a special super-hard chain lock that also cannot be cut with bolt cutters because it's made with an electrogalvanized triple heat-treated alloy (SAE 8630) chain that has 3/8-inch links with a Rockwell Hardness of 62 (tough enough to ruin an expensive bolt cutter's jaws).

For more information on the Hammerlock systems, contact Hammerlock Industries, Inc., 10120 SW 40 Street, Miami, FL 33165. Telephone (305) 552-8345, fax (305) 223-6097.—BS.

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