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A Guide to Safe and Efficient Recreational Boating in Florida[1]

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BOATING OPPORTUNITIES

Florida's thousand-mile coastline and its numerous lakes and rivers offers us a wide variety of recreational boating opportunities. This is evidenced by the continuing rise in the number of boat registrations in Florida. In 1989 the total exceeded 700,000. Officials estimate this will double by the turn of the century. If you own or plan to buy a power boat, remember that the main expense will be fuel. This circular is intended to provide the reader with information on selecting a power boat, factors that affect fuel consumption, how to operate your boat efficiently, and maintaining and operating your boat in a safe manner. Alternatives to power boating will also be discussed, such as sailing and canoeing. By keeping some of these points in mind, you can save energy, money, and aggravation.

BUYING A POWER BOAT

"Exhilarating" and "exasperating" are two words used to express emotions sometimes felt by power boaters. Others will say, "The two happiest days of my life was the day I purchased my boat and the day I sold it." Too many times power boats are purchased for eye appeal without considering fuel economy. Owners later find they are ill-prepared to pay the operating costs. Even a relatively small outboard boat can use as much gas in one day of pleasure cruising as an automobile will use during a whole week. Fuel economy in automobiles is usually measured in miles per gallon; in boats it is considered in gallons per hour. Outboards have become more fuel efficient than earlier models with the same horsepower.

Before looking at boats, you should plan boating activities. One should ask, "Is it going to be used for off-shore fishing, lake or river fishing, pleasure riding, water skiing, scuba or snorkeling, or a combination?" Some boats used in fishing competition are selected for high speed to get to the fishing spot in a short period of time. These have very poor fuel efficiency rates, or high gallons per hour. Generally, the higher the horsepower (hp), the more gas a boat will use, although this may vary among manufacturers.

Hull design

Large displacement hulls are generally self-limiting in terms of speed; as power increases, speed increases very little. Examples of these designs are large single-hull sailboats, tugboats and merchantships. Flat planing hulls achieve relatively high speed with only moderate power, however, there is some sacrifice made to seaworthiness in these hulls

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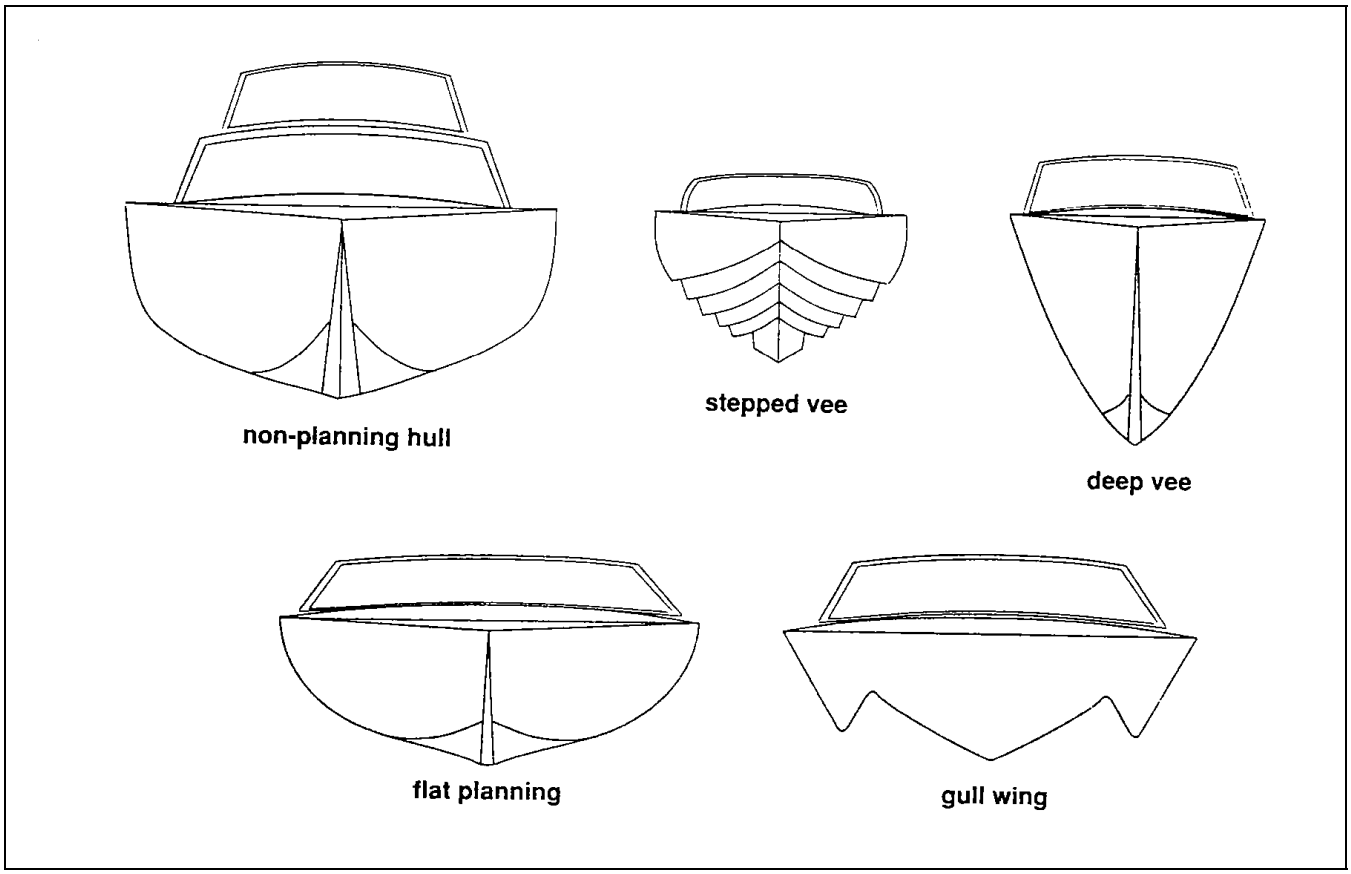

Figure 1. Examples of Single-Hull Designs.

to achieve the speeds. Some multi-hull configurations, such as catamarans and trimarans, are a compromise betwen the two, providing both speed and seaworthiness (Figure 1).

If you plan to use the boat primarily in rivers, lakes, bays or other sheltered bodies of water where rough water is not expected, then a relatively flat-bottomed boat will provide easy planing at low speeds. If you expect moderately rough water, then either the steeped vee, gull wing hull or multi-hull are good choices as a compromise between easy planing and ability to slice through moderate chop. The deep vee hulls will provide a better ride through very rough waters. The disadvantage is that they generally require a higher horsepower motor to maintain a good operational plane compared to the other hulls described earlier.

Before buying, test ride in the conditions in which you expect to operate the boat. Most dealers will provide this courtesy. Ask other people about the particular design you wish to purchase. Although the initial expense of a boat can be staggering, a poor selection in terms of fuel economy can be equally as devastating.

Engines

When selecting an engine for your boat, is it better to go with one or two engines? Virtually on all points, one engine is better when compared on a total horsepower basis, on a given boat. Buying just one engine is much cheaper. The fuel efficiency for one engine is better, there is less propeller and foot drag and generally, the top speed will be greater.

A marginal advantage of two engines is security. If one engine breaks down, you have another to get you home, but this may be overkill. A better solution would be having a small spare engine of 5-10 horsepower. This small engine can also provide an economical trolling speed when used for fishing, yet can power even a large boat to safe harbor in the event of breakdown. A cheaper investment would be a reliable two-way radio for security. The Coast Guard can be contacted about emergencies or mechanical problems.

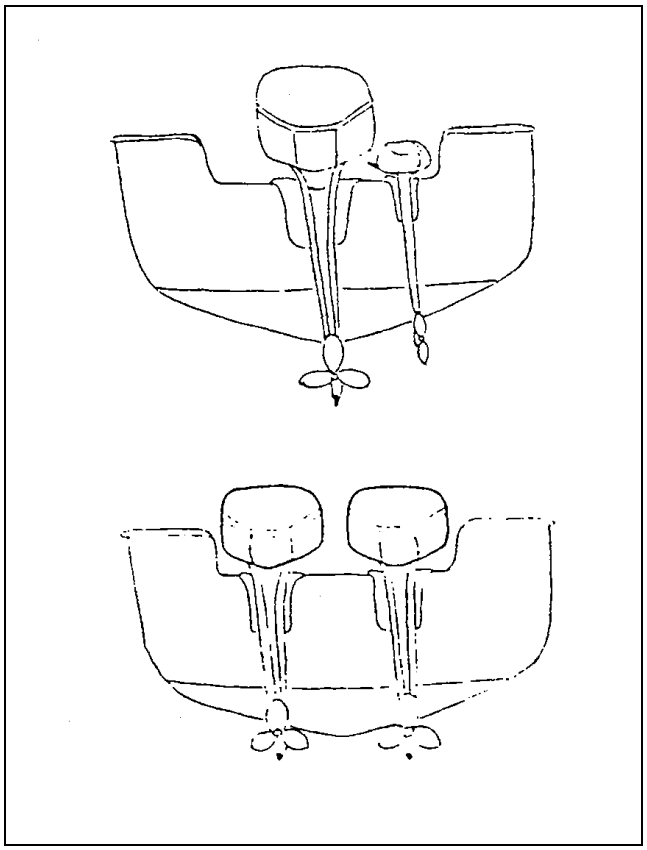

Figure 2. One engine is more efficient than two engines totalling the same HP.

Two engines should not be selected on the basis of providing power. Propellers can be selected to provide power or speed. The propeller selection should be based on the requirements of the owner. Propellers can be either speed- or power-oriented. If the boat will be used for water skiing or activities requiring a lot of power, a power propeller will be required. If speed is the goal, a speed propeller will be required.

For outboard motors, shafts are provided for three transom heights-15, 20 and 28 inches. The motor should be selected based upon the boat's transom height. Providing too long of a shaft will provide excessive drag, waste energy and result in lower speed. Providing too short of a shaft will create excessive cavitation, and inefficient results.

There are three categories of recreational power boats. The **outboard** uses a relatively lightweight two-cycle transom-mounted engine(s) (Figure 2). The **inboard** has four-cycle engine(s) arranged so that just the propeller and shaft exit the hull at a fixed angle. This configuration is generally the least efficient of the three because of the larger angle of propulsion to the plane of the bottom of the hull; also they usually have a deeper draft. This is often compensated for by increased power but less fuel efficiency. The **inboard/outboard** is a combination using one or more four-cycle engines coupled with the powertrain located outside the hull through the rear transom. The advantages are increased fuel efficiency and no mixing of fuel and oil is required on four cylinder engines. Some sacrifice is made to efficiency because of the extra weight of a four-cycle engine. The outboard is most popular because of its lower cost, lightness, versatility and easier maintenance. In terms of overall efficiency, the inboard/outboard and the outboard are comparable per given horsepower.

Navigational Aids and Other Accessories

If the boat is to be used off-shore for deep sea fishing, consider purchasing electronic fish-finding or depth-finding equipment. These devices assist you in finding fish or where your favorite fishing hole is without wasting fuel and time. They can help verify your position by comparing the depth of the water with navigational charts.

When fishing off-shore, a good navigational chart is a must. Advancements in technology has made low cost electronic navigational receivers available, which enable boat operators to determine their exact position using signals from navigational aids (LORAN) or satellites orbiting earth. In addition, a good magnetic compass is a must for the off-shore boater. Getting to your destination safely and efficiently is the ultimate objective.

A fuel flow meter can be a valuable aid in reducing fuel use. It provides information on the rate at which fuel is being used and the amount of fuel remaining in the tank. The fuel flow meter can indicate overall engine performance on any given trip. By monitoring the flow meter, more accurate decisions can be made about optimum fuel efficient power settings. This meter can also indicate when a tune-up is needed. When 5% - 10% more fuel is being used at any particular power setting, a tune-up is probably required.

Speed

Once you buy your powerboat, the most inexpensive way to conserve fuel is to properly operate it by reducing your speed. Most recreational powerboats have their best fuel efficiency considerably lower than wide open. Going from three-quarters to

full power, requires 25% more fuel and only increase your speed by a couple of knots or 4% - 6%, although this will vary from boat to boat.

The one exception is if a boat is underpowered and cannot get on an efficient planing position. A boat with a planing hull operates most efficiently when it reaches a plane; that is, it rides high on the water's surface tension with a relatively small amount of its surface area coming into contact with the water. Most outboard boats reach a planing efficiency between 12mph - 18 mph, or in boating terminology, 10 to 15 knots. Unless speed restrictions exist, it is always best to operate the boat on a plane when getting to and from your objective. However, adding more speed after one has reached a planing position will generally result in much less fuel efficiency. In fact, after a boat reaches planing speed, the throttle can usually be cut back without a corresponding drop in speed. It takes more power to get the boat up on a plane, but once achieved, less power is required to maintain the plane. Unlike large displacement cruisers, a fast planing hull is less efficient at low speeds than at moderate speeds. Studies have indicated that by quickly getting up on a plane and throttling back to maintain that plane, fuel use can be cut by as much as 50 % in terms of miles traveled per gallon of fuel. On large displacement hulls, running at full throttle will merely waste fuel because the gain in speed is disproportionately poor compared to the fuel used.

Another technique for improving efficiency is to compare the tachometer revolutions per minute (rpm) reading with your speedometer. If the boat travels at 22 mph at 4,000 rpm and at 24 mph at 5,000 rpm, you will burn considerably more fuel at the 5,000 rpm reading with only a very small gain in speed.

Skills at improving your energy efficiency are easy to develop with just a little bit of trial and error experience. As with the fuel meter, the tachometer can also indicate when a tune-up or hull cleaning is required. A hull that is dirty or rough with sea growth or scrapes will be much less efficient than one that is smooth and waxed.

Trim

The angle at which your boat moves through the water is referred to as trim. You can plow, skim or drag through the water depending on your trim. (See Figure 3) Placing your engine drive at its best angle will allow you to go through the water with minimum

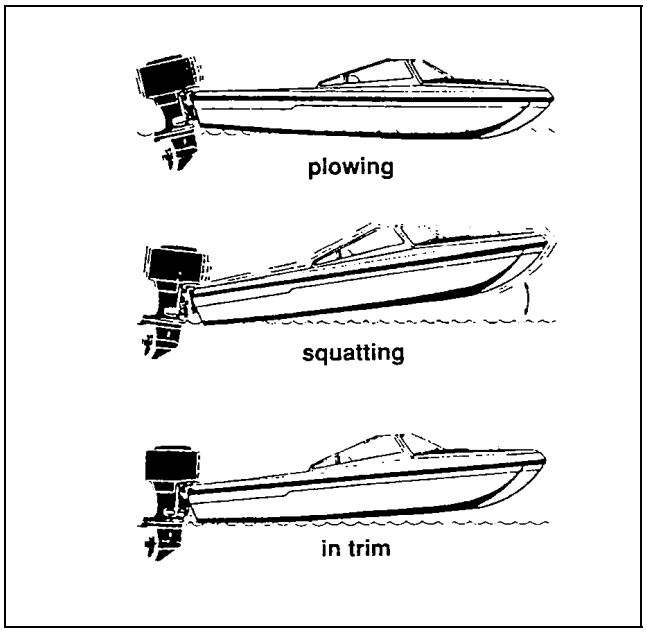

Figure 3. Trim for effeciency.

resistance. Poor trim angles waste fuel. If set too high, the boat will nose down and plow through the water. If too low, it will squat. On smaller outboards, the trim angle must be manually set with a motor bracket before leaving the dock. A good option to purchase for larger outboards and stern drives is a power trim. By using power trim features, a boat can attain a plane position quicker and then operate more efficiently at various speeds and loads. The trim angle for displacement hulls on larger cruisers is usually fixed and determined by the design, but can sometimes be modified using trim tabs.

PLANNING YOUR TRIP

One should plan for boating activities such as specific destination, and how long you plan to be gone. Good planning will result in a more enjoyable trip. Checking the weather, taking into consideration wind and tidal currents, and using them to advantage if possible is always a wise choice. The use of a navigational chart to plot your voyage is a good policy and will get you to your destination by the safest, fastest and shortest route.

SAFETY

Safety should be a key concern when operating a boat. Over the last several years, Florida's boating death rate has more than doubled the national average. In 1988, 105 people died on Florida waters and 79 died in 1989. Although this represents a decrease, safety should still be a paramount issue

when driving and riding in a boat. More than half of the boating deaths are alcohol related. An intoxicated passenger is particularly at risk. They are the ones needing life jackets the most, but often resist when directed to put one on. It may be easier to discharge intoxicated passengers on land. Many deaths were attributed to people falling out of boats, operating boats at excessive speeds, and collisions with other boats or fixed objects. The operator should know what is going on in his boat and in surrounding boats. An even better solution is to minimize the consumption of alcohol on your boat. Anyone consuming alcohol should not be allowed to operate the boat.

Many areas are requesting enforcement of speed limits and other boating safety measures. Common sense and the same general rules should apply to operating the boat as when operating an automobile. The Coast Guard and local Marine patrols are responsible for enforcing boating regulations. They have the authority to fine boaters operating in an unsafe manner or violating regulations, and they can impound boats when appropriate.

Good safety procedures:

- Plan your trip carefully. Take extra water, food and fuel if appropriate.
- Use the 1/3 rule. After 1/3 of your fuel is used, return to port. This provides about 1/3 for emergencies.
- Check the weather before leaving port.
- Be alert to sudden afternoon thunderstorms.
- Keep all the lights and navigational equipment in good operating order.
- Make sure you have a basic repair kit, flares, whistles, and horns on board.
- Make sure you have an accurate compass. If used off-shore, a two-way radio is desirable.
- Carry a life preserver for each person on board.
- Instruct passengers on how to wear a cushion preserver or life jacket. Children should wear jackets.
- Proceed with caution when leaving a dock.
- Slow down when approaching passing sailboats, rowboats, canoes and people fishing. Watch your wake. Boaters are responsible for all damage.
- Don't overload your boat.
- Board small boats and canoes low and amidship.
- When training other operators, practice away from other craft.
- Water skiers should be familiar with signals and should include a safety observer.
- Be familiar with the rules of the waterways. Use proper whistles, lighting-check channel markers, and other navigational aids.
- Use safe practices when fueling the boat; wipe spills and ventilate.
- When operating in restricted waters, remember to stay to the right of the channel and to reduce speed.
- Report unsafe boaters to the Coast Guard or Florida Marine Patrol(FMP). (FMP monitors channel 6.)

NATURAL RESOURCES

Boaters should know that the wake can damage sensitive wetland vegetation and even e rode shorelines. There are many areas in Florida that are inhabited by the endangered manatee. Many manatees are killed every year by power boat propellers and collisions. The docile slow moving manatees have difficulty avoiding speeding boats. Boaters operating in areas inhabited by manatees should be on the alert, observe warning signs, and use discretionary speeds.

Making proper use of navigational charts and visually and physically checking water depth will prevent groundings. Running aground can not only damage props and engines, but coral formations, seagrass beds, and other marine bottoms as well. Fuel and oil spills are also harmful and should be avoided. Major spills are unlawful and should be reported to USGG or FMP.

REQUIRED LICENSES

With few exceptions, most boats in Florida are required to have a number and license decal. The cost of this decal varies depending on the boat size and type of power. Licenses are generally good for one year, from June to June.

Florida requires most people fishing in fresh or from a boat in salt water to have a fishing license as well. There are a few exceptions which include individuals under the age of 16, older than 64 years, certain members of the armed forces on leave, and those that are disabled. Check with your county fish and game commision, FMP licensing agency for requirements.

FISHING ALTERNATIVES

Money, fuel, and time can be saved by fishing near shore. Many Floridians are unaware that some really good-tasting and fun game fish can be caught relatively close to shore. It is not necessary to go off-shore 10 to 20, even 30 to 40 miles to catch king mackerel, red snapper, dolphin, yellow fin tuna or amberjack in order to have fun. There are a number of fish that can be caught either in inland waterways or close to shore. Bluefish can usually be caught from the surf on both coasts in late fall or winter. Bonefish, usually located in shallow-water flats on the west coast of Florida, provide sports fishermen a really good fight for their size. On a seasonal basis, there are also trout, snook, and redfish. On a perennial basis, there are mangrove snapper, black drum, sheepshead, yellow tail and whiting that can be caught in coastal salt and brackish waters. These fish are equivalent to freshwater brim. They are fun to catch, usually plentiful in number, and delicious to eat. Most Florida coastal rivers have an abundant population of sheepshead. Croakers can usually be found near rocky ledges where there is a sharp drop—a typical fishing hole, if you will. These are usually caught on an outgoing tide with relatively unadorned jigs.

Lake and river fishing also brings the typical freshwater catch of large and small mouth bass, and brim— very good eating. Some really good angling experiences are available to Floridians with small outboard boats or even non-powered boats, such as canoes and rowboats. If more information is needed as to what fishing is available in your area, it is suggested you contact your county cooperative extension office.

POWER BOATING ALTERNATIVES

Florida's abundance of waterways offers a wide variety of boating. Even if power boating is not considered, alternatives include just plain floating, canoeing, rowing, and sailing. There are many springs that offer water enthusiasts an opportunity to float down the spring-run in a tire tube or on a lounge-type float. Many find canoeing a real source of pleasure by enabling a person to reach more scenic rivers and streams. Lakes provide an opportunity of rowboats and paddleboats for exercise and just plain relaxation. And, of course, sailing is a whole different world to most people. And yes, sailors and powerboaters can live together.

Many Coast Guard auxiliaries and community colleges offer a variety boating and safety courses, including alternatives to power boating. It is suggested that you attend the courses appropriate to your needs. The Coast Guard also has available basic rules of the road and minimum safety equipment requirements for your size and type of boat.

For information on canoeing, one should contact the Florida Department of Natural Resources, Division of Recreation and Parks, 3900 Commonwealth Blvd., Tallahassee, FL 32399. This agency offers a free publication entitled "Canoe Trails," which briefly describes 36 popular canoe trails as well as regulations and safety tips.