Marathon Canoe Racing

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Author Experience

Howdy! My name is John Gutierrez, and I've written the following in the hopes of providing some information and advice on marathon canoe racing. While I am not the most qualified or experience person to comment on this, I feel obliged to since there is a lack of information on the topic. To give myself some credibility, I offer that:

I've completed the Texas Water Safari twice:

> 2019: 4-man Bugge race canoe with a time of 58hr:12min, where one man suffered a race-ending injury at the Martindale crossing portage.
>
> 2021: 5-man Bugge race canoe with a time of 53hr:12min.

I've completed the Texas River Marathon only once due to scheduling conflicts with school but have logged approximately 1500+ miles in unlimited race canoes.

I'm by no means an expert, and have little experience in solo or tandem canoes, but hope to offer an engineering perspective on marathon canoe racing since so little is currently available.

Canoe Setup

Thorough setup of the canoe is critical to help the paddle go as smoothly as possible, and any small change to help comfort can have many hours of benefit. Here is some general guidance on setting up a canoe for marathon racing.

Water

Intuitively, paddling on a river means near-constant exposure to the sun, which can accelerate dehydration. Therefore, setting up a water jug system is paramount to marathon racing. This is commonly done by inserting a rubber tube through any typical athletic jug and gluing it into the lid. The tube should be long enough so that it can reach the paddler's mouth as they paddle. Furthermore, it is common to wrap a small strip of Velcro around the tube, with another strip near the paddlers waist so that they can quickly reach the tube and replace it where it will not rest at the bottom of the canoe. Finally, regardless of the canoe category, jugs are commonly placed in a foam block behind the paddler's seat to hold it in place. Shown in Fig. 1 is a generic water jug setup.

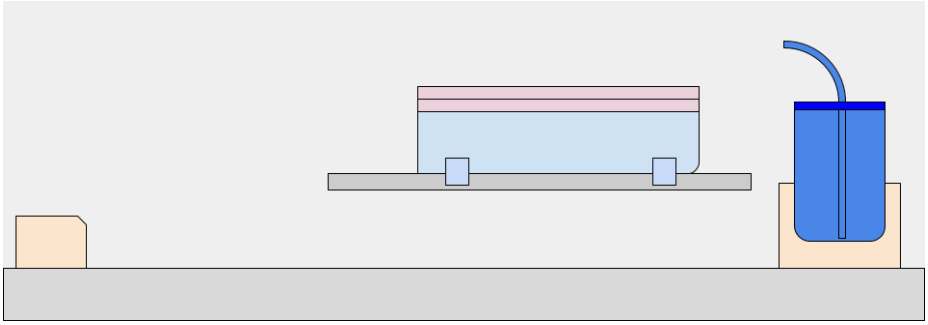

Figure 1. Water Jug Setup

Seat

Paddlers are sitting for nearly all of a race, and so seat setup is critical to comfort and paddle stroke. In racing canoes, seats are typically made of carbon fiber and mounted on parallel bars to allow for different paddlers to adjust for height.

It is common to glue compact foam over the seat for better comfort, and sometimes foam blocks are added as footrests, especially below the pedals on unlimited-class canoes with rudders. A seating setup is shown in Fig. 1.

Snacks & Food

Paddling can burn large amounts of calories, especially over a marathon canoe race, so packing high-calorie snacks and sports gels is important to maintain energy. A zipped, or Velcro, mesh bag can be secured below the seat to store snacks and trash for easy access and a significant amount of storage.

Extra Paddle

Although rare, breaking or loosing a paddle can happen, so being prepared with an extra can ensure a paddler isn't left up a creek without a paddle. Velcro straps or elastic bands along the inside length of the canoe can be used to secure a paddle for potential use.

Basic Canoe Technique

There is little literature on canoe maneuvers and paddling technique, but the best way to master these is practice and discussion with experienced paddlers. Canoe rental services commonly host lessons as well. There are some useful videos and guides online, but these focus mostly on tandem canoeing.

Paddle Stroke

I will address the single-blade paddle stroke, since I am not qualified to address the double-bladed paddles, which are commonly used in kayaking and by unlimited teams on straighter river sections.

First, note that single-blade paddles have a slight bend. The paddle is held with one hand on the grip and the other about two feet or so down the handle. The bend should curve away from the paddler. The paddle stroke should be made as parallel to the canoe as possible, and can then be made in a series of several stages:

1. Catch – with top arm straight, the paddle is reached out and plunged into the water well in front of the paddler, beyond the knee.
2. Power – engaging the core, and pulling with the lower arm, the paddle is pulled through the hip, levering about the lower arm. Maximum power from the paddle is reached near the hip.
3. Recovery – the paddle is lifted quickly upwards from the water and swung slightly outwards from the canoe while being brought forward for the catch phase.

When paddling in a larger canoe with several paddlers, slightly shorter strokes may reduce potential for resistance between paddles.

In a solo or tandem canoe, J-strokes, or more sweeping-style strokes can assist in maintain course and making slight corrections without the need for more direct steering.

Sync

In any multi-person canoe, it is very important to consider the timing of entry for the catch phase of the canoe stroke for all paddlers. Consider that the water is a thick Jell-O substance, and the canoe slides across the top. If paddlers insert their paddles at different times, then the power phases of the strokes do not align, and the paddles work against each other slightly. Therefore, all paddles should be inserted into the water at the same time. This is commonly achieved by syncing catch phases off the bow paddle. After several strokes, the bowman typically shouts “hut”, and all paddlers switch sides to wear muscles evenly.

Driving

It is the stern-man’s responsibility to direct the boat, and therefore the energy of the other paddlers. Good driving can shorten the river and maximize current and shade to keep paddlers as fresh as possible. Rivers are dynamic, with currents, eddies, shifting obstacles, and shallows.

In general, river current should be followed as much as possible, and can add over ¼ mph to boat speed. Current can be identified using cues such as floating leaves and bubbles.

Eddies are normally to be avoided, as they can push the boat from side to side, adjusting its course and inducing instability.

Shallow areas in the river commonly appear lighter since the light is reflected up through the surface more easily by gravel. Furthermore, shallow areas will typically funnel most of the water in one direction, where it is common to see an inverted ‘V’ arrow shape that should be followed.

In unlimited-class canoes with rudders, the rudder should be viewed not only as a way of turning the canoe, but also as a brake, where large adjustments to the rudder can slow the boat significantly. Additionally, quick shifts in rudder direction will induce some instability in the boat.

Counter-Steering

Driving a canoe can be thought of like drifting a car, where when a turn is made, the front is pointed through to the opposite bank. To correct course, and align the canoe parallel to the river, the boat must be steered back into the opposite direction. Typically, the canoe should be kept on the outside bank of the turn, so this counter-steering should be done earlier to remain in the current.

For example (shown in Fig. 2), on a 90-degree right hand turn, the driver should start on the left bank and steer right while staying in the current on the left bank. As the bow comes around the turn, it will begin to point to the right bank. The rudder should then be turned back to the left to bring the bow back to the left bank to follow the current.

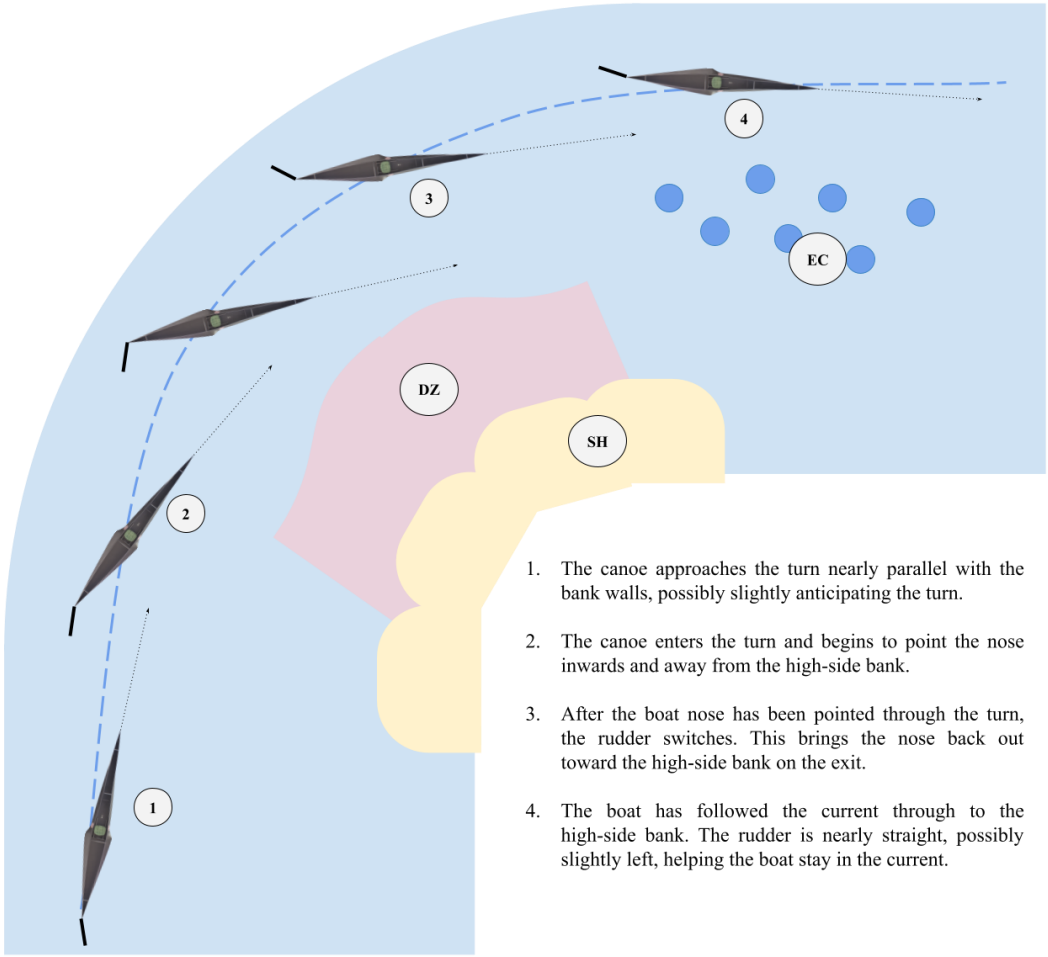

Figure 2. Example of a 90-degree Right Turn with Counter-Steering

Pivoting

Keeping in mind, as mentioned above, that driving a canoe is like drifting a car, the idea of pre-turning/counter-steering is useful when maneuvering about obstacles. It is common on the river, to encounter an obstacle, such as a stump, when making a turn, which requires additional turning inside. When doing this, the concept of keeping the bow of the canoe clear can help time a quick swing in the rudder from one side to the other, so that once the bow is clear, the rudder shifts, and the canoe turns pivots sharply about the obstacle and maintaining optimal course.

Thinking of obstacles as fulcrums to rotate the boat about is not only useful in turns, but a universal idea to be applied when maneuvering so that the canoe can maximize time in current, or generally minimize route distance.

Front-Ruddering

In the case of sharp turns, or the need for immediate course changes, the bowman can use his paddle as a rudder to guide the canoe. Considering the engineering concept of moments, or leverage, where the impact of applying a force is magnified by its distance from the center of mass, the bowman and the stern driver can impact the path of the canoe most. Should the bowman insert his paddle diagonally pointed to the right, the canoe will follow quite quickly. This idea can be applied when encountering immediate obstacles or especially tight turns to bring the bow away from danger. While not especially applicable on longer, wider stretches of river where the driver has good visibility, this is an important idea for the bowman to keep in mind on curvier or obstacle-prone sections of river.

Further Notes

I would like to make note of a few important things that do not quite fit into any of the previous sections.

Race canoes and performance paddles are typically made of carbon fiber for its strength at a decreased weight.

Many races require significant portages, where a set of handles about the canoe can help a team lift the canoe across land and fallen trees, or more commonly, dams and rocks.

Canoes are open-top and can be filled with water if overturned. For this reason, race canoes are typically made with an enclosed cavity in the bow and stern to ensure the boat remains afloat even if it is flipped.

Marathon canoe races such as the Texas Water Safari are multi-day undertakings, where paddling during the night is non-negotiable. During the night, lights must be used to see obstacles and turns in the river. In addition to headlamps, canoes ought to be fitted with a Velcro lighting mount on the bow, with a water-proofed battery pack to illuminate the river ahead. Flashlights are commonly mounted in foam blocks to adjust for lighting angle.

In conjunction with lighting mentioned above, during dawn, and especially dusk, bugs can be an insufferable annoyance, so buffs around the mouth, or potentially mosquito nets should be considered.

Appendix

Appendix A: Texas Water Safari Checkpoints

TWS Course Description

[0.00] - {START} *Spring Lake (00.00)*
[0.25] - Spring Lake Dam
[1.25] - Rio Vista Dam
[1.86] - Thompson's Island Dam
[2.20] - Thompson's Island Bridge
[4.67] - Blanco River Confluence
[5.27] - Cummings Dam
[5.86] - Westerfield Crossing
[9.12] - Cottonseed Rapids
[9.58] - Scull Crossing
[10.66] - Martindale Dam
[10.76] - Martindale Low Water Crossing
[11.35] - FM 1979
[16.62] - *Staples Dam FM 1977 (16.62)*
[26.05] - Fentress Highway 20 Bridge
[29.15] - Prairie Lea Bridge 1
[30.47] - Prairie Lea Private Bridge
[31.65] - Prairie Lea 2
[33.17] - Sairtown Bridge
[39.62] - *Luling 90 (23.00)*
[45.56] - Zedler Dam
[49.68] - IH 10
[56.03] - Ottine Broken Dam
[60.21] - *Palmetto Bridge and Park (20.59)*
[67.95] - Sladen Cemetery Bridge
[76.67] - Gonzales 90A
[79.17] - Old Iron Bridge
[81.26] - Guadalupe River Confluence
[84.46] - Gonzales Dam
[85.79] - *Gonzales 183 Gravel Bar (25.58)*
[122.60] - *Hochheim Hwy 183 (36.81)*
[147.41] - *Cheapside Bridge 766 (24.81)*
[153.98] - FM 3402 Heaton St.
[156.90] - Cuero Highway 183
[161.22] - *Cuero 236 (13.81)*
[178.12] - Thomaston Bridge
[186.83] - Nursery 447
[199.84] - *Victoria Boat Ramp (38.62)*
[212.11] - Highway 59 Bypass or Loop 175 Bridge
[221.40] - Coletto Creek Confluence
[231.27] - *Swinging Bridge (31.43)*
[237.23] - Railroad Crossing
[248.50] - *Salt Water Barrier (17.23)*
[251.21] - Tivoli Highway 35 Bridge
[255.05] - Traylor Cut
[256.23] - Wooden Bridge
[258.68] - Guadalupe River meets San Antonio Bay
[264.65] - {FINISH} *Seadrift Flagpole (16.15)*