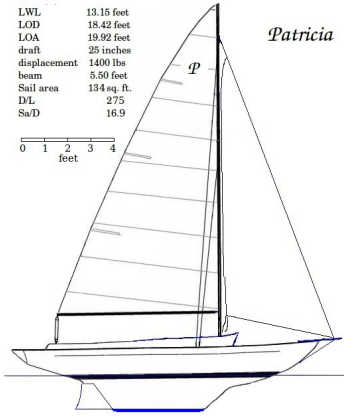


LWL 13.15 feet  
 LOD 18.42 feet  
 LOA 19.92 feet  
 draft 28 inches  
 displacement 1400 lbs  
 beam 5.50 feet  
 Sail area 134 sq. ft.  
 D/L 275  
 Sa/D 16.9



## The *Patricia*

The *Patricia* is an 18 foot keel sloop with a large open cockpit. The *Patricia* is built by modifying an older manufactured fiberglass boat with a small cabin, the Victoria 18, to have a full length open cockpit and classic wooden yacht trim. This report details my original concept of building the *Patricia*.

The intention is to approximate the performance and appearance of a classic daysailer, the Herreshoff 12 ½, as closely as possible, at less expense than the Herreshoff. Both boats are open cockpit keel daysailers, able to carry one to four adults sitting in the cockpit, not on the deck.

The Herreshoff 12 ½ is named for its waterline length, 12.5 feet. It is 15 feet over all, with a big open bench-seated cockpit, and a perfectly balanced helm. It sails well in light airs, and can handle the vigorous winds and waves found alongshore in New England. Some say it is the perfect sailboat for its purpose, which might be termed afternoon or summer sailing, though it is not limited to that. It is a delight to sail. Some say it is the best-sailing small boat ever designed. First built in 1915, original boats are prized today and new boats and closely-related designs are made now. If you want a modern “fast” boat with snappy response, look for something with a flat or shallow-vee bottom and a tall, narrow centerboard: a sharpie, Sunfish, Snipe, Lightning or a similar more recent design; practically any modern boat is that kind. Neither the Herreshoff 12 ½ nor the *Patricia* seek race boat qualities.

Herreshoff 12 ½s are expensive, often over \$20,000, and the number is limited. A few hundred Victoria 18s were built around 1980, and they can now be purchased new for a few thousand dollars, even in sound condition with a trailer. The Victoria 18 is a good boat as built, and with some modifications a Victoria 18 could be an inexpensive alternative to the Herreshoff 12 ½ with quite similar sailing qualities and looks.

The unmodified Victoria 18 is close to the Herreshoff 12 ½ in having a full keel, and in LWL, displacement, sail area, and beam. The Victoria 18 has a small cuddy cabin. Modifying a Victoria 18 into a *Patricia*, to have a flush deck with classic wooden-boat coaming boards and trim, should make an attractive daysailer.

Specifications of the Herreshoff 12 ½, the Victoria 18, and the *Patricia*.

	Herreshoff 12 ½	Victoria 18	<i>Patricia</i>
LWL, feet	12.5	12.83	13.15
LOA, feet	15.83	18.42	18.42 (length on deck)
Draft, inches	30	24	28
Beam, feet	5.83	5.5	5.5
Displacement, lbs	1500 (half in lead)	1200 (550 in ballast)	1400 (750 in ballast)
Sail area, ft <sup>2</sup>	140	134	134
Sa/D parameter	16.9	18.6	16.9
D/L parameter	342	254	275

## Performance Expectations and Modifications

As well as waterline length, hull form, and sail area, performance can be characterized by Ted Brewer's parameters "D/L" and "Sa/D" (see for example [www.tedbrewer.com/yachtdesign.html](http://www.tedbrewer.com/yachtdesign.html)). To a degree, boats with similar values for these parameters will have similar sailing performance. The D/L is a number relating displacement to waterline length. Higher values indicate heavier deeper or fuller hulls for the length. The Sa/D value compares sail area to the displacement. Since for any moving object a measure of force on it (or what makes the force, such as sail area) divided by mass always indicates acceleration, the Sa/D measure is a direct indication of "performance." The Sa/D parameter is actually the 2/3 power of a measure force/mass, so it is not *linearly* related to acceleration. A boat with a higher Sa/D than another has more acceleration than indicated by the direct ratio of their two Sa/D values.

## Displacement

The H 12 and Victoria 18 have roughly similar water line length and displacement, but the combined effect of a slightly longer LWL and 20% less displacement of the Victoria 18 makes the D/L value drop from 342 for the H 12 to 254 for the Victoria 18. This is a significant change that will make the "feel" of sailing the two boats different. To move the Patricia closer to the H 12, I suggest adding 200 more pounds of ballast to the keel. Weights could be secured low inside the V18 hull, or by adding a lead strip along the bottom of the keel. For 200 pounds, 488 cubic inches of lead is needed. 40 inches long by 4 inches wide by 3 inches deep would do it. Another idea is filling the void in the original Victoria 18 keel bottom with resin mixed with lead shot.

The waterplane area of the Victoria 18 hull is approximately 53 square feet, so adding 200 pounds to the keel will make the hull sink about 0.7 inch. That plus 3 inches for the lead on the keel increases the draft by about 4 inches, to 28 inches. This 200 pound increase of displacement will also increase the LWL to close to 13.15 feet.

The increased displacement, plus the increased LWL, means the D/L for the Patricia increases to 275. It is not possible to reasonably modify the Victoria 18 to achieve the H 12's value of D/L (342), though the change to 275 should make performance a little more like the H 12. The Victoria 18 simply has a slimmer hull than the H 12 and there is no way to modify that hull to make its D/L value 342 without overloading it.

## Weather Helm

Some sailors report that the Victoria 18 shows a bit of excess weather helm. Weather helm is a tendency to suddenly round up into the wind in a strong gust. The H 12 is well behaved and does not do this. If a gust hits, the main effect should be a boost in speed, not an alarming heel. Options to reduce the weather helm of the Victoria 18, based on common yacht design principles, include:

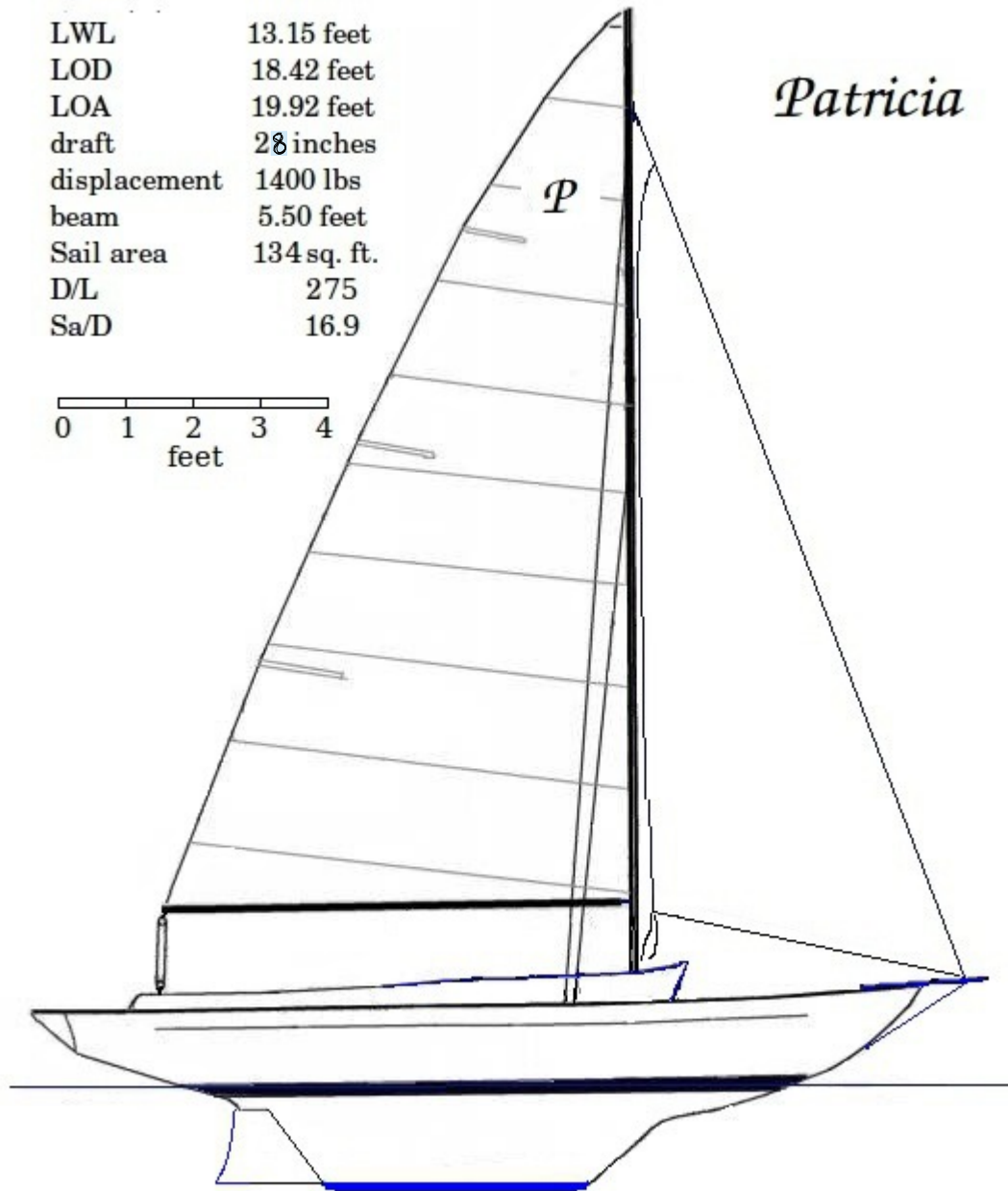
- add weight to the keel, so it heels less. That is planned.
- move mast forward; or make other changes to rig to move center of effort of the sails forward, such as increasing the foretriangle area. For the Patricia, the mast is not moved but the foretriangle is increased.
- enlarge rudder area about 20%, on the aft edge, to move the center of effort of the keel plus rudder aft a tad. The larger rudder should give a little easier control of whatever weather helm occurs, too.

Two changes to the Victoria 18 will be tried to reduce weather helm. First, that 20% increase in area of the rudder. Second, add a bowsprit extending 1.5 feet beyond the bow. A bobstay is needed to counter tension in the jib stay. If designed appropriately the original Victoria 18 jib stay or forestay could be used with no change in length, attaching to a threaded eyebolt through the bowsprit which will allow length and tension adjustments. As

a first test the lower end of the forestay will be moved about 1 foot forward of the bow. Moving the eyebolt fore or aft (one time changes with tools) should make additional desired adjustments to he helm balance.

### Sails and sail area

To have the same Sa/D parameter value as does the Herreshoff 12 ½, the Patricia needs a sail area of 134 ft<sup>2</sup>, which by chance is the area of the original Victoria 18 main and jib, so no sail area changes are needed.



The Victoria 18 rig remains largely unchanged. The forestay end moves out onto the bowsprit. The mast foot is supported at or very near its original position, on a pedestal above the new flush deck. The shrouds may be shortened a tad. Where possible the simplest possible rig for the sheets is employed, as on the Herreshoff 12 ½.

## **Cockpit and Deck**

The Victoria 18 cuddy cabin top is removed, and the cockpit and foredeck replaced with a wooden cockpit and deck like the style and construction of the Herreshoff 12 ½. The area under the foredeck is closed off with doors to prevent flooding. The mast will sit on a strong pedestal several inches above the deck (such as a 6 by 6 inch wooden post) probably reaching the keel, and with solid braces fore and aft and to the sides under the deck.

Construction of the new foredeck, pedestal, cockpit floor, seats, deck, and coaming boards will be the most complex part of the conversion. For ideas, construction drawings of the Herreshoff 12 ½ are available from Mystic Seaport. Past issues of WoodenBoat magazine will be very valuable for building the deck, new frames if needed, seats, painting, etc. The original Victoria 18 deck and cabin top provide hull strength and that must be duplicated by the new deck.

## **Capsize ratio**

The capsize screening value is another parameter described by Ted Brewer. The H 12 ½, Victoria 18, and Patricia all have a value very close to 2.0, indicating low vulnerability to capsizing. The Patricia has the lowest (most stable) value, 1.95, by a small amount.

## **Patricia Development Process**

Start with a good Victoria 18. Sail it in various conditions to verify it is in good sailing order. Install the bowsprit and move the forestay and adjust for best sailing performance. Add 200 pounds more weight (temporarily) inside the hull and check performance. Enlarge rudder trailing edge and check performance. If its performance merits the trouble, increase weight of keel ballast and remove the cuddy and build the new cockpit and foredeck as on the Herreshoff 12 ½.

Stuart Wier

Original June 30, 2019. Revised July 1 and August 25, 2019.