

Recreational Boat Trends

Twenty-five years ago I set out to take the pulse of America's boatbuilding industry to get an understanding of materials and processes in use. I surveyed over two hundred manufacturers and integrated the results into the book, *Marine Composites*. This article is an attempt to update the database on how we build boats. The trend in boat styles has also changed over 25 years.

In addition to boats styles and manufacturing methods, there has been a steady manufacturing migration overseas for boats that used to be built domestically. Some of the lost U.S. activity can be attributed to countries where labor costs are much cheaper. However, Northern Europe retains a large percentage of recreational boat builders. Throughout the industry, smaller builders have become very specialized for building a type of boat associated with their brand while larger builders can project their brand over a wider range of boats, sometimes catering to both the power and sail markets.

According to the National Marine Manufacturers Association, recreational boating contributes over \$100 billion to the U.S. economy. The industry also supports upwards of one million jobs in the country. With the growth of many new forms of outdoor recreational activity, the boating industry competes fiercely to attract new and younger buyers. And with hundreds of domestic and foreign boat builders vying for a share of the U.S. market, competition is very tough.

For this article, the products and manufacturing methods of over two hundred builders that sell boats in the U.S. were analyzed. However, this time foreign manufacturers with a significant presence here were included in the survey.

The majority of recreational boats are built with composite materials or what has been traditionally called fiberglass. Aluminum is used to build smaller pontoon and fishing boats and some yachts in Europe but composite manufacturing remains an economical way to make multiple copies of the same model and will therefore be the focus of our discussion of manufacturing trends.

Figure 1 shows that sales of powerboats in the U.S. are much greater than sailboats. This has always been the case in the U.S. because sailing requires a special skill set and much more of the country's waterways are accessible to powerboats. However, this trend has been greatly exacerbated in the last 25 years. Building sailboats is more specialized than building powerboats so as we have seen sailboat builders migrate towards high-end powerboat manufacturing, there are few examples of powerboat builders who have started building sailboats.



Figure 1. Recent U.S. boat sale data by type of boat [Vicky Yu, Director, Industry Statistics and Research, NMMA, <http://boatingindustry.com/wp-content/uploads/2015/08/2015-State-of-the-Industry.pdf>]

The industry is very interested in the volume of boats sold each year and causes for fluctuations. Figure 2 shows the trend in boat sales for the last 25 years along with global events that may have influenced the market. Going back further, boat sales were hurt badly during the oil embargo in the 1970s and by the temporary luxury tax. Since buying a boat is not a life necessity for most people, a strong economy that produces disposable income is required to support the industry. Low gas prices also help to increase the sale of powerboats.

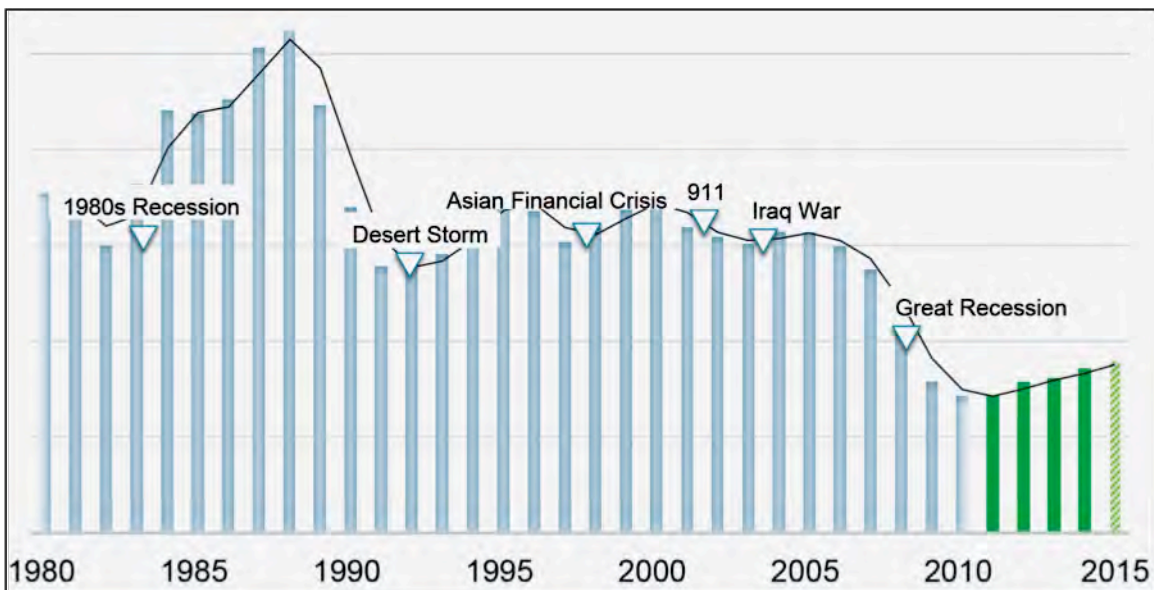


Figure 2. Recent historical U.S. boat sales [Vicky Yu, Director, Industry Statistics and Research, NMMA, <http://boatingindustry.com/wp-content/uploads/2015/08/2015-State-of-the-Industry.pdf>]

Styling Trends

Improved material and manufacturing methods are responsible for producing boats that last longer. Indeed, this is why many boats are repowered rather than discarded. So, much like the automotive industry, boat builders are required attract new buyers with new features and styling. This sometimes ends up creating entirely new types of recreational boats.

I remember a conversation I had about 25 years ago with my father-in-law in southern Florida about his experience buying a new boat. The dealer asked him if he wanted it for fishing or waterskiing when in fact his only use was family outings. Today's builders understand this demographic and both sail and powerboats feature larger cockpits with more comfort and seating options.

Center Consoles

The first center console powerboat was produced by Boston Whaler in the early 60s. Before then, the idea of driving a small powerboat while standing up was not considered and many powerboats were styled after automobiles, complete with tail fins. Today, center console designs represent the majority of models available. Originally targeted for fishing since there is clear gunwale access throughout the boat, some center consoles today are over forty feet long and have additional seating for entertaining. Figure 3 shows a larger center console designed for offshore fishing.



Figure 3. The Jupiter 38FS is the largest center console offered by Jupiter Marine
[\[https://jupitermarine.com/wp-content/uploads/2016/09/jup38fs_featured-img.jpg\]](https://jupitermarine.com/wp-content/uploads/2016/09/jup38fs_featured-img.jpg)

Center console boats are not solely designed for fishing. Figure 4 shows a center console from Scout Boats well appointed with wood trim and seating. Note on both these boats the multiple outboard engines that on some boats total upwards of 1500 hp. The trend of using large outboard engines instead of inboards frees up interior space and is more cost-effective for builders. With the price of gas relatively low, new buyers are demanding boats that can make at least 50 knots for added excitement.



Figure 4. This center console from Scout Boats illustrates the trend towards multiple outboards and luxury appointments http://vectorply.com/wp-content/uploads/2015/08/ZD6_4999-1024x437.jpg

Waterskiing Boats

Bucking the trend towards outboards are waterskiing and wakeboarding boats that need a clear stern platform to get on and off the boat with the added safety of not having a prop nearby. Figure 5 shows a wakeboard boat with an elevated tow tower to assist wake jumping. Traditional waterskiing boats generally create a small wake underway but wakeboard boats drive naval architects crazy with their aft ballast tanks that allow the boat to operate at minimum efficiency creating a maximum wake.



Figure 5. This MasterCraft model is highly specialized for wakeboarding http://cdn-3.psndealer.com/e2/dealersite/images/newvehicles/2010/nv181694_1.jpg

Whether you are being pulled behind a boat on skis, a wakeboard or barefoot, the best experience is on flat water. For that reason, these boats have low freeboard to get on and off the boat easily and are not suitable for open water where the seas can kick up.

Picnic Boats

Hinckley Yachts is one of the builders that started building powerboats after establishing a solid reputation building sailing yachts. They developed the picnic boat concept, which is a fast touring yacht with classic New England looks. Other builders have followed their lead creating boats lavishly appointed with plenty of varnished teak trim. These are high-priced yachts that target a niche market and primarily populate the most exclusive nautical destinations. Figure 6 shows one of Hinckley's current picnic boats underway using waterjet propulsion.



Figure 6. Hinckley developed the picnic boat to be stylish and fast
<http://www.hinckleyyachts.com/images/bg/t38r.jpg>

Express Cruisers

The term express cruiser is somewhat dated but generally refers to powerboats over thirty feet that operate in planing or semi-planing mode with substantial overnight accommodations. Figure 7 shows a European interpretation of this concept. The popularity of this class of boats is closely tied to the health of the overall economy and the price of fuel. As seen in Figure 7, builders use style, comfort and unique features to attract customers.

Trawlers

In contrast to express cruisers, trawlers are designed to operate in displacement mode, with speeds in the 8-12 knot range. Figure 8 depicts a typical layout for this type of boat. These boats are very popular for live-aboard cruisers who travel the country's inland waterways. However, larger trawlers are certainly capable of reaching the globe's most remote cruising grounds.



Figure 7. This express cruiser from Galeon Yachts in Poland is an example of European styling <http://keyassets.timeincuk.net/inspirewp/live/wp-content/uploads/sites/18/2015/08/Galeon-500-Fly-rear-3q.jpg>



Figure 8. This Kadey Kroger trawler has a commercial style pilothouse and maximizes interior living spaces http://www.boattest.com/images-gallery/News/kadey-krogen_58.jpg

Sportfishermans

Sportfishermans may be the most distinctive style of boat, with relatively minor variations among builders. They are purposely designed for offshore fishing and especially tournaments, where speed to get to the fishing ground is paramount. Figure 9

illustrates the distinctive features of these boats – large bow flare, flybridge steering station, and a small cockpit aft with low freeboard for landing fish. They generally have fairly nice accommodations below but the utilitarian deck layout makes these boats ill suited for entertaining.



Figure 9. The bow flare on this 58' sportfisherman from Davis Boats is typical of this genre http://www.davisyachts.com/wp-content/uploads/2014/10/Davis-58SF-Run_HOME_2.4.jpg

Flats Boats

For anglers who are not millionaires, the venerable flats boat (Figure 10) has not changed over the years. Typically built in aluminum, the primary feature is shoal draft for inland water fishing. A composite version of these boats has evolved with large outboards to again get to fishing grounds fast during competitions. These boats often sport bow-mounted electric trolling motors.



Figure 10. Flats boats can economically-produced with aluminum https://images.loweboats.com/images/categories/2016-boat-main/large/2016-boat-main_81970.jpg

Pontoon Boats

Pontoon boats are very popular on lakes because they have a large deck for entertaining, as shown in Figure 11. However, these boats are not suited for open water and I get a bit concerned when I see them operating in the Gulf of Mexico or the Chesapeake Bay.



Figure 11. Pontoon boats are designed to be built using aluminum structural profiles
<http://www.travelizmo.com/archives/fiesta-fundeck-pontoon-boat-2008.jpg>

Racing Sailboats

The class of boats that has probably changed the most over the past few decades is the racing sailboat. Traditionally, larger sailboats raced against each other under a handicap system that would equal the playing field between faster and slower boats. These boats were racer/cruisers, with full accommodations below. When stripped out race boats appeared with professional crews, the older boats were no longer competitive, no matter what handicap system was used. Purpose-built racing sailboats evolved, such as the 30-footer shown in Figure 12. And indeed the trend has been toward one-designs, where all boats racing against each other are identical.

Daysailers

With the professionalization of big boat racing, many older sailors yearned for a less stressful experience that attracted them to the water in the first place. This led to the revitalization of the classic daysailer, with comfortable seating and classic lines, as shown in Figure 13. With contemporary underbodies and modern sails, these boats perform surprisingly well.

Cruising Sailboats

Having shed the need to race with large crews on board, the cruising sailboat has turned into a sort of “second home,” with all the expected comforts. Sail handling systems have also evolved to allow a couple to handle boats over fifty feet. In Figure 14 a center cockpit design is shown being sailed by two people. Sailboats have also gotten beamier



Onne van der Wal 2014

Figure 12. *The CC-30 is an example of the trend towards one-design rather than handicap sailboat racing* <http://c-cyachts.com/wp-content/uploads/2014/06/The-CC-30-One-Design-rocket-ship-Launches-29.jpg>



Figure 13. *New England boat builders have found a niche market producing classic designs with composite materials* <http://ma.usARBORS.com/sites/default/files/directory/141112/01-ccsb-stern-quarter.jpg>



Figure 14. With the demise of the racer/cruiser, cruising sailboat builders have focused on comfort and amenities http://www.hallberg-rassy.com/fileadmin/user_upload/minified/HR40MkII_sailing852RTomlinsonMini.jpg

to afford spacious interiors. This trend has led to the popularity of cruising catamarans with cavernous main salons and sleeping accommodations in the hulls. These boats are wonderful for entertaining and very fast but docking at traditional marinas can be challenging with a 25-foot beam.

High Performance Dinghies

High performance dinghies is somewhat of a misnomer as these boats less and less resemble what we consider to be a dinghy. These boats are used almost exclusively for racing as one-designs, so often designs are decades old and result in well-established classes. Figure 15 shows a Laser, which has been around since the early 70s with over 200,000 built. With the advent of composite construction, it has become easier to make near identical copies of the same boat so sailing skills determine the outcome of races rather than who has a lighter or stiffer boat.

Beach Boats

The Hobie Cat 16, launched in the late 60s, was probably one of the first recreational boats to be easily launched off a beach. All types of watercraft are now launched from beaches for fun on the water and Figure 16 shows an inflatable cat that can easily be brought to the beach by car without a trailer.

Manufacturing Trends

Boat builders are constantly striving to make lighter, more durable boats for less money. Sandwich construction introduced in the 70s and now resin infusion has helped to make lighter boats. Some larger small boat manufacturers have introduced automation into their manufacturing process. However, a lot of today's boats are built using methods developed over 50 years ago, albeit with improved materials.



Figure 15. Over 200,000 lasers have been built since its inception in 1971
<https://i.ytimg.com/vi/8xMOIKkBPzU/maxresdefault.jpg>



Figure 16. The inflatable MiniCat 420 offers beach launch sailing without a trailer
http://cdn.shopify.com/s/files/1/0966/9120/files/MiniCat_420_60.JPG?10910577383503720277

Hand layup

Figure 17 shows a craftsman building a composite boat part using the traditional hand layup method. Dry reinforcement fiber is wet out with resin, typically with a roller, and consolidated by hand. This process is very cost effective for building complex parts but can become a bit labor intensive when laminating entire hulls. As noted earlier, the market for smaller boats such as center consoles is very competitive and the more savvy builders have developed specialized equipment, jigs and production procedures to minimize labor cost.



Figure 17. Hand layup remains an economical method for manufacturing smaller boats and parts <http://parkerboats.net/wp-content/uploads/2013/08/19-Laminating-Small-Parts.jpg>

Resin Infusion

With resin infusion, all of the reinforcement material is stacked dry with a vacuum bag placed over the top. Resin is drawn into the laminate stack under vacuum at numerous points on the structure, as seen in Figure 18. The advantage of resin infusion is a controlled fiber to resin ratio with minimal voids. Of the 200 builders surveyed for this article, 35% of the powerboat builders were using resin infusion and 38% of the sailboat builders opted for this method.



Figure 18. This complex labyrinth of vacuum and resin supply lines is typical for infusing a large hull <https://www.horizonpowercatamarans.com/wp-content/uploads/2014/10/Screen-Shot-2014-10-21-at-2.08.44-PM.png>

Prepreg

Prepreg construction uses reinforcement material (usually carbon fiber) that is preimpregnated with partially cured resin. This produces the strongest laminates per weight and therefore is dominant in the aircraft construction industry. High performance racing hulls such as the one shown in Figure 19 use prepreg construction to achieve weight-optimized stiff structures. Prepregs are also popular for building sailboat masts, where added weight adversely affects stability.

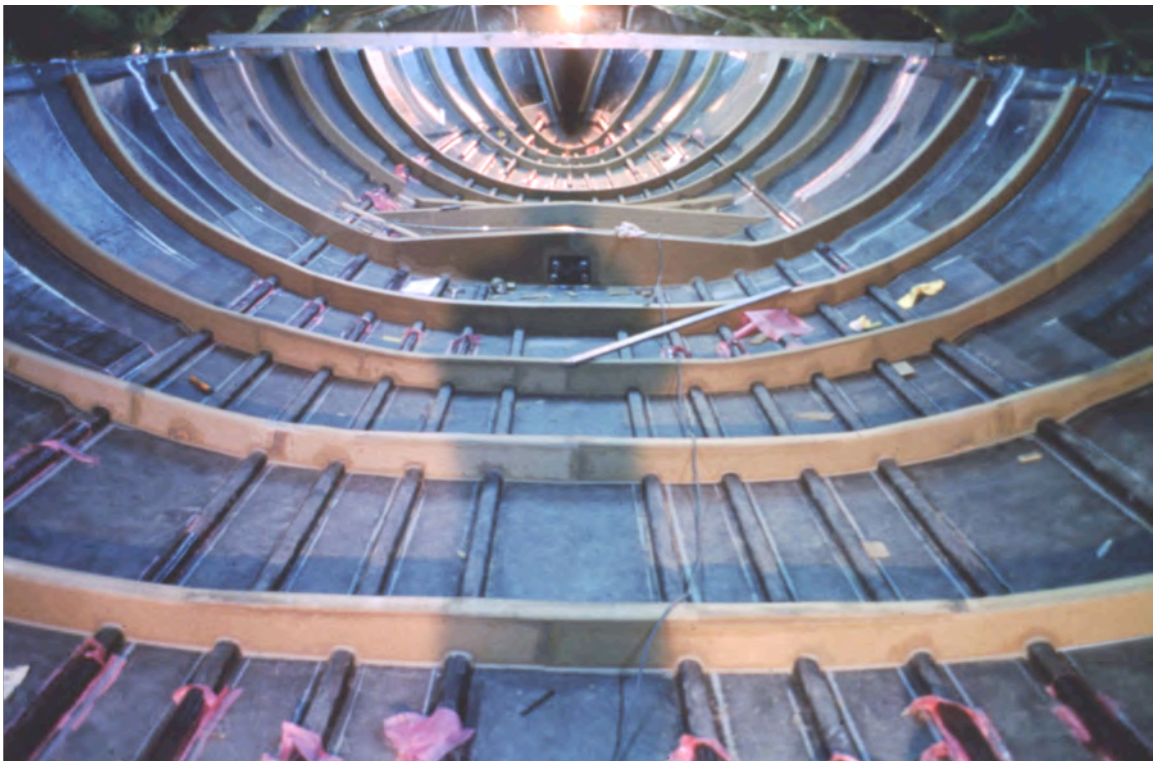


Figure 19. Prepreg construction is limited to the most weight-critical racing boats http://www.finot.com/ecrits/ecritgroupe/confer_jecc/structint2_w.jpg

Geographical Trends

In years past, boat builders set up their shops where there was demand for their product, especially for boats that could not traverse long distances on their own bottom. Today it is not uncommon to see trucks on the highway transporting multiple shrink-wrapped boats. Figure 20 provides a breakdown of U.S. boat builders by state. Florida leads all states for both powerboat and sailboat production. This has created a talented labor pool in the state that can support the fickle nature of the business. After the number one slot, powerboat production shifts to the Carolinas and interior of the country. For sailboats, manufacturing shifts to New England, especially for high-end yachts. California was once a major producer of recreational boats in the U.S. but stringent air quality regulations virtually eliminated open mold laminating in the state.

Internationally, the U.S. overwhelmingly dominates manufacturing for powerboats sold here. As noted earlier, the market for building smaller powerboats is very competitive and profit margins are slim. Smaller boats shipped from overseas have difficulty penetrating the U.S. market. However, larger yachts with labor-intensive wood interiors have made inroads in the U.S. For sailboats, U.S. builders are not quite as dominate. Yards in Northern Europe are able to prosper with the support of an enthusiastic sailing population. South Africa has emerged as a major producer of catamarans, both sail and power.

Conclusion

There are over 15 million registered recreational boats in the United States with 75 million people getting out on the water annually. Boating contributes over \$100 billion to the economy but what do those boats look like? Given the fact that the country does not have 75 million yachtsman or seafarers, these boats are family-centered platforms that put a premium on comfort. And with gas prices low, we want to go fast. Boat builders have responded to this demand with low-maintenance, high-performance designs that emphasize fun on the water. The challenge for designers is to make boating safe and enjoyable, while minimizing boating's carbon footprint at the same time.

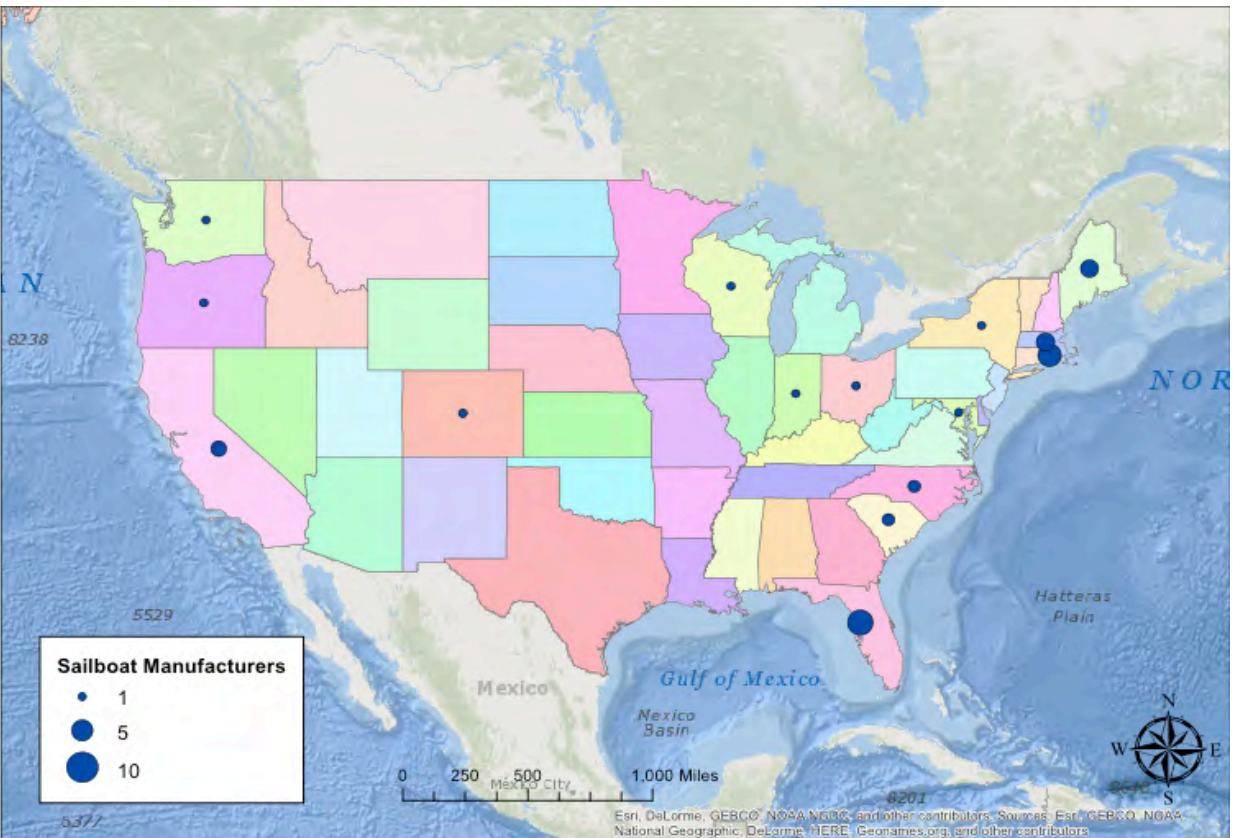
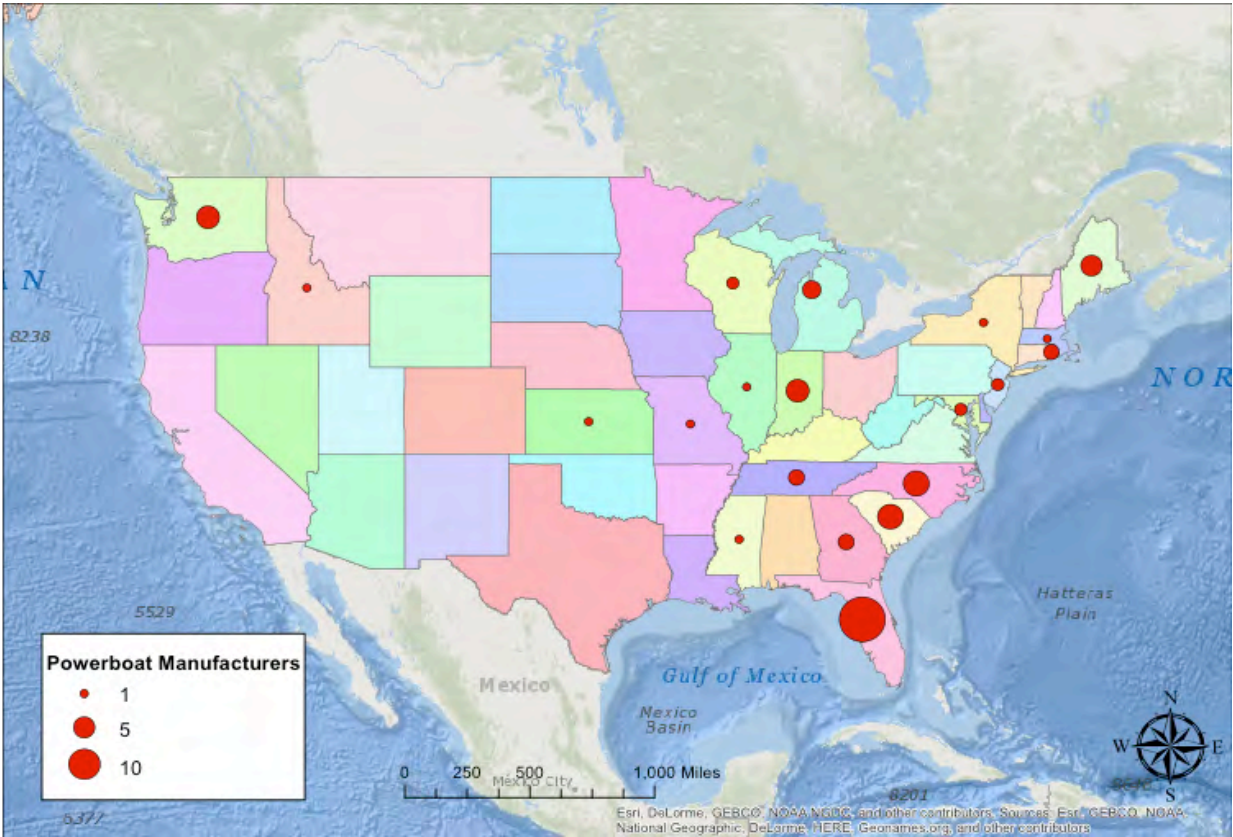


Figure 20. Distribution of U.S. boat builders surveyed by state for powerboats (top) and sailboats (bottom) [graphics by Cole Greene]

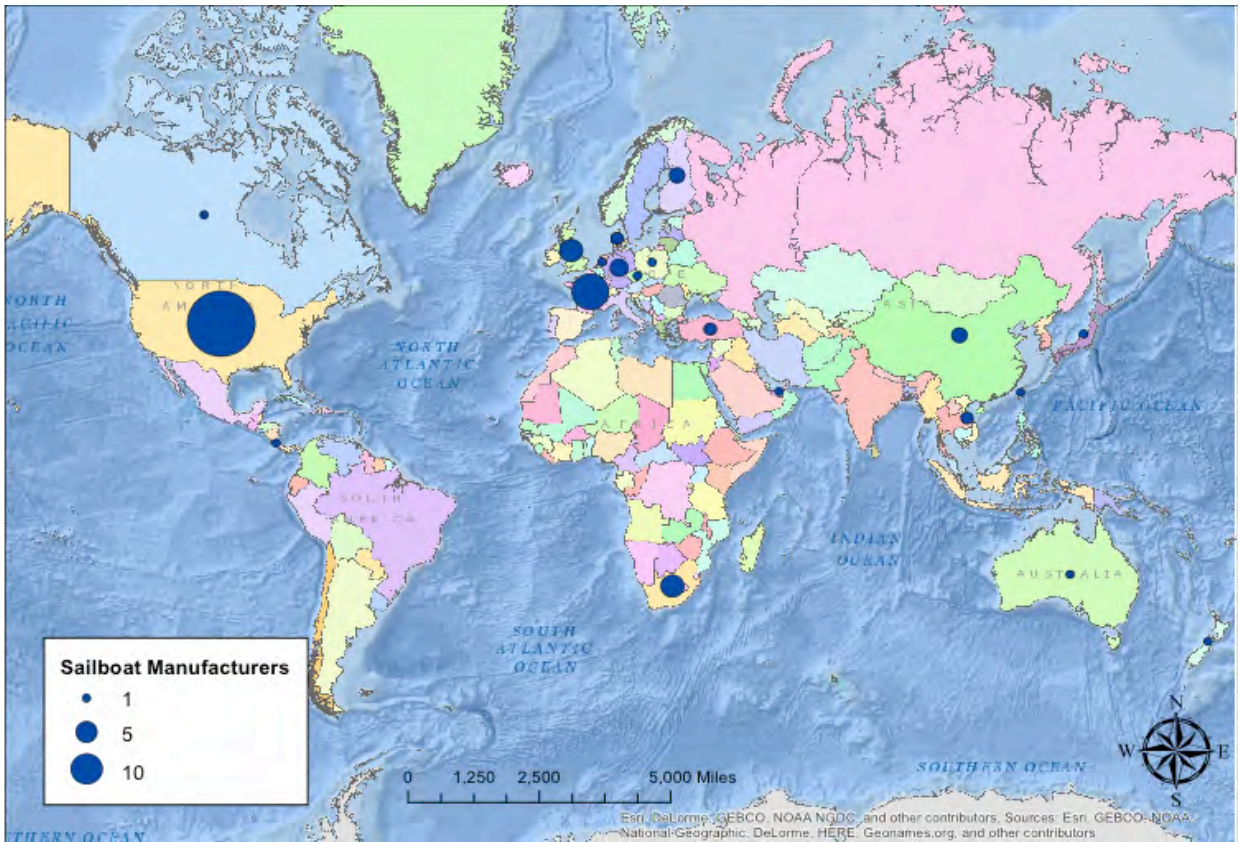
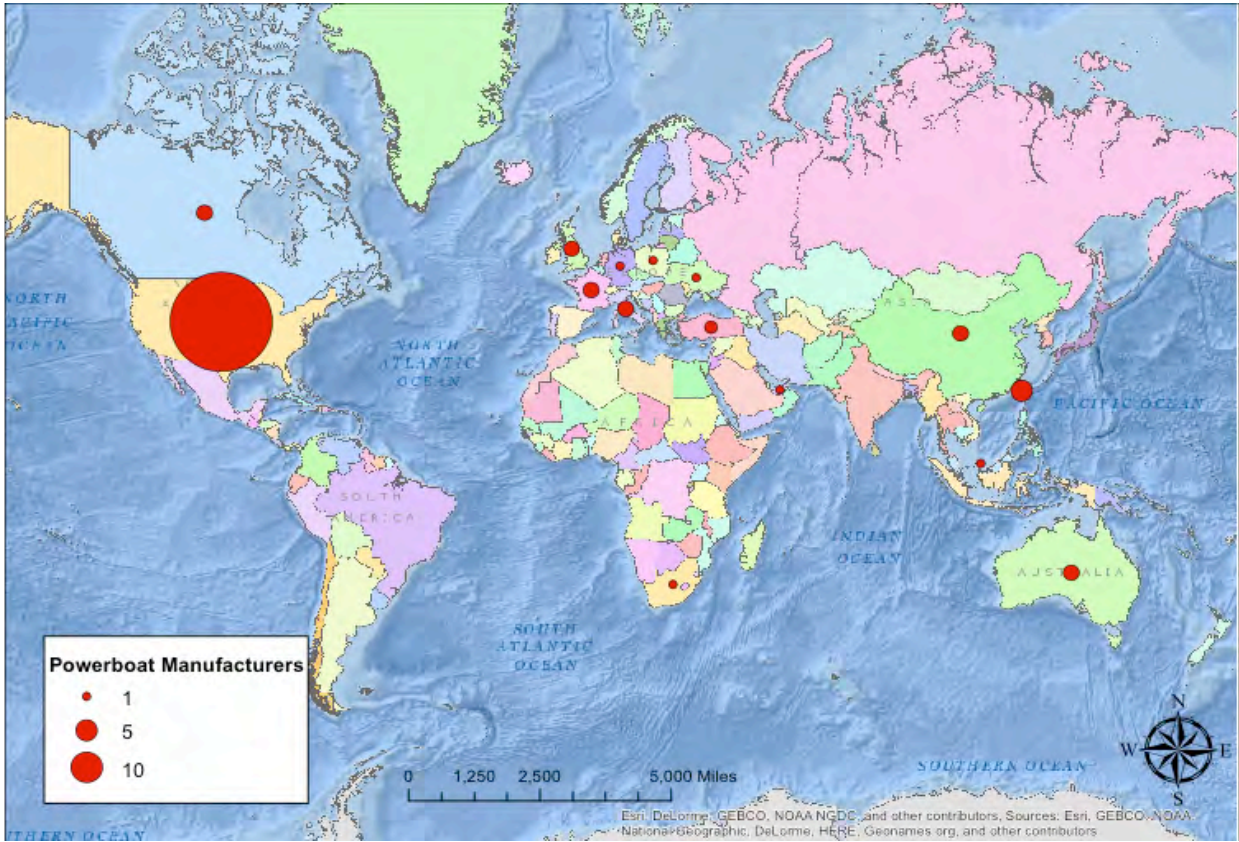


Figure 21. Global distribution of boat builders surveyed by for powerboats (top) and sailboats (bottom) [graphics by Cole Greene]