

Inquiry into the Chicago Yacht Club-Race to Mackinac Capsize and Fatalities

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Introduction and Mission

Sailing is a remarkably safe sport in large part because of the caring of its close-knit community. When a sailor dies, all sailors mourn and do what they can to see that such an accident does not happen again.

After two sailors' lives were lost during the recent Chicago Yacht Club-Race to Mackinac, the Chicago Yacht Club, the race's organizer, asked US SAILING to conduct an independent study of what happened. On July 28 US SAILING appointed the Independent Review Panel for the 2011 Chicago-Mackinac Race, and directed it to consider what lessons might be learned and also to make recommendations.

The members of the Independent Review Panel are (Chairman) Chuck Hawley, Santa Cruz, CA.; Sheila McCurdy, Middletown, R.I.; Ralph Naranjo, Annapolis, Md.; and John Rousmaniere, New York, N.Y. Each is an experienced offshore sailor, a longtime member of US SAILING's Safety-at-Sea Committee, and a moderator of US SAILING-certified Safety at Sea Seminars. Technical support was provided by Ron Trossbach, another Safety at Sea Moderator, Dan Nowlan, Offshore Director at US SAILING, and Jim Teeters, Associate Offshore Director of US SAILING. The Chicago Yacht Club appointed one of its members, Leif Sigmond Jr., to serve as the club's liaison to the panel. *Panel members' biographies are listed in Appendix A.*

The Independent Review Panel presented its report at US SAILING's annual general meeting in Annapolis on October 29, 2011.

Summary

The Chicago Yacht Club Mackinac Committee (CYCMC), a committee of the Chicago Yacht Club, held the 103rd Chicago Yacht Club-Race to Mackinac Island with starts on July 15 and July 16, 2011. The 333 mile race is one of the longest annual freshwater races, and most boats take approximately two days to finish. Among the over 345 boats entered in the race was *WingNuts*, a Kiwi 35 sport boat, sailed by a crew of eight, four of whom were co-owners. *WingNuts* was an extreme boat in many respects, including being very light for her 35' length, but her most differentiating feature was her flared deck which resulted in a beam of 14' combined with a narrow beam at the waterline. This, combined with her large sail plan, made her exciting to sail but also a very tender boat.

The crew of *WingNuts* was very experienced, most of them having raced in numerous Chicago-Mac races or similar races, and most of them having extensive experience on *WingNuts*. In fact, this was the fourth time that several of them had sailed *WingNuts* in the Chicago-Mac.



Prior to the start, the weather was predicted to change from a relatively pleasant southwesterly breeze to the likelihood of thunderstorms on Sunday afternoon and night. The fleet, including *WingNuts*, experienced deteriorating conditions on Sunday as predicted, and the crew prepared for the storm by ensuring that the crew was wearing personal safety gear and by reducing sail. As the winds increased, the crew dropped the main and partially furled the #3 genoa. Around 2300 CDT, *WingNuts* encountered a “wall of wind” in a powerful cell, with wind speed over 50 knots for several minutes.

The wind also veered in direction and *WingNuts* began to capsize, but instead of hesitating at ninety degrees as she had in the past, *WingNuts* continued to roll over until she capsized. Six of the crew members, including one who was below decks at the time of the capsize, were able to free themselves from the vessel but Mark Morley and Suzanne Makowski-Bickel were unable to free themselves and died as a result of head injuries and drowning.

The 40-foot *Sociable*, one of her competitors, aided by the personal lights and whistles of the surviving crew on *WingNuts*, rescued the six crew members and took them to Charlevoix, MI. The Coast Guard assisted in the search for the missing sailors with helicopters, 25’ and 41’ vessels, and the ice breaker USCGC *Mackinaw*.

Findings

- 1) The race deserves its reputation for being well-run with a tactically and navigationally challenging course that is subject to variable and occasionally severe weather.

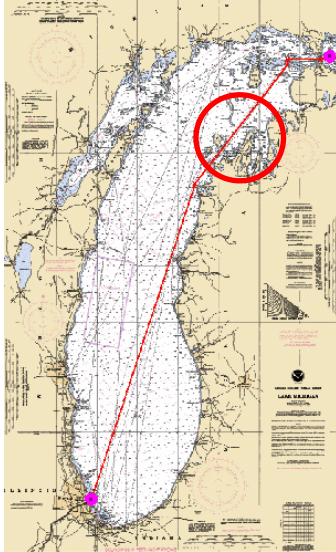
- 2) *WingNuts* was a highly inappropriate boat for a race of this duration, over night, without safety boats, and in an area known to have frequent violent thunderstorms. Her capable crew and preparation could not make up for the fact that she had too little stability which led to her being “blown over” by a severe gust.
- 3) Strong thunderstorms and violent cells are relatively common in the area traversed by the race course in July. Many sailors expressed that while this was a strong series of cells, they had been in previous Macs with similar conditions. The intensity of the lightning was mentioned frequently as been exceptional.
- 4) The Selection Committee of the Chicago Yacht Club-Race to Mackinac Island used a combination of the experience of the crew and the characteristics of the vessel to determine whether a vessel would be invited to enter the race.
- 5) Boats are required to have an ORR handicap measurement certificate. This document includes two measurements of stability: Limit of Positive Stability (LPS), and Stability Index (SI). Both values were considered by the Safety Committee as indications of the boat’s suitability for entering the race. Using the information from the measurement certificate, *WingNuts* did not stand out from the rest of the fleet in either LPS or SI, although she was among the vessels with the lowest stability metrics.
- 6) The Safety Committee relied on self-inspection for the majority of the boats in the race. Some boats requested a pre-race inspection on a voluntary basis. A small number of boats were inspected at the finish for a limited number of items, the identity of which is kept secret so that competitors are encouraged to have all items.
- 7) The fleet was equipped with GPS “trackers” which transmitted the location of each vessel on an hourly basis. Due to a human failure by the supplier, this system was rendered inoperative on Saturday night, and the benefit that might have been derived in tracking the vessels that came to the assistance of *WingNuts* was lost. We do not believe that the failure of the tracking system delayed the rescue of the *WingNuts* crew or impacted their safety.
- 8) The weather that *WingNuts* encountered was forecast prior to the start of the race, and virtually all boats tracked the weather system as it moved towards the fleet using observations and electronic means. Many vessels apparently underestimated the force of the

winds in the “purple” or “red” colored areas on the Doppler radar plots and were caught with too much sail up, or misjudged the speed at which the cells were moving towards their positions.

- 9) We believe that the Mackinac Safety Regulations that governed the safety equipment requirements for the race worked well for the fleet. They appear to have met their objective of clarity, simplicity, and acceptance by the racers.
- 10) During a thunderstorm with winds in the range of 50 knots and waves of 4-6 feet, *WingNuts* was blown over by a high winds and capsized. Five members of the eight-man crew were able to release themselves from the vessel, one was able to swim out of the cabin and to the surface, and two were unable to do so and died. The Coroner’s report lists head injuries as the cause of death. The two fatalities very likely occurred within a few minutes of the capsize.
- 11) While *WingNuts* was well prepared and met the majority of the safety requirements, one harness tether did not have a chest-end shackle (“snaphook”) and therefore did not meet the requirement of being detachable at the “chest” end of the tether. This hindered a surviving crew member from releasing himself from the vessel after the capsize. The victims, however, were wearing compliant tethers.
- 12) The crew of *WingNuts* handled their boat with excellent seamanship, shortening sail when appropriate, and setting up a strong system of jacklines on which to hook safety harnesses. The victims were attached to the boat via a central jackline in the cockpit and two jackines on the side decks. This allowed them to fall a considerable distance, and also restricted their ability to reach beyond the edge of the deck of the boat after the boat capsized.
- 13) There is no evidence that buoyancy of the inflatable life jackets worn by the crew inhibited their ability to escape from the inverted cockpit. Except for the two fatalities, who were helpless due to their injuries, all sailors were able to swim out. One sailor’s tether made exit from the underside of the inverted hull difficult because it tangled in lines after it was released, but the problem was quickly solved and the person in that tether, Stan Dent, later stated that he would again clip on with a safety harness, and he would also wear an automatic

inflating PFD. “If you’re on a boat that you are 95 percent confident will not turtle, by all means that is the way to go.”

- 14) This incident generated discussions on the role of safety harnesses, inflatable life jackets, tethers, and jacklines. The general theme of these comments was that such personal gear may pose a danger to sailors because of entrapment (either due to buoyancy or an inability to release oneself from the vessel). The panel, however, concludes that well-designed personal safety equipment of these types, including tethers that can be quickly unclipped from the harness when under load, did not endanger the crew of *WingNuts* and are desirable in the vast majority of situations.
- 15) The use of the SPOT Satellite Personal Tracker was instrumental in alerting the family and the Coast Guard about the incident. Within a few minutes of activation, the family members and the Coast Guard were aware that two SPOT devices had been activated, and they also knew the location of the incident. This worked well despite the problems with various vessel and land-based communications problems brought on by the intense storm.
- 16) In addition to the SPOT, other non-traditional means of communication were used during the storm and rescue, including telephone calls over cell phones, SMS messages, and FaceBook.
- 17) The crew of the vessel *Sociable* acted competently in their rescue of the *WingNuts* crew, and provided a command structure for the other vessels that dropped out of the race to come to *WingNuts*’s aid.
- 18) The Coast Guard responded appropriately and as quickly as the conditions allowed and in compliance with their routines and orders. Assets were sent from Sector Sault Ste. Marie, Station Charlevoix and Air Station Traverse City stations arriving as soon as two hours after the capsizing including three MH-65C Dolphin helicopters, a 41’ utility boat (UTB) and two 25’ Transportable Port Security Boat (TPSB), in addition to the 240’ Icebreaker USCGC Mackinaw which was accompanying the fleet.
- 19) A majority of the fleet handled the conditions with little or no significant damage. While four other race boats had onboard emergencies, and many boats reported being knocked down for minutes at a time, only *WingNuts* was capsized by the high winds.



Narrative: *The WingNuts* Accident In the 2011 Chicago Yacht Club Race to Mackinac

John Rousmaniere, Oct. 18, 2011

The race course, with area of *WingNuts*' capsizes highlighted

Organized by one of America's oldest and most important yacht clubs, the annual Chicago Yacht Club Race to Mackinac Island is the world's oldest freshwater sailboat race. First sailed by five boats in 1898, and competing annually since 1921, the 333-mile "Chicago-Mac" has averaged 360 boats in recent races, with a record 460 in the 100th Anniversary race in 2008. In 2011 there were 345 boats with crews totaling an estimated 3,500 men and women.

The Chicago-Mac's appeal was summarized in the 1920s by Donald F. Prather, a race winner, in words that appear in the introduction to the Chicago Yacht Club's history of the race:

It is not just a desire to win which impels yachtsmen to undergo the hardships of the long race, but it is something far greater – possibly the modern reflection of the ancient love of the art of seafaring, the rigorous discipline, the peerless craftsmanship, the full life that comes to the sailor and no other, and the opportunity to match skills with other men and other ships.

Prather added, "The Mackinac Race has always been eventful. It has always had its epic side."¹

A favorite story told at the Chicago Yacht Club concerns the humbling of Ted Turner by the Chicago-Mac. When he brought his Twelve Metre *American Eagle* to Chicago in 1970, Turner expected an easy ride and went so far as to characterize Lake Michigan as a "mill pond." After two days of battering by a northerly gale, he contritely announced, "I hereby publicly retract

¹ Donald F. Prather, "Sailing at Chicago," *Sailing Craft*, ed. Edwin J. Schoettle (New York: Macmillan, 1928), 381-404. <http://www.cyracetomackinac.com/history/race-history/>.

anything and everything I have ever said about inland sailing.”² Turner went on to win the America’s Cup and much else, and when he returned to Lake Michigan in 1978 there was another northerly that his tactician, Gary Jobson, remembers as one of the coldest and roughest races he has sailed. In another tough race, in 2002, Roy Disney’s *Pyewacket* from Southern California set the monohull elapsed time record of 23 hours, 30 minutes, 34 seconds.

Such conditions are hardly rare. One of the questions in the survey that the Chicago Yacht Club and the Independent Review Panel sent out after the 2011 race concerned heavy weather experience in previous Chicago-Macs. Most of the 176 skippers who replied cited at least two races. Some said there were many more, with comments such as “Don’t remember the years, but several,” and “It seems that almost every year has at least one storm.”³

These memories are supported by meteorologists. “The line of storms that came across was not that atypical for this time of year,” Justin Arnott of the National Weather Service’s office in Gaylord, Mich., said about the brutal squalls that swept through much of the Chicago-Mac fleet on the night of July 17, 2011. Over the past ten summers, an average of nine Special Marine Warnings have been issued for northern Lakes Michigan and Huron during the last two weeks of July, when the two Mackinac races are sailed. A Special Marine Warning is an alert for “sustained marine thunderstorm winds or associated gusts of 34 knots or greater; and/or hail 3/4 inch or more in diameter; and/or waterspouts.”⁴

These challenges bind together generations of Midwestern sailors who have been members of the Chicago-Mac’s own exclusive club, the Island Goats Sailing Society for veterans of 25 or more races. There are now hundreds of Island Goats, a large number of whom continue to compete in the race. Many of them (like so many Chicago Yacht Club members) are known and respected far beyond Lake Michigan for their sailing accomplishments and numerous contributions to the sport at every level.

² *New York Times*, July 23, 2001.

³ Chicago Yacht Club and Independent Review Panel Survey of 2011 Chicago-Mackinac Race Skippers, August 2011.

⁴ <http://www.nws.noaa.gov/glossary/index.php?word=SMW>

Organization

The race organization is specified in the Notice and Conditions of Race (NOR) as follows: “The Chicago Yacht Club Mackinac Committee (CYCMC) shall represent the Chicago Yacht Club as the Organizing Authority of the Chicago Yacht Club Race to Mackinac.” The CYCMC reports to the club’s Rear Commodore, its chair is appointed by the club’s Commodore, and its decisions and actions are subject to approval by the club’s Board of Directors. The 2011 Race Chair was Greg Freeman, with Lou Sandoval as Vice Chair. The Principal Race Officer was the club’s Race Committee Chair, Janet Crabb. Eighteen CYCMC subcommittees address the concerns of any large modern distance race, from Docking to Protests to Sponsorship to Trophies to Website.

Under Chicago-Mac rules most entries are required to have an overall length between 26 and 86 feet (Doublehanded Division boats may be smaller). Approximately half the 2011 race’s starters were in the 35- to 41-foot range. The many special classes include Cruising (50 starters in 2011), Tartan 10 (24), Multihull (13), J/109s (15), Sportboat (12), and Doublehanded (8). *There is more on the 2011 fleet in Appendix H.*

Entry in the race is by invitation as determined by three committees. The Selections Committee (Don Glasell, chair) evaluates the ability and experience of sailors. The Measurement Committee and the Safety and Inspections Committee (both chaired by Ron White) deal with boat qualifications, ratings, and safety rules.

The safety rules, called the Mackinac Safety Regulations (MSRs), are based on the International Sailing Federation Offshore Special Regulations supplemented by the US Prescriptions for Category 2 races (Cat. 2 OSRs). These races are defined as follows:

Category 2 races are of extended duration along or not far removed from shorelines, where a high degree of self-sufficiency is required of the yachts but with the reasonable probability that outside assistance would be available for aid in the event of serious emergencies.

The Chicago-Mac used the Cat. 2 OSRs until 2005, when it joined with the Port Huron-Mackinac Race to sail under the briefer and clearer MSRs. Race officials report that compliance with safety rules improved after the MSRs were implemented. Besides wording changes, the MSRs are substantively different in some areas. The OSRs require boats to carry life rafts, but the MSRs allow a choice between a life raft and an EPIRB emergency beacon. Some MSR requirements exceed those of the OSRs. The 2011 MSRs required sailors to wear at night a high-

buoyancy personal flotation device, which could be a Coast Guard-approved Type I PFD with fixed buoyancy or an inflatable life jacket or other PFD with at least 32 pounds buoyancy.

Lifesling rescue devices were also required. The MSR design and structural requirements are borrowed from the Cat. 2 OSRs, for example MSR Rule 5 for monohulls:

Strength of Build: Boats shall be strongly built, watertight and, particularly with regard to hulls, decks and cabin trunks, capable of withstanding solid water and knockdowns. They must be properly rigged and ballasted, be fully seaworthy, be built to resist capsize, and must meet the standards set forth in these MSRs.⁵

In interviews at the Chicago Yacht Club on September 19-20, The Independent Review Panel asked race officials and club officers which factor – the quality of the boat, or the quality of the crew – is most important in determining whether a boat will be invited to race. The consensus answer was that the factors are balanced against each other. An inadequacy in one can be made up for by excellence in the other, with participation in prior Mackinac races weighing heavily. According to race records, in the three races in 2008-10 a total of 16 applications for entry were rejected (2011 records are not available). Four of the boats were too small to qualify, and in the 12 other cases either the crews were deemed inexperienced or the applications were incomplete.⁶

One of *WingNuts*' surviving owners, Stan Dent, was asked if a Chicago-Mac race official had ever inquired about the boat's history and characteristics before the four races she sailed. He replied that, to his knowledge, this had not happened, although there was concern about how much space the beamy *WingNuts* took up in the marina at Mackinac Island (the owners chose to dock the boat at St. Ignace on the mainland).

The race does not require inspection of all boats, yet provision is made for surprise inspections for a selected list of safety-related items before and after the race. Thirteen of the 2011 race boats were inspected in Chicago before the start, and another 26 were inspected after they finished. Twelve violations were noted. Ten pre-race inspections discovered one problem (either improper navigation lights or shortage of a flare) and two post-race inspections found multiple violations. After one boat was found with two violations – lack of chain on the anchor rode and absence of

⁵ http://www.cycracetomackinac.com/assets/1/7/2011_MSR_Monohull.pdf

⁶ CYC Race to Mackinac rejects, 2008, 2009, and 2010. Mackinac Race files.

the required searchlight – the boat was penalized five minutes of corrected time. The penalty was indicated in the final results but the reason was not announced.

The second boat failed five of the ten requirements. The inspection checklist shows that her crew had not undertaken the required man overboard practice maneuvers, her flares did not meet mandatory SOLAS standards, there was no radio antenna independent of the mast, the radar reflector was non-functioning, and she had only one of the required two anchors. A sixth requirement was satisfied only partially. The MSRs require that all safety harness tethers have snaphooks – shackles that can be securely closed and easily opened – at both ends to allow sailors to disconnect from the boat quickly. Yet the inspection revealed that the tethers lacked snaphooks at the harness end. The inspector made bluntly clear his opinion of the boat’s preparation in a note he wrote on the form: “This boat failed miserably.” Yet, unlike the boat with two violations, this boat was not penalized. The inspector wrote: “I told him that he would be inspected next year pre-race and at the island. I stressed importance of safety and he acknowledged. I told him I wouldn’t protest.”⁷ While there was no protest, subsequent to the race, the owner was permanently barred from future Chicago-Macs. *See the Appendix for a comparison of the Mackinac Safety Regulations (MSRs) and the ISAF Offshore Special Regulations (ISAF OSRs) for Category 2 races.*

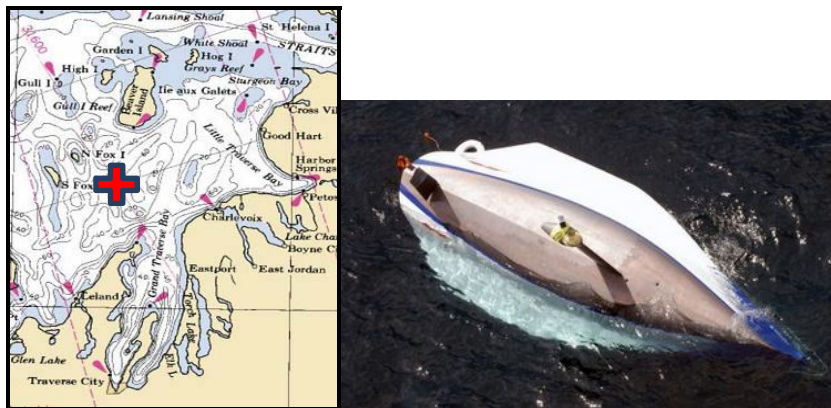
⁷ Inspection forms in 2011 Mackinac Race files.

***WingNuts* and Her Crew⁸**

The boat whose accident is the primary concern of the review panel was an entry in the Sportboat class, for fast lightweight boats. This was the 35-foot sloop *WingNuts*.

Five boats in the 2011 race are known to have been distressed. One was dismasted, two collided, and *Mosquito* lost a crewmember over the side on the afternoon before the storm and recovered him using the boat's Lifesling. (*Mosquito* has been awarded an Arthur B. Hanson Rescue Medal, presented by US SAILING, as has another race boat, *Sociable*, which saved the six survivors of *WingNuts*. More information on the Hanson Rescue Medal can be found at http://offshore.ussailing.org/SAS/Hanson_Rescue_Award.htm).

The fifth distressed boat was *WingNuts*. At approximately 2300 CDT on the night of July 17, she capsized between the Fox Islands and the Michigan shore and two crew members, Mark Morley and Suzanne Makowski-Bickel, died. The medical examiner identified blunt force trauma to the head as the primary cause of death, with drowning as a secondary cause.



The capsizing occurred near 45.42N / 85.60W. A light was placed on the keel to mark the turtled boat as she drifted.

The *WingNuts* crew was a tight-knit bunch of mostly Michigan sailors. The boat was co-owned by the brothers Mark Morley (51) and Peter Morley (47), and the first cousins Stanton Dent (51,

⁸ The following discussions of *WingNuts*, her crew, and the accident are based largely on interviews with two of her co-owners, Stanton Dent and Peter Morely. All times mentioned here are Central Daylight Time. Eastern Daylight Time references used by the Michigan-based weather and rescue services have been converted to CDT.

Peter's brother in law) and John Dent (50). Peter's 15-year-old son Stuart and his 16-year-old cousin Christopher Cummings (known as C.J.) were in the crew. The only two sailors unrelated to another were Lee Purcell (47) and Suzanne Makowski-Bickel (40, Mark's close friend).

The Morleys and Dents had grown up sailing together and against each other at Higgins Lake, Mich., where the families had cottages and raced Lightnings and other small boats out of the local boat club. "We were born on sailboats," said the Morleys' sister.⁹ Mark Morley, the president of a Saginaw education and arts foundation, had done five Chicago-Macs, 14 Port Huron-Macs, and more than 80 qualifiers for the Chicago-Mac. His brother Peter, a dentist from Midland and the boat's navigator and a watch captain, listed his experience as "20 years of big boat buoy racing, 39 years of assorted dinghy, skiff and multihull racing, 19-plus years of shorthanded cruising." He had sailed in four Chicago-Macs, 15 Port Huron-Macs, and 70 qualifiers. The Dents had comparable experience. Purcell was a *WingNuts* regular and Suzanne Makowski-Bickel was sailing her third Chicago-Mac and had done 16 qualifiers and a transatlantic passage. The two boys had sailed at Higgins Lake for years.



Before the start. Front row: Lee Purcell, John Dent, Stuart Morley, C.J. Cummings. Back row: Peter Morley, Stan Dent, Mark Morley, Suzanne Makowski-Bickel.

⁹ <http://detnews.com/article/20110719/METRO/107190371/Mood-somber-after-2-sailors-die-in-Mackinac-race#ixzz1SaXmNCz0>

WingNuts was one of eight boats in the Kiwi 35 class, designed by O.H. Rodgers and built in 1984-85 of a fiberglass-Kevlar sandwich at Kiwi Boats in Plant City, Fla. The yard was run by the Carlin brothers, Gary and Glen, whose brother-in-law was the New Zealand-born yacht designer Ron Holland. The Carlins had been the Dents' and Morleys' sailing instructors at Higgins Lake.

A sailor who raced a Kiwi 35 with Rodgers described the design concept this way: "Original idea was for a 'first to the bar boat' for our Thursday night races."¹⁰ Kiwi 35s were early versions of the dinghy-like sportboat designed for speed and excitement in protected water. The boat was very light weight, had a large sail area, and featured a pair of wings extending several feet out from the hull to enhance the crew's function as moveable ballast (the wings could be folded up to allow the boat to be trailed).



***WingNuts* early in the 2011 Chicago-Mac.**

WingNuts was originally raced at Bay City, Mich., by multihull sailors. The boat moved around the country before she was brought back to Michigan by the Morley-Dent syndicate in 2006. After sailing her for a summer, they made several changes, including two aimed at improving her stability: installing a new carbon-fiber rig that saved 100 lb. aloft, and adding 300 lb. to the keel bulb. These alterations left *WingNuts* with the following dimensions: LOA 35.08'; LWL, 28.5'; Hull Beam, 8.33'; Extreme Beam, 14'; Max. Draft (drop keel) 7'; Sail Area (fractional sloop), 477 sq. ft.; Displacement (approx.), 4,000 lb.; ballast (approx.), 1,400 lb.

¹⁰ *Sailing Anarchy*. Nov. 5, 2007, <http://forums.sailinganarchy.com/index.php?showtopic=63036>



A *WingNuts* sistership sailing upwind.

The boat's features were unusual 30 years ago and remain only slightly less so today, when there are a few other light, winged sportboats of this size. One way to describe her is as a keel version of a trimaran, but without the amas – the floats either side of a tri's main hull that provide buoyancy and stability. Stan Dent suggested after the accident that the boat could have used those amas:

The boat has a flaw in the design. Once its heeled 22½ degrees, it puts the leeward wing into the water. That slows the boat drastically, and with such a small keel you can't point unless you're sailing fast. We get absolutely slaughtered if we have to go upwind. Once the water begins to slap the aft quarter of the leeward wing, you're in trouble. We typically reef at 12 knots. When the trimaran guys called us a trimaran without training wheels, we should have listened.

Stability

One indication of a boat's resistance to capsize is its limit of positive stability (LPS). This is the heel angle at which the righting arm is zero and the boat capsizes. LPS is determined by the boat's shape and dimensions and displayed on the certificate for the boat's rating under the Offshore Racing Rule (ORR), which is used in the Chicago-Mac and other races. The LPS for *WingNuts* is 107 degrees – meaning that if she heels 108 degrees she will go right over. Other indexes take into consideration vessel size and how willing a boat is to remain upside-down. Other stability indicators for the Kiwi 35 yield results ranging from 100.7 degrees to as low as 74 degrees, but they and the LPS agree that well before this boat's mast goes into the water, the hull

flops over. By contrast, a typical modern 35-foot cruiser-racer keelboat has an index of 110-120 degrees, meaning that it resists capsize even when the deck is 20 to 30 degrees beyond vertical, even though the mast is several feet underwater.

Stability formulas can also measure how readily a capsized boat will right itself. Wide boats, like the Kiwi 35 with its wings, tend to be more stable upside-down than they are right-side up.

There is more on stability and WingNuts' design in Appendix B.

The ISAF Offshore Special Regulations recommend compliance with a minimum stability or stability index for Category 2 races. Many category 2 races require an ORR Stability Index of 110 degrees or greater. The 2011 Chicago-Mac did have a Stability Index requirement, but only for the Doublehanded Class, where a 110-degree Stability Index was mandatory for 21- to 26-foot LOA entries (no boat of this size applied).

The Kiwi 35's low stability is well known. The Chesapeake Bay Yacht Racing Association has permitted boats in the class to enter only ISAF Category 6 races, which are defined as "races where participating boats may not be self-sufficient; the races are short in duration and close to a single manned shore base, in relatively warm and protected waters, in daylight and good visibility," and where safety boats are close at hand.¹¹

WingNuts' crew was not blind to the boat's characteristics. "The boat is fun to sail, very tender, [and] two people out on one of the wings will put the wing in the water," one of the owners wrote in a blog in 2007. "You almost need a deck buddy to move around the boat. If you go port, you need an equal-sized person to go starboard. . . . The boat is very light and the acceleration is amazing."¹² Asked if the boat had ever capsized, Stan Dent replied, "We were up on our side all the time, but it always comes back." Peter Morley commented, "I keep telling people that if it weren't for Suzanne and Mark, this would be a story you'd tell at the bar – just another time when I tipped over in a boat."

Reports of Kiwi 35 adventures (including capsizes) on Long Island Sound, Chesapeake Bay, the Gulf of Mexico, and other areas have circulated for years. They are accompanied by irreverent

¹¹ Category 6 OSRs, http://offshore.ussailing.org/Assets/Offshore/SAS/USOSR2010_AppL_1911071.pdf

¹² *Sailing Anarchy*, Nov. 1, 2007, <http://forums.sailinganarchy.com/index.php?showtopic=63036>. Other Kiwi 35 mentions are on *Sailing Anarchy*, *Sailing Scuttlebutt*, and Google.

humor about the boat and sportboats in general. One example is *WingNuts*' name (it was the syndicate's consensus choice). Another is an anecdote about an owner of a Kiwi 35 who was said to have painted "Call 911" on the underside of the wings.¹³ A third example is a sentence in a Chicago-Mac official's post on *Sailing Anarchy*:

Calling all sportboat owners. We are hoping to establish a sportboat section for the Chicago Mac this year and need at least 8 "sportboat" candidates. . . . The general profile is surfboards with keels [smiley face]. Seriously, keep in mind that all entries must meet the Mackinac Safety Regulations ("MSR") which are posted on the web site, and all entrants must have a valid ORR rating. As of today we're at 233 entries and climbing fast.¹⁴

Weather

Before the boat's three previous Chicago-Macs, the *WingNuts* crew was promised a southerly breeze pushing them up the lake at high velocity. Every time they were disappointed. In 2008 they beat into a rough northeasterly, hardly the boat's favorite point of sail. In 2011 they finally got their fair wind. As they screamed along under their large asymmetrical spinnaker for a day and a half, they still had to handle the boat with care. During one jibe, crewmembers moved inboard from the windward wing too soon, the leeward wing dug in and the boat went over on its rail and broached.

These conditions were predicted at the Friday skippers' meeting by the race meteorologist, Chris Bedford, who also warned that more severe weather would arrive late Sunday. He showed a PowerPoint graphic that has been described by one analyst of the race's weather, Mark A. Thornton, as "remarkably accurate in pinpointing the area in which the squall line would develop and travel."¹⁵ When the skippers were asked in the post-race survey if they had been surprised by the conditions, 150 of the 176 respondents replied "No." *A summary of survey responses is in the Appendix I.*

¹³ http://www.huffingtonpost.com/2011/07/18/chicagomackinac-race-two- n_901427.html

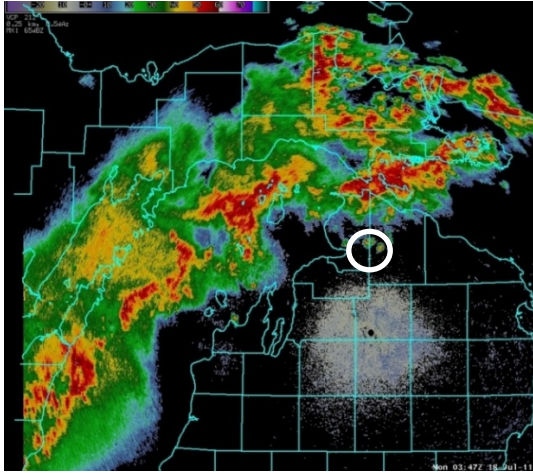
¹⁴ *Sailing Anarchy*, Feb. 23, 2010, <http://forums.sailinganarchy.com/index.php?showtopic=104991>

¹⁵ Mark A. Thornton, *2011 Chicago-Mackinac Race: A Meteorological Summary*, 1, <http://www.lakeeriewx.com/CaseStudies/ChicagoMac/Introduction.html>.

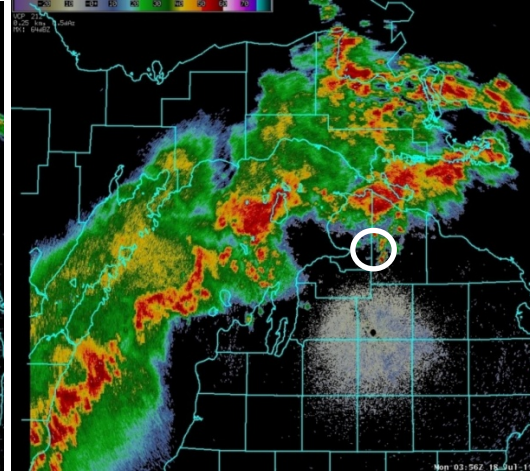
As they ran north at speeds in the high teens, the *WingNuts* team tracked the weather with several tools, including NOAA weather radio forecasts and WX weather overlays on the boat's GPS and radar. The forecast for Northern Lake Michigan area degraded throughout Sunday. A Severe Thunderstorm Watch was established at 1925 CDT, and subsequently the National Weather Service at Gaylord, Mich. issued ever more urgent warnings. In a report produced after the race at the request of the Independent Review Panel, the Gaylord office described the developments this way:

During the late evening of July 17, a disorganized cluster of thunderstorms over Wisconsin and Upper Michigan moved into Lake Michigan and eventually evolved into a line of thunderstorms that crossed northern Lower Michigan. From a radar perspective, the storms were initially somewhat disorganized and marginally severe. As the cluster of storms progressed into Lake Michigan, however, one particular cell rapidly developed and intensified just prior to midnight EDT [2300 CDT].¹⁶

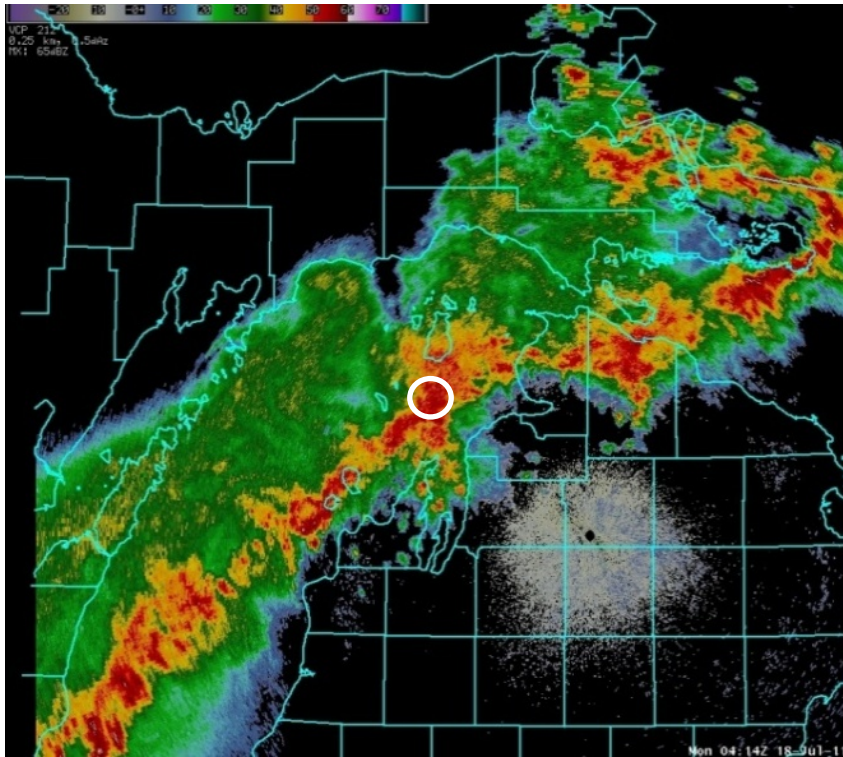
¹⁶ Justin Arnott and Bruce Smith, *An Assessment of Thunderstorm Characteristics Associated with the Marine Accident of 17 July 2011* (August 30, 2011), 3. Arnott is Science and Operations Officer, and Smith is Meteorologist-In-Charge, at the National Weather Service office in Gaylord, Mich. ***This report is in the Appendix.***



2247 CDT



2256 CDT



2314 CDT

NOAA radar images showing the cell on the night of July 17. *WingNuts* capsized in the circle, just east of the Fox Islands, at approximately 2300 CDT. (From Arnott and Smith, *An Assessment*)

Harnesses, Tethers, and Jacklines

After sunset at 2025 CDT, the wind veered somewhat into the west. The *WingNuts* crew changed down from their large asymmetrical spinnaker to a smaller one, and soon changed to the genoa as they broad-reached on port tack. The seaway from the two days of fresh southerlies flattened a little, yet conditions remained rough enough to make steering difficult. Because the race tracking system had crashed, a view of the whole fleet was impossible but there were a great many hulls and sails within sight – and then, after sunset, a great many running lights.

The sailors were spread around the cockpit and side decks to keep the boat level. They wore inflatable life jackets, most of which had automatic inflation systems. The life jackets were integral with safety harnesses whose tethers were about 6½ feet long. Seven tethers – including Mark Morley’s and Suzanne Makowski-Bickel’s – met the Chicago-Mac safety rule requiring snaphooks at both ends. This allows sailors to detach from the boat quickly by opening the shackle on the harness at their chests. The eighth tether, Peter Morley’s, was secured to the harness with a cow hitch (sometimes called a “luggage tag” hitch) and would have to be cut with a knife to allow the sailor to get free.

Each tether was hooked to a length of webbing, called a jackline, secured to the boat at both ends and running fore and aft. *WingNuts* had three jacklines, one on the boat’s centerline in the cockpit and the others on the side decks. Made of no-stretch Kevlar and pulled tight, the centerline jackline prevented sailors from going over the side into the water, which is any seaman’s worst nightmare. Instead, they would fall on deck or in the cockpit. The two deck jacklines were rigged from the bow and stern on the side decks with about 2 feet of slack to allow people to move around on the wings.

The Storm

It was obvious that some very bad weather was sweeping in. Peter Morley remembered the radar display on the boat’s instruments: “We could see the intensity of a couple of cells coming toward us – the greens, then the yellows, then the maroons – and we knew they were very intense.” So was the display of lightning. “I’d never seen a storm with so much electrical activity. It really stood apart. There were many ground strikes. It almost seemed like it was light outside.” As the wind built to 20 and 30 knots, the crew took two reefs in the mainsail. In time they replaced the

genoa jib with a small number 3 jib. When the wind continued to rise, they took in the mainsail altogether, furling it on the boom and centering the boom over the cockpit on the main halyard. The *WingNuts* crew then rolled up the small jib and went under bare poles for a while until they decided they were sailing too slowly for steerageway and a comfortable motion and unrolled the sail. (Other crews were much less cautious. Responding to the post-race survey's request. "What would you do differently?", several skippers said they should have reefed much earlier, and another stated, "Take the spinnaker down sooner.")



***WingNuts* from overhead, the three jacklines indicated by black lines. The jib furling line that Mark was pulling when the boat capsized is near X.**

Several minutes before 2300 CDT, the time for the change of watch, Stan Dent, the captain of the new watch, sat down on the leeward (starboard) side of the cockpit, forward of the traveler and next to Suzanne, and hooked his tether to the starboard jackline, running forward across the wing behind him. Looking around at the waves of sheet lightning, he said to himself, "This is not a typical simple summer storm."

Both Stan and Peter Morley, who was steering, remember clearly that Mark Morley went forward from the after part of the cockpit to near the cabin on the port side. There he looked at the radar instrument, with its weather overlay. Stan Dent was close enough to Mark and the instrument to see a large bright spot on the screen heading right at *WingNuts*.

Glancing upwind, Stan saw boats disappearing into what he has described as “a wall of white.” He announced in a loud voice that a bad one was about to hit. Peter remembered, “I was looking across the bow and trying to keep the boat under the mast when Stan on the starboard side yelled “*I can see a wall of wind. It just knocked down that boat, and I can see it coming!*”

Mark immediately shouted, “*Roll the jib!*” He turned to his left, grabbed the furling line, and pulled on it so hard that he leaned backwards toward Suzanne, seated to starboard. He had the jib about half-way rolled up when the boat lifted to a wave, and the wind suddenly went forward and increased viciously, blowing the boat over on her side with violence. The windspeed indicator went to 50. Peter soon saw 67.

“We went through 90 degrees pretty quick. I don’t remember any pause at all. It went straight over,” Stan recalled. “We’re used to being knocked down,” echoed Peter Morely. “We went up to the windward side and waited for the boat to come back. But this was not a short puff but a steady blast. What stood out was the gust’s longevity. ”

Thirty-seven other boats were knocked down, according to the race survey. Here is how Chris Beckwith described the experience in *Nirvana*, a 34-foot Beneteau 10r sloop with 10,265 lb. displacement:

The first blast of air pegged our anemometer to about 65, and the boat lay on its side for about 2 minutes. The breeze eased up. We continued to get hammered, rolling over for approximately two minutes every minute or so. Fifteen minutes or so of this knockover, upright, over, upright, and we had the main down, and took a lightning hit that knocked out the instruments.¹⁷

Several of the 176 skippers responding to the survey said that a crew member was incapacitated in the storm. There were five cases of seasickness, one of debilitating fear, and three physical injuries (a broken wrist during the spinnaker takedown, a head injury during a jibe and, “one

¹⁷ Chris Beckwith email to Chuck Hawley, July 21, 2011. *Nirvana*’s experiences are shown on a video, <http://www.youtube.com/watch?v=R4Bc2oFPMH4>

crew member cut head when boat heeled and he lost his grip”). Damage to the boats was limited mostly to sails.

Capsize

Peter Morley remembered the moment: “The wind was still blasting and suddenly we’re beyond 90 degrees and I can see the end of the mast going deeper, and the boat beginning to turtle. I yelled, *‘It’s going over, everybody get clear of the boat!’* But that’s not easy to do in boat that’s 14 feet wide.”

Mark and Suzanne were thrown together and then to the end of their tethers onto the leeward wing, suffering serious injuries on the back of Mark’s head and on Suzanne’s face. The other wing may have come down onto them. They very likely were unconscious before the boat settled upside-down.

Peter, the two boys, and Stan Dent fell straight into the water. Peter’s automatic life jacket inflated. He swam toward the stern until he jerked up on his tether, which he was unable to release because it was secured to his harness with the cow hitch. He reached for his knife but it wasn’t there. He had taken it out when he went below to change clothes and forgot it in the cabin. “I didn’t know what was going on,” Peter recalled. “My thoughts were with my son and his cousin. Time compressed. I had a poor sense of what was happening.” Swallowing water and rapidly becoming exhausted, he began to feel that he would not survive.

The boys were having troubles of their own. Unable to unhook his tether, C.J. was dragged underwater, where Stuart found him, released the harness, and the two of them with Lee Purcell climbed up on the boat’s bottom.

Under the turtled hull, Stan Dent had his head in the cockpit air pocket, which was bathed in the red and green glow of the cabin and instrument lights, broken by the blinding white of the rapid-fire lightning filtered by the water as the turtled boat pitched and rolled violently in the waves. His inflatable life jacket had manual inflation, which he did not trigger until later. He tried to swim out but was hindered by his clothing and eventually stopped by the harness tether, which was still clipped to the jackline. Unlike Peter Morley, he had a snaphook at the body end of his tether, but he decided to unhook at the jackline. As Stan again tried to swim out, the dangling

tether tangled in the boat's lines. He located his multi-tool, opened the knife, and cut away the tether and debris.

Dent has since stated that, if he were given a choice of safety gear to wear and use, he would wear an automatic inflating PFD and clip on with a safety harness tether. "If you're on a boat that you are 95 percent confident will not turtle, by all means that is the way to go."

Finally free, he swam out, inflated his life jacket, and climbed onto a wing. The wings contained buoyancy tanks and there were other tanks in the cabin, so the boat was not about to sink. After counting heads and catching his breath, he moved aft. Part-way to the stern he saw Suzanne, underwater. He grabbed her shoulder but there was no response. He considered releasing her tether but was unable to reach the snaphook. Working his way around to the transom, he discovered Peter Morley hanging on there, hooked on to the jackline, and unable to climb up onto the boat's bottom. Stan cut Peter's tether and went back to Suzanne, cutting one of the boat's running backstays to clear his access, but this time he could not see her in the water.

Asked about Mark Morley, he said, "I never saw Mark again. I hoped he had got free and blown away from the boat." Stan then climbed up onto the keel. Asked how much time had passed, he replied, "I didn't know whether I'd been in water for 20 minutes or two hours."

The eighth sailor was John Dent. When the boat rolled, he was below, trying to rest. Afraid of being trapped under the boat, he left his automatic inflatable life jacket behind and swam out of the cabin, shaking off lines grabbing his body. He dove under the lifelines and worked his way aft to the stern and climbed up onto the bottom.

Peter, alone in the water at the stern in his inflated life jacket and no longer tethered, went in search of Mark and Suzanne. Working his way around the wing, he touched a PFD. He looked under the water and saw Suzanne, with no life in her. He briefly considered trying to retrieve her body through the lifelines, but decided there was no use. He was sure his brother was under there and he hoped he'd found an air pocket, but he heard no tapping. He returned to the stern and waited as the sailors clustered around the keel above him got to work calling for help.

Rescue

The two boys triggered SPOT Messaging Devices they had been issued. SPOT relays messages through low earth orbiting satellites, and then to the GEOS International Emergency Response Center. A SPOT has three buttons for sending messages: “Check-in/OK” (for use by a specified distribution list of friends and contacts); “Help” (for the same distribution list); and “911” (which GEOS forwards to rescue agencies). Some alerts include the boat’s geographic position and a link to a Google map. The messages are repeated every few minutes.

Stuart pressed the “911” button on his SPOT. This sent an alarm with the boat’s geographical position to GEOS and then on to the Coast Guard, and also triggered a phone call to Stuart’s home. C.J. pressed the “Help” button, which sent a text message with the boat’s position to his mother’s cell phone. When C.J.’s stepfather Kinney read the message, he telephoned the Coast Guard at Sault Ste. Marie, not knowing that the station had received Stuart’s SPOT message. His contact instructed him to send the geographical position in an email. Maddening to Kinney at the time, this confusion may have been a byproduct of lightning damage to a radio tower used by the Coast Guard.

After the SPOT messages went out soon after 2300 CDT, the survivors employed the signaling devices they found on their life jackets and in their pockets. The one that worked first was a small whistle blown by one of the boys. The shrill sound attracted the attention of Bob Arzbaeher and his crew in *Sociable*, a half-mile away, and then they spotted waving lights and realized that something was seriously wrong. Arzbaeher would marvel at how effective this was: “A life jacket, a whistle and a light. My God, *how simple it can be?* But that’s what it was.”¹⁸ *Sociable*’s radioman, Brian Adams, began sending out alerts over the boat’s VHF-FM radio that reached the Coast Guard at Sault Ste. Marie and Charlevoix, and many competitors in the race. While saving six lives, the boat was also the primary civilian contact for the U.S. Coast Guard, other boats, and the race committee. Seventy-two boats in those stormy waters said in the panel’s survey that they had heard radio reports of the accident or saw flares fired off by

¹⁸ <http://www.jsonline.com/news/milwaukee/125806048.html>

Sociable and other boats. A Coast Guard Search and Rescue official would say about the crew of *Sociable*, “They’re one of the heroes.”¹⁹

At first there was some confusion in the fleet and with the Coast Guard whether the problem lay with *Sociable* or another boat that had been dismasted. The Manitou Channel was crowded with racing boats (14 skippers reported in the survey that they either had a collision or risked one). Despite the strong winds, rough seas, blinding rain, and the lightning, *Sociable* and at least 23 other boats in the Mac fleet stood by *WingNuts*, as required by the racing rules and by the best traditions of seafarers, which is that sailors will risk their own necks to look after other sailors in trouble. ***The Sociable crew’s detailed account of the rescue and the lessons learned from it are in Appendix S.***

Sociable made the rescues with a Lifesling, which offered the only way to get the sailors away from *WingNuts* without the risk of entangling *Sociable* in the web of lines and gear floating around the capsized hull. Under power, the boat dragged the sling around the hull until one of the sailors grabbed it. “Peter went first, then C.J., Stuart, and Lee, and then John and I went together,” Stan Dent recalled. “The Lifesling worked very well and the boat’s scoop transom was almost a swim platform on the back.” Some of the *WingNuts* people were chilled or hypothermic, and the *Sociable* crew was generous with dry clothes.

At 0100 CDT, a U.S. Coast Guard 41-footer arrived from Coast Guard Station Charlevoix, followed 11 minutes later by an MH-65 Dolphin rescue helicopter from Coast Guard Air Station Traverse City (the helicopter’s takeoff was delayed for an hour by the storm). Both searched the surrounding area for bodies and debris, and the boat’s bottom was tapped with a boathook in a futile hope of stimulating a response from someone trapped in the air pocket. The 41-footer remained on station and was joined by a 25-foot Coast Guard boat and the Coast Guard Ice Breaker *Mackinaw*, the race escort, which assumed the role of on-scene commander. Near dawn on Monday, one of the Coast Guard helicopters brought out two divers, one from the Antrim County Sheriff’s Office and one from the Charlevoix County Sheriff’s Office, who recovered Mark’s and Suzanne’s remains, which the 41-footer carried to shore.²⁰ There was, of course, considerable concern in the racing fleet about the missing crew members. Some of that grief and

¹⁹ John Rousmaniere interview with Jerry Popiel and Lt. David French, Oct. 4, 2011.

²⁰ This is a correction to the original report which reported that the divers were “commercial divers.”

frustration was directed at the Coast Guard for not sending divers from their vessel or helicopter to go under the boat to search for the victims. Coast Guard representatives later suffered verbal abuse at Mackinac Island. One sailor went so far as to complain in a newspaper interview that it is the Coast Guard's job to "ensure" sailors' safety.

Stan Dent later expressed regret for not making it clear that Suzanne and Mark almost certainly were dead. "When we got on *Sociable*, we could have said something, and should have. It was long over before *Sociable* got to us." He has no complaints about the Coast Guard. "We were a long way from shore and nobody can expect boat and helicopter to get there right away. They did everything they could, and the result wouldn't be any different." *For more on the Coast Guard's participation, see Appendix E.*²¹

Aftermath

Not very long after *Sociable*'s first call, news of the accident reached the race's Principal Race Officer, Janet Crabb. She had come up to Mackinac Island by bus while the club's flag officers, the race director, and many other race officials sailed in the race. Until a sailor called her from the water, Crabb's concern had been focused on the race's tracking system – or, more accurately, the absence of tracking after the system crashed on Saturday (this was the second straight year of serious tracking problems). The race's brief emergency plan assumed that tracking would be effective, and indicated that the PRO was in charge of emergencies.

Janet Crabb immediately got to work and, over the next few hours, gathered information. The detailed log that she kept that night includes the cell phone call she made at 0444 Monday to *Sociable*. After Brian Adams reported briefly on the rescue, Stan Dent provided details about the capsizing, stated that Suzanne and Mark had died, and conveyed his and Peter Morley's certainty that they had died during or very soon after the capsizing. Those were only some of the important communications that were by mobile phone, using either voice or text messaging. It has been estimated that as much as 20 percent of the communications surrounding the accident were text

²¹ Some sailors questioned the Coast Guard's lack of participation in the removal or salvage of WingNuts. A letter received by US Sailing from Marilyn Kinsey, November 2, 2011 expressed concern that the Coast Guard did not do more to make WingNuts less of a hazard to navigation. WingNuts was spotted, aground, six days after the event, on July 23, and several vessels broadcast a Mayday, thinking that the vessel had recently been involved in some sort of accident.

messages. Some information about the accident was posted on Facebook early Monday. ***There is more on the onshore response and communications in the Appendix.***

As Stan Dent and Janet Crabb spoke, *Sociable* was nearing Charlevoix, her crew of 12 enlarged by the six survivors of *WingNuts*. They were met by three ambulances and Stan's sister and spent the remainder of the night in rooms at the marina. They refused medical attention.

A total of 47 boats withdrew from the race, some because of the storm, and others out of respect for the tragedy. As one skipper put it, "this was no longer a race." A memorial service was held at Mackinac Island with representatives from the U.S. Coast Guard, *Sociable*, the racing fleet, and a local clergyman.



WingNuts a day after the accident.

The capsized *WingNuts* drifted north and at some point righted herself; perhaps a list due to water in one of the wings heeled the boat enough for the keel to exert leverage. Mark Tescari, on a boat returning from Mackinac, snapped a photo and took a video posted on You Tube.

Eventually *WingNuts* fetched up on Grays Reef, 50 plus miles north of where she had capsized, and was vandalized. She was towed off the reef and is now in a yard in Charlevoix. The insurance company wrote her off as a total loss and very likely she will not sail again.

Mark Morley and Suzanne Makowski-Bickel were memorialized with great affection in Saginaw. After a period of soul-searching, Stan and John Dent sailed in the Port Huron-

Mackinac race. “For me it was good therapy to get back on the water,” Stan said. “It was what Mark and Suzanne would have wanted, too. Mark’s parents said, ‘Of course, go.’”

By then the youngest members of the *WingNuts* crew – the two teenagers who, balanced precariously on the boat’s bottom, had triggered the SPOT alarms, blown the whistles, and waved the lights that brought rescuers – were back at Higgins Lake, teaching sailing.

Panel Recommendations

1. Overall

- 1.1. Race organizers need to be circumspect about inviting appropriate crews and boats that enter their races.

2. Selection

- 2.1. We recommend that race organizers establish minimum standards for both the skipper and crew of each boat as well as the boat's suitability and seaworthiness.
- 2.2. We recommend that the race organizers, when needed, engage the services of a naval architect to assist in technical issues.
- 2.3. We recommend that the race organizers of Category 1 and 2 races implement a minimum Stability Index for their fleets.

3. Stability

- 3.1. US SAILING should consider redefining or recalculating Stability Index so that it more accurately represents the boat's ability to resist or recover from a knockdown or capsize. *This is described in greater detail in Appendix B.*

4. Safety Regulations

- 4.1. We recommend that the Safety at Sea Committee at US SAILING consider rewriting the Offshore Special Regulations to make them more understandable and practical for race participants and organizers.
- 4.2. We recommend that the Safety at Sea Committee conduct a study of different tether/life jacket/harness designs to determine if an optimum combination of security and ease of release can be found.

5. Training

- 5.1. We recommend that US SAILING Safety at Sea Seminars, other training events, and publications include the following:
 - 5.1.1. Demonstrate the possible difficulty of releasing a tether once the life jacket has inflated, and encourage sailors to practice releasing tethers using their own gear.
 - 5.1.2. Stress the importance of stability, its implications, and how it's calculated.

5.1.3. The role, capabilities and the policies of the Coast Guard and other rescue services.

5.2. We recommend that race organizers make a high priority of promulgating weather awareness and information in close coordination with the National Weather Service.

6. Disaster Planning

6.1. We recommend that US SAILING develop a template for detailed written incident and crisis plan for use by race organizers.

7. Inspections

7.1 -- We strongly recommend that the organizer of each distance race train and appoint a committee of knowledgeable inspectors, the records of which should be kept as permanent race documents.

7.1.1 -- We recommend that these inspectors conduct pre-race inspections of at least one-half the boats in each division or class in order to advise skippers and crews on (1) the importance of, and reasons for, required equipment; and (2) preparing the boat and themselves for the rigors of distance racing.

7.1.2-- We recommend that (1) random post-race inspections of a portion of the fleet be conducted; (2) infractions be penalized; and (3) infractions and penalties be publicized in order to reinforce the importance of safety.

Appendix A: Biographies

Chuck Hawley, Santa Cruz, Cal.

Chuck has sailed approximately 43,000 miles on vessels ranging from ultralight “sleds” to single-handed sailboats to the maxi-catamaran *PlayStation*. His voyages include two singlehanded passages to Hawaii, three crewed trans-Pacific races, and a world record attempt on the West to East transatlantic record. Chuck has moderated many US SAILING Safety at Sea Seminars, and serves as Chairman of US SAILING’s Safety-at-Sea Committee. He’s also a powerboat instructor for US SAILING. He has done extensive research into crew overboard recovery, life raft design, anchor design, and storm tactics.

Chuck has served on the boards of the ABYC Technical Board, Transpacific Yacht Club, Santa Cruz Yacht Club, Singlehanded Sailing Society, and Pacific Cup Yacht Clubs. He has worked for West Marine for 30 years, and is VP of Product Information. He lives in Santa Cruz with his wife Susan and five daughters, and owns an Alerion Express 38 Yawl.

Sheila McCurdy, Middletown, R.I.

Sheila McCurdy has sailed 90,000 miles offshore, including 15 Newport Bermuda Races, two Marion Bermuda Races, nine transatlantic passages, and a Bayview-Mackinac Race. As skipper and navigator in the 1994 and 2008 Newport Bermuda Races, she and her crew finished second overall in divisions of over 120 boats in her family boat, *Selkie*, a 38-foot cutter designed by her late father, Jim McCurdy. Sheila runs US SAILING’s National Faculty for Training and is a Moderator for Safety at Sea Seminars. She holds a USCG 100-ton Master’s license and a Master of Marine Affairs degree from the University of Rhode Island. She serves as Commodore of the Cruising Club of America for 2010-12. She has been a Fales Committee advisor to the US Naval Academy sailing program for 15 years. She serves on US SAILING’s Safety-at-Sea Committee and the Bermuda Race Organizing Committee.

Ralph Naranjo, Annapolis, Md.

Ralph Naranjo’s sailing experience includes a family voyage around the world aboard his sloop *Wind Shadow*. For 15 years he served as a judge for Cruising World magazine's “Boat of the Year” Contest. He has managed a full service boatyard and consulted on boat projects. For 10 years he served as the Vanderstar Chair at the U.S. Naval Academy, overseeing the sail training

program and acting as the Academy's lead agent on the development of the new Navy 44 foot sail training sloops. He moderates US SAILING safety at sea seminars, is a past Chairman of the Safety at Sea Committee, and has written extensively about a wide range of marine topics. He is Technical Editor of "Practical Sailor" and Electronics Editor for "Sail".

John Rousmaniere, New York, N.Y.

John's 40,000-plus miles of offshore sailing includes a Chicago-Mac, a Bayview-Mac, Newport Bermuda Races (twice in the second-place boat), and Fastnets. In small boats he was on a Soling pre-Olympic team and helped win a Thistle National Championship. He has moderated or spoken at more than 100 or seamanship safety seminars, and he wrote the final report of the most recent crew overboard rescue trials. His books on sailing include two on storms – Fastnet, Force 10 and After the Storm— plus the history of the Bermuda Race and The Annapolis Book of Seamanship. John is a member of the New York Yacht Club, the Cruising Club of America, the Bermuda Race Organizing Committee, and U.S. SAILING's Safety at Sea Committee, where he coordinates the Hanson Rescue Medal program.

Dan Nowlan, Portsmouth, RI

Dan was first introduced to sailing as a college undergraduate and immediately fell in love with the sport. He was drawn to offshore racing and successfully campaigned his Santa Cruz 50, *Bombay Blaster*, up and down the California coast, to Mexico and to Hawaii. Dan has competed in two Transpac's, multiple races to Mexico and a Bayview-Mac event. While living in California he was chief handicapper of PHRF of Southern California, chairman of PHRF of San Diego and was a founder of the Fabulous Fifties, a group of fifty-foot ultralight sleds. For the last twelve years, he has been the Offshore Director at US SAILING where he administers the IRC and ORR rating rules and leads staff support to the Safety at Sea Committee. Dan is currently serving as rear commodore of the Transpacific Yacht Club.

Jim Teeters

A yacht designer for 30 years with both Sparkman & Stephens in New York and Langan Design Associates in Newport, RI, Jim now works in the Offshore Office of US SAILING. He has been a member of design teams for 5 America's Cup campaigns, specializing in tank test simulations and performance predictions. He has served on US SAILING's IMS committee and the ORC's International Technical Committee helping to develop the IMS rule. Jim is also president of the

Sailing Yacht Research Foundation and currently is responsible for the technical development of the ORR, Offshore Racing Rule. He has raced extensively offshore in events such as Newport to Bermuda , Marblehead to Halifax, Cowes Week, Copa del Rey, Kenwood Cup, Sardinia Maxi Worlds. He has created and managed the Bucket Rule used for handicapping large luxury yachts in events such as the St. Barth's and Newport Buckets, the Superyacht Cup Palma and the Shipyard Cup.

Ronald C. Trossbach, Captain USN (Ret)

Ron Trossbach serves on the Cruising Club of America's Safety at Sea (SAS) Committee and US SAILING's SAS Committee where he edits the Offshore Special Regulations for Racing and the booklet Safety Recommendations for Cruising Sailboats. He is one of six Moderators of US SAILING Sanctioned Safety at Sea Seminars.

Ron held the Vanderstar Sailing Chair at his alma mater, the US Naval Academy, in 1994-95. He is past chairman of CCA's and US SAILING's SAS Committees. He has served on the Newport Bermuda Race Organizing Committee since 1992 and was Chairman of the 2000 Newport Bermuda Race.

The Trossbach's typically spend up to six months a year on their boat. They sailed a 39 foot cutter, MOONESHINE, for 20 years. They have sailed four transatlantic passages along the North Atlantic Circle to and from Ireland twice and from Grenada to Labrador including a circumnavigation of Newfoundland. They have over 85,000 sea miles sailing their own boats in the Atlantic and Pacific. Ron has sailed in five races to Bermuda.

Appendix B: Vessel Design Comments, Ralph Naranjo and Jim Teeters

The panel looked closely at the design parameters of *WingNuts* and concluded that the vessel's stability characteristics were a primary cause of this tragic incident, and a major contributory factor in the deaths of crew members Morley and Makowski-Bickel. The extreme deck beam necessitated by the wing like appendages negatively impacted the vessel's stability, and it's the panel's opinion that the vessel's design characteristics made the Kiwi 35 an inappropriate boat for such a long distance race.

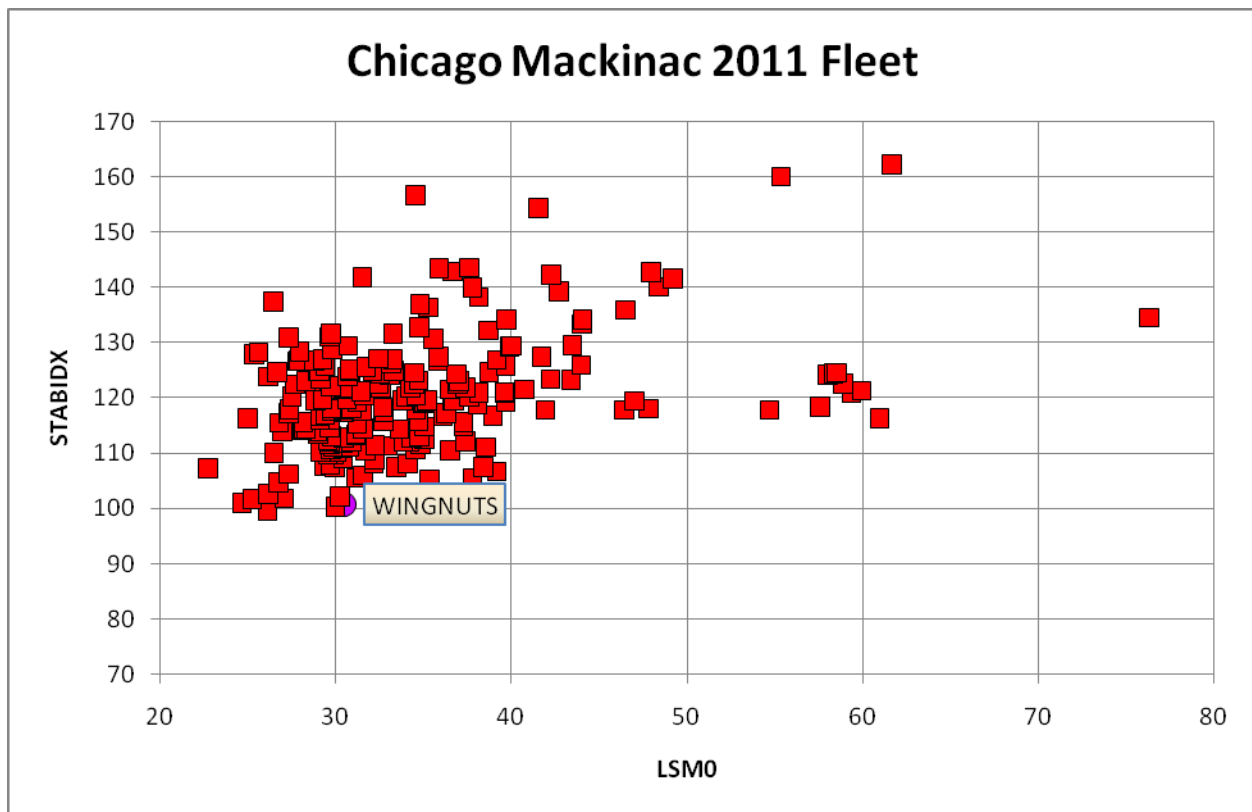


Figure B-1. Stability Index plotted vs. Measurement Trim Rated Length

The calculated 100.7 stability index (Fig. B-1) placed the vessel in the questionable lowest percentile of the rating cluster. A look at the vessel's GZ curve (Fig. B-2) reveals a boat with little inherent initial righting moment—an intentional omission designed to be offset by crew weight on the windward wing. Another alarming trait was the ratio of areas under the positive and over the negative portions of the GZ curve. The almost equal areas indicated a vessel that was inclined to remain capsized. Add to this the light displacement and large amount of surface

area posed by an elevated wing and the prospect of recovery from a knock down in heavy weather was poor at best. In such situations, wind pressure on the elevated wing added to the heeling rather than righting moment—encouraging a capsize.

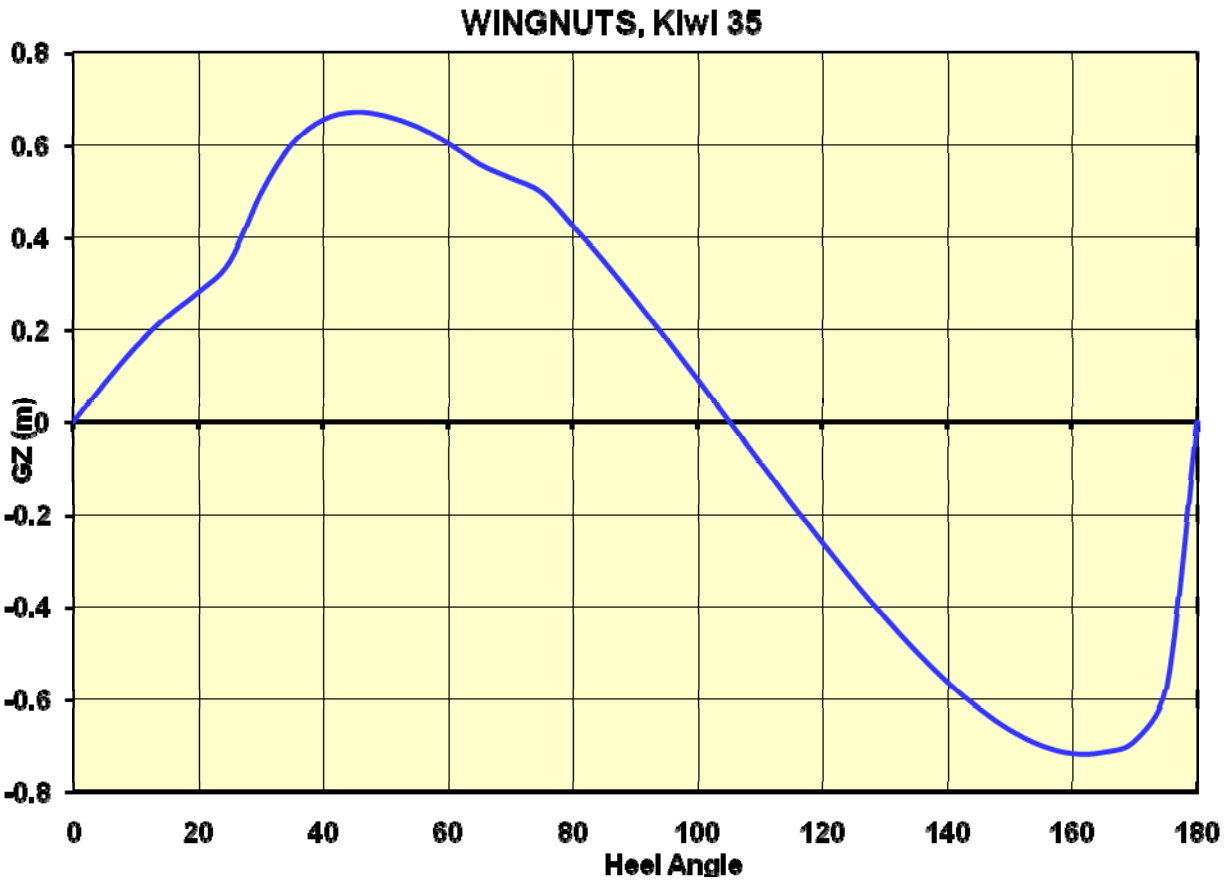


Figure B-2. GZ (Righting Arm) Curve.

The fact that the mainsail was down and the jib was partially furled when the boat was knocked down underscores the lack of initial stability and inadequate righting moment inherent in the design. An important bit of data came from feedback from the fleet. At the point when *WingNuts* was in the midst of capsizing, a nearby group of J-109s was being knocked down and pummeled by similar intensity winds. All had more sail up, and none were capsized.

Naval Architect and Associate US SAILING Offshore Director Jim Teeters provided the review panel with extensive technical assistance. He reviewed the Kiwi 35 design providing the panel with stability data, computer modeling of capsize dynamics and parametric comparisons with

other vessels. One of the most revealing discussions centered on the 100.7 stability index rating assigned *WingNuts*, and the fact that the formulae used do not fully penalize the Kiwi 35's extreme flare (disparity between waterline beam and maximum beam). Figure B-3 shows the Capsize Increment that is added to the LPS. There is a minimum value of -5 degrees. *Wingnuts* has that minimum value.

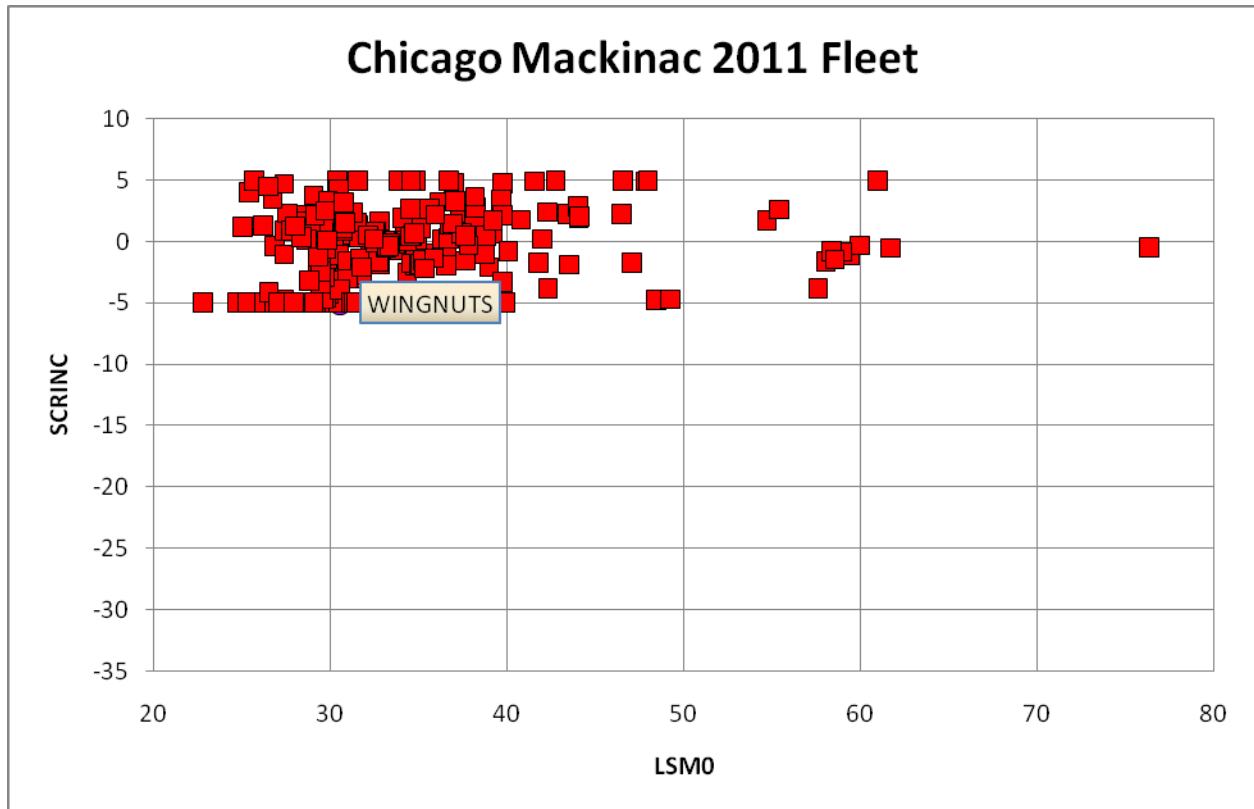


Figure B-3. Capsize Increment with lower limit in place.

Figure B-4 illustrates the value of the Capsize Increment without the lower limit. There are a number of boats effected but *Wingnuts* has a value that is notably different from the rest of the fleet. If the full negative value of this design trait was applied to the equation, the Kiwi 35's stability index would have dropped from 100.7 to 74.4. (Figure B-5). None of the other boats in the Chicago Mac Fleet would have seen such a drastic reduction if the full increment correction was applied to their stability index.

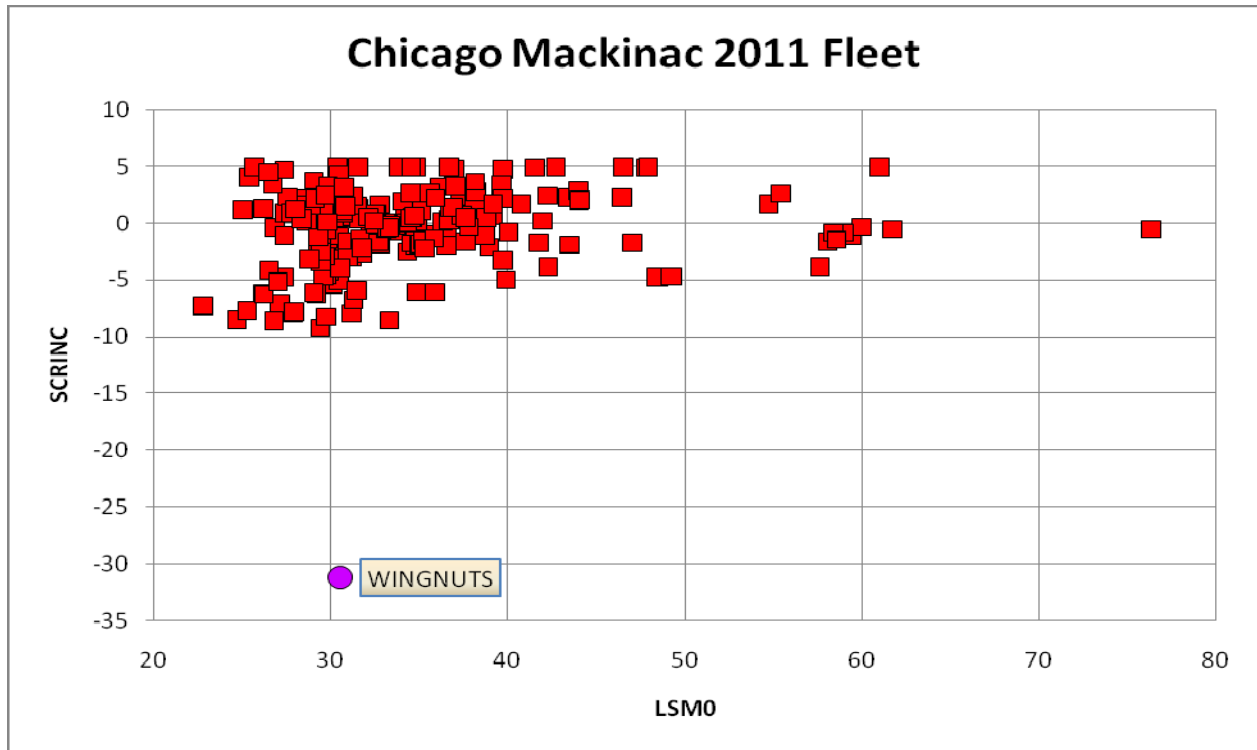


Figure B-4. Capsize Increment with no lower limit.

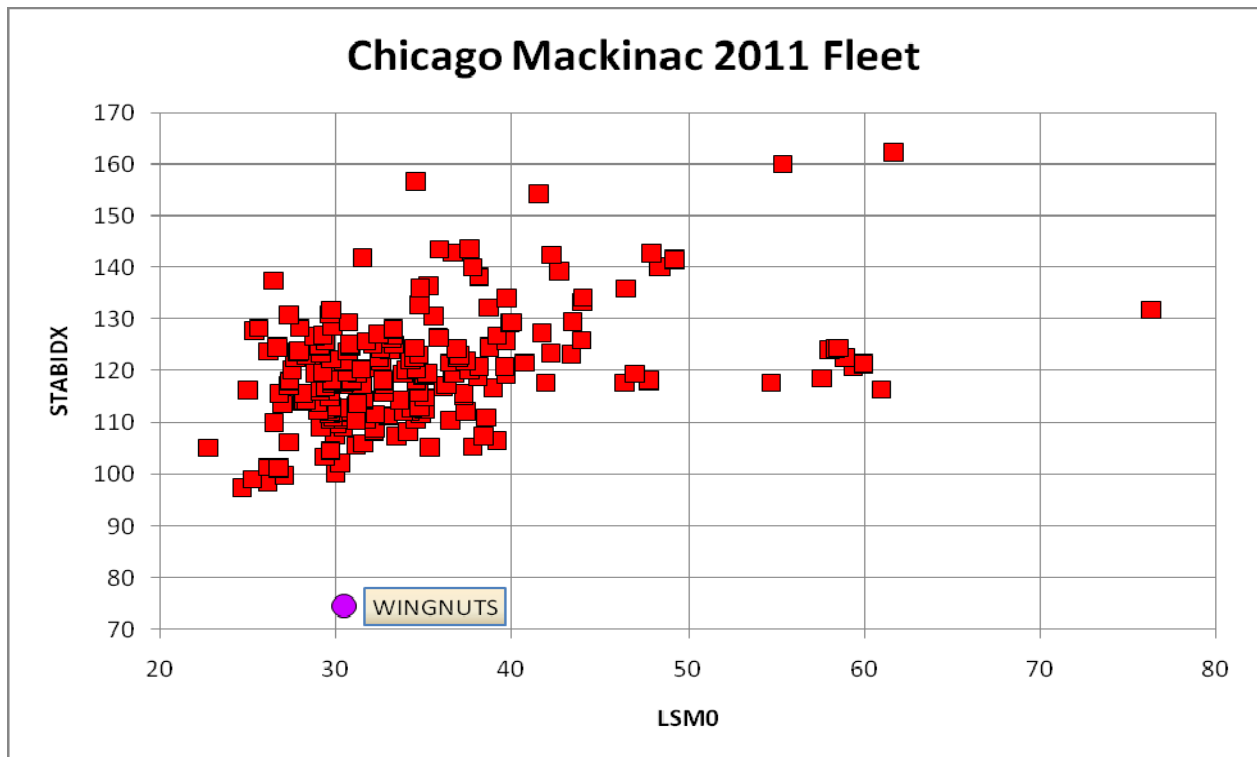


Figure B-5. Stability Index with no lower limit on Capsize Increment. The anecdotal record linked to the Kiwi 35 design alludes to the vessel being knockdown prone and very much in need of crew weight on the windward wing deck in order to remain upright. A recent capsizing on Long Island Sound and the fact that CBYRA race organizers on the Chesapeake Bay only allow the vessel to compete in near shore day races adds to the cumulative record.

The fact that the CYC race entry process deemed *WingNuts* appropriate to participate in a long distance overnight racing caused panel members to look closely at the vessel selection process, especially how the concept of “adequate stability” was being ascertained. After reviewing material provided by the club and interviewing those associated with the inspection process, we feel that there’s a need for closer scrutiny of vessels falling at the lower end of the stability index rating. The latter, as it currently stands, is an indicator but not an absolute means of determining the category of races that boats should be allowed to sail in. However, when used in combination with other indicators such as a low ratio of areas in the GZ curve, and high windage when heeled to 90 degrees, a picture of vulnerability begins to take shape. When a crew alludes to numerous encounters of being “over on the side” all parties should acknowledge the implications of being “caught out” in heavy weather.

One of the panel’s biggest concerns was the widespread assumption that the Kiwi 35 possessed adequate stability for the Chicago-Mackinac Race. There seemed to be an assumption that the possession of a rating certificate and a stability index of 100.7 somehow met the stability criteria. To put this in another context, as mentioned earlier the formulae used in some calculations do not fully correct for the instability of beamy boats like the Kiwi 35, and therefore they appear more stable than they actually are. The crew also seemed unaware of the danger lurking in vessel’s design and how it was being used. This prompted the panel to focus on where the go/no go decision needs to reside, and how in the future such vessel design shortfalls ring a warning bell. The assumption that the owner and crew understand what they are getting into does NOT hold up and race organizers need to rethink the role of gate keeper when it comes to vessel appropriateness for a given event.

Appendix C: Weather Review, Ralph Naranjo

Severe weather was a primary cause of the capsizing of the sloop *WingNuts* on July 17, 2011. The Incident Review Panel noted that the development of severe thunderstorms in the waters west of Charlevoix, Michigan generated localized storm force wind gusts. The squall line was not associated with a low pressure system or related warm or cold fronts, but instead formed on a weak surface boundary amidst a very unstable atmosphere.

The panel appreciated the efforts of National Weather Service meteorologists Justin Arnott and Bruce Smith who conducted an in-depth post storm review, and Mark Thornton of Lake Erie Weather who also added valuable detail regarding how the system evolved over time. In addition to dialoging with forecasters, we spoke with race competitors regarding their encounters with the squall line and the way in which they monitored weather updates. Each provided opinion on the severity of the conditions in their given area, and we compared the anecdotal data with buoy reports and nearby land base readings.

From this information gathering effort it became clear the duration of the worst weather varied from 10 to 45 minutes depending upon vessel location. The highest gust measured by a calibrated NWS anemometer was 64 knots and sustained winds of 40 knots or more were reported over a wide area of the upper peninsula of Michigan. According to the meteorologists we spoke with, a radar documented bow echo, containing a super cell thunderstorm developed west of Charlevoix, and likely resulted in a downburst with wind gusts of 70 knots. The cell passed close to the recorded position of *WingNuts* at the time of the capsizing. Wind direction was contingent upon where in relation to a specific cell a vessel happened to be located, but the general trend was a veering breeze moving from the southwest to the northwest. The cells were moving at 30 knots, and not long after midnight the system had exited the region.

We also reviewed the forecast data available to the fleet via VHF and via cellular download. Twenty four hours prior to the event The Storm Prediction Center (SPC) in Norman, OK had issued a slight risk of severe weather. Three and a half hours before the event a “Severe Thunderstorm Watch” went into effect. At the time of the event forecasters at SPC had referenced an “extensive corridor of strong thunderstorms” moving into the upper portion of Lake Michigan at over 40 knots.

Two days before the incident the local National Weather Service office in Gaylord, MI issued a Hazardous Weather Outlook (HWO) that alluded to the potential for “strong thunderstorm development on Sunday and Monday nights.” Two hours before the squall line hit the fleet the NWS described the storms approaching northern Lake Michigan as having “winds of 30 knots or higher.” When the squalls rolled through the fleet there was a **Special Marine Warning** in place that alluded to “strong winds 34 knots or greater – gusty winds – high waves – dangerous lightning – heavy rain”

On Sunday July 17, 2011 at 0356 race affiliated weather blogger Chris Bedford filed a weather update on his *Chicago Yacht Club—Race to Mackinac’s Notes* page on face book. He noted the current prevailing lighter air conditions, spoke of a building southerly during the day, and in three of the six paragraphs that comprised this update, Bedford addressed the unsettled weather boundary moving southeasterly toward upper Lake Michigan. He used terms like the potential for “strong thunderstorms” and “a chance that these storms could be severe with gusts over 40 knots.” These comments were available on Facebook 19 hours before the fleet encountered the tempest.

The consensus among weather forecasters labeled this weather event a wide area of severe thunderstoms with at least one reaching “super cell’ status. Later analysis of the radar data revealed a “bow echo” in the vicinity of *WingNuts’s* location. An associated severe thunderstorm cell with extreme vertical development showed an abrupt collapse indicative of a strong down burst. This is all in keeping with the gale to storm force (34-64 knot) gusts experienced by many of the competitors in the area. In all, the forecasters saw what was coming and accurately warned of the conditions that lay ahead.

Another key consensus among the experts, and moist of the veteran Chicago-Mackinac racers we interviewed, was that this weather event, though severe, was by no means an anomaly for this part of Lake Michigan. At other times, most indicated that they had encountered worse weather and larger seas. The conclusion reached by the panel is that the squalls that overtook the 2011 Chicago-Mac Fleet should certainly be viewed as atypical weather, but not so exceptional that reoccurrence is treated as unlikely.

Recommendations-

We feel that racers would benefit from additional weather training, especially in reference to developing a better understanding of how to utilize forecast information and the implication of specific National Weather Service terminology. Terms such as weather watches versus warnings, severe thunderstorm warnings, the relationship of sustained wind velocity and peak gusts and other key references spelled out in marine forecasts.

The volatility of weather patterns moving across northern Lake Michigan make it reasonable to put more emphasis on weather awareness training. The fact that forecast validity degrades with time underscores the need to maintaining a regular update schedule and how this should be accomplished is another facet of the training curriculum. Building an awareness of how to best utilize VHF weather channel updates, plus forecasts derived from cellular and satellite connectivity also fit into this training module. The implementation of a pre-race weather workshop in conjunction with a safety seminar would be of considerable value to the fleet.

Topics to include:

- The dynamics of local weather patterns

- Forecast acquisition alternatives

- Thunderstorms/squall line life cycle

In summary, the panel feels that it was the straight line wind gusts associated with a severe thunderstorm, on the night of July 17, 2011, that contributed to the capsizing of the sloop *WingNuts*. The crew responded reasonably to the deteriorating conditions and in extremis, it was the combination of strong wind and vessel design characteristics that were the primary factors in causing the incident.

Appendix D: Summary of Personal Gear In Use at the Time of the Capsize of *WingNuts*, Chuck Hawley

Name	Tether	Jackline	Means of Release	PFD
Mark Morley	West Marine double tether with a snap shackle and two Kong aluminum snap hooks	Center cockpit	Not released. Eventually unclipped at deck end by Sheriff's diver.	Automatic inflating Spinlock Deck Vest
Suzanne Makowski-Bickel, in cockpit aft of traveler.	West Marine Single tether with a snap shackle. Bitter end unknown but presumed to be a Kong aluminum snap.	Center cockpit	Not released. Eventually cut due to entanglement by Sheriff's diver.	Automatic inflation; Mustang Survival MD3032
Peter Morley, steering at the time of capsizes.	"Cow hitch" tether attachment at the chest, requiring that it be cut.		Could not release it. Tether cut by Stanton Dent.	Automatic inflation. "West Type with a cow-hitch."
Stuart Morley, sitting on port side forward of Peter Morley.	Possibly a West Marine single tether with snap shackle at chest.	Port side deck.	Released chest end of his own tether as boat capsized. Held bitter end in hand to keep near boat.	"West type with beaded snap shackle."
Stanton Dent, sitting on the starboard side to balance boat.		Starboard side deck	Released deck-end of tether himself after swimming back to air pocket in cockpit. Later cut his own tether.	Manual inflation. Activated when out from under the cockpit.
John Dent, below decks		Below decks; not tethered.	Left life jacket/harness in cabin.	Automatic inflation, not worn at the time of capsizes (in cabin)
Lee Purcell, sitting on port side, just forward of cockpit		Cockpit jackline, then transferred to port jackline. Not encumbered.	"I untied my tether."	
C.J. Cummings, port side between Stuart and Lee.	Double harness with "one hiking style clip and two quick release clips"		Stuart pulled the release string.	

Appendix E: Role of the US Coast Guard in the *WingNuts* Rescue, Sheila McCurdy

The *WingNuts* case gives insight for the racing sailor and recreational boater into the USCG capacity of responding to and keeping track of the developing details of an emergency like the capsizing of a vessel at night in bad weather. The Coast Guard assets of vessels, aircraft, and well trained personnel are impressive, but their search and rescue (SAR) teams face the same constraints of time, distance, changing information, restricted visibility, and severe conditions that can contribute to a life-threatening situation in the first place.

The United States Coast Guard mission is to “protect the public, the environment, and U.S. economic interests – in the nation’s ports and waterways, along the coast, on international waters, or in any maritime region as required to support national security.” They list maritime safety first of their major roles. When they receive a distress call, they rely on standard procedures to use available assets to save lives and not put personnel into unacceptable danger. One rule is that a Coast Guard swimmer who is part of a helicopter search team is not permitted to dive under hulls of overturned or submerged vessels. It is too dangerous for the swimmer, especially at night. The goal of the response craft is to reach the scene of distress within two hours. For the capsizing of *WingNuts* the Coast Guard employed three H65 Dolphin helicopters, a 41-foot utility boat, and the icebreaker Mackinaw. They had a 25-foot boat trailered to the area as backup.

The Coast Guard divides the U.S. into nine Districts. District 9 covers the Great Lakes. The district is divided into sectors including Sector Sault Ste. Marie (Sec SSM), located about 80 nautical miles from the accident site. They coordinated the Coast Guard SAR communications during the *WingNuts* rescue after they received a telephone call from private company which was alerted by the messages from the two SPOT personal locator beacons aboard *WingNuts*. Sec SSM diverted the USCG Cutter Mackinaw, which was escorting the race fleet, toward the scene; they notified the USCG Air Station Traverse City (40 miles away from the accident) to launch a helicopter as soon as the severe thunderstorm activity abated; they worked with the USCG Station Charlevoix (16 miles away) to get a 41-foot utility boat on scene; and they enlisted the

Antrim and Charlevoix County (Michigan) Sheriff's Offices²² to ready divers for the location as quickly as possible. Sec SSM stayed in close communication with *Sociable*, the race participant that was first on scene and rescued six of the eight crew from *WingNuts*. The accident case file shows how the Coast Guard activities unfolded the night of July 17-18.

At 2320 CDT on July 17, Sec SSM received a report from International Emergency Services of the activations of two SPOTs registered to two crew aboard *WingNuts* at 45-12.34N 085-43.54W. Sec SSM contacted USCGC Mackinaw to get a confirmation of location of the sailing vessel and establish whether there was cause for concern. USCGC Mackinaw was several hours from the scene and had heard nothing about the incident. At 2340, Sec SSM overheard a VHF report from *Sociable* which was on scene at 45-25.4N 085-36.12W. From this point the Coast Guard knew 6 crew were accounted for and 2 were believed missing.

Sec SSM communications were hampered by a casualty to the Norwood high level site (HLS) antenna. They had USCG Station Charlevoix establish communications through their LLS and learned that *Sociable* was firing flares to bring more race boats to the area to search for the two missing crew. Within minutes Sec SSM, having notified District command, requested a helicopter launch but were told that due to lightning the launch would be delayed by an estimate of an hour.

Meanwhile *Sociable* was bringing aboard the 6 crew members from *WingNuts* overturned hull. Several other race boats were standing by. By 0015, there was a report that two missing crew may have been trapped under the hull. At 0022 USCGC Mackinaw was 10 nautical miles away but was monitoring another case of a dismasted sailboat. The UTB 41-footer from Station Charlevoix had an ETA of about 60 minutes, but arrived at 0100. At 0055 the helicopter from Traverse City launched and arrived on scene 16 minutes later. The helicopter and the boat began searching the waters around the capsized boat. At 0144, there was a report that the hull had been tapped and no response was received. The search continued to look for persons in the water with or without PFDs until the bodies were found after sunrise. The boat was traveling at 15 knots using a parallel search. The helicopter was flying at 90 knots. The pilots were using night vision

²² This is a correction from the original document which misidentified the county as Emmet Country.

goggles. After the first hour the helicopter needed to refuel and then returned to the site. A second helicopter relieved the first at 0700.

By 0230 *Sociable* was en route to Charlevoix with the six crew members. The District 9 command was kept notified and was preparing a report for the Admiral. Two local divers from Charlevoix were preparing if they were needed to the scene. Sec SSM had yet to talk to the survivors directly because the Norwood HLS was not working. By 0330 Sec SSM received the crew list from the Race Committee listing names and years of births. By 0630, Sec SSM received the report that divers from the Antrim and Charlevoix Country Sheriff's Offices²³, arrived by helicopters, aboard the USCGC *Mackinaw* for a daylight search under the overturned hull. By 0835 *Sociable* had arrived at Station Charlevoix on the mainland. The crew of *WingNuts* confirmed that all crew had been tethered to the boat. Through the early morning, Sec SSM also responded to media and next-of-kin phone calls.

By 0730 the divers confirmed that the two missing crew were tethered to the submerged section of the hull. The bodies were recovered and taken by the 41-footer to Station Charlevoix to be turned over to the coroner.

On October 4, John Rousmaniere interviewed a District 9 SAR official. The official was very helpful in explaining policies for SAR that may not be readily apparent to recreational sailors. As example is they have endeavor to reach a SAR site within two hours. There are 57 Coast Guard stations at intervals along the coasts of the Great Lakes and two Coast Guard air stations in Traverse City and Detroit. Every helicopter has a swimmer for assisting in rescues, setting up pumps, and other functions. The Great Lakes rescue swimmers do not have scuba equipment and are not permitted to dive under submerged objects due to the danger of entanglement and drowning. The Coast Guard enlists the help of professional local divers just as they coordinate with local law enforcement, fire departments, and medical facilities.

Jerry Popiel, a SAR specialist for District 9 said they do 3,000 search and rescues on the Great Lakes. They use all resources to their best advantage; nevertheless, he said the "SAR ethos, our mantra, is we treat every possible victim as a family member."

²³ This is a correction to the original document which misidentified the law enforcement office.

The Coast Guard responded with search aircraft and vessels as quickly as conditions and distance allowed after receiving the distress call 20 minutes or more after the capsizing. They monitored the activities of the capable race participants on scene who saved six of the eight crew, and the Coast Guard brought in the local police and emergency services to assist. The responders adjusted their efforts through the night as the evidence became clear that the two missing crew had been trapped under the boat and likely had died shortly after the capsizing. The Coast Guard has the responsibility to save lives. Time does not always allow them to succeed.

Summary of Coast Guard Assets and Response to *WingNuts* Accident, Chuck Hawley

Date and Time, CDT	Coast Guard Response/action
7/17 2345	Requested helo (no tail number). Air Station says it will be 60 minutes before launch due to WX.
7/18 2345	Helo identified as MH65C, #6562.
7/18 2345	UTB requested.
7/18 0005	41' UTB launched #41375
7/18 0055	6562 launched.
7/18 0100	41375 on scene.
7/18 0111	6562 on scene.
7/18 0144	41375 tapped on hull of the capsized vsl and heard nothing.
7/18 0151	Mackinaw is enroute to the scene, ETA 1h 50 min.
7/18 0256	6562 is 75% complete with search, returning for fuel at Traverse City.
7/18 0324	Helo is refueling.
7/18 0400	Permission granted to take divers (mutual assist) to scene at daybreak.
7/18 0419	Mackinaw is on scene.
7/18 0505	25831 is readied at St. Ignace
7/18 0525	Helo 6592 is enroute to Charlevoix to pick up "another diver" (not sure of originating airport)
7/18 0542	41375 reports being done with search pattern NEGRES.
7/18 0552	6592 is on scene again
7/18 0559	25831 is on trailer and prepped for trip south from St. Ignace.
7/18 0641	6562 returns to base; sortie ended.
7/18 0649	41375 crew is relieved by a fresh crew from 25626
7/18 0700	6530 launched from Air Station Traverse City
7/18 0715	6530 on scene
7/18 0730	Divers confirm missing crewmembers are under boat and deceased.
7/18 0750	6530 Sortie ended.
7/18 0750	41375 departs scene with subjects enroute to Charlevoix.

7/18 1003	41375 at Charlevoix.
7/18 1320	25831 Sortie aborted due to other...

Appendix F: A Comparison of the ISAF Special Regulations for Category 2 Races with the Mackinac Safety Regulations, Ron Trossbach

This Executive Summary of the document 2011 Safety Regulations Comparison is intended to identify the substantive differences between the “Mackinac Safety Regulations” (MSR) and the “ISAF Offshore Special Regulations” (ISAF OSR). It is not intended to make any judgment about the adequacy of either document.

The reader should keep in mind that both documents have the same stated purpose, ‘to establish uniform minimum equipment, accommodation and training standards for monohull boats offshore.’

MSR is 11 pages long and is written in US English in paragraph form. ISAF OSR is 43 pages long and is written in European English in table form.

MSR presents 74 specific requirements using the terms “shall” or “must”. There is only 1 recommendation (EPIRBs and Liferrafts are strongly recommended) and use of the permissive terms “should” and “may” are restricted to offering alternative items or procedures that are accepted in filling a requirement.

ISAF OSR emphasizes “shall & must” requirements and “should & may” recommendations by changing the print style and font. ISAF requirements are printed using regular type while recommendations, warnings, and notes are printed in italic type. Bold type is often used for titles and emphasis while bold italic type is used for US SAILING Prescriptions. ISAF documents also use color print to identify new additions and changes.

MSR requirements are self contained while ISAF OSR requirements often refer to other documents like the ISO Standards which are not available to the average boat owner or race organizer.

MSR is distributed for a single purpose (monohull or multihull) for use in the US Great Lakes while the ISAF OSR publication combines monohull and multihull regulations for six different categories for world-wide use. The result is that ISAF OSR extracts for each situation are oddly numbered, then interrupted, and often modified by both US SAILING Prescriptions and local race organizers before they reach the boat owner.

MSR omits all reference to ISAF OSR items not under the immediate direct control of the boat owner. This includes ISAF design guidelines on canting keels (OSR 3.02.3), movable ballast controls (OSR 3.02.4), hull construction standard/scantlings (OSR 3.03), stability (OSR 3.04), hatches & companionways (OSR 3.08), cockpits (OSR 3.09), mast step (OSR 3.12), clipping points (OSR 4.04.2) , sheet winches (OSR 3.11), radar reflector (OSR 4.10)

MSR changes ISAF OSR guidelines as follows:

MSR	ISAF OSR Category 2
One bilge pump	Two bilge pumps
Outboard engines allowed	Inboard engines only
No AIS Transponder requirement	AIS Transponders required
Jacklines can be composite line	Jacklines cannot be composite line
EPIRB with GPS <u>or</u> life raft	Life Raft required
25% reef in main or storm trysail required	Storm trysail required
Beltpack PFDs allowed	No beltpacks allowed
PFDs required between sunset and sunrise	PFDs required at start and finish of race
Tethers must be releasable from either end	Tethers must meet ISO 24401
Annual Man Overboard Practice required	Training required

AUTHOR’S CONCLUSION STATEMENT. The development of the Chicago Mackinac Safety Regulations was originally done by the Race Organizers of the Chicago Mackinac Race in response to the frustration experienced while trying to interpret and modify the international Offshore Special Regulations for use in the US Great Lakes. A great deal of effort and thoughtfulness went into their writing and they have since been modified by experience and become widely accepted by other race organizers in the area. They are viewed by both organizers and competitors as clear and adequate for the conditions and area in which they are used. There is much to be said and respected about this type of wide acceptance. *See Appendix D.*

Appendix G: Communications during the Race

The primary means of communicating boat-to-boat was the marine VHF-FM radio, which the fleet used to maintain a required watch on Channel 16 during the race. Evidence of the number of vessels monitoring Channel 16 (or spotting flares) can be deduced by the rapidity with which boats voluntarily stopped racing when *Sociable* initially notified the fleet that *WingNuts* had capsized. However the sheer number of boats and density of communication made it difficult for several boats to determine if *Sociable* was organizing the rescue effort or was the boat in need of assistance. *Sociable*'s radio operator, Brian Adams, is credited by many of the racers as having maintained a sense of order despite the number of boats in the vicinity and the general difficulty of assessing what was actually happening.

As would be predicted, vessels beyond approximately 20 miles from the incident were not aware of what was unfolding due to the short range nature of VHF communications. However, the high number of boats in the vicinity of *WingNuts* caused approximately 24 boats to come to her aid.

Rescue 21, the Coast Guard's modern coastal communication system for monitoring VHF-FM marine transmissions has been installed along most of the Continental US coastline and northern Great Lakes. Rescue 21 allows for triangulation of VHF broadcasts and improves the range of coverage for Coast Guard stations. According to the newest map showing Rescue 21 coverage, the area where *WingNuts* capsized was just outside of the stations which cover northern Lake Michigan.

While VHF radios provided the broadcast and party line communication link, cell phones provided the ability to contact vessels from the shore and boat-to-boat, depending on the proximity to the cellular network on land. The PRO for the race, Janet Crabb, used her cell phone repeatedly during Monday morning July 18 to gather information from the boats in the fleet. Cell phones were required to be carried by the fleet, and crews reported that they polled their fellow crewmembers' carriers to see who belonged to what network so they could remain in touch. (Smart cell phones also were used by many boats to monitor Doppler radar weather maps as the storm approached on Sunday night.)

While the cell phone numbers on board the race boats were required by the race committee, they were not shared between the other competitors.

Janet Crabb also used SMS messages, or text messages, to communicate with specific vessels when voice communications failed. The advantage of SMS is that it is a “store and forward” messaging system where the two parties do not have to be in contact at the time the message is received. When the receiving party enters a cellular network area, the messages are delivered to the phone. This proved to be effective for many boats that were on the edge of the cellular coverage area.

While the Chicago-Mac racers are required to carry either a life raft or an EPIRB, it was two SPOT Personal Satellite Messengers that first alerted the families and the Coast Guard to the trouble on *WingNuts*. C.J. Cummings and Stuart Morley each carried the small satellite communicator and each activated their SPOT after the capsized. This proved to be an effective means of alerting with their parents and the Coast Guard via services provided by SPOT and GEOS.

"The U.S. Coast Guard received initial notification from a private company that monitors personal locator beacons, reporting that two PLBs aboard the sailing vessel *WingNuts* had been activated." [1]

Each participating vessel carried a Iridium-based tracker supplied by IonEarth, a company that provides tracking services for a variety of races (including the Iditirod, sailboat racing, and off-road racing). During the previous year’s race, the IonEarth servers had not been able to keep up the traffic generated by the fleet, and the system failed during the race. To insure that this did not happen in 2011, race committee members met with IonEarth for the seven months leading up to the start of the race. In 2011, a human error apparently caused the ION Earth server to go “down” and lose all information associated with the racers and their previous positions, so the tracking system failed for a second year in a row.

Different race committee members had different opinions as to the role that the tracking system served as safety gear. Race Chairman Greg Freeman emphasized that the role of the tracker was primarily for the sponsors and family members at home, as well as the Coast Guard. Janet Crabb thought the tracker providing useful safety information for the race committee.

Sail-World.com, July 18

In addition to electronic means of communication, the more mundane methods of communicating through noise (whistles), light (strobes and flashlights) and signals (rocket parachute flares) were instrumental in the rescue. The crew of *Sociable* remarked several times on the effectiveness of the whistles and lights used by the crew of *WingNuts*. Without these devices, it's likely that the rescue of the *WingNuts* crew could have been greatly delayed.

Appendix H: Fleet Structure, Sheila McCurdy

The 103rd Race to Mackinac had 345 boats entered. The total number of people racing was listed in the Chicago Yacht Club summer edition of “Blinker” as 3177. The Chicago Yacht Club calls the race the largest fresh water race in the world. Over the years divisions have been added to bring in different types of boats and crews and encourage wider participation, but almost 80% of the fleet were almost equally divided between the Chicago Mackinac Trophy Division and the Mackinac Cup Division.

The 2011 race started on July 15 for the Cruising Division and July 16 for the remainder of the fleet. The Offshore Racing Association SMART scratchsheet listed 345 boats in 5 Divisions:

The Chicago Mackinac Trophy Division had 142 boats in 9 sections. This division included the Sportboat Section of 12 boats including *WingNuts*.

The Mackinac Cup Division had 129 boats in 7 sections.

The Cruising Division had 50 boats.

The Multihull Division had 14 boats.

The Double Handed Division had 10 boats.

The NOR has a standard format and states that the race is governed by the Racing Rules of Sailing with the US SAILING Prescriptions. The monohull divisions race with valid ORR certificates, and the multihulls race with valid GLMRA certificates. The NOR stipulates that monohulls must be seaworthy and have a minimum length of 26 feet. The minimum crew size is 5 for all but the Double Handed Division. The multihulls must be seaworthy and have a minimum length of 24 feet. The minimum crew size is 3. The term seaworthy is not defined and for the most part is left to the owner or person in charge to make the determination. The varying lengths and minimum crew numbers seem to target specific types of boats.

The Notice of Race (NOR) further states that participation is by invitation. The Mac Committee may ask a boat seeking entry for the first time to evaluate their crew’s experience based on the standards for the US SAILING’s offshore course (passage making skills and knowledge). Those entering the race must comply with the 2011 “Mackinac Safety Regulations” (MSR) for monohull and multihulls. The Monohull MSR is 13 pages long covering structural features,

portable boat equipment and supplies, personal safety equipment, and training. The MSR is written for easy comprehension and is closely aligned with the ISAF Special Regulations for Category 2 with a few exceptions. For example, a reserve fresh water supply is not required because the lake water is considered potable at the northern end of Lake Michigan. The race also allows an entry to carry either an EPIRB or a life raft. The training specified in the MSR is an annual man-overboard drill with at least $\frac{2}{3}$ of crew listed for the race.

Boats may be inspected prior to or after the race for compliance with the MSR. A person in charge may request a pre-race inspection or the Mac Committee may choose to inspect. In 2011, 13 boats were inspected prior to the start. A common issue was running lights that did not satisfy the regulations. After finishing at Mackinac but prior to docking, some boats are randomly picked for inspection. In 2011, 26 boats were inspected. There was very high safety compliance. Only one boat was penalized 5 minutes of elapsed time for an infraction. The owner of another boat has been banned from future Chicago-Macs due to his equipment deficiencies in 2011.

In this year's race, 47 boats withdrew prior to finishing. Twenty seven of the boats reported the reason was storm related. Six reported dropping out of the race to assist the rescue and search for the *WingNuts*' crew. Others withdrew due to lack of wind, crew injury or illness, damage to the boat, or gear failure unrelated to the stormy weather.

Thirty one boats reported assisting in the search for *WingNuts*' crew. Twenty three sought redress for the time spent on the scene. *Sociable* which led the search effort listed 16 boat names from radio communications during the night of the accident.

The fleet was to have Iridium-based trackers on each boat with the online tracking service provided by IonEarth. A system failure after the start prevented the boats from being tracked.

In interviews that the panel had in September, the race officials seem comfortable with the size and composition of the fleet in general. A major limiting factor of fleet size is the available dockage at Mackinac and the marina in St Ignace nearby. The harbor at Mackinac has 76 slips. After the race, boats may be rafted up to 10 deep. The entire marina of 120 slips at St Ignace is reserved for race boats for several days.

The fleet seems to have reached a maximum for the docking facilities, but the size of the fleet means that less than 4% of the 2011 fleet was inspected before the start, and twice that were inspected after the finish (less than 8%).

While the majority of boats handled the conditions during the 2011 race reasonably well, the race organizers have the ability to assist boats and crews in recognizing the range of weather conditions and need for self-sufficiency that the course requires. Pre-race inspections, especially of boats new to the race and more crew training would aid in better risk management.

In a race of this nature, boats in the fleet are most likely to be first responders, as was the case in the 2011 Chicago-Mac. All participants should be prepared to respond to the distress of another boat or crew. The willingness of over thirty boats to stop racing and standby and the skill of the radio operator of *Sociable* to coordinate responders is exemplary and a model to all offshore racers.

Appendix I: Summary of the US SAILING Survey of Participants, Sheila McCurdy

Following the 2011 Race to Mackinac, US SAILING surveyed the race fleet to determine the conditions the crews saw, and the issues they dealt with during the race. The purpose was to capture a fuller picture of the weather and the crew responses to the challenges of the race. The response rate between July and September was statistically high at 51%.

This brief summary focuses on a few elements of the survey that are most pertinent to the *WingNuts* case. Significantly, most boats reported little or no damage. There was also only minor discomfort for most of the crews. Eighty three of respondents (47%) said they had no damage. One hundred and forty-four (82%) said they had no safety related problems. One boat was dismantled. Three broke booms. Six said they had sails destroyed. Forty nine reported sail damage.

One hundred and fifty three (87%) listed no trouble with lifejackets or harnesses. One crew member fell overboard and was retrieved quickly by his boat. One crew member broke a wrist. Seasickness was not uncommon.

In response to questions about the severe weather, 48 (27%) reported 45 degrees of heel or greater, and of those 30 saw over 60 degrees of heel.

Surprisingly, fifteen reported collision or near collision in the survey. Two boats retired after a collision.

Notably, in answer to “What would you have done differently?”

55 respondents (31%) said “nothing” or did not fill in an answer.

36 replied they would have shortened sail earlier.

21 said they should have had better weather coverage and monitoring.

13 said they should have paid more attention to tethers.

One respondent wrote, “Have crew members more adept at working every crew position. Be more critical of weather reports. Reef sails further or drop sails entirely faster as wind conditions deteriorated.”

The final query was for general comments. Most of the responses were about boat specific breakage or crew and weather related issues. In the more general responses, 66 (38%) said boats with poor stability or extreme design like *WingNuts* should not be in the race.

14 specifically said that the Chicago Yacht Club did a great job.

3 cited flaws in the race management.

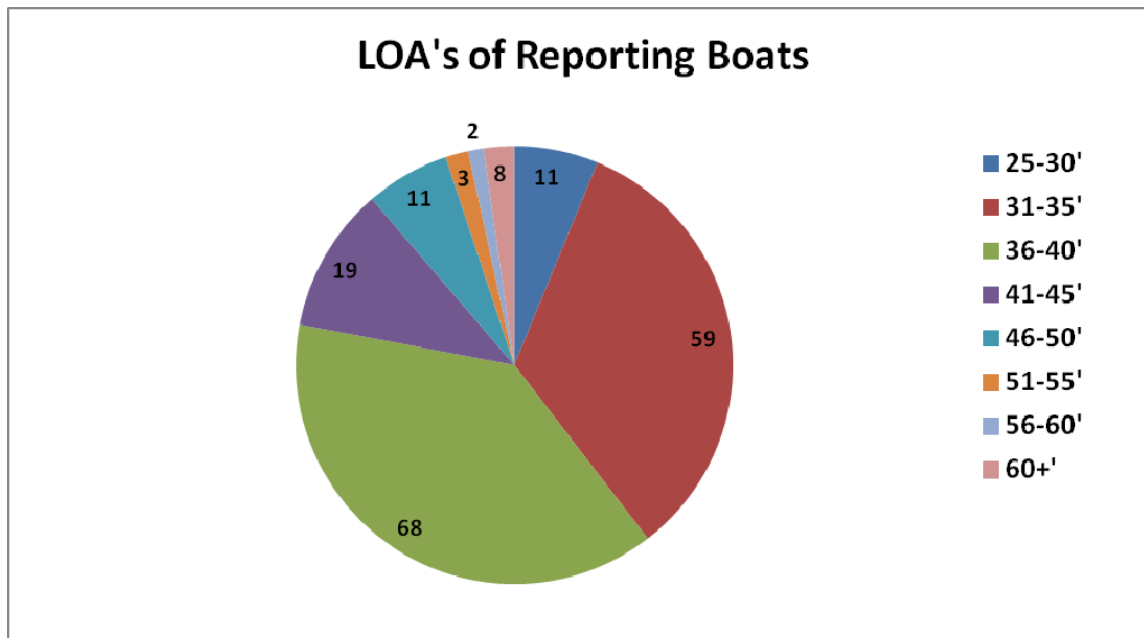
3 called for more inspections of questionable boats before the race.

9 said the safety regulations were adequate.

5 said there should be better safety regulations and gear requirements.

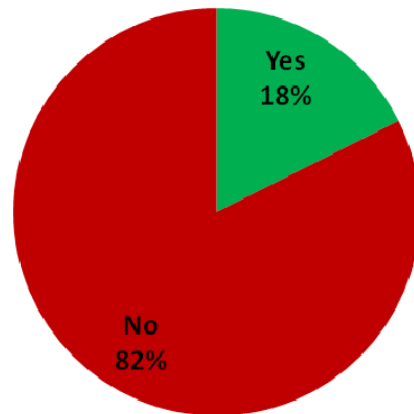
5 said it was a great race despite the weather and the tragedy.

3 thought tracking was very important.



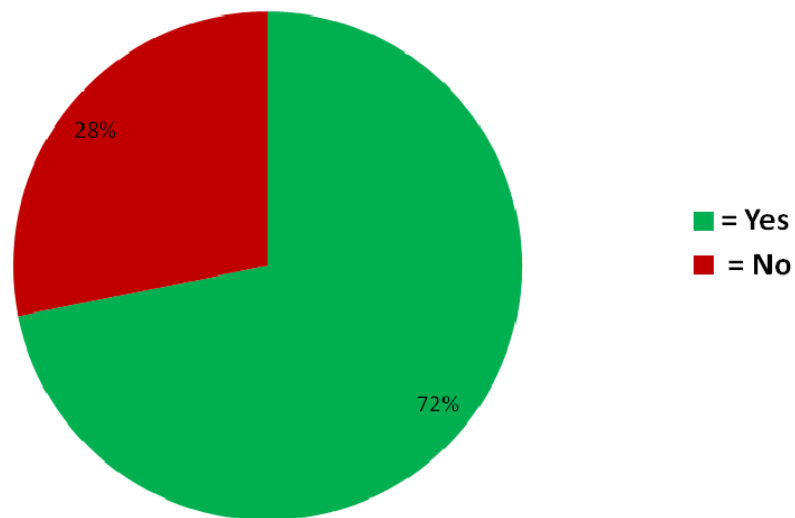
Approximately 70 of the fleet were in the 31-40' range.

Percentage of Competitors Who Considered Retiring



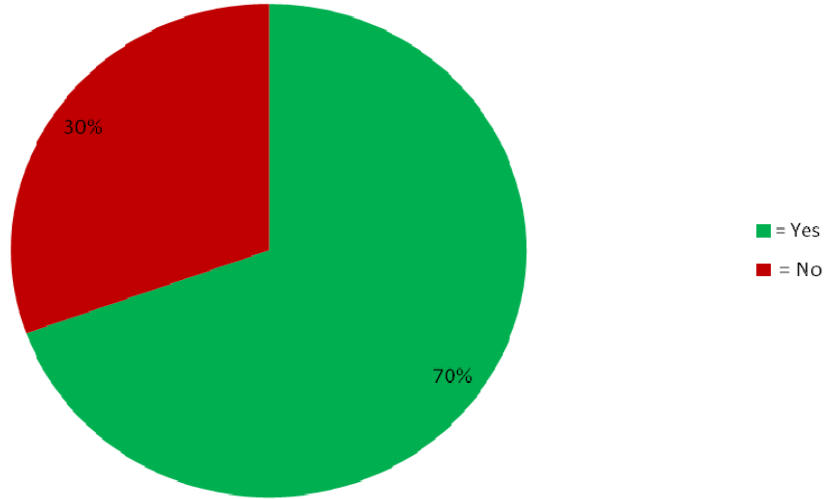
Of the 345 starters, approximately 50 did retire, or 14%.

Found The Weather Forecasts Accurate

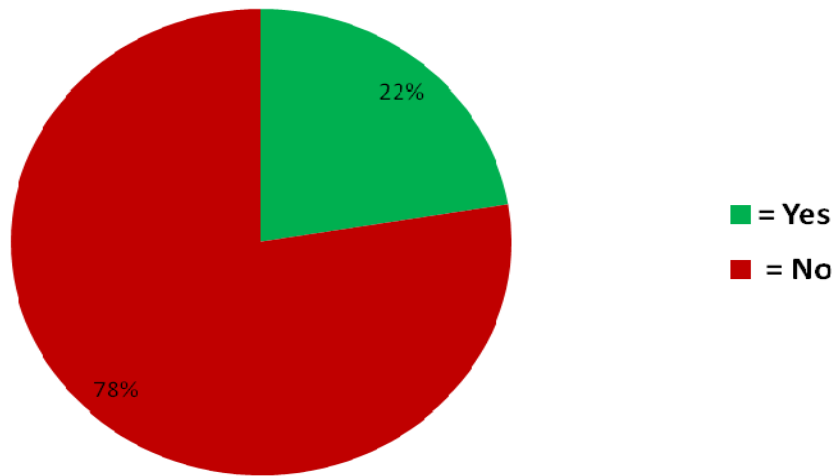


This may be related to the storm intensity descriptions used by the National Weather Service e.g Special Marine Warnings, or it could be because most warnings stated wind speeds around 34 knots.

Tracked the Storm on Radar

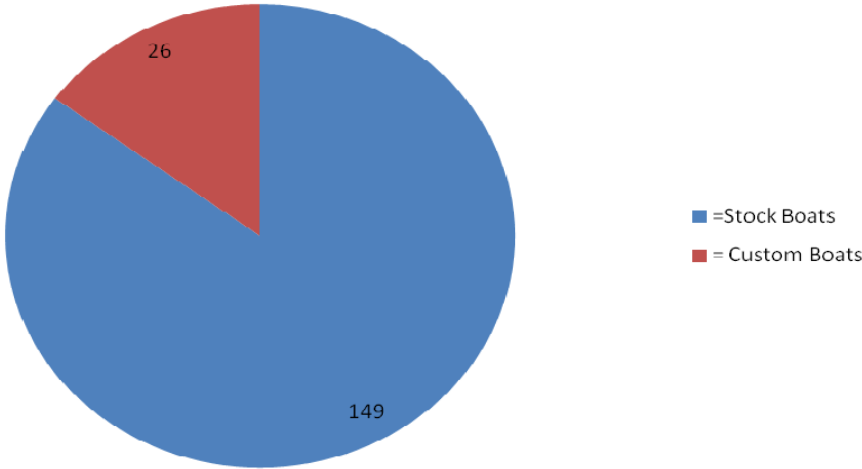


Were Knocked Down or Out of Control

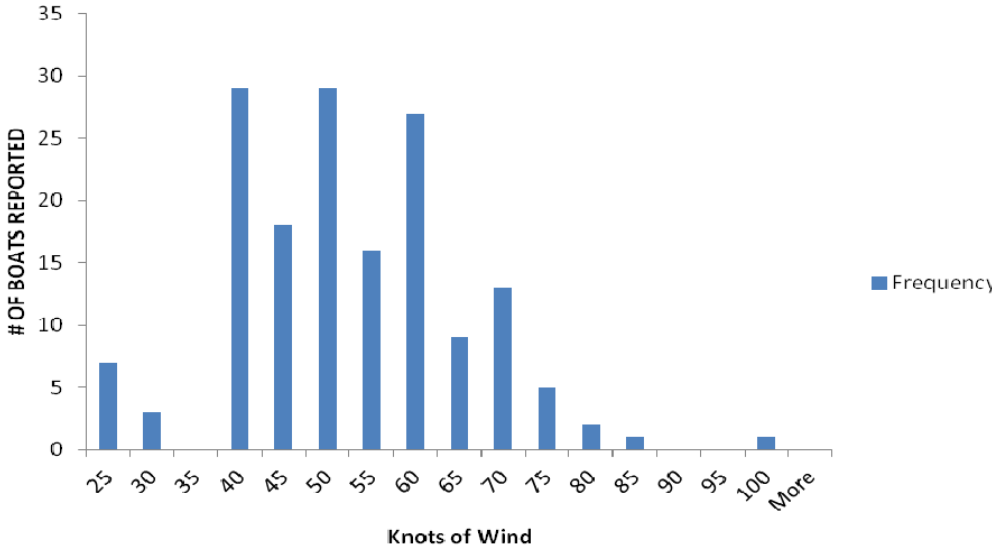


Some of the cruising boats and faster race boats had finished by the time the storm hit.

Custom Vs. Stock Boats



Average High Wind Speed Reported



Appendix J: *Sociable* Crew Rescue Narrative, Bob Arzbaeher

We raised our main sail once the storm had passed around 11:15 pm CDT. Visibility was still poor, and the sea state was very lumpy from the storm. Shortly after raising our main and beginning to make headway, several crewmembers heard what sounded like a whistle. Around that same time, we encountered a bare poled sailboat to starboard, and we suspected the whistle came from that boat attempting to alert us to its presence. Hearing the whistle certainly heightened our senses that we should be vigilant for others given the nature of the storm that just occurred.

A minute or two after hearing the whistle, a crewmember spotted a faint light perhaps 1/4 to 1/2 mile to port, and this light after 1 minute was confirmed by other crew members. We continued on our current course for two or three minutes until we had an appropriate angle to tack over to the light. We brought our spot light on deck. As we drew closer, we were able to see other lights, and we signaled in the direction with our spot light. Our signal was returned with flashes from the lights in the distance. At that time we became certain we were headed toward a vessel (or person) in distress and we made the decision to lower our main sail and proceed under power. We started the motor and verbally notated the time as 11:30 CST. The sails on our boat were taken down and stowed.

As we approached we were able to discern the outline of a turtled hull with several people standing on it. Wind conditions at this point were around 15-20 knots, very confused sea state of 3-5 foot waves. At this time another *Sociable* crew member notified the Coast Guard via VHF radio of the situation, and this crew member took over sole responsibility of manning the VHF radio communication while the other crew began the rescue procedures. We attempted radio transmission several times without response from the USCG. A nearby vessel Vayu was able to relay to us that the coast guard was acknowledging our calls. Once we were within hailing distance, the *WingNuts* crew told us that there were six crewmembers with the boat with two other crew members missing in the water. This information was relayed to the Coast Guard we requested assistance in the search efforts for the 2 missing crew members.

Five of the *WingNuts* crew were standing on the overturned hull of the vessel, with a sixth crew member clinging to the stern of the boat in the water. Our first priority was to rescue the man in

the water. With unknown amounts of rigging and lines in the water around *WingNuts*, we needed to be careful not to approach too close as to foul our own prop. We also needed to keep a close lookout for the other two missing crew still in the water.

We deployed our Lifesling off the starboard stern of *Sociable*, throwing it towards the man in the water, however *Sociable* was just far enough away so that the sling was still about 5 feet from the man. He attempted to swim to reach the sling but *Sociable's* drift was not allowing him to reach it. He was clearly very weak at this point. We retrieved the sling and made another pass closer in and were then able to put the slings rope easily within reach of this crewmember, and we pulled him to the transom of *Sociable*. This large gentleman was physically exhausted, and it took four of *Sociable's* crew to lift him aboard our vessel. We assessed his condition as mildly hypothermic, and he was vomiting a lot of water. At this point we launched a handheld flare so other boats could see us, but determined it was creating too much smoke and was interfering with our rescue mission. Our estimate is that it took 15 minutes to get this first victim on board.

We made subsequent circles around *WingNuts* while towing our lifesling. The *WingNuts* crew jumped from their hull into the water and swam a few yards to reach the lifesling and/or the line it was attached to. On the first subsequent pass, we pulled one of the *WingNuts* crew into *Sociable*. On the next two passes, we pulled two crew members aboard at once. Total time to get next 5 victims aboard *Sociable* was 10 minutes.

As the individuals came aboard and went below decks on *Sociable* we instructed the crew to get their wet clothes off and we gave them blankets. One individual was showing signs of hypothermia. He was placed in a sleeping bag and monitored. After about 30 to 45 minutes he was improving.

One of the *WingNuts* crew we brought aboard mentioned that he thought the 2 missing crewmembers were still underneath *WingNuts*, possibly still attached to the boat by their tethers. While this crewmember was standing with us in *Sociable's* cockpit, a *Sociable* crewmember, asked out loud "should we try to have a *Sociable* crewmember go underneath *WingNuts* to check for the missing 2." The *WingNuts* crewmember immediately said we should not, it was too dangerous, with the rolling seas, and lines, or rigging that were loose underneath *WingNuts*. *Sociable's* crew in the cockpit agreed. As we received this information, we relayed it to the Coast

Guard, telling them we had strong reason to believe the missing people were under *WingNuts*, including a request that a diver be available to assist with the rescue.

At that time, we were able to see nearby racing boats headed to assist. We noted which boats were available to help, and also co-coordinated a grid system for boats to look for the missing crew members. We launched several parachute flares upon the suggestion of the Coast Guard. We also noted several flares from a nearby boat Vayu. Sailboats from the Mac Race began arriving soon after we had the 6 crew members aboard, we estimate that 15-20 boats arrived on location within the hour of our first VHF transmission.

We launched subsequent parachute flares 45 minutes later at the request of the Coast Guard in order to aid the rescue boat/helicopter in ascertaining our position. Ahead of the arrival of USGS Search boat 375, USGS helicopter 6265 conducted a search pattern in the vicinity of the incident. It was probably 45 minutes after we had recovered the 6 crew, while we continued to circle *WingNuts* looking for signs of the other 2 crew, that a Coast Guard helicopter arrived. The Coast Guard helicopter made passes through the area with their search light on the water, but then seemed to go far off in the distance before returning for another pass of our immediate area. We were informed via radio that there were no divers available to assist with the rescue, either from the helicopter or rescue boat.

Upon arrival on the scene, the Coast Guard rescue boat used what appeared to be a boat hook to tap on the hull of *WingNuts*. They also attempted to position their vessel in a manner to provide some visibility under the hull of *WingNuts*. Upon hearing/seeing no signs of life, the rescue boat began conducting its own search pattern for 30 minutes before heading back to Charlevoix or Petoskey/Harbor Springs.

At this point, we asked the Coast Guard what they wanted us to do with the 6 *WingNuts* crew; the reply was to "standby." While the *WingNuts* crew seemed to be ok, we were worried that shock might set in and one or more of them would need more medical attention. We then told the Coast Guard that we wanted to proceed to port to get the *WingNuts* crew to medical personnel. *Sociable* determined our closest port would be Charlevoix, and we communicated to Coast Guard that we were heading there. At 2:15 CDT we left the scene, plotted a course and motored for about 2.5 hours before arriving at the Charlevoix Coast Guard station where we dropped off the

six *WingNuts* crew. Two ambulances were waiting at the Coast Guard station upon arrival, although all six crew refused medical attention.²⁴

***Sociable* Conclusions:**

- 1) The Lifesling overboard system was the key to a prompt rescue. The system was easy to deploy (even with one failed “throw” attempt), and the combination of the floating line and the inflatable harness we were able to quickly retrieve the 6 crewmembers of *WingNuts*.
- 2) The whistle sound definitely put *Sociable* into a “heads up” mode and was the start to building awareness outside the boat. The light on lifejacket created a “needle in a haystack” opportunity for rescue in the middle of the night. Without these two separate safety devices, *Sociable* would have continued racing North, away from *WingNuts*.
- 3) Separating radio communication from the rescue activities above decks was a huge key to our success. With 12 crew aboard *Sociable*, we had plenty of crew for each of these important but totally separate parts of the rescue operation. Down below decks at the nav station allowed for calm and quiet communication with the Coast guard and other boats, it also allowed us to write down boats, key data, etc.
- 4) Chicago Yacht Clubs’ safety gear for this race was used extensively. Lifesling, Harnesses (with lights), whistles, throw rope, parachute and handheld flares, Spotlight, first aid kit, annual MOB certification all played a role in a successful rescue.
- 5) Other MAC boats created immediate “search party” for the two missing crew members.
- 6) We grossly misunderstood the mission and protocols of the USCG in their response and rescue capabilities. Don’t assume the Coast Guard will assist; plan to manage rescue operations yourself. If you get help great, but don’t count on it, particularly offshore at night.
- 7) We needed to ascertain the circumstances of the missing crew earlier. While the crew of *WingNuts* coming on board of *Sociable* were in some level of shock, we needed to get more information (about them being tethered underneath *WingNuts*) earlier in the event there was an air pocket to survive under.

²⁴ Arzbaeher, Word Document, *Sociable*

- 8) We did not have a lightning strategy aboard *Sociable* during the squall. We needed to have crew trained on what to do in event of a lightning strike.
- 9) An organized boat. Particularly for the MAC, we emphasize that everything on the boat has a place. As part of our pre-race safety crew discussion, we played a game of where *Sociable* safety equipment was kept (example: “Cathy, where are the two fire extinguishers?”) Each crew member was asked a question. When the rescue happened, we were organized and didn’t have to look for items.
- 10) Likely the biggest open question among the *Sociable* crew after this incident is the use of tethers in this race. While we understand the merits of “staying attached to your boat”, we believe this is more of an ocean requirement rather than a fresh water sailboat race with 300 boats, relatively moderate water temperature, and boats that have experienced crew. While not unanimous, we like our chances better floating in Lake Michigan for an hour or two (or longer) waiting for our crew, or another boat finding and retrieving us. Obviously this only works with a life jacket or harness, a light, a whistle, and even a personal EPIRB.²⁵

²⁵ Arzbaecher, Word document, *Sociable*, Beneteau 40.7, Chicago to Mackinac 2011 Race

Appendix K:

An Assessment of Thunderstorm Characteristics Associated with the Marine Accident of 17 July 2011

Justin Arnott, Science and Operations Officer NWS Gaylord MI
Bruce Smith, Meteorologist-In-Charge NWS Gaylord MI (August 30, 2011)

Note: The entire document can be found on the US SAILING web site in the same index as the panel's report. It is not included here because it is formatted for portrait orientation.

1. Introduction

Following is a brief assessment of the thunderstorms which impacted northern Lake Michigan during the late evening of July 17, and resulted in the tragic loss of two lives during the 2011 Chicago to Mackinac Yacht race.

Early anticipation was very good that strong to severe thunderstorms would impact portions of the Great Lakes, including northern Lake Michigan, on Sunday, July 17. A complex of strong thunderstorms moved from Wisconsin and Upper Michigan into Lake Michigan Sunday evening. Initially, these storms were relatively disorganized and marginally severe. However, as the storms approached the Fox Islands region, radar indicated the rapid intensification of one particular cell just prior to midnight EDT. As it intensified, this storm also exhibited small areas of strong radar detected low level winds. The location and timing of this storm evolution appears to be well correlated with the marine accident. *Continued...*

Appendix L: Summary of PRO Janet Crabb's Activity at Mackinac Island, Sheila McCurdy

Janet Crabb served as Principal Race Officer (PRO) of the 2011 Race to Mackinac. She has a substantial background in the race and its organization having been involved with 30 Mac Races. In addition to her PRO position, 2011 was her third year as chair of the Chicago Yacht Club Race Committee (RC). She has been on Mackinac Committee for 16 years. This year she had about 60 RC members helping at the start and 12 at finish.

The Race to Mackinac was fortunate to have Janet Crabb on duty at race headquarters at the finish. She arrived at 10:00 PM (EDT) on Saturday. The Mac Committee monitored the weather on Sunday, July 17 and saw the storms developing over Wisconsin. By 11:00 PM the rain had flooded the finish line tent to ankle depth. Janet had concerns about power outages effecting their finish procedures and had contingency plans to move the headquarters to the lobby of the Windermere Hotel. She also had written a contingency plan for handling an accident on the race. She was about to put it to use.

She had tried to get some sleep, but was woken up at 2352 (CDT) by a phone call from a race committee member, Janet Hansen, on duty at the skipper's sign-in table. Hansen's husband was on the race and had heard radio calls about a capsized. Initially the understanding was that Sociable had capsized. Crabb started a comprehensive communications log and immediately telephoned the commanding officer of the cutter *Mackinaw*, Commander Scott Smith, who had become a friend through the previous years of using the icebreaker as a race escort vessel. He told her they were looking for a dismantled boat, *Free Agent*, but also said he had been notified of two emergency signals transmitted from another boat.

Within minutes Crabb learned of the location of the *WingNuts* capsized via relay the radio communication between the Coast Guard and *Sociable*. By 2358, she was getting text messages from Matt Gallagher relaying information from VHF transmissions from the scene. A little after 0100 she called the Jerry Bober, Vice Commodore of the Chicago Yacht Club, who was on the island. She left a phone message with *Sociable* and another boat in the vicinity. At 0116 she learned that two crew were missing. She called the CYC Commodore Joe Haas who was in St. Ignace. She continued to update key race people and the general manager of the CYC. Because fleet tracking had failed early in the race, boat locations were not available online, but a

committee member Winn Soldani had been managing the Facebook page and responding to postings. He posted a message asking for participants who had useful information to call the Island Registration Desk number. About 0225 the father of Chris Cummings, a young crew aboard *WingNuts*, called to say he had received notice from his son that he was okay. He called again to confirm his son had been rescued and would be taken to Charlevoix. At 0418 USCG Station St. Ignace called to ask for the *WingNuts* crew names and ages. They also asked for the safety equipment that might be on board. She referred them to the MSR posted on the race website.

At 0444 Crabb spoke to Brian Hill aboard *Sociable* which had the surviving crew aboard. She also spoke to Stan Dent and got a brief synopsis of the accident and the likelihood that the two missing crew had died. By 0630 Crabb had confirmed with Coast Guard Command Center that they would handle contacting next of kin.

The Race Committee handled the situation very well by keeping essential people informed and responding honestly but carefully to inquiries before all the facts were known. The communications were recorded and kept confidential.

The use of texting was very helpful in an area with weak cell phone coverage and limited VHF range along the race course. Crabb had direct contact with CGC *Mackinaw* because she happened to have the commanding officer's personal cell phone number. Normally cutters do not use cell phone communications in responding to incidents. Facebook was used carefully by the race committee to control rumors and solicit information from the fleet. It also gave racers a venue to vent opinions about the accident and rescue efforts. Clearly tracking would have been helpful in knowing where boats were as the bad weather moved in and where they headed after some diverted to help *WingNuts* and some retired due to damage or crew concerns.

Commodore Haas called a crisis manager on Monday morning and found him very helpful on how to proceed with the post-race activities. The post-race atmosphere was understandably subdued. The Mac Committee held a memorial service at a local church. The Awards Ceremony was held in a quiet "tea garden" of the Grand Hotel. The Coast Guard was included in the Awards ceremony. When the crew of *Sociable* was invited on stage, the crowd was completely silent.

Appendix M: CYCMC Committee Assignments, Revised March 29, 2011

Docking: G. Freeman (Chair), L. Walls, C. D'Agostino, (Freeman)

Finance/Procurement: G. Freeman (Chair), L. Sandoval (Freeman)

Gear/Clothing/Tee Shirts and Trinkets: Liz Ware (Chair), G. Freeman, L. Kokenes, L. Freeman (Freeman)

Island/Government Relations: G. Freeman (Chair), L. Sandoval, L. Karzan, L. Freeman (Freeman)

Measurement: R. White (Chair), S. O'Neill, W. Soldani (Sandoval)

Memorabilia/Trophies: D. Glasell, (Chair), G. Freeman, (Sandoval)

Protest Committee/Jury: T. Jones (Chair), J. Crabb, G. Freeman (Freeman)

Publicity/Marketing: L. Sandoval, L. Ware, R. Treiber, M. Gallagher (Comm Comm Rep), G. Freeman, (Sandoval)

Race Documents: T. Jones, S. O'Neill, W. Soldani, J. Crabb, W. Soldani (Sandoval)

Race Management: Janet Crabb (Chair), 3 APROs, (Freeman)

Race Program: L. Kokenes (Chair), L. Freeman, L. Ware, S. Rotfeld (Sandoval)

Race Tracking: J. Murray (Chair), J. Muller, (Sandoval)

Safety and Inspections: R. White (Chair), J. Crabb, S. O'Neill, L. Thomas (Freeman)

Selections: D. Glasell (Chair), S. O'Neill, J. Zienda W. Soldani (Sandoval)

Shore Events: L. Freeman (Chair), L. Kokenes, Liz Ware (Freeman)

Skippers' Meeting: J. Muller (Chair), L. Sandoval, M. Gallagher (Sandoval)

Sponsorship: Liz Ware (Chair and Sponsorship Committee Liaison), Soldani, (Freeman)

Website/Technology: M. Gallagher (Chair), G. Freeman, R. Treiber, W. Soldani, J. Veatch (L. Sandoval)

Acknowledgements

The Panel thanks Chicago Yacht Club for its hospitality on September 19-20, with special thanks to our liaison, Leif Sigmond, Jr. We thank the following for spending time with us and informing us about the race: Greg Freeman (2011 MAC Chair), Ron White (2011 MAC Measurer), Janet Crabb (2011 MAC PRO), Joseph Haas (CYC Commodore), Lou Sandoval (2011 MAC Vice Chair), Greg Miarecki (Rear Commodore and Immediate Past MAC Chair), Don Glasell (MAC Selections) and Shawn O'Neill (MAC Committee). Commodore

We would also like to thank the following individuals for their generous support, openness, and availability to the Panel, without which this report could not have been written.

Gary Jobson, President, US SAILING

Sheriff W. D. (Don) Schneider, Charlevoix County Sheriff's Office

Justin Arnott, Science and Operations Officer, National Weather Service, Gaylord, MI

Bruce Smith, Meteorologist-In-Charge, NWS, Gaylord, MI

Mark A. Thornton, Lake Erie WX

Bob Arzbaeher, Skipper of *Sociable*

The Owners and Crew of *WingNuts*

Peter Morley, Jr.

Stanton Dent

John Dent

Lee Purcell

Stuart Morley

Christopher "C. J." Cummings

Jerry Popiel, SAR, Ninth Coast Guard District

LT Dave French, External Affairs Officer, Ninth Coast Guard District

Photographs by Boatpix [www.boatpix](http://www.boatpix.com), and other photographers.