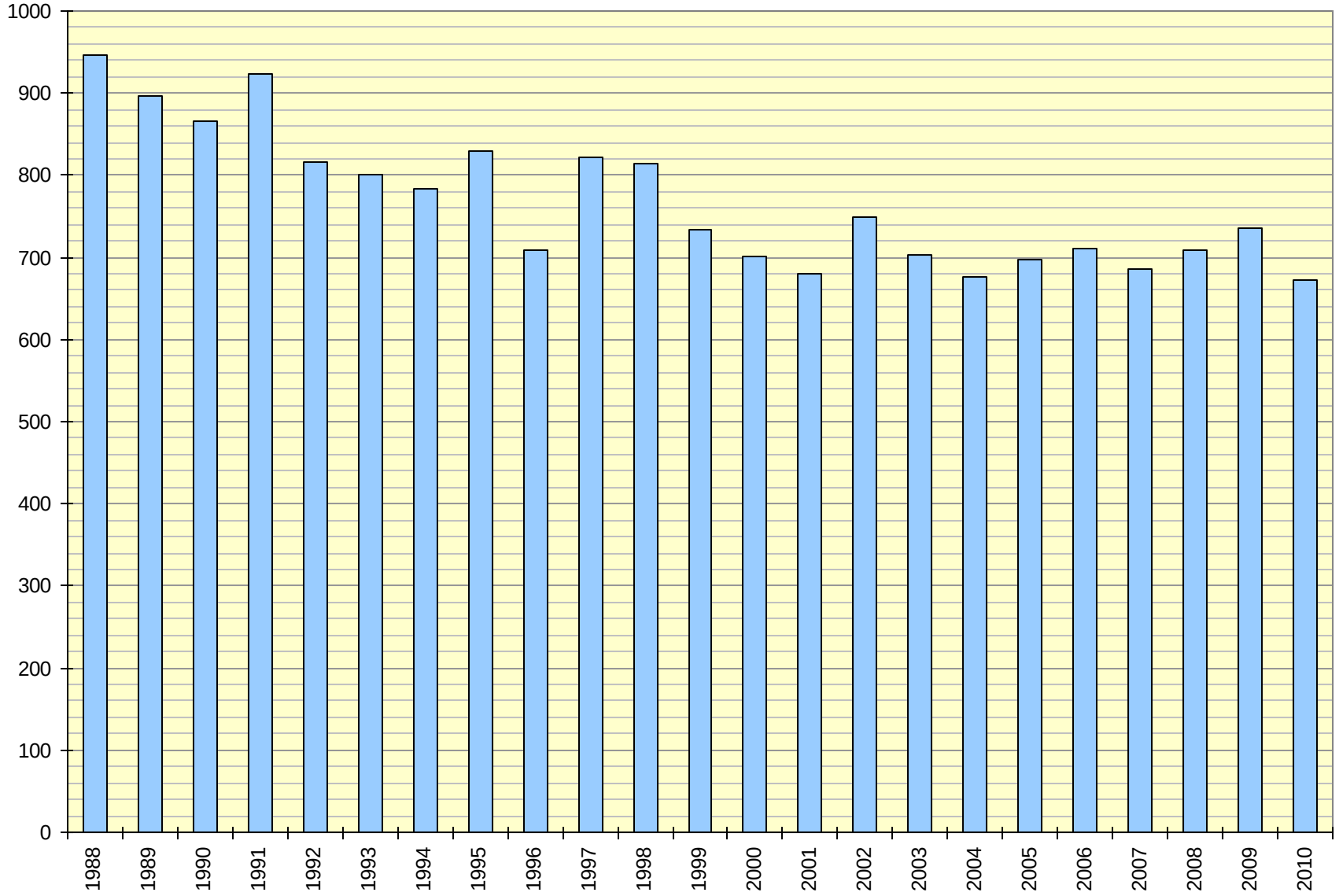
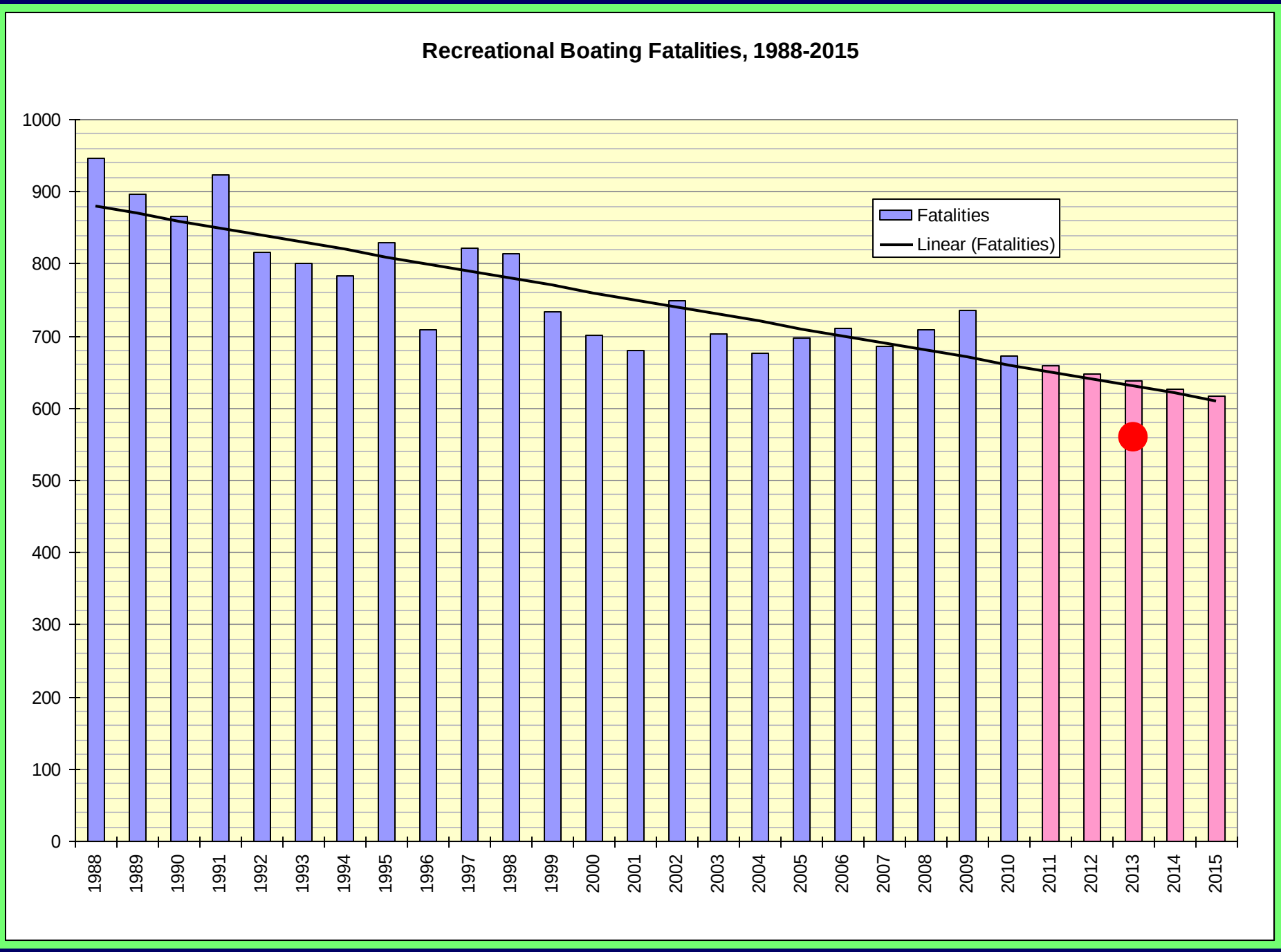
A Summary of Recent Marine Incidents and What We Can Learn From Them

KYC Safety at Sea Seminar

Chuck Hawley
Chairman, US Sailing Safety at Sea Committee

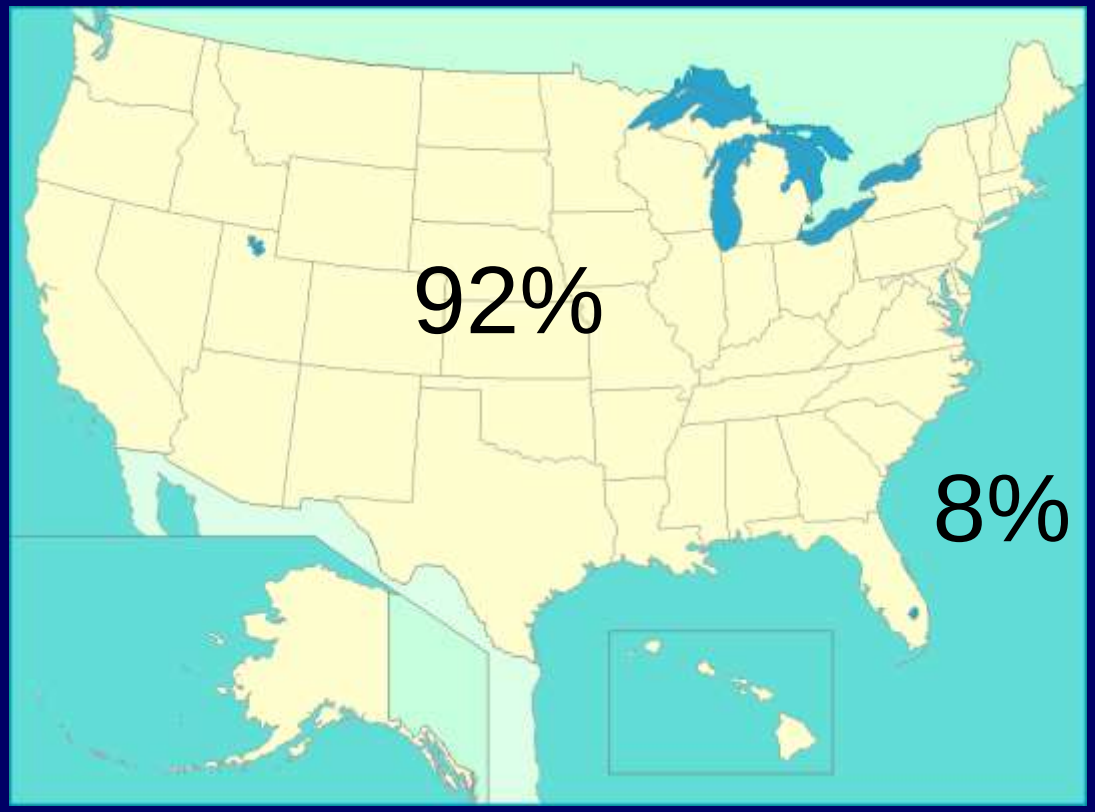
Recreational Boating Fatalities, 1988-2010




Recreational Boating Fatalities, 1988-2015
1000
900
800
700
600
500
400
300
200
100
0
Fatalities
Linear (Fatalities)
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015

Question 1:

In the last six years, what % of drownings in recreational boat accidents happened on the Great Lakes, oceans, and Gulf?



Question 2:

50% of the drownings occurred in waves less than what height?

Question 3:

What % of drownings occurred when water temp <40°F?

Sailing Accidents

2011-2014

Why so many?

What happened?

What can we learn?

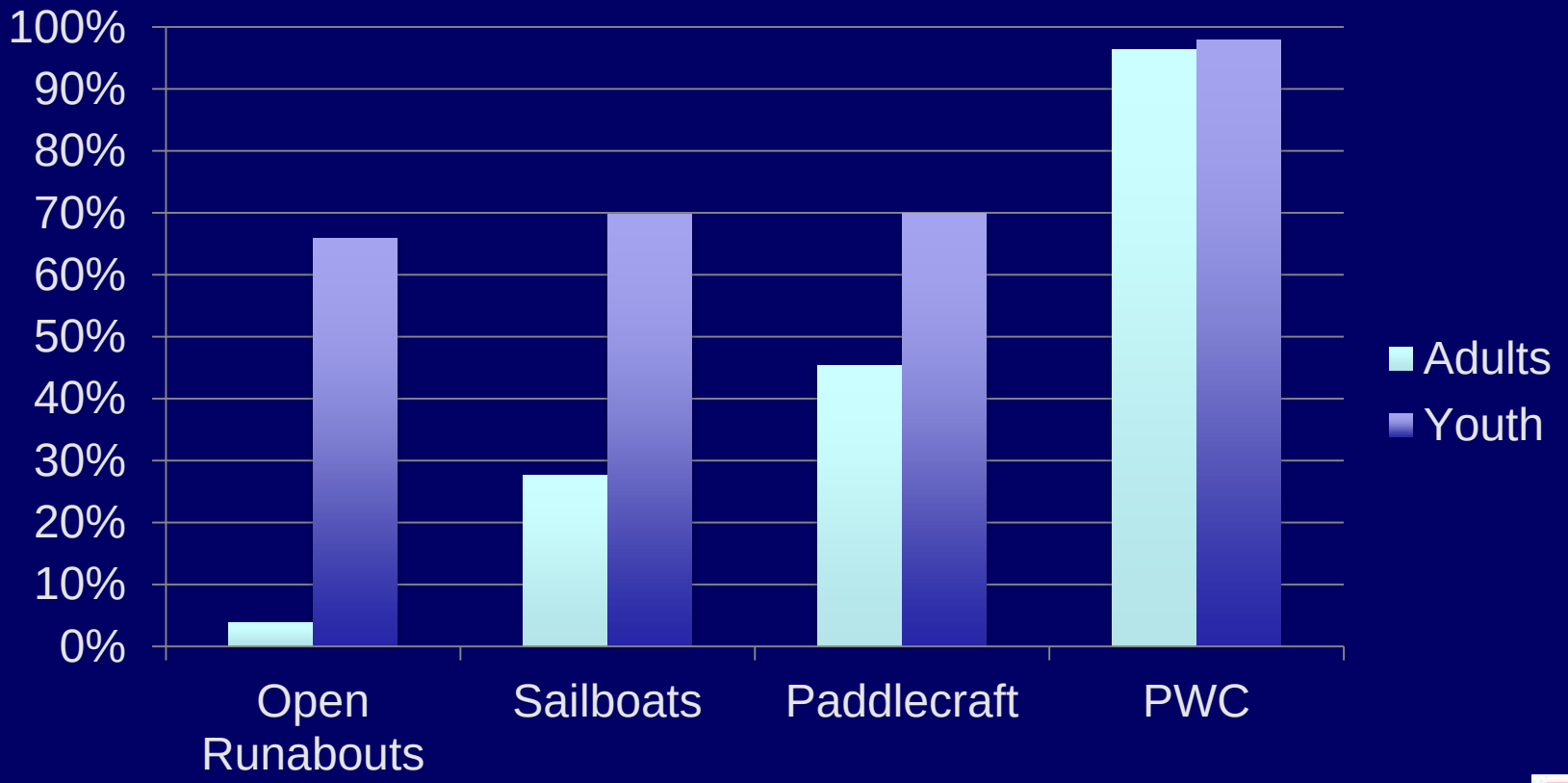
Sailing is pretty safe…

Year	Sailing Fatalities	% of Drownings	Total Fatalities	% of Total
2009	21	62%	736	2.9%
2010	23	83%	672	3.0%
2011	28	68%	758	3.7%
2012	27	52%	651	4.2%
2013	19	63%	560	3.4%
Average	24	66%		3.5%

Life Jacket Wear Rates

2013 Life Jacket Wear Rate Observation Study

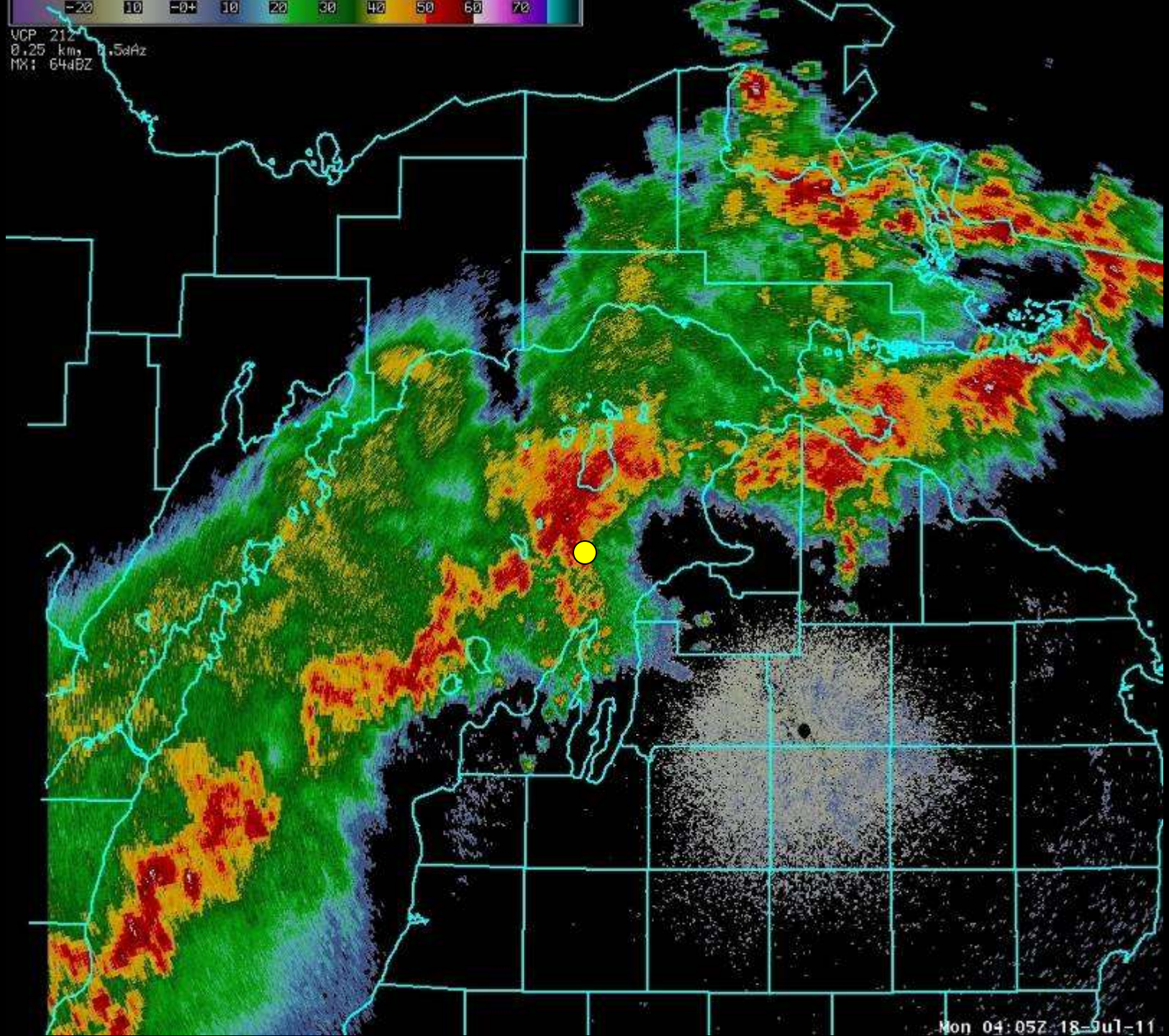
JSI Research and Training Institute



Who are those 24 people per year?

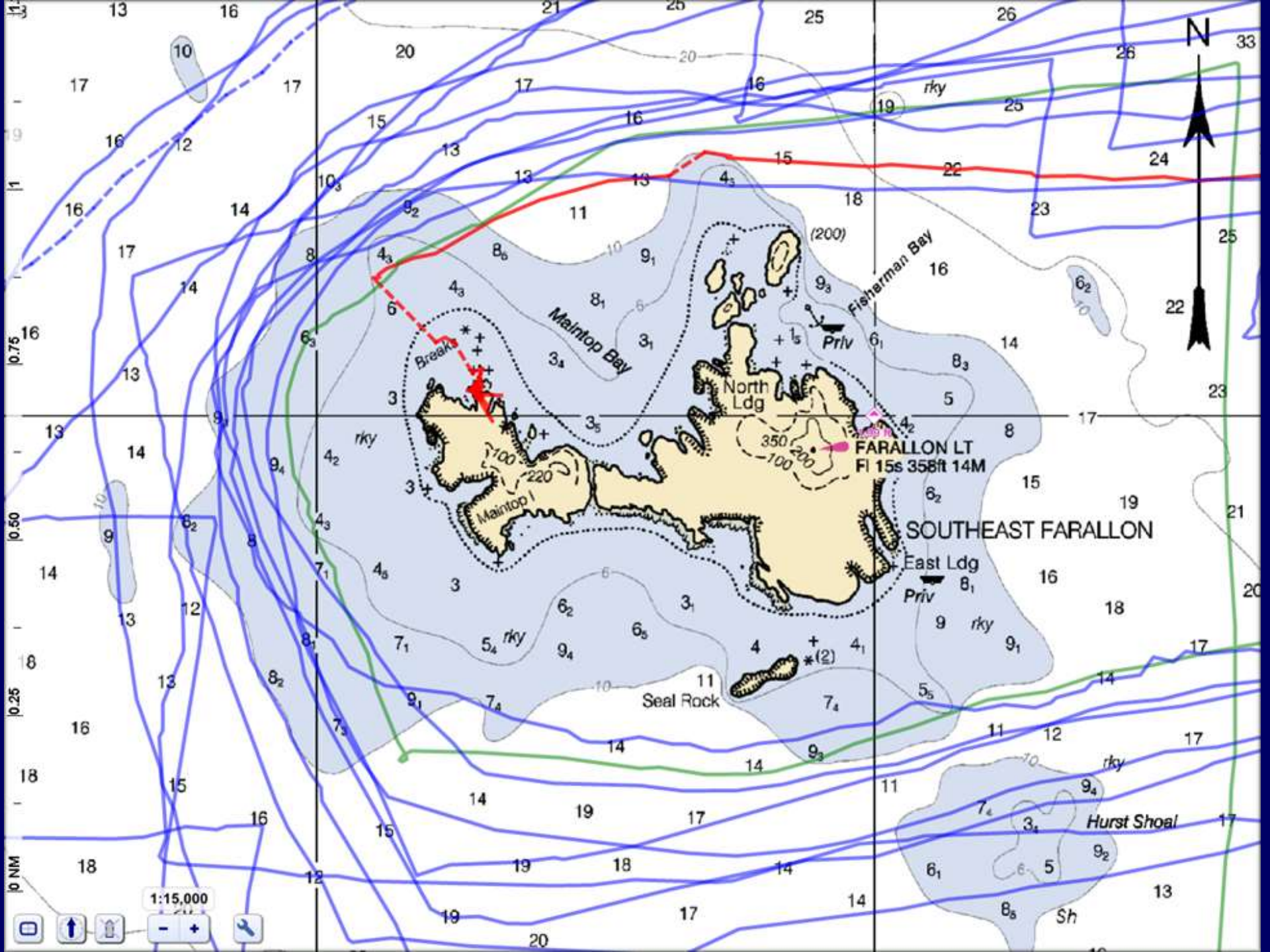
Olivia Constants, 2011

WingNuts, 2011

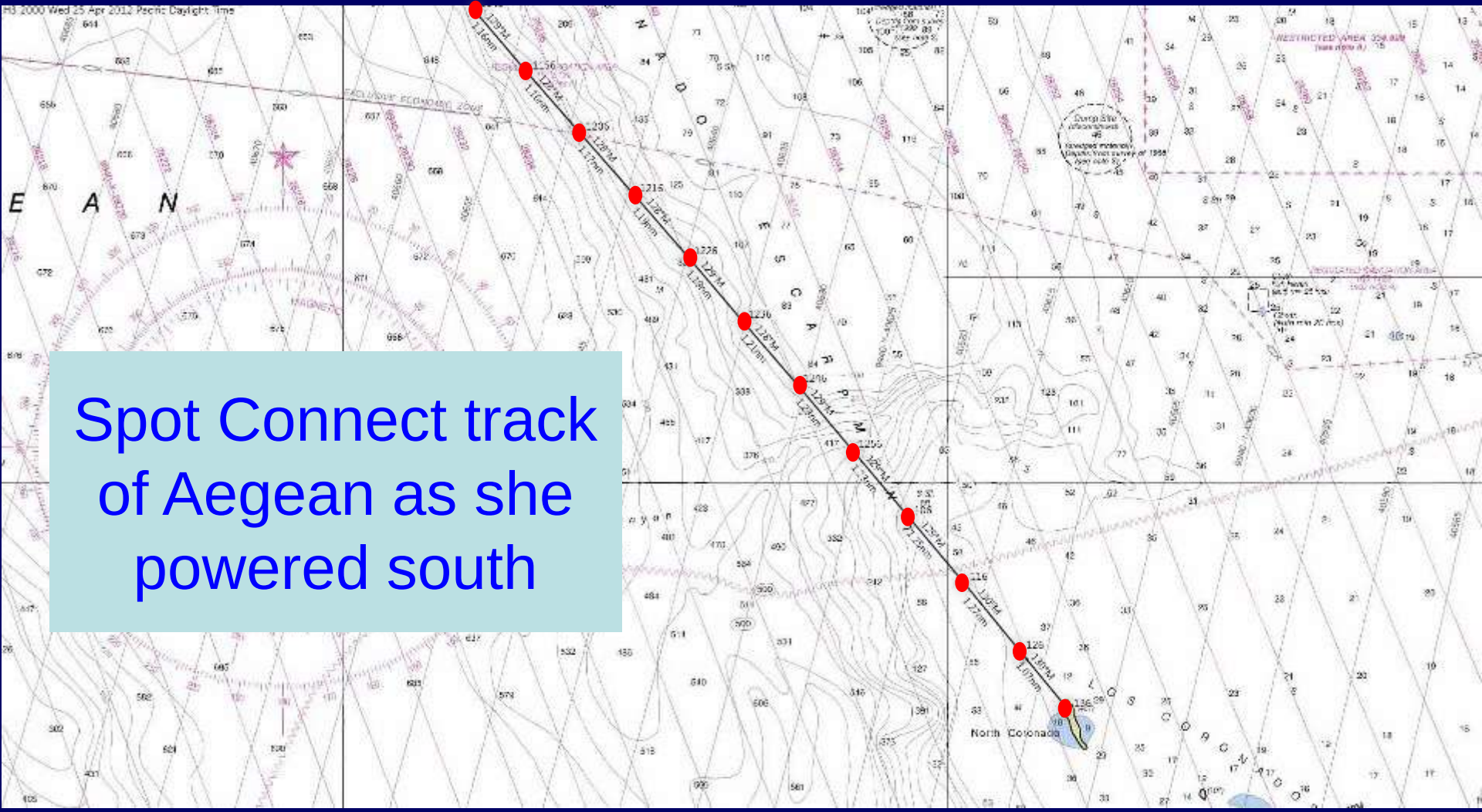

-20 10 -0+ 10 20 30 40 50 60 70
VCP 212
0.25 km, 0.5dAz
MXI 64dBZ
Mon 04:05Z 18-Jul-11

Rambler 100, 2011

Low Speed Chase, 2012

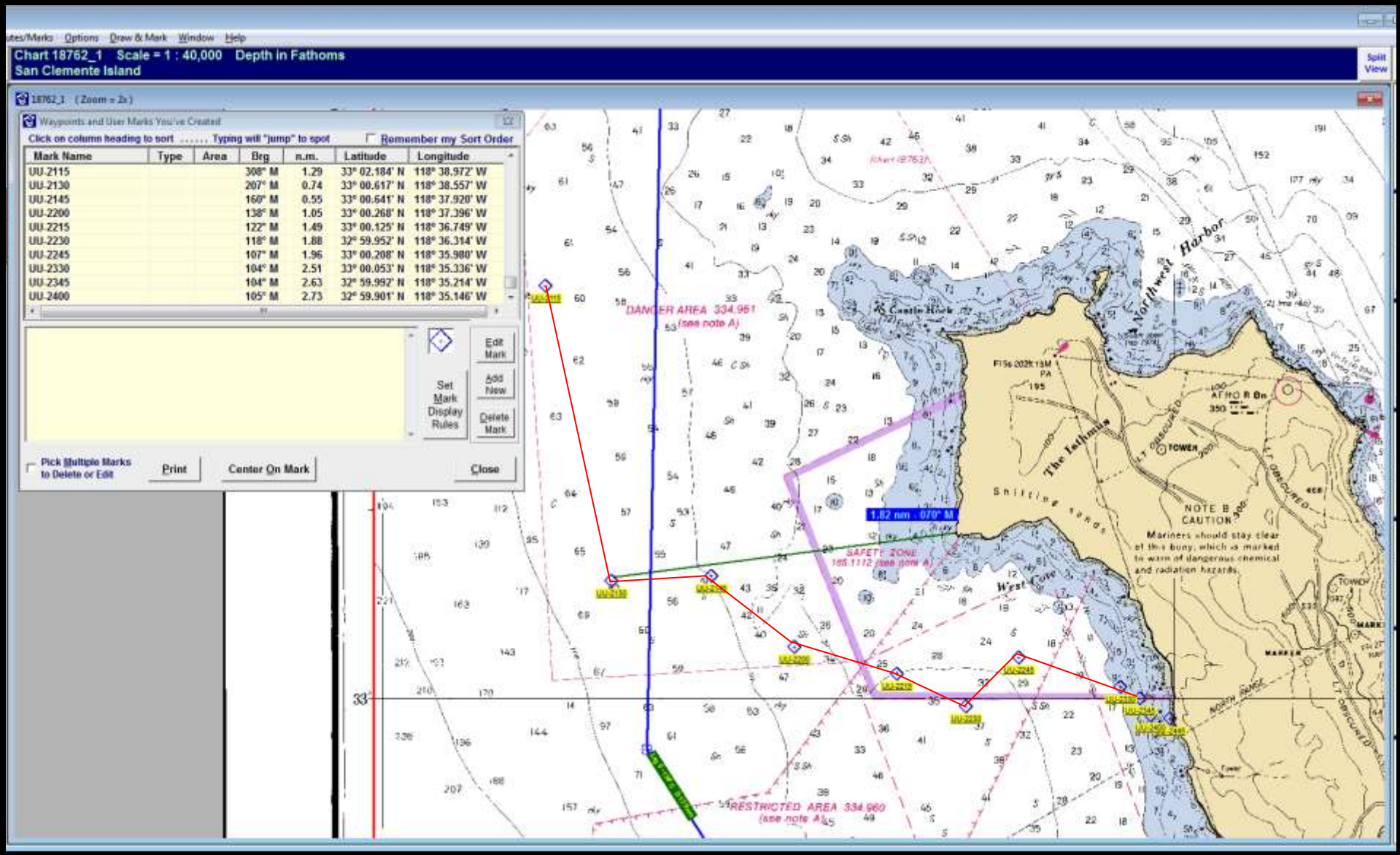

N
Fisherman Bay
Maintop Bay
Break
Maintop I
North Ldg
East Ldg
Priv
FARALLON LT
Fl 15s 358ft 14M
SOUTHEAST FARALLON
Seal Rock
Hurst Shoal
rky
(200)
1:15,000

Aegean, 2012



Spot Connect track of Aegean as she powered south


Uncontrollable Urge, 2013


Options Draw & Mark Window Help
Chart 18762_1 Scale = 1 : 40,000 Depth in Fathoms
San Clemente Island
Split View
18762_1 (Zoom = 2x)
Waypoints and User Marks You've Created
Click on column heading to sort ..... Typing will "jump" to spot
Remember my Sort Order
Mark Name | Type | Area | Brg | n.m. | Latitude | Longitude
UU-2115 308° M 1.29 33° 02.184' N 118° 38.972' W
UU-2130 207° M 0.74 33° 00.617' N 118° 38.557' W
UU-2145 160° M 0.55 33° 00.641' N 118° 37.920' W
UU-2200 138° M 1.05 33° 00.268' N 118° 37.396' W
UU-2215 122° M 1.49 33° 00.125' N 118° 36.749' W
UU-2230 118° M 1.88 32° 59.952' N 118° 36.314' W
UU-2245 107° M 1.96 33° 00.208' N 118° 35.980' W
UU-2330 104° M 2.51 33° 00.053' N 118° 35.336' W
UU-2345 104° M 2.63 32° 59.992' N 118° 35.214' W
UU-2400 105° M 2.73 32° 59.901' N 118° 35.146' W
Edit Mark
Add New
Set Mark Display Rules
Delete Mark
Pick Multiple Marks to Delete or Edit
Print
Center On Mark
Close
DANGER AREA 334.951 (see note A)
1.82 nm 070° M
SAFETY ZONE 165.1112 (see note A)
RESTRICTED AREA 334.960 (see note A)
Northwest Harbor
The Isthmus
West Cove
NOTE B CAUTION
Mariners should stay clear of this buoy, which is marked to warn of dangerous chemical and radiation hazards.


CRAFT POSITION
09-MAR-2013
LOCAL: 08:58:56
NO DATA
NO DATA
ELEV: NO DATA
HDG: NO DATA
TARGET POSITION
MTM
IR
WHITE HOT
BIT
LOS
N
RATE


Artemis


Artemis
AP

“a combination between sort of a motocross rider and an NFL linebacker”

Helmet

Communications System

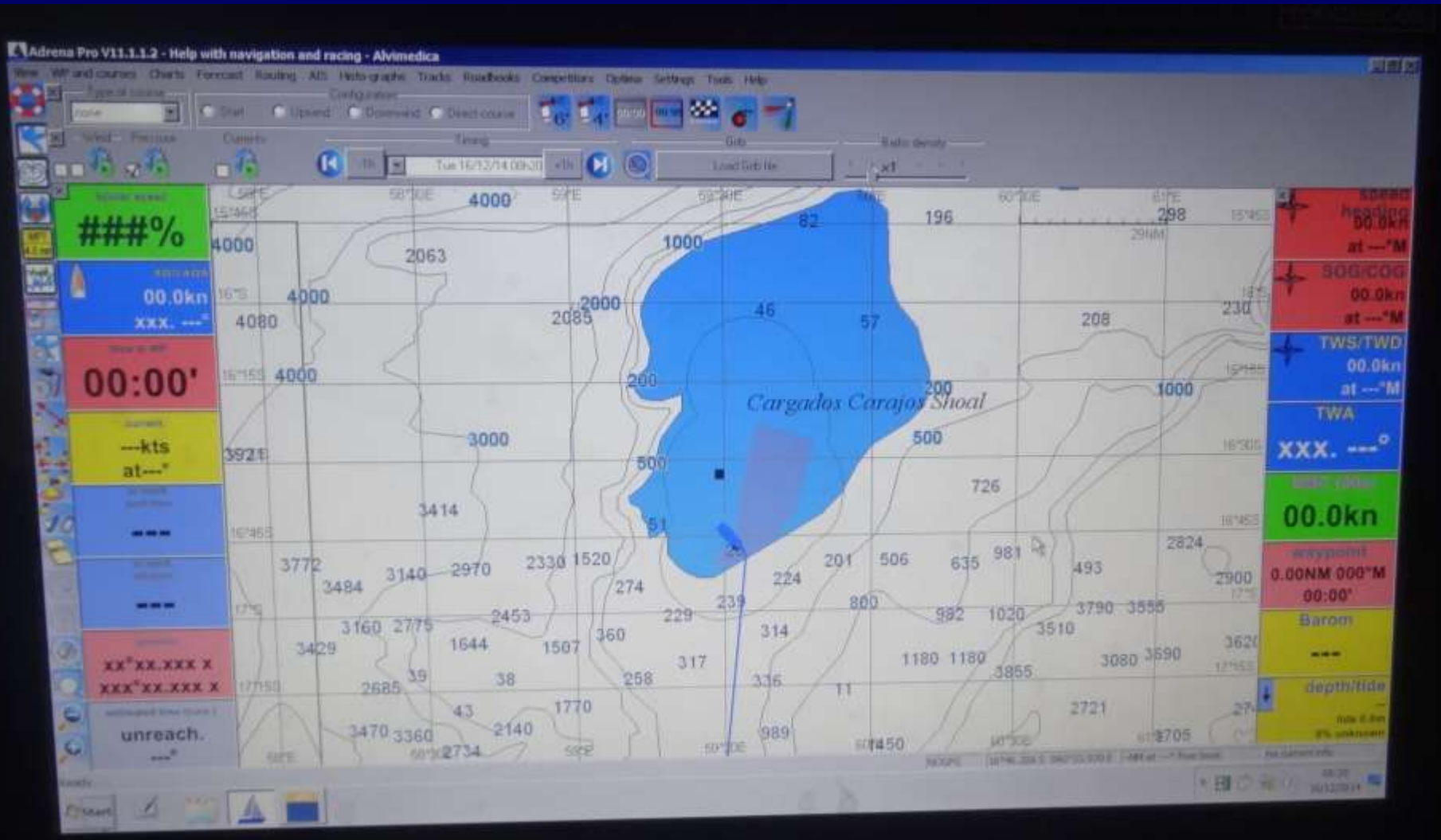
Body Armor

Spare Air

Pelvic Harness

Knife

Vestas Wind, 2014


Adrena Pro V11.1.1.2 - Help with navigation and racing - Alvimedica
###%
00.0kn
xxx. ---°
00:00'
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Cargados Carajos Shoal
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00:00'
Barom
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depth/tide


VOLVO
OCEAN
RACE
Vestas

Dauphin Island Race, 2015

Organized by Fairhope YC

117 boats from 16’ to 40’

17.7nm in length

Thunderstorms forecast several days in advance

Delayed start by 90 min to 11:00am

Storm hit very quickly after 3:00pm

Winds of up to 75mph

Five boats sunk; ten “damaged”

Six fatalities (not all of whom might have been in race)

How do we learn about extreme weather events?

GoPro cameras and smart phones!

16 minute video by Joshua Edwards

Catalina 36 Sailboat returning from the finish

Claimed to have “300 years of sailing experience"

2:43 Passes boat out of control

6:02 Gets Type II out of cockpit locker

6:29 Life ring shows amount of breeze

10:06 Skipper gets a life jacket

10:10 Skipper loses life jacket

World's Creepiest Video re: Race


Stockton
Creola
Bay Minette
Saraland
Semmes
Prichard
Mobile
Daphne
Tillmans Corner
Vandeave
Grand Bay
Escatawpa
Bayou La Batre
Point Clear
Foley
Pascagoula
Gulf Shores
Dauphin Island

From Sailing Anarchy

…we…proceeded to…FYC when we spotted three sailors floating, we rescued them and had learned they were sailing a Cal 24 that turtled and sank. They were in the water for more then an hour and were in shock as they lost 2 crew to drowning. We got them safely back to FYC.

The sailors we rescued yesterday *were all wearing PFDs*, they stated that the two victims were also wearing PFDs. The chop on the bay was so incredibly steep that it may have contributed to them drowning as the water was constantly breaking over their heads. Ironically one overboard sailor survived a three hour ordeal without a PFD. I'm not advocating against wearing life jackets I'm just telling you what I know that happened yesterday.

What are the common themes? What conclusions can we draw?

Vessel	Deaths	Stability ?	Life Jackets?	Navigation ?	"Hi Tech" Design?
420	1	X	X		
WingNuts	2	X	X		X
Rambler 100	0	X	X		X
Low Speed Chase	5		X	X	
Aegean	4			X	
Artemis	1	X			X
Uncontrollable Urge	1		X	X	X
Vestas Wind	0			X	X
Dauphin Island	6	X	X		
Total	20	5	6	4	5

Additional Incidents of Interest

Beneteau 40.7 *Cheeki Rafiki*

Cape Fear 38 *Cynthia Woods*

Oyster 825 (90’) *Polina Star III*

Beneteau 40.7 *Cheeki Rafiki*

MAIB Report

- The bond between a floor grid and hull can break without detection.
- Light groundings can damage internal structural (grid or matrix) bonds
- Inspection of hull-keel joint can provide warning of failure
- Avoid storms at sea
- Leaks can come from the hull-keel joint
- Post inversion, you have to be able to get the raft

Cape Fear 38 *Cynthia Woods*

June 6, 2006

Cape Fear 38 *Cynthia Woods*

June 6, 2006

Different reports put the responsibility on different parties

Multiple causes:

- Inadequate hull thickness
  - Hull thickness: 0.52 to 0.56”, keel bolt 1.50”
- Small backing plates on keel bolts; sharp edges
- Groundings without post-incident inspection
- Inadequate repairs to damage after groundings
  - Disputed by Dobroth Design Science report

Oyster 825 *Polina Star III*

Oyster 825, *Polina Star III*

Keel fell off in about 18 knots of breeze on a delivery over about 6 minutes.

Hull stayed afloat until next day; both hull and keel recovered.

Boat was an 82’, modified by Oyster to 90’

Keel attachment was unlike other Oyster designs

Seven boats made similar to this one.

Post-Accident Investigations

- Survey the fleet to get a broad range of opinions
- Honest assessment of what worked and what didn't
- Interview the Organizing Authority to see what practices were followed
- Suggest changes to avoid a repeat
  - Training
  - Equipment
  - Vessel requirements
  - Crew expertise

Coast Guard Questionnaire

1. Were you participating in the Dauphin Island Race event on April 25, 2015?
2. Did your vessel, or the vessel you were aboard, sustain any significant storm damage?
3. Did you or anyone on your vessel sustain any injury or fall overboard?
4. Did you or anyone on your vessel witness any injury, person overboard, or any other emergency situation aboard another vessel?
5. Did you or anyone on your vessel participate in assisting or rescue of another vessel or person?
6. Did you or anyone on your vessel record the events onboard your vessel or another vessel, for example using a cell phone video or camera?
7. Did you or anyone on your vessel hear weather alerts from any source before weather conditions deteriorated?

What has caused the recent decrease in boating fatalities?

Boater education?

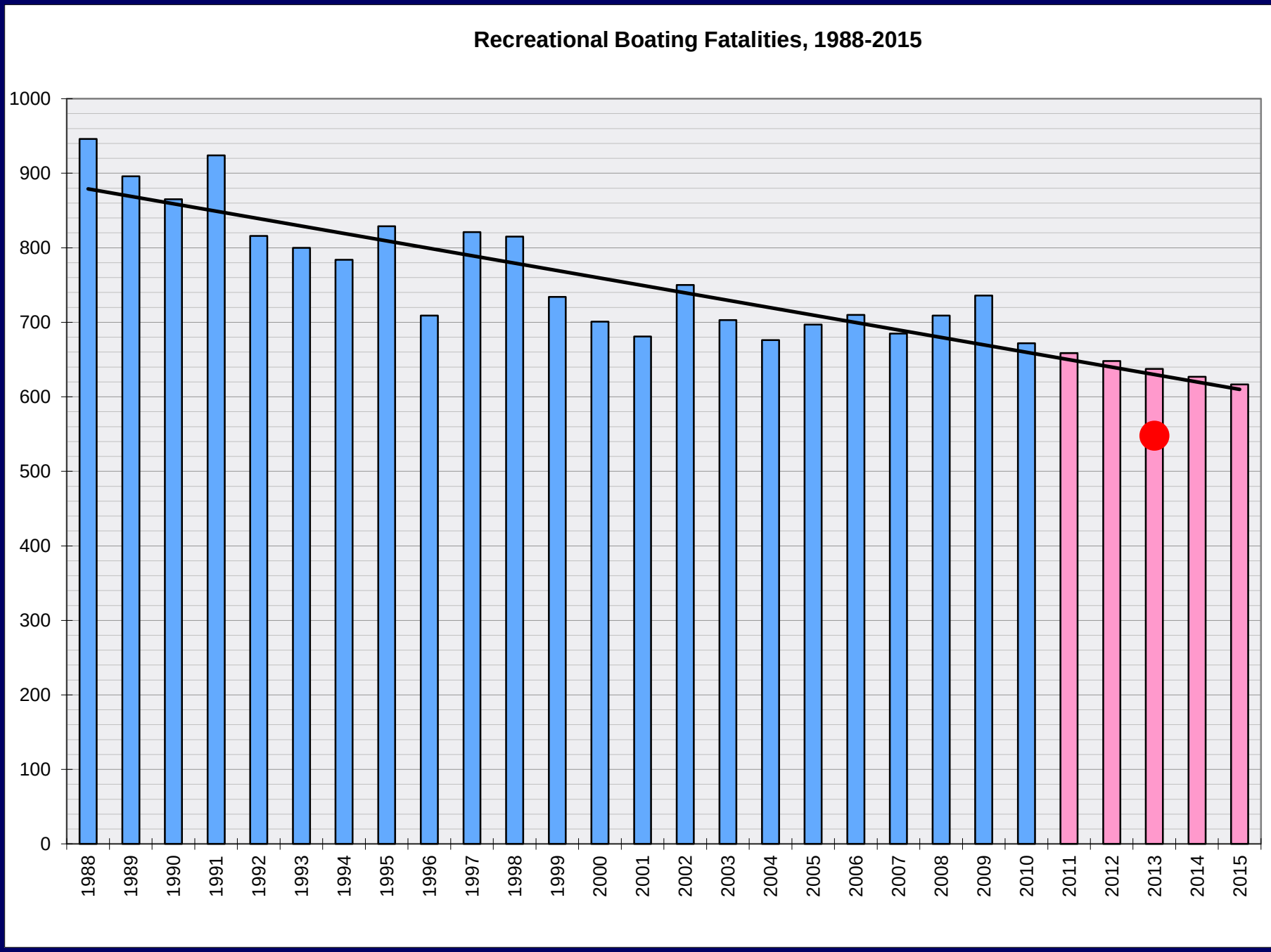
Better boats?

Better life jackets?

Higher wear rate of life jackets?

Fewer BUI?

Greater enforcement of boating regulations?


Recreational Boating Fatalities, 1988-2015
1000
900
800
700
600
500
400
300
200
100
0
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
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2001
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2003
2004
2005
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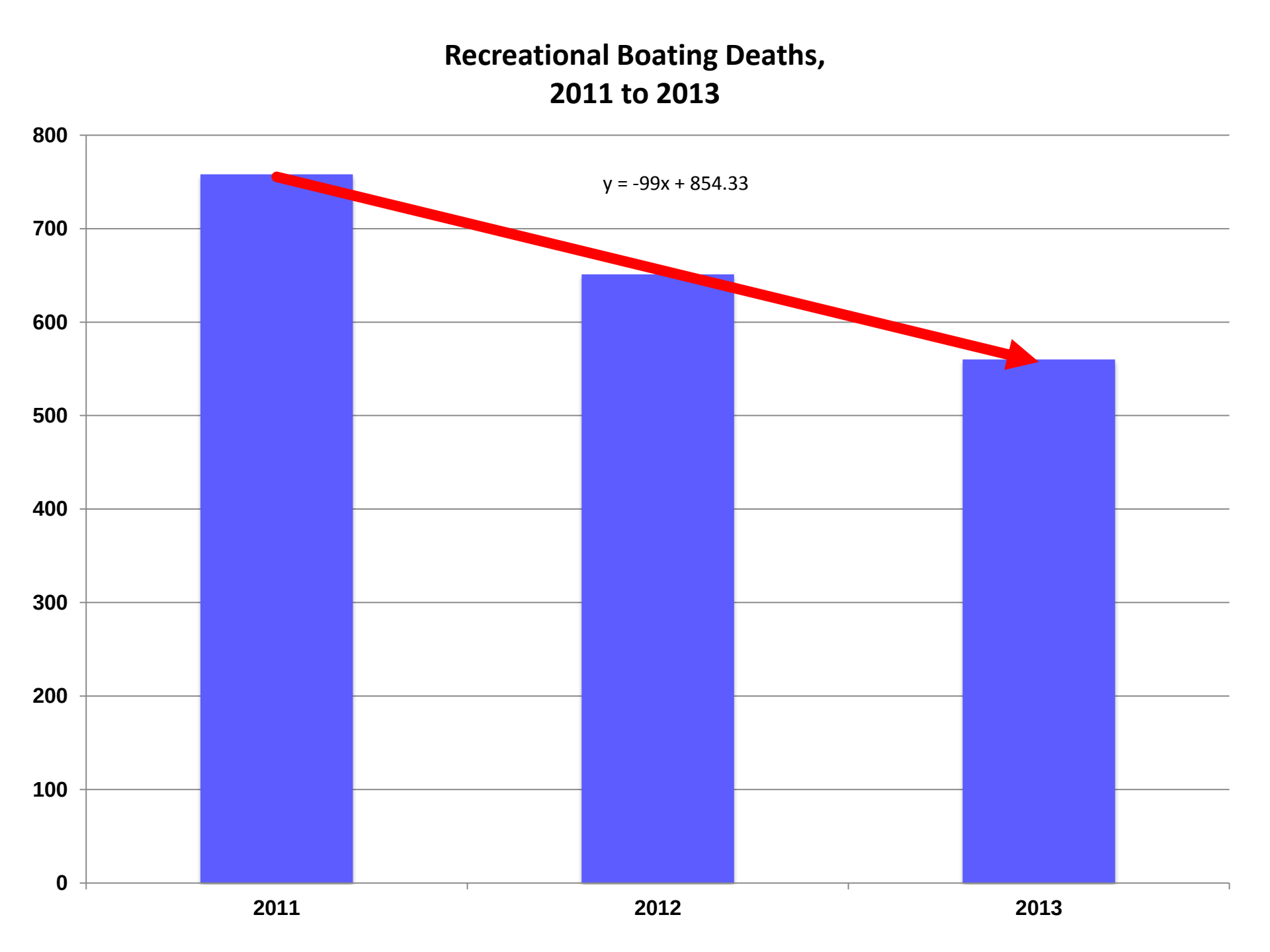
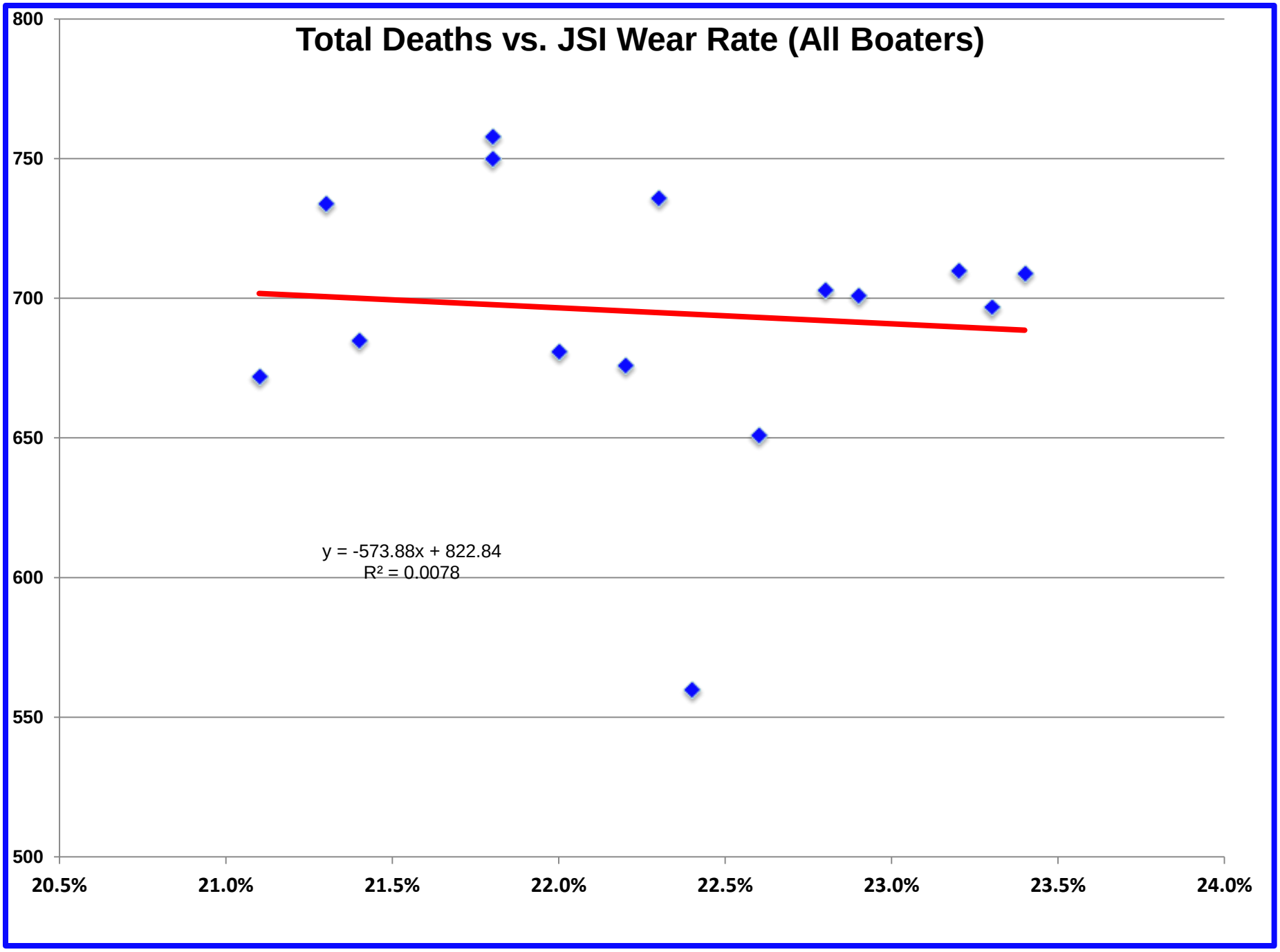
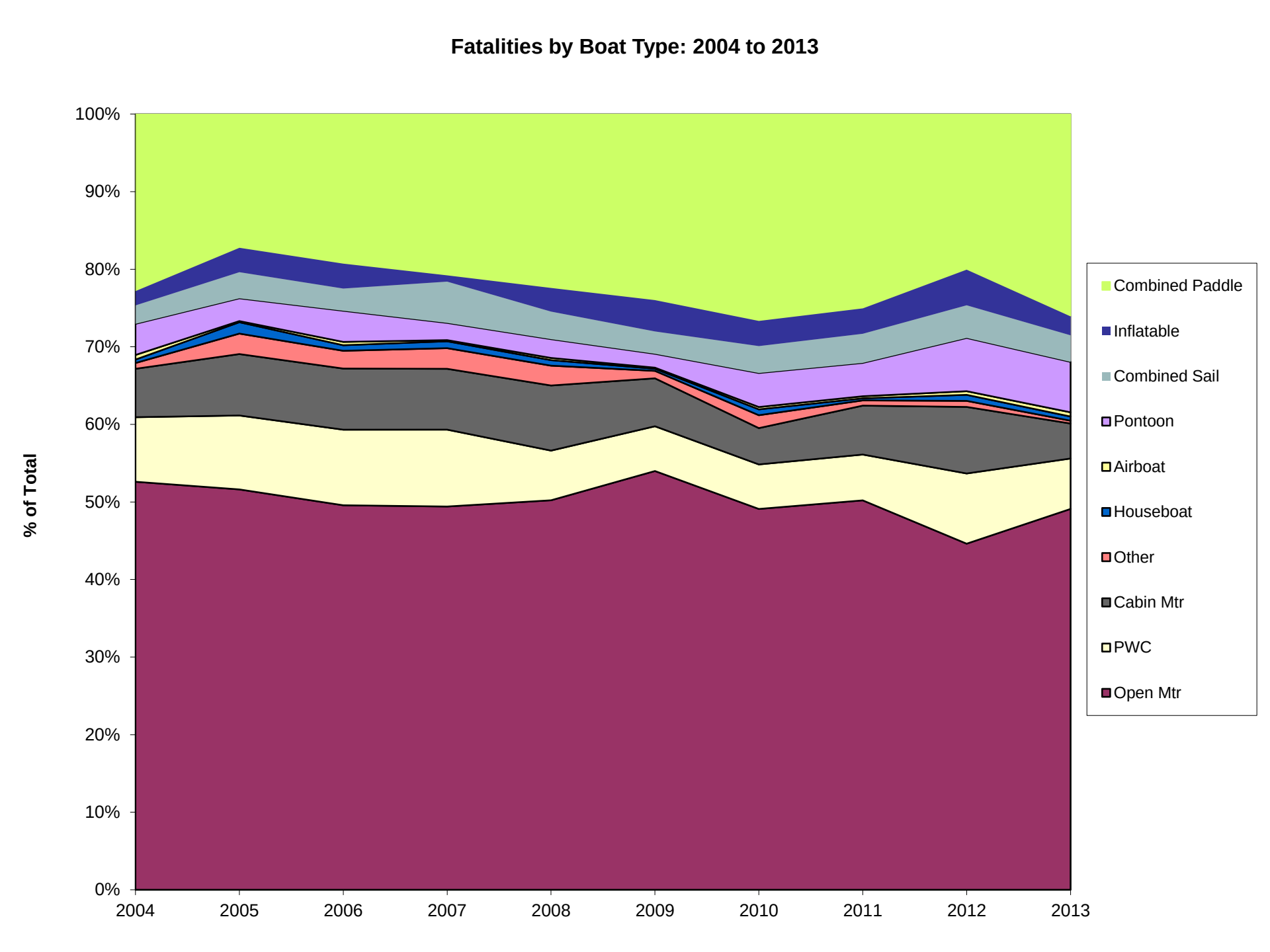
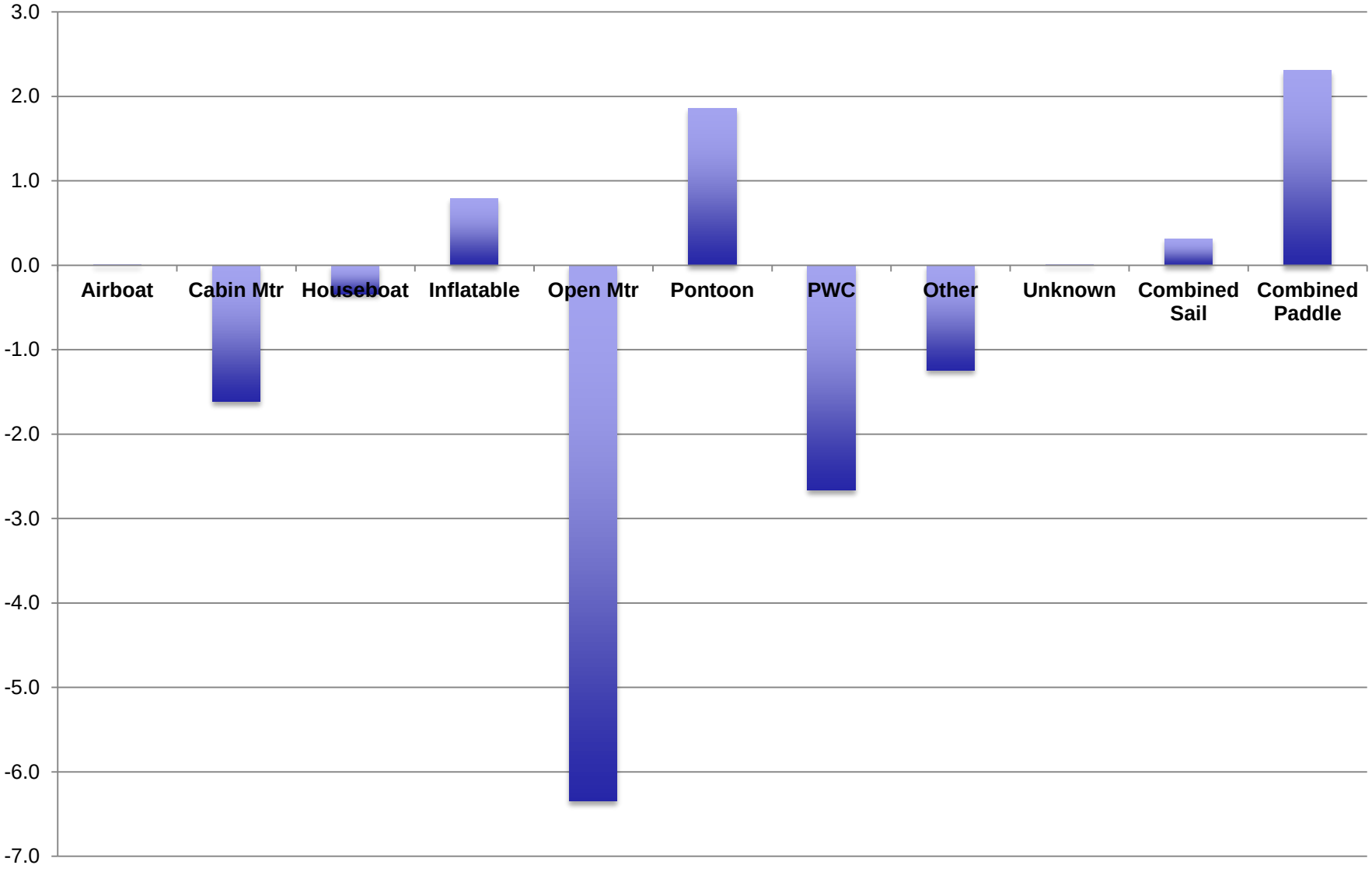
2015

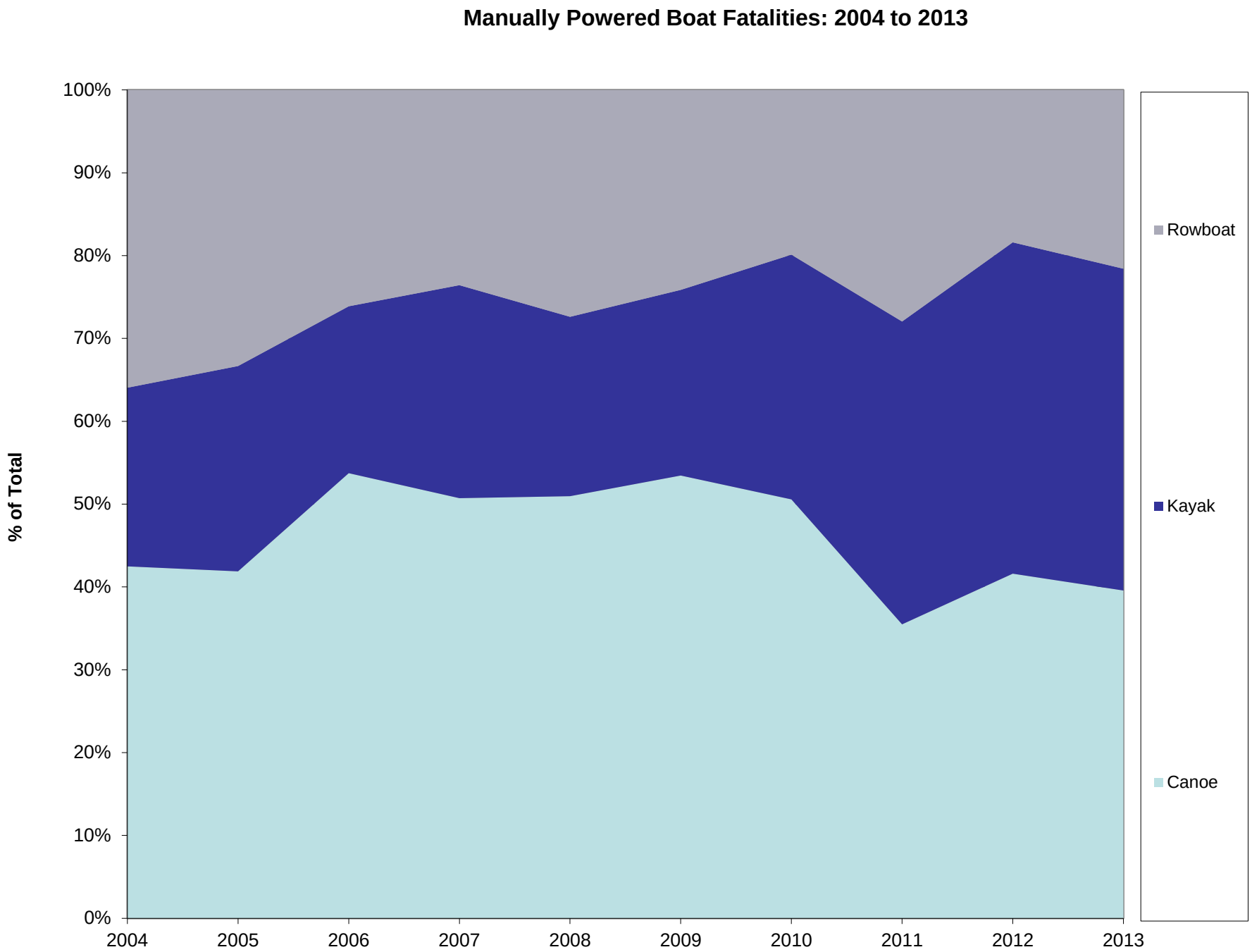

Recreational Boating Deaths,
2011 to 2013
y = -99x + 854.33
800
700
600
500
400
300
200
100
0
2011
2012
2013


Total Deaths vs. JSI Wear Rate (All Boaters)
800
750
700
650
600
550
500
20.5%
21.0%
21.5%
22.0%
22.5%
23.0%
23.5%
24.0%
y = -573.88x + 822.84
R² = 0.0078


Fatalities by Boat Type: 2004 to 2013
% of Total
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Combined Paddle
Inflatable
Combined Sail
Pontoon
Airboat
Houseboat
Other
Cabin Mtr
PWC
Open Mtr

Annual Change in Fatalities by Boat Type




Manually Powered Boat Fatalities: 2004 to 2013
% of Total
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Rowboat
Kayak
Canoe

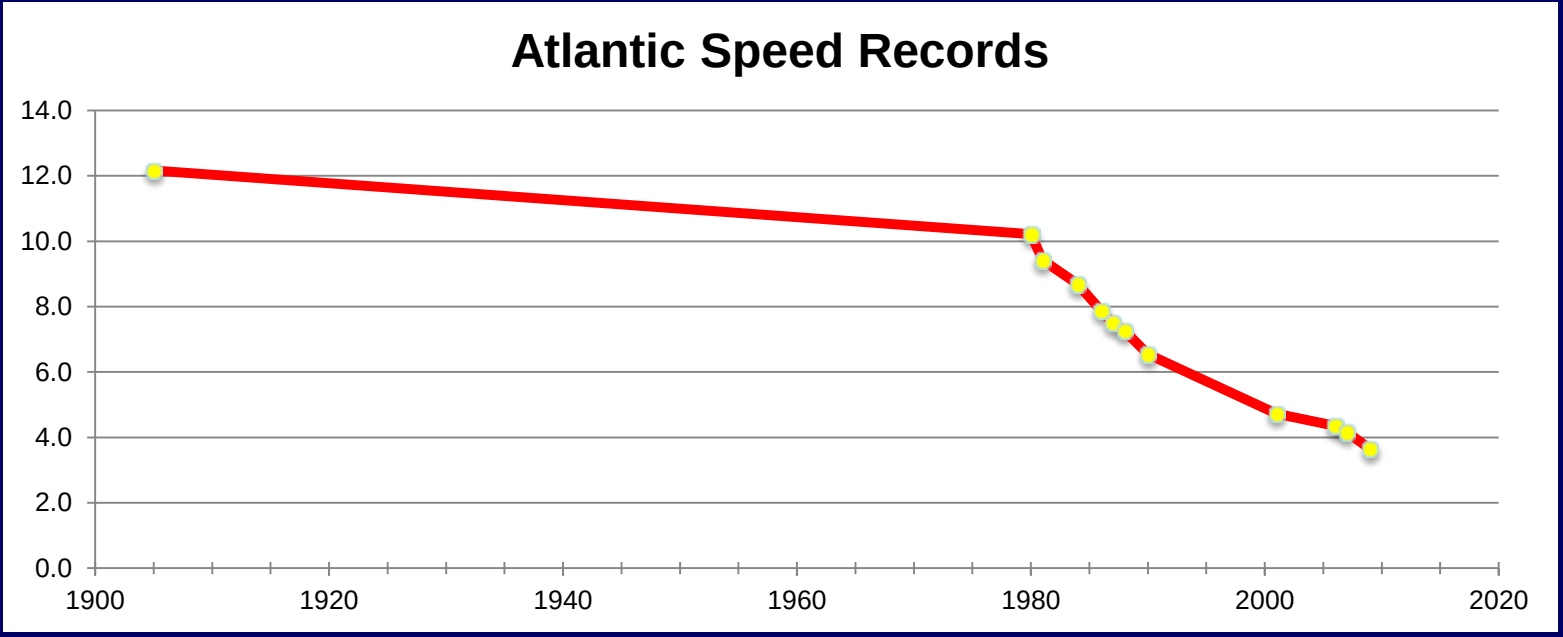

Making more possible
www.VolvoOceanRace.org

Improvements in Offshore Safety

Training is better

Electronics have improved

Boats are better (mostly) and much faster



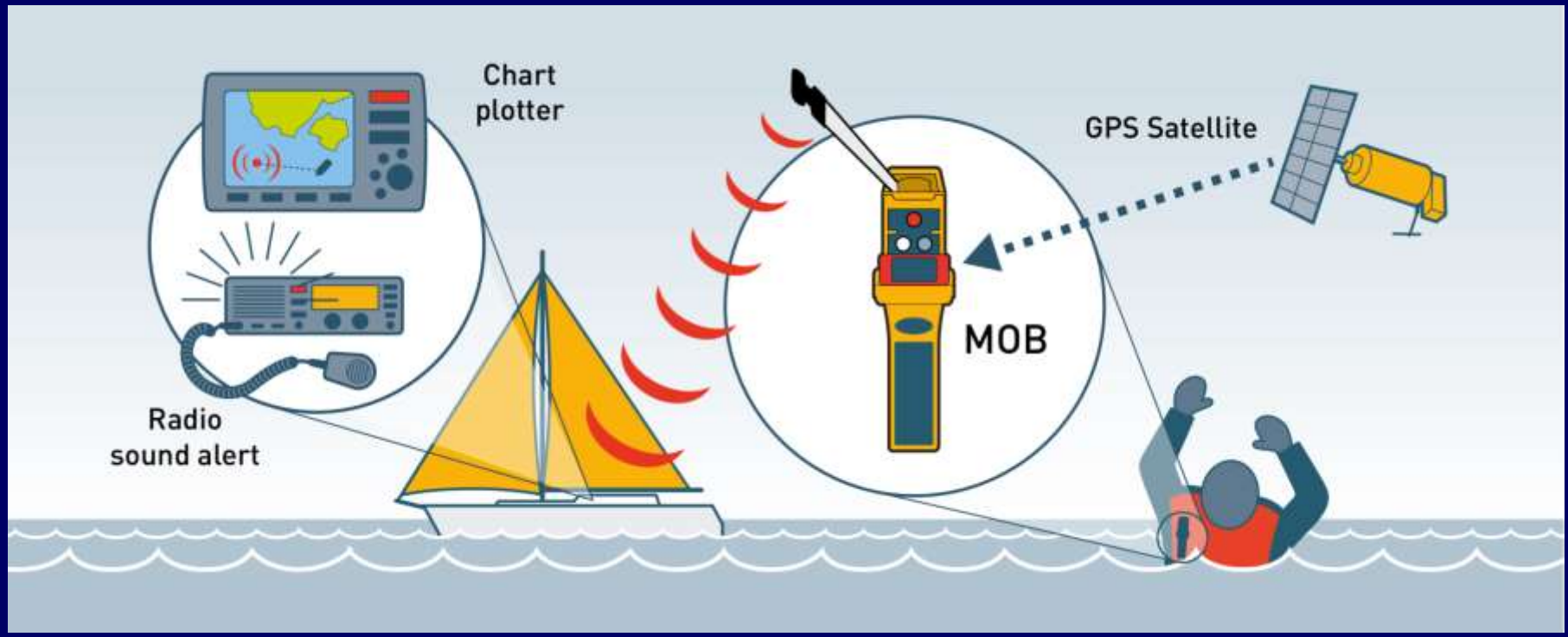
But faster boats have a problem…

	5 kts	7 kts	10 kts	14 kts	20 kts
10 sec.	84’	118’	169’	236’	338
20 sec.	169’	236’	338’	473’	675’
30 sec.	253’	355’	507’	709;	1013’
60 sec.	507’	709’	1013’	1418’	2026 ‘
10 min.	0.8nm	1.2nm	1.7nm	2.3nm	3.3nm

So how do you find sailors who fall overboard?

AIS/DSC Beacons

AIS/DSC Beacons



So where does this leave us?

Boating is getting safer

Most fatalities occur in benign conditions

Avoid islands and unstable boats

Take down your sails and put on a life jacket when an enormous cloud overtakes you

Kayaking in the winter can be hazardous

Fast boats need to have a way of finding their crews