NEW LIFESAVING AUTHORITY
COAST GUARD AUTHORIZATION ACT 2010

Exploring the Business Case for
Emergency Locator Beacon Carriage for
Recreational Vessels Operating Beyond 3 Miles Offshore

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GMDSS Implementation Task Force
RTCM Annual Conference
19 May 2011

Strengthening the Risk Taker - Responder Partnership for SAR Success to Save Significantly More Lives at Significantly Lower Cost

Leveraging Emergency Locator Beacon Technology for Improved Risk Taker Distress Alerting, Position Indicating, and Active Signaling Capabilities

Partnership for Search and Rescue Success

- Search and Rescue **success requires a partnership between** vessel operators, or **"risk takers," and responders**. We all have an interest in reducing offshore recreational vessel risk to acceptable levels at acceptable costs, especially under prevailing federal budget conditions.

- **Offshore operators have four key responsibilities in this partnership.**

  - **Distress Alerting**. Alert responders to the distress situation—no alert, no response
  - **Position Indicating**. Indicate the distress position—get responders into the ballpark; give responder sensors a reasonable chance to "see" them
  - **Active Signaling**. Actively signal—present a "bigger" electronic/visual profile , help responder sensors "see" them
  - **Surviving in Environment.** Survive in the distress environment —give responders a reasonable chance to reach the scene, locate and assist

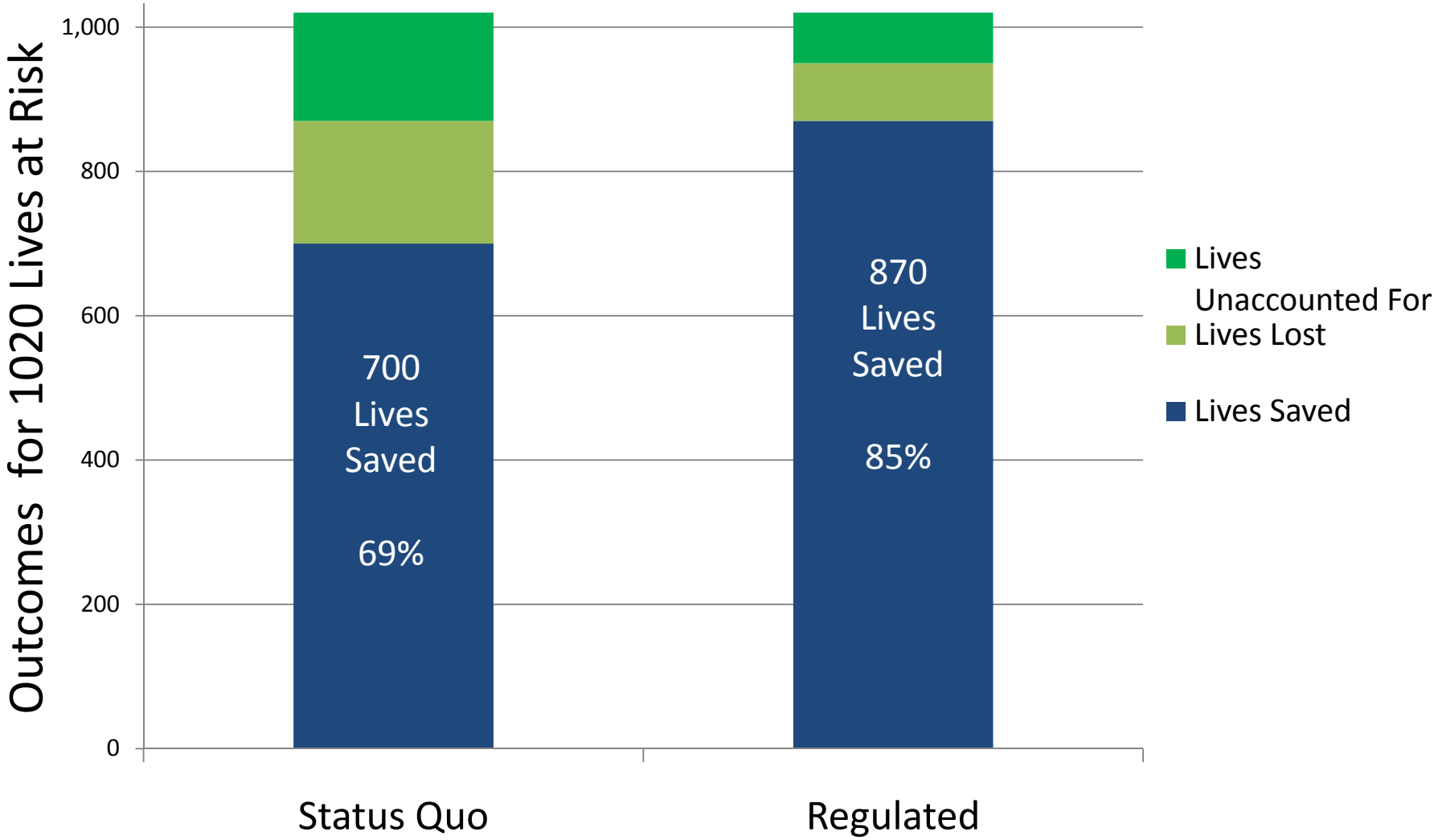
- **Most losses trace to shortcomings in one or more of the above.**

Expected Impact of ELB Carriage Requirement

- An initiative **requiring Emergency Locator Beacon (ELB) carriage for recreational vessels operating beyond 3NM offshore**, under authority of CG Authorization Act 2010, **would improve distress alerting, position indicating, and active signaling capabilities for those affected.**
- A **$10M annual "Risk Taker"** Emergency Locator Beacon **Expenditure** (about $20 per affected vessel x about 500,000 affected vessels) could—
  - **Save an** estimated **additional 170 lives/yr** ($1071M) (more going forward),
  - **Improve lifesaving performance** for recreational vessel distress cases beyond 3NM offshore **from about 70% to about 85%,**
  - **Reduce** annual Coast Guard **response costs by about $37M**
  - Have an **estimated ROI of about 110:1**
  - **Improve SAR program performance ROI** for offshore recreational vessel distress cases **from about 75:1 to about 215:1—saving significantly more lives at significantly lower cost**

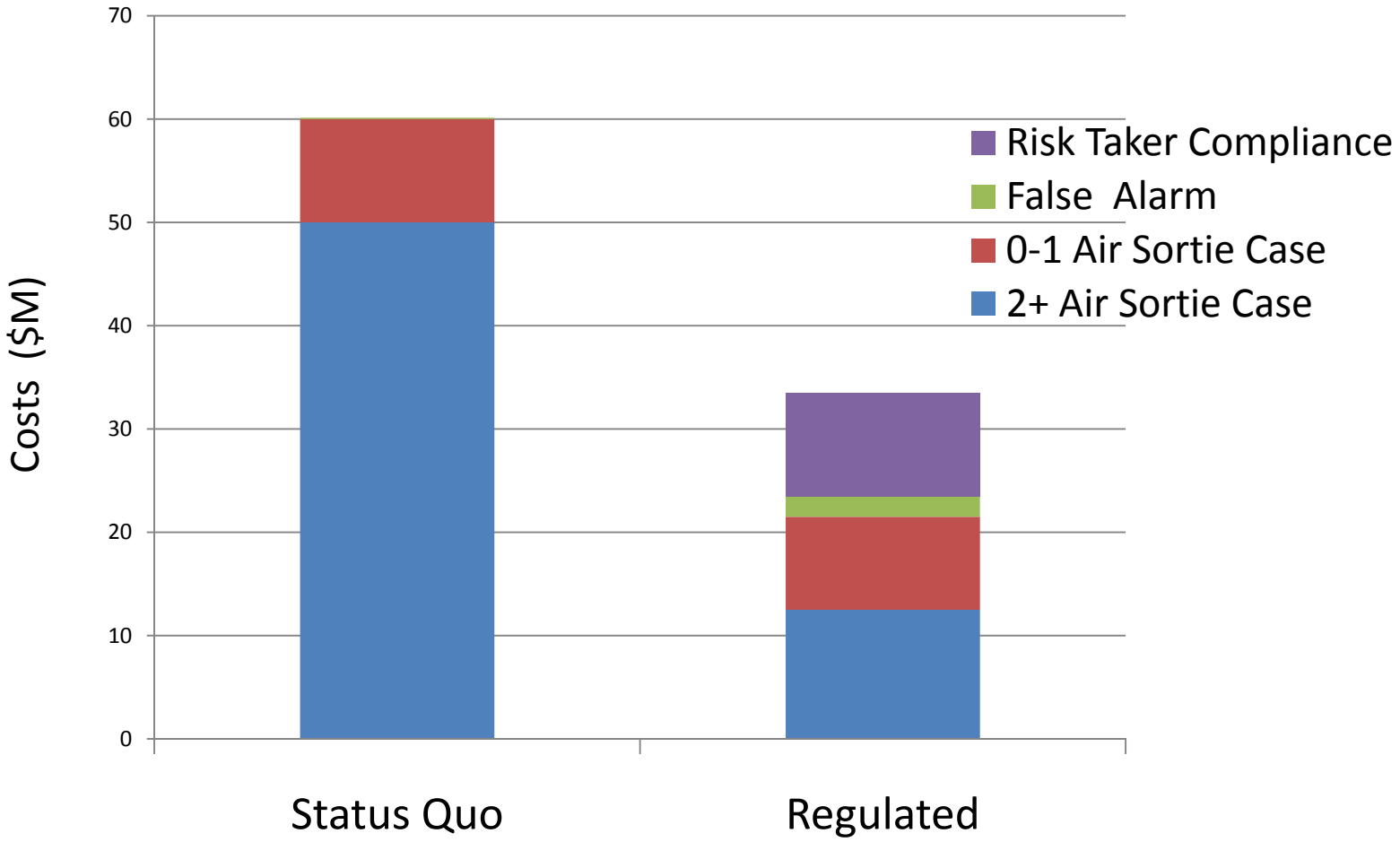
Lifesaving Effectiveness

For U.S. Recreational Vessel Distress Cases Beyond 3NM Offshore



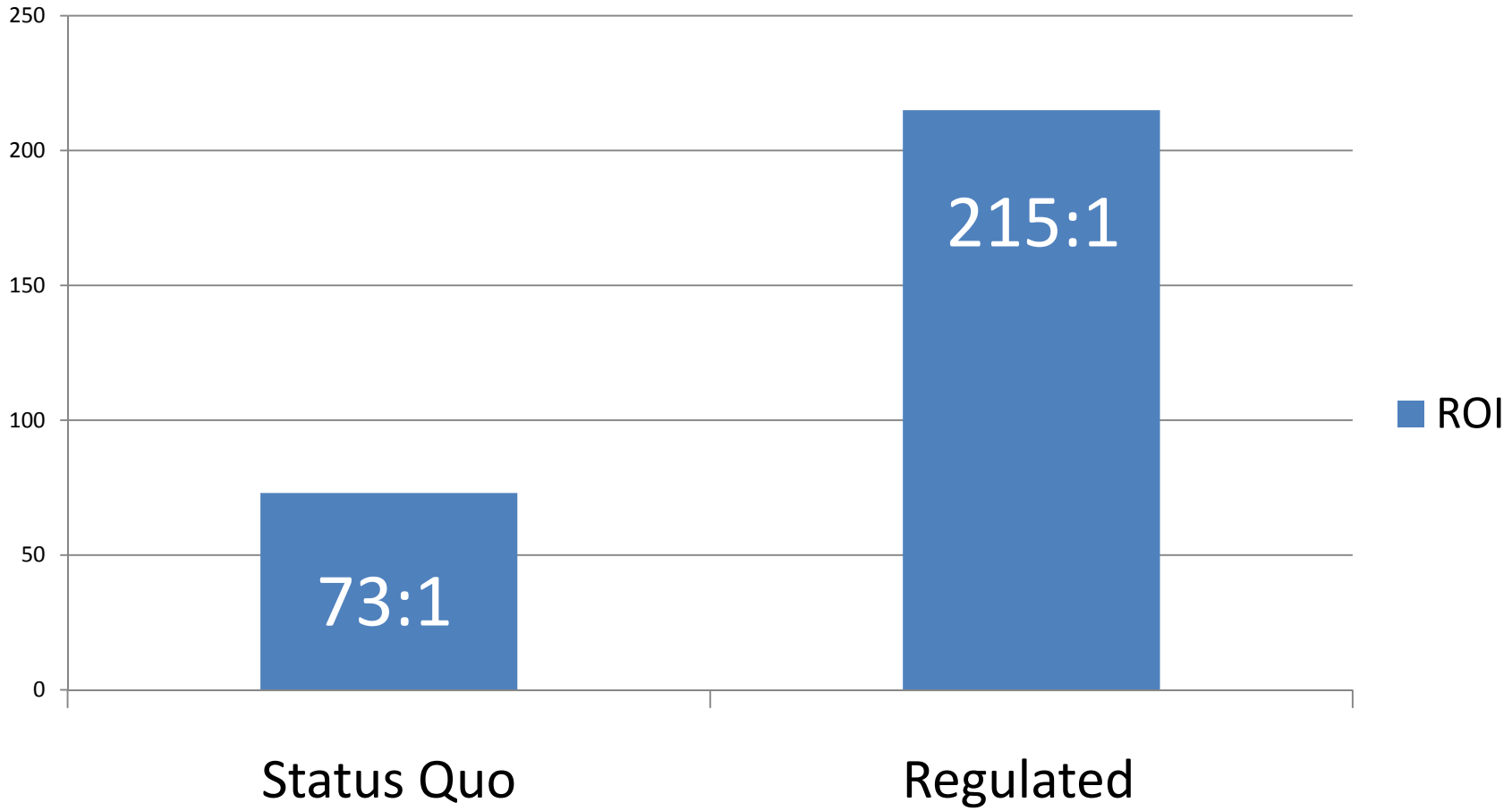
Annual Costs

Status Quo v. Regulated



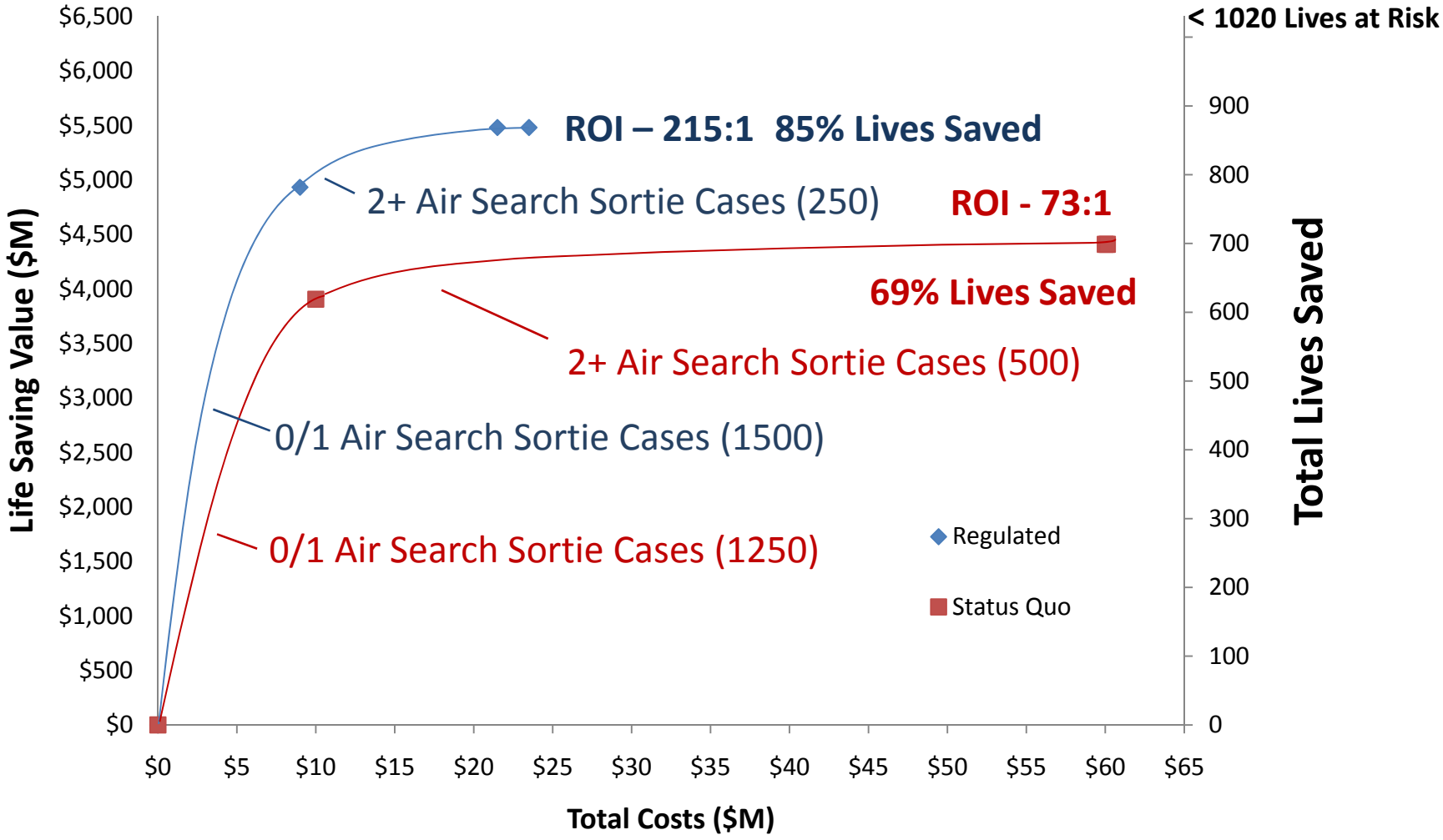
ROI - Benefit / Response + False Alarm Costs

Status Quo v. Regulated



SAR Performance – Cost Curves

U.S. Recreational Vessel Distress Cases > 3NM Offshore



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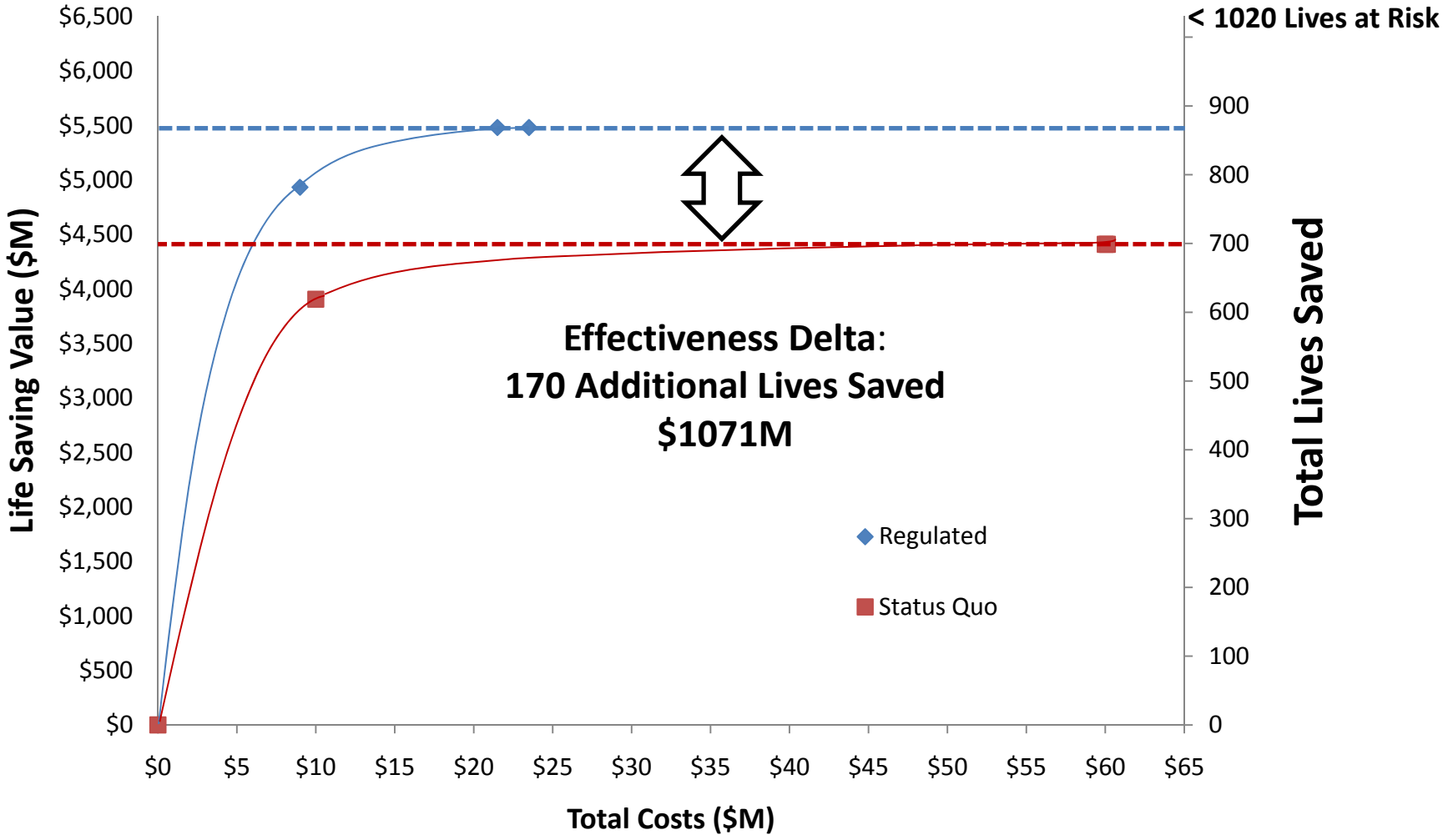

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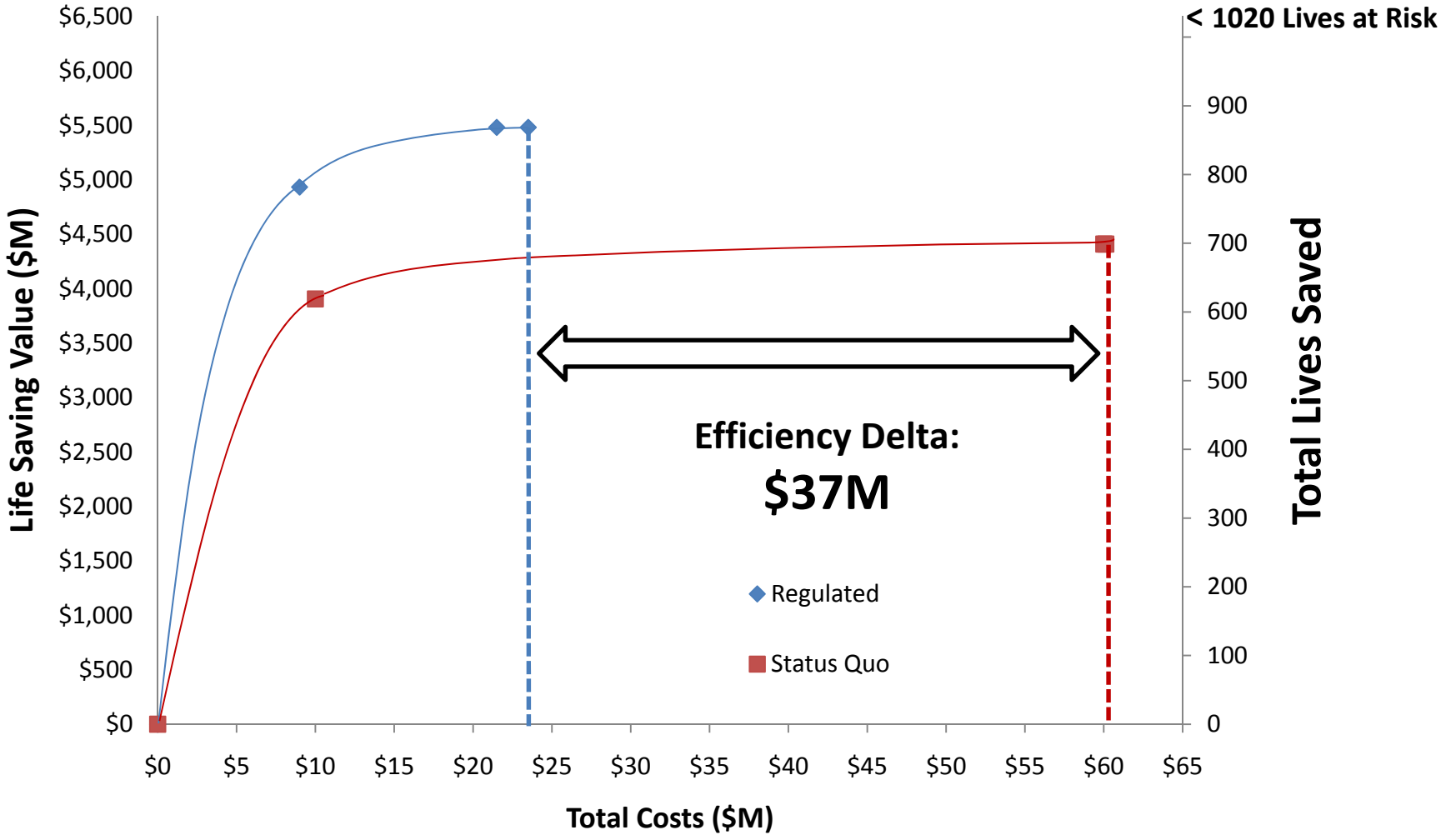

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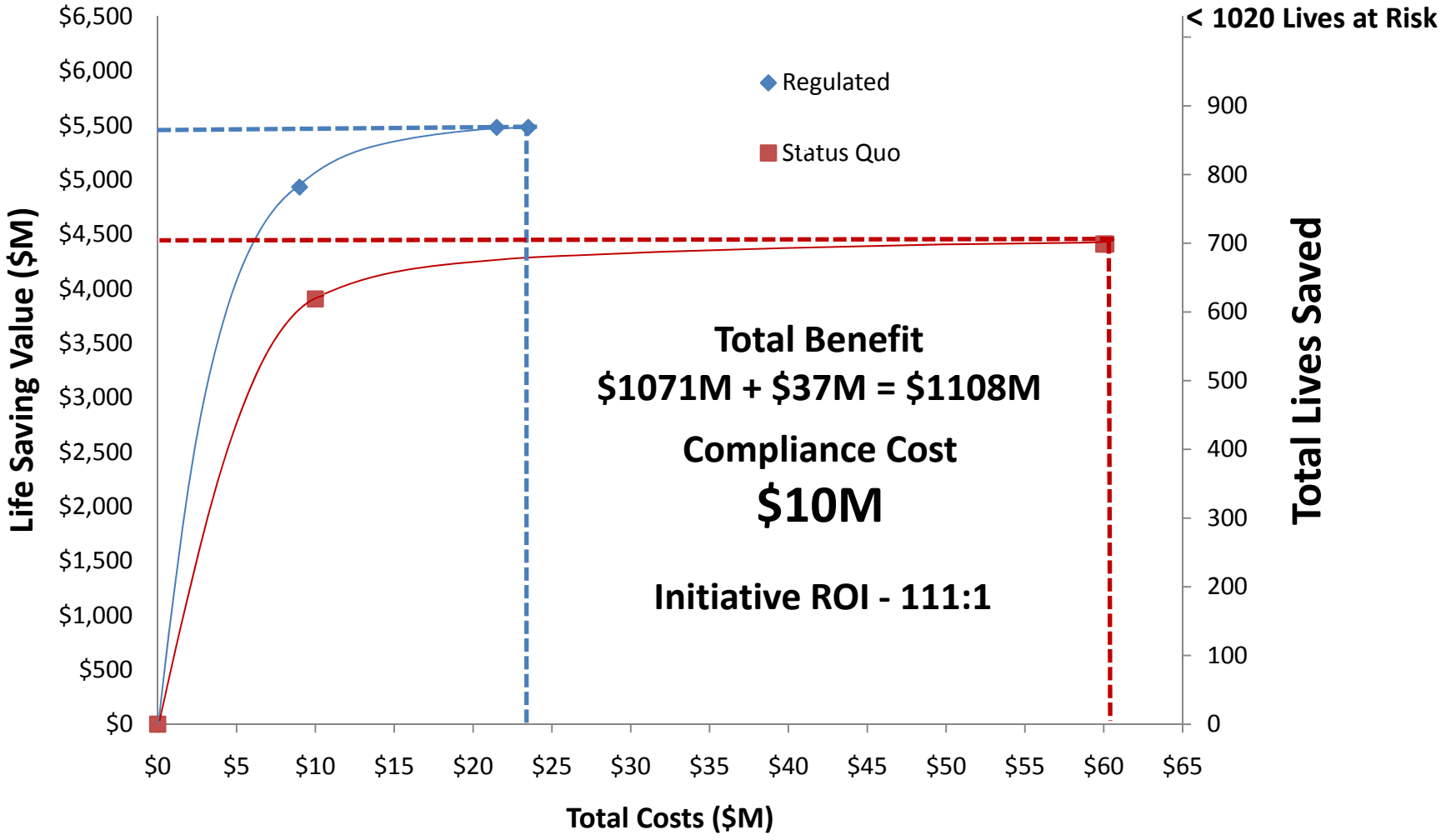

SAR Performance – Cost Curves

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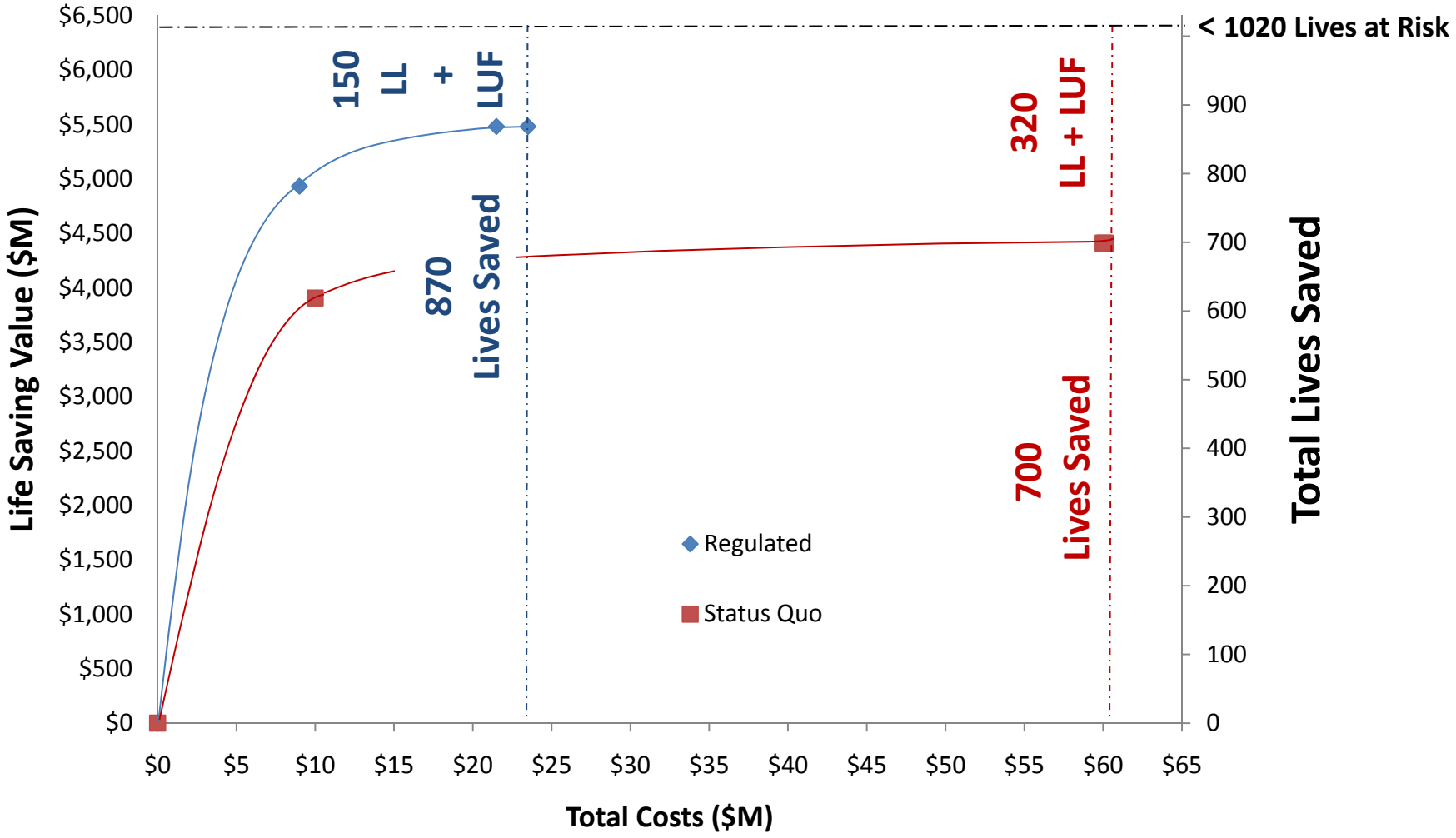

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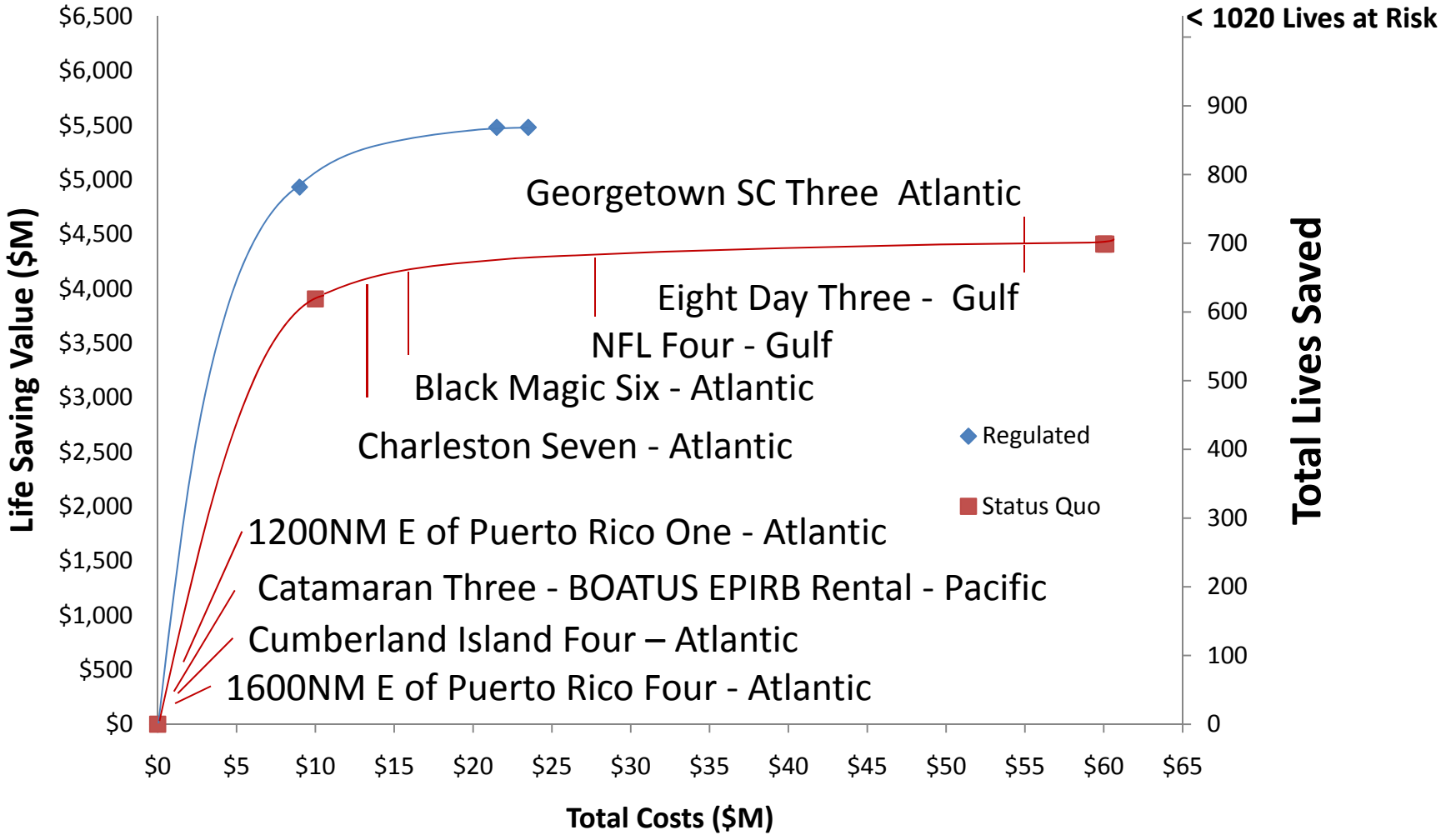

Sensitivity Analysis

For this straw man …

- Double costs and halve benefits … Still a better than 25 to 1 ROI.
- Double costs and halve benefits again … still a better than 6 to 1 ROI.

This exploration intended to provoke thought and inspire action …

Questions?

Appropriate Action?

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14 May 2011 - 4 Saved 15NM off Cumberland Island

Well Prepared Crew Contributes to Effective, Efficient Rescue

Good Distress Alerting, Position Indicating, Active Signaling and Survival Readiness

VHF and EPIRB and PFDs

Coast Guard Rescues 4 After Boat Capsizes

25-Foot Boat Capsized In Atlantic Ocean About 15 Miles Off Shore

POSTED: Saturday, May 14, 2011

UPDATED: 6:31 pm EDT May 14, 2011

Photo by Christopher Evanson / USCG

Larry Kirkland holds the radio beacon that Coast Guard members said helped them find him and 3 others in the Atlantic Ocean Saturday.

MAYPORT, Fla. -- Four boaters were back on dry land Saturday afternoon after a long day on the water. Saturday around 12:30 p.m., members of the United States Coast Guard from Jacksonville and Brunswick responded to a distress call about 14 miles off the coast of Cumberland Island, Ga.

After sending vessels to search, the Coast Guard found the overturned boat and rescued the four people who were clinging onto it. Larry Kirkland, of South Carolina, was one of the boaters rescued. He said he just had just bought the 25-foot boat in Amelia Island and decided to take it off shore with his father, stepmother and another relative. He said the boat started to take on water and eventually flipped over.

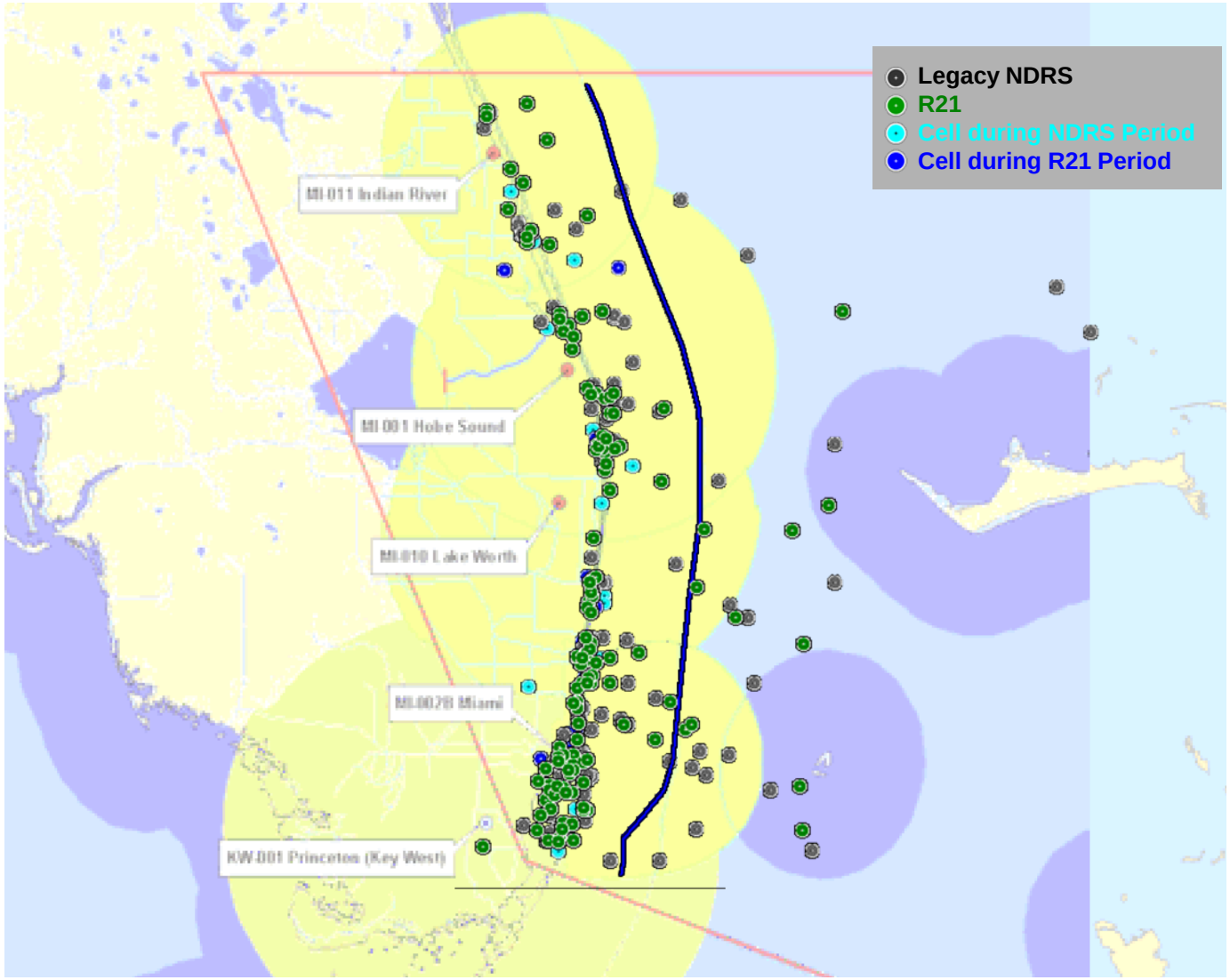
All four boaters had life jackets on and Kirkland had an Emergency Position-Indicating Radio Beacon, or EPIRB. He turned the device on after radioing the Coast Guard. Rescuers said they were able to find the vessel so quickly because of the location beacon.

All four boaters arrived at the Coast Guard station in Mayport around 3:30 p.m. Saturday. Paramedics with Jacksonville Fire and Rescue checked them out and the Coast Guard gave them warm blankets.

They said they were relieved to be back on dry land and thankful they left the dock prepared with the radio beacon and life jackets.

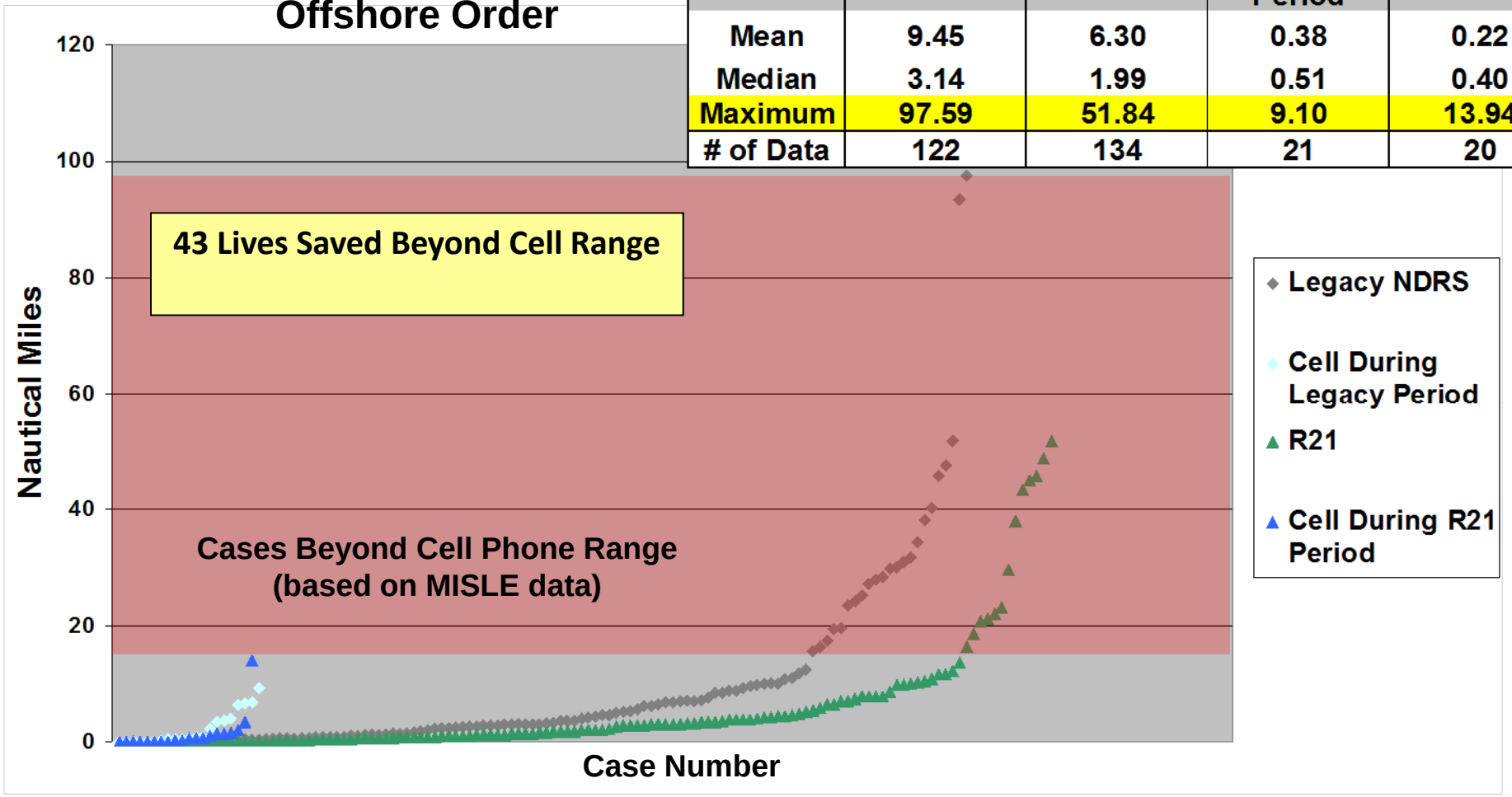
Saturday afternoon, the family's 25-foot boat remained in the ocean and was being towed back.

VHF-FM AND CELL PHONE CASES – SECTOR MIAMI 2YRS

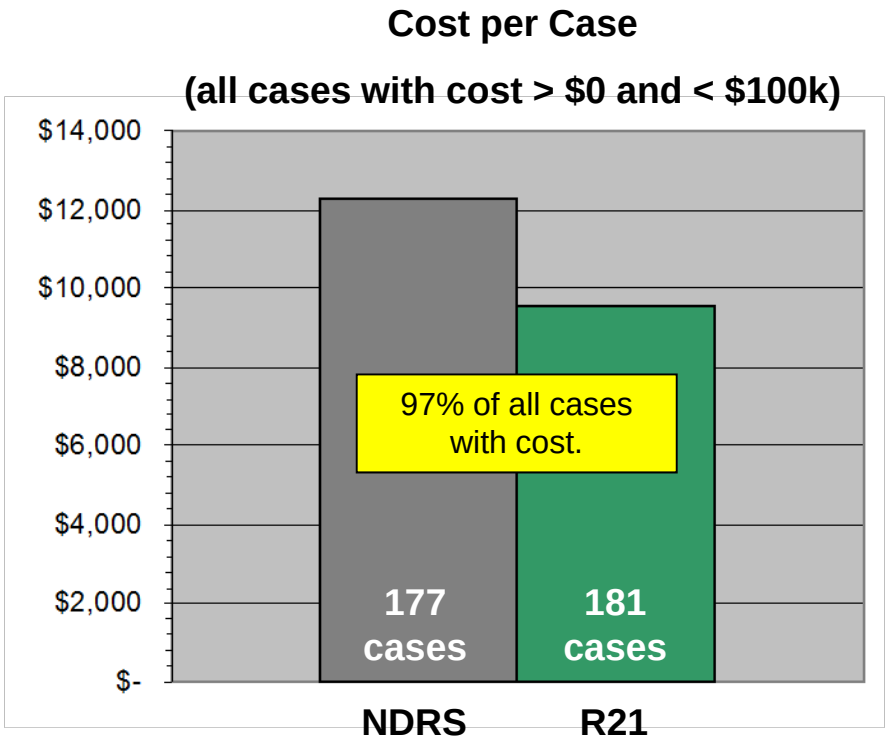


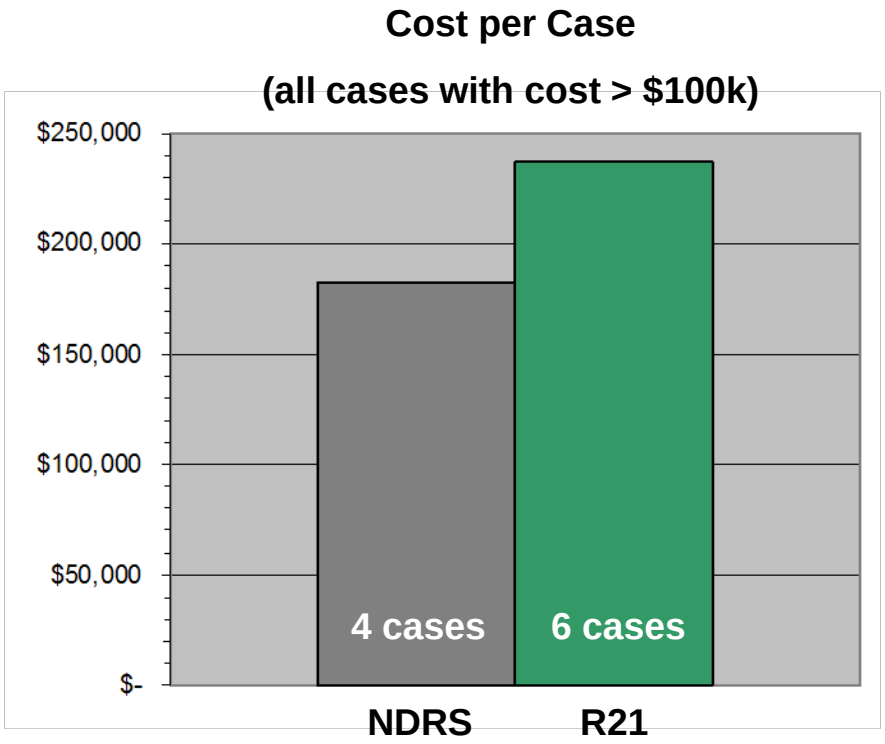
Geo-Spatial Ordered Analysis (Sector Miami Cases)

	Legacy NDRS	R21	Cell During Legacy Period	Cell During R21 Period
Mean	9.45	6.30	0.38	0.22
Median	3.14	1.99	0.51	0.40
Maximum	97.59	51.84	9.10	13.94
# of Data	122	134	21	20



Operational Cost per Case (Sector Miami)

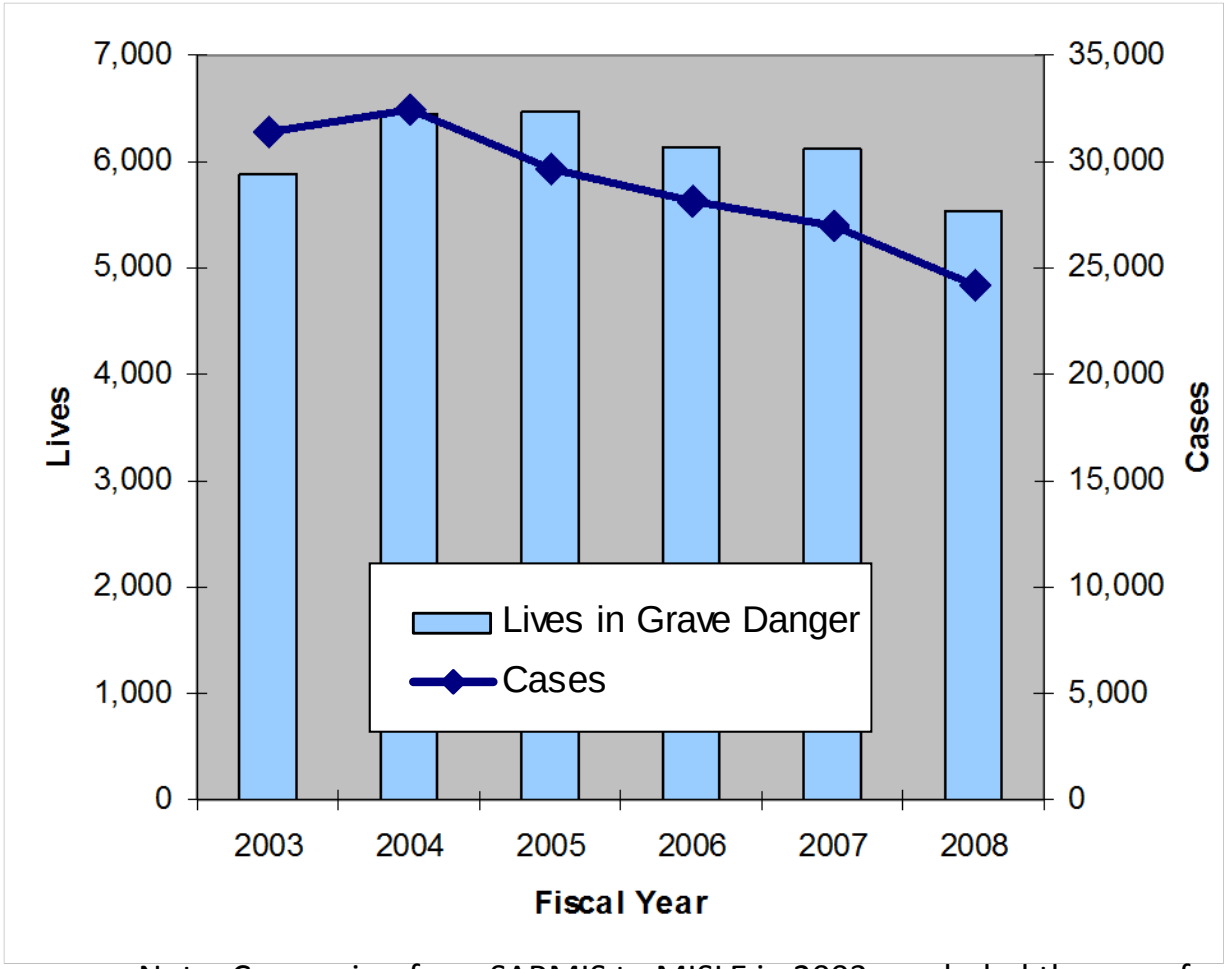




- **Legacy NDRS: 227 cases without cost (sortie)**
- **R21: 129 cases without cost (sortie)**

Lives in Grave Danger 2003 - 2008

- Downward trend in number of cases (dark blue line).
  - Likely a result of continuing growth of commercial assistance.
  - Trend has been in effect since 1980's.
- "Lives in grave danger" (light blue bars) accounts for lives saved, lost after notification, and unaccounted for.
- Analysis of variance regarding lives in grave danger revealed no statistical trend – possibly due to limited data.
- Number of lives in grave danger declined 1% per year on average (linear).



Note: Conversion from SARMIS to MISLE in 2003 precluded the use of earlier data.

SAR Response Cases

by Notification Type 2003 - 2008

Case Count as values	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	All Years
Audio	68	55	52	45	38	32	**302**
EPIRB/ELT	1,633	2,014	1,652	1,697	1,798	1,484	**11,303**
Other	740	801	667	653	602	494	**4,213**
Phone	12,802	13,042	12,242	11,826	11,445	10,486	**77,072**
Radio	11,283	11,050	9,710	8,625	8,234	6,114	**57,167**
Rescue 21	0	0	0	0	0	1,024	**2,253**
Satellite	1,723	1,894	1,330	1,324	1,192	909	**8,731**
UNSPECIFIED	1,640	2,166	2,902	3,118	2,828	2,951	**17,157**
Visual	1,541	1,401	1,100	866	804	729	**6,700**
All Notification Types	**31,430**	**32,423**	**29,655**	**28,154**	**26,941**	**24,223**	**184,898**

	FY03	FY04	FY05	FY06	FY07	FY08	ALL
%VHF	36	34	33	31	31	29	31
%ELB*	11	12	10	17	11	10	11

SAR Response Cases

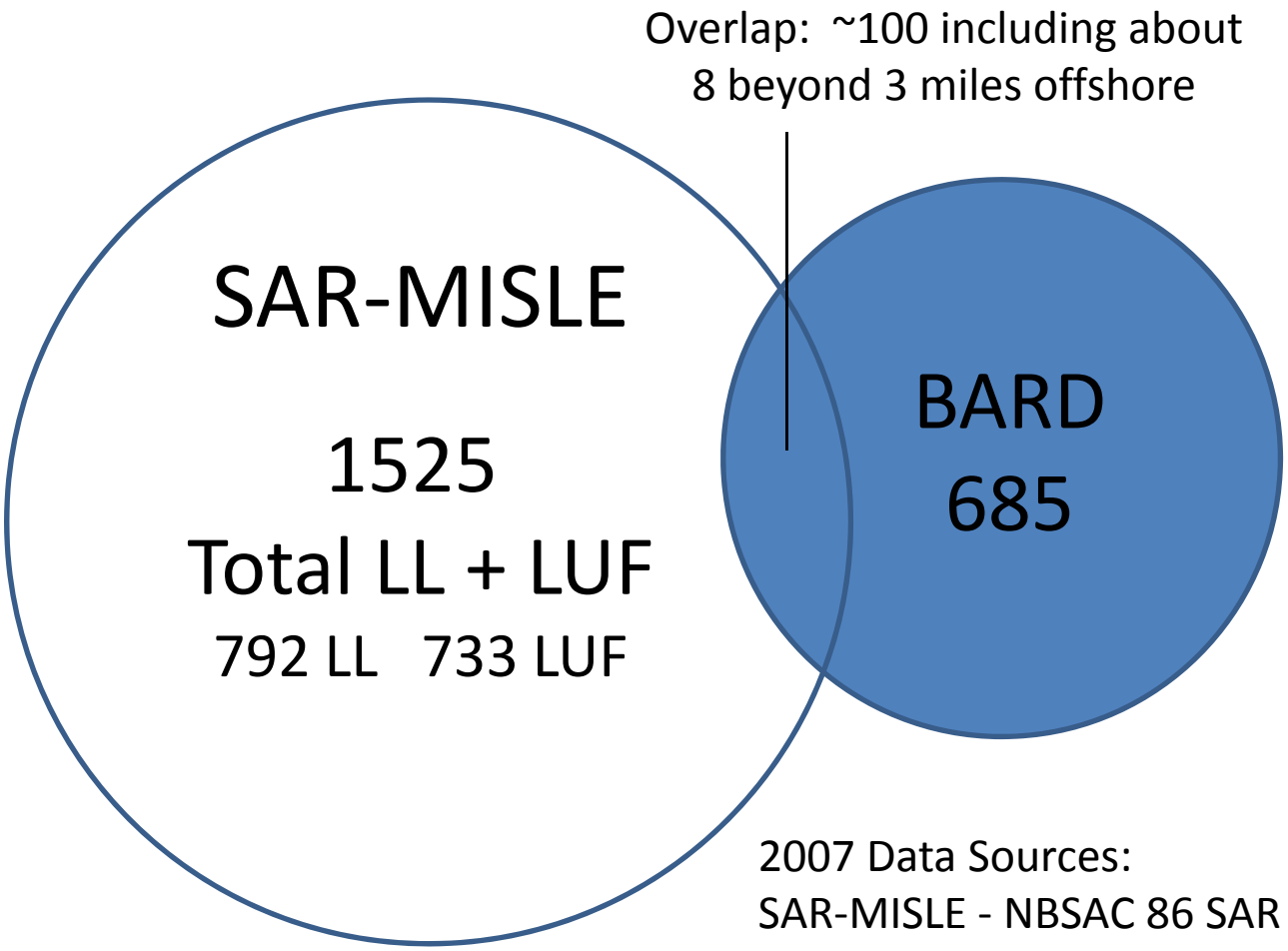
by Performance Measures Elements 2003 - 2008

MEASURES as values	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	All Years
Case Count	31,429	32,423	29,655	28,154	26,941	24,223	**184,965**
Sortie Count	33,172	33,533	30,828	28,658	26,667	25,537	**191,140**
Lives Saved	5,192	5,557	5,641	5,276	5,204	4,910	**34,283**
Lives Assisted	38,480	41,933	41,491	38,126	35,812	31,623	**243,793**
Lives Lost Before CG Notification	410	503	522	475	492	534	**3,234**
Lives Lost After CG Notification	189	184	219	206	188	186	**1,275**
Lives Lost After Assisting Unit Alongside	25	18	36	35	32	28	**185**
Lives Lost Onboard Assisting Unit	9	13	18	10	14	10	**76**
Lives Lost After Reaching Shore Facility	38	66	50	56	67	67	**361**
Lives Unaccounted For	496	691	603	664	733	435	**4,001**
Total Lives Affected	44,839	48,965	48,580	44,848	42,542	37,793	**287,208**

Rule Making Perspectives

- Public Policy – Improved balance of Individual and public responsibility. Better performance at lower cost.
- Directly Affected – Improved personal and public outcomes at cost of ~$20/yr.

SAR-MISLE v. BARD
Lives Lost/Unaccounted For



2007 Data Sources:
SAR-MISLE - NBSAC 86 SAR ppt - CGBI
BARD - Boating Accident Statistics 2007

2007 CNA SAR Review

Table 6. The impact of not having to search[a]

	% Lives saved[b]	Lives saved per 100 sortie hours
Located without search	96.4	72.1
Search performed	90.2	45.7

a. All data from MISLE, includes WPB, boats, aircraft.
b. After CG notification.

2007 CNA SAR Review Table 6

Table 6 shows that the difference in lives saved is significant—as much as 6 percentage points. The efficiency of the SRU action also increased—the number of lives saved per 100 sortie hours goes up by over 50 percent. Of course, this comparison should be taken with a grain of salt: as appendix C describes, we had to perform our analysis on a subset of available MISLE data that may not be representative of SAR activity as a whole. However, an analysis like this can project the maximum increase in SAR effectiveness to be expected from an improved SAR sensor or better distress-signal locating, assuming mission profiles stay roughly constant. A better sensor might cause the SRU to be much more effective than in its pre-improvement mission use, but it also might allow it to be used in more difficult conditions than it could be beforehand. This might tend to counterbalance the improved technology with a more challenging application.

2007 CNA SAR Review

Table 15. Efficiency calculation by search category and resource type[a]

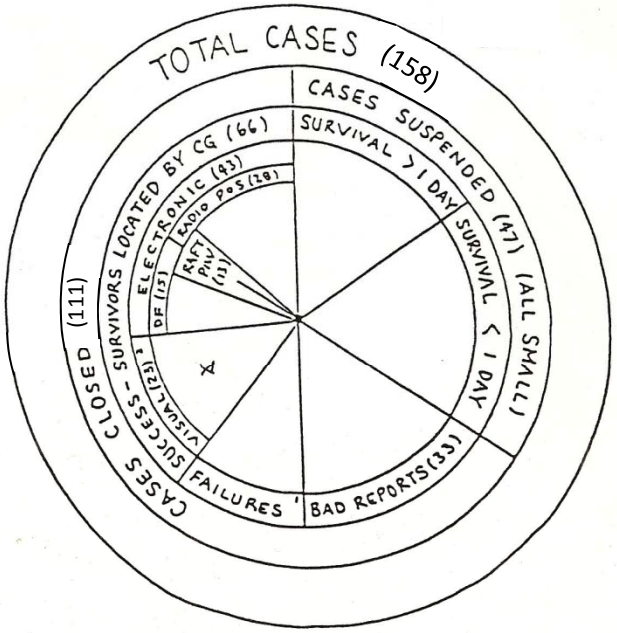
Search category[b]	Resource type	Lives saved[c]	Lives lost[d]	Sortie hrs	Lives saved per 100 hrs	Lives lost per 100 hrs
Search performed	Boat (<65')	2,309.9	144.9	3,888.8	59.4	3.7
	Fixed wing	160.6	113.5	950.9	16.9	11.9
	Helo	1,042.4	87.5	2,610.1	39.9	3.4
	WPB	36.2	0.7	318.7	11.4	0.2
Search performed total		***3,549.1***	***346.6***	***7,768.4***	***45.7***	***4.5***
Located directly	Boat (<65')	2,307.1	77.0	2,392.7	96.4	3.2
	Fixed wing	70.8	1.7	391.9	18.1	0.4
	Helo	590.6	28.4	1,319.3	44.8	2.2
	WPB	155.4	3.4	231.6	67.1	1.5
Located directly total		***3,123.9***	***110.5***	***4,335.5***	***72.1***	***2.5***
Unknown	Boat (<65')	3,908.4	165.4	5,085.9	76.8	3.3
	Fixed wing	218.3	8.3	986.5	22.1	0.8
	Helo	841.7	55.0	2,141.5	39.3	2.6
	WPB	96.4	3.8	526.6	18.3	0.7
Unknown total		5,064.8	232.5	8,740.6	57.9	2.7
Grand Total		11,737.7	689.6	20,844.6	56.3	3.3

2007 CNA SAR Review Table 15

a. These calculations are based on a subset of the data in MISLE (5,745 cases, involving 8,811 sorties). We note that this efficiency analysis is an illustration of a technique and, as detailed in the text, involved significant culling of the data to generate a viable sample dataset; we do not base any findings on these results.
b. "Located directly" indicates that no search was necessary; the response unit located the target upon arrival on-scene.
c. Fractions resulted from the way we calculated lives lost and saved: We used the "outcome amount" indicated in the case records and ignored that listed in the sortie records. Where several sorties were involved in a single case, we assigned a proportional amount to the number of lives involved. For example, if four sorties were involved in a case where 1 person's life was saved, each sortie was considered to have saved 0.25 lives
d. Includes all lives lost after the Coast Guard received notification; see footnote c above.

CGD7 Major Searches 1984

SEVENTH COAST GUARD DISTRICT
MULTI-AIRCRAFT-SORTIE SEARCH CASES
01 JAN - 30 NOV, 1984



* All Small Boats / Rafts

[1] ACTIVE SEARCHES SUSPENDED - SURVIVOR SUBSEQUENTLY RESCUED DEBRIEF INDICATED SUBJECT OVERFLOWN ONE OR MORE TIMES BY CG AIRCRAFT: HC-130 (5), HU-25A (6), HELO (1)

[2] HC-130 (5), HU-25A (7), HELO (8), VESSELS (3)