

RESEARCH ON RIGHT WHALE/ FISHING GEAR CONFLICT REDUCTION

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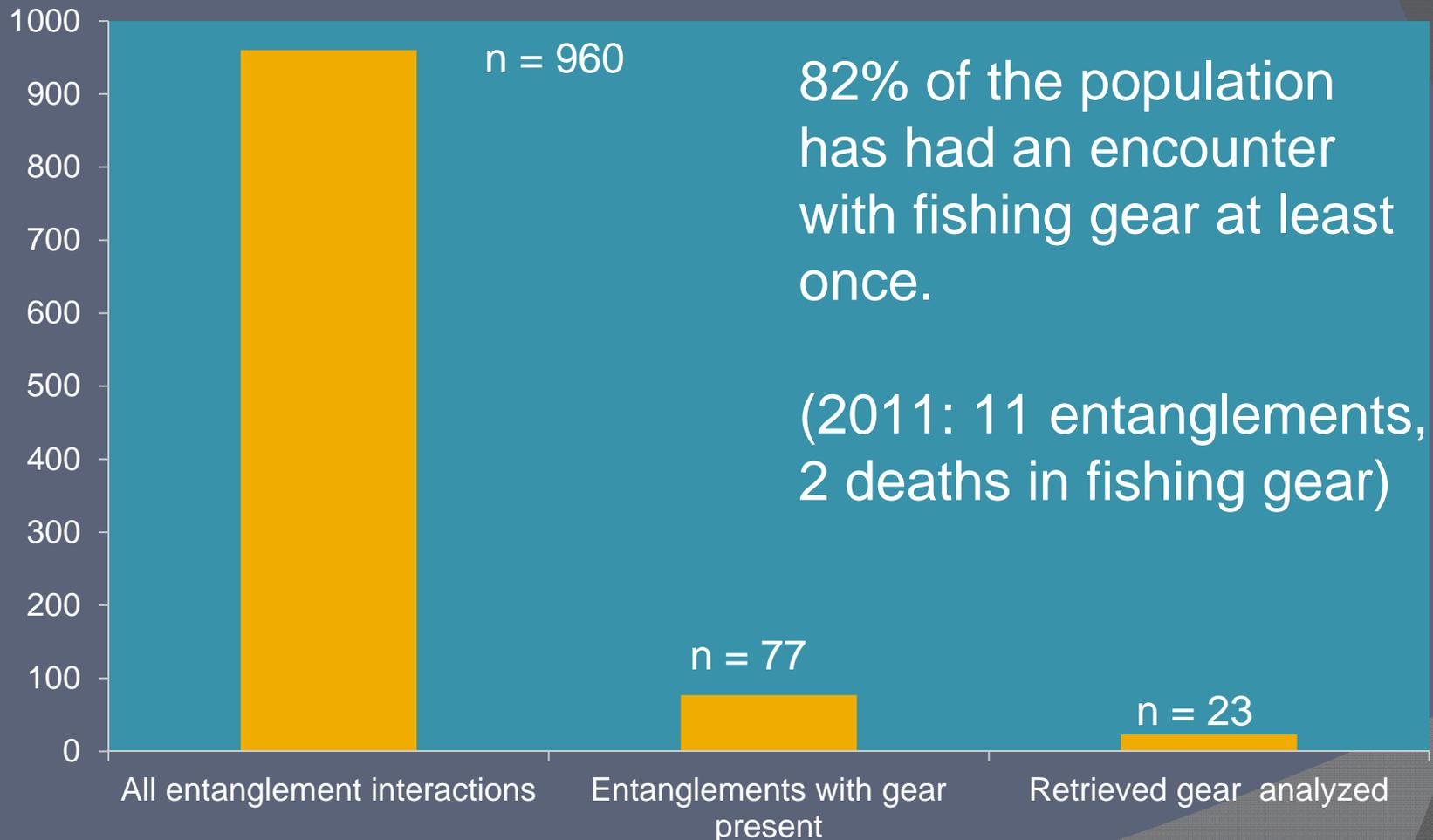
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Right whale entanglements 1980 - 2008



Rope Analysis (Ropes)

- Measured the following parameters of rope removed from large whales either during disentanglement events or from carcasses – total of 123 ropes from 62 events assessed from 1994-2007

- **Diameter**

- Linear density
- Specific gravity
- Pitch and pitch ratio
- Material and fiber type
- Assessment of rope condition

- **Estimated breaking strength**

- Actual testing of rope breaking strength
- Testing of yarn breaking strength to calculate rope breaking strength,
- Application of rope condition reduction to known breaking strength of a new rope of same kind and diameter
- New rope strength for same type and diameter rope
- Photograph gear

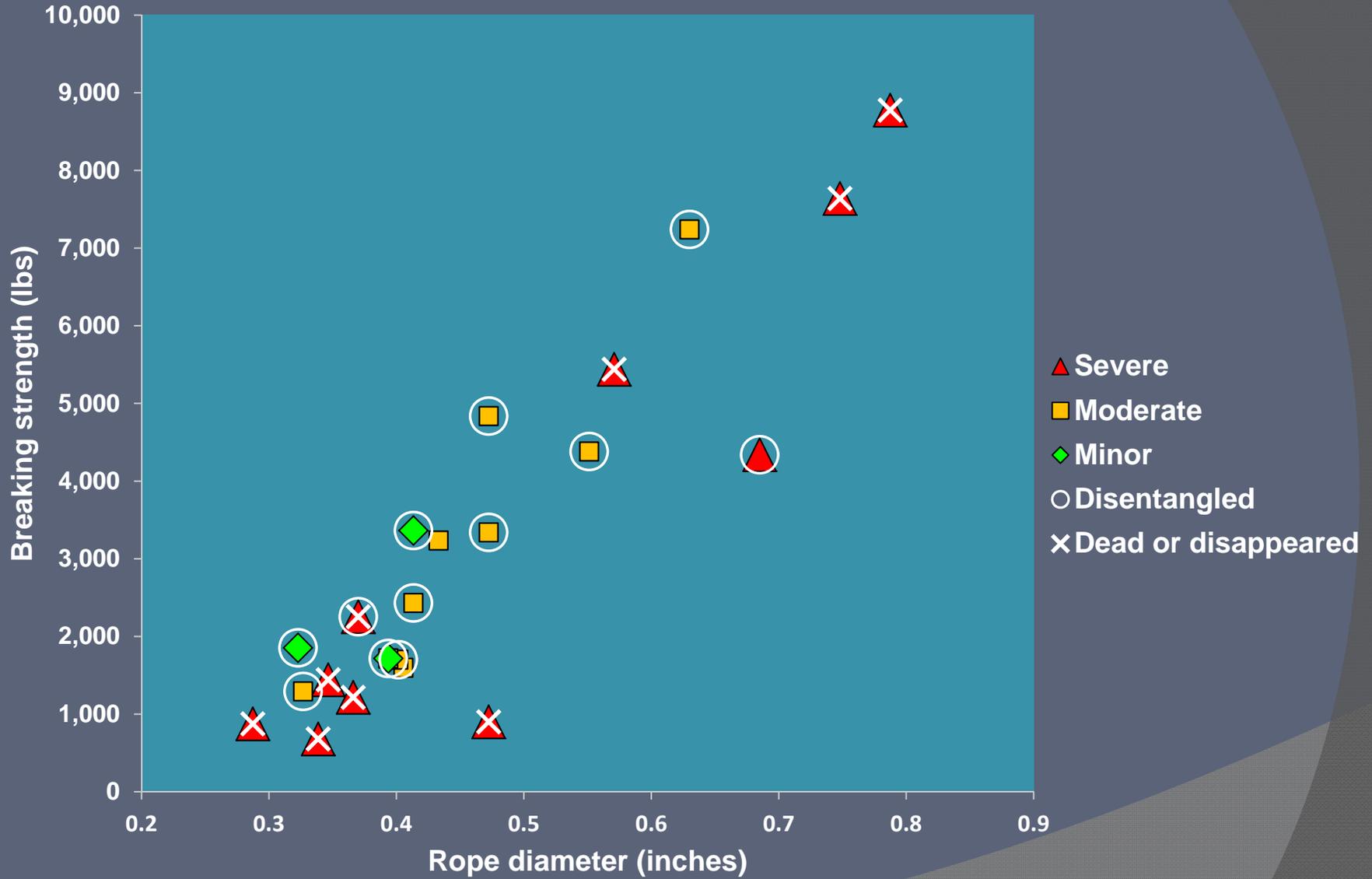


■ Rope Analysis (Whales)

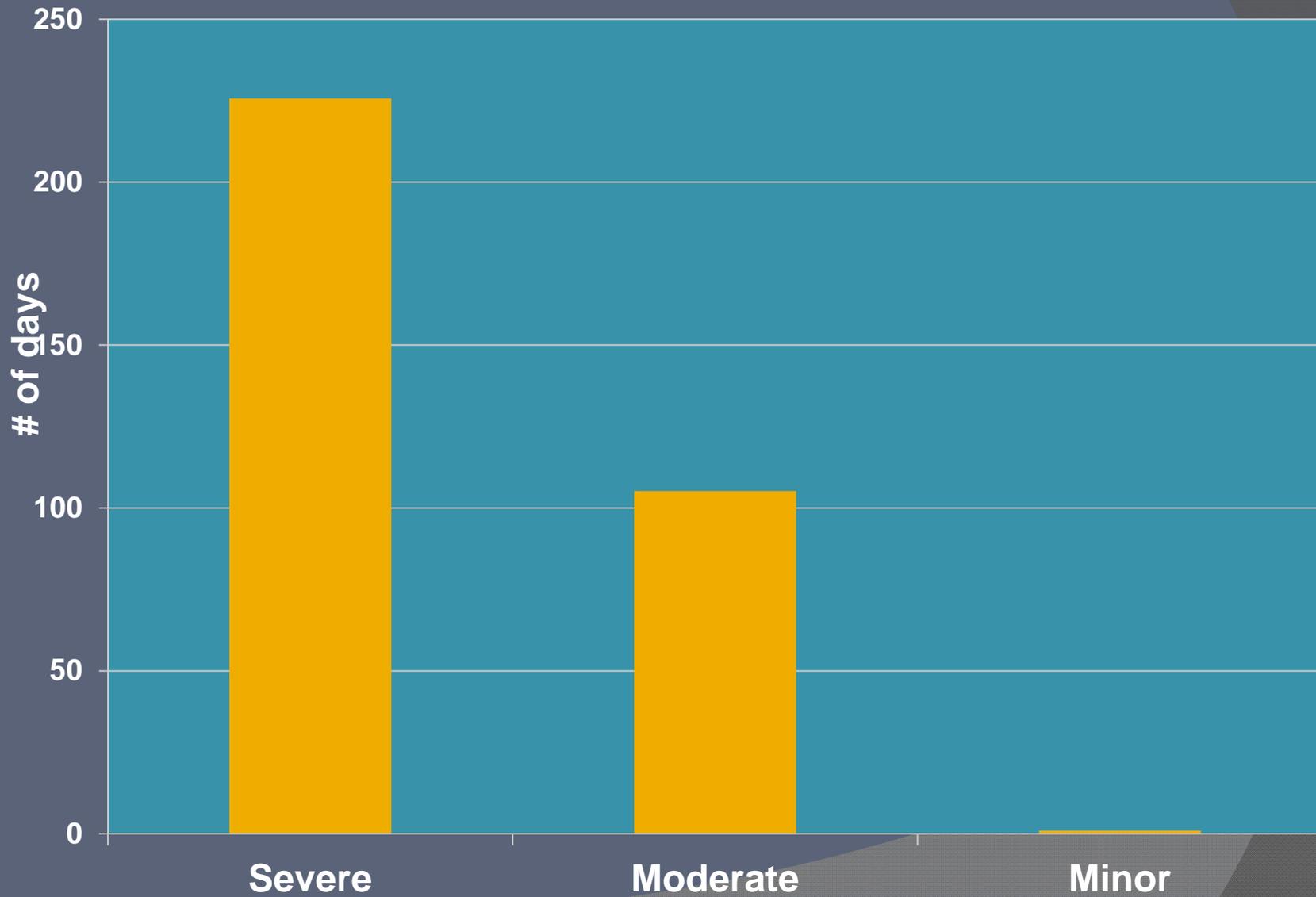
- 23 right whale cases reviewed – 3 sets of gear collected from carcasses, 20 sets of gear collected from animals alive at the time
- **Not** categorized by gear type (not always known)
- Wound severity: minor, moderate, severe



Right Whales by Wound Severity



Average minimum duration carrying gear

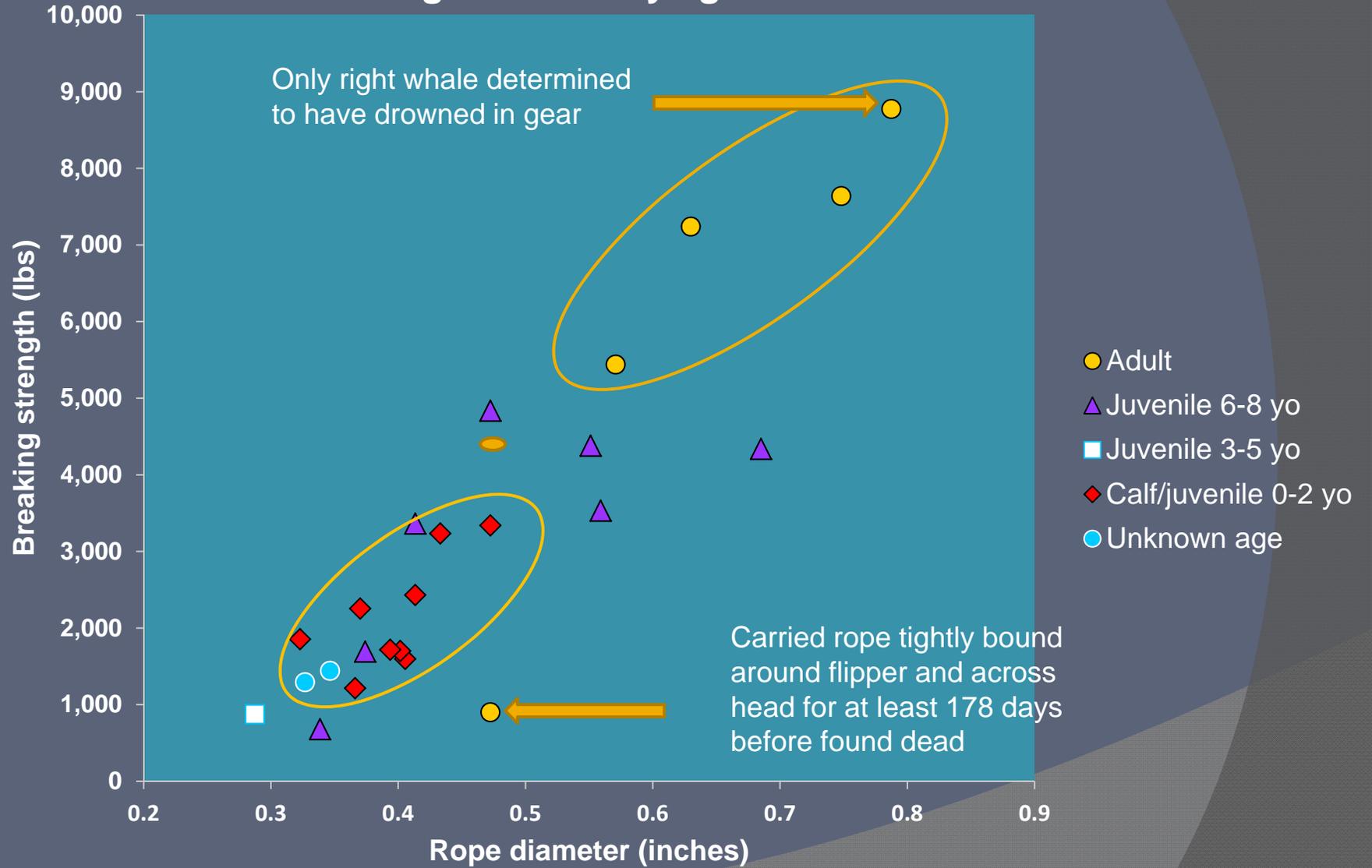


Findings related to severity

- Rope diameter and breaking strength does not appear to influence the severity of the wounds
- Disentanglement is effective
- Animals with severe wounds tend to die – many carried gear for months before dying or disappearing.



Right whales by age



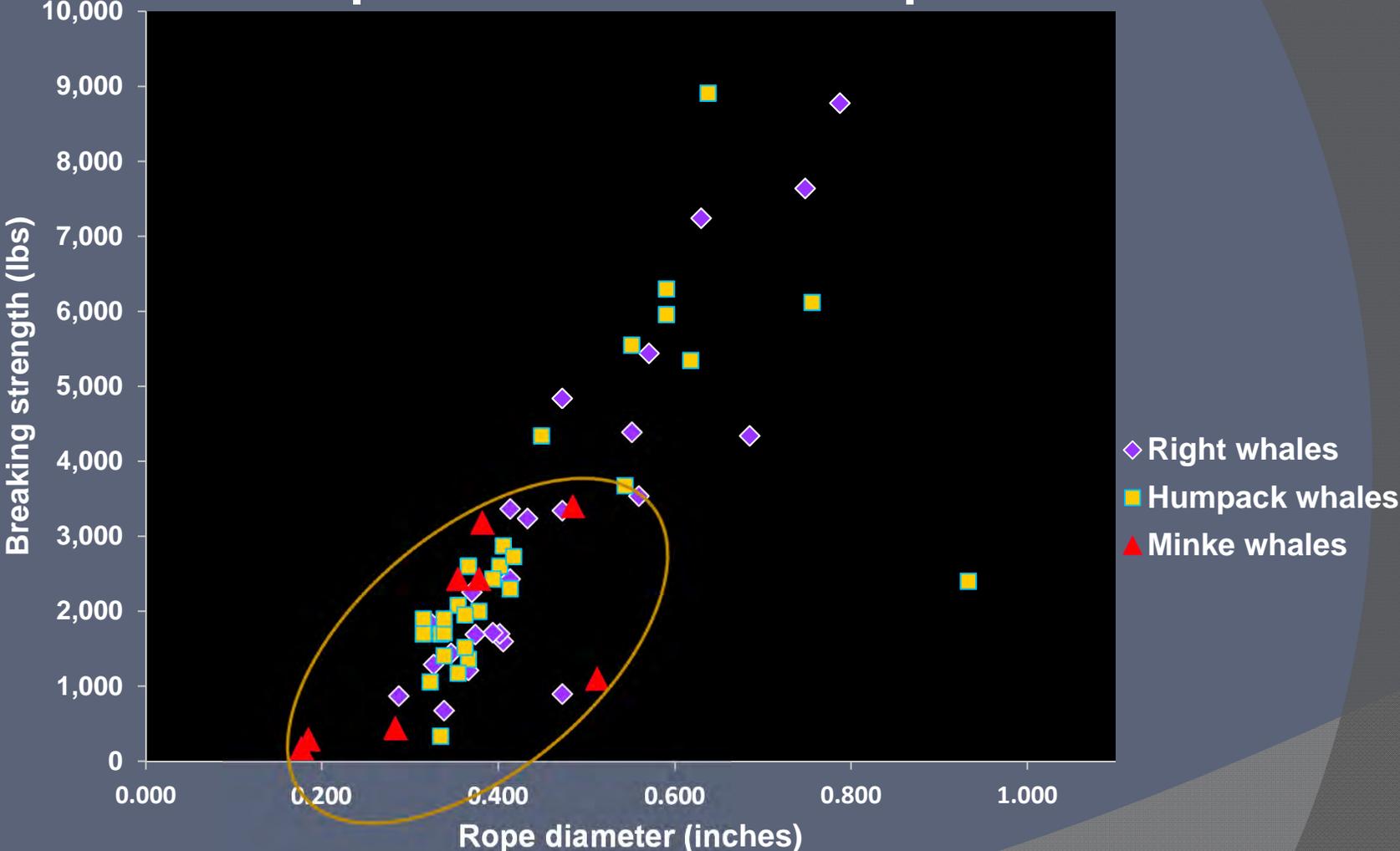
Findings related to age

- Age is correlated with the rope strengths found on right whales
- All the adults except one were found in ropes greater than 5,000 lb strength
- No juveniles under 8 years old found in ropes greater than 5,000 lb breaking strength
- The nine 0–2 year olds were all found in strengths below 3,500 lbs

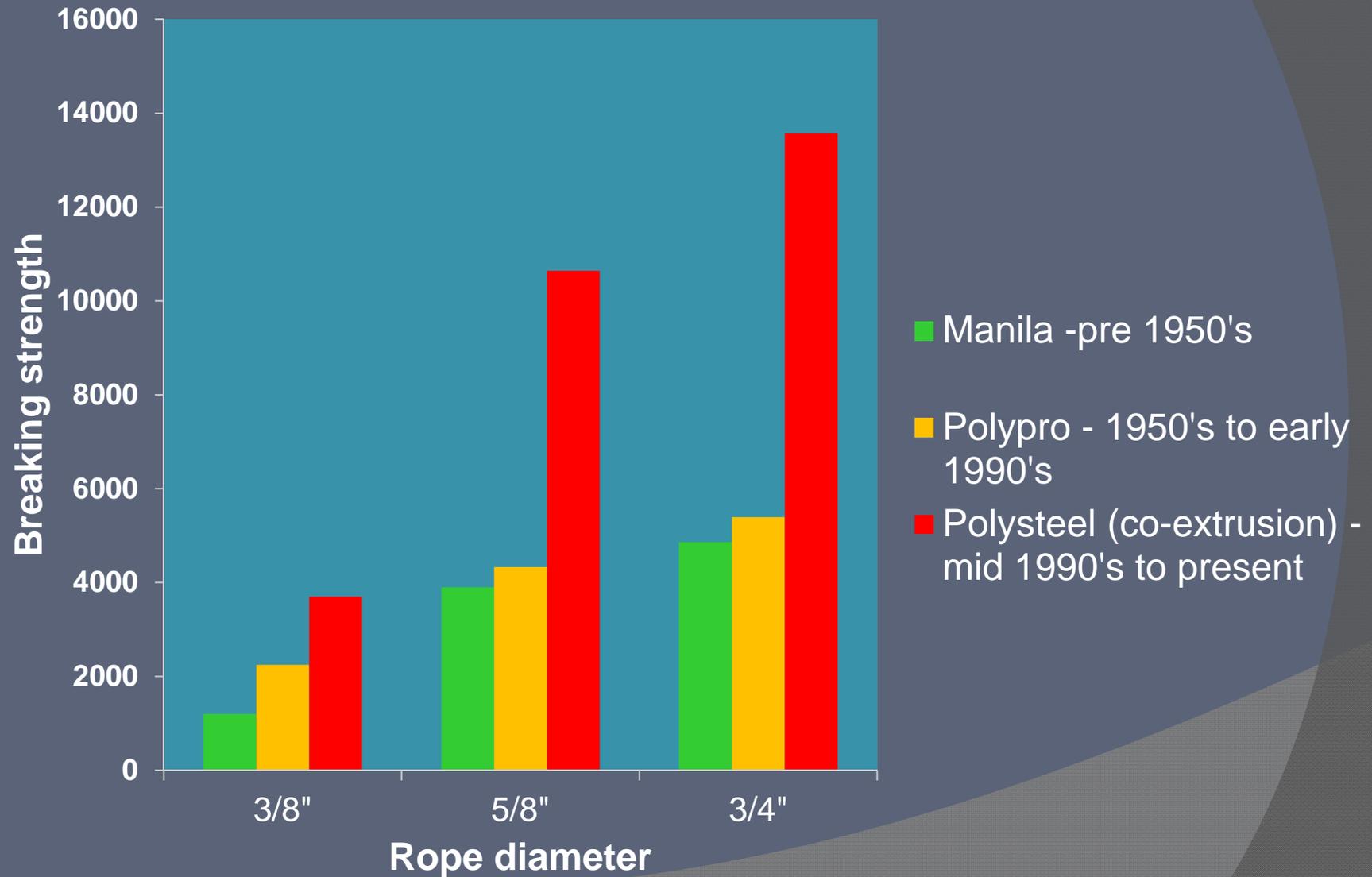
Why?

- Differential use of inshore vs offshore habitats by calves and young juveniles?
- Calves/young juveniles don't interact with offshore gear in same way?
- Adults break free of weaker gear before a complex interaction results?
- 0-2 yo cannot break free of stronger gear and may die during entanglement event?

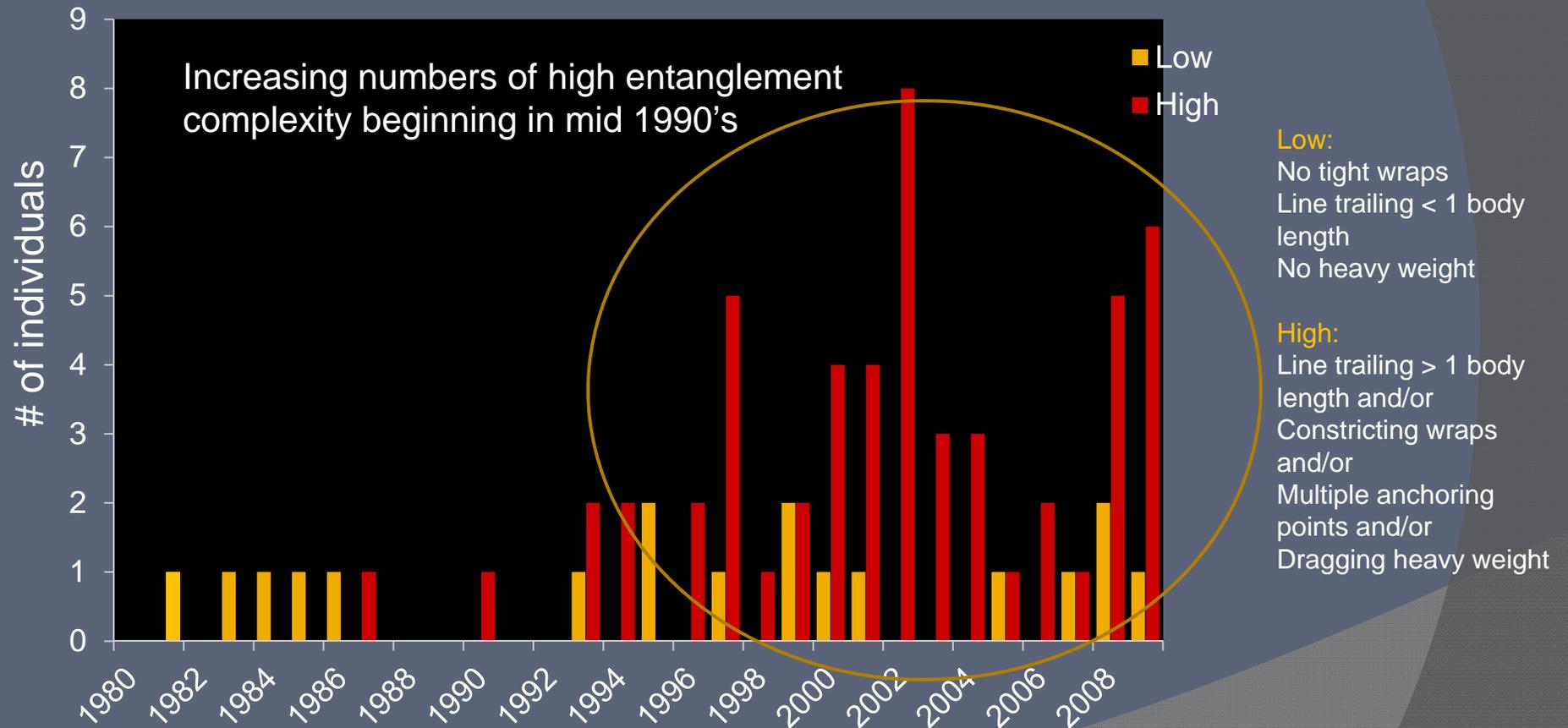
Rope retrieved from all species



Rope manufacturing changes



Entanglement complexity for all right whales seen with gear



Summary of findings

- Rope strength increased in the early 1990's with the advent of co-extrusion rope manufacturing
- This change is correlated with an increasing number of complex gear entanglements in right whales
- Small and young whales are found in weaker ropes and may not survive entanglements in the stronger gear
- Severe wounds typically lead to death and are the result of long duration entanglements
- Survival is strongly dependent on disentanglement

Weak rope evaluation 2005-2008 (Bycatch Consortium/MLA)

- Three separate batches of “weak rope” were manufactured and evaluated by fishermen under normal fishing operations
- Rope was polypropylene infused with barium sulfate (approximately 1:1 ratio, by weight) and produced by *Better Gear, LLC*.
- Rope was fished as endline and usually spliced with float rope on lower third
- Lobstermen kept logsheets on rope performance
- Rope breaking strength was tested before and after fishing (2006 trial)



Weak Rope Trials

<i>Year</i>	2005	2006	2008
<i>Diameter</i>	5/16"	3/8"	5/16"
<i>Average new breaking strength</i>	600 ± 25 lbs	1,200 lbs	1,200 lbs
<i>Field Trials (# lobstermen)</i>	Cushing (1), Cutler (1), Yarmouth (2), York (2)	Cushing (2), Cutler (2), Harpwell (1), South Thomaston (2), Tenants Harbor (1), Yarmouth (1), York (1)	Yarmouth (1)

Rope performance (2006 only)

<i>Zone</i>	<i># Responses</i>	<i>Fouling</i>	<i>Chaffing</i>	<i>Hang-ups</i>	<i>Noise</i>	<i>Kinking</i>	<i>Durability</i>	<i>Handling</i>
A	2	1	1.5	-	-	1	1	1
D	2	3	1.5	1	3.5	3.5	1.5	3
F	2	3	2	4	3.5	4	2	4
G	1	3	3	3	3	3	3	3

Qualitative evaluation of weak ropes from 7 lobstermen during the 2006 trials.
(1 = terrible; 5 = excellent)

Summary

- Fishable ropes can be manufactured at lower breaking strengths (~ 1200lb)
- Their use probably would increase parting, and are less feasible in Downeast Maine
- Multiple trap trawls could use at least one weak rope?
- May result in more instances of large whales breaking free than with weak links (all vs one part of the rope where the line is weak)

Experimental Test of Right Whale Flipper Encounters with High Tension Rope (Pseudo-stiff Rope)

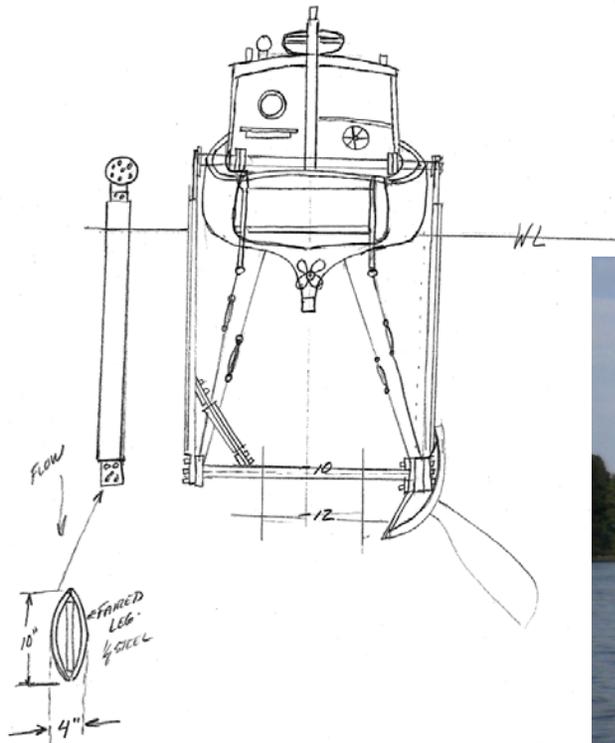
- University of New Hampshire and Blue Water Concepts
- Hypothesis: Will buoy lines under high tension, such as those seen in high tides in the eastern Gulf of Maine, create a “stiff” rope in which whales could not get entangled?
- Test: Fly a fake flipper through rope under high tension.



High Tension Rope Test



High Tension Rope Test



SCALE 1
" JESSIE B.
E1107
7/27/50



Methods

- The mooring was fitted with 3/8 " line
- Water depth was 38 feet
- Boat speed approximately 2 knots
- The surface float was a 28" diameter poly-ball
- When fully submerged it would provide approximately 415 lbs of line tension

Preliminary Results

High tension rope slipped off the outer 2/3 leading edge of the flipper similar to previous observations. However, if the rope got caught (in the 1/3 of the flipper next to the body), it cut rapidly into the flipper. The high tension rope appears to increase the cutting action of any sliding rope through increased pressure and friction on the contact points.



Lobster Pot Gear Configurations in the Gulf of Maine

Hot off
the
press!

Patrice McCarron
and Heather Tetreault
2012



Further Research Needed!

1 - Stiff rope. Looking less promising as research results come in, but we need to complete our proposed body of work before closing the door on this. high tension rope (downeast ME) and stiff (e.g., hard lay) rope.

2 - Weak rope? Large diameter? Recent analyses suggest we need to give this some more attention, perhaps at least in S Maine--prob. not downeast.

3 - Acoustic releases – Promising work in some areas requires further evaluation. We should be fully informed about the technology, management, policy, enforcement, and traditional conflict issues.

4 – Visible rope. We have data on glow rope fishing performance and RW vision, and vision trials continue off Cape Cod this spring. The results may inform additional gear modifications to reduce risk.

5 – Localized fishing mods – configuration changes, or temporary closures – is it possible to identify very local hotspots of conflict where local adaptations could reduce risk?

6. Other?

Acknowledgements

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