Species	Right Whale	Whale ID	Eg #1907

Date first observed entangled (date seen prior without gear)	16 Aug 1990 (15 Oct 1989)				
Sex	Female	Birth year	1989	Age at entanglement	1

Case study ID	CCS	NMFS	GEAR ID
Gear sample collected?	Yes	Gear type	Gillnet

Photographs inadequate to determine complete entanglement configuration - no drawing available

Reproductive prior to entanglement detection?	No				
Reproductive after entanglement detection?	No				
Entanglement severity	Severe				
Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	None	None	None	None	High
Duration of time carrying gear	Minimum 189 days, maximum 493 days				
Disentangled?	No				
Status	Dead in 1991				
Number of prior entanglement interactions	0				

Entanglement configuration	Gillnet gear tightly wrapped around fluke with buoys attached.
Anchoring point(s)	Flukes
Gear configuration confidence	High
Remaining questions	None
Comments	Animal migrated from the Bay of Fundy to the coast of Florida between September and February. In very poor condition and was found dead from a vessel strike with gear still attached. Gear retrieved but not available for analysis.

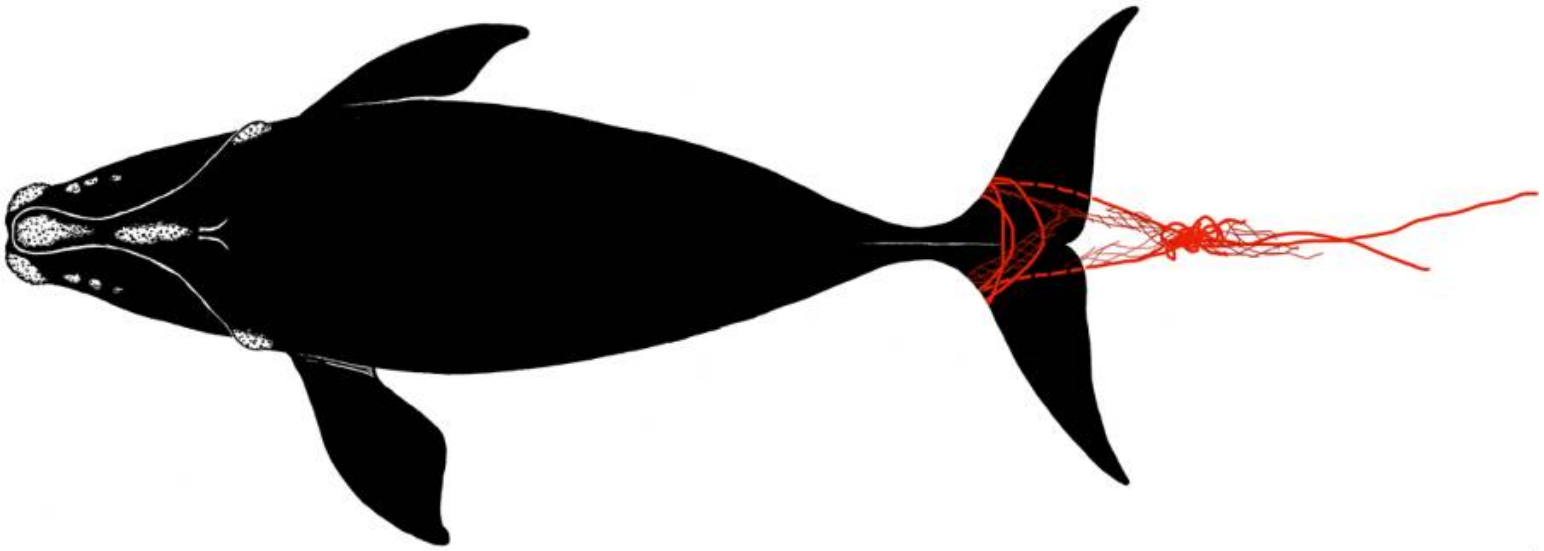
20 Aug 1990 NEA

20 Aug 1990 NEA

Species	Right Whale	Whale ID	Eg #2233

Date first observed entangled (date seen prior without gear)	09 Jul 1993 (26 Sep 1992)		
Sex: Female	Birth year: 1992	Age at entanglement: 1	

Case study ID	CCS	NMFS	GEAR ID
Gear sample collected?	Yes	Gear type	US swordfish drift gillnet and unk lobster.



Reproductive prior to entanglement detection?	No				
Reproductive after entanglement detection?	No				
Entanglement severity	Severe				
Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	Medium	Medium	Medium	High	High
Duration of time carrying gear	Minimum 29 days, maximum 314				
Disentangled?	Yes, 2 times				
Status	Presumed dead - last sighted in 1993				
Number of prior entanglement interactions	0				

Entanglement configuration	Whale was entangled around the head and tail (not drawn) in a swordfish gillnet and partially disentangled on 9 July. Pre-existing gear was also seen on tail stock. Whale seen free swimming on 7 Aug 1993 with line and netting wrapped tightly around leading edges of both flukes and leading to a tangled mass of line. An assessment of the gear removed indicated both swordfish driftnet and lobster gear involved.
Anchoring point(s)	Mouth, body, flipper and tail
Gear configuration confidence	Reasonable
Remaining questions	Length of trailing line unknown
Comments	Whale was in very poor condition at the time of disentanglement.

09 July 1993 NMFS

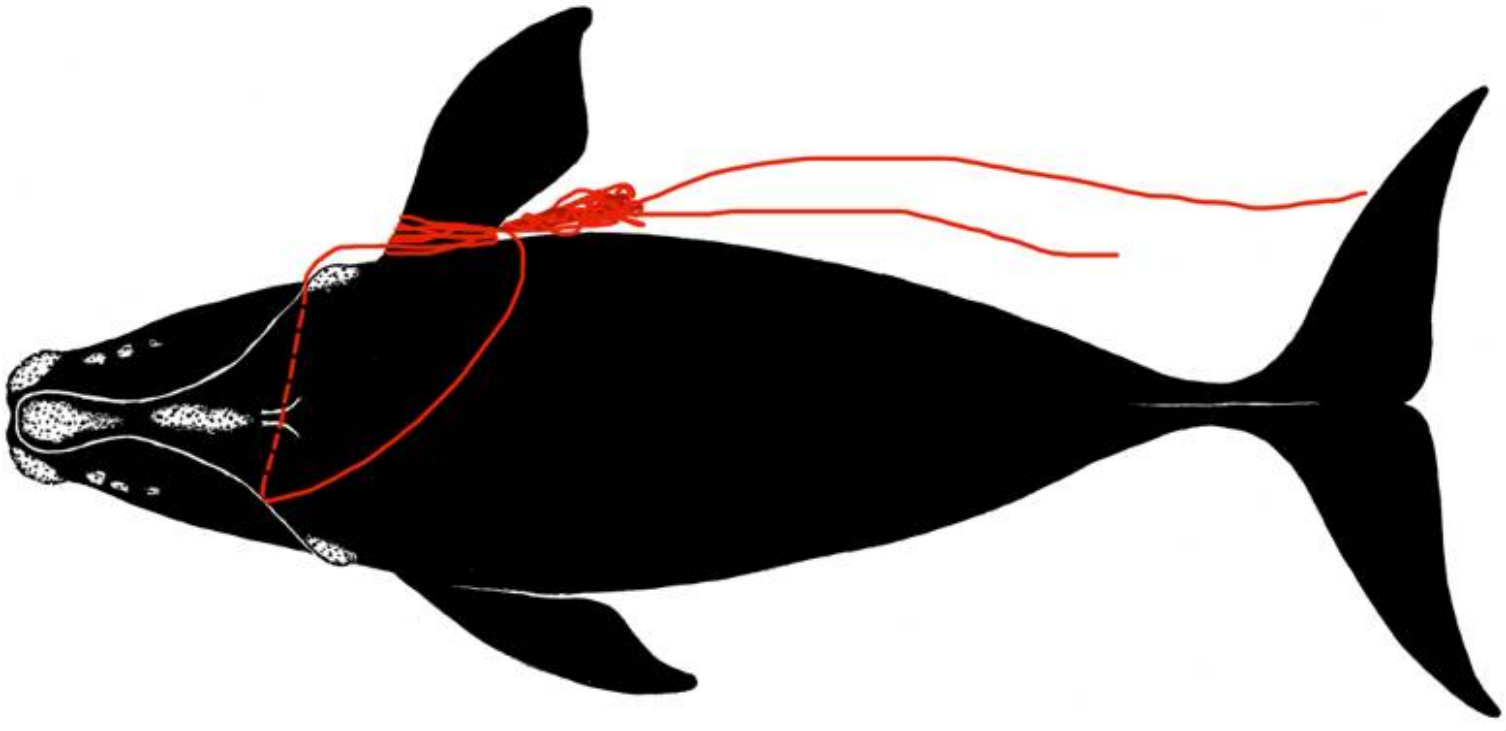
09 Jul 1993 NMFS

22 Aug 1993 Okeanos

Species	Right Whale	Whale ID	Eg #2366

Date first observed entangled (date seen prior without gear)	21 Dec 1993 (22 Aug 1993)		
Sex: Male	Birth year: 1993	Age at entanglement: 0	

Case study ID	CCS	NMFS	GEAR ID
			J071795 a-d
Gear sample collected?	Yes	Gear type	Offshore lobster



Reproductive prior to/after entanglement detection?	
Entanglement injury severity	Severe
Entanglement configuration risk	High

Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	Low	Low	High	Low	None

Duration of time carrying gear	Minimum 573 days, maximum 693 days
Disentangled?	No
Status	Dead 17 Jul 1995
Number of prior entanglement interactions	0

Entanglement configuration	Whale free-swimming; line through mouth leading to many tight wraps of the right flipper
Anchoring point(s)	Mouthline, flipper
Gear configuration confidence	Moderate
Remaining questions	Length of trailing line unknown
Comments	Whale seen alive but full extent of entanglement was not understood; gear was removed from carcass.

Polymer Type		PP	PP	PP	Polypro/PET
Gear Component		Groundline (floating)			
Rope Diameter (inches)		3/8 (0.366)	3/8 (0.354)	3/8 (0.358)	1/4 (0.283)
Breaking Strength (lbs)	Tested	1 215	974	1 538	983
	New	2 430	2 430	2 430	1 200

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See: Knowlton, A.R., J. Robbins, S. Landry, H.A. McKenna, S.D. Kraus, T. B. Werner. 2015. Effects of fishing rope strength on the severity of large whale entanglements. Conservation Biology DOI: 10.1111/cobi.12590

26 Sep 1994 NEA

17 Jul 1995 NEA

17 Jul 1995 NEA

17 Jul 1995 NEA

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DATA SHEET

FORENSIC ANALYSIS OF ROPES
WHALE ENTANGLEMENT PROJECT

SPECIMEN ID NO. **NMFS NO.**

J071795 **E (**no analysis)

Gear Description:
Black (a), green (b) and blue (c) are $^{3}/_{8}$ inch PP mono and there were long lengths of each. Specimen (d) was $^{1}/_{4}$ inch black PP laid in parallel with PET and had a wooden handle in an eye on one end.

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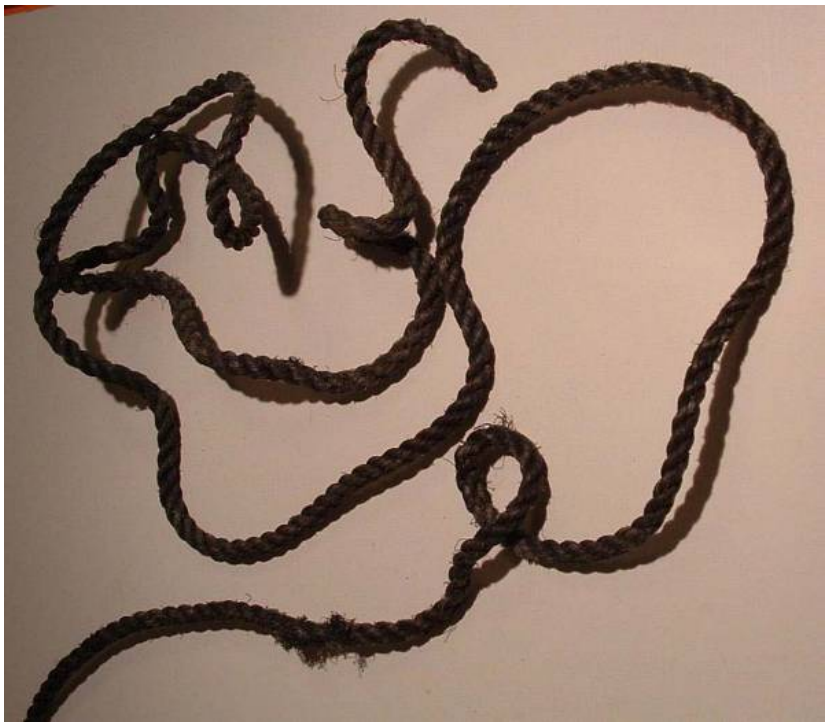
Rope description:
Black (a), green (b) and blue (c) lines are $^{3}/_{8}$ inch PP mono. The blue specimen has a red (faded) marker yarn in one strand. All show signs of use, faded colors and some surface abrasion. The black specimen (a) is severely and permanently kinked, and there is a cut strand which is visible bottom center in the photo. All have 4 rope yarns per strand.

A

Tested (T) or adjusted (A) strength	Typical new strength	Rope condition
1,215 lbs (T)	2,430 lbs	Fair



J071795-a Note kinks and cut at bottom of photo.

B

Tested (T) or adjusted (A) strength	Typical new strength	Rope condition
974 lbs (T)	2,430 lbs	Poor

C

Tested (T) or adjusted (A) strength	Typical new strength	Rope condition
1,538 lbs (T)	2,430 lbs	Fair

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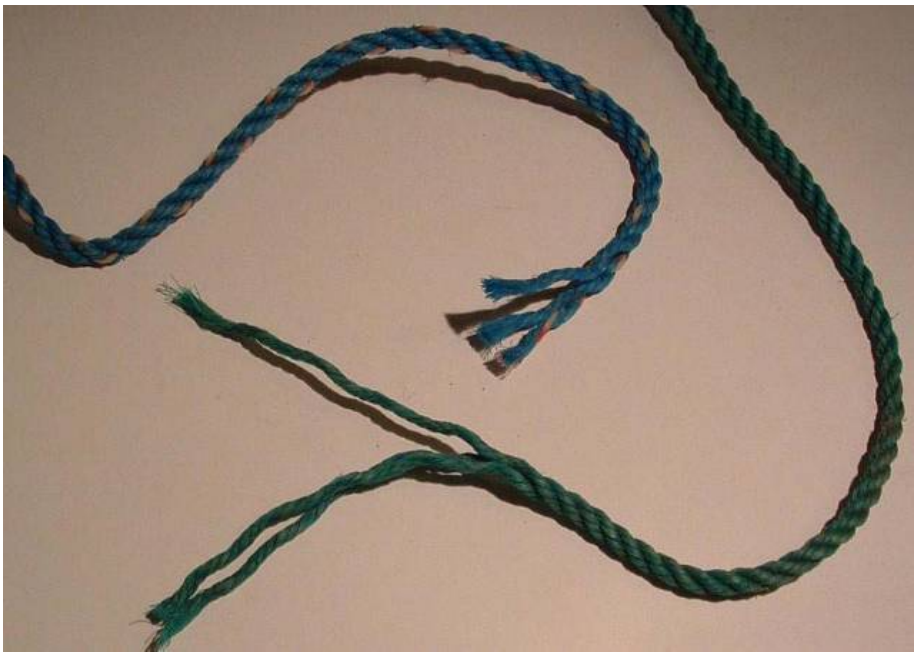

J071795-b-c

Specimen (d) is $^{1}/_{4}$ black PP laid in parallel with PET. The line displays moderate surface abrasion. It is severely and permanently kinked. The cut strand is visible in the photo.

D

Tested (T) or adjusted (A) strength	Typical new strength	Rope condition
983 lbs (T)	1,900 lbs	Poor

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Species	Right Whale	Whale ID	Eg #1903

Date first observed entangled (date seen prior without gear)	13 Jul 1994 (7 Jan 1994)				
Sex	Male	Birth year	1989	Age at entanglement	5

Case study ID	CCS	NMFS	GEAR ID
Gear sample collected?	No	Gear type	

Photographs inadequate to determine complete entanglement configuration - no drawing available

Reproductive prior to entanglement detection?					
Reproductive after entanglement detection?					
Entanglement severity	Severe				
Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	Unknown	Medium	Unknown	Unknown	High
Duration of time carrying gear	Minimum 1 day, maximum 186 days				
Disentangled?	No				
Status	Dead				
Number of prior entanglement interactions	1				

Entanglement configuration	Very decomposed carcass with entanglement wounds on head and body and rope at tail stock.
Anchoring point(s)	Flukes
Gear configuration confidence	Low
Remaining questions	Unsure how gear was wrapped because of decomposition
Comments	Entanglement appears to have originated at the mouth.

This case study was developed at the New England Aquarium with financial support from NOAA Fisheries. Whale data were provided by the North Atlantic Right Whale Consortium (www.narwc.org). All images are listed with appropriate credit information and taken under permit. Retrieved gear is assessed and archived by NOAA Fisheries. Entanglement diagrams courtesy of S. Landry, Center for Coastal Studies. Please contact Amy Knowlton (aknowlton@neaq.org) for potential use.

13 Jul 1994 Opportunistic

13 Jul 1994 Opportunistic

Species	Right Whale	Whale ID	Eg #2320

Date first observed entangled (date seen prior without gear)	24 Aug 1994 (15 Feb 1993)				
Sex	Female	Birth year	Unknown	Age at entanglement	2+

Case study ID	CCS	NMFS	GEAR ID
Gear sample collected?	No	Gear type	Gillnet

Photographs inadequate to determine complete entanglement configuration - no drawing available

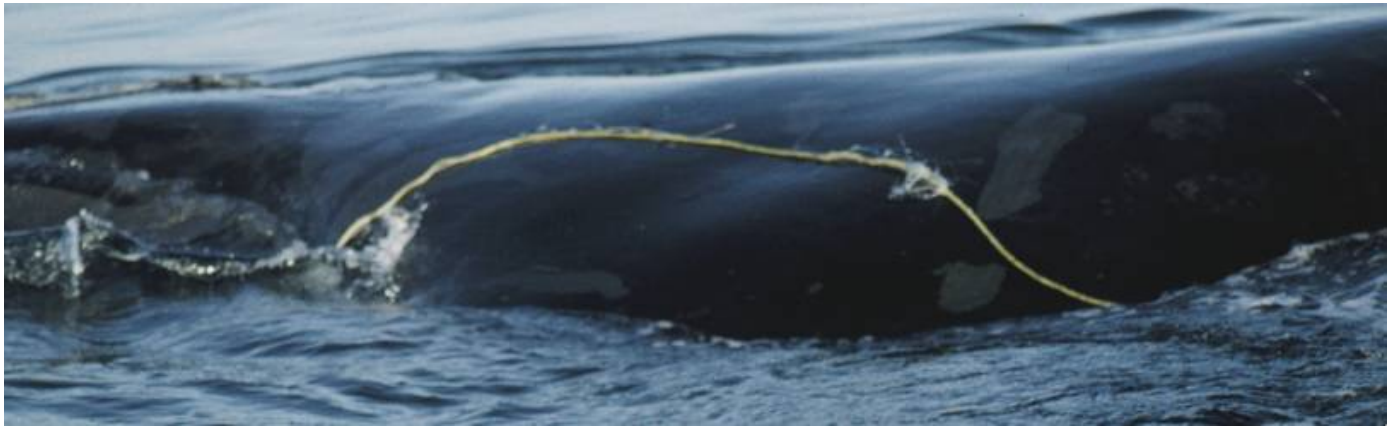
Reproductive prior to entanglement detection?	No
Reproductive after entanglement detection?	Yes
Entanglement severity	Minor

Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	Low	Unknown	None	None	Low

Duration of time carrying gear	Minimum 380 days, maximum 934 days
Disentangled?	No
Status	Alive until seen dead in 2015 unknown cause
Number of prior entanglement interactions	2

Entanglement configuration	Single line with monofilament netting evident exiting left mouth and along left flank. No gear trailing.
Anchoring point(s)	Mouth
Gear configuration confidence	High
Remaining questions	None
Comments	Line eventually shed after at least one year.

19 Aug 1995 NEA



19 Aug 1995 NEA

Species	Right Whale	Whale ID	Eg #1247

Date first observed entangled (date seen prior without gear)	21 Sep 1994 (25 Sep 1992)				
Sex	Male	Birth year	1982	Age at entanglement	12

Case study ID	CCS	NMFS	GEAR ID
Gear sample collected?	No	Gear type	

Photographs inadequate to determine complete entanglement configuration - no drawing available

Reproductive prior to entanglement detection?					
Reproductive after entanglement detection?					
Entanglement severity	Severe				
Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	Low	None	Unknown	None	High
Duration of time carrying gear	Minimum 330 days, maximum 1055 days				
Disentangled?	No				
Status	Presumed dead - Last sighted in 1995				
Number of prior entanglement interactions	1				

Entanglement configuration	Multiple wraps of rope with buoy attached wound tightly around the peduncle cutting into the tissue.
Anchoring point(s)	Flukes
Gear configuration confidence	Low
Remaining questions	Unsure how much gear was trailing.
Comments	Entanglement appears to have originated at the mouth.

21 Sep 1994 NEA

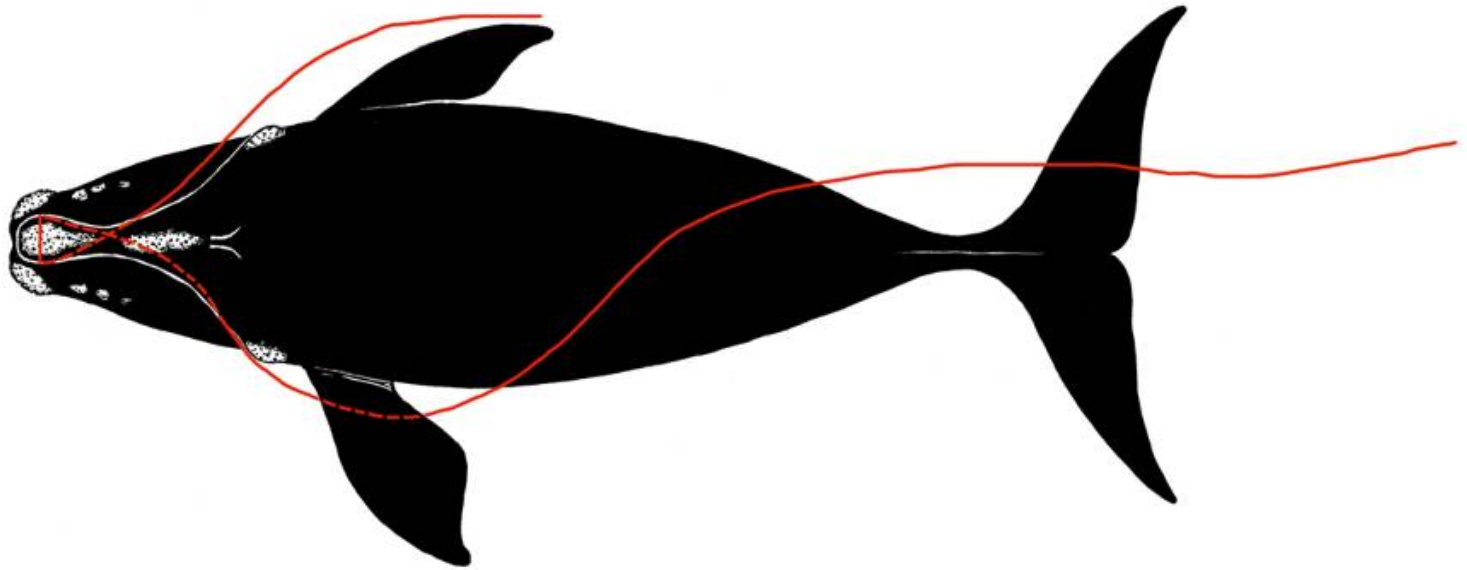
22 Sep 1994 NEA

17 Aug 1995 NEA

Species	Right Whale	Whale ID	Eg # 2151

Date first observed entangled (date seen prior without gear)	17 Nov 1994 (09 Aug 1994)		
Sex: Unknown	Birth year: 1991	Age at entanglement: 3	

Case study ID	CCS	NMFS	GEAR ID
			J111694
Gear sample collected?	Yes	Gear type	



Reproductive prior to/after entanglement detection?	
Entanglement injury severity	Severe
Entanglement configuration risk	High

Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	High	High	Unknown	Low	Medium

Duration of time carrying gear	Minimum 1 day, maximum 99 days
Disentangled?	No
Status	Presumed dead - Last sighted in 1994
Number of prior entanglement interactions	None

Entanglement configuration	Whale free-swimming; continuous length of line wrapped over front of rostrum and exiting both sides of mouth; line on left side trails 20-30 feet aft of flukes.
Anchoring point(s)	Mouth
Gear configuration confidence	Reasonable
Remaining questions	Length of line trailing from right mouth.
Comments	In poor condition, not seen again.

Polymer type	PP/PET	
Gear component		
Rope diameter (inches)	5/16 (0.312)	
Breaking strength (lbs)	Tested	874
	New	1900

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17 Nov 1994 NEA

17 Nov 1994 NEA

17 Nov 1994 NEA

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Species	Right Whale	Whale ID	Eg #1506

Date first observed entangled (date seen prior without gear)	02 Aug 1995 (25 Aug 1994)				
Sex	Male	Birth year	1985	Age at entanglement	10

Case study ID	CCS	NMFS	GEAR ID
Gear sample collected?	No	Gear type	

Photographs inadequate to determine complete entanglement configuration - no drawing available

Reproductive prior to entanglement detection?					
Reproductive after entanglement detection?	Yes				
Entanglement severity	Moderate				
Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	Moderate	Low	Unknown	None	Low
Duration of time carrying gear	Minimum 8 days, maximum 352 days				
Disentangled?	No				
Status	Alive - Last sighted in 2023				
Number of prior entanglement interactions	0				

Entanglement configuration	Short length of rope exiting out of right side of mouth. No gear trailing.
Anchoring point(s)	Mouth
Gear configuration confidence	High
Remaining questions	
Comments	Gear shed within 2 weeks of initial sighting with gear.

02 Aug 1995 LM

10 Aug 1995 NEA

Species	Right Whale	Whale ID	Eg #2110

Date first observed entangled (date seen prior without gear)	16 Sep 1995 (08 Sep 1995)				
Sex	Male	Birth year	1991	Age at entanglement	4

Case study ID	CCS	NMFS	GEAR ID
Gear sample collected?	Yes	Gear type	Canadian gillnet

Photographs inadequate to determine complete entanglement configuration - no drawing available

Reproductive prior to entanglement detection?					
Reproductive after entanglement detection?					
Entanglement severity	Minor				
Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	Low	Low	Unknown	None	Low
Duration of time carrying gear	Minimum 1 day, maximum 7 days				
Disentangled?	Yes				
Status	Alive until 2008 when new severe entgl injury				
Number of prior entanglement interactions	1				

Entanglement configuration	Single line through mouth and trailing ~ 700 feet to a high-flyer.
Anchoring point(s)	Mouth
Gear configuration confidence	High
Remaining questions	Gear picked up same day it was set in Bay of Fundy according to fisherman.
Comments	Gear not available for analysis.

16 Sep 1995 NEA

16 Sep 1995 NEA

16 Sep 1995 NEA

16 Sep 1995 NEA

Species	Right Whale	Whale ID	Eg #1707

Date first observed entangled (date seen prior without gear)	06 Jan 1996 (03 Oct 1995)		
Sex: Female	Birth year: 1987	Age at entanglement: 9	

Case study ID	CCS	NMFS	GEAR ID
Gear sample collected?	No	Gear type	

Photographs inadequate to determine complete entanglement configuration - no drawing available

Reproductive prior to entanglement detection?	No				
Reproductive after entanglement detection?	Yes				
Entanglement severity	Moderate				
Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	Unknown	Low	Unknown	Medium	Low
Duration of time carrying gear	Minimum 10 days, maximum 306 days				
Disentangled?	No				
Status	Presumed dead - Last sighted in 1998				
Number of prior entanglement interactions	1				

Entanglement configuration	Rope wrapped at mid body and trailing ~ 200 feet behind whale.
Anchoring point(s)	Body.
Gear configuration confidence	Low
Remaining questions	Unsure if mouth and/or flippers involved.
Comments	Gear was shed when sighted 7 months later. She had a calf ~11 months after first entanglement sighting indicating she was likely pregnant when she first became entangled. She developed lesions on the head region when with her calf, was sighted only once one year later and then disappeared.

06 Aug 1996 NEA

Species	Right Whale	Whale ID	Eg #2220

Date first observed entangled (date seen prior without gear)	09 Mar 1996 (03 Oct 1995)			
Sex	Male	Birth year	Unknown	Age at entanglement	5+

Case study ID	CCS	NMFS	GEAR ID
		E96-2	J030996
Gear sample collected?	Yes	Gear type	Canada lobster

Photographs inadequate to determine complete entanglement configuration - no drawing available

Reproductive prior to/after entanglement detection?					
Entanglement injury severity	Severe				
Entanglement configuration risk	High				
Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	Medium	High	Medium	Unknown	Medium
Duration of time carrying gear	Minimum 85 days, maximum 115				
Disentangled?	No				
Status	Dead in 1996				
Number of prior entanglement interactions	1				

Entanglement configuration	Single line extended both sides of the mouth and also was loosely wrapped around tail with a single lobster pot attached. Gear traced back to Bay of Fundy.
Anchoring point(s)	Mouth and tail
Gear configuration confidence	High
Remaining questions	
Comments	A 3 meter gash on the back and broken skull indicates the animal was likely killed by ship strike.
Polymer type	PP
Gear component	Vertical
Rope diameter (inches)	3/8 (0.346)
Breaking strength (lbs) Tested	1 442
Breaking strength (lbs) New	2 430

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10 Mar 1996

10 Mar 1996

10 Mar 1996

10 Mar 1996

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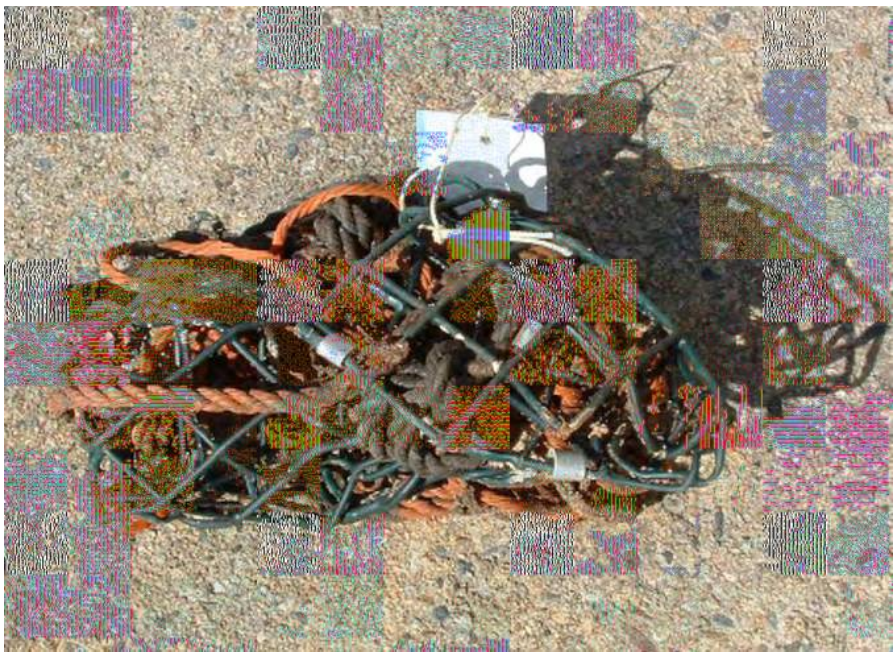
DATA SHEET

FORENSIC ANALYSIS OF ROPES
WHALE ENTANGLEMENT PROJECT

SPECIMEN ID NO. **NMFS NO.**

J030996 **E96-2**

Gear Description:
A tangle of lines inside the bent trap. Included were a length of $^{3}/_{8}$ inch orange PP 3-strand with a green marker yarn (a), a piece of $^{7}/_{16}$ inch black PP with a green marker yarn (b) with a tensile break at one end. The orange PP 3-strand was the only specimen taken and photographed; the others were just measured at the site.



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Rope description:
J030996-a: The $^{3}/_{8}$ inch orange PP 3-strand had a green marker yarn in one strand and 4 rope yarns per strand. The retrieved line segment was in good condition. However the part in the trap was moderately damaged.

Tested (T) or adjusted (A) strength	Typical new strength	Rope condition
1,442 lbs (T)	2,430 lbs	Good

$^{3}/_{8}$ inch orange PP 3-strand with green marker yarn- good condition.

J030996-b: A $^{5}/_{16}$ inch PP/PET 3-strand with black PP rope yarns in parallel with the white PET rope yarns. Another example of 'Easy Haul'.

Sample not tested.

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Species	Right Whale	Whale ID	Eg #1505

Date first observed entangled (date seen prior without gear)	12 Apr 1997 (24 Feb 1997)				
Sex	Male	Birth year	1985	Age at entanglement	12

Case study ID	PCCS	NMFS	GEAR ID
Gear sample collected?	No	Gear type	

Photographs inadequate to determine complete entanglement configuration - no drawing available

Reproductive prior to entanglement detection?					
Reproductive after entanglement detection?					
Entanglement severity	Moderate				
Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	Low	Medium	Unknown	None	Low
Duration of time carrying gear	Minimum 1 day, maximum 360 days				
Disentangled?	No				
Status	Presumed dead - Last sighted in 1999				
Number of prior entanglement interactions	4				

Entanglement configuration	Single rope anchored at mouth and/or flipper and trailing along body to just forward of the flukes. One line also visible over aft part of head.
Anchoring point(s)	Mouth and/or right flipper
Gear configuration confidence	Low
Remaining questions	Anchoring points and configuration of gear at head.
Comments	Gear was shed four months after initial sighting. Animal in very poor condition at last sighting two years after entanglement. Cause of decline uncertain.

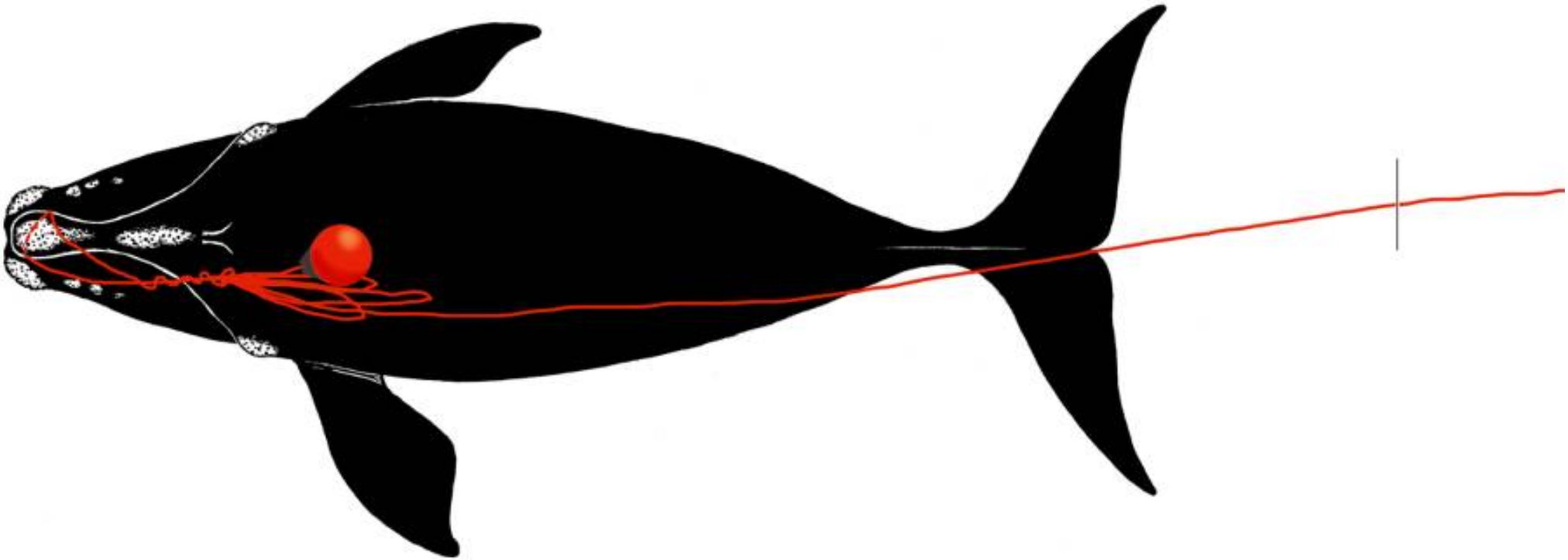
1997 Apr 12 NEA

1997 Aug 26 NEA

Species	Right Whale	Whale ID	Eg #1971

Date first observed entangled (date seen prior without gear)	24 Jun 1997 (20 Aug 1996)				
Sex	Male	Birth year	1989	Age at entanglement	8

Case study ID	PCCS	NMFS	GEAR ID
		E9-97	J062497 a-c
Gear sample collected?	Yes	Gear type	Lobster offshore



Reproductive prior to/after entanglement detection?					
Entanglement injury severity	Moderate				
Entanglement configuration risk	High				
Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	Medium	Medium	None	Medium	Medium
Duration of time carrying gear	Minimum 22 days, maximum 346 days				
Disentangled?	Yes - 24 Jun 1997				
Status	Alive - Last sighted in 2019				
Number of prior entanglement interactions	1				

Entanglement configuration	Whale free swimming; line caught around forward part of upper jaw leading to a triangle of line and balloon buoy; line trailing to ~60feet.
Anchoring point(s)	Mouth
Gear configuration confidence	High
Remaining questions	None
Comments	Disentanglement was extremely difficult with whale towing fishing vessel in reverse and defending itself with head and flukes.

Polymer type		PP/PET	PP/PE	PP
Gear component		Vertical	Vertical	Surface sys
Rope diameter (inches)		1/2 (0.512)	9/16 (0.575)	9/16 (0.551)
Breaking strength (lbs)	Tested	3 648	1 580	4 381
	New	4 500	5 000	4 590

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24 Jun 1997 PCCS

24 Jun 1997 PCCS

24 Jun 1997 PCCS

24 Jun 1997 PCCS

03 Aug 1997 NEA

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FORENSIC ANALYSIS OF ROPES
WHALE ENTANGLEMENT PROJECT

SPECIMEN ID NO.	**NMFS NO.**
J062497	**E9-97**

Gear Description:
Buoy application, perhaps offshore.

Buoy gear set. Under buoy line (a) is relatively short and soft, and is spliced into a long soft orange PP line (b). Line (c) was also lone, had a hard lay and was part of the set. Line (a) is moderately negative (sp gr 1.01), line (b) is floating (sp gr 0.92) and line (c) is very negative with a sp gr of about 1.3.

All lines are relatively large compared to most in this study.

Rope description:
J062497-a: This is a $^{1}/_{2}$ inch 3-strand PP/PET combo line. The lay is moderately soft. It has a small gold marker yarn in one strand. There are 6 rope yarns per strand. It has moderate wear.

Tested (T) or adjusted (A) strength	Typical new strength	Rope condition
3,648 lbs (T)	4,500 lbs	Good

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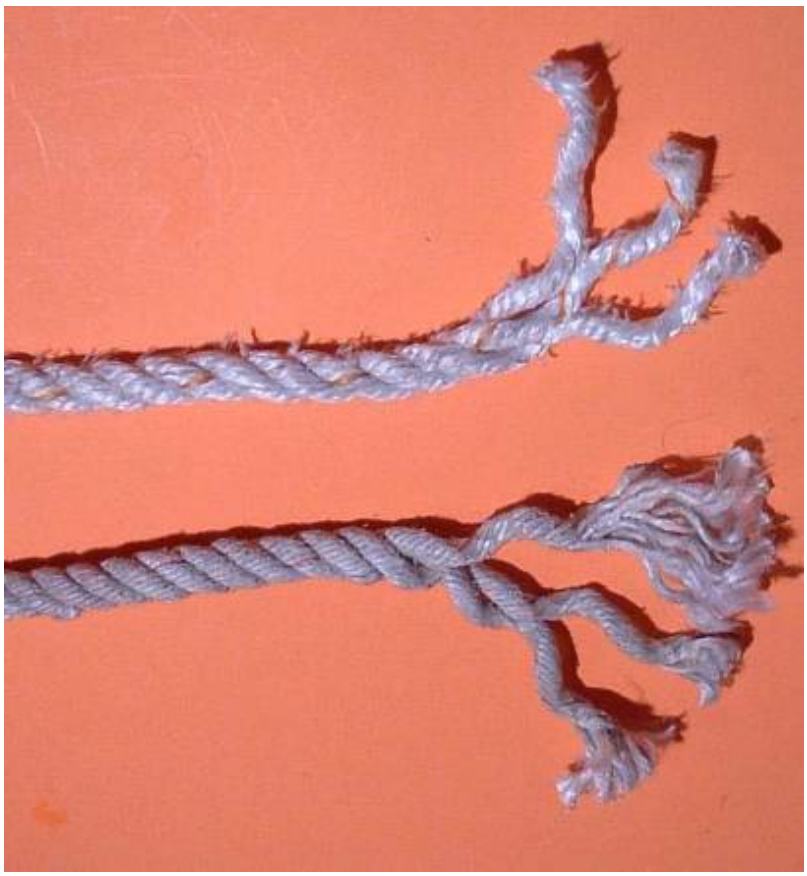
J062497-b: This is a $^{9}/_{16}$ inch 3-strand orange PP with a green marker yarn. There are 14 rope yarns and a center yarn per strand. It has a soft lay. The condition is fair.

Tested (T) or adjusted (A) strength	Typical new strength	Rope condition
1,580 lbs (T)	5,000 lbs	Poor

J062497-c: This is a $^{9}/_{16}$ inch 3-strand PP/PET combo line dominated by heavier PET. It has small red and black marker yarns. It has a hard lay and 8 rope yarns per strand.

Tested (T) or adjusted (A) strength	Typical new strength	Rope condition
4,381 lbs (T)	4,590 lbs	Good



J062497-a (upper) and J062497-c (lower)

J062497-b

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Species	Right Whale	Whale ID	Eg #1705

Date first observed entangled (date seen prior without gear)	01 Jul 1997 (27 Sep 1996)		
Sex: Female	Birth year: 1987	Age at entanglement: 10	

Case study ID	PCCS	NMFS	GEAR ID
		E15-97	
Gear sample collected?	No	Gear type	Gillnet

Photographs inadequate to determine complete entanglement configuration - no drawing available

Reproductive prior to entanglement detection?	Yes				
Reproductive after entanglement detection?	Yes				
Entanglement severity	Minor				
Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	Low	None	Unknown	None	Low
Duration of time carrying gear	Minimum 67 days, maximum 955 days				
Disentangled?	No				
Status	Presumed dead - last sighted in 2013				
Number of prior entanglement interactions	3				

Entanglement configuration	Single line exiting right mouth ending at right flank with a cluster of small black gillnet float buoys visible.
Anchoring point(s)	Mouth
Gear configuration confidence	High
Remaining questions	None
Comments	Gear eventually shed.

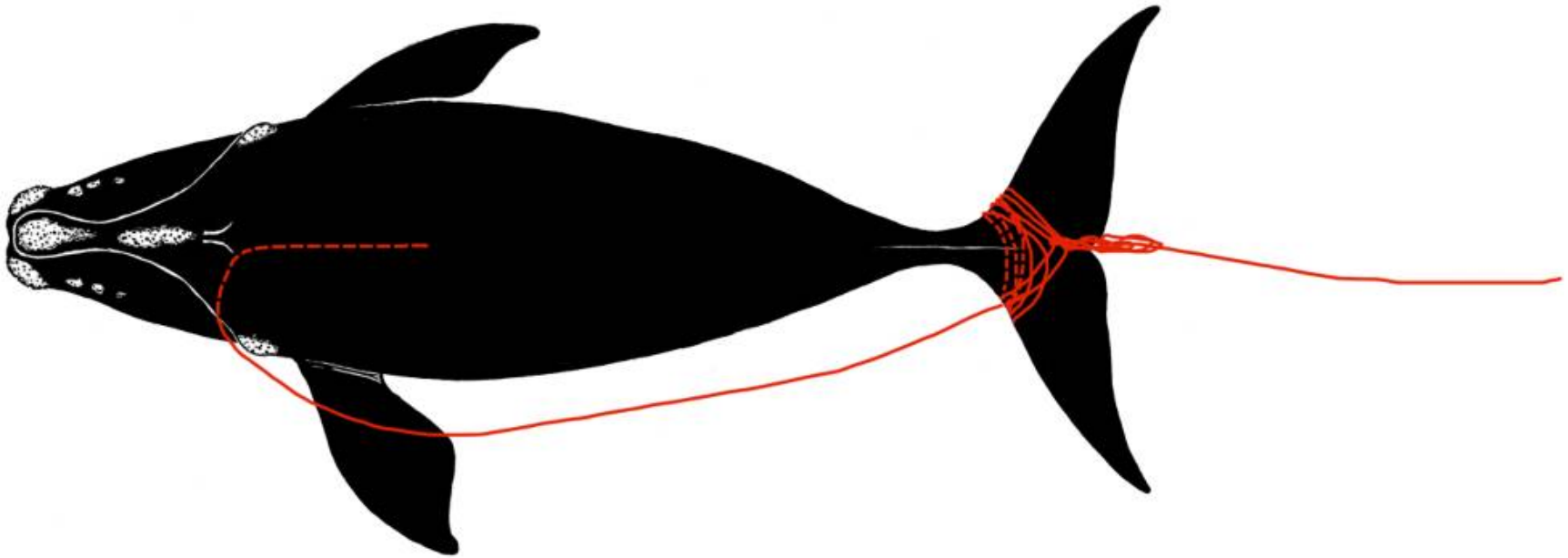
06 Sep 1997 NEA

06 Sep 1997 NEA

Species	Right Whale	Whale ID	Eg #2212

Date first observed entangled (date seen prior without gear)	23 Aug 1997 (16 Aug 1996)				
Sex	Male	Birth year	1992	Age at entanglement	5

Case study ID	PCCS	NMFS	GEAR ID
		E20-98	J072498 a-b
Gear sample collected?	Yes	Gear type	



Reproductive prior to/after entanglement detection?					
Entanglement injury severity	Severe				
Entanglement configuration risk	High				
Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	Low	None	Unknown	None	High
Duration of time carrying gear	Minimum 335 days, maximum 705 days				
Disentangled?	Yes - partially 24 Jul 1998				
Status	Presumed dead - Last sighted in 1998				
Number of prior entanglement interactions	3				

Entanglement configuration	Whale free swimming with multiple wraps of the tailstock; tangle of line aft of the flukes trailing no greater than half a body length. At subsequent sightings line determined to be in mouth and down gullet.
Anchoring point(s)	Flukes
Gear configuration confidence	Moderate
Remaining questions	
Comments	Whale in very poor condition at time of disentanglement.

Polymer type		PP	PP
Gear component			
Rope diameter (inches)		5/16 (0.339)	5/16 (0.339)
Breaking strength (lbs)	Tested	680	644
	New	1 700	1 700

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29 Aug 1997 NEA

4 Sep 1997 NEA

12 Sep 1998 PCCS

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FORENSIC ANALYSIS OF ROPES
WHALE ENTANGLEMENT PROJECT

SPECIMEN ID NO.	NMFS NO.
J072498	E20-98

Gear Description:
Orange PP 3-strand knotted to black PP 3-stand. Black line in poor condition with knots, kinks. and brittleness in the fibers. The black line shows a tensile failure at one end. Both lines are $^{5}/_{16}$ inch and relatively long.

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Rope description:
J072498-a $^{5}/_{16}$ inch orange 3-strand PP. Laid relatively hard and in poor condition. There are 9 rope yarns plus a center yarn. The filaments are brittle.

Tested (T) or adjusted (A) strength	Typical new strength	Rope condition
680 lbs (A)	1,700 lbs	Poor

J072498-b $^{5}/_{16}$ inch black 3-strand PP. Laid relatively hard and in poor condition with permanent kinks knots and abrasion. Line displays tensile failure in center and lower right in photo.

Tested (T) or adjusted (A) strength	Typical new strength	Rope condition
644 lbs (T)	1,700 lbs	Poor

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Species	Right Whale	Whale ID	Eg #2557

Date first observed entangled (date seen prior without gear)	29 Aug 1997 (08 Feb 1996)				
Sex	Female	Birth year	1995	Age at entanglement	2+

Case study ID	PCCS	NMFS	GEAR ID
Gear sample collected?	No	Gear type	

Photographs inadequate to determine complete entanglement configuration - no drawing available

Reproductive prior to entanglement detection?	No				
Reproductive after entanglement detection?	No				
Entanglement severity	Severe				
Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	Low	None	High	Low	Medium
Duration of time carrying gear	Minimum 21 days, maximum 588				
Disentangled?	No				
Status	Presumed dead - Last sighted in 1997				
Number of prior entanglement interactions	0				

Entanglement configuration	Two lines exiting right mouth and then crisscrossed over back. One line appears to go to left flipper which appears white under water. The other line goes under left side of body further aft.
Anchoring point(s)	Mouth, flipper
Gear configuration confidence	Low
Remaining questions	Level of flipper involvement, trailing line.
Comments	Animal in poor condition when first sighted entangled, seen for three days over the course of one month and not seen again.

29 Aug 1997 ECE

19 Sep 1997 NEA

19 Sep 1997 NEA

19 Sep 1997 NEA

19 Sep 1997 NEA

Species	Right Whale	Whale ID	Eg #2027

Date first observed entangled (date seen prior without gear)	12 Sep 1997 (26 Aug 1997)		
Sex: Male	Birth year: 1990	Age at entanglement: 7	

Case study ID	PCCS	NMFS	GEAR ID
		E24-97	J091297
Gear sample collected?	Yes	Gear type	Canada gillnet (prob)

Photographs inadequate to determine complete entanglement configuration - no drawing available

Reproductive prior to/after entanglement detection?					
Entanglement injury severity	Low				
Entanglement configuration risk	High				
Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	Low	Low	Low	None	Low
Duration of time carrying gear	Minimum 1 day, maximum 16 days.				
Disentangled?	Yes				
Status	Alive - Last sighted in 2023				
Number of prior entanglement interactions	2				

Entanglement configuration		Two lines exiting right mouth and loosely draped over back, trailing around 500 feet.
Anchoring point(s)		Mouth
Gear configuration confidence		High
Remaining questions		None
Comments		Entanglement was reported by a fishing vessel. Gear was likely gillnet gear picked up same day as gillnetting was occurring to NE and whale was traveling fast to WSW. No lobster fishing in Bay of Fundy that time of year.
Polymer type		Polysteel
Gear component		Gillnet
Rope diameter (inches)		7/16 (0.413)
Breaking strength (lbs)	Tested	3 363
	New	4 100

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12 Sep 1997 NEA

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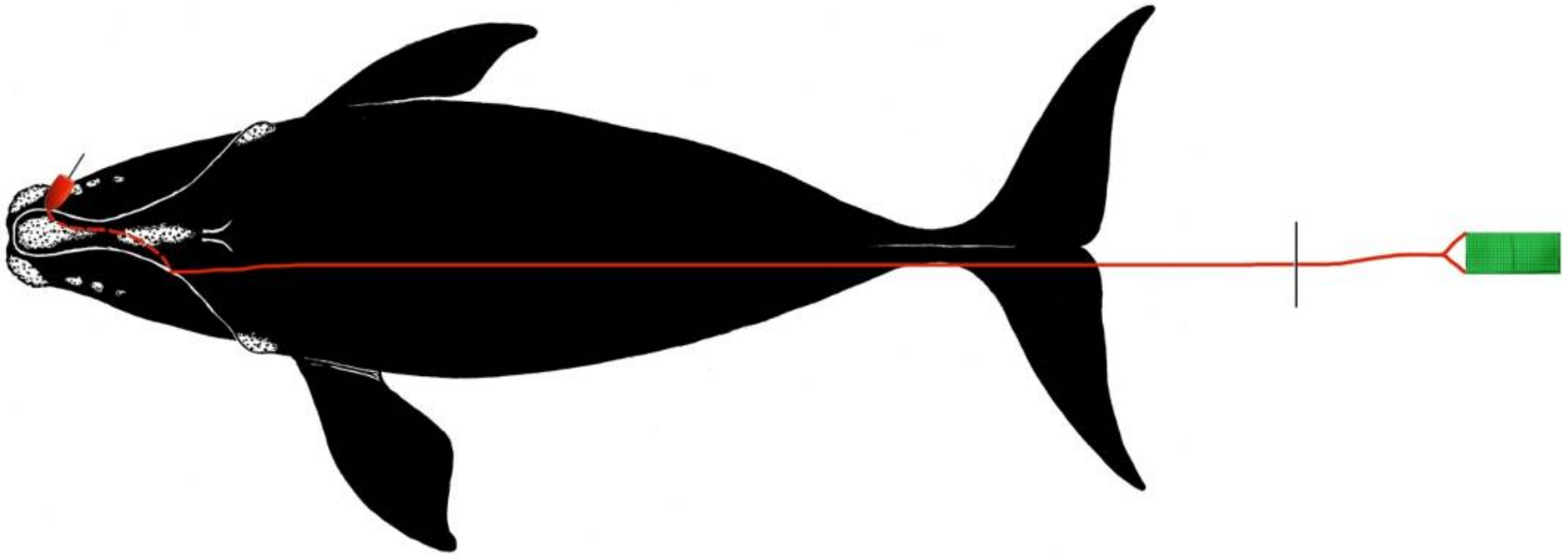
Species	Right Whale	Whale ID	Eg #2212

Date first observed entangled (date seen prior without gear)	12 Sep 1998 (20 Aug 1998)				
Sex	Male	Birth year	1992	Age at entanglement	6

Case study ID	PCCS	NMFS	GEAR ID
		E36-98	J091298 a-b
Gear sample collected?	Yes	Gear type	Lobster



Reproductive prior to/after entanglement detection?					
Entanglement injury severity	Minor				
Entanglement configuration risk	High				
Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	Low	Low	Unknown	Unknown	Unknown
Duration of time carrying gear	Minimum 1 day, maximum 24 days				
Disentangled?	Yes - partially 12 Sep 1998				
Status	Presumed dead - Last sighted in 1998				
Number of prior entanglement interactions	4				

Entanglement configuration	Whale free swimming; dragging single pot/surface system from mouth; buoy jammed in mouthline; length of line caught in mouth and down throat from previous entanglement.
Anchoring point(s)	Mouth
Gear configuration confidence	High
Remaining questions	None
Comments	Whale dragged its gear into a number of other gear sets as it blundered through Provincetown Harbor; line down throat could not be seen on this date, but was seen at its third entanglement on 14 Sept 1997 (not illustrated).

Polymer type		PP	PP/PET
Gear component		Vertical	Vertical
Rope diameter (inches)		5/16 (0.339)	3/8 (0.374)
Breaking strength (lbs)	Tested	1 615	1 692
	New	1 700	2 600

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12 Sep 1998 PCCS

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FORENSIC ANALYSIS OF ROPES
WHALE ENTANGLEMENT PROJECT

SPECIMEN ID NO. **NMFS NO.**

J091298 **E36.98**

Gear Description:
A 3 foot trap, end line and surface buoy.

Rope description:
J091298-a $^{5}/_{16}$ inch 3-strand black PP floating line with green marker yarn. Moderate wear.

Tested (T) or adjusted (A) strength	Typical new strength	Rope condition
1,615 lbs (T)	1,700 lbs	Good

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J091298-b $^{3}/_{8}$ inch 3-strand PP/PET ‘Easy Haul’ sinking line. Black PP rope yarns in parallel with white PET yarns. Sinking line with a specific gravity 0f 1.100.

Tested (T) or adjusted (A) strength	Typical new strength	Rope condition
1,692 lbs (T)	2,600 lbs	Very good

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Species	Right Whale	Whale ID	Eg #2212

Date first observed entangled (date seen prior without gear)		14 Sep 1998 (12 Sep 1998)			
Sex	Male	Birth year	1992	Age at entanglement	6

Case study ID	PCCS	NMFS	GEAR ID
		E38-98	J091498
Gear sample collected?	Yes	Gear type	US northeast lobster

Photographs inadequate to determine complete entanglement configuration - no drawing available

Reproductive prior to/after entanglement detection?					
Entanglement injury severity	Minor				
Entanglement configuration risk	High				
Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	Low	Low	Unknown	Unknown	Unknown
Duration of time carrying gear	Minimum 1 day, maximum 2 days				
Disentangled?	Yes - partially 14 Sep 1998				
Status	Presumed dead - Last sighted in 1998				
Number of prior entanglement interactions	4				

Entanglement configuration	Whale free swimming; single line through mouth and over top of head. It had just been disentangled from lobster gear on 12 Sept 1998.
Anchoring point(s)	Mouth
Gear configuration confidence	High
Remaining questions	None
Comments	Line down throat observed and determined to be from first entanglement in August 1997(first detected on 24 July 1998)

Polymer type		PP	PP	PP/PET	PP/PET	PP/PET
Gear component		Vertical				
Rope diameter (inches)		9/16 (0.559)	3/8 (0.354)	3/8 (0.394)	7/16 (0.457)	5/16 (0.335)
Breaking strength (lbs)	Tested	3 532	1 420	1 784	2 100	1 162
	New	4 590	2 430	2 600	3 600	1 900

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PCCS 14 Sep 1998

PCCS 14 Sep 1998

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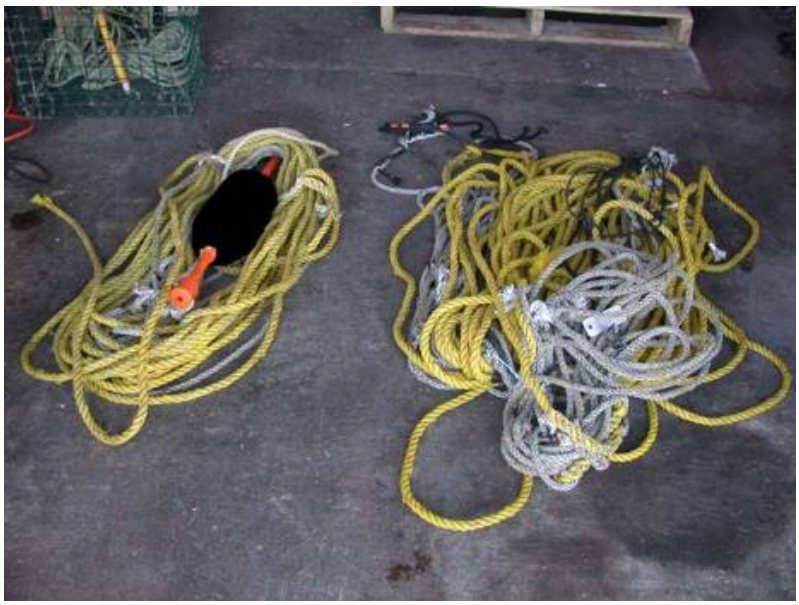
FORENSIC ANALYSIS OF ROPES
WHALE ENTANGLEMENT PROJECT

SPECIMEN ID NO.	**NMFS NO.**
J 091498	**E38-98**

Gear Description:
The gear consisted of two large sets with four total pieces. Item (a) was long while the others were relatively short. Item (c) was joined to (a) by a T splice (in the left side of the third figure. The lines were part of trap gear.



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Items (a) yellow, (b) black and (c). speckled grey. Note splices. Knots may have been made post recovery.

Rope Descriptions:

J091498-a

$^{9}/_{16}$ Yellow PP monofilament 3-strand. Discolored and random broken filaments may indicate UV degradation. This was a very long length and apparently made up most of the set.

Rope (a)

Tested (T) or adjusted (A) strength	Typical new strength	Rope condition
3,532 (T)	4,590 lbs	Good

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J091498-b
$^{3}/_{8}$ Black PP monofilament 3-strand, Appeared in good condition. Only a short segment present. This may have been used to make secondary attachments.

Rope (b)

Tested (T) or adjusted (A) strength	Typical new strength	Rope condition
1,420 (T)	2,430 lbs	Good

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J091498-c

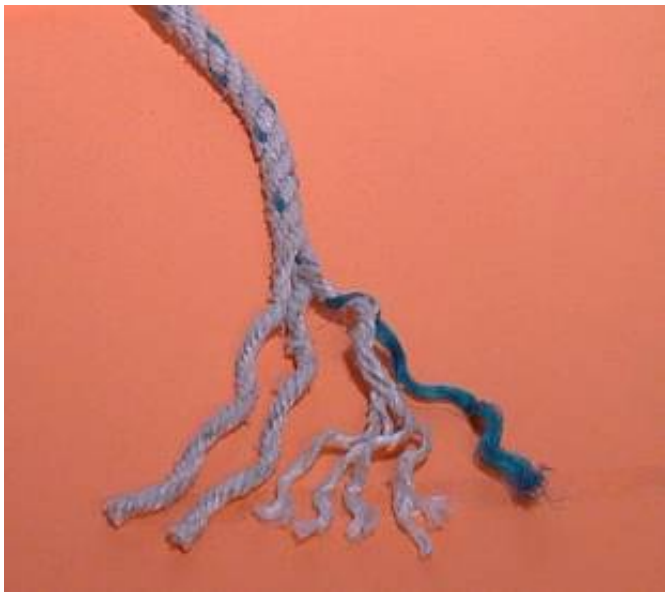
$^{3}/_{8}$ 3-Strand construction. In each strand there are 3 rope yarns of black PP monofilament are twisted in parallel with 3 PET multifilament rope yarns. This line has a Tee splice into specimen (a), the yellow PP. Refer to the photo. This rope design is seen frequently and known as “Easy Haul”

Rope (c). Known in trade as “Easy Haul)

Tested (T) or adjusted (A) strength	Typical new strength	Rope condition
1,784 (T)	2,600 lbs	Good

J091498-d

$^{9}/_{16}$ 3-Strand construction. Each of 4 rope yarns has PET wrapped around PP, the fifth strand is all green monofilament. The rope has moderate surface abrasion.



Rope (d)

Tested (T) or adjusted (A) strength	Typical new strength	Rope condition
2,160 (A)	3,600 lbs	Fair

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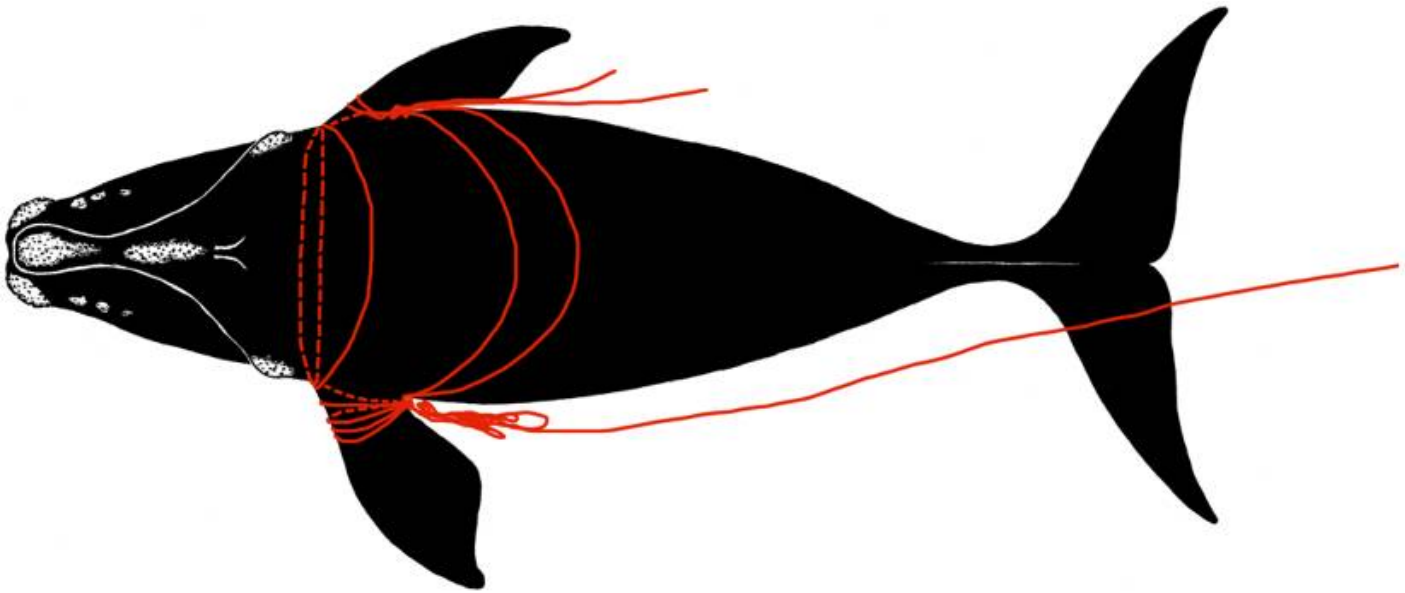
Species	Right Whale	Whale ID	Eg #2030

Date first observed entangled (date seen prior without gear)	10 May 1999 (11 Sep 1997)			
Sex: Female	Birth year: Unknown	Age at entanglement: 9+		

Case study ID	PCCS	NMFS	GEAR ID
	WR-1999-03	E4-99	J051099 a-b
Gear sample collected?	Yes	Gear type	Sink gillnet



Reproductive prior to/after entanglement detection?	No/No
Entanglement injury severity	Severe
Entanglement configuration risk	High

Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	None	None	High	High	Medium

Duration of time carrying gear	Minimum 163 days, maximum 768 days
Disentangled?	No
Status	Dead - 20 Oct 1999
Number of prior entanglement interactions	4

Entanglement configuration	Whale free-swimming; chest and back wraps stretched between flippers, each with multiple wraps; very little trailing line.
Anchoring point(s)	Flippers, body
Gear configuration confidence	High
Remaining questions	None
Comments	Multiple disentanglement attempts were unsuccessful; tail harness was tried but failed.

		Polymer type	PP	PP/PET
		Gear component	Gillnet anchor system	Gillnet anchor system
		Rope diameter (inches)	1/2 (0.469)	9/16 (0.571)
Breaking strength (lbs)	Tested		2 757	5 440
	New		3 780	6 800

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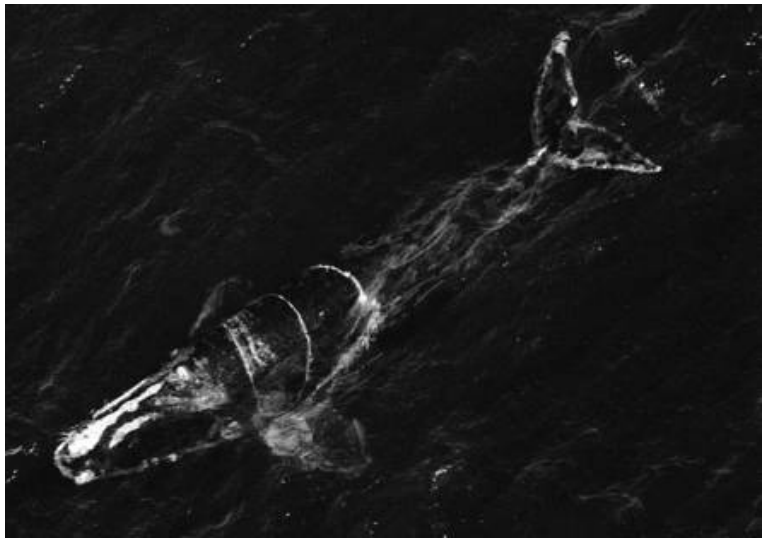

10 May 1994 NMFS

4 Sep 1999 NEA

21 Oct 1999 NEA

4 Sep 1999 NEA

21 Oct 1999 NEA

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FORENSIC ANALYSIS OF ROPES
WHALE ENTANGLEMENT PROJECT

SPECIMEN ID NO.	**NMFS NO.**
J051099	**E4-99**

Gear Description:
Note on gear indicated use with gill net operation. As seen in photo, the separate segment on the left has been unlaid and one end indicates a tensile break.

The gear consisted of a large length of the 3-strand polypropylene rope described below and a segment of $^{5}/_{8}$ inch combo rope too short to analyze.

Gear set possibly associated with gill netting.

Rope description:
J051099-b: Short segment of 5/8 inch combo rope

Tested (T) or adjusted (A) strength	Typical new strength	Rope condition
5,440 lbs (A)	6,800 lbs	Good

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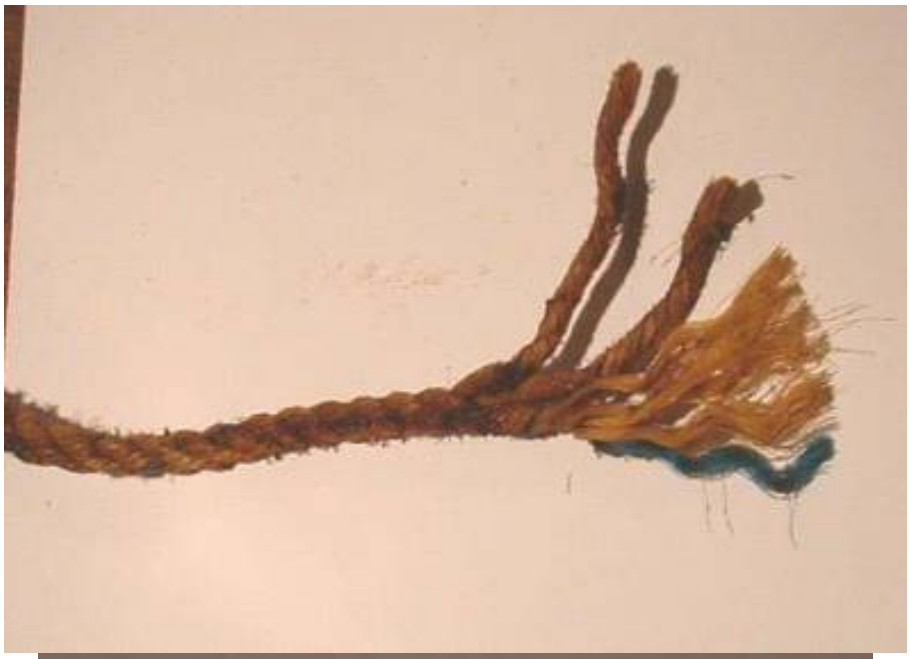
Rope description:
J051099-a: 1/2 inch 3-Strand, yellow PP monofilament with one blue rope yarn in one strand.
There are 7 rope yarns per strand including marker. Little wear, some broken filaments along length. Some of the line was in better condition as seen in the lower photo.

Tested (T) or adjusted (A) strength	Typical new strength	Rope condition
2,757 lbs (T)	3,780 lbs	Fair



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Species	Right Whale	Whale ID	Eg #1158

Date first observed entangled (date seen prior without gear)	19 May 1999 (03 Mar 1999)				
Sex	Female	Birth year	Unknown	Age at entanglement	19+

Case study ID	PCCS	NMFS	GEAR ID
	WR-1999-05	E6-99	
Gear sample collected?	Yes	Gear type	

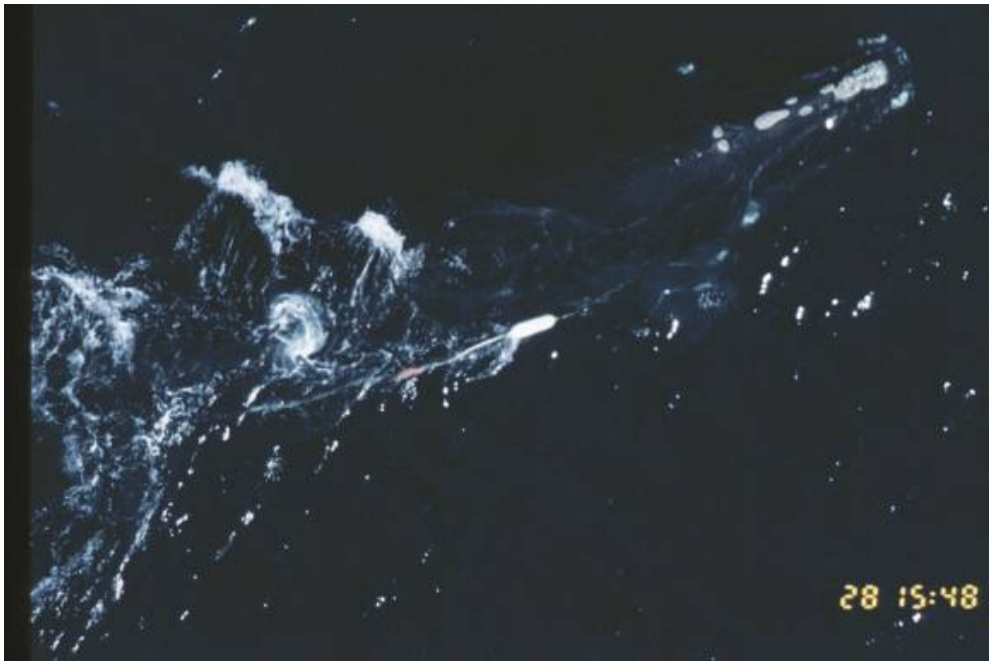
Photographs inadequate to determine complete entanglement configuration - no drawing available

Reproductive prior to entanglement detection?	Yes/No				
Reproductive after entanglement detection?	No				
Entanglement severity	Moderate				
Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	None	None	Medium	None	Low
Duration of time carrying gear	Minimum 131 days, maximum 206 days				
Disentangled?	Yes - 27 Sep 1999				
Status	Alive - Last sighted in 2023				
Number of prior entanglement interactions	3				

Entanglement configuration	Rope wrapped on right flipper with high flyer attached just aft of flipper. Less than one body length of rope trailing.
Anchoring point(s)	Flipper
Gear configuration confidence	High
Remaining questions	
Comments	Only highflyer retrieved. No rope available for analysis.

23 May 1999 PCCS

05 Aug 1999 NEA



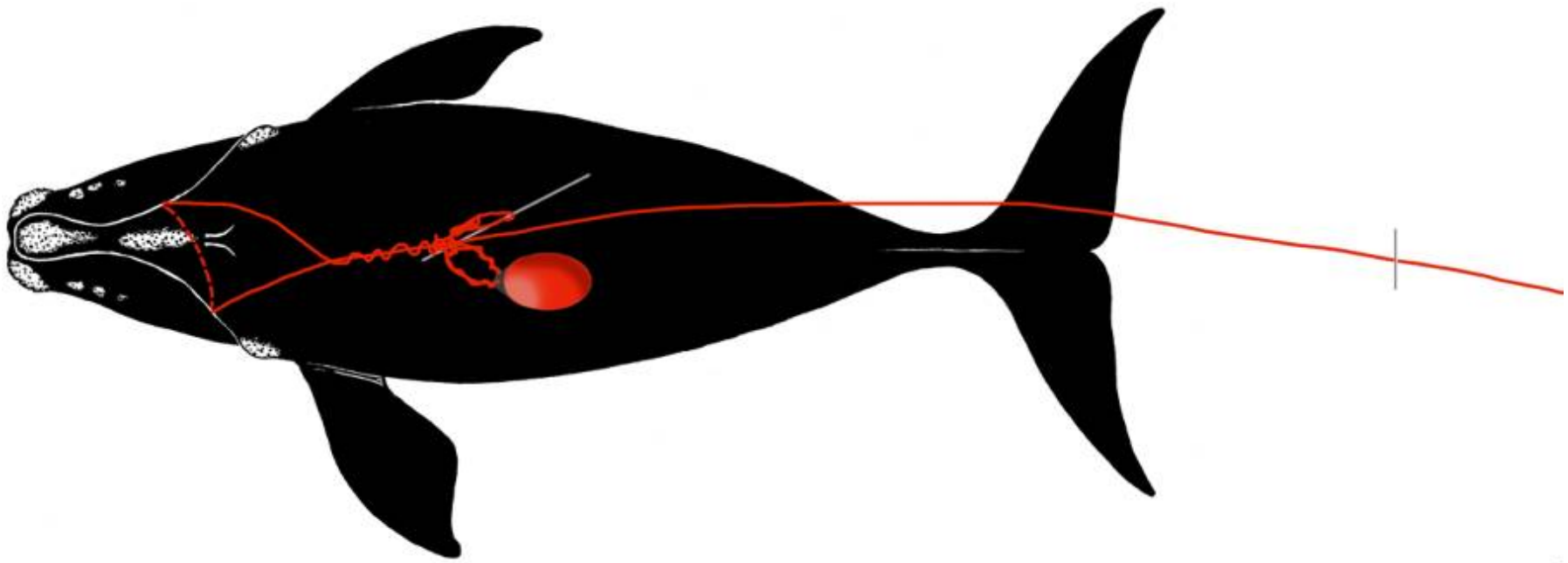
28 May 1999 NMFS

11 Aug 1999 NEA

Species	Right Whale	Whale ID	Eg #2753

Date first observed entangled (date seen prior without gear)	05 Jun 1999 (03 Sep 1998)		
Sex: Female	Birth year: 1997	Age at entanglement: 2	

Case study ID	PCCS	NMFS	GEAR ID
	WR-1999-06	E7-99	J060599
Gear sample collected?	Yes	Gear type	



Reproductive prior to/after entanglement detection?	No/Yes				
Entanglement injury severity	Minor				
Entanglement configuration risk	High				
Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	Low	None	Unknown	Low	Low
Duration of time carrying gear	Minimum 1 day, maximum 289 days				
Disentangled?	Yes - 5 Jun 1999				
Status	Alive - Last sighted in 2023				
Number of prior entanglement interactions	1				

Entanglement configuration	Whale free-swimming; bridle of line caught in mouth leading to tangle of line and buoys on back; line trailing ~300 feet.
Anchoring point(s)	Mouth
Gear configuration confidence	High
Remaining questions	None
Comments	Whale was discovered and disentangled during training session in Bay of Fundy.

Polymer Type		PP/PET
Gear Component		Vertical line
Rope Diameter (inches)		5/16 (0.323)
Breaking Strength (lbs)	Tested	1 854
	New	1 900

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05 Jun 1999 ECE

05 Jun 1999 ECE

05 Jun 1999 ECE

05 Jun 1999 ECE

05 Jun 1999 ECE

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DATA SHEET

FORENSIC ANALYSIS OF ROPES
WHALE ENTANGLEMENT PROJECT

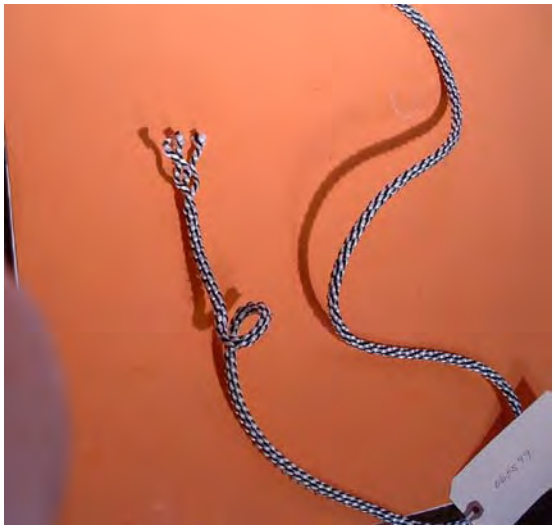
SPECIMEN ID NO. **NMFS NO.**

J060599 **E7-99**

Gear Description:
Coil of 'Easy Haul' PP/PET sinking line as seen below

Rope description:
J060599 $^{5}/_{16}$ inch 3-strand PP/PET sinking line. Typical black PP and white PET in parallel. Specific gravity 1.152. Good condition.

Tested (T) or adjusted (A) strength	Typical new strength	Rope condition
1,854 lbs (T)	1,900 lbs	Very good



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Species	Right Whale	Whale ID	Eg #2710

Date first observed entangled (date seen prior without gear)	21 Jul 1999 (19 Jun 1999)				
Sex	Female	Birth year	1997	Age at entanglement	2

Case study ID	PCCS	NMFS	GEAR ID
	WR-1999-11	E16-99	J072199
Gear sample collected?	Yes	Gear type	Lobster

Photographs inadequate to determine complete entanglement configuration - no drawing available

Reproductive prior to/after entanglement detection?	No/Yes				
Entanglement severity	Moderate				
Entanglement configuration risk	High				
Wound severity	Mouth	Head/ Rostrum	Flippers	Body	Flukes
	Low	Low	Medium	Low	Medium
Duration of time carrying gear	Minimum 55 days, maximum 389 days				
Disentangled?	Yes				
Status	Presumed dead - last sighted in 2014				
Number of prior entanglement interactions	1				

Entanglement configuration	Rope through mouth and crisscrossing over blowholes and body. May wrap both flippers. Trailing ~ 20 feet behind flukes.
Anchoring point(s)	Mouth, flipper(s)
Gear configuration confidence	Low
Remaining questions	Extent of flipper involvement.
Comments	Gear pulled off by telemetry buoy attached to trailing gear.

Polymer type		PP
Gear component		
Rope diameter (inches)		1/2 (0.472)
Breaking strength (lbs)	Tested	3 339
	New	3 780

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02 Aug 1999 NEA

02 Aug 1999 NEA

03 Aug 1999 NEA

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DATA SHEET

FORENSIC ANALYSIS OF ROPES
WHALE ENTANGLEMENT PROJECT

SPECIMEN ID NO.	NMFS NO.
J072199	E16-99

Gear Description:
Considerable tangling of the gear set but untangled rope was in very good condition,
Noted by NMFS as Canadian pot gear.

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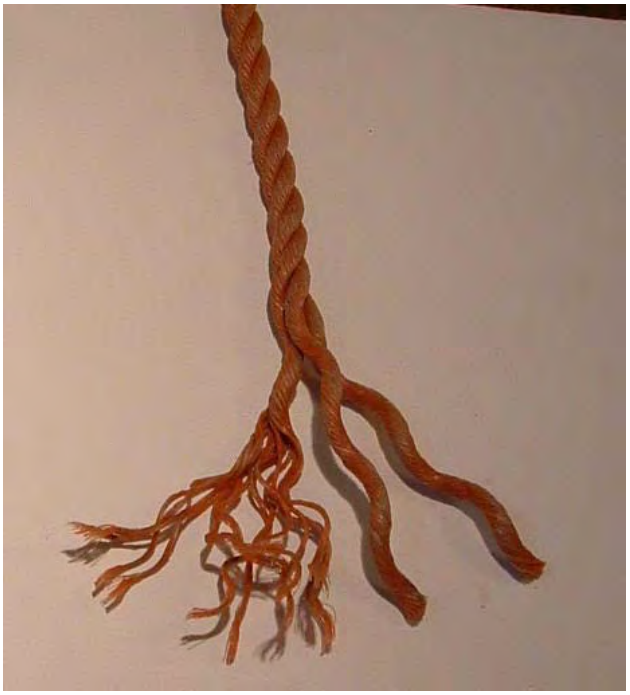
Rope description:
$^{1}/_{2}$ dia 3-stand red polypropylene monofilament with 13 rope yarns per strand.

Tested (T) or adjusted (A) strength	Typical new strength	Rope condition
3,339 lbs (T)	3,780 lbs	Very good



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