

**APPENDIX IV: Table A. Surveys**

Survey Number	Year	Season	Platform	Track line length (km)	Area	Agency/Program	Analysis	Corrected for g(0)	Reference
1	1982	year-round	plane (AT-11; 1978-1982)	211,585	Cape Hatteras, NC to Nova Scotia, continental shelf and shelf edge waters	CETAP	Line transect analyses of distance data	N	(CETAP 1982)
2	1990	Aug	ship (Chapman)	2,067	Cape Hatteras, NC to Southern New England, North wall of the Gulf Stream	NEC	One team data analyzed by DISTANCE.	N	(NMFS 1990)
3	1991	Jul-Aug	ship (Abel-J)	1,962	Gulf of Maine, lower Bay of Fundy, southern Scotian Shelf	NEC	Two independent team data analyzed with modified direct duplicate method.	Y	(Palka 1995)
4	1991	Aug	boat (Sneak Attack)	640	inshore bays of Maine	NEC	One team data analyzed by DISTANCE.	Y	(Palka 1995)
5	1991	Aug-Sep	plane 1(AT-11)	9,663	Cape Hatteras, NC to Nova Scotia, continental shelf and shelf edge waters	NEC/SEC	One team data analyzed by DISTANCE.	N	(NMFS 1991)
6	1991	Aug-Sep	plane 2 (Twin Otter)		Cape Hatteras, NC to Nova Scotia, continental shelf and shelf edge waters	NEC/SEC	One team data analyzed by DISTANCE.	N	(NMFS 1991)
7	1991	Jun-Jul	ship (Chapman)	4,032	Cape Hatteras to Georges Bank, between 200 and 2,000m isobaths	NEC	One team data analyzed by DISTANCE.	N	(Waring <i>et al.</i> 1992; Waring 1998)
8	1992	Jul-Sep	ship (Abel-J)	3,710	N. Gulf of Maine and lower Bay of Fundy	NEC	Two independent team data analyzed with modified direct duplicate method.	Y	(Smith <i>et al.</i> 1993)
9	1993	Jun-Jul	ship (Delaware II)	1,874	S. edge of Georges Bank, across the Northeast Channel, to the SE. edge of the Scotian Shelf	NEC	One team data analyzed by DISTANCE.		(NMFS 1993)
10	1994	Aug-Sep	ship (Relentless)	534	shelf edge and slope waters of Georges Bank	NEC	One team data analyzed by DISTANCE.	N	(NMFS 1994)
11	1995	Aug-Sep	plane (Skymaster)	8,427	Gulf of St. Lawrence	DFO	One team data analyzed using quenouille's jackknife bias reduction procedure that modeled the left truncated sighting curve	N	(Kingsley and Reeves 1998)

Survey Number	Year	Season	Platform	Track line length (km)	Area	Agency/Program	Analysis	Corrected for g(0)	Reference
12	1995	Jul-Sep	2 ships (Abel-J and Pelican) and plane (Twin Otter)	32,600	Virginia to the mouth of the Gulf of St. Lawrence	NEC	Ship: two independent team data analyzed with modified direct duplicate method. Plane: one team data analyzed by DISTANCE.	Ship: Y. Plane: Y (only harbor porpoise) N (rest of species)	(Palka 1996)
13	1996	Jul-Aug	plane	3,993	Northern Gulf of St. Lawrence	DFO	Quenouille's jackknife bias reduction procedure on line transect methods that modeled the left truncated sighting curve	N	(Kingsley and Reeves 1998)
14	1998	Jul-Aug	ship	4,163	south of Maryland	SEC	One team data analyzed by DISTANCE.	N	(Mullin and Fulling 2003)
15	1998	Aug-Sep	plane (1995 and 1998)		Gulf of St. Lawrence	DFO			(Kingsley and Reeves 1998)
16	1998	Jul-Sep	ship (Abel-J) and plane (Twin Otter)	15,900	north of Maryland	NEC	Ship: two independent team data analyzed with the modified direct duplicate or Palka & Hammond analysis methods, depending on the presence of responsive movement. Plane: one team data analyzed by DISTANCE.	Y	
17	1999	Jul-Aug	ship (Abel-J) and plane (Twin Otter)	6,123	south of Cape Cod to mouth of Gulf of St. Lawrence	NEC	Ship: two independent team data analyzed with modified direct duplicate or Palka & Hammond analysis methods, depending on the presence of responsive movement. Plane: circle-back data pooled with aerial data collected in 1999, 2002, 2004, 2006, 2007, and 2008 to calculate pooled g(0)'s and year-species specific abundance estimates for all years except 2008.	Y	
18	2002	Jul-Aug	plane (Twin Otter)	7,465	Georges Bank to Maine	NEC	Same as for plane in survey 15.	Y	(Palka 2006)
19	2002	Feb-Apr	ship (Gunter)	4,592	SE US continental shelf Delaware - Florida	SEC	One team data analyzed by DISTANCE.	N	(Garrison <i>et al.</i> 2003)

Survey Number	Year	Season	Platform	Track line length (km)	Area	Agency/Program	Analysis	Corrected for g(0)	Reference
20	2002	Jun-Jul	plane	6,734	Florida to New Jersey	SEC	Two independent team data analyzed with modified direct duplicate method.	Y	(Garrison 2003)
21	2004	Jun-Aug	ship (Gunter)	5,659	Florida to Maryland	SEC	Two independent team data analyzed with modified direct duplicate method.	Y	(Garrison et al. in prep)
22	2004	Jun-Aug	ship (Endeavor) and plane (Twin Otter)	10,761	Maryland to Bay of Fundy	NEC	Same methods used in survey 15.	Y	(Palka 2006)
23	2006	Aug	plane (Twin Otter)	10,676	Georges Bank to Bay of Fundy	NEC	Same as for plane in survey 15.	Y	Palka (in prep)
24	2007	Aug	ship (Bigelow) and plane (Twin Otter)	8,195	Georges Bank to Bay of Fundy	NEC	Ship: Tracker data analyzed by DISTANCE. Plane: same as for plane in survey 15.	Y	Palka (in prep)
25	2007	July-Aug	plane		Canadian waters from Nova Scotia to Newfoundland	DFO	uncorrected counts	N	(Lawson and Gosselin 2008)
26	2008	Aug	plane (Twin Otter)	6,267	NY to Maine in US waters	NEC	Same as for plane in survey 15.	Y	Palka (in prep)
27	2001	May-June	plane	na	Maine coast	NEC/UM	corrected counts	N	(Gilbert <i>et al.</i> 2005)
28	1999	March	plane	na	Cape Cod	NEC	uncorrected counts	N	(Barlas 1999)
29	1983 -1986	1983 (Fall) 1984 (Winter, Spring, Summer) 1985 (Summer, Fall) 1986 (Winter)	plane (Beechcraft D-18S modified with a bubblenose)	103,490 total 25,627 (bays and sounds) 36,685 (coastal) 41,178 (outer continental shelf, OCS)	northern Gulf of Mexico bays and sounds, coastal waters from shoreline to 18-m isobath, and OCS waters from 18-m isobath to 9.3km past the 183-m isobath	SEC	One team data analyzed with Line-transect theory	N	(Scott <i>et al.</i> 1989)
30	1991-1994	Apr- June	ship (Oregon II)	22,041	northern Gulf of Mexico from 200m to U.S. EEZ	SEC	One team data analyzed by DISTANCE	N	(Hansen <i>et al.</i> 1995)
31	1992-1993	Sep-Oct	plane (Twin Otter)	5,578 (bays and sounds) 4,806 (coastal)	northern Gulf of Mexico bays and sounds, coastal waters from shoreline to 18m isobath, and	GOMEX92 GOMEX93	One team data analyzed by DISTANCE	N	(Blaylock and Hoggard 1994)

Survey Number	Year	Season	Platform	Track line length (km)	Area	Agency/Program	Analysis	Corrected for g(0)	Reference
				7,678 (outer continental shelf, OCS)	OCS waters from 18-m isobath to 9.3km past the 183-m isobath				
32	1994	Sep-Nov	plane (Twin Otter)	1,155 (bays and sounds) 1,953 (coastal) 1,879 (outer continental shelf, OCS)	northern Gulf of Mexico bays and sounds, coastal waters from shoreline to 18-m isobath, and OCS waters from 18-m isobath to 9.3km past the 183-m isobath	GOMEX94	One team data analyzed by DISTANCE	N	NMFS unpub. data
33	1996-1997, 1999-2001	Apr-June	ship (Oregon II and Gunter)	12,162	northern Gulf of Mexico from 200m to U.S. EEZ	SEC	One team data analyzed by DISTANCE	N	(Mullin and Fulling 2004)
34	1998-2001	end Aug-early Oct	ship (Gunter and Oregon II)	2,196	northern Gulf of Mexico outer continental shelf (OCS, 20-200m)	SEC	One team data analyzed by DISTANCE	N	(Fulling <i>et al.</i> 2003)
35	2003-2004	Jun-Aug (2003) Apr-Jun (2004)	ship (Gunter)	10,933	northern Gulf of Mexico from 200m to U.S. EEZ	SEC	One team data analyzed by DISTANCE	N	(Mullin 2007)
36	2004	12-13 Jan	helicopter		Sable Island	DFO	Pup count	na	(Bowen <i>et al.</i> 2007)
37	2004		plane		Gulf of St Lawrence and Nova Scotia Eastern Shore	DFO	Pup count		(Hammill 2005)

**APPENDIX IV: Table B. Abundance estimates – "Survey Number" refers to surveys described in Table A. "Best" estimate for each species in bold font.**

Species	Stock	Year	Nbest	CV	Survey Number	Notes
Humpback Whale	Gulf of Maine	1992	501			minimum pop'n size estimated from photo-ID data
		1993	652	0.29		YONAH sampling (Clapham <i>et al.</i> 2003)
		1997	497			minimum pop'n size estimated from photo-ID data
		1999	902	0.45	17	
		2002	521	0.67	18	
		2004	359	0.75	22	
		<b>2006</b>	<b>847</b>	<b>0.55</b>	<b>23</b>	
		2008			26	
Fin Whale	Western North Atlantic	1995	2,200	0.24	12	
		1999	2,814	0.21	18	
		2002	2,933	0.49	18	
		2004	1,925	0.55	22	
		<b>2006</b>	<b>2,269</b>	<b>0.37</b>	<b>23</b>	
		2008			26	
Sei Whale	Nova Scotia	1977	1,393-2,248			based on tag-recapture data (Mitchell and Chapman 1977)
		1977	870			based on census data (Mitchell and Chapman 1977)
		1982	280		1	
		2002	71	1.01	21	
		<b>2004</b>	<b>386</b>	<b>0.85</b>	<b>23</b>	
		2006	207	0.62	24	
		2008			26	
Minke Whale	Canadian East Coast	1982	320	0.23	1	
		1992	2,650	0.31	3+8	
		1993	330	0.66	9	
		1995	2,790	0.32	12	
		1995	1,020	0.27	11	
		1996	620	0.52	13	
		1999	2,998	0.19	17	
		2002	756	0.9	18	
		2004	600	0.61	22	
		<b>2006</b>	<b>3,312</b>	<b>0.74</b>	<b>23</b>	
		2007	3,242		25	
2008			26			
Sperm Whale	North Atlantic	1982	219	0.36	1	
		1990	338	0.31	2	
		1991	736	0.33	7	
		1991	705	0.66	6	
		1991	337	0.5	5	
		1993	116	0.4	9	
		1994	623	0.52	10	
		1995	2,698	0.67	12	
		1998	2,848	0.49	16	
		1998	1,181	0.51	14	
		2004	2,607	0.57	22	
		2004	2,197	0.47	21	
		<b>2004</b>	<b>4,804</b>	<b>0.38</b>	<b>21+22</b>	<b>Estimate summed from north and south surveys</b>
Kogia spp.	Western North	1998	115	0.61	16	
		1998	580	0.57	14	

Species	Stock	Year	Nbest	CV	Survey Number	Notes
	Atlantic	2004	358	0.44	22	
		2004	37	0.75	21	
		<b>2004</b>	<b>395</b>	<b>0.4</b>	<b>21+22</b>	<b>Estimate summed from north and south surveys</b>
Beaked Whales	Western North Atlantic	1982	120	0.71	1	
		1990	442	0.51	2	
		1991	262	0.99	7	
		1991	370	0.65	6	
		1991	612	0.73	5	
		1993	330	0.66	9	
		1994	99	0.64	10	
		1995	1,519	0.69	12	
		1998	2,600	0.4	16	
		1998	541	0.55	14	
		2004	2,839	0.78	22	
		2004	674	0.36	21	
		<b>2004</b>	<b>3,513</b>	<b>0.63</b>	<b>21+22</b>	<b>Estimate summed from north and south surveys</b>
		2006	922	1.47	23	
Risso's Dolphin	Western North Atlantic	1982	4,980	0.34	1	
		1991	11,017	0.58	7	
		1991	6,496	0.74	5	
		1991	16,818	0.52	6	
		1993	212	0.62	9	
		1995	5,587	1.16	12	
		1998	18,631	0.35	17	
		1998	9,533	0.5	15	
		1998	28,164	0.29	15+17	Estimate summed from north and south surveys
		2002	69,311	0.76	18	
		2004	15,053	0.78	21	
		2004	5,426	0.54	22	
		<b>2004</b>	<b>20,479</b>	<b>0.59</b>	<b>21+22</b>	<b>Estimate summed from north and south surveys</b>
2006	14,408	0.38	23			
Pilot Whale	Western North Atlantic	1951	50,000			Derived from catch data from 1951-1961 drive fishery (Mitchell 1974)
		1975	43,000-96,000			Derived from population models (Mercer 1975)
		1982	11,120	0.29	1	
		1991	3,636	0.36	7	
		1991	3,368	0.28	5	
		1991	5,377	0.53	6	
		1993	668	0.55	9	
		1995	8,176	0.65	12	
		1995	9,776	0.55	12+16	Sum of US (#12) and Canadian (#16) surveys
		1998	1,600	0.65	16	
		1998	9,800	0.34	17	
		1998	5,109	0.41	15	
		2002	5,408	0.56	18	
		2004	15,728	0.34	22	
		2004	15,411	0.43	21	
		<b>2004</b>	<b>31,139</b>	<b>0.27</b>	<b>21+22</b>	<b>Estimate summed from north and south surveys</b>
		2006	26,535	0.35	23	
2007	6,134		25			
Atlantic white-sided	Western North	1982	28,600	0.21	1	
		1992	20,400	0.63	2+7	

Species	Stock	Year	Nbest	CV	Survey Number	Notes
Dolphin	Atlantic	1993	729	0.47	9	
		1995	27,200	0.43	12	
		1995	11,750	0.47	11	
		1996	560	0.89	13	
		1999	51,640	0.38	17	
		2002	109,141	0.3	18	
		2004	2,330	0.8	22	
		2006	17,594	0.3	23	
		<b>2006</b>	<b>63,368</b>	<b>0.27</b>	<b>(18+23)/2</b>	<b>average of #18 and #23</b>
		2007	5,796		25	
			26			
White-beaked Dolphin	Western North Atlantic	1982	573	0.69	1	
			5,500			(Alling and Whitehead 1987)
		1982	3,486	0.22		(Alling and Whitehead 1987)
		<b>2006</b>	<b>2,003</b>	<b>0.94</b>	<b>23</b>	
		2007	1,1842		25	
		2008			26	
Common Dolphin	Western North Atlantic	1982	29,610	0.39	1	
		1991	22,215	0.4	7	
		1993	1,645	0.47	9	
		1995	6,741	0.69	12	
		1998	30,768	0.32	17	
		1998	0		15	
		2002	6,460	0.74	21	
		2004	90,547	0.24	22	
		2004	30,196	0.54	21	
		<b>2004</b>	<b>120,743</b>	<b>0.23</b>	<b>21+22</b>	<b>Estimate summed from north and south surveys</b>
		2006	84,000	0.36	24	
2007	53,625		25			
Atlantic Spotted Dolphin	Western North Atlantic	1982	6,107	0.27	1	
		1995	4,772	1.27	12	
		1998	32,043	1.39	16	
		1998	14,438	0.63	14	
		2004	3,578	0.48	22	
		2004	47,400	0.45	21	
		<b>2004</b>	<b>50,978</b>	<b>0.42</b>	<b>21+22</b>	<b>Estimate summed from north and south surveys</b>
Pantropical Spotted Dolphin	Western North Atlantic	1982	6,107	0.27	1	
		1995	4,772	1.27	12	
		1998	343	1.03	16	
		1998	12,747	0.56	14	
		2004	0		22	
		2004	4,439	0.49	21	
		<b>2004</b>	<b>4,439</b>	<b>0.49</b>	<b>21+22</b>	<b>Estimate summed from north and south surveys</b>
Striped Dolphin	Western North Atlantic	1982	36,780	0.27	1	
		1995	31,669	0.73	12	
		1998	39,720	0.45	16	
		1998	10,225	0.91	14	
		2004	52,055	0.57	22	
		2004	42,407	0.53	21	
		<b>2004</b>	<b>94,462</b>	<b>0.4</b>	<b>21+22</b>	<b>Estimate summed from north and south surveys</b>
Bottlenose Dolphin	Western North	1998	16,689	0.32	16	
		1998	13,085	0.4	14	

Species	Stock	Year	Nbest	CV	Survey Number	Notes
	Atlantic Offshore	2002	26,849	0.19	20	
		2002	5,100	0.41	18	
		2004	9,786	0.56	22	
		2004	44,953	0.26	21	
		<b>2004</b>	<b>81,588</b>	<b>0.17</b>	<b>20+21+22</b>	<b>Estimate summed from north and south surveys and 2002 survey</b>
Harbor Porpoise	Gulf of Maine/Bay of Fundy	1991	37,500	0.29	3	
		1992	67,500	0.23	8	
		1995	74,000	0.2	12	
		1995	12,100	0.26	11	
		1996	21,700	0.38	14	
		1999	89,700	0.22	18	survey discovered portions of the range not previously surveyed
		2002	64,047	0.48	21	
		2004	51,520	0.65	23	
		<b>2006</b>	<b>89,054</b>	<b>0.47</b>	<b>24</b>	
		2007	4,862		25	
		2008			26	
Harbor Seal	Western North Atlantic	2001	99,340	0.097	27	
Gray Seal	Western North Atlantic	1999	5,611		28	
		2001	1,731		27	
		2004	52,500	0.15	37	Gulf of St Lawrence and Nova Scotia Eastern Shore
		2004	208,720 216,490 223,220	0.14 0.11 0.08	36	Sable Island
Bryde's Whale	Northern Gulf of Mexico	1991-1994	35	1.10	30	
		1996-2001	40	0.61	33	
		<b>2003-2004</b>	<b>15</b>	<b>1.98</b>	35	
Sperm Whale	Northern Gulf of Mexico	1991-1994	530	0.31	30	
		1996-2001	1,349	0.23	33	
		<b>2003-2004</b>	<b>1,665</b>	<b>0.20</b>	35	
Kogia spp.	Northern Gulf of Mexico	1991-1994	547	0.28	30	
		1996-2001	742	0.29	33	
		<b>2003-2004</b>	<b>453</b>	<b>0.35</b>	35	
Cuvier's Beaked Whale	Northern Gulf of Mexico	1991-1994	30	0.50	30	
		1996-2001	95	0.47	33	
		<b>2003-2004</b>	<b>65</b>	<b>0.67</b>	35	
Mesoplodon spp.	Northern Gulf of Mexico	1996-2001	106	0.41	33	
		<b>2003-2004</b>	<b>57</b>	<b>1.40</b>	35	
Killer Whale	Northern Gulf of Mexico	1991-1994	277	0.42	30	
		1996-2001	133	0.49	33	
		<b>2003-2004</b>	<b>49</b>	<b>0.77</b>	35	
False killer Whale	Northern Gulf of Mexico	1991-1994	381	0.62	30	
		1996-2001	1,038	0.71	33	
		<b>2003-2004</b>	<b>777</b>	<b>0.56</b>	35	
Short-finned Pilot Whale	Northern Gulf of Mexico	1991-1994	353	0.89	30	
		1996-2001	2,388	0.48	33	
		<b>2003-2004</b>	<b>716</b>	<b>0.34</b>	35	
Melon-headed Whale	Northern Gulf of Mexico	1991-1994	3,965	0.39	30	
		1996-2001	3,451	0.55	33	
		2003-2004	2,283	0.76	35	
Pygmy Killer Whale	Northern Gulf of	1991-1994	518	0.81	30	
		1996-2001	408	0.60	33	



Species	Stock	Year	Nbest	CV	Survey Number	Notes
	Mexico	<b>2003-2004</b>	<b>323</b>	<b>0.60</b>	35	
Risso's Dolphin	Northern Gulf of Mexico	1991-1994	2,749	0.27	30	
		1996-2001	2,169	0.32	33	
		<b>2003-2004</b>	<b>1,589</b>	<b>0.27</b>	35	
Pantropical Spotted Dolphin	Northern Gulf of Mexico	1991-1994	31,320	0.20	30	
		1996-2001	91,321	0.16	33	
		<b>2003-2004</b>	<b>34,067</b>	<b>0.18</b>	35	
Striped Dolphin	Northern Gulf of Mexico	1991-1994	4,858	0.44	30	
		1996-2001	6,505	0.43	33	
		<b>2003-2004</b>	<b>3,325</b>	<b>0.48</b>	35	
Spinner Dolphin	Northern Gulf of Mexico	1991-1994	6,316	0.43	30	
		1996-2001	11,971	0.71	33	
		<b>2003-2004</b>	<b>1,989</b>	<b>0.48</b>	35	
Clymene Dolphin	Northern Gulf of Mexico	1991-1994	5,571	0.37	30	
		1996-2001	17,355	0.65	33	
		<b>2003-2004</b>	<b>6,575</b>	<b>0.36</b>	35	
Atlantic Spotted Dolphin	Northern Gulf of Mexico	1991-1994 oceanic	3,213	0.44	30	
		1996-2001 oceanic	175	0.84	33	
		1998-2001 OCS	37,611	0.28	34	This abundance estimate is from 2000-2001 surveys only. Current best population size estimate is unknown because data from the continental shelf portion of this species' range are more than 8 years old.
		2003-2004 oceanic	0	-	35	
Fraser's Dolphin	Northern Gulf of Mexico	1991-1994	127	0.90	30	
		1996-2001	726	0.70	33	
		2003-2004	0	-	35	Current best population size estimate is unknown.
Rough-toothed Dolphin	Northern Gulf of Mexico	1991-1994 oceanic	852	0.31	30	
		1996-2001 oceanic	985	0.44	33	
		1998-2001 OCS	1,145	0.83	34	This abundance estimate is from 2000-2001 surveys only. Current best population size estimate is unknown because data from the continental shelf portion of this species' range are more than 8 years old.
		2003-2004 oceanic	1,508	0.39	35	
Bottlenose Dolphin	Northern Gulf of Mexico Oceanic	1996-2001	2,239	0.41	33	
		<b>2003-2004</b>	<b>3,708</b>	<b>0.42</b>	35	
Bottlenose Dolphin	Northern Gulf of Mexico Continental Shelf	1998-2001	17,777	0.32	34	This abundance estimate is from 2000-2001 surveys only. Current best population size estimate is unknown because data from the continental shelf are more than 8 years old.
Bottlenose Dolphin	Northern Gulf of Mexico Coastal (3 stocks)	Eastern 1994	9,912	0.12	32	
		Northern 1993	4,191	0.21	31	
		Western 1992	3,499	0.21	31	Current best population size estimate for each of these 3 stocks is unknown because data are more than 8 years old.
Bottlenose Dolphin	Northern Gulf of Mexico Bay, Sound and Estuarine (33 stocks)	Barataria Bay, 2001	138	0.08		(Miller 2003)
		St. Joseph Bay, 2005-2006	81	0.14		(Balmer <i>et al.</i> 2008)
		St. Vincent Sound, Apalachicola Bay, St. George Sound, 2008	537	0.09		(Tyson 2008)
		Remaining 30 stocks	unknown	undetermined	31	Current best population size estimate for each of these 30 stocks is unknown because data are more than 8 years old.

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