Regional baselines for marine mammal knowledge across the North Sea and Atlantic areas of Scottish waters: Appendix 2 - Vital rates

Appendix 2: Vital rates

Contents

Risso's dolphin

Table 1 Demographic parameter estimates for Risso's dolphin obtained from the literature

Population	Source	Parameter	Value
In general	Taylor *et al.* (2007)	Age at first reproduction	11 years
		Interbirth interval	2.4 years
		Calf survival	0.798
		Survival (non-calf)	0.950
Taiwan	Chen *et al.* (2011)	Sexual maturity	10 years
Japan			8-10 years
western Indian Ocean			<9 years

White-beaked dolphin

Table 2 Demographic parameter estimates for white-beaked dolphin obtained from the literature

Population	Source	Parameter	Value
In general	Taylor *et al.* (2007)	Age at first reproduction	10 years
		Interbirth interval	2.5 years
		Calf survival	0.798
		Survival (non-calf)	0.95

Short-beaked common dolphin

Table 3 Demographic parameter estimates for short-beaked common dolphins obtained from the literature

Population	Source	Parameter	Value
In general	Taylor *et al.* (2007)	Age at first reproduction	9 years
		Interbirth interval	2.1 years
		Calf survival	0.798
		Survival (non-calf)	0.950
Northeast Atlantic	Winship and Hammond (2009)	Age at which 50% of animals are sexually mature	8.23 years
		Age-specific natural annual survival rate	Age <1 = 0.8 Age 1 year = 0.86 Age 2 year = 0.92 Age 2<26 years = 0.97 Age 26 years = 0.92 Age 27 years = 0.87 Age 28 years = 0.82 Age 29 years = 0.77 Age 30 years = 0.72
		Maximum birth rate	0.18 or 0.25 (result in maximum annual population growth rates of 2% and 4%, respectively)

Atlantic white-sided dolphin

Table 4 Demographic parameter estimates for Atlantic white-sided dolphins obtained from the literature

Population	Source	Parameter	Value
In general	Taylor *et al.* (2007)	Age at first reproduction	10 years
		Interbirth interval	2.5 years
		Calf survival	0.798
		Survival (non-calf)	0.950
Atlantic	Cipriano (2009)	Sexual maturity	6-12 years
		Gestation period	11 months

Long-finned pilot whale

Table 5 Demographic parameter estimates for long-finned pilot whales obtained from the literature

Population	Source	Parameter	Value
In general	Taylor *et al.* (2007)	Age at first reproduction	12 years
		Interbirth interval	3.3 years
		Calf survival	0.828
		Survival (non-calf)	0.986
Strait of Gibraltar	Verborgh *et al.* (2009)	Adult survival	0.982
	Verborgh (2015)		2006-2007 = 0.779
			2010-2011 = 0.754
	Gauffier *et al.* (2013)	Calf survival	0.629
		Juv survival	0.869
	Verborgh (2015)	Birth interval	4.5 years
Alborán Sea	Wierucka *et al.* (2014)	Adult survival	0.919-0.995
			1992-2005 = 0.919
			2006-2008 = 0.547
Faroe Islands	Bloch (1993)	Calf survival	0.862

Killer whale

Table 6 Demographic parameter estimates for killer whales obtained from the literature

Population	Source	Parameter	Value
In general	Taylor *et al.* (2007)	Age at first reproduction	14 years
		Interbirth interval	5.02 years
		Survival	Calf = 0.910 Non-calf = 0.990
northern Norway	Kuningas *et al.* (2014)	Survival	Adult M = 0.971 Adult F = 0.977 Sub-adult = 0.768
		Calving interval	3 to 14 years
		Fecundity	0.197
Crozet Archipelago	Poncelet *et al.* (2010)	Survival	Between 1977-2002: M: 0.935 – 0.895 F: 0.942 – 0.901
Northeast Pacific (northern and southern residents)	Brault and Caswell (1993)	Mean offspring production	0.1186
		Survival	Calf = 0.9554 Juvenile = 0.9847 Adult = 0.9986 Post-reproductive = 0.9804
Northeast Pacific (southern residents)	Lacy *et al.* (2015)	Annual mortality rates	Calf = 17.48% Juv = 2.15% Young adult F = 0.97% Older adult F = 2.25% Post-reproductive F = 6.29%
		Breeding rate	age 10-30 = 12.04% age 31-45 = 7.88%

Humpback whale

Table 7 Demographic parameter estimates for humpback whales obtained from the literature

Population	Source	Parameter	Value
In general	Taylor *et al.* (2007)	Age at first reproduction	6 years
		Interbirth interval	2.36 years
		Calf survival	0.760
		Survival (non-calf)	0.960
North Atlantic	Buckland (1990)	Survival	0.951
	Barlow and Clapham (1997)		0.96
East and West Australia	Zerbini *et al.* (2010)	Age at first birth	11 years
Japan			11 years
Gulf of Maine			5.9-8.78 years
Southeast Alaska			11.8 years
Southeast Alaska	Zerbini *et al.* (2010)	Birth rate	0.37
Alaska			0.36
Gulf of Maine			0.39-0.42
California			0.44
Gulf of Maine	Zerbini *et al.* (2010)	Survival (non-calf)	0.925-0.964
Western Greenland			0.957
Southeast Alaska			0.937
Southeast Alaska/Hawaii			0.951-0.957
Prince William Sound			0.984
Alaska/Hawaii			0.931
Hawaii			0.963
Eastern Australia			0.966
Gulf of Maine	Zerbini *et al.* (2010)	Calf survival	0.664-0.85
North Pacific Ocean			0.818
Gulf of St. Lawrence	Ramp *et al.* (2010)	Survival	F = 0.992 M = 0.971

Sperm whale

Table 8 Demographic parameter estimates for sperm whales obtained from the literature

Population	Source	Parameter	Value
In general	Taylor *et al.* (2007)	Age at first reproduction	12 years
		Interbirth interval	5 years
		Calf survival	0.828
		Survival (non-calf)	0.986
Global	Chiquet *et al.* (2013)	Survival	Calf = 0.9070 Juv = 0.9424 Mature = 0.9777
		Age at maturity	9 years
		Interbirth interval	3-6 years
		Gestation period	14-16 months
Global	IWC (1971)	Natural mortality rate	0.05-0.09

Fin whale

Table 9 Demographic parameter estimates for fin whales obtained from the literature

Population	Source	Parameter	Value
In general	Taylor *et al.* (2007)	Age at first repro	10 years
		Interbirth interval	2.24 years
		Calf survival	0.806
		Survival (non-calf)	0.960
Mediterranean	Arrigoni *et al.* (2011)	Calf mortality	0.774
		Juv mortality	0.184
		Adult mortality	0.063-0.022
		Net reproductive rate	0.73
Gulf of St. Lawrence	Ramp *et al.* (2014)	Survival (non-calf)	0.955

Beaked whale spp.

Table 10 Demographic parameter estimates for northern bottlenose whale obtained from the literature

Population	Source	Parameter	Value
In general	Taylor *et al.* (2007)	Age at first reproduction	14 years
		Interbirth interval	2 years
		Calf survival	0.798
		Survival (non-calf)	0.950
Labrador Sea	Christensen (1973)	Gestation length	365 days
		Lactation duration	365 days
North Atlantic	Benjaminsen and Christensen (1979)	Minimum age of sexual maturity	7 years
		Mean age at sexual maturity (f)	11 years
		Mean age at sexual maturity (m)	7-11 years
		Lactation duration	1 year
		Interbirth interval	2 years

Table 11 Demographic parameter estimates for Sowerby's beaked whale obtained from the literature

Population	Source	Parameter	Value
In general	Taylor *et al.* (2007)	Calf survival	0.798
		Survival (non-calf)	0.950
In general	Mead (1984)	Gestation length	365 days
		Lactation duration	365 days
In general	New *et al.* (2013)	Lactation duration	365 days

Table 12 Demographic parameter estimates for Cuvier's beaked whale obtained from the literature

Population	Source	Parameter	Value
In general	Taylor *et al.* (2007)	Calf survival	0.798
		Survival (non-calf)	0.950
In general	New *et al.* (2013)	Gestation period	365 days
		Lactation duration	365 days

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