

Short Note

Mixed-Species Associations of Marine Mammals in the Southern California Bight, with Emphasis on Risso's Dolphins (*Grampus griseus*)

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Supplemental Materials

Table S1. List of mixed-species associations made during southern California marine mammal aerial survey monitoring, 2008-2013

Date (d/mo/y)	Species 1	# of indiv.	Species 2	# of indiv.	Species 3	# of indiv.	Latitude (North)	Longitude (West)	Water season*	Behavioral state **
17/10/2008	Common dolphin sp.	1,200	Bottlenose dolphin	75	--	--	33.0905	-117.4190	Warm	F, S
20/10/2008	Risso's dolphin	23	Bottlenose dolphin	6	--	--	33.2719	-118.2600	Warm	T
21/10/2008	Common dolphin sp.	38	Bottlenose dolphin	37	California sea lion	4	33.2553	-118.1844	Warm	T
17/11/2008	Pacific white-sided dolphin	300	Short-beaked common dolphin	240	--	--	32.7690	-117.5201	Cold	F, M
17/11/2008	Short-beaked common dolphin	60	California sea lion	7	--	--	32.6338	-118.0311	Cold	F, M
18/11/2008	Common dolphin sp.	50	California sea lion	7	--	--	32.5905	-117.9241	Cold	T
6/6/2009	Northern right whale dolphin	700	Fin whale	2	--	--	32.9104	-119.1821	Warm	T, S
7/6/2009	Risso's dolphin	60	Common dolphin sp.	52	--	--	32.6056	-117.8228	Warm	T
11/6/2009	Fin whale	1	Blue whale	1	--	--	33.1191	-117.4537	Warm	F
11/6/2009	Common dolphin sp.	700	Blue whale	1	--	--	33.01.201	-117.3043	Warm	T
20/7/2009	Unidentified dolphin	30	Unidentified dolphin	2	--	--	32.9488	-117.7831	Warm	T
27/7/2009	Short-beaked common dolphin	230	California sea lion	1	--	--	32.8971	-118.1566	Warm	F
17/5/2010	Unidentified dolphin	90	Risso's dolphin	28	California sea lion	1	32.9385	-118.1627	Warm	F, M
17/5/2010	Risso's dolphin	35	Bottlenose dolphin	12	--	--	33.1575	-117.4603	Warm	T
17/5/2010	Risso's dolphin	44	California sea lion	1	--	--	32.8721	-118.2795	Warm	T, F
17/5/2010	Common dolphin sp.	500	Pacific white-sided dolphin	26	California sea lion	4	32.9492	-117.9017	Warm	R, F, M
27/7/2010	Blue whale	6	Fin whale	2	--	--	32.8287	-117.3788	Warm	F
28/7/2010	Blue whale	5	Fin whale	3	--	--	32.6433	-117.3460	Warm	F
31/7/2010	Blue whale	1	Fin whale	1	--	--	33.0567	-117.3682	Warm	S
2/8/2010	Common dolphin sp.	300	Blue whale	3	--	--	32.9122	-117.3052	Warm	M
23/9/2010	Common dolphin sp.	60	California sea lion	1	--	--	32.8773	-118.2473	Warm	F
24/9/2010	California sea lion	30	Unidentified dolphin	4	--	--	32.9785	-119.2063	Warm	T
24/9/2010	Long-beaked common dolphin	250	Risso's dolphin	2	--	--	32.9922	-118.3178	Warm	T

25/9/2010	Common dolphin sp.	700	Risso's dolphin	10	--	--	32.9450	-117.6785	Warm	T
1/4/2011	Risso's dolphin	20	Northern right whale dolphin	8	--	--	32.9515	-118.6773	Cold	F, S
1/4/2011	Risso's dolphin	11	Northern right whale dolphin	2	--	--	33.0015	-118.7087	Cold	F
18/4/2011	Risso's dolphin	7	Bottlenose dolphin	5	--	--	33.0802	-117.6663	Cold	T
10/5/2011	Bottlenose dolphin	10	Blue whale	2	--	--	32.7900	-117.3975	Warm	S
10/5/2011	Fin whale	2	Blue whale	2	--	--	32.8778	-117.3047	Warm	F
11/5/2011	Risso's dolphin	32	Bottlenose dolphin	8	--	--	32.6730	-117.5750	Warm	T
14/5/2011	Northern right whale dolphin	50	Sperm whale	24	Risso's dolphin	11	32.6228	-117.7247	Warm	T, S
30/1/2012	Gray whale	4	Bottlenose dolphin	2	--	--	32.9204	-117.2956	Cold	T
2/2/2012	Risso's dolphin	75	Bottlenose dolphin	25	--	--	33.4176	-118.1176	Cold	T
4/2/2012	Risso's dolphin	48	Northern right whale dolphin	1	--	--	32.8099	-118.6381	Cold	T
13/3/2012	Risso's dolphin	7	Bottlenose dolphin	5	--	--	32.6263	-118.0023	Cold	T
14/3/2012	Bottlenose dolphin	25	Risso's dolphin	15	--	--	32.6669	-117.5390	Cold	R
29/3/2012	Common dolphin sp.	125	Fin whale	1	--	--	33.2272	-117.5354	Cold	T
30/3/2012	Long-beaked common dolphin	50	Gray whale	2	--	--	32.7349	-117.7448	Cold	T, M
30/3/2012	Risso's dolphin	15	California sea lion	1	--	--	32.6312	-118.0085	Cold	T, M
26/3/2013	Humpback whale	1	California sea lion	1	--	--	33.2374	-118.0719	Cold	T
26/3/2013	Minke whale	4	Fin whale	1	Humpback whale	1	33.2375	-118.0720	Cold	T, R
28/3/2013	Risso's dolphin	23	Minke whale	1	--	--	33.0612	-118.0263	Cold	S
29/3/2013	Common dolphin sp.	60	California sea lion	8	--	--	33.1598	-117.3802	Cold	T
30/3/2013	Fin whale	3	Minke whale	1	--	--	32.9063	-119.0729	Cold	S
30/3/2013	Risso's dolphin	18	Northern right whale dolphin	1	--	--	32.9969	-118.8068	Cold	S
24/5/2013	Risso's dolphin	15	Bottlenose dolphin	10	--	--	32.6257	-118.1290	Warm	F
24/5/2013	Risso's dolphin	25	Pacific white-sided dolphin	1	--	--	32.7429	-118.3399	Warm	S
25/5/2013	Short-beaked common dolphin	10	Northern right whale dolphin	2	--	--	32.9788	-118.8030	Warm	S
26/5/2013	Risso's dolphin	22	Common dolphin sp.	2	--	--	33.2483	-118.3121	Warm	F
26/5/2013	Risso's dolphin	37	California sea lion	4	--	--	32.8342	-118.3326	Warm	T

*Warm-water season (May to October) and cold-water season (November to April)
 **Behavioral states: F = Foraging, M = Milling, R = Resting, S = Socializing, and T = Traveling (see Smultea & Bacon, 2012, for definitions).

Table S2. Documented marine mammal mixed-species associations involving Risso's dolphin off northern, central, and southern California. NC = Northern California (California-Oregon border to San Mateo), CC = Central California (San Mateo to Santa Barbara), and SC = Southern California (Santa Barbara to U.S.-Mexico border).

Species*	NC	CC	SC	Source
Gray whale	X			Leatherwood, 1974; Sheldon et al., 1995
Blue whale		X		Mangels & Gerrodette, 1994
Fin whale	X	X		Dohl et al., 1983
Sperm whale			X	Smultea et al., 2014
Dall's porpoise		X	X	Leatherwood, 1974; Kruse, 1989
Pacific white-sided dolphin	X	X		Leatherwood, 1974; Kruse, 1989; Carretta & Forney, 1993; Black, 1994; Von Saunder & Barlow, 1999; Sheldon & Laake, 2002; Appler et al., 2004; Smultea & Bacon, 2013
Bottlenose dolphin	X	X	X	CCMS, 1978; Oliver, 1991; Hill & Barlow, 1992; Carretta & Forney, 1993; Mangels & Gerrodette, 1994; Carretta et al., 1995; Shane, 1995; Von Saunder & Barlow, 1999; Kinzey et al., 1999, 2000; Appler et al., 2004; Bearzi, 2005; Barlow et al., 2010; Bearzi & Saylan, 2011; Smultea & Bacon, 2012; Douglas et al., 2014; Jefferson et al., 2014
Striped dolphin	X	X	X	Fiscus & Niggol, 1965; Hill & Barlow, 1992; Mangels & Gerrodette, 1994; Kinzey et al., 1999
Short-beaked common dolphin	X	X		Hill & Barlow, 1992; Carretta & Forney, 1993; Carretta et al., 1995
Long-beaked common dolphin		X	X	Appler et al., 2004; Smultea & Bacon, 2012
<i>Delphinus</i> sp.		X	X	Leatherwood, 1974; Hill & Barlow, 1992; Smultea & Bacon, 2012
Northern right whale dolphin	X	X	X	Fiscus & Niggol, 1965; Leatherwood, 1974; CCMS, 1978; Leatherwood et al., 1987; Kruse, 1989; Dohl et al., 1983; Hill & Barlow, 1992; Carretta & Forney, 1993; Black, 1994; Mangels & Gerrodette, 1994; Carretta et al., 1995; Von Saunder & Barlow, 1999; Sheldon & Laake, 2002; Appler et al., 2004; Sheldon & Rugh, 2010; Smultea & Bacon, 2012; Douglas et al., 2014; Smultea et al., 2014
Killer whale			X	Dahlheim et al., 2008
Short-finned pilot whale	X	X	X	Fiscus & Niggol, 1965; Leatherwood et al., 1987; Shane, 1995; Kinzey et al., 1999, 2000
<i>Mesoplodon</i> sp.			X	CCMS, 1978
California sea lion		X	X	Carretta & Forney, 1993; Carretta et al., 1995; Smultea & Bacon, 2012
Unidentified dolphin	X	X		Von Saunder & Barlow, 1999
Unidentified pinniped		X	X	Carretta et al., 1995

*Species were seen in mixed-species association with more than one species.

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