COSTA RICA DOME BLUE WHALE CRUISE REPORT

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Cascadia Research Collective
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Vessels: 50' (15m) Sailing vessel 'Russamee'
14' (4.3m) Inflatable launch

Cruise Dates: Leg 1: 13-30 January 1999
Leg 2: 10-22 March 1999

Funding: National Geographic Explorers Council
Michuru and Yuki Ogino

Itinerary:

13 Jan 1999	Depart Zihuatenejo, Mexico
30 Jan 1999	Return Acapulco, Mexico
9 Mar 1999	Depart Flamingo, Costa Rica
22 Mar 1999	Return Zihuatenejo, Mexico

Objectives:

The primary focus of this cruise was to investigate the occurrence of blue whales at the Costa Rica Dome. Individual identification photographs, skin samples, recordings of vocalizations and behavioral data were gathered for later comparison and analysis.

Study Area:

Blue whales are known to occur over a wide area of the eastern tropical Pacific but most densely at or near the Costa Rica Dome. Our primary study area targeted this region but survey effort also included the entire vessel track from Zihuatenejo to Acapulco, Mexico and from Flamingo, Costa Rica to Zihuatenejo, Mexico.

Personnel:

Leg1:	Todd Chandler	Captain/Observer, CRC
	John Calambokidis	Chief Scientist/Observer, CRC
	Kristin Rasmussen	Observer, CRC
	Annie Douglas	Observer/Cook, CRC
	Carl Deskins	First Mate/Engineer, CRC
	John Francis	Producer/Observer, Nat. Geo
	Jordan Klein, Jr.	Cameraman, Nat Geo

Leg2:	Todd Chandler	Captain/Observer, CRC
	Kristin Rasmussen	Chief Scientist/Observer, CRC
	Annie Douglas	Observer/Cook, CRC
	George Kurzman	First Mate/Observer, CRC
	Lydia Neilson	Observer, CRC
	Emily Walton	Observer, CRC

Methods:

Survey Methods

At least one and usually two people observed from the crow's nests (7.6 m) whenever weather was acceptable during daylight hours. To assist in detecting whales a hydrophone was lowered periodically. When whales were sighted and weather permitted, a 4.3m inflatable boat was launched to approach whales to obtain photographs, skin samples, and hydrophone recordings. Data were gathered from the primary survey vessel when it was not possible to launch the inflatable boat or when multiple sightings occurred simultaneously.

Photographic identification

Identification photographs were taken with *Nikon* 8008s or N90s cameras equipped with 300mm telephoto lenses. High-speed black and white film (*Ilford* HP-5+) was exposed pushed 1 1/2 stops so that exposure times were generally 1/1000 or 1/2000 sec. Both right and left sides of the blue whales were photographed when possible as well as the ventral side of the flukes.

Behavioral observations and associations

Behaviors of animals that we approached were recorded. These behaviors were assessed throughout the sighting and described at the end of the sighting and varied from a single behavior (*i.e.*, slow travel, stationary, unknown) to a range of behaviors (*i.e.*, slow travel and milling, milling and surface lunge feeding). Associations with other animals such as birds or other marine mammals were also recorded.

Hydrophone recordings

We used a hydrophone made by Offshore Acoustics (sensitivity -154 dBV/uPa ±4 dB at 100 Hz, frequency response from 6 Hz to 14 kHz ±3 dB) with a 10m cable to listen for and record blue whale vocalizations. When vocalizations were heard or when blue whales were sighted, recordings of 10-30 minutes were made onto Digital Audio Tape (DAT) with a *Sony* TCD-D7 DAT recorder (frequency response 20-14,000 Hz, 32 Hz sampling rate). Mark McDonald, Whale Acoustics, determined presence of cetacean vocalizations.

Skin Samples

Sloughed-skin samples were collected opportunistically in the footprint of the animals. These samples were preserved in DMSO for later analysis.

Results:

Effort

A total of 2400 km (1300 nm) were surveyed during daylight hours on both legs to the Costa Rica Dome (Fig. 1). Survey effort was conducted with at least one observer in the crow's nest except on one day when observations were conducted from the cockpit during rough weather.

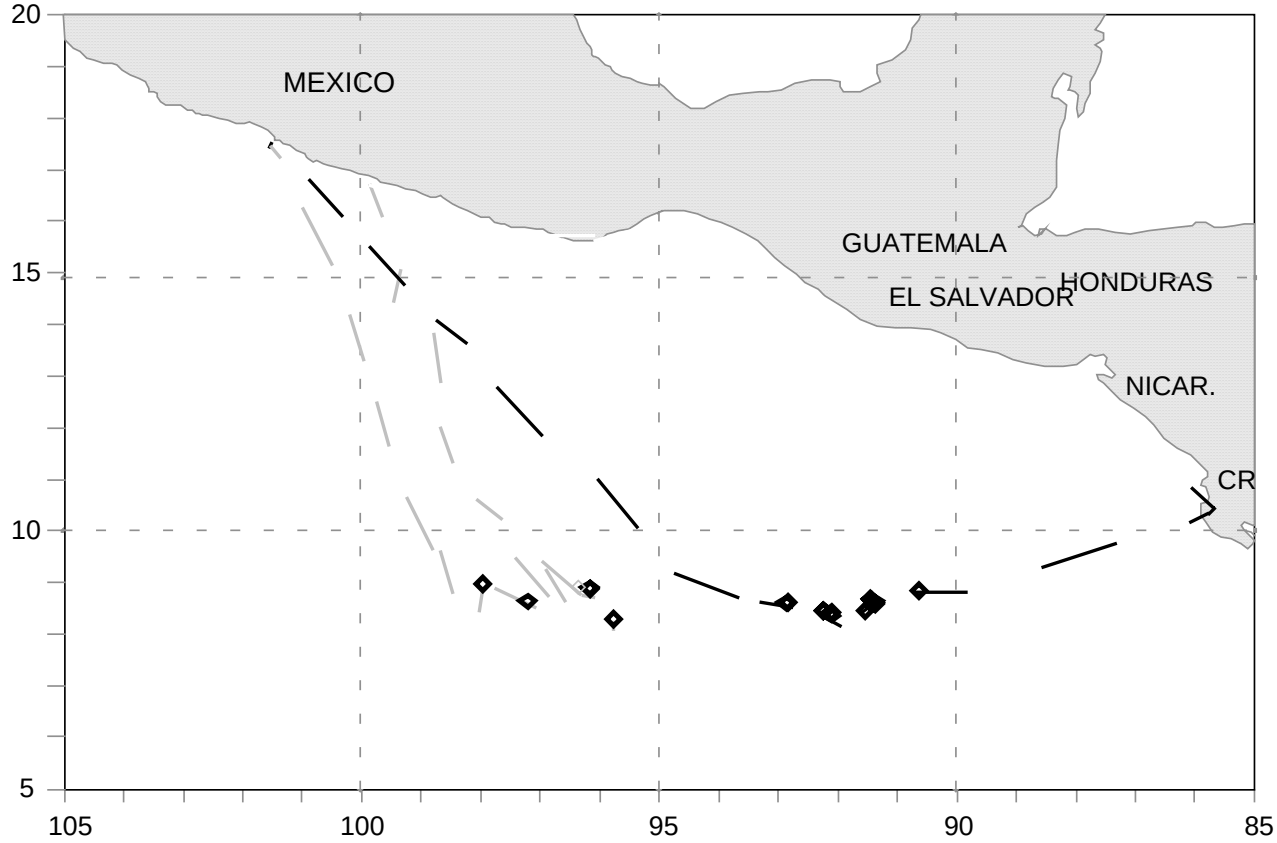

Figure 1. Survey effort and blue whale sightings during the Jan-Mar 1999 surveys. January effort is shown in gray and March effort is shown in black.

Sighting Results

Twenty-four sightings of 28 blue whales (Fig 1, Table 1) were made from 250 to 420 nmi offshore of Costa Rica between 13 January and 22 March 1999. All sightings of blue whales were of single (83%) or paired (17%) animals. Although no confirmed sightings were made of mother-calf pairs, we had one tentative sighting of a calf from a distance but we could not confirm the sighting due to poor weather.

Table 1. Blue whale sightings during the 1999 CRC blue whale survey to the Costa Rica Dome.

Date	Time	Total #	# IDed	Lat°N	Long°W	ID1	ID2	Behavior
19-Jan	16 03	1	1	9 00.90	97 59.97	148		slow travel
20-Jan	16 31	2	0	8 39.95	97 14.71			racing
23-Jan	09 31	2	2	8 55.62	96 12.26	1210	1506	milling, slow travel
23-Jan	10 53	1	0	8 53.71	96 11.19			
24-Jan	16 53	2	0	8 19.97	95 48.69			
25-Jan	07 00	1	0	8 54.19	96 21.65			
12-Mar	14 18	1	1	8 52.54	90 39.98	1504		milling
13-Mar	08 13	1	2	8 41.05	91 27.84	302	964	milling, slow travel
13-Mar	08 36	1	0	8 41.07	91 27.85	PQ-1		milling
13-Mar	08 45	1	1	8 41.05	91 27.93	302		milling
13-Mar	08 57	1	1	8 41.06	91 27.53	1505		slow travel
13-Mar	09 10	1	1	8 42.31	91 28.80	302		slow travel
13-Mar	09 19	1	0	8 42.11	91 28.80	PQ-1		slow travel
13-Mar	11 02	1	1	8 39.98	91 25.05	717		miling, slow travel
13-Mar	12 05	1	1	8 38.78	91 25.09	1505		milling, slow travel
13-Mar	13 16	1	1	8 36.09	91 24.02	964		milling, slow travel
13-Mar	16 05	1	1	8 29.21	91 33.72			fast travel
14-Mar	10 32	1	1	8 24.34	92 08.61	737		fast travel
14-Mar	10 37	2	0	8 24.23	92 08.84			
14-Mar	13 10	1	1	8 26.68	92 08.64	737		
14-Mar	16 30	1	1	8 28.97	92 15.93	1503		
14-Mar	16 59	1	0	8 28.98	92 15.55			
15-Mar	09 13	1	1	8 39.28	92 51.91	1500		
15-Mar	12 14	1	0	8 37.74	92 54.38			

Photographic identification

Good-quality identification photographs were taken of 13 individual animals (Table 2). Most of these animals (10 of 13) were photographed on the second leg in March with all of those sightings occurring on the same day or on consecutive days.

Table 2. Information on the 13 blue whales identified during the 1999 CRC blue whale survey to the Costa Rican Dome. Resightings of these individuals are reported from photo-identification studies off California during studies between 1986-2003 by Cascadia Research.

Date	ID No.	Latitude	Longitude	Years seen off CA
01/19/99	148	9 00 N	098 00 W	87, 92, 94, 97, 98, 99, 00
01/23/99	1210	8 55 N	96 10 W	96, 01, 03
01/23/99	1506	8 55 N	96 10 W	92, 95, 01, 03

03/12/99	1504	8 53 N	90 40 W	
03/13/99	302	8 41 N	91 28 W	86, 87, 91, 92, 95, 99, 01
03/13/99	964	8 41 N	91 27 W	94
03/13/99	1505	8 41 N	91 27 W	
03/13/99	717	8 39 N	91 25 W	92, 01
03/13/99	1501	8 29 N	91 33 W	01, 03
03/13/99	1502	8 38 N	91 25 W	
03/14/99	737	8 24 N	92 08 W	92
03/14/99	1503	8 28 N	92 15 W	
03/15/99	1500	8 39 N	92 51 W	

Behavioral Observations

Of the whales identified, a range of behaviors seen included: slow and fast travel, milling, and racing (Table 1). Slow travel (60%) and milling (53%) behaviors were most commonly seen. On two occasions, light reddish-brown feces were observed in the animals' wake, indicating the blue whales were likely feeding (although no feed was visible). We attempted to collect feces but it dissipated too quickly.

Acoustics

Ten recordings were made while in the presence of or while searching for blue whales (Table 3). Vocalizations were detected on five of the seven recordings made in the presence of blue whales and on two recordings when no whales were in view (data from Mark McDonald). On one occasion no blue whale calls were detected while a blue whale was in close proximity. Spectrogram review was conducted and revealed all call types were of those previously described for the northeastern Pacific blue whale and included types A, B and A-B.

Table 3. Log of recordings or attempted recordings from the 1999 CRC blue whale survey to the Costa Rica Dome. Species codes are Bm for blue whales, Oo for Orca, and Sb for rough-toothed dolphin. A and B calls are principal components of eastern North Pacific blue whale call.

Date	Begin	End	N Lat	W Long	Sp. seen	Qual	Comments
19-Jan	10:43	10:53	8 44.9	97 54.2	5 Oo	F-G	A-B calls heard; no sighting
19-Jan	16:03	16:05	7 01.0	97 59.6	1 Bm	F	Audible A-B call
19-Jan	17:32	17:46	8 59.9	97 58.8	1 Bm	G	Multiple clear A and B calls
22-Jan	18:05	18:14	8 46.3	96 36.1	20 Sb	G-F	Clear A call, then B, then A
23-Jan	8:02	8:11	8 54.0	96 19.1	2 Oo	F	Audible whistles and clicks
23-Jan	11:14	11:15	8 54.4	96 10.4	1 Bm	G	Close animal, no calls heard
23-Jan	11:23	11:26	8 54.6	96 10.1	2 Bm	F-P	Distant A call –whales 150m away
23-Jan	13:03	13:11	8 54.7	96 08.5	2 Bm	F	Distant A and B calls, skin, IDs
12-Mar	17:09	17:22	8 55.0	90 40.8	1 Bm	G	No blue whale calls
13-Mar	17:37	17:37	8 34.2	91 38.2	1 Bm	G	No whale calls - dolphins and ship

Skin Samples

A total of 12 sloughed-skin samples were collected from the wakes of blue whales during both legs to the Costa Rica Dome (Table 4). Samples were submitted to SWFSC for determination of sex. Samples were also analyzed by Carole Conway, Univ. California, Davis. Sex was difficult to determine from the samples because of the small amount of low quality DNA present in the sloughed skin samples.

Table 4. Dates and locations where sloughed skin samples were collected during the 1999 CRC blue whale survey to the Costa Rica Dome.

Field Id #	Date Collected	Latitude	Longitude
CRC-BM-99-1	19-Jan	9 00 N	97 59 W
CRC-BM-99-2	23-Jan	8 53 N	96 10 W
CRC-BM-99-3	23-Jan	8 54 N	96 09 W
CRC-BM-99-4	23-Jan	8 54 N	96 08 W
CRC-BM-99-5	13-Mar	8 41 N	91 26 W
CRC-BM-99-6	13-Mar	8 38 N	91 25 W
CRC-BM-99-7	13-Mar	8 39 N	91 23 W
CRC-BM-99-8	13-Mar	8 36 N	91 24 W
CRC-BM-99-9	13-Mar	8 33 N	91 37 W
CRC-BM-99-10	14-Mar	8 25 N	92 09 W
CRC-BM-99-11	14-Mar	8 26 N	92 08 W
CRC-BM-99-12	14-Mar	8 28 N	92 15 W