

Aerial Survey Monitoring for Marine Mammals and Sea Turtles in the Hawaii Range Complex in Conjunction with a Navy Training Event

SCC February 19–21
and August 12–13, 2013



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14. ABSTRACT Aerial surveys of marine mammals and sea turtles (MM/ST) were conducted in the waters off the Pacific Missile Range Facility (PMRF), Kauai, Hawaii, during the periods Feb 19-21 and Aug 12-13, 2013 in conjunction with Submarine Commander Course (SCC) training events. The February event corresponded with the time of peak residency of humpback whales on the Hawaiian wintering grounds, whereas during the August event, humpback whales are not normally present. Surveys during both months involved flying elliptical orbits ahead of a missile destroyer (DDG) to detect and monitor any MM/ST within approximately 5 km of the ship. Upon detection, a focal follow procedure was initiated, whereby the survey plane increased altitude from 244 to 305 m to reduce potential for reaction to the plane. Survey effort comprised a total of 15.3 and 8.1 hours and approximately 2,834 and 1,500 km for the February and August events, respectively, with the majority of effort occurring in poor sea state conditions (Bf = 6) in both cases. For the February event, a total of 40 sightings were recorded, including 37 confirmed humpback whales, one unidentified large whale (likely humpback), an unidentified species of sea turtle, and one unidentified dolphin species. Of these, six sightings occurred while orbiting the DDG, including five pods of humpback whales and one unidentified sea turtle. One focal follow was performed on a pod of two humpback whales, which resulted in a 19-minute video. The latter will be added to the focal follow videos obtained during previous SCC events for subsequent analysis of behavioral response. For the August event, three unidentified dolphin groups were seen, all within 5 km of the DDG. Focal follows were not possible in these cases due to poor sea state conditions. Additionally, three sightings of an unidentified turtle species were recorded during transits along the Kauai coastline.		

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Cover Photo: Humpback whales (*Megaptera novaeangliae*) photographed with a telephoto lens from the aircraft during an aerial monitoring survey in Hawaii. Photograph by J. Mobley taken under NOAA Permit No. 642-1536-03 issued to Joseph R. Mobley, Jr. Graphic: K. Lomac-MacNair.

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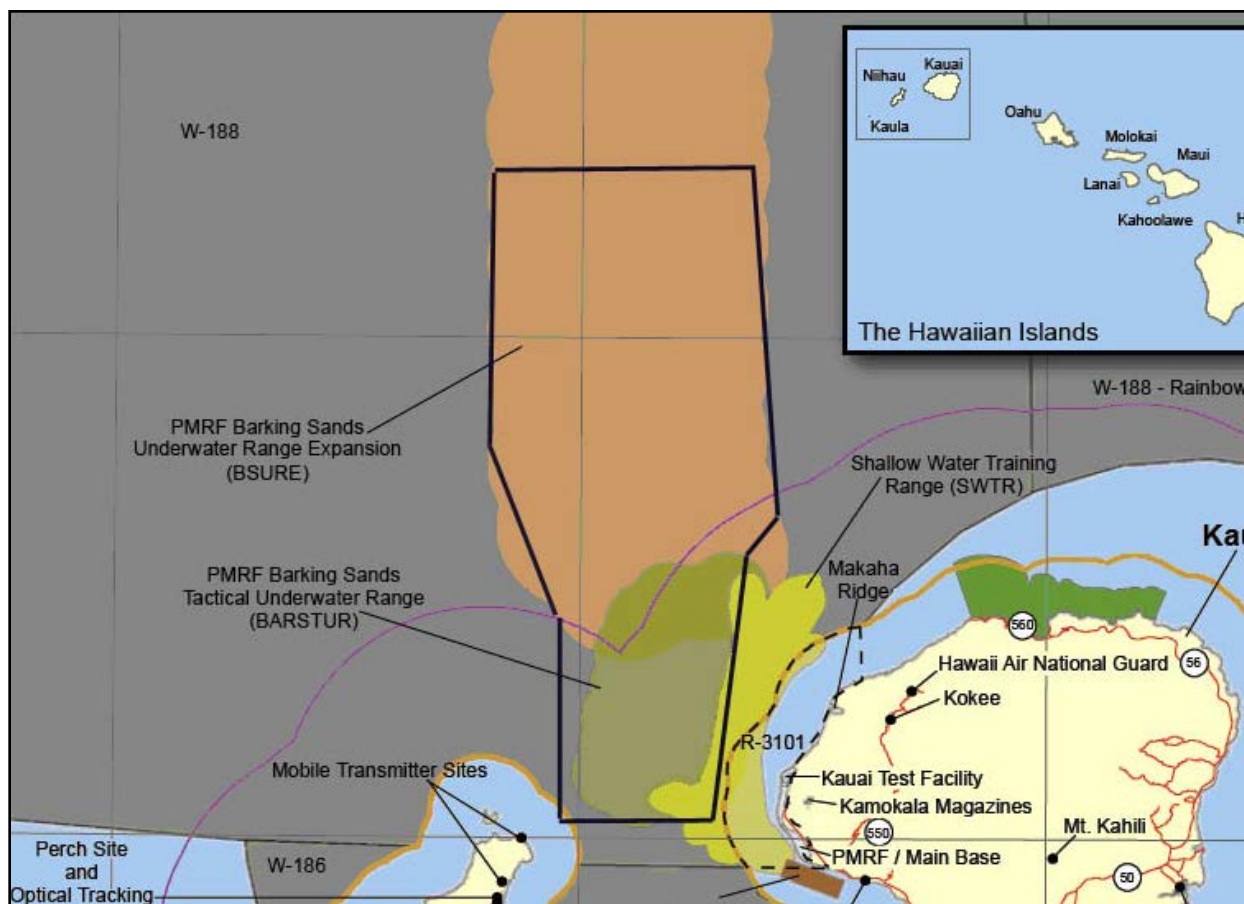
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ACRONYMS AND ABBREVIATIONS

ASW	Anti-Submarine Warfare
BARSTUR	Barking Sands Tactical Underwater Range
BSS	Beaufort Sea State
BSURE	Barking Sands Underwater Range Extension
DDG	missile destroyer
HST	Hawaii Standard Time
HRC	Hawaii Range Complex
hrs	hour(s)
km	kilometer(s)
kn	knots
MFAS	Mid-frequency Active Sonar
MM/ST	marine mammals and sea turtles
no.	number
NTR	Navy Technical Representative
PMRF	Pacific Missile Range Facility
SCC	Submarine Commander's Course
SOW	Statement of Work
U.S.	United States

1 Section 1 Introduction

2 Aerial surveys to monitor marine mammals and sea turtles (MM/ST) were conducted in
 3 conjunction with a United States (U.S.) Commander Pacific Fleet training event in the Hawaii
 4 Range Complex (HRC) on the Pacific Missile Range Facility (PMRF) Barking Sands Tactical
 5 Underwater Range (BARSTUR) and Barking Sands Underwater Range Extension (BSURE)
 6 between Kauai and Niihau, Hawaii (**Figure 1**), during the period 19 to 21 February and
 7 12 to 13 August, 2013. The Submarine Commander's Course (SCC) training event occurred in
 8 waters adjoining Kauai and Niihau and involved surface ships, submarines and aircraft.



9
 10 **Figure 1. Location of the aerial survey monitoring area (black box area for ship follows) in**
 11 **and near the U.S. Navy PMRF Range west and northwest of Kauai, Hawaii.**

12 The survey methods and sampling design were submitted and approved in advance per the
 13 Statement of Work (SOW) to the Navy), and followed previously established protocol
 14 (Mobley 2011, Mobley and Milette 2010, Smultea et al. 2009a,b).

15 Prior to the training event, the Principal Investigator (Joseph Mobley) and pilots (Stephen
 16 Holmes and John Sharkey) attended pre-planning sessions known as 'pre-sails' with Navy
 17 representatives at Pearl Harbor, to coordinate survey efforts with the SCC February and August
 18 2013 training events. Per the SOW, the goal of the aerial survey was to identify whale or dolphin

1 pods near the DDG (within 5 kilometers [km]), then perform focal follows using accepted
2 observation methods (Altmann 1974) to monitor their behavior for any changes.

3 The DDG being followed by the aircraft was conducting anti-submarine warfare (ASW) training
4 events such that the vessel was sometimes utilizing mid-frequency active sonar (MFAS). Since
5 MFAS locations and transmission times were unknown to the observers during this field survey
6 effort, no effort was made to determine types or level of response of MM/ST to these
7 transmissions. Rather, as stated in the SOW, survey data collected during this monitoring effort
8 will be compiled with previous (Mobley and Pacini 2012, Mobley 2011, Mobley and Milette
9 2010) and subsequent data, and analyzed by the Navy.

10 Survey effort during this training event is summarized below (**Table 1**):

11 **Table 1. Summary of Effort Type, Hours, and Sea State by Date**

Date	Type of Effort	No. Hrs Effort*	Mean Beaufort Sea State
Part A: February Surveys 2013			
2/19/13	With DDG	5:37	5.9
2/20/13	With DDG	6:18	5.9
2/21/13	With DDG	3:25	5.8
Total		15:20	5.9
Part B: August Surveys 2013			
8/12/13	With DDG	6:18	5.2
8/13/13	With DDG	5:46	5.8
Total		12:04	5.5

* Note: Computed wheels up to wheels down

12 Section 2 Methods

13 Monitoring effort followed protocols implemented in previous SCC training events (Mobley
14 2011, Mobley and Milette 2010). The approach involved flying elliptical-shaped patterns in
15 advance of the Navy vessel (DDG) that extended from the front of the ship (approximately
16 200 meters [656 feet]) out to approximately 2,500 meters (8,202 feet) over a width of 5 km (3
17 miles).

18 February 2013 surveys were conducted from a small fixed-wing Partenavia P68 Observer for all
19 3 days. During the August 2013 surveys, an Aero Commander was used. The aircraft flew at 100
20 knots (kn) groundspeed and an altitude of approximately 305 m (1,000 feet), unless the pilot was
21 directed to fly at alternate altitudes by flight controllers for safety reasons. Observations from the
22 monitoring aircraft involved six personnel including the pilot and copilot, plus two primary
23 observers, a data recorder, and secondary observer/videographer. The survey crew and pilot were
24 not informed as to the status of MFAS transmissions, which minimized the potential for
25 observational bias.

1 When animals were detected, the vertical angle to the sighting when abeam at 90 degrees to the
2 trackline was recorded using hand-held Suunto clinometers, typically followed by orbiting to
3 identify species and, in the case of marine mammals, to characterize behavior and direction of
4 travel. Photographs were taken opportunistically by the data recorder to assist in species
5 identification using a Canon 5D digital camera with a Canon 100–400 millimeter telephoto lens
6 with image stabilizer. Environmental data (Beaufort Sea State [BSS], glare and visibility) were
7 recorded at the start of the effort and when conditions changed. Positional data via GPS were
8 automatically recorded every 3 seconds and manually when sightings occurred. Data were
9 recorded using Mysticetus (version 1.7.0.85).

10 When pods were observed close to the DDG (i.e., within 5 km [3 miles]) and were judged to be
11 suitable (i.e., were visible at the surface for extended periods) focal follows were performed
12 using accepted methods (Altmann 1974). The aircraft ascended to 457 meters (1,500 feet), an
13 altitude shown to minimize reactivity to fixed-wing aircraft (Smultea et al. 1995), and the pod
14 was orbited and behavior video-recorded for as long as possible. A high-definition Canon Vixia
15 HF10 camcorder with 12-power optical zoom was used to video focal follows. The intercom
16 system of the aircraft inputted to the audio port of the digital camcorder so that all behavioral
17 observations could be recorded with a minimum of ambient noise. Time stamps on the Canon
18 camcorder were synchronized with those from the Garmin GPS receiver. The resultant digital
19 audio/video file and digital photos will be made available to the Navy for subsequent behavioral
20 analysis.

21 ***Communications***

22 Communications were possible between the survey aircraft and marine mammal observers
23 aboard the DDG using aviation-band VHF radios broadcasting on 123.45 MHz. This system was
24 reliable whenever the aircraft was in the vicinity of the ship (i.e., less than 10 km [6 miles]) and
25 when personnel onboard the DDG were outside on the bridge wings. Communications at greater
26 distances were possible via radio communications with PMRF Range Control or Outrider Bravo.
27 Daily locations of the DDG were usually communicated via onboard VHF radio once in the air
28 via PMRF Range Control or Outrider Bravo. A standard operating procedure was established
29 prior to the event which was to be followed in the event that communications were lost
30 (**Appendix A**).

31 ***Safety***

32 Safety on the PMRF Range is paramount. After a safety debriefing held at the PMRF on 27 July
33 2011, rules were established to ensure the safe operation of our civilian aircraft in the context of
34 a Navy training event with active military aircraft in the vicinity (**Appendix A**). Safety issues
35 were further discussed as part of the pre-sail briefing held on 11 February 2013 prior to the
36 training event.

1 Section 3 Results and Discussion

2 *Effort*

3 During the February SCC event surveys, the aircraft accompanied the DDG for 9.3 hours (hr)
 4 (61 percent) of the total 15.3 hr of SCC-related flight time (**Table 2, Part A**). The remaining
 5 6.0 hr (39 percent) while not with the DDG primarily involved transiting between the DDG's
 6 location and Lihue, Kauai for refueling (**Figure 2**). The aircraft was considered "with the DDG"
 7 upon commencement of elliptical orbits around the ship's location and "not with the DDG" when
 8 not orbiting. Sightings that were initially recorded while orbiting were noted as "sightings with
 9 DDG" otherwise they were noted as "away from DDG."

10 During the August SCC event surveys, the aircraft accompanied the DDG for 8.1 hr across the 2
 11 days of surveys (67 percent) of the total 12.1 hr of survey effort (**Table 2, Part B**). The
 12 remaining 3.9 hr (32 percent) was spent transiting to and from Lihue airport for refueling.

13 **Table 2. Survey Effort (with and not with DDG).**

Date	Time Wheels up	Time Wheels Down	Total Flight Hours	Period not with <i>DDG</i>	Total Hours not with <i>DDG</i>	Period with <i>DDG</i> *	Total Hours with <i>DDG</i>	No. of Sightings with <i>DDG</i>	No. of Sightings away from <i>DDG</i>
Part A. February Surveys 2013									
2/19/13	8:13 13:41	11:13 16:18	5:37	8:13-8:44 10:45-11:13 13:41-14:05 15:48-16:18	1:53	8:44-10:45 14:05-15:48	3:44	1	8
2/20/13	8:09 13:32	11:35 16:25	6:18	8:09-8:32 10:28-11:35 13:32-13:58 15:55-16:25	2:26	8:32-10:28 13:58-15:55	3:53	3	13
2/21/13	8:03	11:27	3:25	8:03-8:30 10:12-11:27	1:42	08:30-10:12	1:42	2**	14
			15:20	6:01		9:19		6	34
Part B. August Surveys 2013									
8/12/13	8:38 13:38	12:02 16:32	6:18	8:38-8:55 10:25-11:04 11:37-12:02 13:38-14:15 16:01-16:32	2:30	8:55-10:25 11:04-11:37 14:15-16:01	3:48	0	0
8/13/13	8:40 14:25	12:05 16:48	5:46	8:40-9:05 11:40-12:05 14:27-14:47 16:32-16:48	1:26	9:05-11:40 14:47-16:32	4:20	3	3
			12:04	3:56		8:08		3	3

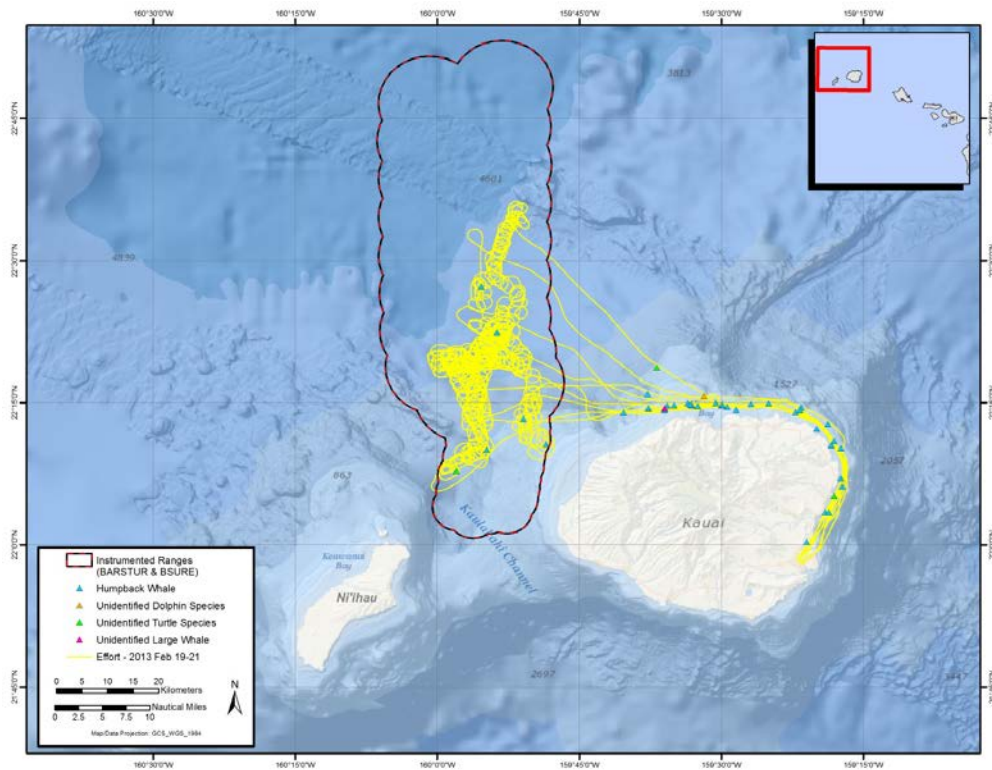
Notes:

All times are Hawaii Standard Time (HST).

*Survey plane noted as "with DDG" during elliptical orbits around ship; otherwise noted as "not with DDG." Sightings were noted as "with DDG" if initially recorded during orbits; otherwise noted as "away from DDG."

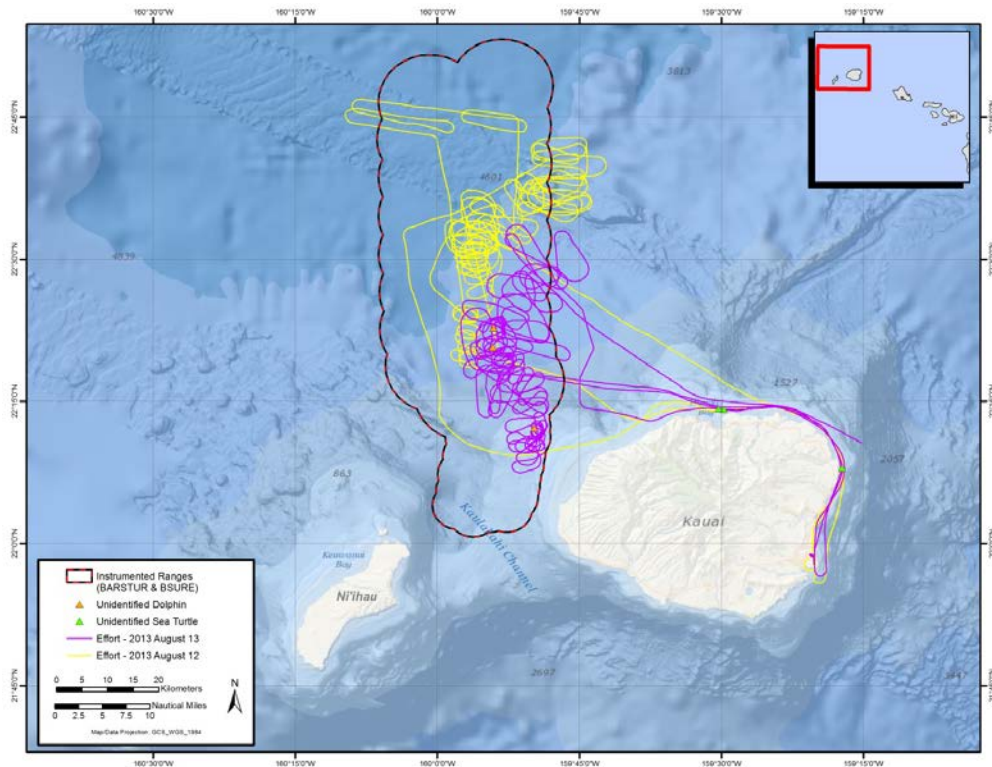
** including one sighting of an unidentified sea turtle species

1 **Part A. February Surveys (19–21 February 2013)**



2

3 **Part B. August Surveys (12-13 August 2013)**



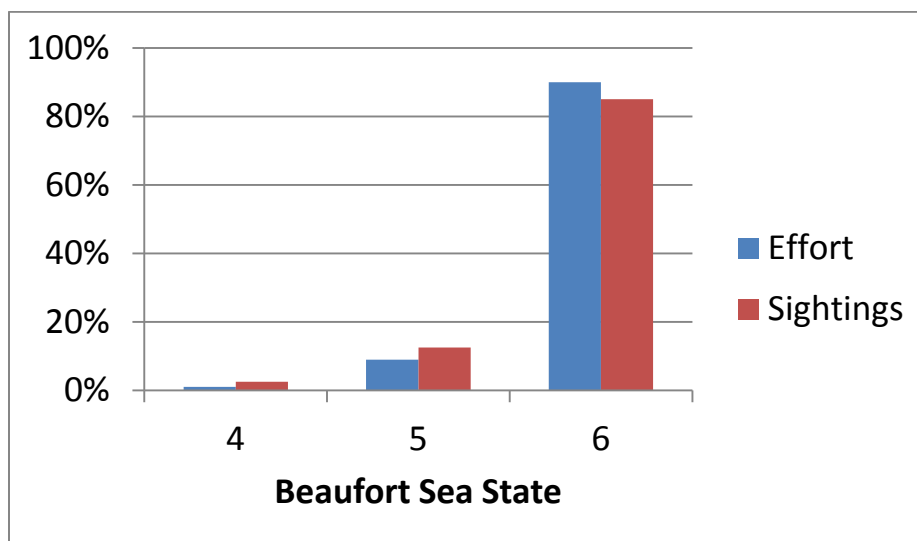
4

5 **Figure 2. Effort and sighting locations during surveys involving ship follows with the DDG.**

1 **Sea State**

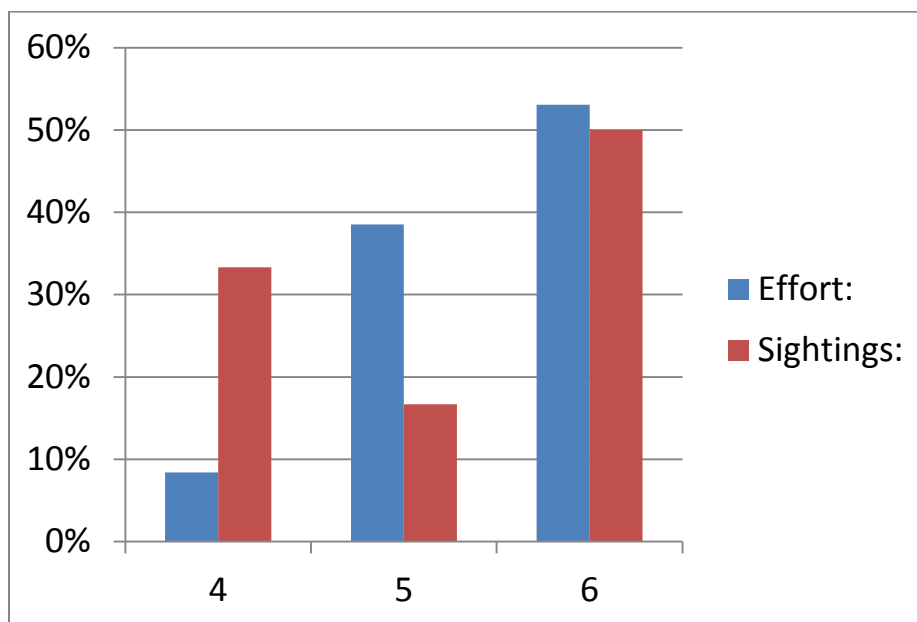
2 For the February surveys, the majority of overall effort (90 percent) was spent in unfavorable sea
 3 state conditions (i.e., BSS 6) where 85 percent of sightings occurred (**Figure 3, Part A**). It
 4 should be noted that the prevailing trade winds were unusually strong (>20 knots) during the
 5 entire three-day period of the event. These adverse conditions likely suppressed the number of
 6 sightings given the effects of sea state on visual sighting probability (Buckland et al. 2001).
 7 During the August surveys, conditions were not as consistently unfavorable with 52 percent of
 8 total effort spent in BSS 6. The remaining 48 percent of effort was in Beaufort 5 or better. Half
 9 of all sightings (N = 3) occurred in BSS 6, however (**Figure 3, Part B**).

10 **Part A. February Surveys 2013**



11

12 **Part B. August Surveys 2013**



13

14

Figure 3. Beaufort Sea State by effort and sightings.

1 **Sightings**

2 Most sightings during the February SCC event occurred during transits between Lihue, Kauai,
3 and the ship's position (**Figure 2, Part A**). Five sightings of humpback whales (*Megaptera*
4 *novaeangliae*) and one sighting of an unidentified sea turtle species occurred in the vicinity of
5 the DDG (green circles shown in elliptical plots). One of the whale sightings became the target
6 of a focal-follow session with video.

7 During the 2 days of August surveys, three unidentified dolphin groups were seen all within 5
8 km (3 miles) of the DDG (**Figure 2, Part A**). The three sea turtle sightings occurred during
9 transits to and from Lihue Airport while traveling along the Kauai coastline.

10 For a comprehensive list of all sightings and associated data, please see **Appendix B**; a list of
11 associated behavioral data can be found in **Appendix C**.

12 **Focal Follow Results**

13 During the February surveys, six sightings were recorded while within the vicinity of the DDG
14 (within 5 km [3 miles]), including five humpback whale pods and one sighting of an unidentified
15 turtle species (**Table 3, Part A**). Two of the humpback groups consisted of a cow and calf. Focal
16 follows were initiated for two of the five humpback whale sightings and videotaped in one
17 instance. The attempted focal follow was curtailed when the two whales were not resighted. In
18 all three of the other instances, the target pod was not resighted after initial detection.

19 **Table 3. Summary of Sightings Observed within 5 km of DDG**

Date	Time Sighted (HST)	Species	No. Indiv (calf)	Video? (Y/N)	Video Length (min)	If No, Reason Video not Initiated
Part A. February surveys						
02/19/2013	9:58:27	Humpback whale	2	N	--	Not resighted
02/20/2013	14:06:15	Humpback whale	2	N	--	Attempted focal— not resighted
	14:33:03	Humpback whale	2 (1)	N	--	Not resighted
	15:40:11	Humpback whale	2 (1)	N	--	Not resighted
02/21/2013	10:08:52	Humpback whale	2	Y	19	
	10:48:09	Unid Turtle spp.	1	N	--	Turtles not focal species
Part B. August surveys						
08/13/2013	10:03:05	Unid dolphin spp	2	N	--	Not resighted
	10:15:00	Unid dolphin spp	7	N	--	Not resighted
	11:20:10	Unid dolphin spp	15	N	--	Not resighted

1 The behavioral focal follow session conducted while monitoring near the DDG on 21 February
 2 (sighted at 10:08:52) involved a pod of two humpback whales. The duration of the taped session
 3 was 19 minutes. During much of this time, however, the whales were not in view due to the high
 4 sea state (Beaufort 6), the orientation of the plane, or the pods were traveling underwater. The
 5 poor sea state in particular made it difficult to resight the animals so the overall quality of the
 6 tape was judged as poor.

7 Since the video quality was poor, the videotaped session obtained in this case will not likely be
 8 useful for the ongoing analysis of videotaped focal follows. However, the locations of the five
 9 humpback whale pods can potentially permit calculation of estimated received levels if any of
 10 those overlap with MFAS transmissions. Analysis of these cases is ongoing as of this report.

11 During the August surveys, three groups of unidentified dolphin species were seen within 5 km
 12 (3 miles) of the DDG. However, none of them were resighted likely due to their small size and
 13 the obscuring effects of high sea state (BSS = 6) (**Table 3, Part B**).

14 **Overall Sightings**

15 There were 46 sightings made during the 5 days of combined surveys (February and August)
 16 (**Table 4**). The majority (80 percent) of these sightings were humpback whales (all seen during
 17 February surveys); of these 32 (86 percent of humpback sightings) were observed in shallow
 18 areas (less than 183 meters (600 feet), known to be preferred habitat of humpbacks based on past
 19 survey results (Mobley 2004). These inshore sightings of humpback whales were seen during
 20 transits to and from the DDG. When converted to sighting rates, the result is 0.011 humpback
 21 sightings/km effort (*Note*: effort calculated as time [hours] x 100 kn mean speed). This is
 22 substantially less than the 0.065 sighting rate estimated from the 2012 SCC event surveys
 23 (Mobley and Pacini 2012) and the 0.040 sighting rate for the 2011 SCC event surveys (Mobley
 24 2011). As stated earlier, this is likely due to the poor sighting conditions (mean BSS 6) that
 25 prevailed during the current surveys relative to surveys for 2011 and 2012 (mean BSS of 3.3 and
 26 3.1, respectively).

27 **Table 4. Summary of Sightings by Species—Surveys Combined**

Species	No. Groups	No. of Individuals	Average Pod. Size
Humpback whale (<i>Megaptera novaeangliae</i>)	37	53	1.5
Unidentified dolphin	4	24	6
Unidentified sea turtle	4	4	1
Unidentified large whale	1	1	1
Total	46	--	--

28 No instances of unusual behavior or signs of distress (e.g., defensive or evasive behaviors) were
 29 observed throughout the 5 days of surveys. This was also the case for the five whale groups and
 30 three dolphin groups seen within 5 km (3 miles) of the DDG. This does not mean that no adverse
 31 effects occurred, merely that none were detected.

1 Section 4 Overall Conclusions

2 Given the caveats noted, overall there were no direct observations of adverse effects to marine
3 mammals during the training event. As for the effects of sonar, since the status of MFAS
4 transmissions throughout the survey period was unknown, any specific response of the animals
5 observed to such transmissions would require more detailed behavioral analyses by the Navy
6 with knowledge of the time/duration of MFAS and the received levels at the animals. The time-
7 stamped audio/video files from all focal follows from this and all previous surveys will be
8 provided to the Navy to enable such detailed analyses. Per the SOW, the data obtained in this
9 study are meant to contribute to a growing database of information on the distribution,
10 occurrence, and behavior of MM/ST near Navy training events in the HRC per the HRC Marine
11 Species Monitoring Plan (DoN 2011) and as revised in the HRC Annual Monitoring Report
12 (DoN 2012).

13 Range Control interventions were reduced to near zero during both the February and August
14 events. As a result, there was virtually no disruption of the marine mammal monitoring effort,
15 unlike in 2011 (Mobley 2011). This was likely due to the briefing of the Range Control Officers
16 that took place during the pre-event debriefings and the continuous and reliable level of
17 communications with Range Control and Outrider Bravo during the events, and having standard
18 operating procedures in the form of PACMISRANFAC INSTRUCTION 3125.1 in place for
19 operating our civilian aircraft on the PMRF Range.

20 Section 5 Acknowledgements

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22 Facilities Engineering Command Pacific EV24 and PMRF range control for their support,
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25 Holmes, Makana Ciotti, John Sharkey and Chris Gore. All observations were made in
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27 Joseph R. Mobley, Jr.

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Appendix A: Mitigation Flight Guidelines



DEPARTMENT OF THE NAVY
PACIFIC MISSILE RANGE FACILITY
P.O. BOX 128
KEKAHA, HAWAII 96752-0128

IN REPLY REFER TO:

PMRFINST 3125.1
N3R/RC:src

13 FEB 2012

PACMISRANFAC INSTRUCTION 3125.1

From: Commanding Officer, Pacific Missile Range Facility

Subj: MARINE MAMMAL MITIGATION FLIGHT GUIDELINES

Ref: (a) Meeting at PMRF with COMPACFLT Environmental Personnel on 27Jul11

1. Purpose. In accordance with (IAW) reference (a), this instruction is to establish procedures for operational execution and contract oversight for Marine Mammal Mitigation (M3) Flights during fleet exercises.
2. Background. As part of the Navy's permit to train with Medium Frequency Active Sonar (MFAS), marine mammal monitoring is required. This involves 120-160 hours of visual surveys by boat or air. Fleet exercises, such as the Submarine Commander Course (SCC), provide optimal opportunity to accomplish these requirements due mainly to the size and scope of their operations. In an effort to accomplish the M3 goals and ensure safe operation of all craft involved, procedures need to be put in place for civilian observer aircraft.
3. Operational Execution.
 - a. Aircraft check in points – remain at 2000 feet (ft) or above until cleared by air operations then descend to 800-1000ft as agreed to by Commander, Destroyer Squadron Three One (COMDESRON THREE ONE) and Pacific Missile Range Facility (PMRF) Range Safety.
 - (1) Northern approach – Makaha Ridge
 - (2) Southern approach – South Kauai Vortec
 - b. Check in procedures – aircraft should state the following information upon check in with PMRF Air Operations.
 - (1) Working call sign
 - (2) Mission (to include time on range)

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13 FEB 2012

(3) Mode 3

(4) Number of souls on board

(5) Fuel state (meaning hours left on station)

c. Aircraft safe holding area/lost communications procedure – it is a requirement that aircraft have one (1) working radio at all times. Loss of radio communication will require aircraft to depart operating area.

(1) Aircraft must have at least one (1) working radio and be in communication with Range Operations at all times. Radio checks will be conducted if no communication from either the aircraft or Range Air Operations has been received on the quarter hour. If unable to establish radio communications, aircraft will be required to exit operation area, return to base, and call Range Control via land line to report loss of communications.

(2) Safe holding area is 10-15 miles on 360 radial at 2000 ft, weather permitting. In the event of bad weather they will depart the range and return to base. PMRF is a VFR (visual flight rules) range.

(3) Should communications fail, aircraft must attempt to contact Range Facility Control (RFCO) on VHF 125.2 first then the tower on VHF 126.2. If unable, return to base of origination, call Range Operations on a land line explaining loss of communication.

(4) Declared emergency

(a) Squawk 7700 for one (1) minute

(b) Call tower on VHF 125.2

(c) Send out International Air Distress on VHF 121.5

(d) Proceed to PMRF for emergency landing.

(e) All other emergencies, communicate intentions to PMRF if possible

d. Class D Airspace – aircraft is not permitted to enter any Class D airspace unless cleared to enter by Air Operations Control coordinated with PMRF tower.

e. PMRF Operation areas

PMRFINST 3125.1
13 FEB 2012

(1) Area of exercise (SCC operations or other scheduled exercises) is instrumented range within W-188.

(2) Minimum three (3) mile standoff of Niihau island.

(3) Unless in pursuit of mammals, the marine mammal observer aircraft is to remain off the bow of their assigned observer ship. When conducting observations of mammal groups, aircraft will inform PMRF Air Operation Control of sighting and remain with mammal group until observations are completed. Then return to station, which in most cases transects ahead (bow) of assigned ship.

(4) Observer aircraft are prohibited from entering pre-determined ships radii other than assigned unit unless cleared by air operations.

(5) Prior to the execution of any air launches, ships will be required to call in flight quarters. Flight quarter status changes of the assigned M3 surface vessel will be communicated to the M3 aircraft.

(6) Maintain 800 ft hard deck to allow U.S. Navy participating aircraft to maintain an airspace plan to work 500ft and below and 1500ft and above. Working altitude should be 800-1000 ft once cleared by assigned range air controller.

f. Operating around ships

(1) Safety briefs will define safe operating procedures and reference this instruction while also including special instances to include live fire events, Electromagnetic Interference (EMI), Hazards of Electromagnetic Radiation to Person (HERP), and Hazards of Electromagnetic Radiation to Ordnance (HERO) concerns.

(2) Marine Mammal Mitigation team to provide CONOPS of daily activities

(3) Aircraft will communicate clearly and regularly throughout their time on range, particularly when changing their course or altitude. They will inform range control when mammals are observed, when observations have ended, and when they are going to return to assigned ship.

PMRFINST 3125.1

13 FEB 2012

g. Pre-Flight Procedures for M3 aircraft

(1) Contact range on land line for following information

(a) Daily flight plan will include confirming relevant radio channel frequencies

(b) Situation report (SITREP) from PMRF

(c) Confirm contact phone numbers for all crew on board, PMRF, RFCO and Operations Conductor

(2) Provide PMRF with operational frequencies between aircraft and Marine Mammal Observer onboard ship.

h. Operational instructions between both ships and aircraft and aircraft to aircraft will be addressed at the mandatory safety briefs.

(1) Follow PMRF Air Operation procedures as required for safe operation and mission success.

(2) Operating areas – stay in W-188 unless cleared

4. Conclusion. Safety is of utmost importance and flight check in procedures will be strictly enforced. Failure to comply with range instructions will result in immediate expulsion from range area and termination of Marine Mammal Mitigation participation in fleet exercises.


NICHOLAS MONGILLO

Distribution:

List 1

Appendix B: Summary of Sightings with Positions (GPS)

Date	Time (HST)	Species*	No. Indivs	Latitude (N)		Longitude (W)	
			(calf)	(degrees)	(minutes)	(degrees)	(minutes)
2/19/2013	9:58:27	MN	2	22	0.3739	159	53.688
2/19/2013	11:01:48	MN	2	22	0.2474	159	26.844
2/19/2013	11:03:14	MN	2	22	0.2487	159	24.990
2/19/2013	11:04:56	MN	1	22	0.2419	159	21.522
2/19/2013	13:55:42	MN	1	22	0.2438	159	32.460
2/19/2013	16:00:46	MN	1	22	0.2449	159	33.096
2/19/2013	16:02:34	MN	1	22	0.2374	159	28.416
2/19/2013	16:12:30	MN	2	22	0.1168	159	17.352
2/19/2013	16:12:57	MN	1	22	0.1024	159	17.232
2/20/2013	8:23:25	MN	2	22	0.2493	159	33.516
2/20/2013	8:25:03	MN	1	22	0.2653	159	37.788
2/20/2013	11:10:20	UT	1	22	0.3117	159	36.810
2/20/2013	11:15:09	UD	1	22	0.2616	159	31.806
2/20/2013	11:18:32	MN	1	22	0.2451	159	29.952
2/20/2013	11:27:14	MN	2	22	0.1699	159	17.352
2/20/2013	11:30:45	MN	1	22	0.0571	159	18.996
2/20/2013	11:32:24	MN	1	22	0.0046	159	20.946
2/20/2013	13:39:01	MN	1	22	0.0858	159	18.048
2/20/2013	13:50:30	MN	1	22	0.2368	159	36.000
2/20/2013	14:06:15	MN	2	22	0.2217	159	50.916
2/20/2013	14:33:03	MN	2 (1)	22	0.1768	159	48.492
2/20/2013	15:40:11	MN	2 (1)	22	0.4545	159	55.362
2/20/2013	16:11:42	MN	2	22	0.2459	159	29.892
2/20/2013	16:15:28	MN	3	22	0.2333	159	22.152
2/20/2013	16:17:18	MN	1	22	0.2037	159	19.902
2/21/2013	8:06:54	MN	3	22	0.0567	159	18.630
2/21/2013	8:11:32	MN	2	22	0.1824	159	18.078
2/21/2013	8:12:35	MN	1	22	0.2122	159	18.726
2/21/2013	8:13:46	MN	1	22	0.2370	159	21.696
2/21/2013	8:17:34	MN	2	22	0.2493	159	30.564
2/21/2013	8:18:13	MN	2	22	0.2466	159	33.276
2/21/2013	8:19:15	MN	1	22	0.2448	159	34.968
2/21/2013	8:19:27	MN	2	22	0.2443	159	35.712
2/21/2013	10:08:52	MN	2	22	0.1670	159	54.780

Date	Time (HST)	Species*	No. Indivs	Latitude (N)		Longitude (W)	
			(calf)	(degrees)	(minutes)	(degrees)	(minutes)
2/21/2013	10:48:09	MN	1	22	0.1300	159	57.966
2/21/2013	11:07:27	MN	1	22	0.2329	159	40.326
2/21/2013	11:07:47	MN	1	22	0.2403	159	37.692
2/21/2013	11:09:00	UW	1	22	0.2399	159	35.970
2/21/2013	11:13:24	MN	1	22	0.2425	159	29.376
2/21/2013	11:20:25	MN	2	22	0.1750	159	18.354
8/13/2013	8:50:30	UT	1	22	29.742	159	13.884
8/13/2013	8:51:20	UT	1	22	30.290	159	14.006
8/13/2013	10:03:25	UD	2	22	52.989	159	22.849
8/13/2013	10:15:00	UD	7	22	53.934	159	20.652
8/13/2013	11:20:10	UD	15	22	49.721	159	12.035
8/13/2013	14:30:55	UT	1	22	16.915	159	7.959

***Species Code** **Species (*Latin name*)**

MN humpback whale (*Megaptera novaeangliae*)
UD unidentified dolphin spp.
UT unidentified sea turtle spp.
UW unidentified large whale spp.

Appendix C: Summaries of Behavior

Date	Time (HST)	Group #	Group size	Species	Behavior	Animal bearing	Comments
2/19/2013	9:58:27	1	2	MN	slow swim	180	focal attempted
2/19/2013	11:01:48	2	2	MN	slow swim	0	
2/19/2013	11:03:14	3	2	MN	slow swim	170	
2/19/2013	11:04:56	4	1	MN	slow swim	90	
2/19/2013	13:55:42	5	1	MN	slow swim	180	
2/19/2013	16:00:46	6	1	MN	breach	--	
2/19/2013	16:02:34	7	1	MN	slow swim	--	
2/19/2013	16:12:30	8	2	MN	slow swim	200	
2/19/2013	16:12:57	9	1	MN	slow swim	180	
2/20/2013	13:39:01	10	1	MN	slow swim	0	
2/20/2013	13:50:30	11	1	MN	slow swim	100	
2/20/2013	14:06:15	12	2	MN	slow swim	--	in front of DDG; attempted video but no resight
2/20/2013	14:33:03	13	2 (1)	MN	slow swim	0	w/in 5 km DDG
2/20/2013	15:40:11	14	2 (1)	MN	slow swim	270	w/in 5 km DDG
2/20/2013	16:11:42	15	2	MN	very slow swim	200	
2/20/2013	16:15:28	16	3	MN	slow swim	--	
2/20/2013	16:17:18	17	1	MN	tailslap	--	
2/20/2013	8:23:25	18	2	MN	slow swim	90	
2/20/2013	8:25:03	19	1	MN	dove	90	
2/20/2013	11:10:20	20	1	UT	slow swim	--	
2/20/2013	11:15:09	21	1	UD	slow swim	--	
2/20/2013	11:18:32	22	1	MN	slow swim	300	
2/20/2013	11:27:14	23	2	MN	slow swim	0	
2/20/2013	11:30:45	24	1	MN	slow swim	180	
2/20/2013	11:32:24	25	1	MN	slow swim	30	
2/21/2013	8:06:54	26	3	MN	1 pec slapping; other 2 underwater	0	
2/21/2013	8:11:32	27	2	MN	both breaching	45	
2/21/2013	8:12:35	28	1	MN	slow swim	150	
2/21/2013	8:13:46	29	1	MN	slow swim	90	
2/21/2013	8:17:34	30	2	MN	slow swim	0	

Date	Time (HST)	Group #	Group size	Species	Behavior	Animal bearing	Comments
2/21/2013	8:18:13	31	2	MN	underwater bubbling	270	
2/21/2013	8:19:15	32	1	MN	slow swim	--	
2/21/2013	8:19:27	33	2	MN	underwater swim	90	
2/21/2013	10:08:52	34	2	MN	slow swim	190	focal follow initiated; video recorded
2/21/2013	10:48:09	35	1	UT	slow swim	--	w/in 5 km DDG
2/21/2013	11:07:27	36	1	MN	Breach	--	
2/21/2013	11:07:47	37	1	MN	Breach	--	
2/21/2013	11:09:00	38	1	UW	Blow	--	
2/21/2013	11:13:24	39	1	MN	blow & dive	180	
2/21/2013	11:20:25	40	2	MN	underwater swim	300	
8/13/2013	8:50:30	1	1	UT	Slow swim	176	
8/13/2013	8:51:20	2	1	UT	Slow swim	175	
8/13/2013	10:03:25	3	2	UD	Slow swim	71	w/in 5 km DDG
8/13/2013	10:15:00	4	7	UD	milling	93	w/in 5 km DDG
8/13/2013	11:20:10	5	15	UD	Slow swim	163	w/in 5 km DDG
8/13/2013	14:30:55	6	1	UT	Slow swim	77	