

Jacksonville (JAX) Firing Exercise (FIREX) with Integrated Maritime Portable Acoustic Scoring and Simulator (IMPASS)

MARINE SPECIES MONITORING

AERIAL MONITORING SURVEYS

TRIP REPORT



29 April – 01 May 2013

Suggested citation:

HDR. 2013. *Jacksonville (JAX) Firing Exercise (FIREX) with Integrated Maritime Portable Acoustic Scoring and Simulator (IMPASS) Marine Species Monitoring, Aerial Monitoring Surveys, 29 April – 01 May 2013: Trip Report*. Submitted to Naval Facilities Engineering Command (NAVFAC) Atlantic, Norfolk, Virginia, under Contract No. N62470-10-D-3011 Task Order 03, issued to HDR Inc., Norfolk, Virginia. 22 October 2013.

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ACRONYMS AND ABBREVIATIONS

BL&P	Blind Loaded and Plugged
BSS	Beaufort Sea State
EDT	Eastern Daylight Time
FIREX	Firing Exercise
GUNEX	Gunnery Exercise
hr	Hour(s)
ICMP	Integrated Comprehensive Monitoring Program
IMPASS	Integrated Maritime Portable Acoustic Scoring and Simulator
JAX	Jacksonville
km	Kilometer(s)
km ²	Square Kilometer(s)
m	Meter(s)
NEPM	Non-Explosive Practice Munition
OPAREA	Operating Area
SPUE	Sightings Per Unit Effort
U.S.	United States

Section 1 Introduction

Aerial marine species monitoring occurred 29 April through 01 May 2013 for a Firing Exercise (FIREX) with Integrated Maritime Portable Acoustic Scoring and Simulator (IMPASS) event that occurred in the Jacksonville (JAX) Range Complex off the eastern coast of Florida within the United States (U.S.) Navy's FIREX boxes BB and CC. These types of events occur periodically throughout the year and allow the U.S. Navy to fulfill essential training requirements.

As part of the compliance requirements of the Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973, the U.S. Navy developed the Integrated Comprehensive Monitoring Program (ICMP). The ICMP applies by regulation to those activities on U.S. Navy training ranges and operating areas (OPAREAs) for which the U.S. Navy sought and received incidental take authorizations. In order to support the U.S. Navy in meeting regulatory requirements for monitoring established under the Final Rules and to provide a mechanism to assist with coordination of program objectives under the ICMP, monitoring of marine mammals and sea turtles during this exercise included visual surveys from a fixed-wing aircraft.

The results of marine mammal monitoring reported here are part of a long-term monitoring effort under the U.S. Navy's Marine Species Monitoring Program (Contract # N62470-10-D-3011) supported by HDR.

Section 2 Methods

Study Area

The U.S. Navy's JAX OPAREA lies off the Atlantic coast of the U.S. near the Georgia/Florida border. Protected marine species monitoring conducted during the FIREX training event was focused on the BB and CC boxes within the JAX OPAREA (see **Figure 1**). Gunnery Exercise (GUNEX) range box AA was designated as an alternate location to be flown if the aircraft was excluded from the intended survey area due to live-fire exercises taking place. This area is approximately 81 to 167 kilometers (km) offshore, covers an area approximately 1,376 square kilometers (km²) in size, and ranges in bottom depth from 30 to 600 meters (m).

Event Details

The FIREX event commenced at approximately 11:00 EDT on 29 April 2013, with a total of 33 5-inch Non-Explosive Practice Munition (NEPM) Blind Loaded and Plugged (BL&P) rounds fired. Thus, no live-explosive rounds were used during the FIREX training. Therefore, no animals were exposed to explosive sounds during this FIREX with IMPASS training event.

Aerial-Based Monitoring

Aerial-based monitoring was conducted before, during, and after the scheduled FIREX within the JAX OPAREA from 29 April through 01 May 2013 (see **Figure 1, Table 1**). Survey methods were consistent with currently accepted Distance Sampling theory (Buckland et al. 2001) and

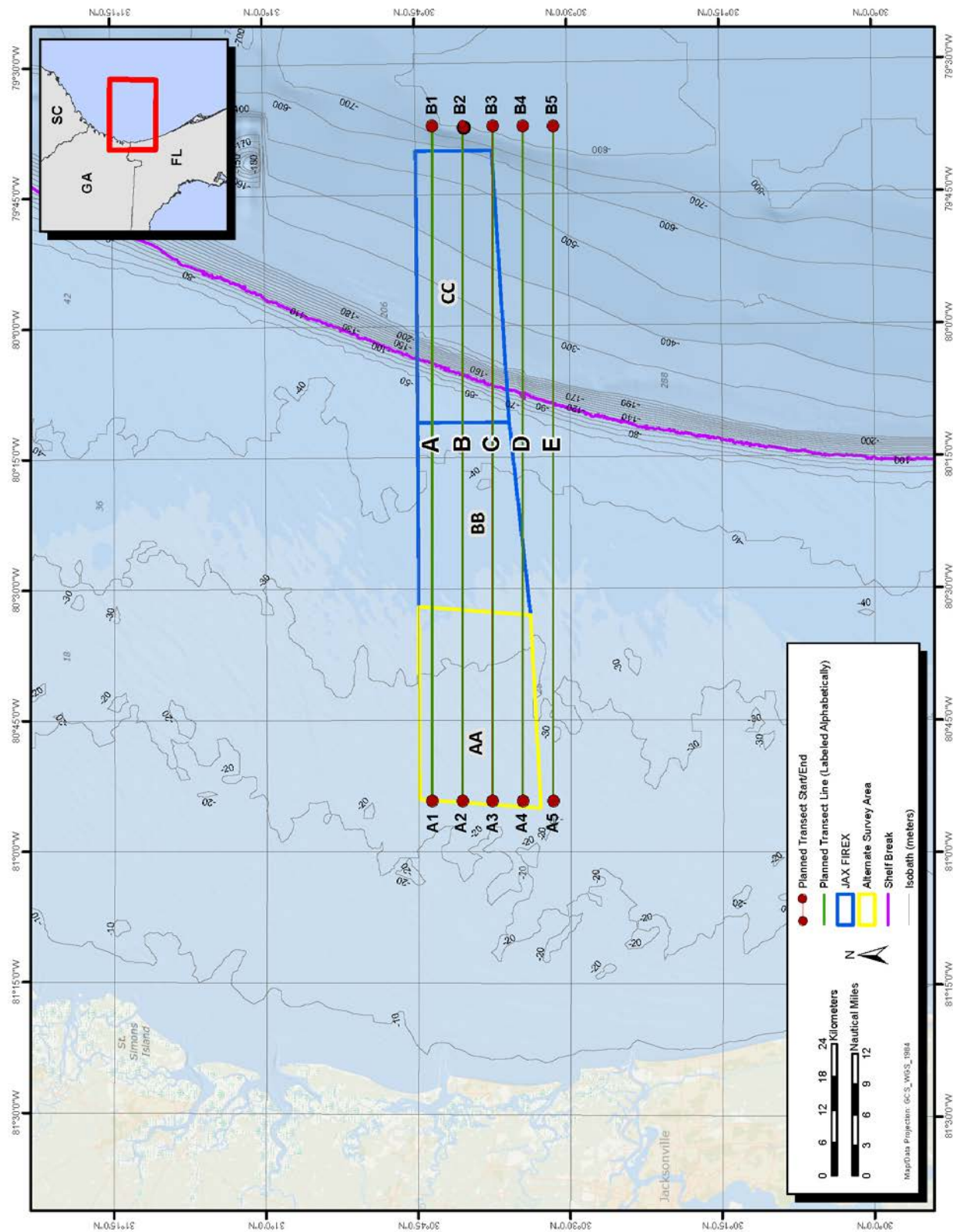


Figure 1. Pre-planned Tracklines for the Survey Effort for JAX FIREX Monitoring.

Table 1. Summary of Monitoring Effort for JAX FIREX Training

Date	Description	Start Time	Stop Time	Total Survey Time* (min)	Total On-Effort Time (min)	Trackline On-Effort Distance (km)
29 April	Transect Survey (Pre-Event)	13:13	15:50	157	144	439
30 April	Transect Survey (During Event)	11:40	13:48	128	117	360
01 May	Transect Survey (Post-Event)	9:12	11:46	154	146	459
Total				439 (≈7.3 hr)	407 (≈6.8 hr)	1,258 km

Note: * Total Survey Minutes reflects time occupied in the range/area of interest and includes both on-effort (systematic) and off-effort (cross-legs between transects, and circling for focal follows or species ID) total minutes.

followed a well-established protocol used for aerial surveys throughout all U.S. Navy Range Complexes (Smultea and Bacon 2012). A survey altitude of approximately 305 m at a speed of 100 knots was maintained while on-effort, but might have varied slightly based on weather conditions in the area. Once a marine mammal sighting was made and basic sighting information was collected, a focal follow session was initiated at 305 m or higher if conditions were appropriate (Smultea and Bacon 2012; refer to the survey methods on page 4 of this document). When possible, a lower altitude of approximately 214 m was established before or after focal-follow sessions for photography purposes to provide sharper images required for species identification.

The observation platform was a Cessna T337H Turbo Skymaster aircraft operating out of Fernandina Beach Municipal Airport in Fernandina Beach, Florida. Three surveys were conducted following pre-planned transect lines covering and extending approximately 1.8 km beyond the boundaries of the BB and CC boxes (see Figure 1). GUNEX box AA was designated as an alternate location to be flown if the aircraft was excluded from the intended survey area due to live-fire exercises taking place. Each survey was limited to a 5-hour (hr) maximum flight time window. When possible, aerial surveys were conducted in the primary FIREX region according to the pre-planned transect lines; however, due to: 1) multiple exercises occurring in the primary range boxes of interest, 2) safety concerns with multiple aircraft in the area on 29 April and 01 May, and 3) weather constraints, transect lines were sometimes modified or truncated.

Both aerial observers (see Table 2) were experienced with line-transect survey methodology, had experience in identification of Atlantic marine mammal and sea turtle species, and were knowledgeable of marine mammal biology and behavior.

Table 2. Observers and Roles

Observer	Role(s)
Carter Esch	Chief Scientist/Observer
Lenisa Blair	Observer/Recorder

Survey effort attempted to cover the portion of the area relevant to the FIREX event (approximately 1,376 km²) within the BB and CC boxes. Six parallel tracklines running west-east, measuring 92 km in length and spaced approximately 5.3 km apart, were flown during “systematic” efforts throughout the monitoring period. Based on an effective sampling width of approximately 6 km (3 km distance on each side of the transect line to reliably sight a group of 25 or more dolphins in optimal conditions at an altitude of 305 m), the total survey coverage area was 3,312 km² (see **Figure 1**). Planned lines were followed when possible, but exact transects flown for each survey day were subject to modifications as a result of range exclusion by live-fire U.S. Navy exercises in the area, unfavorable weather conditions on the range, or instruction via hourly contact with naval flight operations requiring an increase in the plane’s altitude (see **Table 1, Figures 2 through 5**). Due to the FIREX target location being unexpectedly relocated to the west of the BB and CC boxes, the monitoring team conducted pre-event surveys adjacent to the actual exercise location (see **Figure 3**). The following describes the general survey approach:

1. Pre-planned transect lines and waypoints were followed using methods described by Smultea and Bacon (2012) until a marine mammal/sea turtle group was sighted. Standard environmental and oceanographic parameters such as Beaufort sea state (BSS), glare, visibility, and cloud cover were recorded at the start of each transect line as well as when conditions changed during flight.
2. Upon sighting a marine mammal/sea turtle group, basic sighting information was recorded per established protocol (see Smultea and Bacon 2012). As outlined in the *JAX Range Complex Monitoring Plan*, information included: (1) species identification and group size; (2) location and relative distance from the IMPASS buoy field if available; (3) the behavior of marine mammals and sea turtles; (4) date, time, visual conditions, and environmental and oceanographic parameters associated with each observation; (5) direction of travel relative to true North; and (6) duration of the observation.
3. If the sighting appeared suitable for a focal follow, the aircraft increased altitude to approximately 365 to 455 m, and radial distance increased to approximately 0.5 to 1.0 km. Then, the aircraft circled the sighting to obtain detailed behavioral information as long as possible and logistically feasible. Focal follows were attempted for a minimum of 5 minutes (min). When conditions allowed, high definition video and digital photographs of the group were also collected.
4. If the sighting was not selected for a focal follow, and species and group size were unknown, the aircraft circled the sighting to obtain digital photographs for species identification confirmation and to estimate group size/composition.

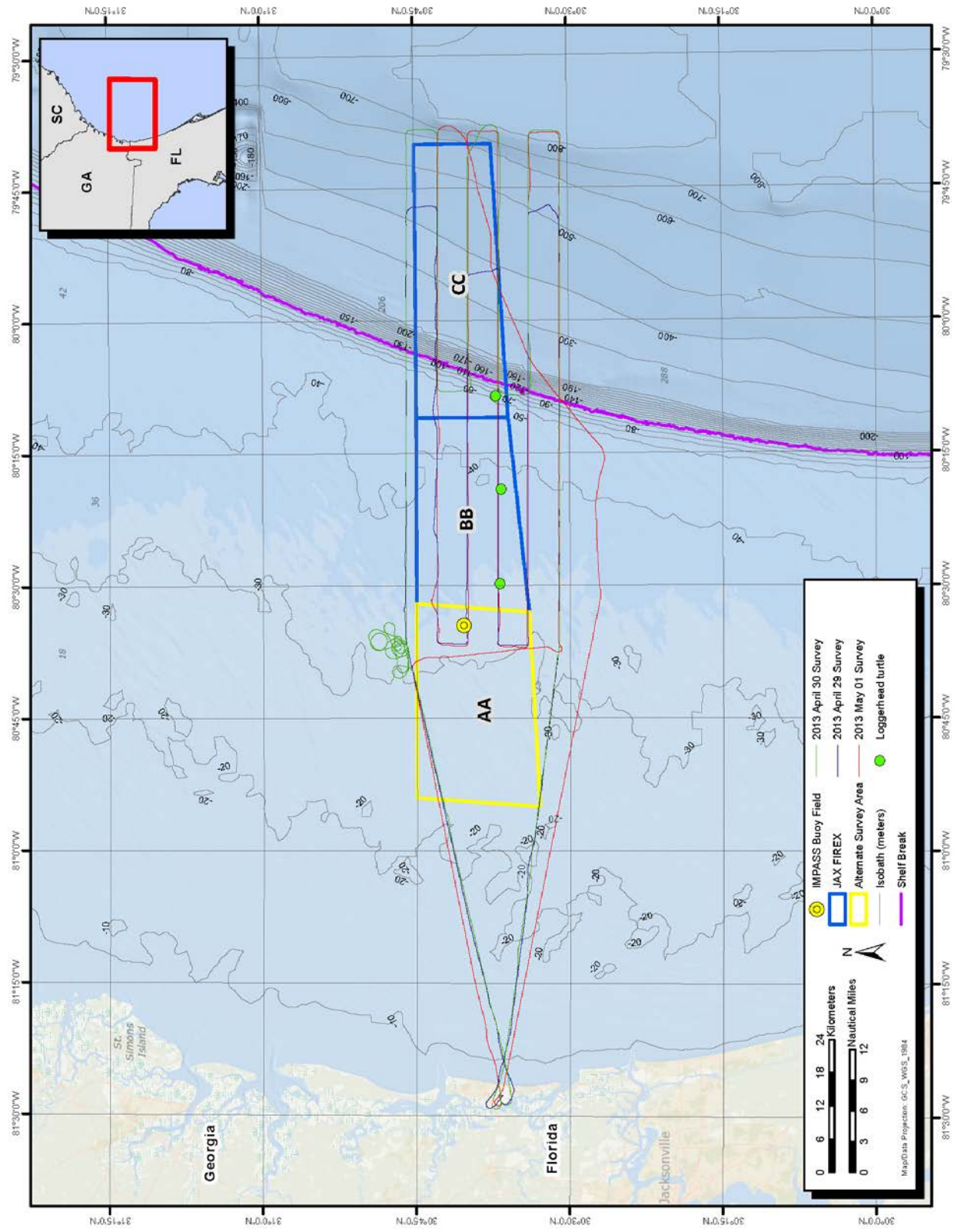


Figure 2. Locations of All Sea Turtle Sightings Seen Throughout the JAX FIREX Monitoring Period (29 April through 01 May).

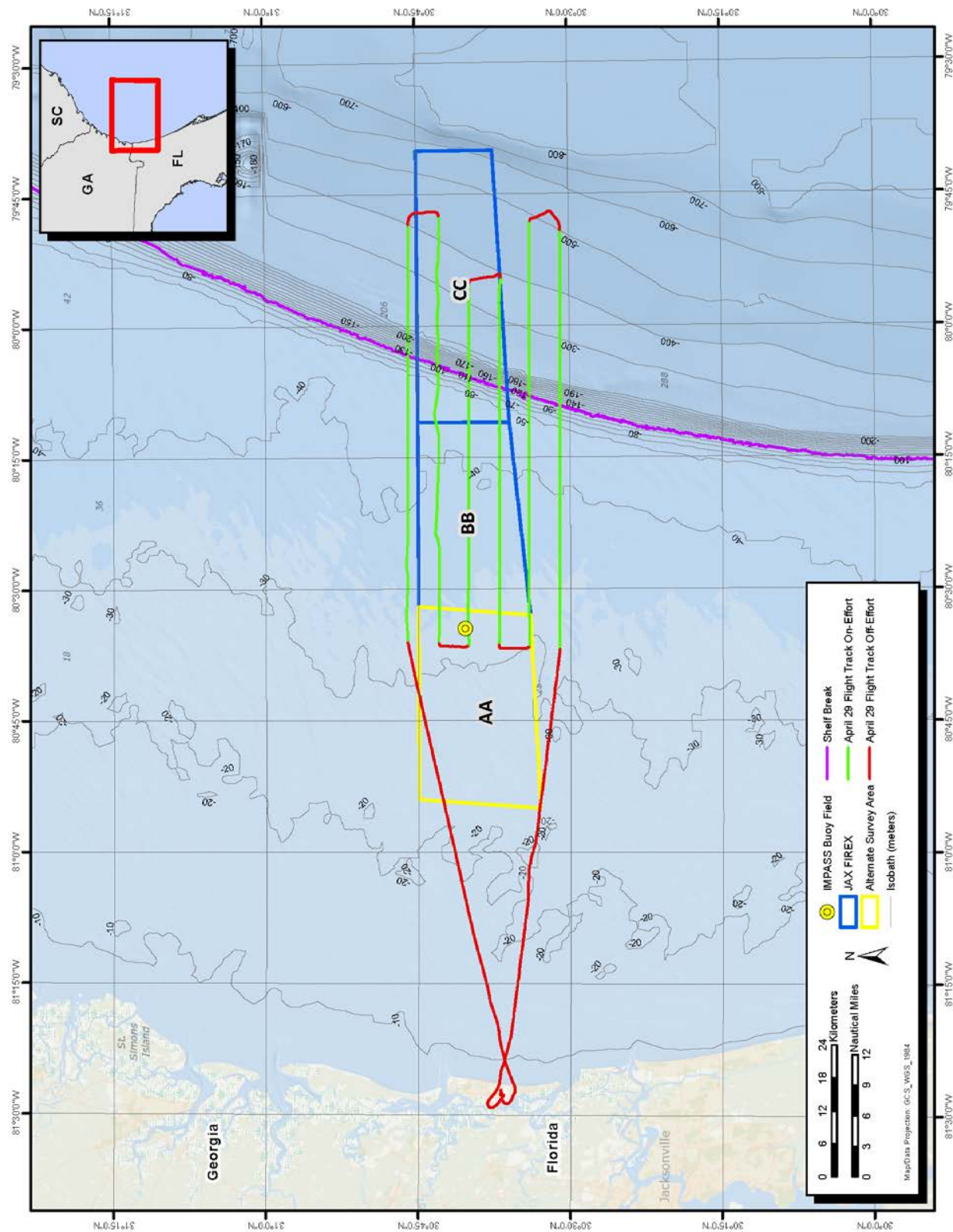


Figure 3. Survey Flight Track Conducted Pre-FIREX (29 April).

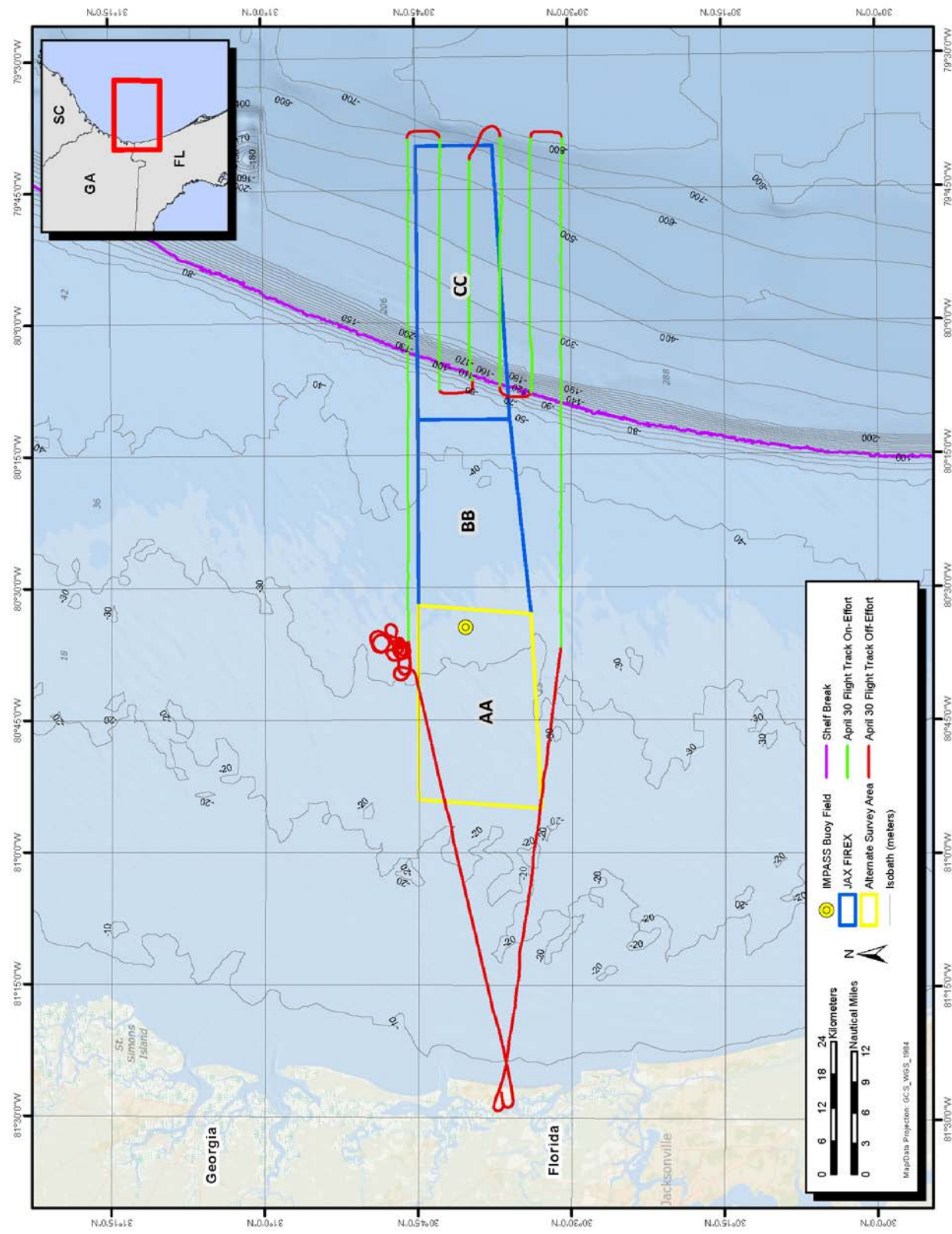


Figure 4. Survey Flight Track Conducted During-FIREX (30 April).

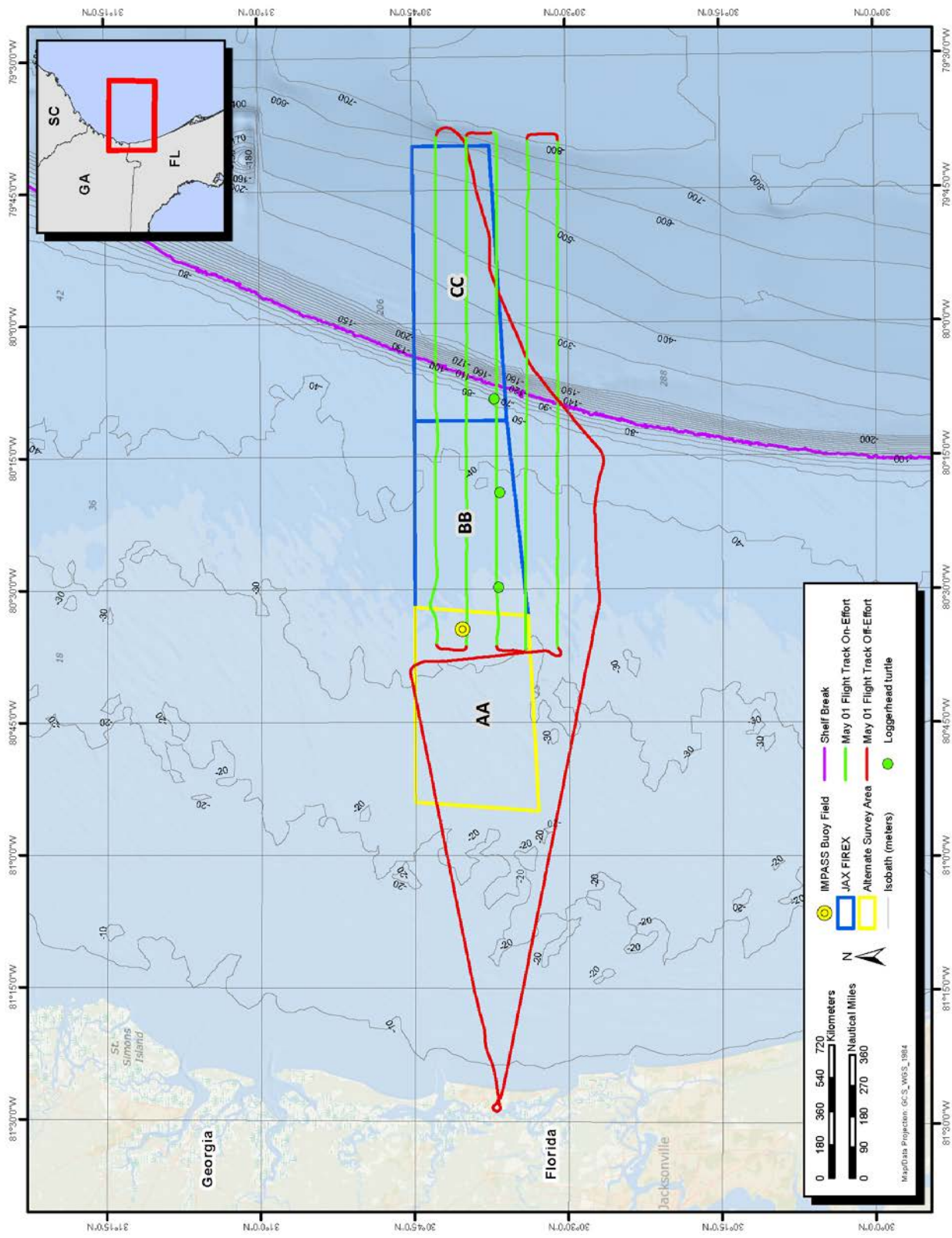


Figure 5. Locations of All Sea Turtle Sightings Seen Throughout the JAX FIREX Post-Exercise Monitoring Period (01 May)

Section 3 Results

Survey Effort

Observers visually surveyed 1,258 km of on-effort trackline and an additional 851 km off-effort trackline (connector lines and transit) during 3 survey days for approximately 6.8 hr of on-effort status (see **Table 1**; **Figures 2 through 5**). The FIREX event was scheduled for 30 April; a pre-event survey was conducted on 29 April, covering the BB and CC boxes (see **Figure 3**). Tracklines were truncated on the eastern edge to avoid poor weather (i.e., thunderstorms). On 30 April, survey effort was delayed by fog in the morning. Due to restricted airspace limitations related to U.S. Navy activities in the BB box, survey effort was limited to the CC box (see **Figure 4**). Again, survey effort on the eastern edge of the CC box was limited by poor weather and a low cloud ceiling. Repeated efforts were made to communicate with the event vessel to determine when access to the BB box would be granted. The survey team was consistently told that box BB was restricted until 20:00 Eastern Daylight Time (EDT). BSS and weather conditions continued to deteriorate throughout the survey of CC box. On 01 May, a post-event survey was conducted in the BB and CC boxes. Weather conditions during this post-event survey were poor throughout most of the survey area and pilots had to break survey tracklines in order to avoid thunderstorms. Survey effort was eventually terminated by the pilots due to safety concerns (see **Figure 5**). BSS ranged from 3 to 5 (**Appendix A**), and sightings were made only on 01 May in BSS 3 (see **Table 3**). **Appendix A** contains a detailed description of environmental, oceanographic, and sighting conditions.

Sightings

Three loggerhead turtles were sighted during approximately 7 hr of total survey flight time (includes on-effort and off-effort intervals) within the survey area (see **Figure 2**, **Table 3**). All sightings were made on 01 May 2013 during the post-event survey (see **Figures 2 and 5**, **Table 3**). Sightings over the 3-day period included three sightings of loggerhead turtles. **Table 4** provides a summary of information on sightings and associated bottom depths. Bottom depths for each sighting were estimated in 10-m ranges from plots of latitude and longitude for each sighting within a Geographic Information System.

Sightings Per Unit Effort

No marine mammals were sighted during this monitoring effort. Sightings Per Unit Effort (SPUE) was calculated as the total number of turtle ($n=3$) sightings divided by total survey effort (hours and km). For this monitoring effort, the SPUE for turtles ($n=3$) was equal to 0.441 sightings per hr and 0.002 sightings per km.

Behavior

No visible evidence of unusual behavior was observed during the pre-FIREX, during-FIREX, or post-FIREX surveys (see **Table 3**).

Table 3. Summary of Sightings

Sighting No.	Date	Species	Group Size Best/High/Low			Calves	Start Time	Stop Time	BSS	Latitude	Longitude	Vert. Angle	Bearing Angle	Distance Off Track (m)	Heading	Bottom Depth (m)	Photos/Video Taken	Focal Follow	Behavioral Summary
Post-FIREX Sightings – 01 May 2013																			
1	5/01/13	Cc	1	1	1	-	10:17	10:19	3	30.614	-80.496	049	194	400	180	30-40	No/No	No	One loggerhead turtle dived immediately after sighting occurred.
2	5/01/13	Cc	1	1	1	-	10:23	10:24	3	30.612	-80.318	034	195	520	140	30-40	No/No	No	One loggerhead turtle logging at surface. No disturbance detected.
3	5/01/13	Cc	1	1	1	-	10:28	10:29	3	30.620	-80.142	043	14	430	270	60-70	No/No	No	One loggerhead turtle logging at surface. No disturbance detected.

Key: Cc = Loggerhead turtle (*Caretta caretta*)

Table 4. Summary of Sightings and Depths Recorded During Monitoring for JAX FIREX Training

Species	Number of Sightings	Bottom Depth (m)
Loggerhead turtle	3	30-70

Section 4 Acknowledgements

We would like to thank Orion Aviation’s Director Ed Coffman and pilots Rocky Walker and Sam Garrett. These data were obtained under National Marine Fisheries Service Permit No. 14451 issued to Joseph R. Mobley, Jr.

Section 5 References

- Buckland et al. 2001 Buckland, S.T., D.R. Anderson, K.P. Burnham, J.L. Laake, D.L. Borchers, and L. Thomas. 2001. *Introduction to Distance Sampling: Estimating Abundance of Biological Populations*. Oxford University Press, Oxford, U.K.
- Smultea and Bacon 2012 Smultea, M.A., and C.E. Bacon. 2012. *A Comprehensive Report of Aerial Marine Mammal Monitoring in the Southern California Range Complex: 2008-2012*. Prepared for Commander, U.S. Pacific Fleet, Pearl Harbor, Hawaii. Submitted to Naval Facilities Engineering Command Southwest (NAVFAC SW), EV5 Environmental, San Diego, 92132 under Contract No. N62470-10-D-3011 issued to HDR, Inc., San Diego, California.

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APPENDIX A

Environmental, Oceanographic, and Sighting Conditions

Table A-1 shows the environmental, oceanographic, and sighting conditions encountered by Marine Mammal Observers (MMOs) during the pre-FIREX, during-FIREX, and post-FIREX monitoring efforts.

Time	Beaufort Left MMO	Glare Left MMO (%)	Visibility Distance Left MMO (km)	Beaufort Right MMO	Glare Right MMO (%)	Visibility Distance Right MMO (km)	Cloud Cover (%)
Pre-FIREX Survey Effort – 29 April 2013							
13:13	3	<75	1	3	<50	1	90
13:28	4	<75	1	4	<75	1	90
13:34	3	<75	1	3	<75	1	90
13:38	4	<75	1	4	<50	1	90
14:09	3	<75	0.75	4	<75	1	90
14:31	3	<75	0.75	3	<75	1	90
14:56	3	<50	1	3	<50	1	90
15:24	3	<50	1	3	<75	1	90
During-FIREX Survey Effort – 30 April 2013							
11:39	3	<50	1	3	<75	1	40
12:11	3	<50	1	3	<50	1.5	70
12:29	5	<10	1	5	<75	1	80
12:44	4	<75	1	3	<50	1.5	90
13:02	5	<50	1	5	<75	1	90
13:18	4	>75	1	4	<50	1.5	90
Post-FIREX Survey Effort – 01 May 2013							
09:11	4	<50	0.75	4	<75	1	80
09:23	3	<50	0.75	3	<75	1	80
09:33	4	<50	0.75	4	<75	1	70
09:44	4	<50	1	4	<50	1	70
09:57	3	<50	1	3	<50	1	70
10:14	4	<50	0.5	4	>75	0.5	100
10:20	3	<50	0.5	4	>75	0.5	100
10:36	5	<50	1	4	>75	1	90
10:46	4	<50	1	4	<50	0.75	90
10:55	5	<10	1	4	Diffuse	0.5	100
10:59	5	None	0.25	4	None	0.5	100
11:05	5	None	0	4	0	0	100
11:07	4	<50	0.5	4	0	0.5	100
11:14	4	<50	0.5	4	<75	0.75	100
11:22	4	<75	0.75	4	<75	0.5	100
11:28	4	None	0.25	5	>75	0.5	90

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