

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

Marine Species Monitoring

AERIAL MONITORING SURVEYS

TRIP REPORT



19-21 September 2011

ACRONYMS AND ABBREVIATIONS

BSS	Beaufort sea state
FIREX	Firing Exercise
ft	feet
HDR EOC	HDR Environmental, Operations and Construction, Inc.
hr	hour(s)
ICMP	Integrated Comprehensive Monitoring Program
IMPASS	Integrated Maritime Portable Acoustic Scoring and Simulator
JAX	Jacksonville Range Complex
km	kilometer(s)
km ²	square kilometers
m	meter(s)
MMO	Marine Mammal Observer
NEPM	Non-Explosive Practice Munition
NM	nautical mile(s)
OPAREA	operating area
SPUE	Sightings Per Unit Effort
U.S.	United States

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Section 1 Introduction

Aerial marine species monitoring occurred between 19 and 21 September 2011 for a Firing Exercise (FIREX) with Integrated Maritime Portable Acoustic Scoring and Simulator (IMPASS) Exercise that occurred in the Jacksonville Range Complex (JAX) 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) issued to HDR Environmental, Operations and Construction, Inc. (HDR EOC).

Section 2 Methods

Study Area

The U.S. Navy's Jacksonville OPAREA lies off the coast of the Georgia/Florida border. Protected marine species monitoring conducted during the JAX FIREX training event was focused on the BB and CC boxes within the JAX OPAREA (see **Figure 1**). This area is approximately 81 to 167 kilometers (km) (44 to 90 nautical miles [NM]) offshore, covers an area approximately 1,431 square kilometers (km²) in size, and ranges in bottom depth from 30 to 610 meters (m).

The FIREX event commenced at 05:45 on 20 September 2011, and a total of 47 Non-Explosive Practice Munition (NEPM) rounds of 5-inch Blind Loaded and Plugged were fired. In addition, the unit also shot four NEPM rounds of 5-inch Illumination. NEPM was used first, which resulted in a successful training mission. Thus, no live-explosive rounds were used during the FIREX training. Therefore, no animals were exposed during this JAX FIREX with IMPASS training event.

Aerial-Based Monitoring

Aerial-based monitoring effort was performed before, during, and after a FIREX with IMPASS within the JAX OPAREA from 19 to 21 September 2011 (see **Figure 1, Table 1**). Survey methods were consistent with currently accepted Distance Sampling theory (Buckland et al. 2001) and followed a well-established protocol used for aerial surveys throughout all U.S. Navy Range Complexes (Smultea et al. 2009). A survey altitude of approximately 1,000 feet (ft) at

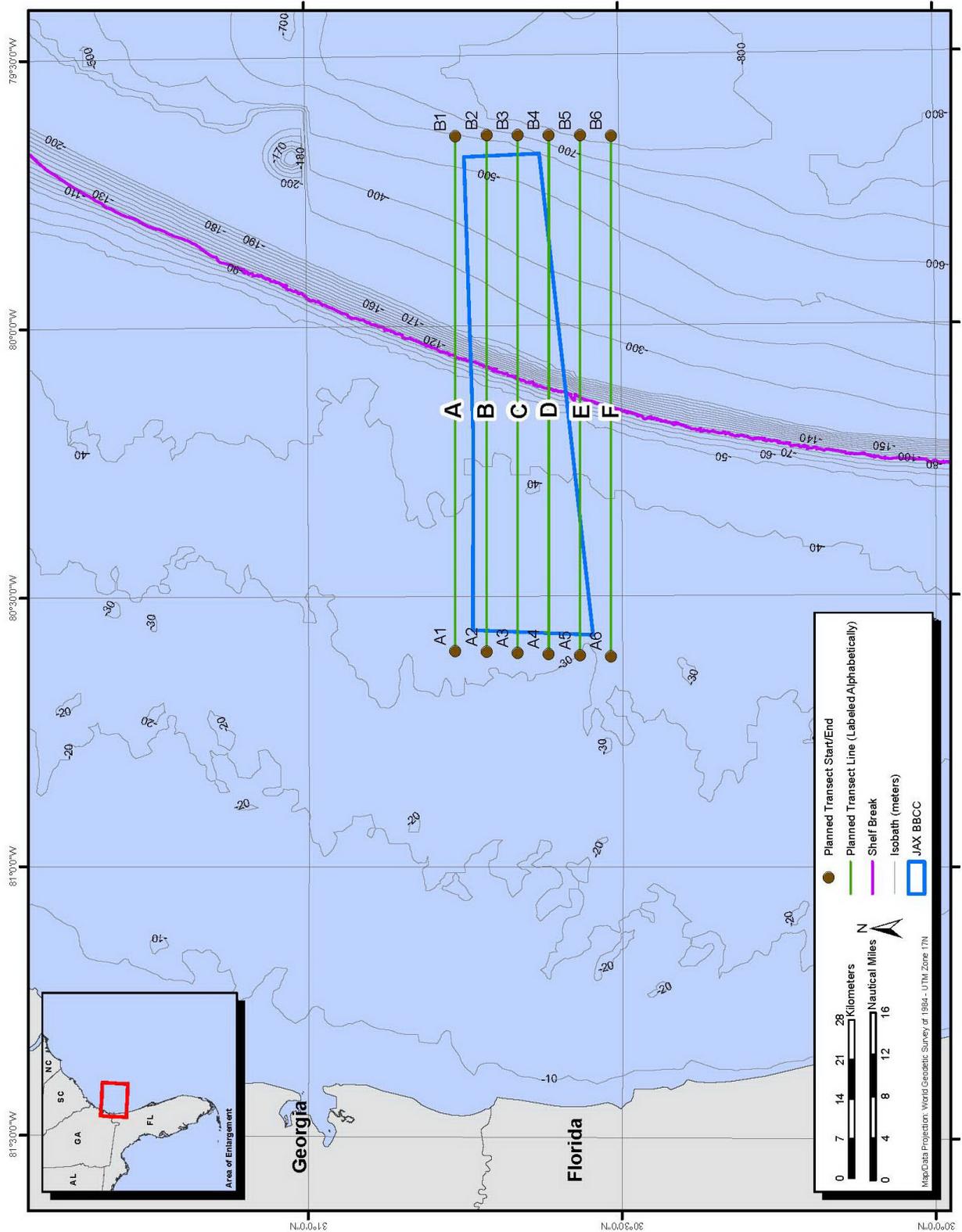


Figure 1. Pre-planned Tracklines for the Survey Effort for JAX FIREX Monitoring.

Table 1. Summary of Monitoring Effort for the JAX FIREX Training.

Date	Description	Start Time	Stop Time	Total Survey Minutes*	Total On-Effort Minutes	Trackline On-Effort Distance (km)
19 September	Transect survey (Pre-Event)	8:13	8:59	46	41	138
20 September	Transect survey (During Event)	8:31	11:15	163	153	516
21 September	Transect survey (Post-Event)	8:12	11:03	171	159	534
Total				381 (≈6.4 hours)	353 (≈5.9 hours)	1,188 km

Note: * Total Survey Minutes reflect minutes occupied in the range/area of interest and include both on-effort (systematic) and off-effort (connector/circling) total minutes.

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, a focal follow session was initiated at 1,000 ft or higher if conditions were appropriate (Smultea et al. 2009; refer to the survey methods on page 4 of this document). A lower altitude of approximately 700 to 800 ft was established 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 3.5 km (1.9 NM) beyond the boundaries of the BB and CC boxes (see **Table 1**, **Figure 1**). Each survey was limited to a 5-hour (hr) maximum flight time window. The pre-FIREX survey on 19 September was not fully executed due to deteriorating weather conditions.

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)
Lenisa Blair	Chief Scientist/Observer
Mark Cotter	Observer

Survey effort included the entirety of the BB and CC boxes (approximately 1,431 km²). Six parallel tracklines running from west to east, measuring 91 km long and spaced approximately 5.3 km apart were flown during “systematic” efforts throughout the monitoring period and provided a total survey coverage area of approximately 2,513 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 hourly contact with naval flight operations requiring an increase in the plane's altitude (see **Table 1, Figures 2 through 5**).

The following describe the general survey approach:

1. Pre-planned transect lines and waypoints were followed using methods described by Smultea et al. (2009) until a marine mammal/sea turtle group was sighted. Variables such as Beaufort sea state (BSS), glare, and visibility were recorded for each transect flown.
2. Upon sighting a marine mammal/sea turtle group, basic sighting information was recorded per established protocol (see Smultea et al. 2009). 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 site if available; (3) the behavior of marine mammals and sea turtles, including standard environmental and oceanographic parameters; (4) date, time, and visual conditions associated with each observation; (5) direction of travel relative to true North; and (6) duration of the observation.
3. If the species appeared suitable for a focal follow, the aircraft increased altitude to approximately 365 to 455 m and radial distance increased approximately 0.5 to 1.0 km. Then, the aircraft circled the sighting to obtain detailed behavior information as long as possible and logistically feasible. Focal follows occurred for a minimum of 5 minutes, including an observer taking video and digital photographs when possible.
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.

Section 3 Results

Survey Effort

Observers visually surveyed approximately 1,188 km of on-effort trackline and an additional 1,268 off-effort (connector lines and circling for focal follow or species ID) during three survey days for approximately 5.9 hr of on-effort status (see **Table 1**). BSS ranged from 3 to 5 and sightings were made during all BSS (see **Table 3**). This survey was hindered by heavy rain, and low cloud ceilings restricting both visibility and safe flying conditions. **Appendix A** contains a detailed description of environmental, oceanographic, and sighting conditions.

Sightings

Zero sightings of marine mammals and 10 sightings of sea turtles were recorded during 6.4 hr of total survey flight time (includes on-effort and off-effort intervals) within the survey area covering a 3-day period (see **Figure 2, Table 3**). Sightings Per Unit Effort (SPUE) was calculated as the total survey effort (hr/km/NM) divided by the total number of sea turtles ($n=10$). For this monitoring exercise, the SPUE for sea turtles was equal to one sighting per 0.64 hr, 119 km, and 64.3 NM.

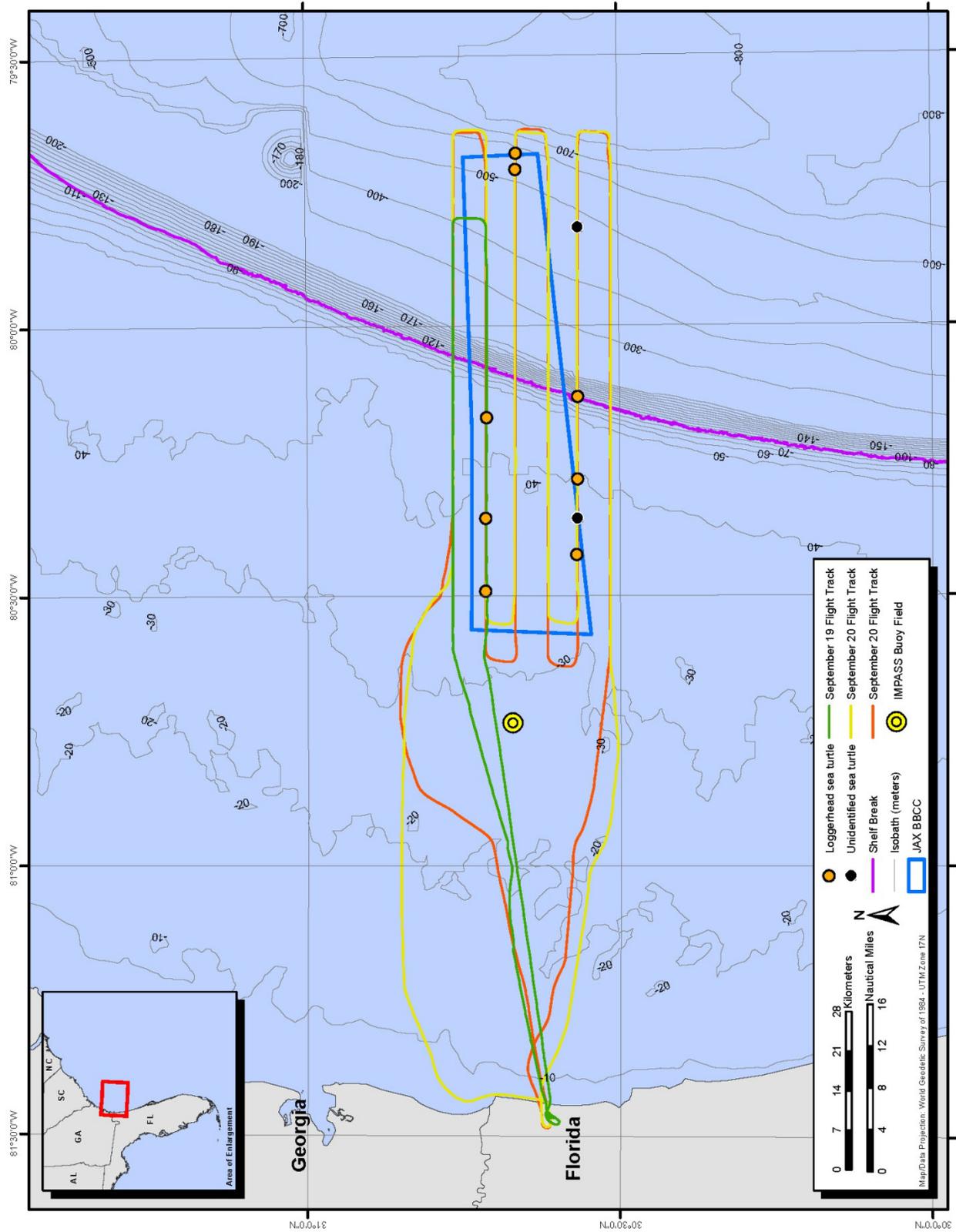


Figure 2. Locations of All Cetacean and Sea Turtle Sightings Recorded During JAX FIREX Monitoring (19-21 September).

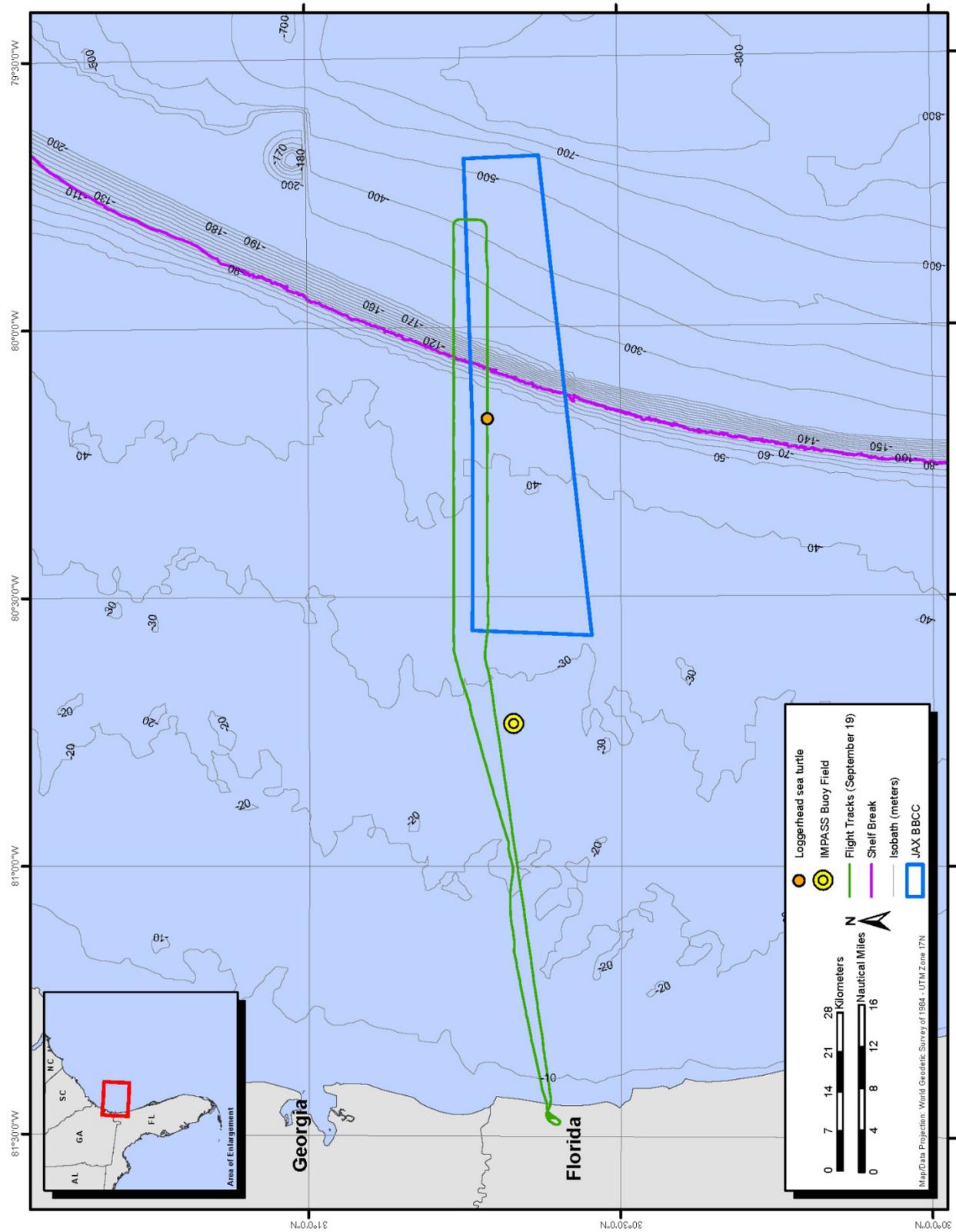


Figure 3. Locations of Cetacean and Sea Turtle Sightings Recorded Pre-FIREX Training (19 September).

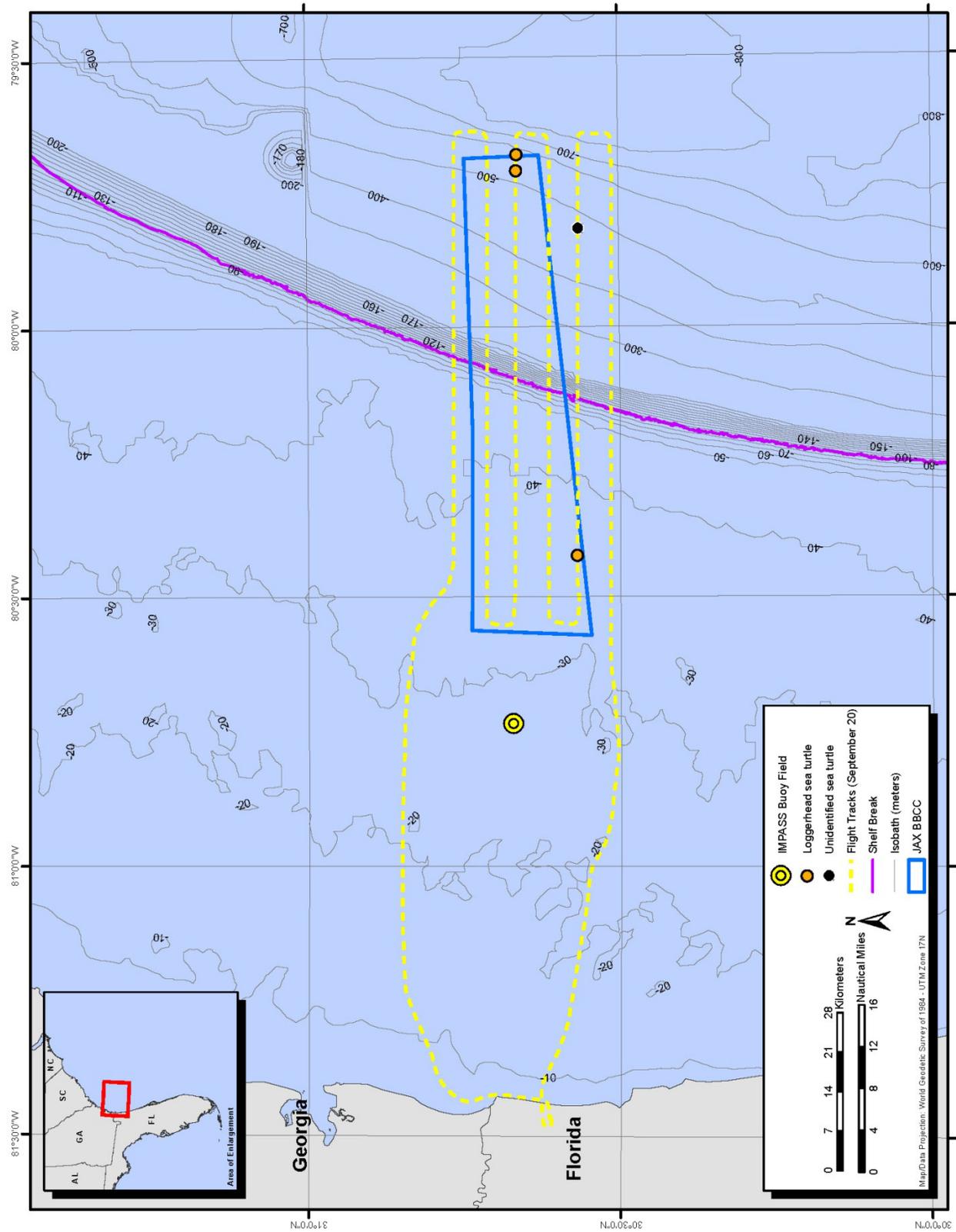


Figure 4. Locations of Cetacean and Sea Turtle Sightings Recorded During-FIREX Training (20 September).

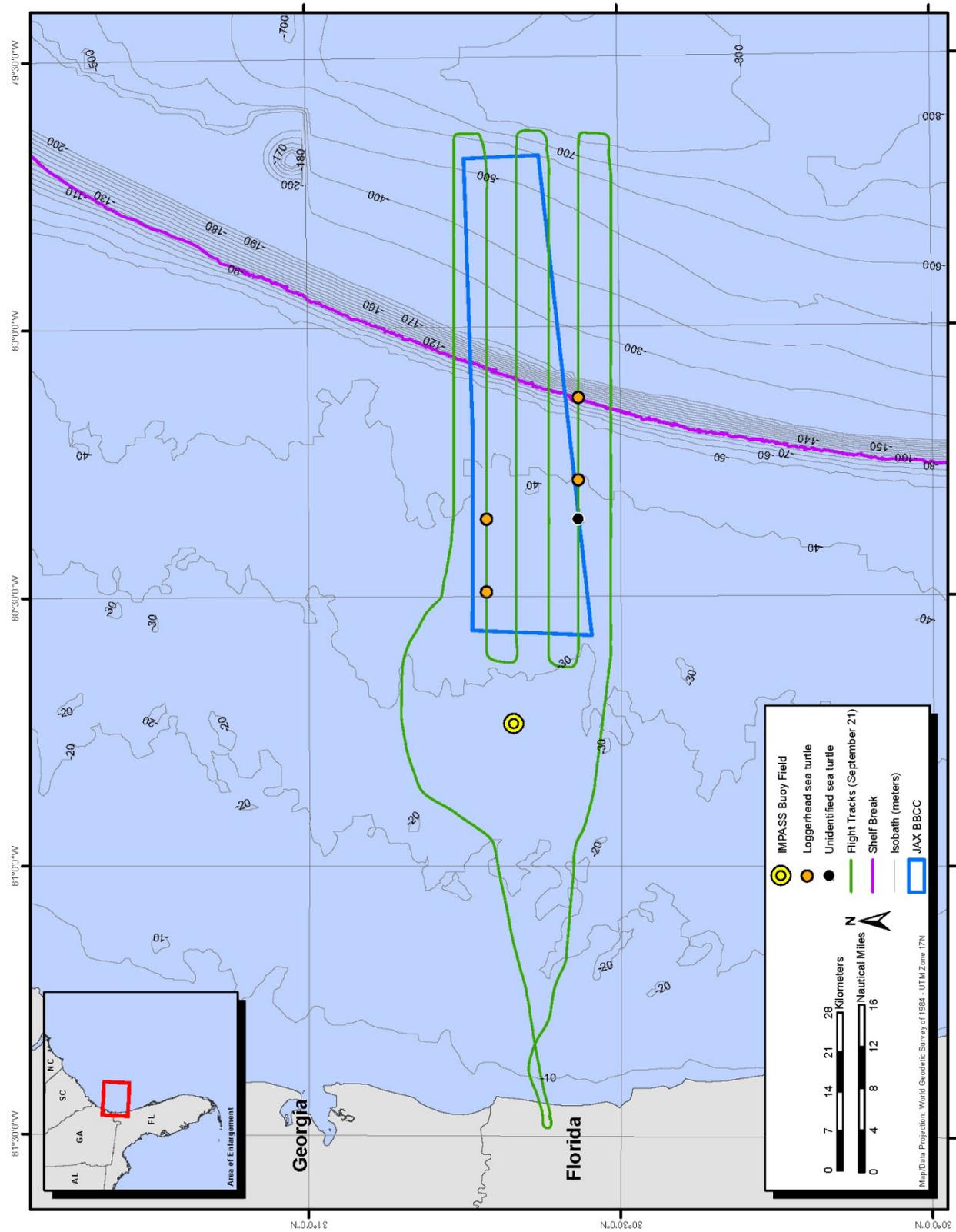


Figure 5. Locations of Cetacean and Sea Turtle Sightings Recorded Post-FIREX Training (21 September).

Table 3. Summary of Sightings.

Sighting No.	Date	Species	Group Size Best/High/Low			Calves	Start Time	Stop Time	Beaufort Sea State	Latitude	Longitude	Vert. Angle	Distance off Track (km)	Heading	Bottom Depth (m)	Behavioral Summary
Pre-FIREX Sightings on 19 September 2011																
1	9/19/11	CC	1	1	1	-	8:48	-	5	30.713	-80.170	050	0.2	225	50	Loggerhead turtle resting at the surface. No disturbance detected
During-FIREX Sightings on 20 September 2011																
1	9/20/11	CC	1	1	1	-	9:49	-	3	30.664	-79.711	042	0.3	090	500	Loggerhead turtle resting at the surface. No disturbance detected
2	9/20/11	CC	1	1	1	-	9:50	-	3	30.663	-79.681	054	0.2	248	600	Loggerhead turtle resting at the surface. No disturbance detected
3	9/20/11	CC	1	1	1	-	10:23	-	3	30.570	-80.424	047	0.3	113	30	Loggerhead turtle resting at the surface. No disturbance detected
4	9/20/11	Unid ST	1	1	1	-	10:41	-	3	30.566	-79.819	032	0.5	Unk.	500	Unidentified sea turtle resting at the surface. No disturbance detected.
Post-FIREX Sightings on 21 September 2011																
1	9/21/11	CC	1	1	1	-	8:58	-	4	30.715	-80.356	030	0.5	000	40	Loggerhead turtle resting at the surface. No disturbance detected
2	9/21/11	CC	1	1	1	-	9:02	-	4	30.716	-80.491	040	0.4	045	30	Loggerhead turtle resting at the surface. No disturbance detected.
3	9/21/11	Unid ST	1	1	1	-	10:14	-	3	30.569	-80.357	032	0.5	180	40	Unidentified sea turtle resting at the surface. No disturbance detected.
4	9/21/11	CC	1	1	1	-	10:16	-	3	30.568	-80.284	036	0.4	045	40	Loggerhead turtle resting at the surface. No disturbance detected.
5	9/21/11	CC	1	1	1	-	10:23	-	3	30.567	-80.132	021	0.8	180	100	Loggerhead turtle resting at the surface. No disturbance detected.

Key:

CC = loggerhead turtle (*Caretta caretta*)

Unid ST = Unidentified sea turtle

One sighting of a sea turtle was made during the 1-day pre-FIREX survey (see **Figure 3, Table 3**). Four sightings of sea turtles were made throughout the 1-day during-FIREX survey period (see **Figure 4, Table 3**). Five sightings of sea turtles were made during the one-day post-FIREX survey (see **Figure 5, Table 3**).

Sightings over the 3-day period included eight sightings of loggerhead turtles and two sightings of unidentified sea turtles. **Table 4** provides a summary of sightings information and environmental data. 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.

Table 4. Summary of Sightings Recorded during Monitoring for JAX FIREX Training.

Species	Number of Sightings	Bottom Depths (m)
Loggerhead turtle	8	30-600
Unidentified turtle	2	40-500

Behavior

No visible evidence of unusual behavior was observed for the pre-FIREX, during-FIREX or post-FIREX surveys (see **Table 3**). The survey team did not conduct any focal follows, because no sightings of marine mammals were recorded during the FIREX monitoring effort.

Section 4 Acknowledgements

We would like to thank Orion Aviation's Director Ed Coffman and pilots Stan Huddle and Ryan MacGregor. 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.
- Smultea et al. 2009 Smultea, M.A., J.R. Mobley, Jr., and K. Lomac-MacNair. 2009. *Aerial Survey Monitoring for Marine Mammals and Sea Turtles in Conjunction with US Navy Major Training Events off San Diego, California, 15-21 October and 15-18 November 2008, Final Report*. Prepared by Marine Mammal Research Consultants, Honolulu, HI, and Smultea Environmental Sciences, LLC., Issaquah, WA, under Contract No. N62742-08-P-1936 and N62742-08-P-1938 for NAVFAC Pacific, EV2 Environmental Planning, Pearl Harbor, HI.

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 on 19 September 2011							
8:13	4	30	1	4	0	1	100
8:36	5	30	1	5	0	1	100
8:40	6	20	0.5	6	10	0.5	100
8:45	5	20	0.5	5	10	0.5	100
8:50	4	20	0.5	4	10	0.5	100
During-FIREX Survey Effort on 20 September 2011							
8:31	3	25	1	3	10	1	100
8:49	4	25	1	4	10	1	100
8:57	3	25	1	3	0	1	100
9:08	3	45	1	3	0	1	100
9:24	3	50	1	3	10	1	100
9:28	3	50	1	3	60	1	100
9:54	2	40	1	2	50	1	100
9:55	3	40	1	3	50	1	100
10:20	3	50	1	3	30	1	100
10:49	3	45	1	3	20	1	100
Post-FIREX Survey Effort on 21 September 2011							
8:12	3	45	1	3	40	1	60
8:38	4	45	1	4	25	1	60
9:08	3	20	1	3	30	1	60
9:23	4	20	1	4	30	1	60
9:39	4	20	1	4	15	1	60
9:57	4	50	1	4	15	1	60
10:07	3	15	1	3	50	1	60
10:36	3	50	1	3	35	1	60
10:52	3	80	1	3	35	1	60

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