



Memorandum

TO: Brian D. Hopper (NMFS PR1), Mandy Migura (NMFS AK)

CC: Sheyna Wisdom, Lindsey Saxon Kendall (Fairweather Science); Kate Lomac-MacNair (SAExploration)

FROM: John Hendrix, Lisa Parker, ^{MCN}Marta Czarniecki (Apache Alaska Corporation)

RE: Monthly Report – May 6-31, 2012

1.0 INTRODUCTION

The National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) issued Apache Alaska Corporation (APACHE) an Incidental Harassment Authorization (IHA) under the authority of section 101(a)(5)(D) of the Marine Mammal Protection Act (16 U.S.C. 1361 *et seq.*) to harass small numbers of marine mammals, by Level B harassment, incidental to three-dimensional (3D) seismic surveys in Cook Inlet (hereafter *Cook Inlet 3D Seismic Program*) from April 2012 through April 2013.

This monthly report presents information requested in the IHA and Incidental Take Statement (ITS) for this reporting time period of **May 6-31, 2012** and includes information on the seismic operations, marine mammal monitoring and mitigation measures implemented. Protected Species Observer (PSO) daily reports which include details on the required information are not included in the monthly report because they were attached to the weekly reports previously sent to NMFS.

SUMMARY OF SIGHTINGS

Table 1. Summary of the number of sightings, shut downs and takes.

Marine Mammal Species	# Sightings	# Shut Downs	# Takes	# Cumulative Takes
Beluga Whale	26	1	0	0
Killer Whale	0	0	0	0
Harbor Porpoise	39	11	0	0
Steller Sea Lion	1	0	0	0
Harbor Seal	169	37	5	5
Other (describe)	1 gray whale	2 gray whale 2 false sightings	0	0
Unknown	4	1	0	0

2.0 SUMMARY OF OPERATIONS

The following table summarizes the seismic operations over this reporting period. More details are found in the following text.

Table 2. Total number of slack tides and hours per airgun.

Source	# of Slack Tides	# Hours
10 cui mitigation	NA	32.4
440 cui ultra-shallow (M/V Peregrine Falcon)	0	0
2400 cui (M/V Peregrine Falcon)	26	34.6
2400 cui (M/V Arctic Wolf)	65	97.2

Operations occurred in the general area of Trading Bay on the west side of Cook Inlet (Figure 1). All operations occurred in nearshore waters, within 6.5 miles offshore, between the town of Shirleyville and slightly to the north of the village of Tyonek. The two source vessels include the *M/V Arctic Wolf* and the *M/V Peregrine Falcon*. During seismic activity, the vessels traveled at speeds between 4-5 knots. As identified in the IHA application, marine seismic data are only acquired during low and high slack tides (approximately 2-3 hours over the tide). There are approximately 4 slack tides in a 24-hour period. Over the course of this reporting period, airguns operated for a total of 131.8 hours during a total of 91 slack tides. The 2400 cui airgun array operated from *Arctic Wolf* during 65 slack tides, for a total of approximately 97.2 hours. The *Peregrine Falcon* operated the 2400 cui airgun array during 26 slack tides for a total of approximately 34.6 hours. The mitigation gun was used on 17 different nights for a total of approximately 32.4 hours. The mitigation vessel, the *M/V Dreamcatcher*, was stationed to the north of the northern end of the patch for acoustic and visual monitoring during all periods of seismic operations.

The monitoring team consisted of two PSOs on the *Arctic Wolf*, two PSOs on the *Peregrine Falcon*, two PSOs on the *Dreamcatcher*, two PSOs at a land-based station (Shirleyville, Tyonek Dock or Bluff Site #1) and aerial overflights with one PSO. All PSOs operate on a 4-hour shift to avoid fatigue and only during daytime operations.

A radio-telemetered passive acoustic monitoring (PAM) buoy was deployed on May 10, 2012 to the north of the northern end of the patch for nighttime acoustic monitoring. However, the buoy turned over due to waves and currents; therefore, making transmission impossible. Because of inclement weather, the buoy was not retrieved until May 16. The buoy was damaged while deployed, and therefore, was not redeployed. Instead, it returned to Anchorage for maintenance and re-evaluation. Thus, an over-the-side (OTS) hydrophone was deployed from the *Dreamcatcher* during all nighttime operations with the engines off (but generators still on) for passive acoustic monitoring. The *Dreamcatcher* is positioned to the north of the seismic acquisition patch. Two acoustic technicians monitored for acoustic detections of marine mammals during all nighttime operations in 4-hour shifts. The reported detection range of small vessels on this hydrophone with the engines off was approximately 3 km.

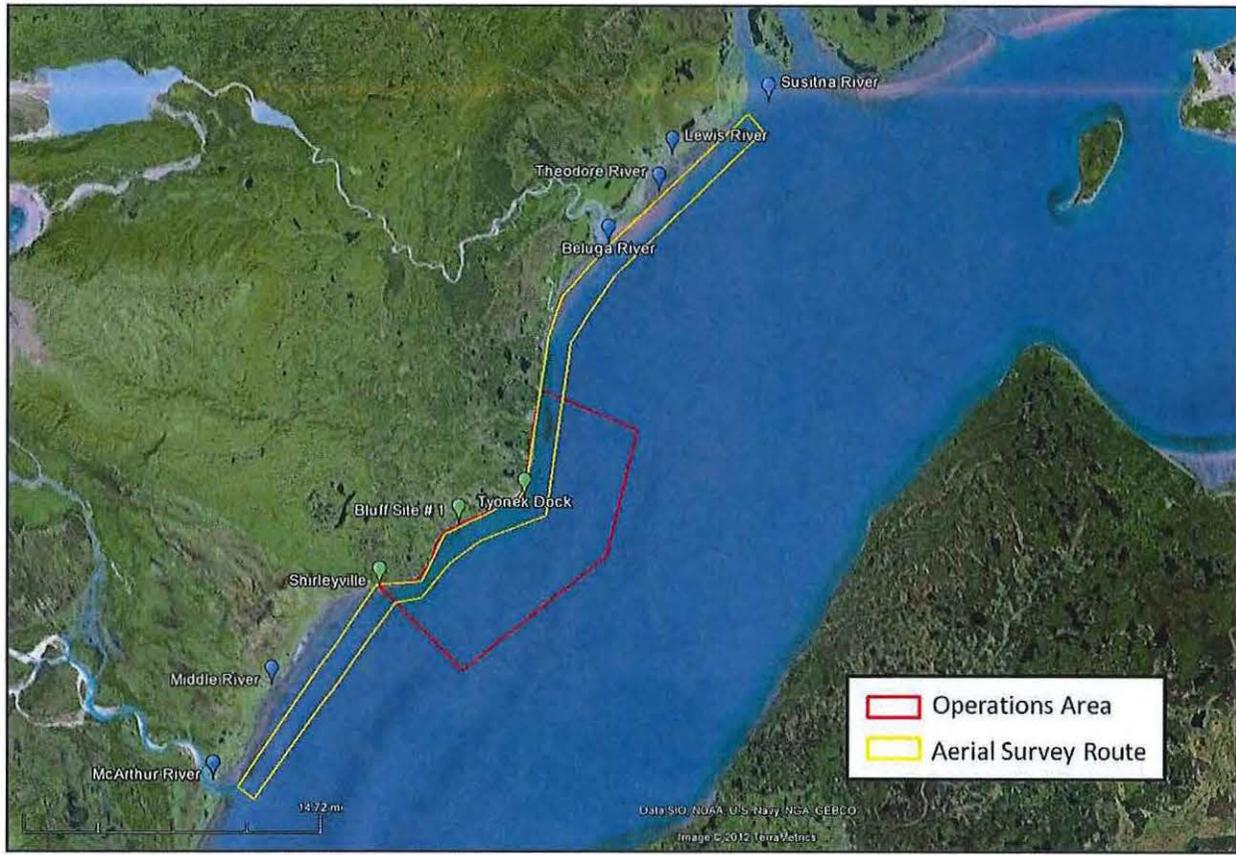


Figure 1. Operations occurred in the general area of Trading Bay on the west side of Cook Inlet (red polygon). The yellow polygon indicates the aerial survey route.

3.0 MONITORING EFFORT

A total of 2,176.1 hours of monitoring effort took place during the month of May including visual vessel- and land-based, passive acoustic monitoring and aerial surveys (Table 3).

Table 3. Total number of hours of monitoring per method.

Monitoring Method	Total # of Hours
Visual Vessel-based	1,095.9
Visual Land-based	708.5
Passive Acoustic Monitoring	355.0
Aerial Survey	16.7
Total	2,176.1

3.1 Environmental Conditions

In general, the environmental conditions were conducive to appropriately monitor marine mammals during seismic operations. The sea state ranged from 0 to 3 with an occasional 4, 5 or 6 on the Beaufort Sea State scale.

3.2 Marine Mammal Sightings

Visual Observations

Five marine mammal species were sighted during this month's monitoring effort including the beluga whale, gray whale, harbor porpoise, Steller sea lion and harbor seal (Table 4). There were four sightings of unknown marine mammal species. Details on the species sightings are described below and in the PSO Daily Reports.

Table 4. Total of individuals and sighting per species

Species	# of Individuals	# of Sightings
Beluga Whale	70	26
Killer Whale	0	0
Harbor Porpoise	48	39
Steller Sea Lion	1	1
Harbor Seal	167 ¹	169
Gray Whale	1	1
Unknown	4	4
Total	291	234

¹The total number of harbor seals only reflects the individuals sighted and does not include the total counts from the six haul out sightings observed during aerial surveys.

Beluga Whale

A total of 70 beluga whales were observed on 26 occasions. Beluga whales were observed traveling, diving, milling and foraging.

Gray Whale

One gray whale was observed in the project area on May 22. The gray whale was observed blowing, swimming, diving and milling. Operations ceased with initial sighting of the gray whale, but continued later that day when the whale was no longer in view. All night operations were discontinued because the gray whale remained in the area.

Harbor Porpoise

A total of 48 harbor porpoise were observed on 39 occasions. Harbor porpoise were observed traveling, swimming and porpoising.

Steller sea lion

On May 6, one Steller sea lion was observed swimming approximately 400 m away from the Arctic *Wolf*. No seismic activity was taking place at the time of the sighting.

Harbor Seal

Harbor seals were observed on 169 different occasions. There were 167 individuals observed on 163 occasions and six sightings of large numbers of seals hauled out or near the Lewis and Theodore Rivers. The number of seals hauled out ranged from 10 individuals to over 100. Harbor seals were observed traveling, swimming, diving, milling, foraging, bottlenosing, sinking, looking toward the vessel and resting.

Acoustic Observations

No marine mammal species were acoustically detected during this month's monitoring effort.

3.3 Marine Mammal Takes

During the month of May, there were five harbor seal takes (Table 5). The takes occurred on May 8, 11, 15 and 31 (Table 6). No other marine mammal species were taken during this time period.

Table 5. Number of marine mammal takes

Species	No. of Takes	Cumulative Level of Takes
Beluga whale	0	0
Harbor seal	5	5
Harbor porpoise	0	0
Killer whale	0	0
Steller sea lion	0	0

Table 6. Harbor seal takes

Date	Time	Behavior	Comments
May 8	17:40	Looked toward vessel and then dove	Seismic activity continued
May 11	10:36	Swimming and then sank without diving	Seismic activity continued
May 11	11:16	Bottlenosed and then sank	Seismic activity continued
May 15	11:04	Swimming, looked toward vessel, then sank	Seismic activity shut down
May 31	17:52	Bottlenosing	

No cetaceans or pinnipeds were exposed to 180 or 190 dB, respectively.

3.4 Implementation of Mitigation Measures

Mitigation measures that were implemented during the month of May include the safety radii and shut down and ramp up procedures. Marine mammal monitoring (visual, acoustic and aerial) was ongoing throughout the month. Passive acoustic monitoring using an “over-the-side” hydrophone occurred at night during seismic operations. NMFS’s vessel operation and marine mammal viewing guidelines to minimize vessel and aircraft impacts are continually implemented. Airguns were discharged at depths greater than 2 m (~6.6 ft). Details on changes to the mitigation measures are described below.

Sound Source Verification Study

The sound source verification (SSV) study took place in Beshta Bay, between Tyonek dock and Old Tyonek Creek over a period of three days from May 6-8. The results from the SSV study are presented in Table 7.

Table 7. Maximum threshold distances for the mitigation airgun and three airgun arrays. Distances are maximized over direction and environment and are based on the 90th percentile fits.

SPL _{rms90} Threshold (dB re 1 μPa)	Airgun Array			
	10 cui	440 cui	1200 cui	2400 cui
190	10 m	100 m	250 m	380 m
180	10 m	310 m	910 m	1400 m
160	280 m	2500 m	5300 m	9500 m ¹

¹This radius applies to receivers in water depths of approximately 25 m. The radius is substantially reduced for receivers in 10 m water depth, and it slightly reduced for receivers in water depths from 35-65m.

Safety Radii

On May 6, at the start of seismic activity, the modeled safety radii were implemented and the monitoring zone extended to 6.1 km. However, based on preliminary results from the SSV study, the monitoring zone increased to an area larger than modeled during the week of May 16-22. On May 25, the 160 dB monitoring zone increased to the measured monitoring zone of 9.5 km.

Aerial Survey

The area in which the aerial surveys covered expanded during the month of May due to the SSV results. At the start of seismic activity, aerial surveys extended from the Chuitna River to Middle River, approximately 10 km north and south of the operations area. Once the SSV study results were available, the aerial survey expanded to the southern end of the Big Susitna River to the McArthur River, approximately 25 km to the north and 20 km to the south of the operations area (Figure 1). The increase in aerial survey distance insured adequate coverage of the measured 160 dB monitoring zone.

3.5 Implementation of Conservation Recommendations

The conservation recommendations described in the Biological Opinion issued by NMFS were not stated as a condition, but rather designed to minimize adverse effects to the Cook Inlet beluga whale from in-water noise generated by the airguns during the Cook Inlet 3D Seismic Program. At this time APACHE has not implemented any of the conservation recommendations suggested by NMFS. If any of the conservation recommendations are implemented, NMFS will be notified and the effectiveness of the recommendation will be reported.



Memorandum

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CC: Sheyna Wisdom, Lindsey Saxon Kendall (Fairweather Science); Kate Lomac-MacNair (SAExploration)

FROM: John Hendrix, Lisa Parker, *MCB* Marta Czarnecki (Apache Alaska Corporation)

RE: Monthly Report: June 1 – 30, 2012

1.0 INTRODUCTION

The National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) issued Apache Alaska Corporation (APACHE) an Incidental Harassment Authorization (IHA) under the authority of section 101(a)(5)(D) of the Marine Mammal Protection Act (16 U.S.C. 1361 *et seq.*) to harass small numbers of marine mammals, by Level B harassment, incidental to three-dimensional (3D) seismic surveys in Cook Inlet (hereafter *Cook Inlet 3D Seismic Program*) from April 2012 through April 2013.

This monthly report presents information requested in the IHA and Incidental Take Statement (ITS) for this reporting time period of **June 1– 30, 2012** and includes information on the seismic operations, marine mammal monitoring and mitigation measures implemented. Protected Species Observer (PSO) daily reports which include details on the required information are not included in the monthly report because they were attached to the weekly reports previously sent to NMFS.

SUMMARY OF SIGHTINGS

Table 1. Summary of the number of observations, shut downs and takes.

Marine Mammal Species	No. of Observations¹	No. of Shut Downs	No. of Takes	No. of Cumulative Takes
Beluga Whale (<i>Delphinapterus leucas</i>)	57	1	0	0
Killer Whale (<i>Orcinus orca</i>)	0	0	0	0
Harbor Porpoise (<i>Phoca vitulina</i>)	47	6	0	0
Gray Whale (<i>Eschrichtius robustus</i>)	3	2	0	0
Steller Sea Lion (<i>Eumatopia jubatus</i>)	0	0	0	0
Harbor Seal (<i>Phocoena phocoena</i>)	177	32	1	6
California Sea Lion (<i>Zalophus californianus</i>)	1	0	0	0
Unidentified Large Cetacean	3	0	0	0
Unidentified Pinniped	3	1	0	0

¹ Number of observations include animals visually observed (vessel, land, aerial) and acoustically detected

2.0 SUMMARY OF OPERATIONS

The following table summarizes the seismic operations over this reporting period. More details are found in the following text.

Table 2. Total number of slack tides and hours per airgun.

Source	No. of Slack Tides	No. of Hours
10 cui mitigation	NA	57.9
440 cui ultra-shallow (<i>M/V Peregrine Falcon</i>)	0	0
2400 cui (<i>M/V Arctic Wolf</i>)	78	127.9
2400 cui (<i>M/V Peregrine Falcon</i>)	78	151.6

Operations moved offshore during the week of June 6-12; however, remained in the general area of Trading Bay on the west side of Cook Inlet (Figure 1). The two source vessels include the *M/V Arctic Wolf* and the *M/V Peregrine Falcon*. During seismic activity, the vessels traveled at speeds between 4-5 knots. As identified in the IHA application, marine seismic data are only acquired during low and high slack tides (approximately 2-3 hours over the tide). There are approximately 4 slack tides in a 24-hour period. Over the course of this reporting period, airguns operated for a total of approximately 279.5 hours. The 2400 cui airgun array operated from *Arctic Wolf* during 78 slack tides, for a total of approximately 127.9 hours. The *Peregrine Falcon* operated the 2400 cui airgun array during 78 slack tides for a total of approximately 151.6 hours. The mitigation gun was used on 20 different nights for a total of approximately 57.9 hours. During this month, operations were delayed due to mitigation measures for a total of 35.8 hours, with a cumulative time of 38.9 hours for the duration of the project. The mitigation vessel, the *M/V Dreamcatcher*, was generally stationed to the north of the northern end of the patch for acoustic and visual monitoring during all periods of seismic operations.

The monitoring team consisted of two PSOs on the *Arctic Wolf*, two PSOs on the *Peregrine Falcon*, two PSOs on the *Dreamcatcher*, two PSOs at a land-based station (Shirleyville, Tyonek Dock or Bluff Site #1) and aerial overflights with one PSO. All PSOs operate on a 4-hour shift to avoid fatigue and only during daytime operations.

A radio-telemetered passive acoustic monitoring (PAM) buoy has not been redeployed. The PAM buoy remains in Anchorage for maintenance and re-evaluation. Thus, an over-the-side (OTS) hydrophone was deployed from the *Dreamcatcher* during all nighttime operations (at minimum) with the engines off (but generators still on) for passive acoustic monitoring. The *Dreamcatcher* is positioned to the north of the seismic acquisition patch. Two acoustic technicians monitored for acoustic detections of marine mammals during all nighttime operations in 4-hour shifts. The reported detection range of small vessels on this hydrophone with the engines off was approximately 3 km.

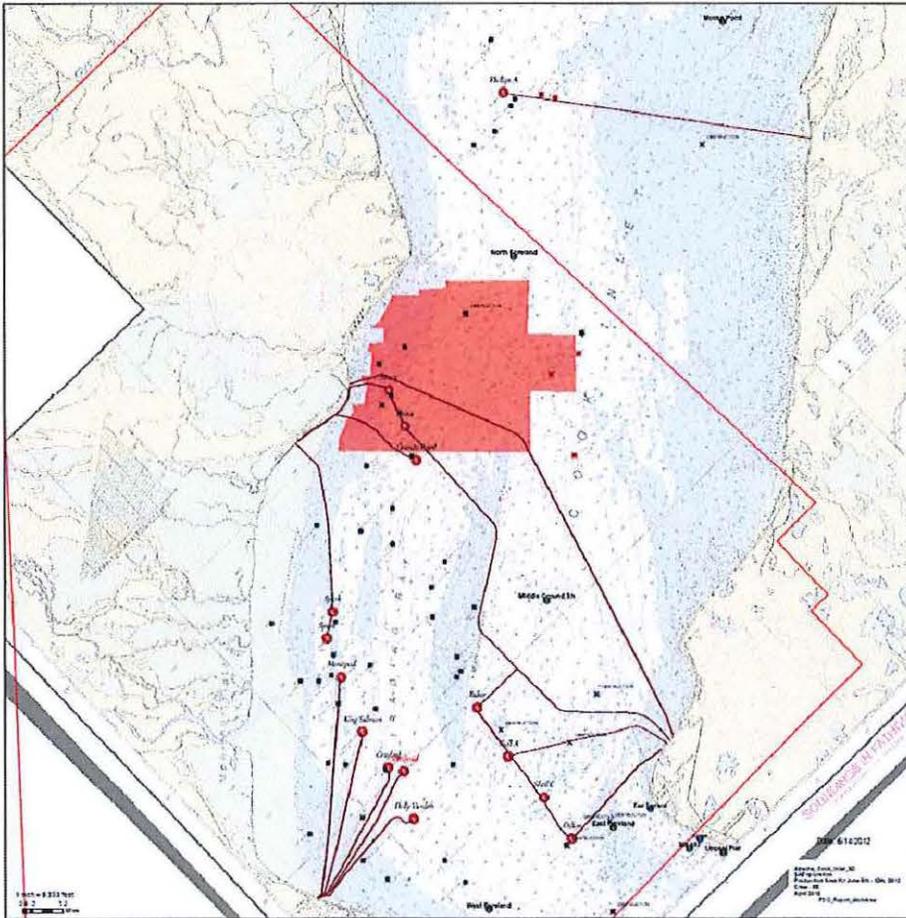


Figure 1. Operations occurred in the general area of Trading Bay on the west side of Cook Inlet (red polygon).

3.0 MONITORING EFFORT

A total of 1,658.4 hours of monitoring effort took place from June 1 – 30, 2012 including visual vessel- and land-based (861.1 and 281.3 hours, respectively), passive acoustic monitoring (497.9 hours) and aerial surveys (18.1 hours; Table 3). The PSOs watched for marine mammals prior to and during seismic activity to monitor the 160 dB zone (9.5km). Opportunistic observations took place when applicable from the mitigation vessel and days when seismic activity did not take place.

Table 3. Total number of hours of monitoring per method.

Monitoring Method	Total No. of Hours
Visual Vessel-based	861.1
Visual Land-based	281.3
Passive Acoustic Monitoring	497.9
Aerial Survey	18.1
Total	1,658.4

3.1 Environmental Conditions

In general, the environmental conditions were conducive to appropriately monitor marine mammals during seismic operations. The sea state ranged from 0 to 4 with an occasional 5 or 6 on the Beaufort Sea State scale.

3.2 Marine Mammal Observations

A total of 291 marine mammal observations and 3,353 estimated individual animals were observed from June 1-30, 2012 using visual vessel- and land-based, acoustic and aerial survey methods. Details on the species sightings are described below and found in the PSO Daily Reports.

Visual Vessel- and Land-based Observations

Five marine mammal species were visually observed from vessel- or land-based stations during this month's monitoring effort including the beluga whale, harbor porpoise, gray whale, harbor seal and California sea lion (Table 4). In addition to those species, there were three sightings of an unidentified large cetacean and two sightings of unidentified pinnipeds.

Table 4. Total of individuals and sighting per species from vessel- and land-based stations

Species	Estimated No. of Individuals Observed	No. of Sightings
Beluga Whale	113	13
Harbor Porpoise	57	39
Gray Whale	3	3
Harbor Seal	148	143
California Sea Lion	2	1
Unidentified Large Cetacean	3	3
Unidentified Pinniped	4	2
Total	330	204

Beluga Whale

A total of 113 beluga whales were observed on 13 occasions. Beluga whales were observed traveling, diving and milling.

Harbor Porpoise

A total of 57 harbor porpoise were observed on 39 occasions. Harbor porpoise were observed traveling, swimming, milling and foraging.

Gray Whale

On June 1, there were three sightings of one gray whale at 11:00, 15:13 and 16:23. The gray whale was observed blowing, swimming and diving. Two shut downs occurred and there was no seismic activity taking place during the third sighting.

Harbor Seal

Harbor seals were observed on 169 different occasions. Harbor seals were observed traveling, swimming, diving, milling, bottlenosing, sinking, looking toward the vessel and resting.

California Sea Lion

Two California sea lions were observed traveling on June 23 at 20:22.

Acoustic Observations

Three species of marine mammals were acoustically detected during this month's monitoring effort including the beluga whale (1 detection), harbor porpoise (7 detections) and harbor seal (5 detections; Table 5). At this time it is not possible to estimate the total number of individuals acoustically because it is not possible to localize with the current hydrophone configuration.

Table 5. Number of acoustic detections per species

Species	No. of Detections
Beluga Whale	1
Harbor Porpoise	7
Harbor Seal	5
Total	13

Aerial Observations

Three species of marine mammals were observed during aerial surveys including the beluga whale, harbor porpoise and harbor seal (Table 6). In addition to those species, was one sighting of an unidentified pinniped.

Table 6. Total of individuals and sighting per species from aerial surveys

Species	Estimated No. of Individuals Observed	No. of Sightings
Beluga Whale	547	43
Harbor Porpoise	1	1
Harbor Seal	2,474	29
Unidentified Pinniped	1	1

Beluga Whale

A total of approximately 547 individual beluga whales were observed on 43 different occasions during aerial surveys. Many of these individuals were likely resighted on several occasions. Beluga whales were observed traveling, swimming, milling, diving and foraging near the McArthur, Beluga, Theodore, Lewis, Ivan and Big Susitna Rivers. Belugas were also observed near Tyonek Creek.

Harbor Porpoise

On June 3, one harbor porpoise was observed during the aerial survey traveling toward central Cook Inlet.

Harbor Seal

A total of approximately 2,474 individual harbor seals were observed on 29 different occasions during aerial surveys. Harbor seals were observed hauled out, swimming, traveling, resting and foraging near the McArthur, Beluga, Theodore and Lewis Rivers.

3.3 Marine Mammal Takes

During the month of June, there was one harbor seal take (Table 7). The take occurred on June 9 at 4:35 (Table 8). No other marine mammal species were taken during this time period.

Table 7. Number of marine mammal takes

Species	No. of Takes	Cumulative Level of Takes
Beluga whale	0	0
Killer whale	0	0
Harbor porpoise	0	0
Steller sea lion	0	0
Harbor seal	1	6

Table 8. Harbor seal take

Date	Time	Behavior	Comments
June 9	4:35	Swimming	Seismic activity was taking place on both the <i>Arctic Wolf</i> and the <i>Peregrine Falcon</i> (2400 cui airgun). A shut down initially occurred, and then seismic activity resumed.

No cetaceans or pinnipeds were exposed to 180 or 190 dB, respectively.

3.4 Implementation of Mitigation Measures

Mitigation measures that were implemented during the month of June include delay clearing safety zone (62), shut down (42) and power down procedures (16; Table 9). Ramp up procedures also took place when initiating operations. Marine mammal monitoring (visual, acoustic and aerial) of the safety radii (monitoring zone extends 9.5 km) was ongoing throughout the month. Passive acoustic monitoring using an “over-the-side” hydrophone occurred at minimum at night during seismic operations. NMFS’s vessel operation and marine mammal viewing guidelines to minimize vessel and aircraft impacts are continually implemented. Airguns were discharged at depths greater than 2 m (~6.6 ft). Details on the implemented mitigation measures are described in the PSO Daily Reports.

Table 9. Number of implemented mitigation measure per species.

Species	Delay Clearing Safety Zone	Shut Down	Power Down	None	Total
Beluga Whale	9	1	0	47	57
Killer Whale	0	0	0	0	0
Harbor Porpoise	16	6	3	22	47
Steller Sea Lion	0	0	0	0	0
Harbor Seal	38	32	13	94	177
Gray Whale	1	2	0	0	3
California Sea Lion	1	0	0	0	1
Unidentified Large Cetacean	3	0	0	0	3
Unidentified Pinniped	0	1	0	2	3
Total	68	42	16	165	291

Aerial Survey

Aerial surveys continued to occur during the month of June. The surveys extended to the southern end of the Big Susitna River to the McArthur River, approximately 25 km to the north and 20 km to the south of the operations area. The surveys stayed within approximately 1.6 km (1 mi) offshore due to safety restrictions (Figure 2). The aerial survey distance insured adequate coverage of the measured 160 dB monitoring zone in areas where high concentrations of marine mammals were expected.



Figure 2. Aerial survey route extends from Big Susitna River south to McArthur River and approximately 1.6 km (1 mi) offshore (yellow polygon).

Extended Shut Down

When a cetacean was observed within in the area, operations ceased for 30 minutes or until the animal cleared the safety zone. In the case of the gray whale, the marine mammal monitoring team used a one hour clearing time to account for the long dive time of this animal.

3.5 Implementation of Conservation Recommendations

The conservation recommendations described in the Biological Opinion issued by NMFS were not stated as a condition, but rather designed to minimize adverse effects to the Cook Inlet beluga whale from in-water noise generated by the airguns during the *Cook Inlet 3D Seismic Program*. At this time APACHE has not implemented any of the conservation recommendations suggested by NMFS. If any of the conservation recommendations are implemented, NMFS will be notified and the effectiveness of the recommendation will be reported.



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This monthly report presents information requested in the IHA and Incidental Take Statement (ITS) for this reporting time period of **July 1– 31, 2012** and includes information on the seismic operations, marine mammal monitoring and mitigation measures implemented. Protected Species Observer (PSO) daily reports which include details on the required information are not included in the monthly report because they were attached to the weekly reports previously sent to NMFS.

SUMMARY OF SIGHTINGS

Table 1. Summary of the number of observations, shut downs and takes.

Marine Mammal Species	No. of Observations ¹	No. of Shut Downs	No. of Takes	No. of Cumulative Takes
Beluga Whale (<i>Delphinapterus leucas</i>)	32	1	0	0
Killer Whale (<i>Orcinus orca</i>)	0	0	0	0
Harbor Porpoise (<i>Phoca vitulina</i>)	27	7	0	0
Gray Whale (<i>Eschrichtius robustus</i>)	3	1	0	0
Steller Sea Lion (<i>Eumatopia jubatus</i>)	0	0	0	0
Harbor Seal (<i>Phocoena phocoena</i>)	95	13	1	7
Unidentified Large Cetacean	1	0	0	0

¹ Number of observations include animals visually observed (vessel, land, aerial) and acoustically detected

2.0 SUMMARY OF OPERATIONS

The following table summarizes the seismic operations over this reporting period. More details are found in the following text.

Table 2. Total number of slack tides and hours per airgun and vessel.

Source	No. of Slack Tides	No. of Hours
10 cui mitigation (<i>M/V Arctic Wolf</i>)	NA	59.4
10 cui mitigation (<i>M/V Peregrine Falcon</i>)	NA	60.4
440 cui ultra-shallow (<i>M/V Peregrine Falcon</i>)	0	0
2400 cui (<i>M/V Arctic Wolf</i>)	88	140.1
2400 cui (<i>M/V Peregrine Falcon</i>)	82	125.2

Operations occurred offshore from July 1-31, 2012; however, remained in the general area of Trading Bay on the west side of Cook Inlet (Figure 1). Nine vessels operated for the *Cook Inlet 3D Seismic Program* during the month of July including *M/V Arctic Wolf*, *M/V Peregrine Falcon*, *M/V Westward Wind*, *M/V Miss Diane*, *M/V Mark Stevens*, *M/V Maxime*, *M/V Dreamcatcher*, *M/V Norseman I* and *M/V Side Winder* (Table 3). The *M/V Westward Wind* operated on the project from July 1-21 and the *M/V Norseman I* arrived on July 29. Vessel based PSOs were stationed on the *M/V Arctic Wolf*, *M/V Peregrine Falcon* (source vessels) and *M/V Dreamcatcher* (mitigation vessel). During seismic activity, the vessels traveled at speeds between 4-5 knots. As identified in the IHA application, marine seismic data are only acquired during low and high slack tides (approximately 2-3 hours over the tide). There are approximately 4 slack tides in a 24-hour period. Over the course of this reporting period, airguns operated for a total of approximately 265.3 hours. The 2400 cui airgun array operated from *Arctic Wolf* during 88 slack tides, for a total of approximately 140.1 hours. The *Peregrine Falcon* operated the 2400 cui airgun array during 82 slack tides for a total of approximately 125.2 hours. The mitigation gun was used on 25 different nights. The *Arctic Wolf* and the *Peregrine Falcon* operated the mitigation gun for approximately 59.4 and 60.4 hours, respectively. During July, operations were delayed due to mitigation measures for a total of 20.78 hours, with a cumulative time of 59.37 hours for the duration of the project. The mitigation vessel, the *Dreamcatcher*, was generally stationed to the north or south of the project area (opposite of the land-based observation station) for acoustic and visual monitoring for near-shore marine mammal movement during all periods of seismic operations. On July 22, the *Dreamcatcher* moved to the west side of Cook Inlet and was positioned to the north of the OSK dock near Boulder Point to assist in monitoring the west side of the project area.

The monitoring team consisted of two PSOs on the *Arctic Wolf*, two PSOs on the *Peregrine Falcon*, two PSOs on the *Dreamcatcher*, two or three PSOs at a land-based station (Shirleyville, Tyonek Dock, Bluff Site #1 or OSK Bluff Site) and aerial overflights with one or two PSOs. All PSOs operate on a 4-hour shift to avoid fatigue and only during daytime operations.

During July 1-16, land-based observations took place on the west side of Cook Inlet from the Shirleyville, Tyonek Dock or Bluff Site #1 observation stations. On July 16, land-based observations moved to the

OSK Bluff Site near the OSK dock in Nikiski on the east side of Cook Inlet. The land-based station moved to improve monitoring efforts as the vessels continue to work offshore. Observations continued to take place at the OSK Bluff Site from July 17-31.

A radio-telemetered passive acoustic monitoring (PAM) buoy has not been redeployed. The PAM buoy remains in Anchorage for maintenance and re-evaluation. Thus, an over-the-side (OTS) hydrophone was deployed from the *Dreamcatcher* during all nighttime operations (at minimum) with the engines off (but generators still on) for passive acoustic monitoring. The *Dreamcatcher* is positioned to the north or south of the seismic acquisition patch (opposite of the land-based observation station). Two acoustic technicians monitored for acoustic detections of marine mammals during all nighttime operations in 4-hour shifts. The reported detection range of small vessels on this hydrophone with the engines off was approximately 3 km.

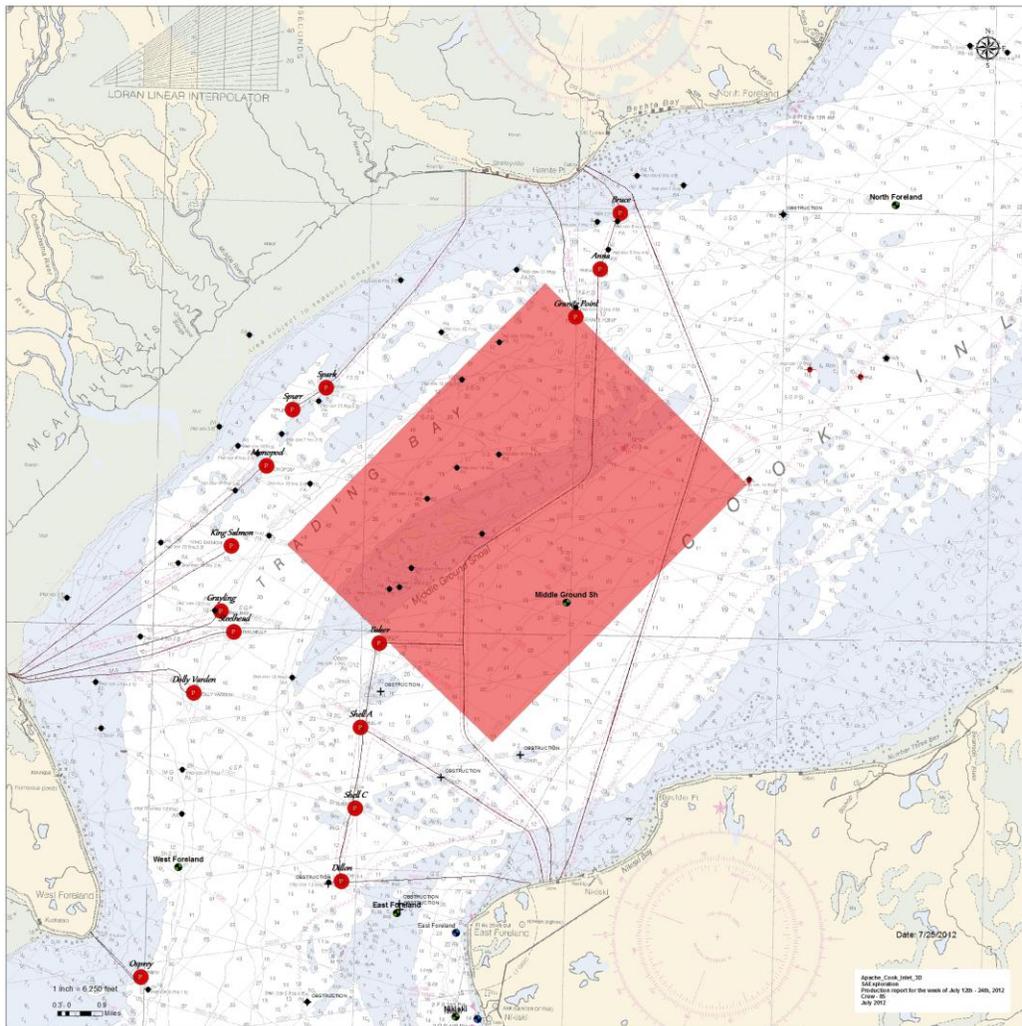


Figure 1. Operations occurred offshore near Trading Bay, Cook Inlet (red polygon).

Table 3. Vessels operating for the Cook Inlet 3D Seismic Program.

Vessel	Vessel Purpose	Size	Documentation No.	Call Sign	Gross Tonnage
<i>M/V Arctic Wolf</i>	Source vessel	41 m x 9 m (135 ft x 30 ft)	687450	-	251
<i>M/V Peregrine Falcon</i>	Source vessel	26 m x 6 m (85 ft x 24 ft)	950245	WCZ6285	131
<i>M/V Westward Wind</i> ¹	Node vessel	-	-	-	-
<i>M/V Miss Diane</i>	Node vessel	26 m x 6 m (85 ft x 20 ft)	1210779	WAV0779	53
<i>M/V Mark Stevens</i>	Node vessel	26 m x 6.7 m (85 ft x 22 ft)	1238385	WCZ-7941	81
<i>M/V Maxime</i>	Transfer vessel	21 m x 4.9 m (70 ft x 16 ft)	1196716	WAV6716	48
<i>M/V Dreamcatcher</i>	Mitigation vessel	26 m x 7.1 m (85 ft x 23 ft)	963070	WBN5411	100
<i>M/V Norseman I</i> ²	Housing Management	33 m x 8.5 m (108 ft x 28 ft)	553713	WDC-6817	197
<i>M/V Side Winder</i>	Side scan sonar	11 m x 4 m (36.8 ft x 14 ft)	1091516	WCZ-6262	16

¹Westward Wind operated on the project July 1-21.

²Norseman I arrived and began operating on the project July 29.

3.0 MONITORING EFFORT

A total of 1,355.1 hours of monitoring effort took place from July 1-31, 2012 including visual vessel- and land-based (746.1 and 158.6 hours, respectively), passive acoustic monitoring (432.5 hours) and aerial surveys (17.9 hours; Table 3). The PSOs watched for marine mammals prior to and during seismic activity to monitor the 160 dB zone (9.5km). Opportunistic observations took place when applicable from the mitigation vessel and days when seismic activity did not take place.

Table 3. Total number of hours of monitoring per method.

Monitoring Method	Total No. of Hours
Visual Vessel-based	746.1
Visual Land-based	158.6
Passive Acoustic Monitoring	432.5
Aerial Survey	17.9
Total	1,355.1

3.1 Environmental Conditions

In general, the environmental conditions were conducive to appropriately monitor marine mammals during seismic operations. The sea state ranged from 0 to 4 with an occasional 5 or 6 on the Beaufort Sea State scale. However, operations did not occur on four days during July due to weather conditions (July 5, 11, 12 and 13).

3.2 Marine Mammal Observations

A total of 158 marine mammal observations and 507 estimated individual animals were observed from July 1-31, 2012 using visual vessel- and land-based, acoustic and aerial survey methods. Details on the species sightings are described below and found in the PSO Daily Reports.

Visual Vessel- and Land-based Observations

Four marine mammal species were visually observed from vessel- or land-based stations during this month's monitoring effort including the beluga whale, harbor porpoise, gray whale and harbor seal (Table 4). In addition to those species, one unidentified large cetacean was observed.

Table 4. Total of individuals and sighting per species from vessel- and land-based stations

Species	Estimated No. of Individuals Observed	No. of Sightings
Beluga Whale	171	16
Harbor Porpoise	37	27
Gray Whale	3	3
Harbor Seal	103	91
Unidentified Large Cetacean	1	1
Total	315	138

Beluga Whale

A total of 171 beluga whales were observed on 16 different occasions. Beluga whales were observed at the surface, blowing, swimming, traveling, diving and milling.

Harbor Porpoise

A total of 37 harbor porpoise were observed on 27 different occasions. Harbor porpoise were observed at the surface, porpoising, swimming, traveling, diving and milling.

Gray Whale

Individual gray whales were observed on three different occasions. On July 2 at 6:35, a gray whale was observed at the surface, blowing and fluking. A shut down occurred at this time. On July 28 at 19:47 and 20:07, a gray whale was observed blowing and swimming and there were two delays clearing the safety zone.

Harbor Seal

A total of 103 harbor seals were observed on 91 different occasions. Harbor seals were observed traveling, swimming, diving, sinking, looking toward the vessel, resting, foraging and hauled out.

Unidentified Large Cetacean

On July 25 at 21:14, a large cetacean was observed blowing and followed by a dive. The species was not identified.

Acoustic Observations

Two species of marine mammals were acoustically detected during this month's monitoring effort including the beluga whale (1 detection) and the harbor seal (1 detections; Table 5). At this time it is not possible to estimate the total number of individuals acoustically because it is not possible to localize with the current hydrophone configuration.

Table 5. Number of acoustic detections per species

Species	No. of Detections
Beluga Whale	1
Harbor Seal	1
Total	2

Aerial Observations

Two species of marine mammals were observed during aerial surveys including the beluga whale and the harbor seal (Table 6).

Table 6. Total of individuals and sighting per species from aerial surveys

Species	Estimated No. of Individuals Observed	No. of Sightings
Beluga Whale	186	15
Harbor Seal	6	3
Total	18	192

Beluga Whale

A total of approximately 186 individual beluga whales were observed on 15 different occasions during aerial surveys. Many of these individuals were likely resighted on several occasions. Beluga whales were observed traveling, swimming, milling, diving and foraging near the McArthur, Chuitna, Beluga and Theodore Rivers. Belugas were also observed near Granite Point and the Tyonek Dock.

Harbor Seal

A total of approximately six individual harbor seals were observed on three different occasions during aerial surveys. Harbor seals were observed either hauled out or swimming near the McArthur River. One harbor seal was observed hauled out on the Middle Ground Shoal, a sandbar located directly east of the town Shirleyville in the center of Cook Inlet.

3.3 Marine Mammal Takes

During the month of July, there was one Level B take of a harbor seal (Table 7). The take occurred on July 19 at 8:32 (Table 8). The harbor seal was observed surfacing and traveling. Seismic activity was taking place on both the *Arctic Wolf* and the *Peregrine Falcon* (2400 cui airgun). The harbor seal's distance from the *Arctic Wolf* and the *Peregrine Falcon* was estimated to be 9.4 km and 8.9 km, respectively. A shut down initially occurred; however, seismic activity resumed. No other marine mammal species were taken during this time period.

Table 7. Number of marine mammal takes

Species	No. of Takes	Cumulative Level of Takes
Beluga whale	0	0
Killer whale	0	0
Harbor porpoise	0	0
Steller sea lion	0	0
Harbor seal	1	7

No cetaceans or pinnipeds were exposed to 180 or 190 dB, respectively.

3.4 Implementation of Mitigation Measures

Mitigation measures that were implemented during the month of July include delay clearing safety zone (15), shut down (22), shut down followed by a power down (24) and power down procedures (2; Table 9). Ramp up procedures also took place when initiating operations. Marine mammal monitoring (visual, acoustic and aerial) of the safety radii (monitoring zone extends 9.5 km) was ongoing throughout the month. Passive acoustic monitoring using an OTS hydrophone occurred at minimum at night during seismic operations. NMFS's vessel operation and marine mammal viewing guidelines to minimize vessel and aircraft impacts were continually implemented. Airguns were discharged at depths greater than 2 m (~ 6.6 ft). Details on the implemented mitigation measures are described in the PSO Daily Reports.

Table 9. Number of implemented mitigation measures per species.

Species	Delay Clearing Safety Zone	Shut Down	Shut Down/Power Down	Power Down	None	Total
Beluga Whale	2	1	3	2	24	32
Killer Whale	0	0	0	0	0	0
Harbor Porpoise	4	7	7	0	9	27
Steller Sea Lion	0	0	0	0	0	0
Harbor Seal	6	13	14	0	62	95
Gray Whale	2	1	0	0	0	3
Unidentified Large Cetacean	1	0	0	0	0	1
Total	15	22	24	2	95	158

Aerial Survey

Aerial surveys continued to occur daily during the month of July. From July 1-16, aerial surveys were conducted from a Bell 407 helicopter. The surveys extended to the southern end of the Big Susitna River to the McArthur River and approximately 1.6 km (1 mi) offshore due to safety restrictions (Figure 2; yellow polygon). From July 17-31, aerial surveys were conducted with *Rediske Air* from a twin-engine Islander fixed-wing aircraft in Nikiski. The flight route typically departed from Nikiski, traveled across the inlet to the Beluga River, south to the McArthur River, with 2-4 transects spaced approximately 2 km apart over the project area and then returned to Nikiski (Figure 2; red polygon).

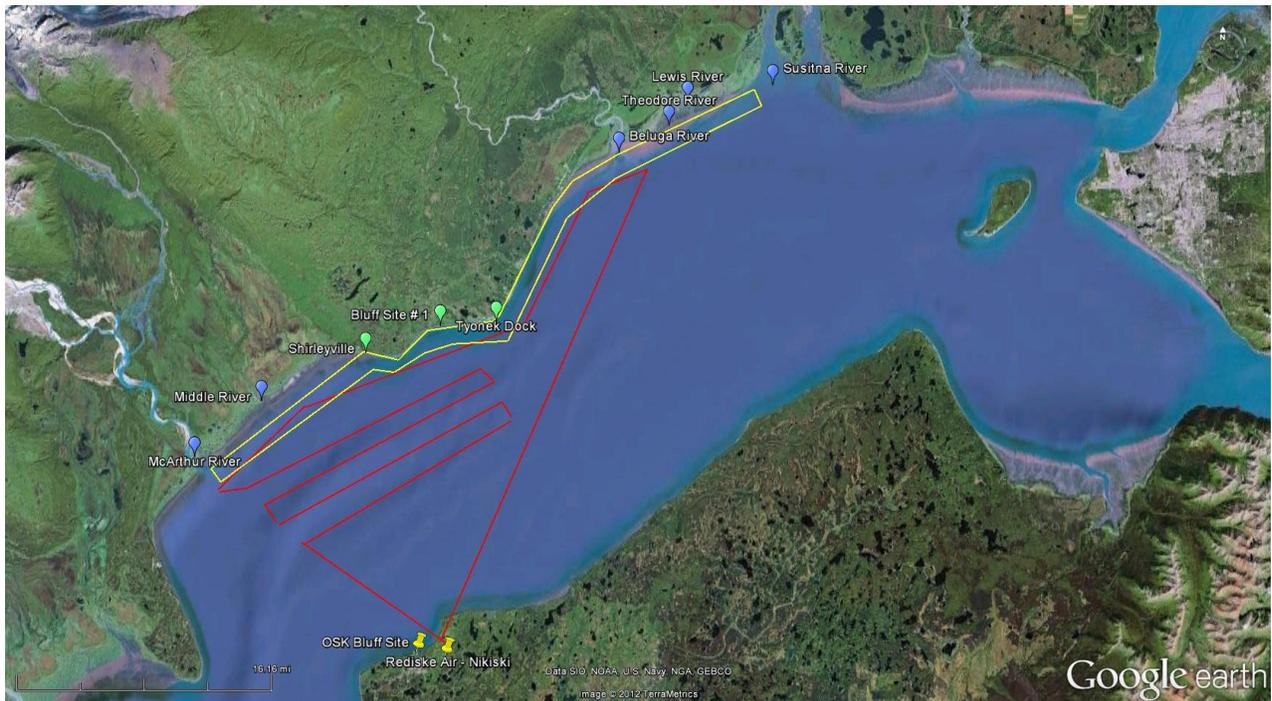


Figure 2. Aerial surveys from July 1-16 took place from the Big Susitna River to McArthur River (yellow polygon). From July 17-31, aerial surveys departed from Nikiski, traveled across the inlet to the Beluga River, south to the McArthur River and over the project area before returning to Nikiski (red polygon). Land-based observation platforms included Shirleyville, Tyonek Dock, Bluff Site # 1 and OSK Bluff Site.

Extended Shut Down

When a cetacean was observed within in the area operations ceased for 30 minutes or until the animal was observed leaving the safety zone. In the case of gray whale sightings, the marine mammal monitoring team used a 45-60 minute clearing time to account for the long dive time of this animal.

3.5 Implementation of Conservation Recommendations

The conservation recommendations described in the Biological Opinion issued by NMFS were not stated as a condition, but rather designed to minimize adverse effects to the Cook Inlet beluga whale from in-water noise generated by the airguns during the *Cook Inlet 3D Seismic Program*. At this time APACHE has not implemented any of the conservation recommendations suggested by NMFS. If any of the conservation recommendations are implemented, NMFS will be notified and the effectiveness of the recommendation will be reported.



Memorandum

TO: Brian D. Hopper (NMFS PR1), Mandy Migura (NMFS AK)

CC: Sheyna Wisdom, Lindsey Saxon Kendall (Fairweather Science); Kate Lomac-MacNair (SAExploration)

FROM: John Hendrix, Lisa Parker, ^{MC3} Marta Czarnezki (Apache Alaska Corporation)

RE: Monthly Report – August 1 – 31, 2012

1.0 INTRODUCTION

The National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) issued Apache Alaska Corporation (APACHE) an Incidental Harassment Authorization (IHA) under the authority of section 101(a)(5)(D) of the Marine Mammal Protection Act (16 U.S.C. 1361 *et seq.*) to harass small numbers of marine mammals, by Level B harassment, incidental to three-dimensional (3D) seismic surveys in Cook Inlet (hereafter *Cook Inlet 3D Seismic Program*) from April 2012 through April 2013.

This monthly report presents information requested in the IHA and Incidental Take Statement (ITS) for this reporting time period of **August 1– 31, 2012** and includes information on the seismic operations, marine mammal monitoring and mitigation measures implemented. Protected Species Observer (PSO) daily reports which include details on the required information are not included in the monthly report because they were attached to the weekly reports previously submitted to NMFS.

SUMMARY OF SIGHTINGS

Table 1. Summary of the number of observations, shut downs and takes.

Marine Mammal Species	No. of Observations¹	No. of Shut Downs	No. of Takes	No. of Cumulative Takes
Beluga Whale <i>(Delphinapterus leucas)</i>	10	0	0	0
Killer Whale <i>(Orcinus orca)</i>	0	0	0	0
Harbor Porpoise <i>(Phoca vitulina)</i>	4	1	1	1
Steller Sea Lion <i>(Eumatopia jubatus)</i>	1	0	0	0
Harbor Seal <i>(Phocoena phocoena)</i>	27	4	1	8
Unidentified Large Cetacean	1	1	0	0
Unidentified Pinniped	5	0	0	0

¹ Number of observations include animals visually observed (vessel, land, aerial) and acoustically detected

2.0 SUMMARY OF OPERATIONS

The following table summarizes the seismic operations over this reporting period. More details are found in the following text.

Table 2. Total number of slack tides and hours per airgun and vessel.

Source	No. of Slack Tides	No. of Hours
10 cui mitigation (<i>M/V Arctic Wolf</i>)	NA	110.5
10 cui mitigation (<i>M/V Peregrine Falcon</i>)	NA	111.2
440 cui ultra-shallow (<i>M/V Peregrine Falcon</i>)	0	0.0
2400 cui (<i>M/V Arctic Wolf</i>)	88	175.8
2400 cui (<i>M/V Peregrine Falcon</i>)	78	177.1

Operations moved easterly; however, continued offshore in central Cook Inlet, with Trading Bay to the west and the Nikiski/Kenai area to the east (Figure 1). Eight vessels operated for the *Cook Inlet 3D Seismic Program* during the month of August including *M/V Arctic Wolf*, *M/V Peregrine Falcon*, *M/V Miss Diane*, *M/V Mark Stevens*, *M/V Maxime*, *M/V Dreamcatcher*, *M/V Norseman I* and *M/V Side Winder* (Table 3). Vessel-based PSOs were stationed on the *M/V Arctic Wolf*, *M/V Peregrine Falcon* (source vessels) and *M/V Dreamcatcher* (mitigation vessel). During seismic activity, the vessels traveled at speeds between 4-5 knots. As identified in the IHA application, marine seismic data are only acquired during low and high slack tides (approximately 2-3 hours over the tide). There are approximately 4 slack tides in a 24-hour period. Over the course of this reporting period, airguns operated for a total of approximately 352.9 hours. The 2400 cui airgun array operated from *Arctic Wolf* during 88 slack tides, for a total of approximately 175.8 hours. The *Peregrine Falcon* operated the 2400 cui airgun array during 78 slack tides for a total of approximately 177.1 hours. The mitigation gun was used on 27 different days. The *Arctic Wolf* and the *Peregrine Falcon* operated the mitigation gun for approximately 110.5 and 111.2 hours, respectively. During August, operations were delayed due to mitigation measures for a total of 5.30 hours, with a cumulative time of 64.67 hours for the duration of the project. The mitigation vessel, the *Dreamcatcher*, was generally stationed to the north or south of the project area (opposite of the land-based observation station) for acoustic and visual monitoring for near-shore marine mammal movement during all periods of seismic operations.

The monitoring team consisted of two PSOs on the *Arctic Wolf*, two PSOs on the *Peregrine Falcon*, two PSOs on the *Dreamcatcher*, two or three PSOs at the land-based station (OSK Bluff Site) and aerial overflights with one or two PSOs. One PSO was based on the *Norseman I* on August 23-28 for additional monitoring. All PSOs operate on a 4-hour shift to avoid fatigue and only during daytime operations.

A radio-telemetered passive acoustic monitoring (PAM) buoy has not been redeployed. The PAM buoy remains in Anchorage for maintenance and re-evaluation. Thus, an over-the-side (OTS) hydrophone was deployed from the *Dreamcatcher* during all nighttime operations (at minimum) with the engines off (but generators still on) for passive acoustic monitoring. The *Dreamcatcher* is positioned to the north or south of the seismic acquisition patch (opposite of the land-based observation station). Two acoustic technicians

monitored for acoustic detections of marine mammals during all nighttime operations in 4-hour shifts. The reported detection range of small vessels on this hydrophone with the engines off was approximately 3 km.

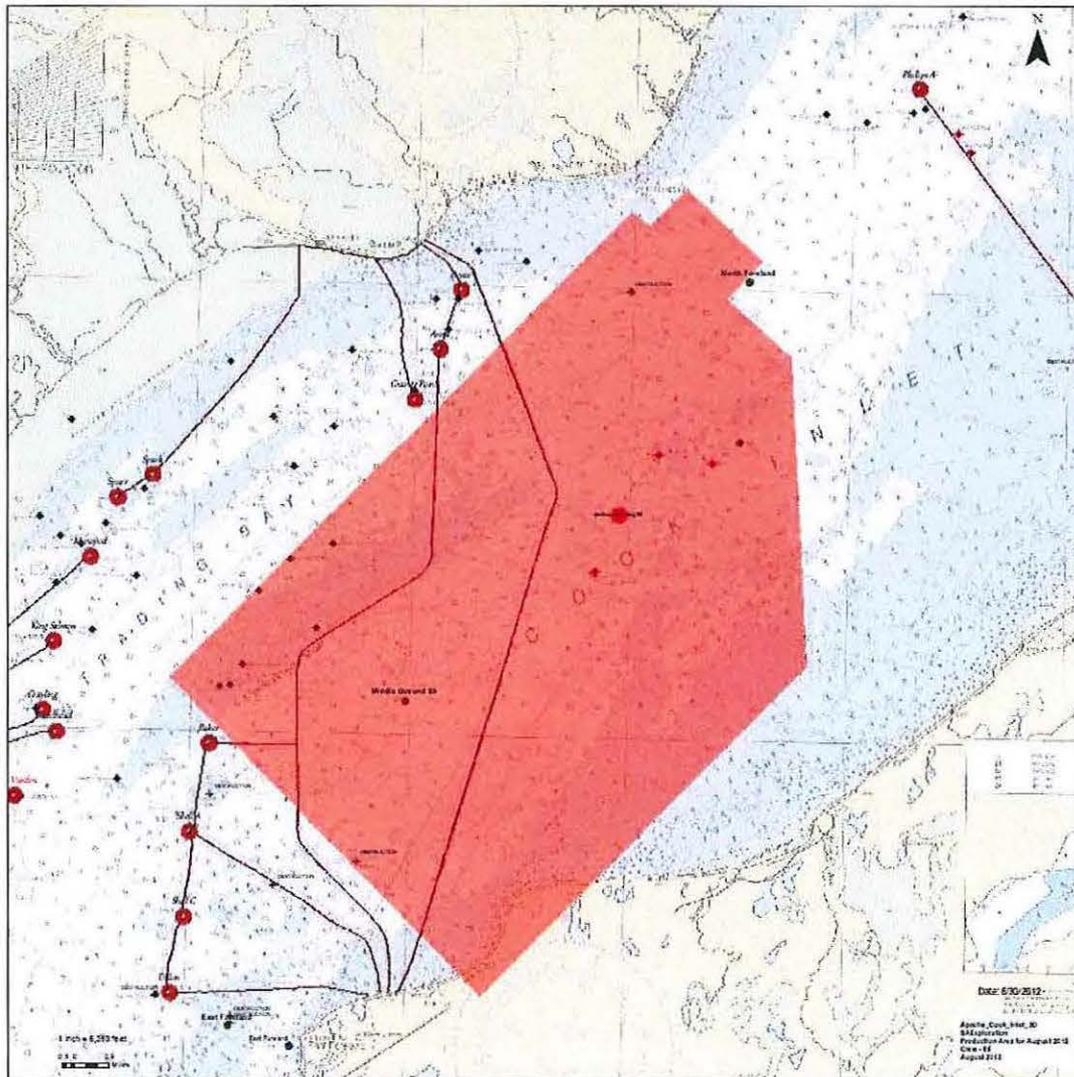


Figure 1. Operations moved easterly; however, continued offshore in central Cook Inlet, with Trading Bay to the west and the Nikiski/Kenai area to the east.

Table 3. Vessels operating for the Cook Inlet 3D Seismic Program.

Vessel	Vessel Purpose	Size	Documentation No.	Call Sign	Gross Tonnage
<i>M/V Arctic Wolf</i>	Source vessel	41 m x 9 m (135 ft x 30 ft)	687450	-	251
<i>M/V Peregrine Falcon</i>	Source vessel	26 m x 6 m (85 ft x 24 ft)	950245	WCZ6285	131
<i>M/V Miss Diane</i>	Node vessel	26 m x 6 m (85 ft x 20 ft)	1210779	WAV0779	53
<i>M/V Mark Stevens</i>	Node vessel	26 m x 6.7 m (85 ft x 22 ft)	1238385	WCZ-7941	81
<i>M/V Maxime</i>	Transfer vessel	21 m x 4.9 m (70 ft x 16 ft)	1196716	WAV6716	48
<i>M/V Dreamcatcher</i>	Mitigation vessel	26 m x 7.1 m (85 ft x 23 ft)	963070	WBN5411	100
<i>M/V Norseman I</i>	Housing Management	33 m x 8.5 m (108 ft x 28 ft)	553713	WDC-6817	197
<i>M/V Side Winder</i>	Side scan sonar	11 m x 4 m (36.8 ft x 14 ft)	1091516	WCZ-6262	16

3.0 MONITORING EFFORT

A total of 1,484.5 hours of monitoring effort took place from August 1-31, 2012 including visual vessel- and land-based (711.51 and 148.8 hours, respectively), passive acoustic monitoring (602.0 hours) and aerial surveys (22.2 hours; Table 3). The PSOs watched for marine mammals prior to and during seismic activity to monitor the 160 dB zone (9.5km). Opportunistic observations took place when applicable from the mitigation vessel and days when seismic activity did not take place.

Table 3. Total number of hours of monitoring per method.

Monitoring Method	Total No. of Hours
Visual Vessel-based	711.5
Visual Land-based	148.8
Passive Acoustic Monitoring	602.0
Aerial Survey	22.2
Total	1,484.2

3.1 Environmental Conditions

In general, the environmental conditions were conducive to appropriately monitor marine mammals during seismic operations. The sea state ranged from 0 to 4 with an occasional 5 or 6 on the Beaufort Sea State scale. However, operations did not occur on two days during August due to weather conditions (August 2 and 3) and aerial surveys were canceled on four additional days (August 4, 20, 23, 31) due to low ceiling level.

3.2 Marine Mammal Observations

A total of 48 marine mammal observations and 341 estimated individual animals were observed from August 1-31, 2012 using visual vessel- and land-based, acoustic and aerial survey methods. Details on the species sightings are described below and found in the “PSO Daily Reports.”

Visual Vessel- and Land-based Observations

Three marine mammal species were visually observed from vessel- or land-based stations during this month’s monitoring effort including the harbor porpoise, Steller sea lion and harbor seal (Table 4). In addition to those species, an unidentified large cetacean and unidentified pinnipeds were observed.

Table 4. Total of individuals and sighting per species from vessel- and land-based stations

Species	Estimated No. of Individuals Observed	No. of Sightings
Harbor Porpoise	7	4
Steller Sea Lion	1	1
Harbor Seal	26	26
Unidentified Large Cetacean	1	1
Unidentified Pinniped	4	4
Total	39	36

Harbor Porpoise

A total of seven harbor porpoise were observed on four different occasions. Harbor porpoise were observed at the surface, swimming, traveling, and foraging.

Steller Sea Lion

A Steller sea lion was observed on August 18 at 13:40 from a vessel-based observation station. The Steller sea lion was observed swimming, diving and looking toward the vessel.

Harbor Seal

A total of 26 harbor seals were observed on 26 different occasions. Harbor seals were observed swimming traveling, diving, sinking, looking toward the vessel and milling.

Unidentified Large Cetacean

On August 11 at 16:43, a large cetacean was observed from a vessel-based observation station blowing, swimming and breaching.

Unidentified Pinniped

A total of four unidentified pinnipeds were observed on four different occasions. The unidentified pinnipeds were observed swimming, traveling, active on the surface, diving, milling, and looking toward the observer.

Acoustic Observations

An unidentified pinniped was the only species acoustically detected during this month's monitoring effort. The pinniped was detected on August 30 at 16:21 and was recorded for approximately 10 seconds. No seismic activity was taking place; and therefore, no mitigation measures were implemented.

Table 5. Number of acoustic detections per species

Species	No. of Detections
Unidentified Pinniped	1
Total	1

Aerial Observations

Two species of marine mammals were observed during aerial surveys including the beluga whale and harbor seal (Table 6).

Table 6. Total of individuals and sighting per species from aerial surveys

Species	Estimated No. of Individuals Observed	No. of Sightings
Beluga Whale	~256	10
Harbor Seal	~45	1
Total	301	11

Beluga Whale

A total of approximately 256 individual beluga whales were observed on 10 different occasions during aerial surveys. Many of these individuals were likely resighted on several occasions. Beluga whales were observed surfacing, swimming, traveling and milling near the McArthur, Beluga, Theodore, Ivan and Susitna Rivers.

Harbor Seal

On August 27 during an aerial survey, approximately 45 harbor seals were observed hauled out near the Susitna River Delta

Dead Harbor Seal

During the month of August, there were two dead harbor seal sightings (Figure 2). Sightings occurred on August 7 and 13. NMFS was notified and a report was submitted within 24 hours of the incident as required by the IHA. Details of these events can be found in the previously submitted reports to NMFS.

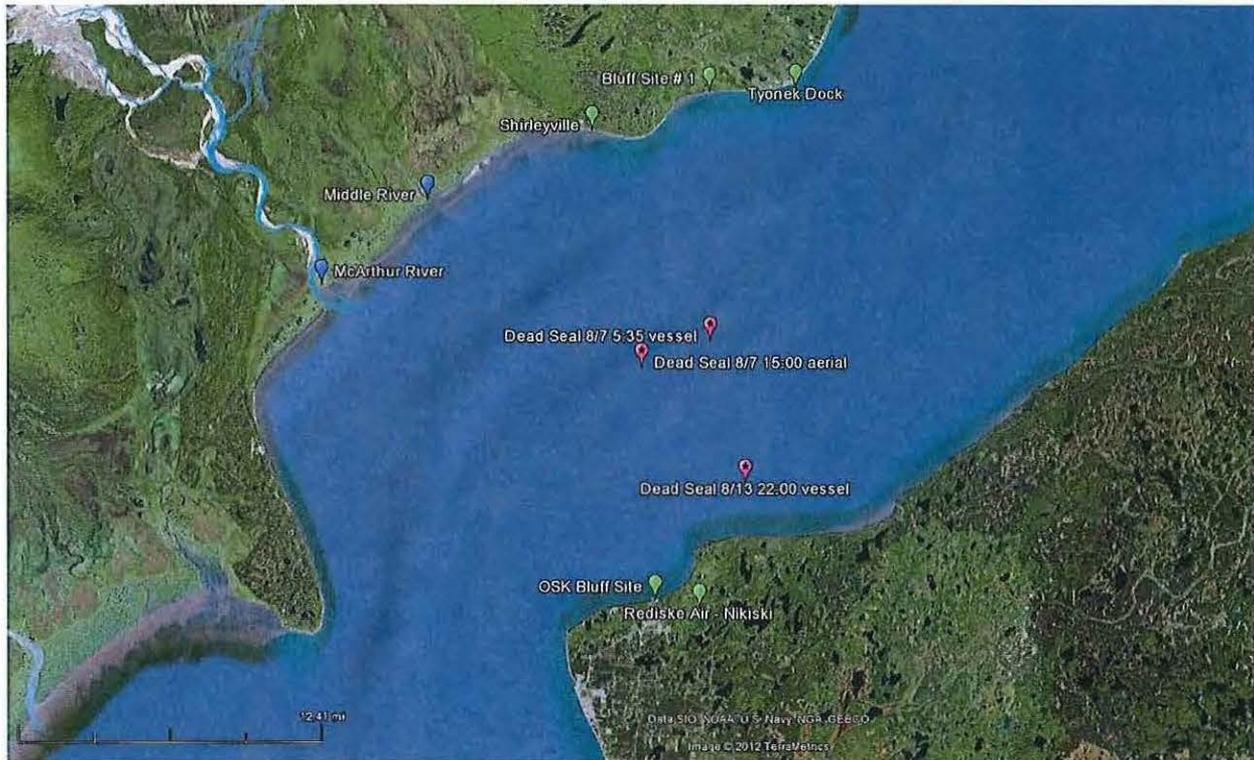


Figure 2. Location of the harbor seal carcasses observed on August 7 and 13 (pink dot with black star).

3.3 Marine Mammal Takes

During the month of August, there were two Level B takes (Table 7). A harbor porpoise was taken on August 20 at 14:45. The harbor porpoise was observed traveling. Seismic activity was taking place on both the *Arctic Wolf* and the *Peregrine Falcon*. Vessels were ramping up and were at 1200 cui when the harbor porpoise was sighted. Seismic activity was initially shut down to estimate the harbor porpoise's distance from the vessels and then resumed ramp up to 2400 cui. The harbor porpoise's distance from the *Arctic Wolf* and the *Peregrine Falcon* was estimated at 8.0 km from both vessels.

On August 25 at 12:45 a harbor seal was taken. The harbor seal was initially observed looking toward the vessel. Seismic activity was only taking place on the *Peregrine Falcon*. The vessel was ramping up and was at 300 cui when the harbor seal was sighted and continued to ramp up until it reached full volume 2400 cui. The harbor seal's distance from the *Arctic Wolf* and the *Peregrine Falcon* was estimated at 3.0 and 1.0 km, respectively, outside the specified 190 dB zone.

No other marine mammal species were taken during this time period. No cetaceans or pinnipeds were exposed to 180 or 190 dB, respectively.

Table 7. Number of marine mammal takes

Species	No. of Takes	Cumulative Level of Takes
Beluga whale	0	0
Killer whale	0	0
Harbor porpoise	1	1
Steller sea lion	0	0
Harbor seal	1	8

3.4 Implementation of Mitigation Measures

Mitigation measures that were implemented during the month of August include shut downs (6; Table 9). There were no shut downs followed by a power down, no power downs and no clearing safety zone delays. Ramp up procedures also took place when initiating operations. Marine mammal monitoring (visual, acoustic and aerial) of the safety radii (monitoring zone extends 9.5 km) was ongoing throughout the month. Passive acoustic monitoring using an OTS hydrophone occurred at minimum at night during seismic operations. NMFS's vessel operation and marine mammal viewing guidelines to minimize vessel and aircraft impacts were continually implemented. Airguns were discharged at depths greater than 2 m (~ 6.6 ft). Details on the implemented mitigation measures are described in the PSO Daily Reports.

Table 9. Number of implemented mitigation measures per species.

Species	Delay Clearing Safety Zone	Shut Down	Shut Down/Power Down	Power Down	None	Total
Beluga Whale	0	0	0	0	10	10
Killer Whale	0	0	0	0	0	0
Harbor Porpoise	0	1	0	0	3	4
Steller Sea Lion	0	0	0	0	1	1
Harbor Seal	0	4	0	0	23	27
Unidentified Large Cetacean	0	1	0	0	0	5
Unidentified Pinniped	0	0	0	0	5	1
Total	0	6	0	0	42	48

Aerial Survey

Aerial surveys continued to occur daily during the month of August. Aerial surveys were conducted with *Rediske Air* from a twin-engine Islander fixed-wing aircraft in Nikiski. The flight route typically departed from Nikiski, traveled across the inlet to the Susitna River, south to the McArthur River, with 2-4 transects spaced approximately 2 km apart over the project area and then returned to Nikiski (Figure 3; red polygon).

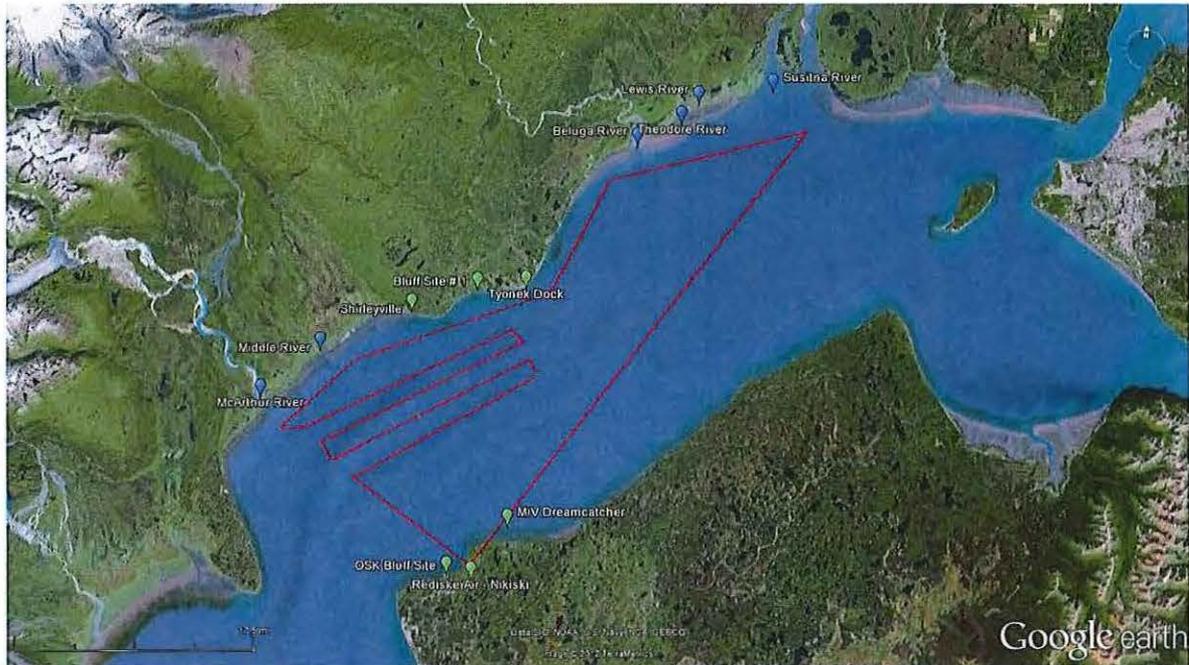


Figure 3. Aerial surveys departed from Nikiski, traveled across the inlet to the Susitna River, south to the McArthur River and over the project area before returning to Nikiski (red polygon). Land-based observation took place at the OSK Bluff Site.

Extended Shut Down

When a large cetacean was observed within in the project area operations ceased for 30 minutes or until the animal was observed leaving the safety zone. In the case the unidentified large cetacean sighting, the marine mammal monitoring team used a 45-60 minute clearing time to account for the potential long dive time of this animal.

3.5 Implementation of Conservation Recommendations

The conservation recommendations described in the Biological Opinion issued by NMFS were not stated as a condition, but rather designed to minimize adverse effects to the Cook Inlet beluga whale from in-water noise generated by the airguns during the *Cook Inlet 3D Seismic Program*. At this time APACHE has not implemented any of the conservation recommendations suggested by NMFS. If any of the conservation recommendations are implemented, NMFS will be notified and the effectiveness of the recommendation will be reported.



Memorandum

TO: Brian D. Hopper (NMFS PR1), Mandy Migura (NMFS AK)

CC: Sheyna Wisdom, Lindsey Saxon Kendall (Fairweather Science); Kate Lomac-MacNair (SAExploration)

FROM: John Hendrix, Lisa Parker, Marta Czarnecki (Apache Alaska Corporation)

RE: Monthly Report – September 1 – 30, 2012

1.0 INTRODUCTION

The National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) issued Apache Alaska Corporation (APACHE) an Incidental Harassment Authorization (IHA) under the authority of section 101(a)(5)(D) of the Marine Mammal Protection Act (16 U.S.C. 1361 *et seq.*) to harass small numbers of marine mammals, by Level B harassment, incidental to three-dimensional (3D) seismic surveys in Cook Inlet (hereafter *Cook Inlet 3D Seismic Program*) from April 2012 through April 2013.

This monthly report presents information requested in the IHA and Incidental Take Statement (ITS) for this reporting time period of **September 1–30, 2012** and includes information on the seismic operations, marine mammal monitoring and mitigation measures implemented. This is the **final monthly report for the 2012 season** because all operations ceased on September 29. Protected Species Observer (PSO) Daily Reports which include details on the required information are not included in the monthly report because they were attached to the weekly reports previously submitted to NMFS.

SUMMARY OF SIGHTINGS

Table 1. Summary of the number of observations, shut downs and takes.

Marine Mammal Species	No. of Observations ¹	No. of Shut Downs	No. of Takes	No. of Cumulative Takes
Beluga Whale (<i>Delphinapterus leucas</i>)	20	0	0	0
Killer Whale (<i>Orcinus orca</i>)	0	0	0	0
Harbor Porpoise (<i>Phoca vitulina</i>)	8	1	3	4
Steller Sea Lion (<i>Eumatopia jubatus</i>)	0	0	0	0
Harbor Seal (<i>Phocoena phocoena</i>)	37	4	5	13

¹ Number of observations include animals visually observed (vessel, land, aerial) and acoustically detected

2.0 SUMMARY OF OPERATIONS

The following table summarizes the seismic operations over this reporting period. More details are found in the following text.

Table 2. Total number of slack tides and hours per airgun and vessel.

Source	No. of Slack Tides	No. of Hours
10 cui mitigation (<i>M/V Arctic Wolf</i>)	NA	88.1
10 cui mitigation (<i>M/V Peregrine Falcon</i>)	NA	66.1
440 cui ultra-shallow (<i>M/V Peregrine Falcon</i>)	18	32.9
2400 cui (<i>M/V Arctic Wolf</i>)	68	142.0
2400 cui (<i>M/V Peregrine Falcon</i>)	12	20.3

Operations moved easterly, along the eastern side of central Cook Inlet near the Nikiski/Kenai area (Figure 1). Ten vessels operated for the *Cook Inlet 3D Seismic Program* during the month of September including *M/V Arctic Wolf*, *M/V Peregrine Falcon*, *M/V Miss Diane*, *M/V Mark Stevens*, *M/V Maxime*, *M/V Dreamcatcher*, *M/V Norseman I*, *M/V Side Winder*, *M/V Sleeprobber* and *M/V My Marie* (Table 3). On September 3rd the *M/V Sleeprobber* arrived at the project area and on September 19th the *M/V Side Winder* left the project area. Vessel-based PSOs were stationed on the *M/V Arctic Wolf*, *M/V Peregrine Falcon* (source vessels) and *M/V Dreamcatcher* (mitigation vessel). During seismic activity, the vessels traveled at speeds between 4-5 knots. As identified in the IHA application, marine seismic data are only acquired during low and high slack tides (approximately 2-3 hours over the tide). There are approximately 4 slack tides in a 24-hour period. Over the course of this reporting period, airguns operated for a total of approximately 195.2 hours. The 2400 cui airgun array operated from *Arctic Wolf* during 68 slack tides, for a total of approximately 142.0 hours. The *Peregrine Falcon* operated the 2400 cui airgun array during 12 slack tides for a total of approximately 20.3 hours. The *Peregrine Falcon* also operated the 440 cui airgun during 18 slack tides for a total of approximately 32.9 hours. The mitigation gun was used on 20 different days. The *Arctic Wolf* and the *Peregrine Falcon* operated the mitigation gun for approximately 88.1 and 66.1 hours, respectively. During September, operations were delayed due to mitigation measures for a total of 0.1 hours, with a cumulative time of 64.8 hours for the duration of the project. The mitigation vessel, the *Dreamcatcher*, was generally stationed to the north or south of the project area (opposite of the land-based observation station) for acoustic and visual monitoring for near-shore marine mammal movement during all periods of seismic operations. On September 24, the *Peregrine Falcon* completed seismic operations. The *Arctic Wolf* continued to operate until September 29, when all operations ceased for the 2012 season. All vessels began transiting toward Anchorage on September 30.

The monitoring team consisted of two PSOs on the *Arctic Wolf*, two PSOs on the *Peregrine Falcon*, two PSOs on the *Dreamcatcher*, two or three PSOs at the land-based station (OSK Bluff Site) and aerial overflights with one or two PSOs. All PSOs operate on a 4-hour shift to avoid fatigue and only during daytime operations.

A radio-telemetered passive acoustic monitoring (PAM) buoy has not been redeployed. The PAM buoy remains in Anchorage for maintenance and re-evaluation. Thus, an over-the-side (OTS) hydrophone was deployed from the *Dreamcatcher* during all nighttime operations (at minimum) with the engines off (but generators still on) for passive acoustic monitoring. The *Dreamcatcher* is positioned to the north or south of the seismic acquisition patch (opposite of the land-based observation station). Two acoustic technicians monitored for acoustic detections of marine mammals during all nighttime operations in 4-hour shifts. The reported detection range of small vessels on this hydrophone with the engines off was approximately 3 km.

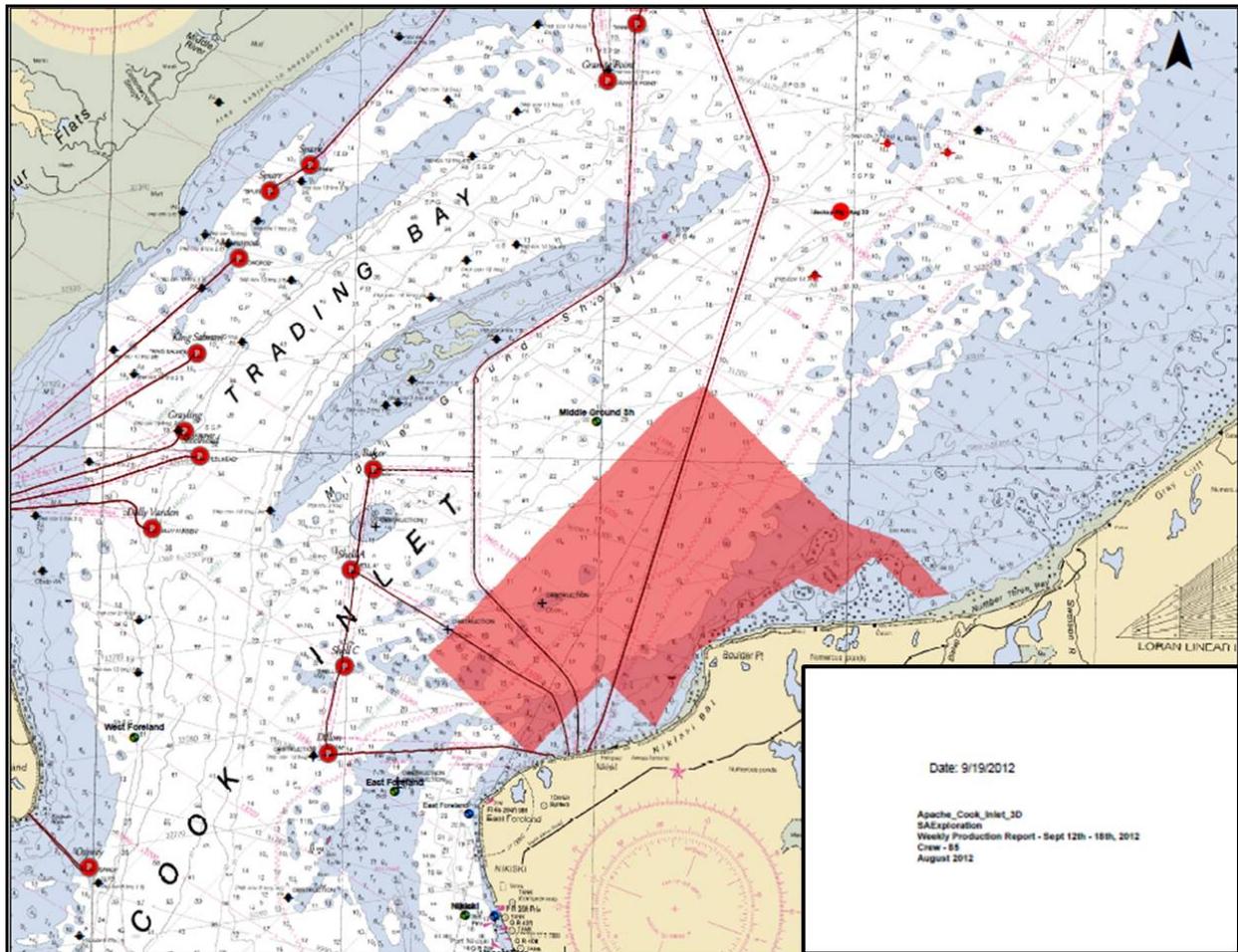


Figure 1. Operations moved easterly, along the eastern side of central Cook Inlet near the Nikiski/Kenai area (red polygon).

Table 3. Vessels operating for the Cook Inlet 3D Seismic Program.

Vessel	Vessel Purpose	Size	Documentation No.	Call Sign	Gross Tonnage
<i>M/V Arctic Wolf</i>	Source vessel	41 m x 9 m (135 ft x 30 ft)	687450	-	251
<i>M/V Peregrine Falcon</i>	Source vessel	26 m x 6 m (85 ft x 24 ft)	950245	WCZ6285	131
<i>M/V Miss Diane</i>	Node vessel	26 m x 6 m (85 ft x 20 ft)	1210779	WAV0779	53
<i>M/V Mark Stevens</i>	Node vessel	26 m x 6.7 m (85 ft x 22 ft)	1238385	WCZ-7941	81
<i>M/V Maxime</i>	Transfer vessel	21 m x 4.9 m (70 ft x 16 ft)	1196716	WAV6716	48
<i>M/V Dreamcatcher</i>	Mitigation vessel	26 m x 7.1 m (85 ft x 23 ft)	963070	WBN5411	100
<i>M/V Norseman I</i>	Housing Management	33 m x 8.5 m (108 ft x 28 ft)	553713	WDC-6817	197
<i>M/V Side Winder</i> ¹	Side scan sonar	11 m x 4 m (36.8 ft x 14 ft)	1091516	WCZ-6262	16
<i>M/V Sleeprobber</i> ²	Crew/Equipment Transport	-	-	-	-
<i>M/V My Marie</i> ³	Crew/Equipment Transport	-	-	-	-

¹The *M/V Side Winder* left the project area on September 19th.

²The *M/V Sleeprobber* arrived at the project area on September 3rd

³The *M/V My Marie* arrived at the project area on August 16th

3.0 MONITORING EFFORT

A total of 858.4 hours of monitoring effort took place from September 1-30, 2012 including visual vessel- and land-based (455.1 and 111.6 hours, respectively), passive acoustic monitoring (275.5 hours) and aerial surveys (16.2 hours; Table 3). The PSOs watched for marine mammals prior to and during seismic activity to monitor the 160 dB zone (9.5km). Opportunistic observations took place when applicable from the mitigation vessel and days when seismic activity did not take place.

Table 3. Total number of hours of monitoring per method.

Monitoring Method	Total No. of Hours
Visual Vessel-based	455.1
Visual Land-based	111.6
Passive Acoustic Monitoring	275.5
Aerial Survey	16.2
Total	858.4

3.1 Environmental Conditions

In general, the environmental conditions were conducive to appropriately monitor marine mammals during seismic operations. The sea state ranged from 0 to 4 with an occasional 5 or 6 on the Beaufort Sea State scale.

3.2 Marine Mammal Observations

A total of 65 marine mammal observations and 245 estimated individual animals were observed from September 1-30, 2012 using visual vessel- and land-based, acoustic and aerial survey methods. Details on the species sightings are described below and found in the “PSO Daily Reports.”

Visual Vessel- and Land-based Observations

Three marine mammal species were visually observed from vessel- or land-based stations during this month’s monitoring effort including the beluga whale, harbor porpoise and harbor seal (Table 4).

Table 4. Total of individuals and sighting per species from vessel- and land-based stations

Species	Estimated No. of Individuals Observed	No. of Sightings
Beluga Whale	25	5
Harbor Porpoise	12	8
Harbor Seal	69	36
Total	106	49

Beluga Whale

A total of approximately 25 beluga whales were observed on five different occasions. Belugas were observed swimming, traveling, milling and foraging.

Harbor Porpoise

A total of 12 harbor porpoise were observed on eight different occasions. Harbor porpoise were observed swimming, traveling, porpoising, and diving.

Harbor Seal

A total of 69 harbor seals were observed on 36 different occasions. Harbor seals were observed at the surface, swimming, traveling, diving, sinking and looking toward the vessels.

Acoustic Observations

No marine mammals were acoustically detected during this month’s monitoring effort.

Aerial Observations

Two species of marine mammals were observed during aerial surveys including the beluga whale and harbor seal (Table 5).

Table 5. Total of individuals and sighting per species from aerial surveys

Species	Estimated No. of Individuals Observed	No. of Sightings
Beluga Whale	~138	16
Harbor Seal	~1	1
Total	139	17

Beluga Whale

A total of approximately 138 individual beluga whales were observed on 16 different occasions during aerial surveys. Many of these individuals were likely resighted on several occasions. Beluga whales were observed surfacing, swimming, traveling and milling near the McArthur, Beluga, Theodore, Ivan and Susitna Rivers.

Harbor Seal

On September 12 during an aerial survey, one harbor seal was observed looking toward the aircraft near Middle River.

3.3 Marine Mammal Takes

During the month of September, there were eight Level B takes including three harbor porpoise and five harbor seals (Table 6). No other marine mammal species were taken during this time period. No cetaceans or pinnipeds were exposed to 180 or 190 dB, respectively. Harbor porpoise Level B takes occurred on September 1 at 8:09 and September 13 at 11:54 and 16:14. Harbor seal Level B takes occurred on September 14 at 16:49 and 19:04, September 18 at 18:44 and September 20 at 14:25 and 14:48. Details on these events are found below in Table 7 and the “PSO Daily Reports.”

Table 6. Number of marine mammal takes

Species	No. of Takes	Cumulative Level of Takes
Beluga whale	0	0
Killer whale	0	0
Harbor porpoise	3	4
Steller sea lion	0	0
Harbor seal	5	13

Table 7. Details on the Level B takes.

Date	Time	Species	No.	Behavior	Distance from Source Vessel (AW/PF)	Airgun Volume (AW/PF)
9/1/12	8:09	Harbor porpoise	1	Swim	2.6 km/3.2 km	2400 cui/240 cui
9/13/12	11:54	Harbor porpoise	1	Swim, travel, dive	8 km/1.4 km	2400 cui/0
9/13/12	16:14	Harbor porpoise	1	Porpoise	3.5 km/2.6 km	150cui/440 cui
9/14/12	16:49	Harbor seal	1	Surface, travel, sink	1.2 km/NA	1200 cui/0
9/14/12	19:04	Harbor seal	1	Swim	5.7 km/NA	1950 cui/0
9/18/12	18:44	Harbor seal	1	Swim, look, dive	6.4 km/1.2 km	150 cui/70cui
9/20/12	14:25	Harbor seal	1	Look, swim, travel, sink	3.91 km/600 m	300 cui/140 cui
9/20/12	14:48	Harbor seal	1	Swim, look, sink	5.9 km/7.1 km	2400 cui/440 cui

3.4 Implementation of Mitigation Measures

Mitigation measures that were implemented during the month of September include delay clearing safety zone (2), shut downs (1) and power downs (1; Table 8). There were no shut downs followed by a power down. Ramp up procedures also took place when initiating operations. Marine mammal monitoring (visual, acoustic and aerial) of the safety radii (monitoring zone extends 9.5 km) was ongoing throughout the month. Passive acoustic monitoring using an OTS hydrophone occurred at minimum at night during seismic operations. NMFS’s vessel operation and marine mammal viewing guidelines to minimize vessel and aircraft impacts were continually implemented. Airguns were discharged at depths greater than 2 m (~ 6.6 ft). Details on the implemented mitigation measures are described in the “PSO Daily Reports.”

Table 8. Number of implemented mitigation measures per species.

Species	Delay Clearing Safety Zone	Shut Down	Shut Down/Power Down	Power Down	None	Total
Beluga Whale	0	0	0	1	19	20
Killer Whale	0	0	0	0	0	0
Harbor Porpoise	1	1	0	0	6	8
Steller Sea Lion	0	0	0	0	0	0
Harbor Seal	1	0	0	0	36	37
Total	2	1	0	1	61	65

Aerial Survey

Aerial surveys continued to occur daily during the month of September. Aerial surveys were conducted with *Rediske Air* from a twin-engine Islander fixed-wing aircraft in Nikiski. The flight route typically departed from Nikiski, traveled across the inlet to the Susitna River, south to the McArthur River, transiting within 1 mile of the shoreline, followed by 2-4 transects spaced approximately 2 km apart over the project area and then returned to Nikiski (Figure 3).



Figure 3. Aerial surveys departed from Nikiski, traveled across the inlet to the Susitna River, south to the McArthur River and over the project area before returning to Nikiski (red polygon). Land-based observation took place at the OSK Bluff Site.

3.5 Implementation of Conservation Recommendations

The conservation recommendations described in the Biological Opinion issued by NMFS were not stated as a condition, but rather designed to minimize adverse effects to the Cook Inlet beluga whale from in-water noise generated by the airguns during the *Cook Inlet 3D Seismic Program*. At this time APACHE has not implemented any of the conservation recommendations suggested by NMFS. If any of the conservation recommendations are implemented, NMFS will be notified and the effectiveness of the recommendation will be reported.