Leatherback Turtle Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, 31 March – 31 July – The leatherback nesting season is underway at Sandy Point National Wildlife Refuge (SPNWR) on St. Croix, US Virgin Islands. This year’s field efforts, led by Kelly Stewart, represent a close collaboration between NOAA, USFWS and The Ocean Foundation (TOF) and will focus on sampling all the new nesting females by collecting small clips of skin to test the hypothesis that leatherbacks mature within 9-15 years. A total of 12 turtles have been observed so far this season, with 34 documented nests on the refuge. There are two re-migrants that were first observed in 1988 now nesting this year. Two first-time nesters (neophytes) have arrived, one of which has a distinctive small notch on the trailing edge of her left front flipper that could correspond to a scar from the skin biopsy taken as hatchling. Samples have been collected and stored for analysis. Amy Frey leaves the field, being replaced by Erin LaCasella. A group of students from Duke University arrive this week to help with beach patrols as part of the Duke Marine Laboratory Sea Turtle Class being taught by Kelly Stewart (MMTD-TOF) and Matthew Godfrey (Duke University). This is an ongoing work cooperative between USFWS, NOAA and TOF. Contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov for more information.

A leatherback finishing up nesting after dawn at Sandy Point this week (Photo: Kelly Stewart)

North Atlantic Right Whale Health Assessment, April 2019 – Over the past two weeks MMTD has participated in the fourth year of a project assessing the health of North Atlantic right whales. LT Jacob Barbaro and LTJG Brandon Tao from our Cetacean Health and Life History Program (CHLHP) successfully flew photogrammetry missions with an unmanned hexacopter from a 55’ sailing sloop during six different days in Cape Cod Bay, Massachusetts. They were collaborating in the field with scientists from Woods Hole Oceanographic Institution, led by Michael Moore. Colleagues from the New England Aquarium also participated to take identification photographs to help link aerial images to whales of known life histories. Aerial images were collected from over 40 different individually-recognizable
whales. Photogrammetry analyses will be conducted by CHLHP to assess changes in growth and body condition in the context of our ongoing time series. For more information contact John.Durban@noaa.gov.

Left: Photogrammetry images like this are being used to measure the growth and body condition of North Atlantic right whales when they return to Cape Cod Bay. Right: A North Atlantic right whale "skim feeding" just below the water's surface. Its open mouth exposes long baleen plates which sieve tiny plankton from the water. Images obtained non-invasively from an unmanned hexacopter flying >100ft about the whales during research authorized by Permit #21371 issued by the National Marine Fisheries Service.

Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, California 25 March-24 May – During the third (8-12 April) and fourth week (15-19 April) of SWFSC’s survey to estimate the annual calf production of eastern North Pacific gray whales, 91 hours of effort were completed during which time 31 mother-calf pairs were recorded. In addition to gray whales, humpback whales and bottlenose dolphins were observed. With the adult and juvenile phase of the gray whale migration now being mostly north of the survey site, the majority of sightings in the weeks ahead will be primarily of mother-calf pairs. On 15 April, John Durban and Holly Fearnbach (SR3) began photogrammetry sampling with an unmanned octocopter. This effort will continue until 3 May and represents the 5th consecutive year (2015-2019) of using unmanned aerial systems (UAS) to collect vertical images to measure the body condition of mothers and the growth of their calves. During 15-19 April, aerial images were collected from five mother-calf pairs that passed close enough during periods of weather suitable for UAS operations. Additionally, LTJG Chelsea Parrish has been helping to lead a dedicated project aimed at assessing the ability to match individual gray whales from UAS and shore-based photo-identifications based on their natural markings (see photos). Nearly 260 images of nine mother-calf pairs have been collected thus far. Once validated, this approach will enable aerial identifications to be linked to oblique-view photo-id catalogs to more precisely quantify calving intervals and relate photogrammetry measurements to life history parameters. This one-of-a-kind time series on gray whale calf production and body condition is greatly benefited by the participation of observers from nearly all of the programs within MMTD as well as associates and volunteers from the broader research community. Observers during weeks 3 and 4 included: Paul Fiedler, Chelsea Parrish, Keiko Sherman, Tina Chen, Lisa Ballance, Brittany Hancock-Hanser, Paige Casler and Dave Weller.

See https://www.fisheries.noaa.gov/feature-story/quarter-century-counting-southwest-fisheries-science-center-celebrates-25-years and for details contact dave.weller@noaa.gov or john.durban@noaa.gov.
The stunning artwork of K. Sherman on the NOAA public outreach signage at the survey site.

A match between UAS imagery (left and top right) and shore-based photo-identification (bottom right) of an adult female gray whale, based on the pattern of barnacles and pigmentation behind the blowhole. Aerial image collected using an unmanned octocopter flown at >150ft under NMFS research permit #19091.
Green Sea Turtle Ecological Research, Seal Beach National Wildlife Refuge, Orange Co., CA, 18 April 2019 – Marine turtle researchers at SWFSC teamed with colleagues from the West Coast Regional Office and the U.S. Navy to conduct green turtle capture efforts at Seal Beach National Wildlife Refuge (SBNWR) in Orange County, CA. Four turtles were captured near the causeway into the 7th St. Pond. Their straight carapace lengths ranged from 54.6 to 81.7 cm and body weights from 20 to 73 kg. Three turtles were fitted with Argos-linked GPS transmitters and will be tracked to determine their movements and habitat use within the Refuge and the greater Anaheim Bay region. The overall goal of this research is to provide information about green turtle demography (life-stage, structure, sex ratio, reproductive status, etc.), movements, and habitat use to inform planning for the reconfiguration of the Naval Weapons Station Seal Beach Ammunition Pier and Turning Basin that is adjacent to the SBNWR. This project will involve year-round capture efforts for the next several years as the reconfiguration is conducted. So far in 2019, the team has captured six green turtles (five satellite tracked). Contact PIs Jeffrey.Seminoff@noaa.gov or Tomo.Eguchi@noaa.gov for additional information.
California Sea Lion Diet Time Series, Channel Islands, California, Quarterly - MMTD biologists will travel to two Channel Islands in April for quarterly sampling for the 38-year-and-counting quarterly time series of California sea lion diet in the Southern California Bight. Alex Curtis and Sam Woodman will travel to San Nicolas Island April 22-24. Alex Curtis and Beth Jaime will travel to San Clemente Island April 26-29. Contact Alex.Curtis@noaa.gov for more information.
Weeks of 1 and 8 April 2019

Aerial Survey off Central California to assess whale distributions and Dungeness crab fishing activity, 15-16 March 2019 - Karin Forney, Scott Benson, and Sam Woodman conducted this survey as part of ongoing efforts to understand and mitigate whale entanglements off California. The survey extended from Point Pinos near Monterey to Gualala (Sonoma/Mendocino County Line), along randomly placed transects spaced 5 nautical miles apart and extending offshore to about the 200 m isobath. Many gray whales were documented along their northbound migration corridor. Four humpback whales were observed between Monterey Canyon and Pigeon Point. Surface-visible anchovy schools were documented near some of the humpback whales, suggesting they were feeding on anchovies. Pot gear targeting Dungeness crab and possibly other species appeared widespread and was the most concentrated near Pt. Reyes and off San Francisco. The aerial survey results have been provided to the California Dungeness Crab Fishing Gear Working Group, in support of their within-season whale entanglement Risk Assessment and Mitigation Program (RAMP). For questions contact Karin.Forney@noaa.gov.

Aerial survey transects and sightings of whales, crab pots, and anchovy bait balls, 15-16 March 2019.

Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, California 25 March-24 May – SWFSC’s survey to estimate the annual calf production of eastern North Pacific gray whales is successfully underway. During the first two weeks (3/25-4/5) of the count the migration was characterized by mostly adult and juvenile whales, largely singletons and pairs, traveling along the
offshore corridor. Despite short bouts of fog and rain, 108 hours of effort were conducted during which time 380 whales including 8 mother-calf pairs were recorded. In addition to gray whales, humpback and blue whales and bottlenose and Risso’s dolphins were observed. Also, as part of our collaborative outreach efforts with the Bureau of Land Management, we conducted ‘Introduction to the NOAA Gray Whale Survey’ sessions for the American Indian Resource Project and the California Conservation Corps. This coming week we expect the offshore component of the migration to further diminish while the frequency of mother-calf pairs begins to increase. This one-of-a-kind time series on gray whale calf production is greatly benefited by the participation of observers from nearly all of the programs within MMTD as well as volunteers from the broader research community. Observers during the last two weeks included: Morgan Lynn, Jim Gilpatrick, Amanda Brusca (UCSD student intern), Trevor Joyce, Paul Fiedler, Chelsea Parrish and Dave Weller. Observers for the week ahead include: Paul Fiedler, Keiko Sherman, Tina Chen, Chelsea Parrish and Dave Weller. See https://www.fisheries.noaa.gov/feature-story/quarter-century-counting-southwest-fisheries-science-center-celebrates-25-years and for details contact dave.weller@noaa.gov

Drifting Acoustic Spar Buoy Recorder (DASBR) testing, Southern California Bight, 25-27 March 2019-Jay Barlow participated in a 3-day readiness cruise on NOAA Ship Reuben Lasker. The ship’s officers generously provided time to test a new deployment system for Jay's Drifting Acoustic Spar Buoy Recorders, as well as a new weighting system for his autonomous towed hydrophone array. Both tests went well, and results will contribute to the design of a more robust DASBR system on future cruises. One of the new DASBR deployment systems used a large buoy with a radar reflector which was visible at 3-4 miles. Jay expresses his gratitude for all the ship’s crew that aided in this test. For more information contact Jay.Barlow@noaa.gov.

Leatherback Turtle Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, 31 March – 31 July 2019 – The leatherback nesting season has begun at Sandy Point National Wildlife Refuge (SPNWR) on St. Croix, US Virgin Islands. SPNWR is an index nesting beach that has been comprehensively monitored for the last 37 years, and is managed by the US Fish and Wildlife Service (USFWS) as one of the most important leatherback nesting beaches under US jurisdiction (Dutton et al. 2005). The richness and consistency of data from this population offers unique opportunities for research and development of tools & approaches for obtaining vital rate parameters that can improve population assessments in sea turtles, including breeding sex ratios (Stewart & Dutton 2014), age at first reproduction and juvenile survivorship, all research priorities for NOAA. In 2009 MMTD began a project jointly with USFWS to sample and genotype hatchlings here. To date, over 43,000 hatchlings have been sampled. These hatchling genetic “fingerprints” will be compared to those of first-time nesting females. A genetic match between a hatchling that left the nesting beach in a known year with a first-time nester (FTN) will provide the first direct evidence of the age to maturity in leatherbacks. Analysis of samples collected from FTNs in 2016 and 2017 did not find any matches to hatchlings sampled in 2009, suggesting a minimum age of maturity greater than 8 years. However, further kinship analysis showed that four of these FTNs were the daughters of FTN in 2006 and 2007, each corresponding to 10 years old (Dutton et al. 2019). We therefore anticipate the first wave of “tagged” hatchlings from 2009 to begin nesting this season and keen effort will focus on sampling all the new nesting females throughout 2019 by collecting small clips of skin to test our working hypothesis that leatherbacks mature within 9-15 years. The nesting season began with the first nest on 2 March. On 23 March, Kelly Stewart traveled to St. Croix to prepare for the arrival of the 2019 survey team.
This week (3 April), Amy Frey (NOAA) joined the survey team of the USFWS and The Ocean Foundation. The focus of the work that the NOAA team members will be doing is to genetically sample the nesting females, as well as conducting night patrols to document nesting activities on the refuge. Despite a strong start in early March, nesting is a little bit behind the previous four years. Since 2 March, there have been 18 nests on the refuge and since night patrols began on 25 March, we have identified 5 individual turtles. All of these have been re-migrants from previous seasons, but we were missing a genetic sample from one of the turtles, so that gap was filled. The most remarkable re-migrant was VI1231, originally tagged 31 years ago on 1 April 1988! She has had over 70 nests at the refuge since that time and ties the record for the longest tag return for a leatherback at Sandy Point and possibly globally. The other four turtles were re-migrants originally tagged from 2005 to 2011. We continue to wait for the FTNs to arrive. This is an ongoing work cooperative between USFWS, NOAA and The Ocean Foundation. Contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov for more information.


Leatherback turtle tagging, Costa Rica 2-13 April, 2019- Scott Benson will join Dr. George Shillinger (Executive Director, Upwell) from April 2-13 to assist with the deployment of electronic tags (satellite and acoustic) and monitoring studies of Northwest Atlantic leatherback turtles nesting at Pacuare Nature Reserve, Limon Province, Costa Rica. Pacuare Nature Reserve is operated by Ecology Project International, and all scientific endeavors are permitted under the Costa Rican Ministry of Natural Resources and the
Environment's Sistema Nacional de Areas de Conservacion (SINAC) and Area de Conservacion La Amistad Caribe (ACLAC). The development of a megaport in Limon, approximately 12 miles south of Pacuare, and a second proposed megaport approximately 12 miles north of the reserve, have created concern over anthropogenic influences on this nesting population and the disruption of a continuous stretch of beach utilized by leatherbacks. The study will provide baseline inter-nesting data to help evaluate and mitigate potential impacts of the megaports, associated ship traffic, and resulting coastal development. Post-nesting movement data will provide information about risks from domestic and international fisheries in the Atlantic Ocean, including the Gulf of Mexico. Contact Scott.Benson@noaa.gov for more information.

**Weeks of 18 and 25 March 2019**

*Condition of coastal bottlenose dolphins off San Diego, March 2019*- Two small boat surveys were completed in the past two weeks, supporting 10 hexacopter flights in the ongoing collaboration with SR3 to assess the condition of coastal bottlenose dolphins off San Diego County. Aerial photogrammetry images and boat-based photo-identifications were collected of >40 individual bottlenose dolphins on these two days. These data will contribute to a growing dataset on longitudinal measures of condition and growth, which is currently being analyzed. To date, 51 flights have been successfully completed on 14 different survey days since late October, adding to 74 flights over 15 days in 2017/2018. For more information, contact John.Durban@noaa.gov.

*Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, California, 25 March-24 May, 2019* – The 26th consecutive year (1994-2019) of SWFSC’s survey to estimate the annual calf production of eastern North Pacific gray whales begins this week. In 2012, this survey was expanded to also include shore-based photo-identification to catalog mother-calf pairs and in 2015 UAS operations were initiated to collect information on the body condition and health of these pairs. This one-of-a-kind time series is greatly benefited by the participation of observers from nearly all of the programs within MMTD as well as volunteers from the broader research community. Researchers on site for week 1 include: Trevor Joyce, Morgan Lynn, Barb Taylor, Dave Weller and Amanda Brusca (UCSD student intern). See [https://www.fisheries.noaa.gov/feature-story/quarter-century-counting-southwest-fisheries-science-center-celebrates-25-years](https://www.fisheries.noaa.gov/feature-story/quarter-century-counting-southwest-fisheries-science-center-celebrates-25-years) and for details contact dave.weller@noaa.gov or john.durban@noaa.gov
Drifting Acoustic Spar Buoy Recorder (DASBR) testing, Southern California Bight, 25-27 March 2019 – Jay Barlow will be testing new configuration of his drifting acoustic spar buoy recorder (DASBR) system on a Lasker test cruise in waters off San Diego. The new configuration has a larger float and a radar reflector and is designed for greater security and fewer issues with line entanglement. Jeff Moore will join Jay in the field. Contact Jay.Barlow@noaa.gov for more information.

Weeks of 18 and 25 February 2019

California Sea Lion Diet Time Series, Channel Islands, California, February 15-19, 2019 – Alex Curtis (contractor with MMTD) and Cameron Clay (NOAA volunteer) completed quarterly field work on California sea lions at Mail Point, San Clemente Island, February 15-19. They collected 50 scat samples, continuing MMTD’s 38-year-and-counting time series of California sea lion diet at two key Channel Island rookeries in the Southern California Bight. They also completed a ground count of pinnipeds in the vicinity of the Mail Point Research Station (covering roughly two miles of coast in each direction). An atmospheric river system immediately preceding their trip washed out critical portions of the unmaintained road to Mail Point, necessitating reconsideration of future logistics for maintaining the site. Contact Alex.Curtis@noaa.gov for more information.

Antarctic Whale Health, February 2019 – Despite disruption from the government shutdown, this month MMTD scientists belatedly took part in collaborative research on whale health around the Antarctic Peninsula. John Durban and Trevor Joyce (MMTD) joined Holly Fearnbach, Leigh Hickmott and Jessica Farrer (SR3) onboard Lindblad Expedition’s National Geographic Explorer to conduct research assessing the body condition of top predators (killer whales) and top consumers (large whales) in this rapidly changing marine ecosystem. To extend long-term population monitoring (since 2004), they collected photo-identification data from 10 groups of killer whales comprising Antarctic Types A, B1 and B2. Using a small unmanned hexacopter, they were able to collect aerial images from 5 of these groups, comprising more than 80 Type B2s, 8 Type B1s and 6 Type A killer whales. Photogrammetry measurements from these images will be used to monitor body condition to assess nutritional status and will add to data collected from 2016-2018 on the body size of the different types to understand the energetics underpinning their predatory impacts. Aerial images were also collected from 11 humpback whales, matched with 2 blow samples- these paired image/blow samples will add to previous samples to link the respiratory health of individual whales to their body condition. Notably, the team documented
almost two dozen Antarctic blue whales in nearshore waters of the Antarctic Peninsula, collecting valuable photo-identification images. Whaling reduced the Antarctic blue whale population to < 1% of its original size, but this is now the second year in a row that blue whales have been photographed around the Antarctic Peninsula. Contact John.Durban@noaa.gov for more information.

Photo: Aerial photograph of a group of Type B2 killer whales in the coastal waters of the Antarctic Peninsula. Images were collected from >30m (100ft) above the whales using a small unmanned hexacopter. Research conducted under NMFS Permit No. 19091 and Antarctic Conservation Act Permit 2017-029.

Weeks of 4 and 11 February 2019

California Sea Lion Diet Time Series, Channel Islands, California, February 4 – February 6, 2019 – MMTD biologists, Alex Curtis and Hollis Europe, completed quarterly field work on California sea lions at San Nicolas Island. They collected 100 scat samples from two areas, continuing MMTD’s 38-year-and-counting time series of California sea lion diet at two key Channel Island rookeries in the Southern California Bight. February 15-19, 2019, Alex Curtis and Cameron Clay will survey San Clemente Island to collect California sea lion scat samples for diet analysis and to count pinnipeds. Contact Alex.Curtis@noaa.gov for more information.
Weeks of 26 November and 3 December 2018

California Current Ecosystem Survey (CCES) *, southern Canada to central Baja California, Mexico, June 26 – December 4, 2018 —

CCES is in the home stretch! The NOAA Ship *Lasker* departed San Diego on November 20th for its final leg (#7), and sailed southward into waters off northern Baja California, Mexico. Since then, the team has been crisscrossing an area between Punta Eugenia, Mexico, and San Diego, conducting marine mammal and seabird surveys and deploying/retrieving our drifting acoustic recorders (DASBRs). Weather has varied, with some beautiful calm periods and a few days that were too rough to work. The mammal sightings continue to be dominated by short-beaked common dolphins, but also included Risso’s dolphins, striped dolphins and blue, fin, and humpback whales. The team was also treated to a cooperative group of Cuvier’s beaked whales that surfaced multiple times near the *Lasker*. This species is notorious for making very long dives (up to 70-90 minutes), followed by short surface intervals lasting only a few minutes. So, this was indeed a special treat. The team also has collected numerous photos, biopsies from fin and blue whales, and eDNA samples from several species. In the bird world, things have quieted down on Leg 7. The migrants have passed through and we're left to enjoy the locals.
Our feel-good favorite is the Laysan Albatross with 49 seen so far this leg. The breeding colony at Guadalupe Island has grown to more than 140 pairs and shows the benefit of controlling the introduced cat population. The DASBRs did cause us a bit of worry during Leg 7, as two of them ceased transmissions for several days. But at the time of this writing we have recovered all except one, which is still transmitting and scheduled to be picked up on our last day at sea. CCES will end in San Diego on December 4th, marking the conclusion of a remarkable 5+ month collaboration and providing SWFSC with volumes of valuable and interesting data about the California Current Ecosystem. – Karin Forney, Cruise Leader, Leg 7.

*The CCES is a collaborative research effort by SWFSC’s Fisheries Resources and Marine Mammal and Turtle Divisions (FRD and MMTD) and Cascadia Research Collective (CRC), and is being conducted aboard the NOAA Ship Reuben Lasker. The marine mammal and seabird components of this field effort are supported in part by NOAA’s Take Reduction Team program, the Bureau of Ocean Energy Management, and the US Navy. For more information, visit the CCES website or contact MMTD’s Chief Scientist: jeff.e.moore@noaa.gov

Green turtle ecological research, Southern California – November 27, 2018- The Marine Turtle Ecology and Assessment Program (Erin LaCasella, Tomo Eguchi, Robin LeRoux and Garrett Lemons) and NMFS West Coast Regional Office (Justin Greenman and Thomas Coleman) conducted marine turtle capture efforts at the Seal Beach National Wildlife Refuge in Seal Beach, California. This field work is in partnership with the U.S. Navy and the U.S. Fish and Wildlife Service. Three turtles were captured in three hours of effort. Curved carapace length for the turtles ranged from 55.1 to 77.5 cm and weight ranged from 17 to 52 kg. All three turtles were new turtles not previously identified. The team collected measurements, samples for genetic and isotope analysis and applied PIT and flipper tags to all three animals. Satellite tags were applied to two of the turtles and will provide information on their movements and habitat use. Stay tuned as we continue to monitor and study the turtles here! Contact Jeffrey.Seminoff@noaa.gov for more information.
**Weeks of 12 and 19 November 2018**

*California Current Ecosystem Survey (CCES)*, *southern Canada to central Baja California, Mexico, June - November, 2018* — The penultimate leg of the CCES cruise was smooth sailing in every sense of the word. The team, led by Barb Taylor, had splendid weather, allowing them to complete a zig-zag of tracklines that covered the northern half of the Baja Peninsula out to 200 nautical miles offshore. They successfully deployed 7 DASBRs and retrieved one that was demonstrating early signs of transmitter failure. The mammal sightings indicated lower animal densities offshore and higher densities with larger school sizes inshore. There was a surprising lack of sperm whale and Risso’s dolphin sightings (where are those squid?), and the team encountered a group of spotted dolphins far to the north of their usual haunts. Sightings of pilot whales and striped dolphins were the first for the 2018 CCES survey. Cuvier’s beaked whales were sighted about half the days and we look forward to some interesting data from the DASBRs, which will be retrieved on the final leg, departing on Monday Nov 19, 2018 which will be led by Karin Forney. The team collected photos, biopsies and eDNA from the southern form of Pacific white-sided dolphins near the southern end of their typical distribution. Returning north to San Diego, the team witnessed a mom humpback with newborn calf; harbingering the southbound humpback whale migration getting underway. *Seabird highlights of Leg 6* — The majority of this leg was spent off Baja California close to the significant seabird breeding colonies of the islands of northwest Mexico. These islands represent a conservation success story and show the benefit of the removal of introduced species that took place between 1995-2006, and the potential for populations to rebound. Between 1995-96 cats were removed from Los Coronados. Leach's and Black Storm-Petrels, Cassin's Auklets and Guadalupe Murrelets now all successfully breed on Coronado Norte and are regularly seen. Isla Guadalupe, where goats were removed from 2003-06, is home to two recently (2016) recognized species, Townsend's and Ainley's Storm-Petrels. There is also an ever growing population of Laysan Albatrosses, which are headed to the island now to begin their breeding season. The removal of cats has allowed this important population to thrive. North of Islas San Benitos there was a great concentration of Black and Least Storm-Petrels. On the morning of 7 November over the span of less than half an hour, 100s of both species flew by. They breed on the San Benitos where introduced goats, burros and rabbits were removed between 1998-99, protecting nesting burrows from being crushed or inhabited. Scripp's, Guadalupe and Craveri's Murrelets all breed on the San Benitos, and though they were not too common on this leg, they too have benefitted from these conservation measures. Natividad Island is home to 95% of the world's Black-vented Shearwaters. At times there were literally 1000s streaming by outside the survey strip. Cat, rabbit, goat and sheep removal was completed on the island in 2000. A total of 117 "Stormies" (Storm Petrels) were recorded along the strip transect; 49 Black Storm-Petrels, 27 in the "Leach's" complex that were not
readily identifiable to a finer species level (though some were presumed to be the difficult-to-identify Ainley's), 24 Least, 13 Townsend's and 4 Ashy. Approximately 20 Stormies were attracted to the deck lights and came aboard one night. All were in the Leach's complex. To gain a better understanding of this group, the 20 individuals were measured, photographed and released. Twenty-one boobies of four species: 5 Masked, 2 Nazca, 3 either Masked or Nazca, 2 Red-footed and 9 Brown were recorded. Brown Boobies are expanding their distribution north as the Pacific is getting warmer. They have been breeding on Isla Coronado since 2002, and expanded to breed on Sutil Islet off Santa Barbara Island in the Channel Islands National Park in 2017. The other three species breed off central and southern Mexico. Ocean warming paired with a high rate of sightings during this cruise could indicate a northward expansion of their recognized breeding range. Additionally, eleven Red-billed Tropicbirds were seen. Most of these sightings occurred during the last few days in southern California waters due west of San Diego. It was with great anticipation that on 10 November, just before sunrise, the ship entered the Keller Channel between Isla Cedros and Natividad. Many thanks to Barb Taylor and the ship's command for ensuring that this passage happened during daylight. The horizon was blackened with an estimated 100,000 birds. Close to the ship in the low morning light were hundreds of Black-vented Shearwaters and the distant masses were identified as Western Gulls, appropriately the most common bird seen on our strip transect this leg. *The CCES is a collaborative research effort by SWFSC’s Fisheries Resources and Marine Mammal and Turtle Divisions (FRD and MMTD) and Cascadia Research Collective (CRC), and is being conducted aboard the NOAA Ship Reuben Lasker. The marine mammal and seabird components of this field effort are supported in part by NOAA’s Take Reduction Team program, the Bureau of Ocean Energy Management, and the US Navy.*

For more information, visit the [CCES website](#) or contact MMTD’s Chief Scientist: jeff.e.moore@noaa.gov

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_**Aerial Survey off Central California to assess whale distributions in advance of the Dungeness crab fishing season, 1-2 November 2018**_ —Karin Forney and Scott Benson, along with Jean de Marignac (NOAA/Monterey Bay National Marine Sanctuary) and fisherman Dick Ogg, conducted this survey from Monterey to Bodega Bay along randomly placed transects spaced 4 nautical miles apart and extending offshore to about the 200 m isobath. Multiple aggregations of humpback whales were documented off Pt. Reyes, just outside of the Golden Gate, off Pigeon Point, and in Monterey Bay. Surface-visible anchovy schools were also documented in these areas, suggesting they were feeding on anchovies in these areas. Two blue whales were also recorded. Crab pots, presumed to be lost gear from the previous fishing season, were also documented throughout much of the study area. The aerial survey results were provided to the CA Dungeness Crab Fishing Gear Working Group, in support of their pre-season whale entanglement Risk Assessment and Mitigation Program (RAMP). An additional survey is planned during late November/early December after the fishing season opens south of Bodega Bay. For questions contact Karin Forney ([Karin.Forney@noaa.gov](mailto:Karin.Forney@noaa.gov)).
Condition of coastal bottlenose dolphins off San Diego, CA, November 2018 — Two small boat surveys were completed in the past two weeks, supporting eight hexacopter flights in the ongoing collaboration with SR3 to assess the condition of coastal bottlenose dolphins off San Diego County. Aerial photogrammetry images and boat-based photo-identification images were collected of 15 different bottlenose dolphins, and aerial images were collected of the first southbound gray whale encountered this year. These data will contribute to our growing datasets on body condition for both species. For more information contact John.Durban@noaa.gov.
Photos: Aerial images of bottlenose dolphins (left) and a gray whale (right) collected in the coastal waters off San Diego County for photogrammetry measurements. Images taken with an unmanned hexacopter at >100ft altitude, with authorization under NMFS permit #19091.

**Weeks of 29 October and 5 November 2018**

*Condition of coastal bottlenose dolphins off San Diego, CA, October 2018*— Over the next six months MMTD scientists (John Durban, lead) are collaborating with SR3 (SeaLife Response, Rehab and Research; Holly Fearnbach, lead) on field work to assess the condition of coastal bottlenose dolphins off San Diego County. The project aims to use unmanned hexacopters to obtain vertical images of dolphins, from which photogrammetry measurements will be made to assess length and body condition. These will be compared to similar measurements from images collected last year, to begin a longitudinal study of growth trends and changes in nutritional status. To achieve this, they are matching aerial images to lateral photo-identifications to track repeat measurements of the same individuals (collaborative analyses underway, led by Alyssa Paredes). Five boat-based surveys have been conducted since early October, and aerial images have been collected from three groups of bottlenose dolphins comprising approximately 30 different individuals. Aerial images have also been collected opportunistically from one group of short-beaked common dolphins and one group of Pacific white-sided dolphins. Data on group spacing and individual size composition will add to a growing dataset on the baseline behavior and structure of dolphin groups off Southern California, to facilitate assessment of the impact of exposure to sonar on Navy ranges. For more information contact John.Durban@noaa.gov.
Aerial images of bottlenose dolphins (left), short-beaked common dolphins (center) and Pacific white-sided dolphins (right) collected in the coastal waters off San Diego County for photogrammetry measurements. Images taken with an unmanned hexacopter at >100ft altitude, with authorization under NMFS permit #19091.

California Current Ecosystem Survey (CCES), southern Canada to central Baja California, Mexico, June – November: Leg 6 of the California Current Ecosystem Survey (CCES) is two weeks old, and the first to enter Mexican waters. Weather has ranged from flat calm to unworkable and the former has yielded coveted sightings of beaked whales. Seabird surveys continue successfully, and are increasingly chronicling species characteristic of the transition between California and Baja California. The CCES is a collaborative research effort by SWFSC’s Fisheries Resources and Marine Mammal and Turtle Divisions (FRD and MMTD) and Cascadia Research Collective (CRC), and is being conducted aboard the NOAA Ship Reuben Lasker. The marine mammal and seabird components of this field effort are supported in part by NOAA’s Take Reduction Team program, the Bureau of Ocean Energy Management, and the US Navy. For more information, see https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=259&id=23098 and contact MMTD’s Chief Scientist: jeff.e.moore@noaa.gov

Weeks of 15 and 22 October 2018

Green sea turtle ecological research, San Diego Bay, 18 October 2018 — Marine turtle researchers at SWFSC conducted their final field capture day for the 2018 season in San Diego Bay and were successful at capturing 2 green turtles. Both were likely adult females. The first, captured for the 8th time in the Bay, initially in 2013 at 27 kg, measured 84.8 cm straight carapace length and weighed 83 kg. The second, initially captured in 2008 when it too weighed 27 kg, was slightly larger at 91.7 cm straight carapace length and 106 kg. So far this season the team has had 32 captures (25 individual turtles) of which 9 were captured for the first time ever. This is among the highest proportion of new turtles ever captured during SWFSC’s San Diego Bay green turtle research, perhaps as a result of increasing population size and more new turtles in the southern California region in general. This season’s field efforts focused on health assessment, demography (life-stage structure, sex ratio, reproductive status, etc.), and habitat use. Contact PIs Tomo.Eguchi@noaa.gov or Jeffrey.Seminoff@noaa.gov for additional information.
California Current Ecosystem Survey (CCES), southern Canada to central Baja California, Mexico, June – November: Leg 5 of the California Current Ecosystem Survey (CCES) is two weeks old. This, the first leg of the survey not shared with the Fisheries Division will end in San Diego on 24 October. The focus has been visual marine mammal and seabird surveys in the offshore waters of the California Current at distances greater than 60 nmi from the coast, and as far north as the Columbia River. We have only been partially successful due to heavy weather in week one, with Beaufort 6+ conditions, 8-10 foot swells, and an occasional shelter in Monterey Bay when swells offshore reached 15 feet. Despite these trials, we have obtained 44 valuable sightings of cetacean species, including sperm whales, beaked whales, fin whales and Dall’s porpoises, and recovered three drifting acoustic buoy recorders (DASBRs) deployed on previous legs of this survey. We also deployed one DASBR and plan to pick up two more before the Leg ends. Unfortunately, many more (>50%) remain lost at sea and have stopped transmitting their locations, one just two days before we arrived in its vicinity. The Leg has also been hard on our towed acoustic component; we lost our hydrophone towfish when a stainless steel cable broke. Fortunately, we downloaded lots of valuable recordings that will allow us to design a new, improved version of the autonomous towed array. The seabird team has had great success; the first full day out of San Diego we were greeted by three booby species: a Red-footed, a Nazca and 3 Browns. Are boobies the "canaries in the coal mine" for rising ocean temperatures? We no longer alert the media when we see these tropical seabirds, they're becoming downright "normal". This leg we've returned to a more regular California Current survey, spending 110.25 hours on effort searching the far offshore waters and seeing pelagic species. Leach's Storm-Petrel had been our most commonly seen species. We saw our first Mottled Petrel of the cruise, and have seen a few Hawaiian Petrels and a number of Cook's Petrels as well. Jaegers continue to migrate south, with Parasitic, Pomarine, and Long-tailed Jaegers and South Polar Skua seen in descending order. Between 12-16 October we were treated to long lines of waterfowl migrating south. Brant, Cackling Geese, Northern Pintail, Greater Scaup, and Greater White-fronted Geese were all recorded. A few Black-footed Albatrosses have been seen almost daily and there’s been two Laysan Albatrosses. Four new species for the cruise have been recorded this leg. On 17 October, a single Parakeet Auklet was seen off Cape Arago, Oregon and on 19 October, a very northern Red-billed Tropicbird, a Merlin (a small falcon), and Dark-eyed Junco round out some of the highlights so far for Leg 5. Stay tuned. There’s more to come. The CCES is a collaborative research effort by SWFSC’s Fisheries
Resources and Marine Mammal and Turtle Divisions (FRD and MMTD) and Cascadia Research Collective (CRC), and is being conducted aboard the NOAA Ship Reuben Lasker. The marine mammal and seabird components of this field effort are supported in part by NOAA’s Take Reduction Team program, the Bureau of Ocean Energy Management, and the US Navy. For more information, see https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=259&id=23098 and contact MMTD’s Chief Scientist: jeff.e.moore@noaa.gov

Marine Mammal Carcass Survey, Gulf of California, October 16-18, 2018. Kerri Danil participated in a marine mammal carcass survey in the upper Gulf of California with San Diego Zoo Global and CICESE. The intent of these repeating surveys is to determine whether marine mammal carcasses are a viable food source for California condors in this region, with respect to abundance and contaminant levels. Twenty-one marine mammal carcasses were observed along 60 km of coastline between San Felipe and Puertecitos during a three-day period. Contact Kerri.Danil@noaa.gov for more information.

Scientists walking the beaches searching for carcasses.

Weeks of 1 and 8 October 2018
Leatherback turtle ecological research, Central California, 24-27 September 2018 - Dense low clouds and fog presented a significant challenge to the aerial and vessel-based platforms that were attempting to locate leatherback turtles for sampling and tagging. The cloud cover lifted just enough during the late afternoon of 27 September for the aerial team, led by Karin Forney and Erin La Casella (MMTD), to locate a leatherback after about an hour of survey effort. The turtle was found foraging at the surface in an extremely dense patch of brown sea nettles (Chrysaora fuscescens) and was successfully captured by the vessel-based team led by Scott Benson (MMTD). With the aid of Tomo Eguchi and Garrett Lemons (MMTD), John Douglas and Jackson Winn (MLML), and Dr. Heather Harris (DVMD), tissue and blood samples were obtained and a satellite-linked transmitter was attached to the carapace prior to release. The leatherback remained in the immediate vicinity of the capture for a few days following release and has since moved in a northwest direction, approximately 35 miles west of Pt. Reyes, CA. For further information, please contact Scott.Benson@noaa.gov.
California Current Ecosystem Survey (CCES), southern Canada to central Baja California, Mexico, June – November: The California Current Ecosystem Survey (CCES) embarked, Oct 4 out of San Diego, on Leg 5 of the seven-leg survey. This leg is led by Jay Barlow and will be working the offshore waters of the US EEZ, retrieving DASBRs deployed during the prior four legs, and conducting visual line transect surveys throughout the region. This marks the beginning of “Phase 2” of the survey. During the first phase, the marine mammal and seabird teams worked alongside the coastal pelagics fish species teams. The second phase includes only a marine mammal and seabird team. The 21-day leg is due back in San Diego on Oct 24. The CCES is a collaborative research effort by SWFSC’s Fisheries Resources and Marine Mammal and Turtle Divisions (FRD and MMTD) and Cascadia Research Collective (CRC), and is being conducted aboard the NOAA Ship Reuben Lasker. The marine mammal and seabird components of this field effort are supported in part by NOAA’s Take Reduction Team program, the Bureau of Ocean Energy Management, and the US Navy. For more information, see [https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=259&id=23098](https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=259&id=23098) and contact MMTD’s Chief Scientist: jeff.e.moore@noaa.gov

Weeks of 17 and 24 September 2018
California Current Ecosystem Survey (CCES), southern Canada to central Baja California, Mexico, June – November – Leg 4 began from San Diego on September 5th, and surveyed transect lines in Central and
Southern California waters from nearshore to 40-60 miles offshore, with two additional 80 mile offshore extensions on the southernmost lines. In total (Legs 1-4, as of 23 September), the marine mammal team has recorded over 1700 cetacean sightings. Of the ~260 sightings from Leg 4, a vast majority (> 90%) have been of common dolphins, both long and short beak forms. Also recorded: Risso’s and common bottlenose dolphins, humpback, fin, and blue whales. Several sightings of the more tropically distributed Bryde’s whales were recorded in waters off the Channel Islands, not frequently seen here. Cascadia Research Collective, serving as the Lasker’s (shore-based) small-boat team was limited by poor weather but did collect photo-identifications, biopsy samples, and water samples for eDNA (environmental DNA) from humpback whales off of Santa Barbara. Seabird diversity was high on Leg 4, 55 species (though 19 species fewer than on Leg 3 when we spent most of our time surveying under a thick marine layer that displaced many terrestrial migrants). Black-vented Shearwater was by far the most widely detected species (15,946 birds, including feeding flocks over Short-beaked and Long-beaked Common Dolphins). Unidentified dark shearwater (Sooty/Short-tailed Shearwater) was the next most abundant taxon, with 2173 individuals. (Of note, Short-tailed Shearwater is extremely rare off the California coast at this time of year. However, considering the difficulty of accurately separating this very similar species from the extremely abundant Sooty Shearwater, the species pair is lumped in the data collection effort.) Two Masked Boobies and 13 Brown Boobies were seen in the vicinity of the Channel Islands. The last DASBR (drifting acoustic spar buoy recorder) of the survey was deployed north of Point Conception. These DASBRs record acoustic data for deep diving species (e.g., beaked whales and sperm whales). All will be retrieved on Leg 5. Leg 4 ended on 23 September when the ship pulled into San Diego. Leg 5 begins 4 October. The CCES is a collaborative research effort by SWFSC’s Fisheries Resources and Marine Mammal and Turtle Divisions (FRD and MMTD) and Cascadia Research Collective (CRC), and is being conducted aboard the NOAA Ship Reuben Lasker. The marine mammal and seabird components of this field effort are supported in part by NOAA’s Take Reduction Team program, the Bureau of Ocean Energy Management, and the US Navy.

Left: feeding Bryde’s whale, photographed by Chris Hoeffer under NMFS MMPA permit. Right: Masked Booby, photograph by Michael Force.

Health monitoring of southern resident killer whales, San Juan Islands, WA, September – Scientists from MMTDs Cetacean Health and Life History Program (John Durban, lead) are currently working in collaboration with SR3: SeaLife Response, Rehabilitation and Research (Holly Fearnbach, lead) to collect aerial photogrammetry images to monitor the growth and body condition of endangered Southern Resident killer whales, a NOAA Fisheries “Species in the Spotlight.” Since the start of September, 56 flights have been flown with an unmanned octocopter (21 hours of cumulative flight time), collecting over 40,000 images and documenting 69/74 individuals in the population to date. The team will continue to collect data until the end of September, with a goal of imaging all individuals in the population to add to a 10-year time series to detect changes. In the longer term, photogrammetry measurements of growth and body condition from these images are intended to support management actions aimed at recovering
this population, and in the shorter term the aerial perspective is offering important insights into the health of individual whales. Contact John.Durban@noaa.gov for further details. For further information on this study, see:
https://swfsc.noaa.gov/news.aspx?ParentMenuId=147&id=23000 and

**Aerial image of Southern Resident killer whales, with members of J, K and L pods represented in the group. Photogrammetry analysis of >40,000 images collected this month will be used to quantify patterns of growth and body condition. Image collected by NOAA/SWFSC and SR3, both obtained using an unmanned octocopter piloted non-invasively >100ft above the whales under NMFS research permit #19091.**

*Leatherback turtle ecological research, Central California, 24-30 September 2018 –* This research will be conducted with teams from aerial and vessel-based platforms, working collaboratively. The aerial effort to locate leatherback turtles will be conducted by MMTD researchers Karin Forney and Erin LaCasella with local support from Jean DeMarignac (National Marine Sanctuary Program) and contract observers Katherine Whitaker and Melinda Nakagawa. The vessel-based team to deploy satellite tags will be led by Scott Benson aboard the Moss Landing Marine Labs (MLML) R/V Sheila B, and includes Tomo Eguchi, Garrett Lemmons, and Peter Dutton from MMTD, as well as local collaborators Jim Harvey (MLML), George Shillinger (Upwell Turtles), and vessel captain John Douglas (MLML). The weather forecast currently looks favorable during the early part of the week, so stay tuned for the next bi-weekly update! For questions contact Scott.Benson@noaa.gov.

*Cetacean Hormone Baseline Sampling, La Jolla Waters, 14 Sept –* During this routine biopsy sampling Nick Kellar, Keiko Sherman, Paige Henderson, and Jake Barbaro encountered a group of ~450 short-
beaked common dolphins exhibiting milling behavior. Three biopsy samples were collected from this
group before the milling behavior rapidly changed to charging. Seven killer whales (including one large
male and a calf) had made a recent kill and were observed sharing this kill over the next hour. Skin biopsy
samples were collected from the male and an adult female before behavioral changes precluded further
sampling. These activities were conducted under NMFS Permit No. 19091-01. For further information
please contact Nick.Kellar@noaa.gov.

Biopsy activities off La Jolla, CA, were conducted under NMFS Permit No. 19091-01.

_Weeks of 3 and 10 September 2018_

_Loggerhead turtle aerial surveys, Southern California Bight, 22-29 August 2018_ – Researchers from
SWFSC, led by Tomo Eguchi, conducted an aerial survey in the Southern California Bight aboard a high-
wing twin-engine aircraft (Partenavia Observer) contracted from Aspen Helicopters (Oxnard, CA; see
photo). The team completed approximately 1,050 nautical miles of track lines during five survey days.
Coastal clouds, high winds, and military exercises were main obstacles for the survey. Two loggerhead
turtles were sighted (see figure) in addition to several marine mammal species, sharks, and sunfish (Mola
mola). The fact that so few loggerheads were observed this year, during some of the warmest sea surface
temperatures ever for the region, suggests that local warm water conditions may not be a sufficient
mechanism that would enable turtles to enter the bight. Contact PI Tomo Eguchi for more information.
Left: Nose photo of the survey aircraft, a Partenavia Observer. Notice the ‘helicopter like’ front end, which enables better visibility for wildlife viewing. Right: Completed track lines of the aerial survey for loggerhead turtles in the southern California Bight.

*Cook Inlet Beluga Research, Cook Inlet, AK, 7-30 August* – This project is a collaboration with Paul Wade (AFSC), Charlotte Boyd (University of Washington), Tom Gage (ADF&G) and Justin Jenniges (ADF&G). LT Hollis Europe and LT Jake Barbaro finished the second and final part of the UAS survey around Anchorage, with four good weather days last week. New areas were explored and whales were spotted and photographed in places not yet documented. In total, the flight team had 41 flights with an APH-22, representing over 6.5hrs of flight time and an estimated 150 whales photographed. Contact Hollis.Europe@noaa.gov for more information.
The California Current Ecosystem Survey (CCES) completed Leg 3 of the survey, led by Lisa Ballance, on Aug 31, arriving in port to San Diego after working in waters between Cape Mendocino and Point Conception. This highly productive area generated > 600 marine mammal sightings, with a new single-day record of 88 sightings, and bringing the cruise total to approximately 1400 on-effort sightings, shattering previous records for SWFSC marine mammal line-transect surveys in the CA Current. The high sightings rate is attributed to the concentration of effort over continental shelf waters for this survey, whereas past surveys have allocated a greater proportion of effort to offshore areas where cetacean densities are lower. Anchovy have been regularly detected south of San Francisco by the FRD Coastal Pelagic Fish survey team aboard the Lasker with us. The most commonly sighted cetacean species have been humpback whales (> 500 sightings), fin whales, Pacific white-sided dolphins, Dall’s porpoise and harbor porpoise (about 100 sightings each). Also seen frequently (20 – 40 sightings each) have been Risso’s dolphin, blue whale, and short-beaked common dolphins, this last species of which just started showing up on Leg 3 and we expect will be very commonly seen off southern California during Leg 4, led by Eric Archer. Cascadia Research Collective, serving as Lasker’s (shore-based) small-boat team has continued to collect photo-ID data and biopsy on humpback whales and they now have hundreds of samples. The one-person bird team (Mike Force) also had a record-breaking leg, recording up to 34 species per day. Overall bird numbers were dominated by Buller’s, Sooty and Short-tailed Shearwaters, along with Common Murres in some areas. Some highlights included Nazca and Brown boobies on the same day (multiple times; rare for so far north), Guadalupe Murrelets, and Laysan Albatrosses. Five additional DASBRs (drifting acoustic spar buoy recorders) were deployed on Leg 3; twelve have been deployed for the survey so far. These are recording acoustic data for deep diving species (e.g., beaked whales and sperm whales) and will be retrieved on a subsequent leg of the cruise. The CCES is a collaborative research effort by SWFSC’s Fisheries Resources and Marine Mammal and Turtle Divisions.
(FRD and MMTD) and Cascadia Research Collective (CRC), and is being conducted aboard the NOAA Ship Reuben Lasker. The marine mammal and seabird components of this field effort are supported in part by NOAA’s Take Reduction Team program, the Bureau of Ocean Energy Management, and the US Navy. For more information, see the California Current Ecosystem Survey 2018 web page and contact MMTD’s Chief Scientist: jeff.e.moore@noaa.gov.

Weeks of 20 and 27 August 2018

California Current Ecosystem Survey (CCES), southern Canada to central Baja California, Mexico, June – November – Leg 3 of this survey began Monday, 13 August, when the ship sailed from San Francisco. In the two weeks since that time, we have covered survey lines running perpendicular to the coast to 30-40 nmi offshore, spaced every 10-20 nm, from Cape Mendocino to Monterey. We have also made SWC cetacean and ecosystem assessment survey history. First, we made our 1000th sighting (a humpback whale). First time ever for a single cetacean survey (dating to the 1970s and including 2-ship surveys of 240 sea days – a testament to the high density of cetaceans along the shelf and slope of the California Current). We had to write Robert Holland (computer programmer extraordinaire) for a WinCruz (data entry software program) revision to handle the number 1001. Second, we broke the record for highest number of sightings in one day – 87 (see photo; previous record: 77, set on Leg 1 of this same survey). Among the most exciting things about this survey is that we are able to experience, in real time, the correlation (or not) between cetaceans, seabirds, and fish schools (predators and prey). We got a strong such positive correlation early in the morning of 24 August. First light found us 35 nm southwest of Año Nuevo and headed offshore in search of the edge (end) of “the fish signal” in the acoustic backscatter data. That signal corresponded with an unprecedented rush of humpback whale and Pacific white-sided dolphin sightings on the flying bridge (1 sighting every 2 minutes for 40 minutes) and an overwhelming number of seabirds streaming by the ship. After 20 nm, the morning rush slowed as the fish signal subsided, and we all took a breath of air. Number of marine mammal sightings for the survey to date: 1,246. The CCES is a collaborative research effort by SWFSC’s Fisheries Resources and Marine Mammal and Turtle Divisions (FRD and MMTD) and Cascadia Research Collective (CRC), and is being conducted aboard the NOAA Ship Reuben Lasker. The marine mammal and seabird components of this field effort are supported in part by NOAA’s Take Reduction Team Program, the Bureau of Ocean Energy Management, and the US Navy. For more information see California Current Ecosystem Survey 2018 and contact MMTD’s Chief Scientist Jeff.E.Moore@noaa.gov.
**Cook Inlet Beluga Research, Cook Inlet, AK, 7-30 August** – In collaboration with AFSC and Alaska Department of Fish and Game, LT Hollis Europe and LT Jake Barbaro finished the first of two parts of the annual Cook Inlet Beluga Unmanned Aerial Survey last Thursday with three days on effort (one from the water and two from land), three weather days (off effort), and 10 flights completed. An estimated 40 whales were seen and photographed. They will return to Anchorage this week to continue the survey until August 31st. Direct any questions to Hollis.Europe@noaa.gov.

Photo authorized by permit #20465.

**Green sea turtle ecological research, San Diego Bay, 22 August 2018** – Marine turtle researchers at SWFSC conducted their 9th field capture day for the 2018 season in San Diego Bay and were successful at capturing two green turtles, both juveniles. One, not sampled to date in the long history of this project, measured 76.4 cm in curved carapace length (CCL) and weighed 49.0 kg (see photo). The second measured 89.9 CCL and weighed 79.0 kg. So far this season the team has had 30 captures (24 individual turtles) of which nine were captured for the first time. This is among the highest proportion of new turtles ever captured during SWFSC’s San Diego Bay green turtle research. This season’s field efforts will be ongoing through the end of September. Research will continue to focus on health assessment, demography (life-stage structure, sex ratio, reproductive status, etc.), and habitat use. Contact PIs Tomo.Eguchi@noaa.gov or Jeffrey.Seminoff@noaa.gov for additional information.

Photo: Green turtle captured in San Diego Bay. This individual measured 76.4 cm in curved carapace length 49.0 kg in weight; this was the first-ever capture of this turtle as part of SWFSC’s green turtle research program

**Loggerhead turtle aerial surveys, Southern California Bight, 22 August 2018** – In a busy day for SWFSC marine turtle researchers, Tomo Eguchi, Erin LaCasella, and Garrett Lemons conducted the first day of
the 2018 Southern California Bight Loggerhead Aerial Survey onboard a Partenavia Observer (Aspen Helicopters). This survey is part of a project funded by Bycatch Reduction and Engineering Program (BREP) and a collaborative effort among SWFSC, NOAA West Coast Region, UC Santa Cruz, Stanford University, and University of Maryland. The aerial team found a short window of good weather (Beaufort sea state < 4) in the early afternoon and completed six transect lines (150 nm) in the southern part of the study area (blue lines in the figure). No loggerhead turtles were sighted. The team is waiting for another weather window to complete the track lines and possibly extend the coverage to the offshore area of the planned track lines in the next several days. The study will run until 30 August 2018. Contact Tomo.Eguchi@noaa.gov or Jeffrey.Seminoff@noaa.gov for additional information.

SWFSC Aerial Survey Team in front the survey aircraft, the Partenavia ‘Observer’ provided by Aspen Helicopters of Oxnard, CA.

Tracklines for the 2018 Southern California Bight Loggerhead Aerial Survey. Blue transect lines indicate those that were completed on 22 August 2018.
Weeks of 6 and 13 August 2018

California Sea Lion Census, Channel Islands, Southern California Bight, 6 July – 8 August – MMTD biologist Mark Lowry, who will be retiring at the end of 2018, completed his last aerial photographic survey to census California sea lions last week. This survey took longer than is typical due to aircraft availability and adverse weather conditions. Mark has been conducting aerial photographic surveys of California sea lions, northern elephant seals, Pacific harbor seals, and Steller sea lions since 1987, a legacy time series. Contact Mark.Lowry@noaa.gov for more information.

Photo: Mark Lowry (left) and pilot for Aspen Helicopters, Kevin Ellington (right), standing next to a Partenavia Observer aircraft which Mark used for conducting aerial photographic surveys of pinnipeds at the Channel Islands and throughout the California and Oregon coasts during his career at NOAA’s Southwest Fisheries Science Center.

California Current Ecosystem Survey (CCES), southern Canada to central Baja California, Mexico, June – November - NOAA ship Reuben Lasker arrived in San Francisco early morning on August 9th ending Leg 2 of the survey. The total number of cetacean sightings to date stands at 848. Fin whales have been the most commonly-sighted cetacean, followed by humpback whales. Other highlights have included Mesoplodon beaked whales, Baird’s beaked whales, and killer whales. Cascadia Research Collective, serving as the Lasker’s (shore-based) small-boat team has had great success in obtaining identification photographs of humpback whales, and skin and blubber biopsy samples of humpback, blue, and fin whales. The one-person bird team (Mike Force) has recorded an abundant and diverse seabird community, including highlights of the last week: Buller’s shearwaters, a Laysan Albatross, and a Wilson’s Warbler and Brown-headed cowbirds (both land birds) desperately looking for a place to land. Five more DASBRs (drifting acoustic spar buoy recorders) were deployed during Leg 2 to record acoustic data, primarily of deep-diving species (beaked and sperm whales). These units will be retrieved on a subsequent leg of the cruise. The ship is now docked at Pier 17 next to the Exploratorium for a few days of rest, recreation, and to refuel and provision. Tours for important constituents and the general public have been hosted by ship’s officers, crew, and SWFSC scientists. Leg 3 begins Monday, 13 August. The CCES is a collaborative research effort by SWFSC’s Fisheries Resources and Marine Mammal and Turtle Divisions (FRD and MMTD) and Cascadia Research Collective (CRC), and is being conducted aboard the NOAA Ship Reuben Lasker. The marine mammal and seabird components of this field effort are supported in part by NOAA’s Take Reduction Team Program, the Bureau of Ocean Energy Management, and the US Navy. For more information see California Current Ecosystem Survey 2018 and contact MMTD’s Chief Scientist Jeff.E.Moore@noaa.gov.
Green sea turtle ecological research, San Diego Bay, 9 August 2018 - Marine turtle researchers at SWFSC conducted their 8th field capture day for the 2018 season in San Diego Bay and were successful at capturing three green turtles. All were apparent females, measuring from 83.6 - 104.1 cm in curved carapace length and 78 - 128 kg. So far this season the team has had 28 green turtle captures, including small and large juveniles as well as adult males and females. This season’s field efforts will be ongoing through the end of September. Research will continue to focus on health assessment, demography (life-stage structure, sex ratio, reproductive status, etc.), and habitat use. Contact PIs Tomo.Eguchi@noaa.gov or Jeffrey.Seminoff@noaa.gov for additional information.
Photos: Left - SWFSC researchers simultaneously processing two green turtles at their field site in south San Diego Bay. Each animal is maintained in a restraint box with eyes covered to keep them calm during measurements. Right - Green sea turtle returning to the waters of San Diego Bay. Notice the lights of Chula Vista, CA in the background.

Leatherback Turtle Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, 31 March – 31 July – This year’s field efforts, led by Kelly Stewart, represent a close collaboration with USFWS and The Ocean Foundation (TOF) and focused on sampling all the new nesting females by collecting small clips of skin to test the hypothesis that leatherbacks mature within 9-15 years. Genetic sampling and research have now ended for the 2018 season. We collected samples from a total of 28 nesting females including first-time nesters (neophytes). An additional 900 skin clips from hatchling turtles were collected, along with yolkless eggs from 20 nests laid by un-sampled females. These yolkless eggs will allow us to determine the identity of these females using molecular genetic methods. Samples from 2018 have been sent and received at the SWFSC, La Jolla Laboratory where analysis of the first streams of genomics data generated for the 2009 hatchlings and neophytes through 2017 is currently underway with our new leatherback Single Nucleotide Polymorphism (SNP) markers. Collaborative research projects at St. Croix also ended on 3 August, with Bethany Holtz finishing up trials on bioacoustic responses of hatchlings to sound, and Shreya Banerjee collecting samples for a leatherback genome project. For more information, please contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov
One of the last emerging nests of the season (credit – Kelly Stewart).

_Cook Inlet Beluga Research, Cook Inlet, AK, 7-30 August_ - LT Hollis Europe and LT Jake Barbaro arrived in Anchorage, Alaska last week to begin the second annual Cook Inlet Beluga survey. This project is led by Paul Wade of AFSC with collaboration from Justin Jenniges of ADF&G as the boat driver of the 21’ safeboat for flight operations. Hollis and Jake (MMTD) are conducting the Unmanned Aerial Survey sampling. With cooperative weather conditions, all 3 survey days so far have been successful. With 37 flights and almost 6 hours of flight time, 13,728 photos have been collected for individual identification and photogrammetry. There were 7 encounters and an estimated 291 beluga whales. Contact Hollis.Europe@noaa.gov for more information.
SWFSC-Channel Islands National Marine Sanctuary (CINMS) Soundscape Project - Shannon Rankin, Anne Simonis and Taiki Sakai joined CINMS researchers Lindsey Peavey and Ryan Freedman to retrieve and re-deploy two seafloor recorders for a project looking at human drivers of anthropogenic noise. Specifically, we hope to quantify noise from seal bombs at two sites: San Miguel Island, and Santa Rosa Island. We also tested out a new ‘weight retrieval system’ developed by Jay Barlow. CINMS divers obtained video showing successful deployment of this system, which allows us to retrieve the complete mooring from the seafloor. Jeffrey Michalec (NOAA Hollings Scholar) and Elizabeth Becker also joined the team. Contact Shannon.Rankin@noaa.gov for more information.
California Sea Lion Census and Diet Research, Channel Islands, Southern California Bight, quarterly time series – MMTD biologists completed quarterly fieldwork on California sea lions at San Clemente Island (July 20-23) and San Nicolas Island (July 30-August 1). A total of 145 scat samples were collected from the two islands (50 each from two collection sites at San Nicolas Island and 45 from San Clemente Island), augmenting MMTD’s ongoing 37-year time series documenting the diet of California sea lions at these two key Channel Island rookeries in the Southern California Bight. Biologists also counted California sea lions and northern elephant seals at the study site at Mail Point, San Clemente Island, continuing the 37-year time series of seasonal use by age and sex classes at that rookery. Contact Mark.Lowry@noaa.gov for more information.

Weeks of 23 and 30 July 2018

California Current Ecosystem Survey (CCES), southern Canada to central Baja California, Mexico, June – November – The Reuben Lasker departed Newport, Oregon, on July 20th to begin Leg 2 of the survey. We have been surveying transect lines in Oregon waters from nearshore to 40-60 miles offshore, and one additional offshore line about 150 miles from shore. Through July 26th the marine mammal team has recorded over 525 cetacean sightings. Fin whales have been the most commonly-sighted cetacean, followed by humpback whales. Summer resident gray whales have also been detected off of Newport, Oregon. Encounters with smaller cetaceans have included Pacific white-sided dolphins, northern right whale dolphins, Risso’s dolphin, and a small group of Cuvier’s beaked whales. Cascadia Research Collective, serving as the Lasker’s (shore-based) small-boat team has been limited by poor weather but did collect some photo-ID data on humpback whales this week. The one-person bird team (Mike Force) has recorded many species, including a highlight of several Hawaiian Petrels from earlier this week. The total number of species seen during the past week was 23; the most abundant birds were Common Murre and Leach’s Storm-Petrel, representing a tidy dichotomy between nearshore neritic habitat and the offshore pelagic habitat, respectively. It is rare to see one in the same water as the other. Noteworthy species, rare this far north, were Ashy Storm-Petrel and Nazca Booby. Daily totals ranged from a low of 11 to a high of 16; the average was 12. Although diversity didn’t change all that much, abundance certainly did, ranging from a low of 47 to a high of 336; the average was 122. Two DASBRs (drifting acoustic spar buoy recorders) have thus far been deployed on this leg. These will record acoustic data for deep diving species (e.g., beaked whales and sperm whales) and be retrieved on a subsequent leg of the survey. In addition, a previously-deployed DASBR that was only reporting intermittently was recovered and some additional flotation was added to the unit, which has resulted in a significant improvement in the reporting rate by the SPOT messenger units held within the unit. The CCES is a collaborative research effort by SWFSC’s Fisheries Resources and Marine Mammal and Turtle Divisions (FRD and MMTD) and Cascadia Research Collective (CRC), and is being conducted aboard the NOAA Ship Reuben Lasker. The marine mammal and seabird components of this field effort are supported in part by NOAA’s Take Reduction Team program, the Bureau of Ocean Energy Management, and the US Navy. For more information see the project website and contact MMTD’s Chief Scientist Jeff.E.Moore@noaa.gov.
Leatherback Turtle Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, 31 March–31 July – This year’s field efforts, led by Kelly Stewart, represent a close collaboration with USFWS and The Ocean Foundation (TOF) and will focus on sampling all the new nesting females by collecting small clips of skin to test the hypothesis that leatherbacks mature within 9-15 years. With just one week of sampling remaining, we have collected 1,120 hatchling genetic samples from 35 nests. Roughly 20 nests remain to hatch on the refuge. Collaborative projects during this period were successful with Bethany Holtz testing the reaction of hatchling orientation to sound, Shreya Banerjee collecting hatchling samples for a genome project, and Drue Frey collecting data on natural and relocated nests for her senior project. In addition, Mridula Srinivasan of NOAA Fisheries’ Office of Science and Technology visited the project and participated in morning patrols, nest evaluations and hatchling sampling. Visitors and volunteers from National Save the Sea Turtle Foundation also helped with surveys on the refuge. In the final two weeks, Kelly Stewart will wrap up sampling and close out the season. For more information, please contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov.

Weeks of 9 and 16 July 2018

California Current Ecosystem Survey (CCES), southern Canada to central Baja California, Mexico, June – November – CCES, conducted aboard the NOAA Research Vessel REUBEN LASKER, represents the first effort by SWFSC (perhaps even the first effort by NOAA Fisheries?) to conduct a marine mammal and coastal pelagic fishes research cruise simultaneously. Leg 1 will be successfully completed on
Monday July 16 and is ahead of schedule. LASKER transited, beginning June 24, from San Francisco to the northwest end of Vancouver Island and has since been making its way down the coast of British Columbia, Washington and Oregon, running transects from nearshore to 40-60 miles offshore, and running one transect out to about 150 miles. As of this writing, the mammal team has sighted 400 marine mammal groups. Large whale sightings have been dominated by humpback whales and, to a lesser extent, fin whales. Several gray whales were sighting off the coast of WA in the Grays Harbor area. Large groups of Pacific white-sided dolphins, northern right whale dolphins, Risso’s dolphins, Dall’s porpoise (and harbor porpoise near the coast) have been common. Several killer whale groups have been sighted as well. Many groups have been associated with concentrations of herring or krill, as measured by echosound data collected by the Fisheries Resources Division team on board. Cascadia Research Collective, serving as the marine mammal (shore based) small-boat team, has collected approximately 50 biopsy and almost 200 photo ID samples for large whales, mostly humpbacks, but also a few gray whales. The one-person bird team (Mike Force) has recorded a taxonomically diverse array of species, from pelagic wanderers (albatrosses, fulmars, shearwaters) to coastal alcids such as Rhinoceros and Cassin’s auklets. A highlight was a Guadalupe Murrelet, photographed by Chris Hoefer. This constitutes the first confirmed Canadian occurrence! The last known sighting was from the NOAA ship SURVEYOR in 1994. Three DASBRs (drifting acoustic spar buoy recorders) were deployed on this leg. These will record acoustic data for deep-diving species (e.g., beaked whales and sperm whales) and be retrieved on a subsequent leg of the cruise. LASKER departs July 20 for Leg 2 out of Newport, OR, and will be led on the MMTD side by Jim Carretta. The CCES is a collaborative research effort by SWFSC’s Fisheries Resources and Marine Mammal and Turtle Divisions (FRD and MMTD) and Cascadia Research Collective (CRC), and is being conducted aboard the NOAA Ship Reuben Lasker. The marine mammal and seabird components of this field effort are supported in part by NOAA’s Take Reduction Team program, the Bureau of Ocean Energy Management, and the US Navy. For more information see the project website and contact MMTD’s Chief Scientist Jeff.E.Moore@noaa.gov.

Left: southern resident killer whale (L-pod) (Paula Olson); center: humpback whale (Paula Olson); right: Pacific white-sided dolphin (Juan Carlos Salinas-Vargas).

Steller Sea Lion Aerial Survey, Aleutian Islands, Alaska – In the past 2 weeks, the AFSC Steller Sea Lion Aerial Survey team, which includes the participation of SWFSC’s Morgan Lynn, successfully surveyed almost all the sites in the Central Aleutian Islands working out of Dutch Harbor. Weather conditions were challenging due to fog and wind. Of particular interest was the photographing of Bogoslof Island, a small volcanic island which erupted and doubled in size last year. Both Steller sea lions and fur seals were known to be on the island; both have returned and fur seals in particular have returned in greater numbers. The team then re-positioned to Adak to cover the Central Aleutian sites, but weather continued to be even more challenging. The project wrapped up on July 11th with improved weather the last two days, which allowed the team to survey many of the remaining sites. Several sites of particular interest in the Western Gulf of Alaska region were also surveyed on the way back to Anchorage.
Leatherback Turtle Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, 31 March–31 July – This year’s field efforts, led by Kelly Stewart, represent a close collaboration with USFWS and The Ocean Foundation (TOF) and will focus on sampling all the new nesting females by collecting small clips of skin to test the hypothesis that leatherbacks mature within 9-15 years. Night patrols have now ended, with one last turtle nesting on 23 June - Sarah - AAV640. She has been nesting every 2 years, 2001-2014; this year was her first appearance since then. There have been four additional leatherback nests laid on the refuge and 43 nests have hatched. From these nests, samples from 423 hatchlings have been collected to date. Next week, Mridula Srinivasan (NOAA Office of Science and Technology), Shreya Banerjee (collecting samples for a leatherback genome collaborative project between MMTD and Lisa Komoroske at University of Massachusetts), Bethany Holtz (conducting research on hatchling hearing), and Drue Frey (working on a mini-project for her junior year at Helix High School) will join the team. For more information, please contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov

Health Assessment of Bottlenose Dolphins, Barataria Bay, Gulf of Mexico, week of 9 July – MMTD’s LT Hollis Europe and LT Jacob Barbaro travelled to Grand Isle, LA, to participate in a collaborative study to assess the feasibility of using aerial images from UAS platforms to contribute to the health assessment of bottlenose dolphins in Barataria Bay. This is part of ongoing investigations into the effects of oil exposure on Gulf of Mexico marine mammals, being undertaken by the Consortium for Advanced Research on Marine Mammal Health (CARMMHA). Jake and Hollis flew 31 flights with an unmanned hexacopter during three days, repressing 5.5 hours of active flight time. Almost 7000 images were obtained, with
measurable images of an estimated 50 different dolphins. Photogrammetry analysis of length and condition of these dolphins, in addition to the prevalence of skin lesions, will be conducted alongside similar data sets collected by MMTD’s Cetacean Health and Life History Program from bottlenose dolphins off Southern California and the Bahamas, providing a key comparative context. Special thanks to our hosts Teri Rowles (NOAA Office of Protected Resources), Lori Schwacke, Brian Balmer, and Brian Quigley (National Marine Mammal Foundation). For more information contact John.Durban@noaa.gov.

**Loggerhead Nesting Beach and Bycatch Project, Oman, 12-23 July** – Manjula Tiwari is traveling to Oman as part of a long-term loggerhead sea turtle collaboration with the Ministry of Environment and Climate Affairs, the Environment Society of Oman, and Five Oceans Environmental Services. Contact Manjula.Tiwari@noaa.gov for more information.

**Week of 2 July 2018**

**Green sea turtle ecological research, San Diego Bay, 28 June 2018** – Marine turtle researchers at SWFSC conducted their fifth field capture day in San Diego Bay and were successful at capturing 5 green turtles. The turtles included two juveniles, an adult male, and two females. They ranged from 63.1-101.2 cm straight carapace length and 34-145 kg. This brings the total number of captures this season to 22 green turtles. This season’s field efforts will be ongoing through the end of September. Research will focus on health assessment, demography (life-stage structure, sex ratio, reproductive status, etc.), and habitat use. Contact PIs Tomo.Eguchi@noaa.gov or Jeffrey.Seminoff@noaa.gov for additional information.
SWFSC researchers measuring a green turtle in San Diego bay on 28 June 2018. The juvenile was the first capture of the evening (6pm) and measured 63.1 cm straight carapace length and 34 kg in weight. The green turtle study site is located on the Unified Port of San Diego’s property in the extreme southern portion of San Diego Bay, a site that used host the South Bay Power Plant. Notice the salt pile (background left) that is mined from nearby evaporative ponds; the hills of Tijuana Mexico can be seen in the distance.

Week of 25 June 2018

California Current Ecosystem Survey, 26 June - 7 December – The California Current Ecosystem Survey (CCES) gets underway from San Francisco on June 26! The CCES is a collaborative research effort by SWFSC’s Fisheries Resources and Marine Mammal and Turtle divisions (FRD and MMTD) and Cascadia Research Collective. (CRC). This large-scale line-transect and trawl-sampling survey, conducted aboard the NOAA Ship Reuben Lasker, is the first of its kind by virtue of its multi-taxonomic multi-trophic focus and geographic scope. Stock assessment and predator-prey co-occurrence data will be collected for coastal pelagic fishes, marine mammals and seabirds throughout the California Current ecosystem from June 26 – Dec 7, with transects running up to 200 nmi offshore from Vancouver Island (Canada), the US West Coast, and northern Baja California (Mexico). With respect to marine mammals, the survey will also include a targeted photo ID and biopsy sampling effort for large whales (especially humpback whales) led by CRC, and long-term (up to 80-day) deployments of drifting acoustic spar buoy recorders (DASBRs) to gather distribution and density data for deep diving species such as beaked whales. NOAA SWFSC Chief Scientists are Jeff Moore (MMTD) and David Demer (FRD), who will lead Leg 1 of the survey in waters off Vancouver Island and Washington State. Annette Henry is the MMTD survey coordinator. The marine mammal and seabird components of this field effort are supported in part by NOAA’s Take Reduction Team Program, the Bureau of Ocean Energy Management, and the US Navy. For more information, contact Jeff.E.Moore@noaa.gov.

Integrating Remote Sensing Methods to Measure Baseline Behavior and Responses of Social Delphinids to Navy Sonar, Southern California Bight, 14-22 June - Last week saw the successful completion of fieldwork on this project. John Durban (MMTD) partnered with Holly Fearnbach (SR3) to fly an unmanned octocopter from a 65’ boat to obtain vertical photographs from above dolphin schools off Catalina Island, California. Thirteen flights were flown last week over Risso’s dolphins, bottlenose dolphins and long-beaked common dolphins during controlled exposures to simulated navy sonar. In total for the 10-day project, the team flew > 8.5 hours and collected 21,000 images from these three species; subsequent laboratory analyses will provide quantitative photogrammetry metrics of group behavior during times of exposure and control periods, and also information on individual size and condition as a context for interpreting behaviors (see photo). Collaborators on the project also collected post-exposure biopsy samples from all three species, and laboratory analysis at MMTD/SWFSC (Nick Kellar, lead) will use hormone assays to investigate physiological responses to exposure. Molly Groskreutz, Cassidy O’Bryant and Paige Henderson from MMTD assisted in the field. This is a collaborative project between scientists from Southall Environmental Associates, Kelp Marine Research, Cascadia Research Collective, SR3 and MMTD/SWFSC, with funding by the Office of Naval Research. Further details on this collaborative project can be found on this website. For more information contact John.Durban@noaa.gov.
Photogrammetry at two different scales. Left: a high altitude (~200ft) flight to document the behavior of a large group of long-beaked common dolphins. Right: a lower altitude (~80ft) flight over a bottlenose dolphin to measure length and body condition. Images collected from an unmanned octocopter, authorized by NMFS permit # 19091.

Annual AFSC Steller Sea Lion Aerial Photogrammetric Pup Count Survey – This week MMTD’s Morgan Lynn began participating in the Alaska Fisheries Science Center’s (AFSC) annual Steller sea lion aerial photogrammetric pup count survey. This year’s survey is focused on the western stock of Steller sea lions in the Aleutian Islands and will be conducted using a mix of manned aircraft and unmanned aerial vehicles. Images collected will be used for counting pups on rookeries as well as providing other life history data. The vertical photogrammetry component of this effort was started by SWFSC in 1998 and has now transitioned to colleagues at AFSC, but often with participation by MMTD scientists with photogrammetry expertise. Morgan will be in Alaska until July 11th. For more information contact Morgan.Lynn@noaa.gov or John.Durban@noaa.gov.

Leatherback Turtle Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, 31 March – 31 July – This year’s field efforts, led by Kelly Stewart, represent a close collaboration with USFWS and The Ocean Foundation (TOF) and will focus on sampling all the new nesting females by collecting small clips of skin to test the hypothesis that leatherbacks mature within 9-15 years. Last week three new nests and two false crawls (turtle came onto the beach but returned to sea without nesting) were recorded. A hawksbill nested on the south side of the refuge. And seven nests hatched. All hatching nests are now being sampled by collecting yolkless eggshells for DNA; these allow for identification of females who laid these nests. The season’s total to date: 123 nests on Sandy Point, 134 island-wide, 39 individual females, and 24 hatched nests. For more information, please contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov.
Week of 18 June 2018

**Green Sea Turtle Ecological Research, San Diego Bay, 14 June 2018** – Marine turtle researchers at SWFSC conducted their fourth field capture day in San Diego Bay and were successful at capturing 5 green turtles. The turtles included a juvenile, adult male, and adult female. The capture histories ranged from 1st time capture (juvenile turtle) to an animal (adult female) that was first captured in San Diego Bay in 1999. This brings the total number of captures this season to 14 green turtles, which is a record pace for the SD Bay turtle project. This season’s field efforts will be ongoing through the end of September. Research will focus on health assessment, demography (life-stage structure, sex ratio, reproductive status, etc.), and habitat use. Contact PIs Tomo.Eguchi@noaa.gov or Jeffrey.Seminoff@noaa.gov for additional information.

**Hawksbill and Green Turtle Exploratory Research, Tres Marias Islands, Mexico, 17-25 June 2018** – Jeff Seminoff will travel to the remote Tres Marias Islands off the coast of Nayarit Mexico to participate in an exploratory mission to determine the importance of the islands for hawksbill and green sea turtles. These islands have long been considered a last frontier for sea turtle research in the eastern Pacific, but access has been impossible until now. The islands have been the site of a penal colony that houses the Tres Marias Federal Prison, and has been strictly off limits to outsiders for decades. A recent accord between the National Polytechnic Institute (Seminoff’s collaborating institution), and the Mexican penal system has finally gained access to the islands for sea turtle research. The team will be accompanied by the Mexican Navy as well as members of Mexico’s Commission for Natural Protected Areas. Contact Jeffrey.Seminoff@noaa.gov for more information.
Leatherback Turtle Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, 31 March – 31 July, 2018 – This year’s field efforts, led by Kelly Stewart, represent a close collaboration with USFWS and The Ocean Foundation (TOF) and will focus on sampling all the new nesting females by collecting small clips of skin to test the hypothesis that leatherbacks mature within 9-15 years. Night patrols are now wrapping up, but the team has stayed quite busy this week with 5 turtles nesting: Spot (see photo), Mary Lisa, Nathalie, Dorothy, Sarah, and an unnamed turtle SPP381, who had gooseneck barnacles protruding from her skin. Two hawksbill turtles also laid nests at dawn. Five more nests emerged last week, and 7 nests were excavated with the help of students from James Madison University. This season’s total: 119 nests at Sandy Point, 131 nests island-wide, 38 known females (all of which have been sampled), and 19 hatched nests. Hatchling genetic sampling will become the focus of the team’s work next week. One interesting turtle of note - earlier this year, first-nester “Enid Fern” nested on 24 April. Last week she nested at Maunabo, Puerto Rico, and was equipped with a satellite tag by Dr. Kara Dodge (Woods Hole), working there with Amigos de las Tortugas Marinas. Enid Fern has since moved south of St. Croix. For more information, please contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov

Left: Alyssa excavates a nest that piled up so much sand, it was 115 cm to the bottom! (Photo: Carmen Candal)  
Right: Spot emerged during the last patrol at 4:30am and stayed on the beach until 7:30 am—a very late dawn turtle! (Photo: Dana Desousa)

Integrating Remote Sensing Methods to Measure Baseline Behavior and Responses of Social Delphinids to Navy Sonar, Southern California Bight, 14-22 June, 2018 - Last week saw the start of another round of fieldwork on this collaborative project between scientists from Southall Environmental Associates, Kelp Marine Research, Cascadia Research Collective, SR3 and MMTD/SWFSC, with funding by the Office of Naval Research. John Durban (MMTD) partnered with with Holly Fearnbach (SR3) to fly an unmanned octocopter from a 65’ boat to obtain vertical photographs from above dolphin schools off Catalina Island, California. Three flights were flown over Risso’s dolphins during controlled exposures to simulated navy sonar. These flights generated 4800 high-resolution aerial images: subsequent laboratory analyses will provide quantitative photogrammetry metrics of behavior during times of exposure and control periods, and also information of individual size and condition as a context for interpreting behaviors. Collaborators on the project also collected post-exposure biopsy samples, laboratory analysis at MMTD/SWFSC (Nick Kellar, lead) will use hormone assays to investigate
physiological responses to exposure. Molly Groskreutz, Cassidy O’Bryant and Paige Henderson from MMTD assisted in the field. Further details can be found here. For more information contact John.Durban@noaa.gov.

Aerial images of Risso’s dolphins off Catalina Island, CA, to monitor group behavior (left) and for measurements of individual size and body condition (right). Images collected from an unmanned octocopter, authorized by NMFS permit # 19091.

Week of 11 June 2018

*Integrating Remote Sensing Methods to Measure Baseline Behavior and Responses of Social Delphinids to Navy Sonar, Southern California Bight, June* - MMTD scientists will take part in this third, 10-day field effort conducted off Catalina Island, California. MMTD will partner with SR3 to lead the collection of aerial images of dolphins using UAS platforms to provide quantitative photogrammetry metrics of behavior, and biopsy samples to assess physiological responses. Further details on this collaborative project can be found here. For more information contact John.Durban@noaa.gov

*Leatherback Turtle Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, 31 March – 31 July* – This year’s field efforts, led by Kelly Stewart, represent a close collaboration with USFWS and The Ocean Foundation (TOF) and will focus on sampling all the new nesting females by collecting small clips of skin to test the hypothesis that leatherbacks mature within 9-15 years. Three nests were laid last week; “Sarah” (AAV640, nesting since 2001), “Jumbie” (KL1, nesting since 2004), and “Gertie” (SPP409, a neophyte this year - her second nest) paid us a visit. Two of the nests were relocated due to being laid too close to the water. We also saw a hawksbill, the first one our team has encountered this season! Nests are hatching frequently now, with 8 emergences last week. That puts the count for the season at 115 nests at Sandy Point, 128 island-wide, 37 individual females, and 15 hatched nests. For more information, please contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov
A leatherback nested at dawn on Sandy Point this week. Photo credit: Dana DeSousa

Whale Health Assessment, Washington State, May - With the continued absence of Southern Resident killer whales from inshore waters, the collaborative MMTD/SR3 team collected further data on the health of Bigg’s “transient” killer whales around San Juan Islands, Washington State. An unmanned octocopter was used to collect vertical aerial images of a further 12 individual Bigg’s killer whales (28 for the month) extending the sample to 90 different individuals since 2015. Photogrammetry analyses of these images will be used to describe patterns of growth and body condition in this mammal-eating population, to provide a comparison to the sympatric fish-eating Southern Residents. This project will re-start in September, which is typically a reliable month for encountering Southern Residents. For more information contact John.Durban@noaa.gov.
Aerial images of Bigg’s “transient” killer whales: left, an adult female with a young of the year and her older offspring; right, an adult male in particularly robust body condition. Images collected from an unmanned octocopter at altitudes >100ft under NMFS permit #19091.

Week of 4 June 2018

Channel Islands National Marine Sanctuary Soundscape Study – Last week Shannon Rankin deployed seafloor hydrophones off of San Miguel Island and Santa Rosa Island as part of a collaborative study on the human drivers of noise in the Channel Islands National Marine Sanctuary. The instruments will be retrieved in August, and analysis will include quantification of noise from 'seal bombs', funded by NOAA’s Ocean Acoustics Program. In addition to Shannon, the field team consisted of Lindsey Peavey, Anne Simonis, Elizabeth Duncan, Anuraag Sachdeva. Contact Shannon.Rankin@noaa.gov for more details.

Green Sea Turtle Ecological Research, San Diego Bay, 31 May 2015 – Marine turtle researchers at SWFSC conducted their third field capture day of the 2018 season in San Diego Bay and were successful at capturing 5 green turtles. The turtles ranged from 51.6 cm to 103.4 cm in straight carapace length and 20 kg to 136 kg in body weight. Three individuals were first-time captures for 2018, whereas the other two were captured earlier this season. This season’s field efforts will be ongoing through the end of September. Research will focus on health assessment, demography (life-stage structure, sex ratio, reproductive status, etc.), and habitat use. Contact PIs Tomo.Eguchi@noaa.gov or
The SWFSC Turtle Team processing a 144 kg (317 lb) adult male green turtle captured in San Diego Bay on 31 May 2018. Notice the turtle’s long tail, which is characteristic of adult male turtles.

Leatherback Turtle Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, 31 March – 31 July – This year’s field efforts, led by Kelly Stewart, represent a close collaboration with USFWS and The Ocean Foundation (TOF) and will focus on sampling all the new nesting females by collecting small clips of skin to test the hypothesis that leatherbacks mature within 9-15 years. Nightly beach patrols continue, with the count now at 112 nests for the season laid by 112 individual nesters at Sandy Point, including 15 neophytes. Two of the sampled neophytes are of particular interest since they had what might be small biopsy scars on the trailing edge of their front flipper, where they would have been sampled as hatchlings. Nesting activity has slowed down to one turtle per night, but hatching is expected to pick up next week. Three nests hatched this past week and were assessed for hatching success. For more information, please contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov

Hatchling emerges from a nest at dusk (Photo: Makayla Kelso).
**Whale Health Assessment Research, Washington State, May** - This week the UAS (octocopter) flight team of John Durban (MMTD) and Holly Fearnbach (SR3) were joined by Craig Matkin (North Gulf Oceanic Society) to continue data collection on the health of Bigg’s “Transient” killer whales and humpback whales around the San Juan Islands, Washington State. Vertical aerial images were collected of nine individual Bigg’s killer whales (16 for the month) and two humpback whales (5 for the month). In total, 31 flights have been conducted with the octocopter this month, totaling over 8 hours of flying to collect images for photogrammetry measurements and health inspections of five cetacean species: killer whales, humpback whales, gray whales, minke whales and harbor porpoise. The team is hoping to encounter endangered Southern Resident killer whales during their last two days on the water over the weekend. For more information contact John.Durban@noaa.gov.

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Octocopter flight operations around the San Juan Islands, Washington State. The octocopter is used to obtain vertical aerial images of whales to measure size and body condition under NMFS permit #19091.

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**Week of 29 May 2018**

**Leatherback Turtle Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, 31 March – 31 July** – This year’s field efforts, led by Kelly Stewart, represent a close collaboration with USFWS and The Ocean Foundation (TOF) and will focus on sampling all the new nesting females by collecting small clips of skin to test the hypothesis that leatherbacks mature within 9-15 years. A typical night from last week: four turtles nesting overnight (including a first-time nester), with three before 9:30 pm and one at dawn. The season’s total number of nests is now 103, lain by 34 individuals, 12 of which have been first-time nesters. Nests also began hatching last week, with two observed emergences. Those nests will be marked and assessed for hatching success. We will begin sampling hatchlings in June for the age-to-maturity study that is now in its eleventh year. For more information, please contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov.
Dawn turtles are a regular feature this year - volunteer Dante Trivett takes notes on injuries seen on this dawn turtle, some scarring can be seen on the turtle’s left front flipper (Photo: Nina Mauney).

Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, California 26 March-25 May – During the ninth and final week (21-25 May) of SWFSC’s survey to estimate the annual calf production of eastern North Pacific gray whales, 54 hours of effort were completed during which time 7 mother-calf pairs and 5 adult/juvenile whales were recorded. For the season in total, we completed 466 hours of effort and counted 246 mother-calf pairs and 615 adult/juveniles. In addition to gray whales, bottlenose dolphins, minke whales and humpback whales were observed. With this report, the 25th year of the calf production survey successfully concludes. We thank the many dedicated observers for being so excellent at what they do and for their much appreciated good-fellowship. Stay tuned for results to follow soon. For details contact dave.weller@noaa.gov or john.durban@noaa.gov

Whale Health Assessment, Washington State, May-June - Endangered Southern Resident killer whales were sighted this week off the west coast of Vancouver Island, but have not yet returned to sheltered inshore waters. Nonetheless, the team of John Durban (MMTD), Holly Fearnbach (SR3) and Lance Barrett-Lennard (Coastal Oceans Research Institute) were able to continue data collection on the health of Bigg’s “Transient” killer whales and humpback whales around the San Juan Islands, Washington State. Vertical aerial images of seven individual Bigg’s killer whales were collected with an unmanned octocopter, adding to a dataset of ~80 individuals imaged from the West Coast Transient population over the last four years. These images will be used to assess growth and body condition to provide a key comparison to sympatric Southern Residents. Additionally, aerial images were collected to measure the body condition of two humpback whales, and blow samples were also collected from these whales to enable genetic identification of respiratory microbiome. These data will add to a collaborative project to assess the health of humpback whales on different feeding grounds off Antarctica, NE Pacific, and NW Atlantic. For more information contact John.Durban@noaa.gov
Aerial images of a Bigg’s killer whale with a harbor seal in its mouth (left), and the head of a humpback whale (right) imaged during a low descent to collect a blow sample. Images taken this week around the San Juan Islands, Washington State, using an unmanned octocopter and hexacopter, respectively, under NMFS permit #19091.

Week of 21 May 2018

Green Sea Turtle Ecological Research, San Diego Bay, 15 May – Marine turtle researchers at SWFSC conducted their second field capture day in San Diego Bay and were successful at capturing 8 green turtles. The turtles ranged from 51.6 cm to 99.5 cm in straight carapace length and 20 kg to 148 kg in body weight. Four individuals were first-time captures, whereas one turtle was initially captured in 1990 (a 28 yr. capture history!). Making the night so notable was that all captures occurred within 2 hrs of each other and happened during daylight hours. This season’s field efforts will be ongoing through the end of September. Research will focus on health assessment, demography (life-stage structure, sex ratio, reproductive status, etc.), and habitat use. Contact PIs Tomo.Eguchi@noaa.gov or
North Pacific Right Whale Passive Acoustics, Southern California, Spring – On Tuesday, May 15, Jay Barlow and Shannon Rankin successfully recovered the right whale listening station that was deployed off Mission Beach two months ago. It recorded continuously for ~53 days, and a spot-check showed very good sound quality. Recordings will be sent to the AFSC Marine Mammal Lab where acoustic personnel will search for right whale calls. Barlow and Rankin also tested a new autonomous towed hydrophone array. The SWFSC MMTD thanks Sea World and their vessel captain, Jody Westberg, for aiding in the recovery and testing of acoustic equipment.

Leatherback Turtle Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, 31 March – 31 July – This year’s field efforts, led by Kelly Stewart, represent a close collaboration with USFWS and The Ocean Foundation (TOF) and focus on sampling all the new nesting females by collecting small clips of skin to test the hypothesis that leatherbacks mature within 9-15 years. Last week an additional fourteen nests were laid, four by females not previously sampled, and bringing the season’s total to 32 individual females, 11 of which are first time nesters (neophytes). More neophytes have been observed than expected this year, and with the peak of nesting approaching, a few more should arrive. There are now over 100 nests on the island with most of those laid at Sandy Point. The Video Dive Recorders (VDRs) were removed from both turtles equipped with them on 12 May, ending Ayaka Asada’s (Texas A&M) study on a high note. The turtles both came back on the same night, just 400 m apart within an hour of each other. The VDRs recorded the full 27 hours of video as programmed, as well as other dive information. It will take some time to sift through the information. For more information, please contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov
Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, California 26 March- 25 May – During the eighth week (14-18 May) of SWFSC’s survey to estimate the annual calf production of eastern North Pacific gray whales, 60 hours of effort were completed during which time 26 mother-calf pairs and 7 adult/juvenile whales were recorded. For the season to date, we have completed 412 hours of effort and counted 239 mother-calf pairs and 610 adult/juveniles. In addition to gray whales, bottlenose and Risso’s dolphins, killer whales and minke, blue and humpback whales were observed. This one-of-a-kind time series on gray whale calf production and body condition is greatly benefited by the participation of observers from nearly all of the programs within MMTD as well as volunteers from the broader research community. See “A Quarter Century of Counting: Southwest Fisheries Science Center Celebrates 25 Years of Research on Gray Whales” and for details contact dave.weller@noaa.gov or john.durban@noaa.gov.

Whale Health Assessment, Washington State, May - Endangered Southern Resident killer whales, the main focus of this ongoing study, did not make an appearance this past week. However, the team of John Durban (MMTD), Holly Fearnbach (SR3) and Lance Barrett-Lennard (Coastal Oceans Research Institute) were able to collect data on whale health, specifically for ongoing studies of the nutritional health of large whales that are top consumers in coastal marine ecosystems. Eight flights were completed with an
unmanned octocopter, obtaining aerial images of one humpback whale, two minke whales and three gray whales. These will be used to assess body condition to compare across study sites (e.g., humpback and minke whales in Antarctica vs. coastal NE Pacific) and years (fourth year in a row of humpback whale imaging) to infer key differences in nutritional status. The gray whales were imaged as part of a collaborative study with John Calambokidis (Cascadia Research Collective) to assess the importance of Puget Sound as a feeding stopover for migrating gray whales. Additionally, images were collected from two harbor porpoise to inspect for entanglement scars, and from four Bigg’s transient killer whales, which provide a key comparison of body condition to sympatric Southern Residents. For more information contact John.Durban@noaa.gov

Aerial images of a humpback whale (left), gray whale (mid) and a minke whale during a feeding lunge (right, note fish jumping at water surface to escape the lunge). Images taken this week around the San Juan Islands and northern Puget Sound, Washington State, using an unmanned octocopter that was flown >125ft above the whales under NMFS permit #19091.
Week of 14 May 2018

**Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, California 7-11 May** – During the seventh week (7-11 May) of SWFSC's survey to estimate the annual calf production of eastern North Pacific gray whales, 46 hours of effort were completed during which time 29 mother-calf pairs and 8 adult/juvenile whales were recorded. For the season to date, we have completed 352 hours of effort and counted 213 mother-calf pairs and 603 adult/juveniles. In addition to gray whales, bottlenose dolphins and a minke whale were observed. Challenging wind and weather conditions hampered UAS operations, allowing for only a few flights over female-calf pairs. Last week marked the end of Wayne Perryman’s long-running tenure at Piedras Blancas, a survey that he began in 1994. The survey is one of the most valuable time series on calf production for any large whale species worldwide. Wayne will retire at the end of September this year. His leadership, insight, energy and good humor will be greatly missed, he has been a wonderful colleague and we hope he will undertake a “come back tour” each year into the future. This one-of-a-kind time series on gray whale calf production and body condition is greatly benefited by the participation of observers from nearly all of the programs within MMTD as well as volunteers from the broader research community. See “A Quarter Century of Counting: Southwest Fisheries Science Center Celebrates 25 Years of Research on Gray Whales” and for details contact dave.weller@noaa.gov or john.durban@noaa.gov.

![A gray whale calf taking a look at the survey team and Wayne Perryman at his home away from home at the Point Piedras Blancas Light Station in central California.](image)

**Leatherback Turtle Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, 31 March – 31 July** – This year’s field efforts, led by Kelly Stewart, represent a close collaboration with USFWS and The Ocean Foundation (TOF) and will focus on sampling all the new nesting females by collecting small clips of skin to test the hypothesis that leatherbacks mature within 9-15 years. This week the surge continued with an additional fourteen nesting leatherback encounters, four of which were first-time nesters (and sampled for genetics). This brings the total to 28 individual turtles nesting this season, tying the number for last year. The first nests are due to hatch this week and the team will be watching for hatchling tracks, to initiate sampling of hatchlings from known mothers in order to apply genetic kinship approaches to identify fathers and estimate breeding sex ratios for this year. Ayaka Asada (visiting researcher from Texas A&M) is now searching for the two leatherbacks equipped with Video Data Recorders (VDRs) last week. The turtles are expected to nest on 11 and 12 May, respectively. So far, they have transmitted location data well and are now being detected with VHF radio signals directly off Sandy Point. More neophytes are anticipated this coming week as the peak of the nesting
season draws near. For more information, please contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov

Green Sea Turtle Ecological Research, San Diego Bay, 15 May 2015 – Marine turtle researchers at SWFSC will conduct their second field capture day in San Diego Bay this week. This season’s field efforts will be ongoing through the end of September. Research will focus on health assessment, demography (life-stage structure, sex ratio, reproductive status, etc.), and habitat use. Contact PIs Tomo.Eguchi@noaa.gov or Jeffrey.Seminoff@noaa.gov for additional information.

Health Assessment of Southern Resident Killer Whales, San Juan Islands, WA, May-June - This past week saw the start of another round of health assessment of endangered Southern Resident killer whales (a NMFS “Species in the Spotlight”) around the San Juan Islands, Washington State. This is a collaboration between SWFSC/MMTD (John Durban), SR3 (Holly Fearnbach) and the Vancouver Aquarium’s Coastal Oceans Research Institute (Lance Barrett-Lennard), which builds on a monitoring study that has been underway since 2008. The team will be using an unmanned octocopter to obtain overhead images to monitor the growth and body condition of individually-recognizable whales. These same whales were imaged in both May and September in 2015, 2016 and 2017; comparisons will enable assessments of inter-seasonal and inter-annual changes in condition, to facilitate management of an adequate supply of their Chinook salmon prey. This month the team also hopes to continue the collection of overhead images of Bigg’s (Transient killer whales) for comparative measures of condition from these mammal-eating killer whales, and to collect images and blow samples from humpback whales and gray whales to continue health assessment of large whales. The team are now in position, waiting for whales and weather to cooperate. For more information contact John.Durban@noaa.gov and visit this site.

North Pacific Right Whale Passive Acoustics, Southern California, Spring – On Tuesday, May 15, Jay Barlow and Shannon Rankin will conduct field work to recover the right whale listening station that was deployed off Mission Beach two months ago. It is hoped that the recordings will include right whale calls. The deployment was motivated by a sighting of right whales off La Jolla in mid-April 2017. Sea World vessel captain Jody Westberg will be aiding in the recovery. Contact Jay.Barlow@noaa.gov for more information.
**Week of 7 May 2018**

*Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, California 25 March–25 May* – During the sixth week (30 April – 4 May) of SWFSC’s survey to estimate the annual calf production of eastern North Pacific gray whales, 50 hours of effort were completed during which time 36 mother-calf pairs and 6 adult/juvenile whales were recorded. For the season to date, we have completed 306 hours of effort and counted 184 mother-calf pairs and 595 adult/juveniles. In addition to gray whales, bottlenose dolphins and humpback whales were observed. The UAS team (John Durban, MMTD; Holly Fearnbach, SR3) flew a total of 13 flights over whales using an unmanned octocopter, photographing 11 female-calf pairs. UAS flight duties will now pass to Jacob Barbaro and Hollis Europe for the next two weeks. This one-of-a-kind time series on gray whale calf production and body condition is greatly benefited by the participation of observers from nearly all of the programs within MMTD as well as volunteers from the broader research community. See “*A Quarter Century of Counting: Southwest Fisheries Science Center Celebrates 25 Years of Research on Gray Whales*” and for details contact dave.weller@noaa.gov or john.durban@noaa.gov.

![Overhead image of a gray whale mother and calf (left), migrating through the kelp past Point Piedras Blancas, CA. Photographs of whales in flat surfacing orientation (right) will be used for photogrammetry measurements of growth and body condition. Photos taken from an unmanned octocopter ~170ft above the whales, with flights over whales authorized by NMFS permit #19091.](image)

*Leatherback Turtle Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, 31 March – 31 July* – This year’s field efforts, led by Kelly Stewart, represent a close collaboration with USFWS and The Ocean Foundation (TOF) and will focus on sampling all the new nesting females by collecting small clips of skin to test the hypothesis that leatherbacks mature within 9-15 years. A surge in nesting has meant that there are now 5 first-time nesters (neophytes) recorded out of 24 individual turtles, with more than 70 nests now on the refuge. All neophytes were sampled and genotypes from these will be screened against our baseline dataset of hatchling genotypes from 2009. The team has consistently been recording two to three turtles each night. Visiting researcher Ayaka Asada from Texas A&M University was able to deploy two Video Data Recorders on nesting females (see figure). The first, SPP345, has been a regular nester since 1997 and was last seen in 2015. She usually lays several nests at Sandy Point, so she should return in 10 days when the equipment will be retrieved. The second turtle, 3063, “MaryLisa”, was first tagged on Culebra, Puerto Rico but since 2008 has nested...
at Sandy Point. Two “dawn” turtles were also encountered. These turtles arrive during the last patrol at 4:30 am and the patrol team stays with them until they return to the water, which is usually after sunrise. For more information, please contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov

Left: Tracks of two turtles tagged with video data recorders. Right: A turtle returns to the water after nesting at dawn (photo: Lily Richards)

Week of 30 April 2018

San Diego Bay Green Turtle Research, 26 April 2018 – The SWFSC turtle team launched its 2018 field season last week, and were successful capturing a 302-lb adult female despite poor weather. This season’s field efforts will be ongoing through the end of September. Research will focus on health assessment, demography (life-stage structure, sex ratio, reproductive status, etc.), and habitat use. Contact PIs Tomo.Eguchi@noaa.gov or Jeffrey.Seminoff@noaa.gov for additional information.
An adult female green turtle captured in San Diego Bay on 26 April 2018. This turtle weighed 302 lbs and measured 102 cm in carapace length. Notice the endemic turtle barnacles (Chelonibia testudinaria) on the plastron of this individual. These generally shed quickly on turtles living in San Diego Bay, thus suggesting that this turtle recently arrived from oceanic waters.

Leatherback Turtle Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, 31 March – 31 July – This year’s field efforts, led by Kelly Stewart, represent a close collaboration with USFWS and The Ocean Foundation (TOF) and will focus on sampling all the new nesting females by collecting small clips of skin to test the hypothesis that leatherbacks mature within 9-15 years. The team encountered twelve turtles this week, including three untagged first-time nesters (neophytes), as well as those identified in previous weeks that returned to nest. To date, 52 nests have been laid by a total of 16 individual turtles, including two that were originally tagged on Culebra and Vieques Islands, Puerto Rico, reinforcing what we know about site fidelity for leatherbacks within the region. All turtles were sampled for genetics and Kirsten Harper initiated sampling for a pilot project with Peter Dutton to develop (environmental) eDNA protocols for leatherbacks. Water samples were collected in the wake of two different turtles after they entered the water, and then filtered in the makeshift field lab. Kirsten will test and optimize protocols to recover and sequence DNA from the filter samples at the SWFSC lab. If successful, these protocols will then be used to detect presence of leatherbacks in shipboard habitat surveys in the Pacific in collaboration with Kelly Goodwin. Kelly Stewart has also been co-teaching (with Matthew Godfrey) the Duke Marine Lab’s Sea Turtle Ecology field course (19-29 April) at Sandy Point. Eight students have participated in day patrols on beaches not covered by night monitoring teams, as well as nighttime turtle patrols. Unfortunately, they also helped the USFWS respond to a report of a dead juvenile green turtle caught on fishing line off the beach. They have learned a lot from visiting researchers, local staff and professors as well as the volunteer team and NOAA staff who participated in discussion seminars. For more information, please contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov.
Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, California 25 March-25 May – During the fifth week (23-27 April) of SWFSC’s survey to estimate the annual calf production of eastern North Pacific gray whales, 56.8 hours of effort were completed during which time 48 mother-calf pairs and 19 adult/juvenile whales were recorded. For the season to date, we have completed 256 hours of effort and counted 148 mother-calf pairs and 589 adult/juveniles. In addition to gray whales, bottlenose dolphins, Risso’s dolphins and humpback whales were observed. The UAS team (John Durban, MMTD; Holly Fearnbach, SR3) flew a total of 18 flights over whales using an unmanned octocopter, photographing 20 female-calf pairs. These aerial images show females and calves in a range of body conditions (see image below), and subsequent photogrammetry analyses will compare condition and length estimates to previous years. This one-of-a-kind time series on gray whale calf production and body condition is greatly benefited by the participation of observers from nearly all of the programs within MMTD as well as volunteers from the broader research community. See “A Quarter Century of Counting: Southwest Fisheries Science Center Celebrates 25 Years of Research on Gray Whales” dave.weller@noaa.gov or john.durban@noaa.gov.
Week of 23 April 2018

*California Sea Lion Census and Diet Research, Channel Islands, Southern California Bight, quarterly* – MMTD biologists completed quarterly fieldwork on California sea lions at San Nicolas Island (April 9-11) and San Clemente Island (April 13-16). A total of 150 scat samples were collected from the two islands (50 each from two collection sites at San Nicolas Island and 50 from San Clemente Island), augmenting MMTD’s ongoing 37-year time series documenting the diet of California sea lions at these two key Channel Island rookeries in the Southern California Bight (SCB). Additionally, subsamples from ten scats from San Nicolas Island were sent to the WARRN-West program at NWFSC to be tested for domoic acid as part of a pilot study exploring whether scats from foraging California sea lions can provide early warning of domoic acid events in the SCB and elucidate the association between forage species and domoic acid loads. Last year, high levels of domoic acid were found in six of ten subsamples from April 2017 at San Nicolas Island. Biologists also counted California sea lions and northern elephant seals at the study site at Mail Point, San Clemente Island, continuing the 37-year time series of seasonal use by age and sex classes at that rookery. Contact Mark.Lowry@noaa.gov for more information.
Photo at left: Lisa Ballance, Bob Pitman, and Mark Lowry enjoying their morning coffee at Mail Point Research Station, San Clemente Island, California. Photo at right: Camp set up at Mail Point Research Station, San Clemente Island, California. This site has been used by SWFSC to study pinnipeds at San Clemente Island since 1981 (the storage box, formerly a military communications shelter, was placed there in 1982).

Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, California 25 March–25 May – During the fourth week (16-20 April) of SWFSC’s survey to estimate the annual calf production of eastern North Pacific gray whales, 54 hrs of effort were completed during which time 49 mother-calf pairs and 24 adult/juvenile whales were recorded. For the season to date, we have completed 199 hrs of effort and counted 100 mother-calf pairs and 570 adult/juveniles. In addition to gray whales, bottlenose dolphins were observed during the week. Aerial photogrammetry studies began this week, in parallel to the shore-based photo-identification and counting efforts. A UAS flight team of John Durban (MMTD) and Holly Fearnbach (SR3) began flights with an unmanned octocopter to obtain vertical images of gray whales to measure the length of the calves and the body condition of the mothers, to compare to similar data from 2015, 2016 and 2017. Despite challenging weather, turbid water and few whales travelling close to shore for sampling, the team is off to a productive start. Working with Don LeRoi (Aerial Imaging Solutions) and Wayne Perryman (MMTD), they successfully tested the resolution of a new camera system and optimized the performance of HD transmitter equipment to allow video-assisted targeting at distances up to 2000ft from the launch site. A total of 10 flights were completed for testing and photogrammetry missions (each averaging ~20 mins), and three female-calf pairs of gray whales have been imaged to date (with spectacular resolution from the new camera). The weather forecast for next week is much improved, and the team is hopeful of adding significantly to the sample size. This one-of-a-kind time series on gray whale calf production and body condition is greatly benefited by the participation of observers from nearly all of the programs within MMTD as well as volunteers from the broader research community. See “A Quarter Century of Counting: Southwest Fisheries Science Center Celebrates 25 Years of Research on Gray Whales” and for details contact dave.weller@noaa.gov or john.durban@noaa.gov.
Visual observers on watch during week 4 of the 2018 gray whale calf production survey at Piedras Blancas Light Station.

Overhead image of a gray whale female and calf migrating north past Point Piedras Blancas, CA. Photo taken from an unmanned octocopter ~170ft above the whales, with flights over whales authorized by NMFS permit #19091.

Leatherback Turtle Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, 31 March – 31 July – The leatherback nesting season is underway at Sandy Point National Wildlife Refuge (SPNWR) on St. Croix, US Virgin Islands. This year’s field efforts, led by Kelly Stewart, represent a close collaboration with USFWS and The Ocean Foundation (TOF) and will focus on sampling all the new nesting females by collecting small clips of skin to test the hypothesis that leatherbacks mature within 9-15 years. The nest count is now 38 laid by a total of 13 individual turtles to date. This week the MMTD sampling team (Dutton, Pease, LaCasella, Frey and Harper) encountered one nesting female first tagged in 1992, and last observed nesting in 2006. Such a long absence is noteworthy, since females typically nest every 2-3 years. Patrols continue nightly. For more information, please contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov
Photo (Ayaka Asada): Margeaux Wayne, Vicki Pease and Amy Frey work up a turtle at dawn. This is the biggest turtle so far this year, 170 cm carapace length. She has laid over 50 nests at the refuge beaches since she was first observed in 1995.

**Week of 16 April 2018**

*Leatherback Turtle Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, 31 March – 31 July* – The leatherback nesting season is underway at Sandy Point National Wildlife Refuge (SPNWR) on St. Croix, US Virgin Islands. This year’s field efforts represent a close collaboration with USFWS and The Ocean Foundation (TOF) and will focus on sampling all the new nesting females by collecting small clips of skin to test the hypothesis that leatherbacks mature within 9-15 years. This week the MMTD sampling team encountered one new turtle, in addition to those identified last week, returning to nest. The nest count is now 31, and the turtle nesting the longest was first observed as an adult in 1995. Erin LaCasella joins the team on Monday 16 April and then Peter Dutton and Kirsten Harper will travel to St. Croix on 18 April as the nesting is expected to ramp up. Kirsten will be testing some new eDNA methods for leatherbacks. On Friday, the team hosted a volunteer beach cleanup to remove debris from the nesting beach. Patrols continue nightly. For more information, please contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov
Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, California 27 March-26 May – During the third week (9-13 April) of SWFSC’s survey to estimate the annual calf production of eastern North Pacific gray whales, 50.9 hrs of effort was completed during which time 85 adult/juvenile whales and 31 mother-calf pairs were recorded. In addition to gray whales, humpback whales, blue whales, bottlenose dolphins and harbor porpoise were observed. Additionally, elephant seals, harbor seals, California sea lions and sea otters frequented the area. As the month progresses, we expect the occurrence of mother-calf pairs to continue to increase, climbing to peak numbers in the next two weeks. In addition to our ongoing visual observations and shore-based photo-identification efforts, this week we will kick off the fourth year of UAS operations to assess size and body condition of gray whale mother-calf pairs. This one-of-a-kind time series on gray whale calf production is greatly benefited by the participation of observers from nearly all of the programs within MMTD as well as volunteers from the broader research community. See “A Quarter Century of Counting: Southwest Fisheries Science Center Celebrates 25 Years of Research on Gray Whales” and for details contact dave.weller@noaa.gov or john.durban@noaa.gov.

Week of 9 April 2018

Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, California 27 March-26 May – SWFSC’s survey to estimate the annual calf production of eastern North Pacific gray whales is successfully underway. During the first two weeks (3/26 to 4/6) of the count the migration was characterized by mostly adult whales, largely singletons and pairs, traveling along the offshore corridor. Despite bouts of pesky fog and wind, 95 hrs of effort were completed during which time 462 whales and 20 mother-calf pairs were recorded. In addition to gray whales, humpback whales, bottlenose dolphins, common dolphins, Risso's dolphins and harbor porpoise were observed. This week we expect the offshore component of the migration to continue declining while the frequency of mother-calf pairs begins to increase. This one-of-a-kind time series on gray whale calf production is greatly benefited by the participation of observers from nearly all of the programs within MMTD as well as volunteers from the broader research community. See “A Quarter Century of Counting: Southwest Fisheries Science Center Celebrates 25 Years of Research on Gray Whales” and for details contact dave.weller@noaa.gov or john.durban@noaa.gov.

California Sea Lion Census and Diet Research, Channel Islands, Southern California Bight, quarterly – Mark Lowry and Alex Curtis will travel to San Nicolas Island on April 9-11 to collect California sea lion
scat samples for diet analysis. Mark Lowry, Lisa Ballance, and Bob Pitman will travel to San Clemente Island on April 13-16 to collect California sea lion scat samples for diet analysis and to count pinnipeds. Contact Mark.Lowry@noaa.gov for more information.

*Health Assessment of North Atlantic Right Whales, Cape Cod Bay, MA, March 26 - April 9th – Poor weather prevented flights for much of last week; two days left for the field effort with final results coming in next week’s report. For more information contact John.Durban@noaa.gov.*

*Leatherback Turtle Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, 31 March – 31 July – The leatherback nesting season has begun at Sandy Point National Wildlife Refuge (SPNWR) on St. Croix, US Virgin Islands. SPNWR is an index nesting beach that has been comprehensively monitored for the last 36 years, and is managed by the US Fish and Wildlife Service (USFWS) as one of the most important leatherback nesting beaches under US jurisdiction (Dutton et al. 2005). The richness and consistency of data from this population offers unique opportunities for research and development of tools & approaches for obtaining vital rate parameters that can improve stock assessments in sea turtles, including breeding sex ratios (Stewart & Dutton 2014), age at first reproduction and juvenile survivorship, all research priorities for NOAA. In 2009 MMTD began a project jointly with USFWS to sample and genotype hatchlings here. These hatchling genetic “fingerprints” will be compared to those of first-time nesting females. A genetic match between a hatching that left the nesting beach in a known year with a first-time nester will provide the first direct evidence of the age to maturity in leatherbacks. To date, over 42,000 hatchlings have been sampled. This year’s field efforts represent a close collaboration with USFWS and The Ocean Foundation (TOF), and will focus on sampling all the new nesting females by collecting small clips of skin to test the hypothesis that leatherbacks mature within 9-15 years. Field operations are led by Kelly Stewart (TOF/SWFSC) and Claudia Lombard (USFWS). Amy Frey and Vicki Pease of MMTD joined the team this week. To date, ten nesting females have been sampled, including a first-time nester, and one first recorded nesting on St. Croix in 1995. Additional MMTD staff will join the team through April as the nesting activity ramps up. For more information, please contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov.


The first leatherback track found at Sandy Point in 2018, indicating the start of the nesting season!

*Week of 2 April 2018*

*Health Assessment of North Atlantic Right Whales, Cape Cod Bay, MA, March 26 - April 9th* – This week saw a successful start to field work in the third year of a project assessing the health of North Atlantic right whales. LT Hollis Europe and LTJG Jacob Barbaro (MMTD) successfully flew 15 flights with an unmanned hexacopter from a 42’ powerboat operating in Cape Cod Bay, Massachusetts. They were collaborating in the field with scientists from Woods Hole Oceanographic Institution: Michael Moore and Carolyn Miller, who are collecting blow samples to describe respiratory microbiome, and Aran Mooney & Adam Smith, who are collecting acoustic recordings. Marianna Hagbloom, Sara Labrousse and Amy Knowlton from the New England Aquarium (NEAQ) also participated to take identification photographs to help link aerial images to whales of known identification and life histories. Aerial images were collected from 12 different individually-recognizable whales (see figure) – photogrammetry analyses will be conducted by MMTD’s Cetacean Health and Life History Program to assess changes in growth and body condition. For more information contact John.Durban@noaa.gov.
Two aerial photographs of the same adult male North Atlantic right whale ("Ruffian", NEAQ ID #3530), repeatedly imaged in Cape Cod Bay in March 2016 (left) and March 2018 (right). Photogrammetry measurements will be used to assess changes in condition and patterns of growth. Images taken from an unmanned hexacopter ~150ft above the whale, with research authorized by NMFS permit #17355.

**Week of 26 March 2018**

*Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, California, 26 March-25 May* – The 25th consecutive year (1994-2018) of SWFSC's survey to estimate the annual calf production of eastern North Pacific gray whales begins this week. In 2012, this survey was expanded to also include shore-based photo-identification to catalog mother-calf pairs and in 2015 UAS operations were initiated to collect information on the body condition and health of these pairs. This one-of-a-kind time series is greatly benefited by the participation of observers from nearly all of the programs within MMTD as well as volunteers from the broader research community. See “A Quarter Century of Counting: Southwest Fisheries Science Center Celebrates 25 Years of Research on Gray Whales” and for details contact dave.weller@noaa.gov or john.durban@noaa.gov.

*Health Assessment of North Atlantic Right Whales, Cape Cod Bay, MA* – This week fieldwork will commence on the third year of a collaborative study to assess the health of North Atlantic right whales. For the next two weeks LT Hollis Europe and LTJG Jacob Barbaro (MMTD) will partner with Michael Moore from Woods Hole Oceanographic Institution (WHOI) and Peter Corkeron from the Northeast Fisheries Science Center to study the condition of right whales returning to feed in Cape Cod Bay, Massachusetts. The team is using an unmanned hexacopter to obtain vertical images of the whales for photogrammetric measurements of growth and body condition, and to collect blow samples for studies of respiratory microbiology. Photogrammetry images will be analyzed by MMTD's Cetacean Health and Life History Program and blow samples will be analyzed by Amy Apprill’s lab at WHOI. For further information contact John.Durban@noaa.gov.

*Condition of Coastal Bottlenose Dolphins, San Diego County, CA, March 26 - April 9th.* – Last week saw the completion of a collaborative study to assess the condition of coastal bottlenose dolphins off San
Since late October, MMTD scientists (John Durban, lead) have joined with colleagues from SR3 (SeaLife Response, Rehab and Research; Holly Fearnbach, lead) during 15 boat-based surveys of the coastal waters between Mission Bay and Oceanside. A total of 74 flights were flown with an unmanned hexacopter to collect aerial images during 58 encounters with cetaceans, primarily bottlenose dolphins (42 groups) but also opportunistically with Pacific white-sided dolphins (7 groups), long-beaked common dolphins (2 groups), short-beaked common dolphins (1 group), one minke whale and seven gray whales. Boat based photo-identifications were also collected from all bottlenose dolphin groups, and photographic analyses are now underway to match aerial images to lateral photo-identifications. This will enable us to link morphometric measurements from aerial images to MMTDs long-term photo-identification catalog (Dave Weller, lead) and interpret body condition in the context of known individual life-histories. Preliminary analysis suggests we have imaged >100 individuals from both the hexacopter and the boat. We plan to repeat this survey in October-March 2018/19 to enable longitudinal monitoring of the body condition of individual bottlenose dolphins, to assess the health status of this nearshore coastal population that is exposed to a range of potential anthropogenic threats. For more information contact John.Durban@noaa.gov.

Photos. Aerial images taken last week for photogrammetry measurements of size and condition of coastal cetaceans off San Diego County: bottlenose dolphins (bottom left), Pacific white-sided dolphins (top left) and a gray whale (right). Images taken with an unmanned hexacopter at >100ft altitude, with authorization under NMFS permit #19091.

Week of 19 March 2018

Right whale acoustic listening station deployment, San Diego, CA - Jay Barlow, Shannon Rankin and Karin Forney will deploy an acoustic listening station for right whales on the seafloor off Pacific Beach, San Diego, Ca. The location will be near where a right whale was seen last April. Later analysis of these recordings will reveal whether right whale calls were present this year. Sea World will be supporting this effort with their 27' research vessel captained by Jody Westberg.

Week of 20 February 2018
Antarctic Whale Ecology and Health, Antarctic Peninsula, Jan-Feb – Last week saw the completion of the 2017/18 field season to monitor the health and ecology of whales around the Antarctic Peninsula. John Durban (MMTD/SWFSC), Holly Fearnbach (SR3) and Leigh Hickmott (Open Ocean Consulting) have been hosted onboard the expedition ship National Geographic Explorer for the past month to study top predators (killer whales) and top consumers (humpback and minke whales) in this rapidly changing ecosystem, primarily using an unmanned hexacopter to collect vertical images and blow samples. In total, photo-identification data were collected from seven groups of killer whales, including all three Types (A, B1 and B2) found around the Antarctic Peninsula, and aerial images were collected from three of these groups comprising 25 different whales. Photogrammetry measurements from these images will add to data collected in 2015 and 2016 on the length distributions of the different types to infer trophic requirements of these top predators, and to monitor body condition to assess current nutritional status. Aerial images were also collected from 25 humpback whales, which were matched with 11 blow samples, and 35 Antarctic minke whales, matched to 7 blow samples. These paired image/blow samples will be used to describe the respiratory microbiome community of humpback and minke whales, and examine the link between body condition and respiratory health for these top consumers. For more information contact John.Durban@noaa.gov

Aerial photographs of an Antarctic minke whales (left) and humpback whales (right), are being used to measure length and body condition to infer the trophic requirements and nutritional health of these top krill consumers. Research conducted under NMFS Permit No. 19091 and Antarctic Conservation Act Permit ACA 2017-029.

Week of 12 February 2018

Antarctic Whale Ecology and Health, Antarctic Peninsula, Jan-Feb – Last week the team of John Durban (MMTD/SWFSC), Holly Fearnbach (SR3) and Leigh Hickmott (Open Ocean Consulting) successfully used a hexacopter to collect vertical aerial images of 15 Type B2 killer whales for subsequent photogrammetry analyses of size and condition, documenting a newborn calf and several whales in poor
body condition (see photo). Skin biopsy samples were also collected from three Type B2 killer whales to examine skin bacterial microbiome, particularly relative to variability in diatom burdens (see yellow coloration in photos below). In addition, photogrammetry images of five humpback whales were paired with blow samples to describe the microbiome community in whale blow and examine the link between body condition and respiratory health. Aerial images of three minke whales were also collected, along with photo-identifications of ~20 Type A killer whales. For more information contact john.durban@noaa.gov.

Week of 5 February 2018

Antarctic Whale Ecology and Health, Antarctic Peninsula, Jan-Feb – Last week the collaborative research team of John Durban (MMTD/SWFSC), Holly Fearnbach (SR3) and Leigh Hickmott (Open Ocean Consulting) successfully collected data on the health and ecology of whales around the Antarctic Peninsula. They used a hexacopter to collect vertical aerial images of six Type B2 killer whales and nine humpback whales. Photogrammetric analyses of these images will be used to measure size and body condition to assess the trophic requirements and health of top predators and top consumers in this rapidly-changing system. Of note, a mother-calf pair of Antarctic blue whales was sighted - this is the first sighting over the 10-year study of blue whales close to their pre-whaling feeding grounds around the Antarctic Peninsula. For more information contact john.durban@noaa.gov.
Week of 29 January 2018

_Antarctic Whale Ecology and Health, Antarctic Peninsula, Jan-Feb_ – Over the past two weeks, annual field work has commenced on the health and ecology of whales around the Antarctic Peninsula. The research team of John Durban (MMTD/SWFSC), Holly Fearnbach (SR3) and Leigh Hickmott (Open Ocean Consulting) are being hosted onboard the expedition ship National Geographic Explorer, with the primary aim of assessing the health of top predators (killer whales) and top krill consumers (humpback whales and Antarctic minke whales) in this rapidly-changing system. The team are using a small hexacopter to collect vertical images for measuring body condition, and to collect blow samples to identify respiratory microbiome and disease agents using genetic techniques. This past week, aerial images were collected of five Type B1 (“pack ice”) killer whales, four humpback whales and 20 Antarctic minke whales; blow samples were collected from humpback (three samples) and Antarctic minke whales (three samples). These are the first blow samples to be collected from minke whales in any study, and their respiratory microbiome will be compared to that of humpback whales; the respiratory health of humpbacks in Antarctica will be compared to those on feeding grounds in the northern hemisphere as part of an ongoing collaboration with Woods Hole Oceanographic Institution. For more information contact john.durban@noaa.gov.
California Sea Lion Census and Diet Research, Channel Islands, Southern California Bight, quarterly – Alex Curtis and Jim Carretta will travel to San Clemente Island on January 29-31 to collect California sea lion scat samples for diet analysis and to count pinnipeds. Contact Mark.Lowry@noaa.gov for more information.

Week of 22 January 2018

California Sea Lion Census and Diet Research, Channel Islands, Southern California Bight, quarterly – Alex Curtis and Stephanie Nehasil traveled to San Nicolas Island on January 19-22 to collect California sea lion scat samples and canines from dead female California sea lions for diet analysis. Contact Mark.Lowry@noaa.gov for more information.

Week of 16 January 2018

Cetacean Passive Acoustics Research, Southern California Bight - Jay Barlow is working with Greg Schorr (Marine Ecology and Telemetry Research) at San Clemente Island to deploy DASBRs (drifting recorders) and to tag and photo-ID beaked whales. Contact Jay.Barlow@noaa.gov for more information.

Week of 8 January 2018

Condition of Coastal Bottlenose Dolphins, Coastal San Diego County - Over the past two weeks, five more hexacopter flights were flown to assess the health of coastal bottlenose dolphins off San Diego
County, continuing the project being conducted in collaboration with SR3. Aerial images were collected from 17 individual dolphins, taking the total for this ongoing study above 100 individuals from 45 flights. Photo-identification and photogrammetry analyses of these images is underway to assess size, body condition and pregnancy rates of individuals that can be photographically linked to known life histories from MMTD’s long-term photo-identification catalog. As part of this effort, two new volunteers, Alyssa Paredes and Paige Kennedy Henderson, have joined the Cetacean Health and Life History Program on a volunteer basis to assist with image analysis. For more information contact John.Durban@noaa.gov.

**Photos.** Aerial images of bottlenose collected in the coastal waters off San Diego County for photogrammetry measurements. Images taken with an unmanned hexacopter at >100ft altitude, with authorization under NMFS permit #19091.

*Cetacean Passive Acoustics Research, Southern California Bight* - This week and next, Jay Barlow is working with Navy personnel and contractors to deploy SWFSC drifting acoustic spar buoy recorders (DASBRs) in the Navy SCORE range west of San Clemente Island. Greg Schorr (Marine Ecology and Telemetry Research) is conducting beaked whale tagging research there and has agreed to deploy DASBRs to drift over areas that traditionally have had high densities of beaked whales. Dave Moretti (US Navy) is deploying a Remus AUV and will deploy another DASBR. If flights and housing are available, Jay may join this effort at the end of next week. Ultimately, these data will allow us to compare high-beaked-whale-density areas on the Navy Range to other high-density areas that were identified during the PASCAL survey in 2016. Contact Jay.Barlow@noaa.gov for more information.
Week of 18 December 2017

Condition of Coastal Bottlenose Dolphins, Southern California Bight, Oct-Dec 2017 – Eight hexacopter flights were flown this week to assess the health of coastal bottlenose dolphins off San Diego County, continuing the project being conducted this fall/winter in collaboration with SR3. Aerial images were collected from 21 individual dolphins (~85 individuals for the study so far), from which photogrammetry measurements will be made to assess size, body condition and pregnancy rates. A key objective is to match aerial images to lateral photo-identifications, to link measurements to known life histories from MMTD’s individual photo-identification catalog. Opportunistic aerial images were also obtained of Pacific white-sided dolphins and long-beaked common dolphins. For more information contact John.Durban@noaa.gov.

Aerial images of bottlenose dolphins (left) and long-beaked common dolphins (right) collected in the coastal waters off San Diego County for photogrammetry measurements. Images taken with an unmanned hexacopter at >100ft altitude, with authorization under NMFS permit #19091.

Week of 4 December 2017

Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS), Hawaiian Island Archipelago, 6 July -9 December: Updates for Nov 24-30 – The Leg 4 HICEAS team aboard the Lasker has continued surveying for marine mammals and seabirds along the remaining transect lines within the Hawaii study area. Sightings included false killer whales, humpback whales, fin whales, a sperm whale, Longman’s beaked whale, and pilot whales. Acoustic detections included all of the above, plus sei whale and the ever-present minke whales. Seabird abundance has been low but with moderate to high diversity on most days. The Lasker was scheduled to begin her transit from Hawaiian waters to San Diego, where the survey was to conclude in San Diego (Lasker’s home port) on 9 December. However, the ship was unexpectedly told to return to Honolulu immediately for an unknown amount of time so HICEAS is now complete. Final reports will be posted on the survey website. We thank all the sea-going and shore-based scientists, ship’s officers and crew, and our funding partners, the U.S. Navy and Bureau of Ocean Energy Management, for a successful research effort.

The 2017 HICEAS is a collaboration between the Pacific Islands Fisheries Science Center (PIFSC Chief Scientist: Erin Oleson) and the Southwest Fisheries Science Center (SWFSC Chief Scientist: Jeff Moore) to survey for cetaceans and seabirds within the U.S. waters of the Hawaiian Islands. HICEAS is being conducted July through December 2017 aboard NOAA ships Oscar Elton Sette and Reuben Lasker. Significant funding to support HICEAS is being provided
Week of 27 November 2017

Condition of Coastal Bottlenose Dolphins, Southern California Bight, Oct-Dec 2017 – Nine hexacopter flights were flown this week to assess the health of coastal bottlenose dolphins off San Diego County, continuing the project being conducted this fall in collaboration with SR3. Aerial images were collected from 37 individual dolphins (~65 individuals for the study so far), from which photogrammetry measurements will be made to assess size, body condition and pregnancy rates. A key objective is to match aerial images to lateral photo-identifications, to link measurements to known life histories from MMTDs individual photo-identification catalog. Opportunistic photo-identifications were also obtained from four Pacific white-sided dolphins and one juvenile gray whale. For more information contact John.Durban@noaa.gov.

Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS), Hawaiian Island Archipelago, 6 July - 9 December: Updates for Nov 15-23 – The Lasker departed on its fourth and final leg of HICEAS during the afternoon of Thursday Nov 15, with incoming cruise leader Karin Forney (replacing Jim Carretta) and thirteen new and returning team members (see photo). Weather has been rough but mostly workable. After spending two days near Oahu conducting surveys in and near two areas of interest to BOEM, the team completed a few missing transects from earlier legs before embarking on their own set of Leg 4 transect lines on Nov 21. Sightings so far have included false killer whales (for which all three phases of the special protocol were completed successfully, with 3 biopsy samples!), rough-toothed dolphins, melon-headed whales, pilot whales, spotted dolphins, humpback whales, and a few unidentified dolphins and whales. The acoustics team has been treated to persistent minke whale boings (enough already!), detected as far away as 28 km. They have also recorded sperm whales, humpback whales, fin whales, Blainville’s and Cuvier’s beaked whales, false killer whales, pilot whales, rough-toothed dolphins, melon-headed whales, and assorted other dolphins. The seabird team averaged 14 species per day, boosted by two days where they found 18 species. Total individuals per day averaged about 72. A downward trend in both diversity and abundance was apparent as we worked southeast away from the...
Northwestern Hawaiian Islands. Noteworthy species included a Buller’s Shearwater (the first one since 16 September) and relatively high numbers of Kermadec Petrels off Kauai. Weather permitting, the team expects to complete the transects within the HICEAS study area by Nov 28th, and then the Lasker will begin the 10-day transit back to San Diego (a.k.a. driving from Hawaii to San Diego at the speed of a bicycle…).

The 2017 HICEAS is a collaboration between the Pacific Islands Fisheries Science Center (PIFSC Chief Scientist: Erin Oleson) and the Southwest Fisheries Science Center (SWFSC Chief Scientist: Jeff Moore) to survey for cetaceans and seabirds within the U.S. waters of the Hawaiian Islands. HICEAS is being conducted July through December 2017 aboard NOAA ships Oscar Elton Sette and Reuben Lasker. Significant funding to support HICEAS is being provided by the Bureau of Ocean Energy Management (BOEM) and the U.S. Navy. For additional information, contact Erin.Oleson@noaa.gov, Jeff.Moore@noaa.gov, or visit https://www.pifsc.noaa.gov/hiceas/

Week of 20 November 2017

Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS), Hawaiian Island Archipelago, 6 July - 9 December: Updates for Nov 10-17 – The Lasker began its fourth and final leg of HICEAS 2017 on 15 November, surveying in heavy weather.

The 2017 HICEAS is a collaboration between the Pacific Islands Fisheries Science Center (PIFSC Chief Scientist: Erin Oleson) and the Southwest Fisheries Science Center (SWFSC Chief Scientist: Jeff Moore) to survey for cetaceans and seabirds within the U.S. waters of the Hawaiian Islands. HICEAS is being conducted July through December 2017 aboard NOAA ships Oscar Elton Sette and Reuben Lasker. Significant funding to support HICEAS is being provided by the Bureau of Ocean Energy Management (BOEM) and the U.S. Navy. For additional information, contact Erin.Oleson@noaa.gov, Jeff.Moore@noaa.gov, or visit https://www.pifsc.noaa.gov/hiceas/

Week of 13 November 2017
Condition of Coastal Bottlenose Dolphins, Southern California Bight, Oct-Dec 2017 – One hexacopter flight was flown last week to assess the condition and population structure of coastal bottlenose dolphins in San Diego County waters, continuing the project being conducted this fall in collaboration with SR3. Aerial images were collected from four individual dolphins (~28 individuals for the study so far), from which photogrammetry measurements will be made to assess size, body condition and pregnancy rates. A key objective is to match aerial images to lateral photo-identifications, to link measurements to known life histories from MMTDs individual photo-identification catalog. For more information contact John.Durban@noaa.gov.

Aerial images of bottlenose dolphins collected in the coastal waters off San Diego County for photogrammetry measurements. Images taken with an unmanned hexacopter at >100ft altitude, with authorization under NMFS permit #19091.

Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS), Hawaiian Island Archipelago, 6 July -9 December: Updates for Nov 4 - 9 – The Lasker completed its third leg (of four) on Thursday Nov 9. For this short reporting period, the marine mammal team recorded fin whale, false killer whales, Risso’s dolphin, Cuvier’s beaked whale, striped dolphin, spotted dolphin, and rough-toothed dolphin. The bird team logged between 12 and 17 species per day, with some rare highlights including Flesh-footed Shearwater, Christmas Shearwater, Newell’s Shearwater, and Hawaiian Petrel. The fourth and final leg commences on November 15. 

The 2017 HICEAS is a collaboration between the Pacific Islands Fisheries Science Center (PIFSC Chief Scientist: Erin Oleson) and the Southwest Fisheries Science Center (SWFSC Chief Scientist: Jeff Moore) to survey for cetaceans and seabirds within the U.S. waters of the Hawaiian Islands. HICEAS is being conducted July through December 2017 aboard NOAA ships Oscar Elton Sette and Reuben Lasker. Significant funding to support HICEAS is being provided by the Bureau of Ocean Energy Management (BOEM) and the U.S. Navy. For additional information, contact Erin.Oleson@noaa.gov, Jeff.Moore@noaa.gov, or visit https://www.pifsc.noaa.gov/hiceas/

Vaquita Conservation, Protection, Recovery (CPR), northern Gulf of California, Mexico, 6 October – 3 November – The VaquitaCPR effort concluded Nov. 10 in San Felipe. Capture efforts were suspended after the devastating death of a vaquita (read more here). The last days of the effort were spent trying to obtain photographic identification, but the efforts were limited due to continued winds.

Week of 6 November 2017
Condition of Coastal Bottlenose Dolphins, Southern California Bight, Oct-Dec 2017 – Four hexacopter flights were flown this week to assess the condition and population structure of coastal bottlenose dolphins off San Diego County, continuing the project being conducted this fall in collaboration with SR3. Aerial images were collected from four individual dolphins (24 individuals for the study so far), and opportunistic encounters provided further opportunities to collect aerial images of a group of ~40 short-beaked common dolphins and a single juvenile gray whale. The common dolphin images will provide further baseline data on spacing behavior and swim speeds for this species, to add to ongoing studies on the behavioral responses to sonar exposure. The length and condition of the gray whale will be compared to the dataset on juvenile gray whales that we collect during the late spring as they migrate north again off the central California coast. For more information contact John.Durban@noaa.gov.

Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS), Hawaiian Island Archipelago, 6 July -9 December: Updates for Oct 28-Nov 3 – The Lasker continues its third leg (of four). Sperm whale detections are on the rise, with several groups observed with lots of calves. Additionally, the team visually or acoustically detected Cuvier’s beaked whale, Blainville’s beaked whale, Sei or Bryde’s whale, false killer whale, Risso’s dolphin, minke whale, and they had a fantastic extended sighting of a pygmy
sperm whale. Bird diversity and abundance continues to be high, with up to 18 species recorded one day during this week, including a record breaking 1200+ individual birds recorded within the 300-m strip of the vessel on one day. These were mostly Bonin Petrels, along with 103 White Terns, and the team’s first Laysan Albatross of the cruise.

The 2017 HICEAS is a collaboration between the Pacific Islands Fisheries Science Center (PIFSC Chief Scientist: Erin Oleson) and the Southwest Fisheries Science Center (SWFSC Chief Scientist: Jeff Moore) to survey for cetaceans and seabirds within the U.S. waters of the Hawaiian Islands. HICEAS is being conducted July through December 2017 aboard NOAA ships Oscar Elton Sette and Reuben Lasker. Significant funding to support HICEAS is being provided by the Bureau of Ocean Energy Management (BOEM) and the U.S. Navy. For additional information, contact Erin.Oleson@noaa.gov, Jeff.Moore@noaa.gov, or visit https://www.pifsc.noaa.gov/hiceas/.

Happy Halloween!

Pygmy sperm whale.

*Week of 30 October 2017*
Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS), Hawaiian Island Archipelago, 6 July -9 December: Updates for Oct 21-27 – The Lasker continues its third leg (of four). The crew had a mix of good and terrible weather, and also spent at least some portion of the week in some incredibly unproductive waters (e.g., 100 nmi NE of Laysan Island), leading to some noteworthy days of different kinds. On a high note, the crew observed the rarely sighted Fraser’s dolphin! Additional marine mammals detected visually or acoustically this week include Risso’s dolphins, Cuvier’s beaked whale, a minke whale, a humpback whale, sperm whales and a Kogia spp. On a low note, the birding crew logged its lowest-diversity day of HICEAS thus far, recording a meager 5 species and failing to see the ubiquitous Wedge-tailed Shearwater for the only day of the cruise thus far. They made up for this on October 22, though, sighting 18 species, including South Polar Skuas, Leach’s and Band-rumped Storm Petrels, Mottled and White-necked Petrels, the first Bonin Petrel in three weeks, and a dark morph Northern Fulmar, one of the few N Fulmars ever seen alive in this part of the world.

The 2017 HICEAS is a collaboration between the Pacific Islands Fisheries Science Center (PIFSC Chief Scientist: Erin Oleson) and the Southwest Fisheries Science Center (SWFSC Chief Scientist: Jeff Moore) to survey for cetaceans and seabirds within the U.S. waters of the Hawaiian Islands. HICEAS is being conducted July through December 2017 aboard NOAA ships Oscar Elton Sette and Reuben Lasker. Significant funding to support HICEAS is being provided by the Bureau of Ocean Energy Management (BOEM) and the U.S. Navy. For additional information, contact Erin.Oleson@noaa.gov, Jeff.Moore@noaa.gov, or visit https://www.pifsc.noaa.gov/hiceas/.

Condition of Coastal Bottlenose Dolphins, Southern California Bight, Oct-Dec 2017 – For the next two months, MMTD scientists (John Durban, lead) will be partnering with SR3 (SeaLife Response, Rehab and Research; Holly Fearnbach, lead) on field work to assess the condition of coastal bottlenose dolphins off San Diego County. The project aims to use unmanned hexacopters to obtain vertical images, from which photogrammetry measurements will be made to assess size, body condition and pregnancy rates. A key objective is to match aerial images to lateral photo-identifications, to link measurements to MMTDs long-term photo-identification catalog (Dave Weller, lead) and interpret photogrammetry data in the context of known individual life-histories. The project is off to a good start – eight flights were flown this week, collecting images of 20 individual bottlenose dolphins, in addition to one group of long-beaked common dolphins and a minke whale that were encountered offshore (see photos). This project parallels the ongoing collaboration between MMTD and SR3 to study the condition of Southern Resident killer
whales in the coastal waters of Washington State. In both cases, aerial photogrammetry is being used to assess the health of cetaceans that have a nearshore coastal distribution and are therefore exposed to a range of potential anthropogenic threats. For more information contact John.Durban@noaa.gov.

California Sea Lion Census and Diet Research, Channel Islands, Southern California Bight, quarterly – Mark Lowry and Noah DesRosiers will travel to San Clemente Island on Oct 27-30 to collect California sea lion scat samples for diet analysis and to count pinnipeds. Contact Mark.Lowry@noaa.gov for more information.

Week of 23 October 2017
Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS), Hawaiian Island Archipelago, 6 July -9 December: Updates for Oct 16-20 – The Lasker got under way for Leg 3 on October 16. Jim Carretta (SWFSC) is leading this leg. Rough sea conditions have dominated this week. Consequently, sperm whales were the only mammal species detected during these first 5 days of the leg. The bird team has averaged about 14 species per day, though, with some highlights including a Nazca booby (rare near Hawaii), White-necked petrel (last observed a couple weeks ago), Tristram’s Storm-Petrel (1st and 2nd sighting of the trip), and a Mottled Petrel.

The 2017 HICEAS is a collaboration between the Pacific Islands Fisheries Science Center (PIFSC Chief Scientist: Erin Oleson) and the Southwest Fisheries Science Center (SWFSC Chief Scientist: Jeff Moore) to survey for cetaceans and seabirds within the U.S. waters of the Hawaiian Islands. HICEAS is being conducted July through December 2017 aboard NOAA ships Oscar Elton Sette and Reuben Lasker.

Significant funding to support HICEAS is being provided by the Bureau of Ocean Energy Management (BOEM) and the U.S. Navy. For additional information, contact Erin.Oleson@noaa.gov, Jeff.Moore@noaa.gov, or visit https://www.pifsc.noaa.gov/hiceas/.

Vaquita Conservation, Protection, Recovery (CPR), northern Gulf of California, Mexico, 6 October – 3 November – VaquitaCPR made history last week with the first capture of a vaquita (see Story). Despite strong efforts to capture the mother, with only the calf captured the veterinarians decided to release the calf at the point of capture. Samples were taken for live cell culture and genetic analysis. Bob Pitman nicely captured the start of efforts prior to this capture in this blog.

Although there have been only 3 full days of vaquita-worthy weather, the team is encouraged by having seen at least 6 vaquitas every day and seeing at least 2-3 mother/calf pairs. The design has worked beautifully. Every day, the acoustic team provides the latest information on where vaquitas have been detected on their grid of passive acoustic detectors (CPODs). Barbara Taylor assesses the acoustic results, the latest weather information (summarized by Karin Forney) and past survey results to decide where and when to search.

The visual search team has performed splendidly with sightings from each of the 3 vessels. Even though some vaquitas still manage to elude the 50 pairs of eyes searching for them from all 7 vessels, the visual team has successfully tracked vaquitas and guided the catch boats in on multiple occasions every day to set nets. Rescue operations improve daily with the visual team guiding the 2 high-speed catch boats with the teams of Danes. We have come very close to catching more vaquitas on several occasions and spirits are high that more success will come if we just get more calm days.
Secretary Pacchiano, the Director of SEMARNAT (Mexico’s Department of the Environment and Natural Resources), has been very involved with visits to the ship and a day on the catch boat.

**Screen shot of first capture of vaquita.** Yellow circles show the path of the ship Maria Cleofas. Odisea and Wanderlust are our 2 other visual vessels and Viking is one of the catch RHIBs. The red boxes show the path of the vaquitas. Each white circle is a nautical mile of distance.

**Acoustic detections used to advise search for the first capture of vaquitas on October 18, 2017.** The black dots indicate no data, red dots: no detections, other colors indicate number of detections. The capture was in the vicinity indicated by 1-3 detections.

**Panga heading to retrieve CPOD data at dawn.** These pangas are operated by the fishermen that elected to use alternative gear (not gillnets) and have since been key team members in the acoustic monitoring program.

**Flying bridge on the Maria Cleofas on a ‘vaquita-worthy’ weather day (i.e. winds less than 8 miles per hour).**

*Week of 16 October 2017*
Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS), Hawaiian Island Archipelago, 6 July - 9 December: Updates for Oct 6-9 – The Sette and Lasker completed Legs 3 and 2, respectively, on October 9 and are currently in port in Honolulu. This was the Sette’s final leg. After last week’s rough weather, the seas calmed a bit, allowing for the Lasker and Sette to collect some data again for these last few days of their legs. Mammal species detected between the two vessels included minke whale, spotted dolphins, humpback whale, false killer whale, rough-toothed dolphin, bottlenose dolphin, Blainville’s beaked whale, killer whales and a possible Kogia. Biopsy samples were collected for pilot whales and rough-toothed dolphins. The birders had some great days; for example, the Lasker logged 20 species per day on two of the last three days. Additionally, three DASBRs were retrieved and the ships finished off by conducting an active acoustics background noise level experiment together. Leg 3 of the Lasker commences on October 16.

The 2017 HICEAS is a collaboration between the Pacific Islands Fisheries Science Center (PIFSC Chief Scientist: Erin Oleson) and the Southwest Fisheries Science Center (SWFSC Chief Scientist: Jeff Moore) to survey for cetaceans and seabirds within the U.S. waters of the Hawaiian Islands. HICEAS is being conducted July through December 2017 aboard NOAA ships Oscar Elton Sette and Reuben Lasker. Significant funding to support HICEAS is being provided by the Bureau of Ocean Energy Management (BOEM) and the U.S. Navy. For additional information, contact Erin.Oleson@noaa.gov, Jeff.Moore@noaa.gov, or visit https://www.pifsc.noaa.gov/hiceas/.

Vaquita Conservation, Protection, Recovery (CPR), northern Gulf of California, Mexico, 6 October – 3 November – Barb Taylor (leader of the Find Team), Bob Pitman, Jay Barlow, Robert Holland and Lisa Ballance arrived in San Felipe, Mexico, on October 6, 2017, to begin setup of the visual component of the attempt to remove as many vaquitas as possible and take them into human care until their habitat is free of gillnets. The effort is led by Mexico with assistance from the National Marine Mammal Foundation. Funding is primarily from Mexico and includes support from the Association of Zoos and Aquariums and many private donors. During the peak time of the project, NMFS employees will be 5 of over 60 scientists providing technical expertise in the attempt to rescue vaquitas that now number fewer than 30 individuals.

The Find Team is housed primarily on the research vessel Maria Cleofas, a 130 foot converted Bering Sea crabber now equipped with a pair of “big eyes” on its flying bridge. Two other sportfishing vessels also carry binocular toting observers to help track the elusive vaquitas. Getting the fleet of 7 vessels in the right place at the right time is aided by each vessel carrying AIS devices that output their location. Jay Barlow found and designed easy-for-transport AIS packages for the vessels carrying the specialists needed for the project. The Catch Team is comprised primarily of Danes who will try to capture vaquitas in specially made nets that they developed to capture harbor porpoise off Greenland and Denmark. The fleet of vessels includes not only the Find and Catch teams, but the Care Team that must assess the animals’ status and transport them to the waiting facilities. Robert Holland created a special version of our software that displays the fleet of AIS-equipped vessels. Nina Young and Teri Rowles from headquarters participate in the Find and Care teams.

The first full day on October 13 included our full Find Team, many fresh from the HICEAS (Hawaii Islands Cetacean and Ecosystem Survey) plus several other seasoned vaquita observers including Karin Forney (MMTD). The Find Team has 3 components, the acoustics team, the visual team and the Navy
dolphin tracking team. The acoustic team has 36 passive acoustic devices set in the areas most frequently used by vaquitas. Data are retrieved daily and reported to give us near-real-time results on where to look for the needle in the haystack. On October 13, we set forth with locations where vaquitas had been acoustically detected over the past 2 weeks and the past 2 days. The visual team, with over 300 years of experience searching for cetaceans between the 10 observers, located a pair of vaquitas within hours of the start of the project. The fleet of 7 vessels converged, but vaquitas proved elusive. We had several other sightings throughout the near-perfect day. Each visual vessel had a sighting and the last sighting we came close to setting the nets, but the operation had to be aborted as the light was fading and the Care team felt the conditions not ideal to assess this first golden-rescued vaquita.

As usual, Annette Henry made the complicated logistics work as smoothly as possible, and Laura Tezer ably handled our complex travel.

Week of 10 October 2017

Nina Young, Greg Alker (owner of the Maria Cleofas), Jay Barlow and Robert Holland during set-up on the flying bridge.

Robert Pitman and Jay Barlow taking first looks through the 25x binoculars called ‘big eyes’.
Integrating remote sensing methods to measure baseline behavior and responses of social delphinids to Navy sonar, southern California Bight, week of 10 October – Last week saw the successful completion of another round of fieldwork on the project. John Durban (MMTD) partnered with Holly Fearnbach (SR3) to fly an unmanned octocopter from a 65’ boat to obtain vertical photographs from above dolphin schools off Catalina Island, California. Nine flights were conducted over bottlenose dolphins (2), short-beaked common dolphins (6) and long-beaked common dolphins (1), including during controlled exposures of all three species to simulated navy sonar. These flights generated 12,612 high-resolution aerial images: subsequent laboratory analyses will provide quantitative photogrammetry metrics of behavior during times of exposure and control periods, and also information of individual size and condition as a context for interpreting behaviors. Collaborators on the project also collected post-exposure biopsy samples from all three species and laboratory analysis at MMTD/SWFSC (Nick Kellar, lead) will use hormone assays to investigate physiological responses to exposure. Keiko Sherman and Molly Groskreutz from MMTD assisted ably in the field.

Aerial images of short-beaked common dolphins off Catalina Island, CA, taken from high altitude (>100ft) to monitor group behavior and for measurements of individual size and body condition. Images collected from an unmanned octocopter, authorized by NMFS permit # 19091.

Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS), Hawaiian Island Archipelago, 6 July - 9 December: Updates for Sept 30 - Oct 6 – The Sette and Lasker continue Legs 3 and 2, respectively. Rough weather this week severely limited observing opportunities for the marine mammal observers, but the birders still saw good stuff!
**Lasker:** Acoustic detections of Longman’s beaked whale, Cuvier’s beaked whale, and sperm whale. Being to the far northwest, the bird community has changed a bit, prominently featuring some different petrels than earlier in the cruise, such as Bonin Petrels, Mottled Petrels, and Black-winged Petrels.

**Sette:** Acoustic detections of Cuvier’s beaked whales. Noteworthy birds include several Southern Hemisphere breeders that are likely making their way back south for the austral summer, such as Stejneger’s Petrel, Pycroft’s Petrel (2nd of the cruise) and Flesh-footed Shearwater. Also, the birders saw an endangered Band-rumped Storm Petrel, and a couple of the birders got ashore on Tern Island during a gear and personnel transfer, resulting in a couple nice bird photos.

The 2017 HICEAS is a collaboration between the Pacific Islands Fisheries Science Center (PIFSC Chief Scientist: Erin Oleson) and the Southwest Fisheries Science Center (SWFSC Chief Scientist: Jeff Moore) to survey for cetaceans and seabirds within the U.S. waters of the Hawaiian Islands. HICEAS is being conducted July through December 2017 aboard NOAA ships Oscar Elton Sette and Reuben Lasker. Significant funding to support HICEAS is being provided by the Bureau of Ocean Energy Management (BOEM) and the U.S. Navy. For additional information, contact Erin.Oleson@noaa.gov, Jeff.Moore@noaa.gov, or visit https://www.pifsc.noaa.gov/hiceas/.

**Week of 2 October 2017**

Integrating remote sensing methods to measure baseline behavior and responses of social delphinids to Navy sonar, southern California Bight, week of 2 October  – MMTD scientists are taking part again in fieldwork on this collaborative project between scientists from Southall Environmental Associates, Kelp Marine Research, Cascadia Research Collective, SR3 and MMTD/SWFSC, with funding by the Office of
Naval Research. Field work began this past week off Catalina Island, California, and the MMTD team of John Durban, Molly Groskreutz and Keiko Sherman are partnering with Holly Fearnbach from SR3 to fly an unmanned octocopter from a 65’ boat to obtain vertical photographs from above dolphin schools. Four flights were conducted over bottlenose dolphins (3) and common dolphins (1), including during a controlled exposure of bottlenose dolphins to simulated Navy sonar. These flights generated 2970 high-resolution aerial images: subsequent laboratory analyses will provide quantitative photogrammetry metrics of behavior during times of exposure and control periods, and also provide information of individual size and condition as a context for interpreting behaviors. Collaborators on the project also collected post-exposure biopsy samples from bottlenose dolphins and laboratory analysis at MMTD/SWFSC (Nick Kellar, lead) will use hormone assays to investigate physiological responses to exposure. Further details on this collaborative project can be found on this website: http://sea-inc.net/2017/06/20/new-marine-mammal-research-project-integrating-visual-and-acoustic-sensors-to-study-behavior-and-behavioral-response-in-small-cetaceans/. For more information contact John.Durban@noaa.gov.

Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS), Hawaiian Island Archipelago, 6 July -9 December: Updates for Sept 16-29 –

**Lasker:** Several false-killer whale sightings were made last week, including a fantastic day that resulted in 11 biopsy samples. The team also detected the ship’s first sightings of melon-headed whales and Frasers dolphins. Additional sightings: spotted, rough-toothed, and striped dolphins, sperm whales and an acoustic detection of Blainville’s beaked whale. It’s been a banner stretch for seabird sightings including several days with 18+ species, and a record 22 species on one day. Some gems include a possible Slaty-backed Gull, Parasitic and Long-tailed Jaegers, migrating Short-tailed Shearwaters, Stejneger’s Petrel, Flesh-footed and Pink-footed Shearwaters, Wilson’s Storm-Petrels, and a battle between Brown and Red-footed Boobies. Wedge-tailed Shearwaters, the poster bird for much of the cruise, have become less common as the *Lasker* has traveled far northwest of the main Hawaiian Islands. Also of note was a sighting of a whale shark. This leg has been hard on acoustic equipment though. *Lasker* retrieved two DASBRs, but the cord had been severed on one of them, meaning that we retrieved the surface gear (buoys, satellite transmitter) but lost the working end (hydrophones and data recorder), which has thus carried its secrets to the abyss. Also, a couple of towed arrays have been damaged by cookie cutter sharks (from both vessels).

**Sette:** Last week brought HICEAS’ first detections of baleen whales, and not just one but three species: fin whale (ID confirmed via use of sonobuoys), Bryde’s whale, and two humpback whales, one of which yielded a biopsy sample. Visiting the Northwest Hawaiian Islands also graced the team with monk seals, bottlenose and spinner dolphins, and a little hot spot for deep divers, including sperm whales, Longman’s, Cuvier’s, and Blainvilles’ beaked whales, and pygmy sperm whale. Rounding out the tally were pilot false killer whales, and rough-toothed dolphins. Seabird highlights included three booby species (Masked, Red-footed, and Brown), Bonin petrels, another Pink-footed shearwater, Pomarine Jaegers, White-necked Petrel, Gray-backed Tern, Bulver’s Petrel, South Polar Skua, White Tern, and a mass migration of Short-tailed Shearwaters (the sky was blackened by tens of thousands of birds heading south to Australia. In one 7 min stretch, 630 went through the bird zone. Ninety birds a minute; 1.5 per second!)
The 2017 HICEAS is a collaboration between the Pacific Islands Fisheries Science Center (PIFSC Chief Scientist: Erin Oleson) and the Southwest Fisheries Science Center (SWFSC Chief Scientist: Jeff Moore) to survey for cetaceans and seabirds within the U.S. waters of the Hawaiian Islands. HICEAS is being conducted July through December 2017 aboard NOAA ships Oscar Elton Sette and Reuben Lasker. Significant funding to support HICEAS is being provided by the Bureau of Ocean Energy Management (BOEM) and the U.S. Navy. For additional information, contact Erin.Oleson@noaa.gov, Jeff.Moore@noaa.gov, or visit https://www.pifsc.noaa.gov/hiceas/.

Vaquita Conservation, Protection, Recovery (CPR), northern Gulf of California, Mexico, 6 October – 3 November – The advance set-up team for Vaquita CPR will depart Friday October 6 and include Taylor, Ballance, Barlow, Pitman and Holland from SWFSC plus the full catch team led by Randy Wells (Chicago Zoological Society). This crew will set up the mini-fleet of vessels to be prepared for full operations the following week. For more information contact Lisa.Ballance@noaa.gov

Leatherback Turtle Feeding Ecology Research, Central California Coast, 1 – 29 September –
The team’s patience was rewarded with a brief window of favorable weather during the last week of leatherback turtle sampling. Two turtles, a male and a female, were captured in waters off the San Mateo County coast for blood and tissue sampling, and subsequently released with satellite-linked transmitters. A suction-cup video camera and time-depth recorder tag was attached to two additional turtles, yielding high-quality recordings of leatherback foraging and diving behavior.

Retrieval of the second tag required a heroic effort by the aerial and vessel-based teams, as the weather window closed on Thursday, and fog and wind returned to the study area. The efforts were rewarded with outstanding video footage showing the leatherbacks feeding on brown sea nettles (*Chrysaora fuscescens*). To our surprise, the video also revealed that one of the foraging turtles was accompanied by a pilot fish (*Naucrates ductor*), a species typically found associated with sharks and turtles in warm tropical waters. Please contact Scott.Benson@noaa.gov for additional information.

*Sea Turtle Nesting Beach and Bycatch Projects, Cambodia and Myanmar, 3-29 October* – Manjula Tiwari will work with Flora and Fauna International in both countries to evaluate sea turtle nesting and bycatch, and to conduct training workshops in collaboration with the Cambodian and Myanmar governments. Contact Manjula.Tiwari@noaa.gov for more information.

*Week of 25 September 2017*
**Whale Health & Condition Assessment, Vancouver Island, August-September** – Last week saw the completion of this year’s photogrammetry field work to assess the health of endangered Southern Resident killer whales, a NMFS Species in the Spotlight. The field team of John Durban (MMTD), Holly Fearnbach (SR3) and Lance Barrett-Lennard (Vancouver Aquarium’s Coastal Ocean Research Institute) completed a further 13 flights with a small unmanned hexacopter (63 in total for the three-week project). Vertical images were taken of 18 individual Southern Residents, and five Bigg’s (“Transient”) killer whales, to provide a comparison in body condition. In total, 63/77 whales in the Southern Resident population have been photographed in the past three weeks, along with 11 Bigg’s killer whales. Our work will now move to the laboratory, where photogrammetry measurements will be made from the images to quantify patterns of growth and body condition of Southern Residents to infer nutritional status and health, and compare to similar measurements from Northern Resident and Bigg’s killer whales. For more information contact John.Durban@noaa.gov.

**Leatherback Turtle Feeding Ecology Research, Central California coast, CA, 1 – 29 September** – After nearly three weeks of uncooperative weather, leatherback survey and tagging operations are expected to resume this week. The aerial survey team, including Karin Forney, Erin La Casella, Joel Schumacher, and Katherine Whitaker, plans to conduct surveys beginning Sunday (9/24). The vessel-based team, including Scott Benson, Tomo Eguchi, Jeff Seminoff, Lisa Komoroske, and Heather Harris, has moved operations to Half Moon Bay, near the area where turtles were seen three weeks ago. Please contact Scott.Benson@noaa.gov for additional information.

**Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS), Hawaiian Island Archipelago, 6 July - 9 December:** Sette and Lasker are currently conducting Legs 3 and 2, respectively. HICEAS continues to be in the news (see PRESS – below).
The 2017 HICEAS is a collaboration between the Pacific Islands Fisheries Science Center (PIFSC Chief Scientist: Erin Oleson) and the Southwest Fisheries Science Center (SWFSC Chief Scientist: Jeff Moore) to survey for cetaceans and seabirds within the U.S. waters of the Hawaiian Islands. HICEAS is being conducted July through December 2017 aboard NOAA ships Oscar Elton Sette and Reuben Lasker. Significant funding to support HICEAS is being provided by the Bureau of Ocean Energy Management (BOEM) and the U.S. Navy. For additional information, contact Erin.Oleson@noaa.gov, Jeff.Moore@noaa.gov, or visit https://www.pifsc.noaa.gov/hiceas/.

Week of 18 September 2017

*Whale Health & Condition Assessment, Vancouver Island, August-September* – Last week was very successful for fieldwork monitoring of the health of endangered Southern Resident killer whales, a NMFS Species in the Spotlight. The field team of John Durban (MMTD), Holly Fearnbach (SR3) and Lance Barrett-Lennard (Vancouver Aquarium’s Coastal Ocean Research Institute) completed 27 flights with a small unmanned hexacopter, collecting vertical images of all Southern Resident killer whales that were seen (29 individuals for the week) and three Bigg’s (“Transient”) killer whales. In total 63/77 whales in the Southern Resident population have been photographed during the first two weeks of the project, with the collection of high-resolution images of whales in flat surfacing orientation (see left photo) that can be used for photogrammetric measurements of growth and body condition. Measurements will be compared to previous assessments of the same individuals to infer nutritional status and health, particularly in relation to availability of their primary prey, Chinook salmon (see right photo). For more information contact John.Durban@noaa.gov.

Overhead images of Southern Resident killer whales. Left: adult female (L83) with her juvenile son (L110). These images in flat surfacing orientation are ideal for photogrammetry measurements. Right: a young juvenile (L121) chasing a Chinook salmon, the preferred prey of this population. Images obtained form an unmanned hexacopter that was flown >100ft above the whales under NMFS permit #19091.
Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS), Hawaiian Island Archipelago, 6 July - 9 December: Updates for Sept 11 – 15 – On September 11, the Sette and Lasker left Honolulu to begin Legs 3 and 2, respectively of HICEAS. The Sette leg is being led by Marie Hill (PIFSC). The Lasker leg is being led by Eric Archer (SWFSC). Tune in on Tuesday 9/19 to hear an interview with Erin Oleson, Jeff Moore, and Amanda Bradford about HICEAS on the Honolulu based radio-show “All Things Marine”. You can download the podcast (after Tuesday) here

**Lasker Leg 1:** Two DASBRs were retrieved and one was deployed. On the night of September 14/15, the second of two planned deep-ocean water sampling effort was undertaken above Cross Seamount in hope of collecting environmental DNA that might reveal the identity of an elusive beaked whale known only by its acoustic signature. Marine mammal species sighted or acoustically detected during the past 5 days: pygmy killer whale, false killer whale, short-finned pilot whale, sperm whale, rough-toothed dolphin, spotted dolphins. Cross Seamount and the surrounding vicinity proves once again to be a seabird hotspot. On both 14 and 15 September, the birders observed 18 species, the highest daily total of the entire survey. These included high numbers of Bulwer’s Petrels, Hawaiian Petrels, Kermadec Petrels (four!), Christmas Shearwaters, Newell’s Shearwaters, and dark morph Wedge-tailed Shearwaters. There was a Tahiti Petrel (rare in Hawaiian waters) and only the second one for HICEAS 2017, and single Parasitic Jaeger and South Polar Skua. Another bird highlight was the observation of yet another Pink-footed Shearwater. It was only last leg when we got the first photographic documentation of this species’ occurrence in Hawaii. The Pink-footed Shearwater is common off the west coast of North and South America, but is extremely rare this far west.

**Sette Leg 2:** Three DASBRs were deployed. The Sette had a remarkable false killer whale week. On two consecutive days, good weather and cooperative animals allowed for thousands of photos to be taken, 18 biopsy samples to be collected, and three satellite tags deployed!. Mammal sightings or acoustic detections include false killer whale, short-finned pilot whale, rough-toothed dolphin (including 6 biopsy samples), striped dolphin, spotted dolphin, Risso’s dolphin, and Cuvier’s beaked whale. A bird highlight included sighting a blue-grey noddy, band-rumped storm petrels and Juan Fernandez petrel. The Sette also had their first observations of the trip for Tristram's storm petrels. The blue-grey noddy (affectionately called the blueberry noddy aboard the Sette) is a Halobates specialist (the pelagic water strider). The birds were dipping down and pecking small prey from the surface of the water (perhaps Halobates?).

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Leatherback Turtle Feeding Ecology Research, Central California coast, CA, 1 – 29 September – The 2017 field effort remained suspended last week due to unfavorable weather which is expected to continue through the end of this week. Surveys and in-water capture effort will resume when the weather improves. Please contact Scott.Benson@noaa.gov for additional information.

Week of 11 September 2017

Whale Health & Condition Assessment, Vancouver Island, August-September – Last week the collaborative field team of John Durban (MMTD), Holly Fearnbach (SR3) and Lance Barrett-Lennard (Vancouver Aquarium’s Coastal Ocean Research Institute) arrived on San Juan Island, Washington State, to restart ongoing monitoring of the health of endangered Southern Resident killer whales, a NMFS Species in the Spotlight. This is the fifth field effort since 2015 using a hexacopter drone to collect vertical images for assessing interannual and inter-seasonal changes in growth and body condition, building on photogrammetry surveys in 2018 and 2013 using manned aircraft. The team were also joined in the field last week by MMTD Director Lisa Ballance, who brought good luck! Twenty-three flights were successfully completed with the hexacopter, collecting images of 54 different individual Southern Residents from a current population of 77. Photogrammetry measurements of morphometrics will be compared over time for the same individuals to infer nutritional status and health. For more information contact John.Durban@noaa.gov.

Overhead images of Southern Resident killer whales. Left: a young juvenile (J52) in emaciated condition displaying a “peanut head” – with diminished fat deposits around the head, the white eye patches narrow posterior to the blowhole to trace she outline of the cranium. Right: an adult female (L91) and young juvenile (L122); note the female carrying a Chinook salmon, the preferred prey of this population. Images obtained form an unmanned hexacopter that was flown >100ft above the whales under NMFS permit #19091.
Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS), Hawaiian Island Archipelago, 6 July - 9 December: Updates for Sep 2 – Sep 8 – On September 5, the Sette and Lasker completed Leg 2 and Leg 1, respectively. They leave Honolulu for their next legs on Monday September 11.

**Sette Leg 2:** The last few days of the leg allowed for some up-close-and-personal encounters with short-finned pilot whales, which allowed for a bunch of biopsy samples to be collected. Additional DASBRs were deployed as well. Mammal sightings or acoustic detections included spinner dolphins, short-finned pilot whales, Longman’s beaked whales, spotted dolphins, rough-toothed dolphins. A seabird highlight included a group of 200+ Great Frigatebirds off Maui!

**Lasker Leg 1:** On September 2, a planned deep-ocean water sampling effort was undertaken above Cross Seamount in hope of collecting environmental DNA that might reveal the identity of an elusive beaked whale known only by its acoustic signature. And on September 4, the Lasker and Sette conducted an active acoustic experiment together to evaluate background noise levels produced by the ships. Marine mammal species sighted or acoustically detected during the past week (just three days, really): spotted dolphins, rough-toothed dolphins, Cuvier’s beaked whale, Longman’s beaked whale, Risso’s dolphins, pygmy killer whales, striped dolphins. Birding this week was great, with the seabird team continuing to log about 15 species per day. Dark morph Wedge-tailed Shearwaters dominated the bird scene, with up to a thousand birds being seen each day, almost all in feeding flocks with Sooty Terns. The bird team also photographed a Pink-footed Shearwater, perhaps the first photographically documented record for the state of Hawaii.

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Completed effort (dark blue lines) after Sette Legs 1 and 2 and Lasker Leg 1. Red lines show where Lasker is headed for its Leg 2. Green lines depict survey strata boundaries.

Leatherback Turtle Feeding Ecology Research, Central California coast, CA, 1 – 29 September – The 2017 field effort was suspended last week due to poor sighting conditions. Unfavorable weather is expected to continue this week. Surveys and in-water capture effort will resume when the weather improves. Please contact Scott.Benson for additional information.

Week of 5 September 2017
Loggerhead Aerial Surveys, Southern California Bight, 27-29 August – The goal of this effort was to see if the SWFSC’s turtle scientists’ prediction of ‘no turtles present’ based on environmental conditions was correct. In total, the team flew 241.9 nautical miles of trackline, less than the originally planned 459 miles due to heavy fog and haze. Indeed, as predicted, no sea turtles were sighted, and although not as exciting as when turtles are seen, these ‘absence data’ are key for underpinning the environmental mechanisms that promote loggerhead presence in the region. This project is part of a BREP-funded project to study loggerhead habitat use within the SCB. Contact Tomo Eguchi or Jeff Seminoff for more information.

Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS), Hawaiian Island Archipelago, 6 July -9 December: Updates for Aug 26 – Sep 1 –

Sette Leg 2: The Sette retrieved an additional two DASBRs. The week included a couple of great weather days, during which close encounters with short-finned pilot whales and Blainville’s beaked whales occurred. Biopsy samples and UAS imagery were collected from the pilot whales. Additional mammal sightings/acoustic detections included striped dolphins, Cuvier’s beaked whales, and pygmy sperm whales. Bird of the week was Pacific Golden Plover.

Lasker Leg 1: This was the Lasker’s first week surveying within the US Hawaiian EEZ study area following a long (approx. 10-day) transit across the eastern Pacific from San Diego. Scientific progress was beset with two separate medical evacuations; fortunately, all the persons involved are ok at this writing. Two DASBRs previously deployed from the Sette were retrieved; these devices record acoustic detections of cetaceans, with an emphasis on deep-diving species such as beaked whales, which are difficult to survey visually. And an opportunistic deep-ocean water sampling effort was undertaken in the location of an acoustic and brief visual detection of the mysterious “Cross Seamount” beaked whale. This species is only known acoustically. We hope to have collected some environmental DNA samples that might reveal its identity. A dedicated effort to collect deep-water samples from several additional locations is planned next week. Marine mammal species sighted/acoustically detected: false killer whales, striped dolphins, short-finned pilot whales, pantropical spotted dolphins, Cuvier’s beaked whale, Blainville’s beaked whale, “Cross Seamount beaked whale” (acoustic detections only, and a likely visual glimpse but nothing confirmatory). Birding has been good with 15 or so species recorded most days. Numbers are dominated by tropical residents such as Wedge-tailed Shearwaters, Juan Fernandez and Hawaiian petrels, and feeding flocks of Sooty Terns. We are also commonly treated by a daily close encounter or two with Great Frigatebirds, Brown and Red-footed boobies, White- and Red-tailed...
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Leatherback Turtle Feeding Ecology Research, Central California Coast, 1–29 September - The 2017 field season began this past weekend. The aerial team, led by Scott Benson and Karin Forney, surveyed transects between Monterey Bay and the Sonoma coast during the oppressive heat wave. The team found four leatherbacks between San Francisco and Half Moon Bay in otherwise good sighting conditions, enduring temperatures that reached 95°F in the aircraft. Great numbers of large Mola mola were observed off the San Mateo coast in an area that has traditionally been favorable for leatherbacks; both species feed on local jellyfish and often co-occur in the same areas. Although many whales were sighted in Monterey Bay, no turtles were observed in that area. The weather forecast for the coming week is not favorable for
aerial surveys or in-water sampling, but operations are expected to continue when the weather improves. Please contact Scott.Benson@noaa.gov for additional information.

Top: Fine-scale aerial transects with leatherback turtle and *Mola mola* sightings. Bottom: Blue whale observed off Monterey Bay and temperature gage in aircraft

*Week of 28 August 2017*
Whale Health & Condition Assessment, Vancouver Island, August-September – This past week saw the completion of collaborative field work to assess whale health off northern Vancouver Island, Canada. MMTD’s John Durban partnered with Holly Fearnbach (SR3) and Lance Barrett-Lennard (Vancouver Aquarium’s Coastal Ocean Research Institute) to fly a further 41 flights with an unmanned hexacopter. In a total of 169 flights this month, vertical images were collected from 150 different Northern Resident killer whales, 15 Bigg’s (“Transient”) killer whales and 15 humpback whales (see image). The hexacopter was also used to collect blow samples from 10 of the humpback whales, which will be analyzed for respiratory microbiome in a collaborative project with Woods Hole Oceanographic Institute. The team now moves to the San Juan Islands, Washington State, to begin annual monitoring of the growth and body condition of endangered Southern Resident killer whales, a NMFS Species in the Spotlight, and to collect further images and blow samples to assess the health of humpback whales. For more information contact John.Durban@noaa.gov.

Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS), Hawaiian Island Archipelago, 6 July -9 December: Updates for Aug 18 - 25 –

Sette Leg 2 update: The Sette crossed the international dateline last week, working in the extreme NW portion of the study area. The crossing was ceremonious (image below). The map below shows the Sette’s progress to date (both legs). Mammal sightings included Kogia sp., Mesoplodon sp., rough-toothed dolphin, striped dolphin, short-finned pilot whale, Cuvier’s beaked whale and sperm whales. Bird encounter of the week is the South Polar Skua.

Lasker Leg 1 update: The Lasker spent last week transiting the eastern North Pacific Ocean from San Diego to Hawaii and entered the US Hawaiian EEZ study area Aug 26 before dawn. Over the next week,
the *Lasker* crew will be surveying for cetaceans and seabirds and retrieving one or two DASBRs deployed in recent weeks by the crew of the *Sette*. Marine mammal species sighted or acoustically detected during the past week: blue whales, short-beaked common dolphins, Risso’s dolphins, a Bryde’s/sei whale, striped dolphins, killer whales, false killer whales, Cuvier’s beaked whale, Blainville’s beaked whale, sperm whales, Guadalupe fur seals. Birds include Long-tailed Jaeger, Hawaiian and Cook’s petrels, Buller’s and Sooty shearwaters, White-tailed and Red-tailed tropicbirds, Brown booby, Red-footed Booby, Murphy’s Petrel and Kermadec Petrel, and much more.

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Loggerhead Aerial Surveys, Southern California Bight (SCB), 27-30 August – SWFSC researchers will conduct aerial surveys in the Southern California Bight in waters shoreward of San Clemente Island in their search for loggerhead sea turtles. The team will use a Partenavia Observer aircraft (Aspen Helicopters) for this round of surveys. This project is part of a Bycatch Reduction Engineering Program-funded project to study loggerhead abundance and habitat use within the SCB. Contact Tomo Eguchi or Jeff Seminoff for more information.

Week of 21 August 2017

Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS), Hawaiian Island Archipelago,  6 July -9 December: Updates for Aug 13 - 17 –

Sette Leg 2 update: We have encountered a few sperm groups and employed a long arduous protocol (90 min long) in effort to get good group size estimates. This is a difficult task for these leviathans because they occur in spread out groups of individuals that dive asynchronously for durations exceeding 60 or even 90 minutes. We also had a hugely exciting encounter with a group of Longman’s beaked whales (*Indopacetus pacificus*), which are encountered rarely and about which little is known. There was a single sighting of this species during the 2010 HICEAS cruise – only about 150 miles from where this sighting was made! (roughly 150 mi north of some of the Northwest Hawaiian Islands). Additional mammal species sighted last week included striped dolphins, Bryde’s whales, Cuviers beaked whales, unidentified *Mesoplodon* and beaked whales, and rorquals (either sei or Bryde’s). Notable bird sightings included Bulwer’s petrel, black-winged petrel, and sooty terns.
Lasker Leg 1 update: We are now en route to Hawaii (from San Diego)! The first day was spent setting up stations, trialing some protocols and working out some kinks, and sailing into the sunset! The 2017 HICEAS is a collaboration between the Pacific Islands Fisheries Science Center (PIFSC Chief Scientist: Erin Oleson) and the Southwest Fisheries Science Center (SWFSC Chief Scientist: Jeff Moore) to survey for cetaceans and seabirds within the U.S. waters of the Hawaiian Islands. HICEAS is being conducted July through December 2017 aboard NOAA ships Oscar Elton Sette and Reuben Lasker. Significant funding to support HICEAS is being provided by the Bureau of Ocean Energy Management (BOEM) and the U.S. Navy. For additional information, contact Erin.Oleson@noaa.gov, Jeff.Moore@noaa.gov, or visit https://www.pifsc.noaa.gov/hiceas/.

Whale Health & Condition Assessment, Vancouver Island, August-September – This past week saw spectacular weather and whales off northern Vancouver Island, Canada. MMTD’s John Durban partnered with Holly Fearnbach (SR3) and Lance Barrett-Lennard (Vancouver Aquarium’s Coastal Ocean Research Institute) to fly 76 flights with an unmanned hexacopter – the most our UAS teams have ever flown in a single week. This enabled the collection of vertical images from 140 different Northern Resident killer whales, 10 Bigg’s (“Transient”) killer whales and six humpback whales. The hexacopter was also used to collect blow samples from three of the humpback whales, which will be analyzed for respiratory microbiome in a collaborative project with Woods Hole Oceanographic Institute. Notably, both the images and blow samples represented repeated sampling of the same whales, for both killer and humpback whales that were also sampled in previous years (annually dating back to 2014 for killer
whales); this will enable longitudinal monitoring of body condition and growth rates. For more information contact John.Durban@noaa.gov.

*Abundance and Demography of Cook Inlet Beluga Whales, Cook Inlet, AK, August* – LTJG Hollis Europe and LTJG Jake Barbaro finished the first half of the Abundance and Demography of Cook Inlet Beluga Whale survey with the APH-22 hexacopter (in collaboration with PI Paul Wade, head of beluga research at AFSC) with 5 of 5 survey days successful. Weather was cooperative and 36 hexacopter flights were completed with over 6 hours of flight time and great visual data. After a week back in La Jolla, Hollis and Jake have returned to Anchorage for the second half of the hexacopter survey August 16-25. Wind restricted flight on day 1, but the team was still able to find the whales for oblique photos. Day 2 allowed for another 11 successful flights over beluga whales, including several calves and interesting "logging" behavior by some of the whales. For more information contact John.Durban@noaa.gov or Paul.Wade@noaa.gov

*Week of 14 August 2017*
Whale Health & Condition Assessment, Vancouver Island, August-September – It was a very successful first week of whale health assessment off northern Vancouver Island, Canada. MMTD’s John Durban partnered with Holly Fearnbach (SR3) and Lance Barrett-Lennard (Vancouver Aquarium’s Coastal Ocean Research Institute) to fly 52 flights with an unmanned hexacopter. Vertical images were collected from 40 different Northern Resident killer whales, five Bigg’s (“Transient”) killer whales and three humpback whales. These images will be used for photogrammetry measurements to assess changes in the size and body condition of these same whales, which were also imaged in previous years (dating back to 2014 in some cases). The hexacopter was also used to collect one blow sample from a humpback whale, which will be analyzed for respiratory microbiome in a collaborative project with Woods Hole Oceanographic Institute. For more information contact John.Durban@noaa.gov.

Left: vertical image of a humpback whale, which will be used to compare body condition and health for this species in different feeding areas. Right: vertical image of Northern Resident killer whales, which will be used to compare their growth and body condition to that of endangered Southern Resident killer whales. Images collected using an unmanned hexacopter at altitudes of >100ft above the whales, permitted in Canada under the Species at Risk Act (Marine Mammal License 18) and flight authorizations from Transport Canada (SFOC # 13026742).
Retrieved DASBR, covered with barnacles.

Acousticians Erik Norris and Jennifer Keating.

Week of 7 August 2017

Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS), Hawaiian Island Archipelago, 6 July - 9 December – Update for July 28 - Aug 1: The Sette has been working to retrieve some of the eight DASBRs deployed before July 20. (DASBRs = Drifting Acoustic Spar Buoy Recorders for gathering passive acoustic data for deep diving species.) Some have been retrieved and collected data along drifting paths on the order of a few hundred miles long. Unfortunately, a few have stopped transmitting, possibly due to water condensation or flooding issues. During these final days of Leg 1, mammal sightings have been few, and included false killer whales, short-finned pilot whales, pygmy killer whales, sperm whales, and an unidentified beaked whale. Birders were excited to see two Kermadec petrels, a relatively rarely observed species in Hawaiian waters. The Lasker begins its first leg out of San Diego on August 17. The 2017 HICEAS is a collaboration between the Pacific Islands Fisheries Science Center (PIFSC Chief Scientist: Erin Oleson) and the Southwest Fisheries Science Center (SWFSC Chief Scientist: Jeff Moore) to survey for cetaceans and seabirds within the U.S. waters of the Hawaiian Islands. HICEAS is being conducted July through December 2017 aboard NOAA ships Oscar Elton Sette and Reuben Lasker. Significant funding to support HICEAS is being provided by the Bureau of Ocean Energy Management (BOEM) and the U.S. Navy. For additional information, contact Erin.Oleson@noaa.gov, Jeff.Moore@noaa.gov, or visit https://www.pifsc.noaa.gov/hiceas/.
Abundance and Demography of Cook Inlet Beluga Whales, Cook Inlet, AK, August – This week, LTJG Hollis Europe and LTJG Jake Barbaro worked with Paul Wade, head of beluga research at the Alaska Fisheries Science Center, to begin a new study using hexacopters to collect aerial photo-identification images and photogrammetry measurements of Cook Inlet beluga whales, a NMFS Species in the Spotlight. The aerial and oblique photos obtained will be used to develop an individual identification catalog and estimate the length of whales, with the ultimate goal of estimating calf production and other demographic rates. In four days there have been 5 sightings with 45-175 whales in each group. The 2016 aerial survey abundance estimate was ~330 whales, so the sighting of 175 whales represented more than half the population, giving us very valuable data and photographs. Hollis and Jake have completed 24 photo and video flights with a total of 4 flight hours. The project is made possible by a collaboration with Alaska Department of Fish & Game, which is providing an excellent 21' Safeboat to work from, with coxswains Justin Jenniges and Tom Gage, and with Dave McKay providing local knowledge for safely navigating Cook Inlet's extensive mud flats and 30 foot tides. For more information contact John.Durban@noaa.gov or Paul.Wade@noaa.gov

Whale Health & Condition Assessment, Vancouver Island, August-September – This week MMTD (John Durban) will partner with the Vancouver Aquarium (Lance Barrett-Lennard) and SR3 (Sealife Response, Rehabilitation and Research; Holly Fearnbach) for a fourth year of UAS-photogrammetry studies to monitor the health of Northern and Southern Resident killer whales. For the next three weeks the team will use an unmanned hexacopter to collect vertical images of Northern Resident killer whales off Northern Vancouver Island, Canada, to monitor their growth and body condition, and in September the team will collect comparative images from endangered Southern Research killer whales (a NMFS Species in the Spotlight) in US waters off the San Juan Islands, Washington. This project (ongoing since 2014) aims to compare the nutritional health of these two populations and relate changes across seasons and years relative to changes in the availability of their primary prey, Chinook salmon. These data will support management actions in the US and Canada aimed at maintaining an adequate food supply. Concurrently the team will also use UAS platforms to collect aerial images and blow samples from humpback whales, to build on ongoing studies into the health of humpbacks on several feeding areas worldwide. For more information contact John.Durban@noaa.gov

Week of 31 July 2017
Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS), Hawaiian Island Archipelago, 6 July -9 December – Update for July 22 – 28: The Sette crew has been keeping track of the eight DASBRs deployed before July 20. DASBRs = Drifting Acoustic Spar Buoy Recorders for gathering passive acoustic data for deep diving species. A few of the devices have had some recent problems transmitting their locations; troubleshooting the cause of this is underway. Acoustic or visual sightings last week include false killer whales (3 biopsy samples collected!), melon-headed whales, sperm whales, *Kogia* sp, rough-toothed dolphins, spotted dolphins, and Risso’s dolphins. The *Lasker* begins its first leg out of San Diego on August 17.

The 2017 HICEAS is a collaboration between the Pacific Islands Fisheries Science Center (PIFSC Chief Scientist: Erin Oleson) and the Southwest Fisheries Science Center (SWFSC Chief Scientist: Jeff Moore) to survey for cetaceans and seabirds within the U.S. waters of the Hawaiian Islands. HICEAS is being conducted July through December 2017 aboard NOAA ships *Oscar Elton Sette* and *Reuben Lasker*. Significant funding to support HICEAS is being provided by the Bureau of Ocean Energy Management (BOEM) and the U.S. Navy. For additional information, contact Erin.Oleson@noaa.gov, Jeff.Moore@noaa.gov, or visit https://www.pifsc.noaa.gov/hiceas/.

Abundance and Demography of Cook Inlet Beluga Whales, Cook Inlet, AK, August - This week MMTD will partner with the Alaska Fisheries Science Center to begin a new study using small UAS platforms to collect aerial photo-identification images and photogrammetry measurements of Cook Inlet beluga whales, a NMFS Species in the Spotlight. LTJG Hollis Europe and ENS Jacob Barbaro will join Paul Wade from AFSC for the first of two field efforts to take place this month. The goal is to match morphometric measurements to uniquely identifiable whales to assess growth and size structure in the population, and use aerial photo-identifications to help estimate abundance and demographic rates. For more information contact Hollis.Europe@noaa.gov or John.Durban@noaa.gov.

Week of 24 July 2017
Leatherback Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, spring/summer 2017 – Last week was the final one for the 2017 season. This season’s focus (of this multi-year project) was to collect skin clips from nesting females for genetic fingerprinting. These samples will be compared with the genetic fingerprints of hatchlings, from which skin clips were collected in 2009, as a tool to estimate age to maturity for this population. The 2017 season sample totals were 821 hatchling samples from 29 nests, 28 adult female samples, and samples from egg fragments of 10 nests. Among these samples is a female suspected to have been sampled as a hatchling during a previous season here. Stay tuned for genetic results this fall. Meanwhile, plans for next year’s sampling are underway, made important because leatherback nesting numbers were low this year relative to other years throughout the Caribbean, including our index beach on St. Croix. In fact, the number of nesting females here was the lowest since 1990. However, reports from the foraging grounds indicate high numbers of leatherbacks. Next year will provide additional insights. For more information contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov

California Sea Lion Census and Diet Research, Channel Islands, Southern California Bight, quarterly – Jim Carretta and Alex Curtis will travel to San Clemente Island on July 21-24 to collect California sea lion scat samples for diet analysis and to count pinnipeds. For more information contact Mark.Lowry@noaa.gov

US West Coast Pinniped Census, 5-19 July – An aerial photographic survey of California sea lions and Steller sea lions at the Channel Islands in southern California was conducted during July 8-10 and along the mainland coast from Coos Bay, Oregon, south to Point Conception in central California during July 14-16. Mark Lowry conducted the survey at the Channel Islands, and Beth Jaime joined him with the survey of the mainland coast. Unfortunately, San Miguel Island, one of the Channel Islands in southern California, has not been completely surveyed due to adverse weather conditions. Weather permitting, it will be surveyed next week. The Navy (Naval Base Ventura County) is funding a chartered aircraft for the
survey of the Channel Islands and Alaska Regional Office is funding the aircraft for the mainland coast
survey. For more information contact mark.lowry@noaa.gov

Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS), Hawaiian Island Archipelago,
6 July -9 December – Update for July 9-20 (Days 4 – 15): Last week the Sette crew deployed eight
DASBRs (drifting acoustic spar buoy recorders) to gather passive acoustic data for deep diving cetacean
species. Acoustic or visual sightings included false killer whales, melon-headed whales, pilot whales,
sperm whales, striped dolphins, Kogia sp, Blainville’s beaked whales, bottlenose dolphins, rough-toothed
dolphins, pygmy killer whales and killer whales! The Lasker begins its first leg out of San Diego on
August 17. The 2017 HICEAS is a collaboration between the Pacific Islands Fisheries Science Center
(PIFSC Chief Scientist: Erin Oleson) and the Southwest Fisheries Science Center (SWFSC Chief
Scientist: Jeff Moore) to survey for cetaceans and seabirds within the U.S. waters of the Hawaiian Islands.
HICEAS is conducted aboard NOAA ships Oscar Elton Sette and Reuben Lasker. Significant funding is
being provided by the Bureau of Ocean Energy Management (BOEM) and the U.S. Navy. For additional
information, contact Erin.Oleson@noaa.gov, Jeff.Moore@noaa.gov, or visit
https://www.pifsc.noaa.gov/hiceas/.
Week of 17 July 2017

*Leatherback Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands* – This season’s focus of this multi-year project is to collect skin clips from nesting females for genetic fingerprinting. These samples will be compared with the genetic fingerprints of hatchlings, from which skin clips were collected in 2009, as a tool to estimate age to maturity for this population. The project is in its final week for the season; final tallies of samples will be reported next week. For more information contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov.

Week of 10 July 2017
Successful completion of the San Diego Bay Green Turtle Abundance Project, week of 3 July 2017 – The SWFSC turtle team concluded its inaugural Green Turtle Abundance Survey in San Diego Bay and it was a huge success! The team captured 8 green turtles during their only outing of the week (6 July), bringing the project’s totals to 51 captures of 32 individual turtles. In the coming weeks the team will conduct mark recapture analyses to determine the Bay’s green turtle population size. This information will be instrumental in placing a population-level context for the (too-frequent) green turtle standings that have been happening in the bay over the last several years. Contact PIs Tomo.Eguchi@noaa.gov or Jeffrey.Seminoff@noaa.gov for additional information.

Hawaiian Islands Cetacean and Ecosystem Assessment Survey (HICEAS), Hawaiian Island Archipelago, 6 July – 9 December – The 2017 HICEAS is a collaboration between the Pacific Islands Fisheries Science Center (PIFSC Chief Scientist: Erin Oleson) and the Southwest Fisheries Science Center (SWFSC Chief Scientist: Jeff Moore) to survey for cetaceans and seabirds within the U.S. waters of the Hawaiian Islands. The survey goals are estimate the abundance of cetaceans in Hawaiian water, examine their population structure, and understand their habitat. Large-scale surveys like HICEAS are rare, and the 2017 survey is especially significant as it will provide important data for several management priorities: a) Cetacean and seabird species inventory, abundance, and habitat information for the recently expanded Papahānaumokuākea Marine National Monument; b) New abundance estimates for false killer whales in support of the False Killer Whale Take-Reduction Plan, as well as for all cetacean species as required under the Marine Mammal Protection Act (MMPA); c) Updated abundance and distribution data for large whale, sea turtle, and seabird species listed under the Endangered Species Act; and d) Updated cetacean and seabird assessments used to evaluate whether bycatch rates in U.S. fisheries are sustainable under the MMPA and Magnuson-Stevens Fishery Reauthorization Act. HICEAS will be conducted July through December 2017 aboard the NOAA ships Oscar Elton Sette and Reuben Lasker. The survey effort will include a) visual observations for cetaceans, including photo-identification, biopsy sampling, and satellite tagging; b) passive acoustic monitoring using towed hydrophone arrays and other tools; c) ecosystem
assessment, including visual surveys for seabirds and measurement of oceanographic variables; and d) ancillary projects, such as aerial photogrammetry using a hexacopter, testing of new passive acoustic tools, and projects by visiting scientists. These four research components should provide data to derive abundance estimates for cetacean species, population size and structure, evaluate health condition and contaminant levels, evaluate population movement and range, and collect oceanographic data to characterize the habitat of the study area. NOAA Ship Sette departed Honolulu on July 6th with Erin Oleson (PIFSC) as cruise leader. False killer whales, the highest priority species for the survey, were seen on day 3. Other species encountered included sperm and pilot whales. For additional information, contact Erin.Oleson@noaa.gov, Jeff.Moore@noaa.gov, or visit https://www.pifsc.noaa.gov/hiceas/.

Leatherback Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands - This season’s focus of this multi-year project is to collect skin clips from nesting females for genetic fingerprinting. These samples will be compared with the genetic fingerprints of hatchlings, from which skin clips were collected in 2009, as a tool to estimate age to maturity for this population. Hatchling sampling continues nightly, and the hatchling sample count is now 599. As we had 28 individual females this season, our goal is to sample 32 hatchlings from each of these females in order to deduce the paternal genotypes, and census the number of males and thus determine the breeding sex ratio for this year. To date, we have sampled 18 of these females’ nests, and we expect to finish sampling nests from the remaining females by July 21st. For more information contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov.

Week of 3 July 2017

UAS Photogrammetry of Dolphins, Southern California Bight, Weekly Report 2 – Last week was very successful for data collection on the collaborative project “Integrating remote sensing methods to measure baseline behavior and responses of social delphinids to Navy sonar”. The MMTD team of John Durban, Holly Fearnbach, Molly Groskreutz and Keiko Sherman flew a further 17 flights with an unmanned octocopter from a 65’ boat to obtain vertical photographs from above dolphin schools around Catalina Island, off southern California. In total, the octocopter has been flown for >10 hours during this 10-day field effort, covering more than 67 km, and collecting almost 22,000 images. This includes images of four dolphin species: long-beaked common dolphins (10 flights, 9869 images), short-beaked common dolphins (3 flights, 1852 images), bottlenose dolphins (5 flights, 3343 images) and Risso’s dolphins (6 flights, 6914 images). The project focus now shifts to photogrammetric analyses of these images to provide information on group spacing and behavior, and to measure length and width profiles to infer individual condition. Blubber biopsy samples were also collected during encounters with all these species, and will be used to measure levels of stress hormones as part of a study being led by Nick Kellar from MMTD. These data will be combined with shore- and vessel-based visual sampling and passive acoustic monitoring to document specific aspects of baseline (undisturbed) behavior and physiology, to aid in
identifying responses during controlled sound exposure experiments to take place in October 2017 and June 2018. For more information contact John.Durban@noaa.gov. Further details on this collaborative project can be found here: http://sea-inc.net/2017/06/20/new-marine-mammal-research-project-integrating-visual-and-acoustic-sensors-to-study-behavior-and-behavioral-response-in-small-cetaceans/.

Aerial images of short-beaked common dolphins (left) and Risso’s dolphins (right) taken off Catalina Island; images collected from an unmanned octocopter >100ft above the dolphins, authorized by NMFS permit # 19091.

Leatherback Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, spring/summer 2017 – This season’s focus of this multi-year project is to collect skin clips from nesting females for genetic fingerprinting. These samples will be compared with the genetic fingerprints of hatchlings, from which skin clips were collected since 2009, as a tool to estimate age to maturity for this population. All night patrols have finished early this season, with no observed leatherback nesting since mid-June, making 2017 a year with the lowest number of nesters in over a decade. Hatchling sampling continues nightly; a total of 119 nests have emerged to date and the hatchling sample count is now 535. Twenty-eight females nested this season; our goal is to sample 32 hatchlings from each to deduce paternal genotypes, census the number of breeding males, and determine breeding sex ratio for this year. (Sea turtles have temperature-dependent sex determination. Data from previous years have indicated that breeding sex ratios were 1:1 despite highly female-biased hatching sex ratios associated with warming sand temperatures.) To date, we have sampled 16 of these females’ nests, and nests will continue to emerge through July. The project hosted an
important visitor last week: Donna Wieting (Director Office of Protected Resources). In addition to a site visit, Donna participated in a strategic planning meeting (June 26th) with Peter Dutton, Robin LeRoux, Kelly Stewart and USFWS colleagues to discuss how to formalize cooperation and expand partnerships to maintain monitoring, conservation management and research of the St. Croix leatherback population into the future. For more information contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov.

US West Coast Pinniped Census, 5-19 July – An aerial photographic survey of California sea lions and Steller sea lions at the Channel Islands in southern California and along the mainland coast from Point Conception to Cape Blanco, Oregon will be conducted by Mark Lowry and Beth Jaime. Significant funding for this effort comes from The Navy - Naval Base Ventura County (chartered aircraft for the survey of the Channel Islands) and Alaska Regional Office (aircraft time for the mainland coast survey). Contact Mark.Lowry@noaa.gov for more information.

San Diego Bay Green Turtle Abundance Project, Week of 26 June 2017 – Last week the SWFSC turtle team captured 3 green turtles over two nights (27, 29 June), bringing the season’s total to 43 captures (29 different individuals). The project will conclude on Thursday, 6 July. Contact PIs Tomo.Eguchi@noaa.gov or Jeffrey.Seminoff@noaa.gov for additional information.

Week of 26 June 2017

San Diego Bay Green Turtle Abundance Project, Week of 19 June 2017 – Last week the SWFSC turtle team continued efforts for the Green Turtle Abundance Survey in San Diego Bay and had another great week, capturing 9 green turtles over two nights (20, 22 June). This marked the third highest week-long haul of the project, trailing the 10 turtle week in early May and the record 14-turtle week on 5 June. The week’s green turtles ranged from 55.0-107.5 cm in curved carapace length and included juveniles, adult males and adult females. In addition, four satellite tags were deployed on green turtles in the bay as part of a partnership with the Unified Port of San Diego and US Navy. So far the team has had 40 captures total (28 different individuals) since the start of the project. The project continues through the beginning of July. Contact PIs Tomo.Eguchi@noaa.gov or Jeffrey.Seminoff@noaa.gov for additional information.

Leatherback strategic planning meeting participants (top row) pose with field staff and interns (bottom row) on Sandy Point. Top from left are: Ana Roman (USFWS), Robin LeRoux (NMFS-SWFSC), Brian Garcia (USFWS-Enforcement), Claudia Lombard (USFWS), Susan Silander (USFWS), Peter Dutton (NMFS-SWFSC), Michael Evans (USFWS), Kelly Stewart (The Ocean Foundation/NMFS-SWFSC), Donna Dutton (Ocean Planet Research, Inc.), and Donna Wieting (NMFS-OPR). Front row are field staff and SCA interns. (photo:Emma Dutton)
Leatherback Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, spring/summer 2017 – Tonight (23 June) will be the final night patrol for the team looking for nesting females. During the last week, only one female was found – Coco. This was a turtle that was a neophyte in 2014, and has nested at Sandy Point five times this year. She’s one of the smaller turtles at 143 cm CCL. In May, Coco had some major scratches and cuts on her face just behind her eye. By 22 June, those scratches had completely healed – these turtles recover remarkably quickly from injuries. Hatchling sampling continues nightly; several nests emerged this week and the hatchling sample count is now 416. As we had 28 individual females this season, our goal is to sample 32 hatchlings from each of these females to get a complete picture of the breeding sex ratio for this season. To date, we have sampled nine of these females’ nests. This coming week, Peter Dutton and Robin LeRoux join the team.

UAS photogrammetry of dolphins off Catalina Islands, CA. Weekly Report 1 – A first field effort began this week on the project “Integrating remote sensing methods to measure baseline behavior and responses of social delphinids to Navy sonar”. This is a collaborative project between scientists from Southall Environmental Associates, Kelp Marine Research, Cascadia Research Collective and MMTD/SWFSC, with funding by the Office of Naval Research. The MMTD team of John Durban, Holly Fearnbach, Molly Groskreutz and Keiko Sherman are flying an unmanned octocopter from a 65’ boat to obtain vertical photographs from above dolphin schools around Catalina Island, off Southern California. From these photographs, photogrammetry measurements will be made to describe group spacing and behavior, and to measure length and width profiles to infer individual condition. These data will be combined with shore- and vessel-based visual sampling and remotely deployed passive acoustic sensors.
to document specific aspects of baseline (undisturbed) behavior and potential responses during sound exposure experiments to take place in October 2017 and June 2018. This current 10-day field effort focuses on collecting baseline data and establishing protocols for integrating the different group monitoring approaches. Seven flights have been completed in the first two days of the study, obtaining >3500 images of short-beaked common dolphins and bottlenose dolphins.

**Week of 19 June 2017**

*Leatherback Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, spring/summer 2017 –* This season’s focus of this multi-year project is to collect skin clips from nesting females for genetic fingerprinting. These samples will be compared with the genetic fingerprints of hatchlings, from which skin clips have been collected since 2009, as a tool to estimate age to maturity for this population. Last week there were three nesting turtles that visited Sandy Point. One turtle was a returning nester named Rica and finally, two neophytes nested. We now have a total of 28 individual turtles with 118 nests this season. Of the two neophytes that came to the beach, only one nested (named Grace). Her first two nests collapsed in soft sand but she was then able to get on top of the berm and lay her first nest here at Sandy Point. The other neophyte tried to nest in an area where sand had recently accumulated, after it had been swept down from the west beach, which erodes every season. When she tried to dig her nest, she kept hitting water. She ended up digging twice and then abandoned the attempt. But we were still able to take a genetic sample and this may be the sample to check and double check against our hatching sample fingerprints. Ginger, as she was called, has a small semicircle missing from her right front flipper in the location where we take samples from hatchlings. We will be sending our neophyte samples to the SWFSC genetics lab so they can be analyzed with the new SNP markers being developed. We will be anxious to see if we have a match! Six nests emerged this week and we now have 320 hatchling samples. Additionally, the team has been able to see many hawksbills arriving to the beach, as it’s the start of nesting season for hawksbills and green turtles. Erin LaCasella has joined the team for the next ten days. Peter Dutton and Robin LeRoux will join for the last week in June. For more information contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov.

*San Diego Bay Green Turtle Abundance Project, Week of 12 June 2017 –* Last week the SWFSC turtle team continued efforts for the Green Turtle Abundance Survey in San Diego Bay and had a not so stellar week, capturing 2 green turtles over two nights (13, 15 June). The week’s green turtles were 115 and 80.8 cm in curved carapace. So far the team has had 33 captures totaling 23 different individuals since the start of the project. The project continues through the end of June. Contact PIs Tomo.Eguchi@noaa.gov or Jeffrey.Seminoff@noaa.gov for additional information.

**Week of 12 June 2017**

*The team performs a nest excavation on a nest that hatched at the Carambola Resort. We collected spacer (yolkless) eggs in hopes of using these to identify the unknown turtle that laid this nest in early April.*
San Diego Bay Green Turtle Abundance Project, Week of 5 June 2017 – Last week the SWFSC turtle team continued efforts for the Green Turtle Abundance Survey in San Diego Bay and had a record week, capturing 14 green turtles over two nights (6, 8 June). This marked a record 1-week haul for the history of the San Diego Bay green turtle research which started more than 20 years ago! The week’s green turtles ranged from 55.7-116.2 cm in curved carapace length and included juveniles, adult males and adult females. Notably, one of the turtles was a juvenile first captured in 2016 at Seal Beach National Wildlife Refuge in Orange County, CA; this is the first-ever recapture of a turtle in San Diego Bay that had been initially tagged up north! So far the team has had 30 captures totaling 22 different individuals since the start of the project. The project continues through the end of June. Contact PIs Tomo.Eguchi@noaa.gov or Jeffrey.Seminoff@noaa.gov for additional information.

Leatherback Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, spring/summer 2017 – This season’s focus of this multi-year project is to collect skin clips from nesting females for genetic fingerprinting. These samples will be compared with the genetic fingerprints of hatchlings, from which skin clips were collected in 2009, as a tool to estimate age to maturity for this population. Last week the team saw only 3 nesting leatherbacks on night patrols, all were returning turtles that have been seen this year – including Seri – the turtle that carried a VDR. We currently stand at 111 nests laid by 26 leatherback females for Sandy Point. Hatchlings from 5 nests were sampled bringing this season’s total to 205 hatchling samples. Of note, a nest close to Cottages (where we stay) hatched 65 days after we observed the female digging and laying. Twenty-one hatchlings emerged; we excavated the nest and found 1 more live hatchling, 22 hatched shells, and 69 undeveloped eggs. Poor hatching success may have been due to excessive overwash of the nest during the early part of incubation. We have also seen a mild increase in hawksbill nesting; the team has encountered them on a few patrols. This coming week,
Erin LaCasella will join the team. For more information contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov.

Week of 5 June 2017
Health Assessment of Southern Resident Killer Whales, Puget Sound, May 2017 – Last week saw the successful completion of the first round of the 2017 health assessment of Southern Resident killer whales (a NMFS “Species in the Spotlight”). Working around the San Juan Islands, Washington State, the team from SWFSC/MMTD (John Durban), the Vancouver Aquarium (Lance Barrett-Lennard) and SR3 (Holly Fearnbach) completed 17 flights with a small unmanned hexacopter, obtaining overhead images of all members of “J-pod” (24 whales). Photogrammetric analyses of these images will be used as part of a long-term monitoring study to assess changes in growth and body condition to relate to trends in returns of their Chinook salmon prey. The team will re-start flight operations in September to see how the condition of the whales has changed after summer salmon returns. For more information contact John.Durban@noaa.gov.
Leatherback Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, spring/summer 2017 – This season’s focus of this multi-year project is to collect skin clips from nesting females for genetic fingerprinting. These samples will be compared with the genetic fingerprints of hatchlings, from which skin clips were collected in 2009, as a tool to estimate age to maturity for this population. As the season progresses, fewer turtles are nesting and more nests are emerging; the team is focused on collecting data on hatch success and sampling hatchlings for genetic analysis (120 samples were collected from 5 nests last week). New volunteers have arrived to help throughout the hatchling season, which will continue through July. Ayaka Asada from Texas A&M left last week after retrieving satellite tags from one (of two) tagged turtles. Some nesting continues (7 turtles last week, three of which had recently been attacked by sharks). This year we are seeing a higher proportion of turtles with serious wounds from sharks, and this will be something we investigate in future years as it may play a role in the decreased nesting at Sandy Point. Season total is 108 nests laid by 26 females. Amy Frey and volunteer Drue Frey join the team this week. For more information contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov.

Week of 30 May 2017

Leatherback Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, spring/summer 2017 – This season’s focus of this multi-year project is to collect skin clips from nesting females for genetic fingerprinting. These samples will be compared with the genetic fingerprints of hatchlings, from which skin clips were collected in 2009, as a tool to estimate age to maturity for this population. The peak of the nesting season is coming to an end; to date, 101 nests laid by 26 females have been detected and sampled. Last week, Rapunzel (victim of a shark attack last year) and Kanga (satellite tagged earlier this season by colleagues from Texas A&M) laid their sixth nests of the season, and Nina her fifth. Two turtles still carrying satellite tags and video recorders are expected to nest again this weekend; both are in nearshore waters off Sandy Point. Last week was the beginning of this season’s hatchling sampling (collecting skin samples from hatchlings emerging from nests). For nests with unknown mothers (early season nests), yolkless eggs are also collected to allow for genetic identification of the female. Six nests and 56 hatchlings have been sampled to date. New members of the research team this week include visiting researcher Catherine McClellan, scholarship student from the University of Richmond Nina Mauney, and Morgane Lauf (MMTD-SWFSC). For more information contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov.
Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, California, 27 March - 26 May – The 24th consecutive year (1994-2017) of SWFSC’s survey to estimate the annual calf production of eastern North Pacific gray whales was successfully completed on 26 May. During the 9-week survey, 407.5 hours of visual observation effort were completed during which time 317 female-calf pairs were recorded. Shore-based photo-identification effort to catalog female-calf pairs was highly productive as were UAS operations which carried out 83 flights and photographed 64 pairs to examine body condition and health. The participation of observers from nearly all of the programs within MMTD as well as volunteers from the broader research community has greatly benefited this one-of-a-kind time series. See [https://swfsc.noaa.gov/textblock.aspx?Division=PRD&id=12166&ParentMenuId=211](https://swfsc.noaa.gov/textblock.aspx?Division=PRD&id=12166&ParentMenuId=211) and for details contact dave.weller@noaa.gov, wayne.perryman@noaa.gov or john.durban@noaa.gov.

Health Assessment of Southern Resident Killer Whales, Puget Sound, May 2017 – No Southern Resident killer whales were seen this past week, but John Durban (SWFSC/MMTD), Lance Barrett-Lennard (Vancouver Aquarium) and Holly Fearnbach (SR3) continued to collect photogrammetry data for whale health assessment. Nineteen flights were conducted with an unmanned hexacopter, collecting overhead images to assess the growth and body condition of 10 Bigg’s (“transient”) killer whales and two humpback whales. The team now enter their final week of flight operations before the project breaks until continued health assessment flights in September. For more information contact John.Durban@noaa.gov.

*Week of 22 May 2017*

Overhead images of mother-calf pair of Bigg’s (“transient”) killer whales; the mother carrying a harbor seal that is about to be consumed. Images obtained from an unmanned hexacopter (right) that was flown >100ft above the whales under NMFS permit #19091.
Health Assessment of Southern Resident Killer Whales, Puget Sound, May 2017 – No Southern Resident killer whales were seen this past week, but the collaborative team of John Durban (SWFSC/MMTD), Lance Barrett-Lennard (Vancouver Aquarium) and Holly Fearnbach (SR3) continued to collect data for whale health assessment. Twenty-two flights were conducted with an unmanned hexacopter, collecting overhead images of three Bigg’s (“transient”) killer whales to assess the size and body condition of these mammal-eating killer whales, and images were also collected of seven humpback whales. Two blow samples were collected on the hexacopter during lower descents over humpback whales, and these will be used to examine respiratory microbiome as part of comparative health assessment of large whales on different feeding grounds. For more information contact John.Durban@noaa.gov.

Overhead images of three Bigg’s (“transient”) killer whales (left) and a humpback whale (right). Images obtained form an unmanned hexacopter (right) that was flown >100ft above the whales under NMFS permit #19091.

Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, California, 27 March - 26 May – During week 8 (15-19 May) of SWFSC’s survey to estimate the annual calf production of eastern North Pacific gray whales, 51.5 hours of visual observation effort were completed during which time 11 female-calf pairs were recorded. In addition to gray whales, blue whales, bottlenose dolphins and killer whales were observed. The UAS team was sidelined by high winds during most of the week, but were able to photograph one female-calf pair. For details contact: dave.weller@noaa.gov, john.durban@noaa.gov or wayne.perryman@noaa.gov.

Leatherback Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, spring/summer 2017 – This season’s focus of this multi-year project is to collect skin clips from nesting females for genetic fingerprinting. These samples will be compared with the genetic fingerprints of hatchlings, from which skin clips were collected in 2009, as a tool to estimate age to maturity for this population. This season’s total is now 92 nests laid by 26 individuals, including 6 neophytes (turtles nesting for the first time). Highlights of last week included sightings of Rica (who has nested six times this season) and Phyllis (who has nested on Sandy Point over 50 times since 1999), and a memorable green turtle hatching event: several hatchlings were seen on the beach surrounded by approximately 45 tracks leading into the ocean with some night heron tracks alongside them. The team located the nest from which the tracks began to find that fire ants were attacking the few remaining hatchlings. The next was immediately excavated and four hatchlings were found and released on the south end of the beach.
It was also a successful week for visiting researchers Ayaka Asada and Randall Davis from Texas A&M. They were able to both retrieve their second tag from Kanga and deploy on a third and fourth turtle, Gigi and Seri. Through these deployments, foraging and diving behavior data during interesting periods is being collected. The team happened upon Gigi as she was digging and noticed that she had just begun digging up a previously laid nest. In an attempt to save the other nest, the team covered the nest with sand as Gigi dug, simulating a collapsing nest until she abandoned the nest chamber. Gigi found another site just a few meters away to lay her eggs. The team has also started spending time between nesting turtle patrols to triangulate and mark nests that are estimated to emerge soon. Hatchling sampling and nest protection begins this weekend. Nina Mauney from the University of Richmond is the first student hatchling team volunteer to arrive – she’ll be joining the team Saturday. For more information contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov.

Week of 15 May 2017
Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, California, 27 March - 26 May – During week 7 (8-12 May) of SWFSC’s survey to estimate the annual calf production of eastern North Pacific gray whales, 46.5 hours of visual observation effort were completed during which 47 female-calf pairs were recorded. In addition to gray whales, blue whales, bottlenose dolphins and an adult male killer were observed. The UAS team of Hollis Europe and Jacob Barbaro took advantage of the good weather windows and completed 21 flights for a total of about 3 hours of flight time. A total of 6 gray whale female-calf pairs were photographed and a dozen laser altimeter calibration flights were completed. For details contact: dave.weller@noaa.gov, john.durban@noaa.gov, or wayne.perryman@noaa.gov.

Leatherback Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, spring/summer 2017 – This season’s focus of this multi-year project is to collect skin clips from nesting females for genetic fingerprinting. These samples will be compared with the genetic fingerprints of hatchlings, from which skin clips were collected in 2009, as a tool to estimate age to maturity for this population. Despite rainy and stormy weather, this week we had a total of 10 re-migrant turtles that came to nest. Highlights from last week: A) Nest relocation for a returning turtle (Marsha) because she laid her eggs in an area of the beach that erodes as the season progresses. B) First hatchlings of the season emerged. Community members taking part in the Turtle Watch program were onsite. A total of 80 eggs had hatched and we found and released eight live hatchlings. Samples were collected of the yolkless eggs, which will be used in the lab to determine which turtle laid this nest. C) Two turtles, Sabrina and Esmeralda, false crawled (they dug nests but didn’t lay) because their nest chambers were unstable and collapsed. Sabrina returned three days later and successfully laid her fourth nest of the season. D) We measured two nests reported by beachgoers off the refuge that we will monitor for hatching. E) The second VDR transmitter was deployed by visiting researchers Ayaka Asada and Randall Davis from Texas A&M on a re-migrant turtle (“Kanga”). Kanga first nested at Sandy Point in 2012 and was on her fourth nest this season. Phyllis, the re-migrant turtle that carried the first VDR, returned and Ayaka and her team were able to successfully remove the device. The VDR was intact and had recorded 27 hours of video and a full complement of dive data, despite one of the battery cables being severed. F) A neophyte (a nesting turtle never before recorded at Sandy Point) nested during the night of the full moon on
Wednesday, which makes her the seventh neophyte of the season. This brings us to 80 nests and 26 individual turtles for the season. For more information contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov.

Health Assessment of Southern Resident Killer Whales, Puget Sound, May 2017 – This past week saw the start of another round of health assessment of endangered Southern Resident killer whales (a NMFS “Species in the Spotlight”) around the San Juan Islands, Washington State. This is a collaboration between SWFSC/MMTD (John Durban), the Vancouver Aquarium (Lance Barrett-Lennard) and SR3 (Holly Fearnbach), which builds on a monitoring study that has been underway since 2008. This team is using a small unmanned hexacopter to obtain overhead images to monitor the growth and body condition of individually-recognizable whales. Seventeen flights were conducted last week, obtaining images of all members of “J-pod” (24 whales). These same whales were all imaged in 2015 and in both May and September 2016, which will enable assessments of inter-seasonal and interannual changes in condition to relate to trends in returns of their Chinook salmon prey. This month the team also hopes to continue the collection of overhead images of Bigg’s (Transient) killer whales for comparative measures of condition from these mammal-eating killer whales, and to collect images and blow samples from humpback whales to continue health assessment of large whales. For more information contact John.Durban@noaa.gov.
Leatherback Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, spring/summer 2017 – This season’s focus of this multi-year project is to collect skin clips from nesting females for genetic fingerprinting. These samples will be compared with the genetic fingerprints of hatchlings, from which skin clips were collected in 2009, as a tool to estimate age to maturity for this population. Last week started off with a new turtle to the beach, a neophyte named Sunshine, nesting at dawn. (During her nesting event, team members also captured an injured brown booby and brought her to the local rehabilitation center.) An additional 12 nesting events (all remigrants) were recorded last week. Rapunzel, a victim of a shark attack, has been seen four times this season and three returning turtles were also documented with new shark bite wounds. Visiting researchers Ayaka Asada and Randall Davis from Texas A&M have joined the team and will be working over the next several weeks to attach Video Data Recorders (VDR) and cameras to nesting turtles as part of Ayaka’s PhD project, focused on foraging and dive behavior during the internesting period. Ayaka is finding that these turtles are snacking on jellies (though no concentrated feeding bouts have been recorded). The first transmitter device was deployed on a remigrant turtle named Phyllis last week and is expected back this week. Phyllis has nested at Sandy Point National Wildlife Refuge.
Point over 50 times and is one of the longest returning nesters to the beach, nesting now for over 18 seasons. The week is ending with a total of 25 individual turtles and 71 nests. For more information contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov.

San Diego Bay Green Turtle Abundance Project, 2 and 4 May 2017 – The SWFSC turtle team launched their inaugural abundance estimation project in San Diego Bay last week and captured 10 individual turtles over the two days of effort. These turtles ranged from 72.4-115.2 cm curved carapace length and included juveniles, adult males and adult females. Of note, one large female first captured in 2002 and 5 times subsequently in San Diego Bay, and ‘Trey’ an adult male that 2 years ago was tracked from San Diego Bay to nesting beaches in the Revillagigedos Islands in Mexico. Great to see Trey back in the Bay! Capture efforts will continue twice weekly for seven more weeks. Contact PIs Tomo.Eguchi@noaa.gov or Jeffrey.Seminoff@noaa.gov for additional information.

Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, California, 27 March - 26 May – During week 6 (1-5 May) of SWFSC’s survey to estimate the annual calf production of eastern North Pacific gray whales, 52 hours of visual observation effort were completed during which time 7 whales (adults and sub-adults) and 49 female-calf pairs were recorded. In addition to gray whales, humpback whales, bottlenose dolphins, common dolphins, white-sided dolphins and northern right whale dolphins were observed. In addition, last week marked the completion of a successful first leg of UAS aerial photogrammetry effort. John Durban and Holly Fearnbach (SR3) flew 22 flights with an unmanned octocopter, obtaining vertical images of 20 female-calf pairs and 1 juvenile, and adding to a total of 56 flights over the past three weeks. This is a comparable sample to those collected in 2015 and 2016, and will enable us to compare the growth of calves and body condition of their mothers across years. Additionally, vertical images were collected from one group of bottlenose dolphins. This week John and Holly move on to the San Juan Islands, Washington, to begin photogrammetry monitoring of the body condition of Southern Resident Killer Whales; LTJG Jacob Barbaro and LTJG Hollis Europe will continue UAS flight operations at Piedras Blancas. For details contact: dave.weller@noaa.gov, john.durban@noaa.gov, or wayne.perryman@noaa.gov.

Week of 1 May 2017

Left: Octocopter flight operations at Piedras Blancas. Right: Overhead image of a gray whale female and accompanying calf migrating north past Point Piedras Blancas, CA. Photo taken from an unmanned octocopter ~160ft above the whales, with flights over whales authorized by NMFS permit #19091.
Leatherback Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands – This season’s focus of this multi-year project is to collect skin clips from nesting females for genetic fingerprinting. These samples will be compared with the genetic fingerprints of hatchlings, from which skin clips were collected in 2009, as a tool to estimate age to maturity for this population. A total of 23 individuals have been seen to date this season, including 6 neophytes. This past week brought us 1 first-time nester (neophyte), 1 new unique turtle for the season, and 9 returning turtles. To date, we have 64 nests on Sandy Point. The location of these nests has changed from previous years as the west beach erodes, and sand builds up on the north beach, where nesting density is highest. To date this season, two nests have been relocated from beach vulnerable to wave action; this past week another 4 nests were relocated including Felicia (tag # SPP332, see photo) and Nina (tag # SPP085). Nina was seen two weeks ago and since that time she was attacked by a shark. Though some were deep, none of her wounds were actively bleeding. We will document her healing rate over the season. Earth Day prompted a mini beach cleanup. Please contact Kelly.Stewart@noaa.gov or Peter.Dutton@noaa.gov for more information.

San Diego Bay Green Turtle Abundance Project Launch, 2 May 2017 – Green turtles have been stranding in San Diego Bay at an unprecedented rate in recent years and the population-level impact of these mortalities is unclear. In an effort to gather high-confidence information on local abundance, the Marine Turtle Ecology & Assessment research team will launch their inaugural Abundance Estimation project in San Diego Bay, an effort that will be conducted at regular 3-5 year intervals into the future. Unlike previous years, when sampling occurred every two weeks over the course of the season, spring 2017 will have the green turtle team conducting capture efforts twice weekly for two months in an effort to mark and recapture as many turtles in the Bay as possible. Each day’s efforts will involve simultaneous use of 2-3 capture vessels tagging green turtles throughout many areas within San Diego Bay. The goal is to develop robust abundance estimates and track population trends over medium- and long-term time scales. Contact PIs Tomo.Eguchi@noaa.gov or Jeffrey.Seminoff@noaa.gov for additional information.

Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, California, 27 March - 26 May – During week 5 (24-28 April) of SWFSC’s survey to estimate the annual calf production of eastern North Pacific gray whales, 51.25 hours of effort were completed during which time 9 whales (adults and sub-adults) and 88 female-calf pairs were recorded. In addition to gray whales, minke whales and bottlenose dolphins were observed. Despite a generally windy week, the UAS flight team of John Durban and Holly Fearnbach (SR3) completed 14 flights with the octocopter. Vertical images were obtained of 23 female-calf pairs, and 2 sub-adults; these images will be used to measure the growth of calves and the body condition of mothers to compare to similar data from 2015 and 2016. Vertical images were also collected from one group of Risso’s dolphins and one group of bottlenose dolphins. In addition, on Sunday 30 April, our research team hosted a “behind the scenes” tour for local
research, education and conservation groups to introduce them to our research on gray whales. For details contact: dave.weller@noaa.gov, john.durban@noaa.gov, or wayne.perryman@noaa.gov.

Overhead image of a two gray whale females and accompanying calves (and a third pair submerged) migrating north past Point Piedras Blancas, CA. Photo taken from an unmanned octocopter ~180ft above the whales, with flights over whales authorized by NMFS permit #19091.

Sea Turtle Nesting Beach and Bycatch Research, Oman and United Arab Emirates, 29 April - 14 May – Manjula Tiwari will deploy satellite transmitters on nesting loggerhead turtles in the Hallaniyat Islands off the coast of Oman and discuss ongoing joint bycatch research in Omani waters. The project is a collaboration with US Fish and Wildlife Service, Five Oceans Oman, Environment Society of Oman, and the Omani Ministry of Environment and Climate Affairs. This will be followed by a trip to the United Arab Emirates to discuss bycatch and nesting beach research in the Gulf region with colleagues from the Emirates Wildlife Society-WWF. Contact Manjula.Tiwari@noaa.gov for more information.
Northern Gulf of California Marine Mammal Carcass Survey, week of 24 April – In collaboration with the San Diego Zoo Institute of Conservation Research and the Centro de Investigación Científica y de Educación Superior de Ensenada (CICESE), Kerri Danil participated in an approximately 40km survey of dead stranded marine mammals in the northern Gulf of California, from Punta Zacatosa to Playa Hermosa. The goal of these planned recurring surveys is to determine whether enough carcasses exist for the expansion of the California condor population to this coast and to identify the contaminant load of these carcasses. Over the course of three days, 10 *Tursiops*, 16 *Delphinus*, 6 unidentified whales, 1 Vaquita, 2 unidentified turtles, and 2 *Zalophus* were recorded for a total of 37 specimens.
Leatherback Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands – Since last week the team has seen seven new (for this season) and four returning (each nesting for their second time) turtles on the index beach at Sandy Point, bringing the season’s total to 22 turtles and 60 nests. Four of the seven new-for-this-season turtles were neophytes; the others were re-migrants from previous seasons. Saturday 15 April was the busiest night with four turtles (two new and two returning), including new turtle Marsha, who laid in the relocation zone (the first nest there for this season). An approximately 600 m stretch of beach is prone to seasonal erosion so any nest laid in this “relocation zone” must be moved to the more stable north side of the beach. (About 30% of nests are relocated each year). Another highlight of the week was participation in a local Earth Day event for the school kids in the community. Contact Kelly.Stewart@noaa.gov or Peter.Dutton@noaa.gov for more information.

Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, California 27 March - 26 May – During week 4 (17-21 April) of SWFSC’s survey to estimate the annual calf production of eastern North Pacific gray whales, 49.25 hours of effort were completed during which time 49 whales and 44 mother-calf pairs were recorded. In addition to gray whales, humpback whales, a blue whale, bottlenose dolphins, common dolphins and Risso’s dolphins were observed. Additionally, unmanned aircraft operations were conducted for photogrammetry assessment of the condition of gray whale females and the growth of their calves. This builds on successful field efforts in 2015 and 2016, and this year a new, larger octocopter is being flown to image whales further offshore. John Durban (MMTD) and Holly Fearnbach (SR3) flew 20 flights with the octocopter, collecting vertical images of 14 female-calf pairs and nine juveniles. John and Holly were assisted by Wayne Perryman (MMTD) and Don LeRoi (Aerial Imaging Solutions). See
Cetacean Passive Acoustics Research & Development Field Trials – On Thursday, April 27, the SWFSC marine mammal acoustics team (Shannon Rankin, Jay Barlow, Jennifer Keating, and Emily Griffiths) will conduct an equipment test cruise aboard the Horizon (a San Diego fishing and diving boat). The team will be testing redesigned and re-built equipment in preparation for the HICEAS survey this summer, including towed hydrophone arrays, DASBRs, and sonobuoys. Contact Jay.Barlow@noaa.gov or Shannon.Rankin@noaa.gov for more information.

Leatherback Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, spring-summer 2017 – A total of 17 individuals have been seen to date this season including 4 neophytes. This past week brought a number of interesting sightings. Petal (tag # SPP347) nested at Sandy Point National Wildlife Refuge on 4/10/17 and has a long history here. She was tagged in 2002 as a first time nester and was not seen again until 2010. Recapturing turtles like Petal helps improve estimates of survival and understand more about breeding frequency and its inter-individual variation. On 4/12/17 a turtle with a flipper tag that said only “149” was seen; our suspicions that this was a Puerto Rican turtle were confirmed when we contacted our partners A neophyte turtle on a Puerto Rico beach. Photo courtesy Luis Crespo (ATMAR).
in Maunabo on the southeast coast to find that “Jacinta” had been tagged during a rare daytime nesting event there just this season and had been featured in local papers. Last year we witnessed a 30-minute shark attack directed at a turtle (“Rapunzel”) who was not seen subsequently that season. So we were surprised to discover her nesting this season, looking healthy and strong - she’s already nested two times this season. Turtles in this population typically nest only every 2 or 3 years but Rapunzel has been at Sandy Point now during two consecutive years, characteristic of only 2% of the population. One hypothesis is that she stayed more regionally over the winter instead of heading to the far north to forage. To date, there are 40 nests on the refuge at Sandy Point. Contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov for more information.

Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, California 27 March - 26 May – During the third week (10-14 April) of SWFSC’s survey to estimate the annual calf production of eastern North Pacific gray whales, 41.5 hrs of effort were completed during which time 94 whales and 14 mother-calf pairs were recorded. In addition to gray whales, humpback whales, bottlenose dolphins and harbor porpoise were observed. Additionally, elephant seals, harbor seals, California sea lions and sea otters frequented the area. Marine and terrestrial bird sightings at the research site continue to be reported to eBird (see http://ebird.org/content/ebird/) by Bernardo Alps and Dave Weller continued his effort to lead a "virtual research mission" for elementary school students in classrooms across the US (see http://whaletimes.org/?page_id=83). This week we expect the occurrence of mother-calf pairs to continue to increase, climbing to peak numbers later in the month. In addition to our ongoing visual observations and shore-based photo-identification efforts, this week John Durban, Holly Fearnbach, Wayne Perryman and Don LeRoi (Aerial Imaging Solutions) will kick off the third year of Unmanned Aerial Systems operations to assess size and body condition of gray whale mother-calf pairs using images. This one-of-a-kind time series on gray whale calf production is greatly benefited by the participation of observers from nearly all of the programs within MMTD as well as volunteers from the broader research community. See https://swfsc.noaa.gov/textblock.aspx?Division=PRD&id=12166&ParentMenuId=211 and for details contact dave.weller@noaa.gov, wayne.perryman@noaa.gov or john.durban@noaa.gov.

California Sea Lion Census and Diet Research, Channel Islands, Southern California Bight, quarterly – Mark Lowry and Al Jackson will travel to San Nicolas Island on April 17-19 to collect California sea lion scat samples for diet analysis. Mark Lowry, Marilyn Lowry, and Beth Jaime will travel to San Clemente Island on April 21-24 to collect California sea lion scat samples for diet analysis and to count pinnipeds.

Cetacean Passive Acoustics Research – Shannon Rankin, Jennifer Keating, and Taiki Sakai will conduct a sea trial on Wednesday April 19 to test equipment prior to the summer-fall Hawaiian Islands Cetacean & Ecosystem Assessment Survey and train field acousticians. Charter vessel funding was obtained through NOAA Fisheries’ Cooperative Research Program.

Week of 10 April 2017
Leatherback Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands – Kelly Stewart is training the new leatherback monitoring team who are now in the second week of full nighttime beach patrols for nesting turtles as part of a collaboration with USFWS. The focus this season will be to collect skin clips for genetic analysis from nesting females. These samples will be compared with the genetic fingerprints of hatchlings in 2009 as a tool to estimate age to maturity for this population. After a busy week of visitors, the Duke sea turtle class finishing up, the Student Conservation Association (SCA) interns are being trained and the team is seeing nesting activity increase. To date, 27 nests have been recorded on the refuge, and 13 unique nesting turtles, far ahead of the pace from last year (a grand total of 49 turtles nested in 2016). At least 3 of the turtles this season have returned for a second nest and new turtles are coming each day. Monday night was busy with 5 turtles nesting between 8:30 pm and 4 am. There was a turtle still on the beach after sunrise on Friday morning; SPP346 is her tag number, she was first tagged in 2003 and has now nested over 35 times at Sandy Point. Contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov for more information.

Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, California, 27 March-26 May – During the second week (3-7 April) of SWFSC’s survey to estimate the annual calf production of eastern North Pacific gray whales, 34 hours of effort were completed during which time 186 whales and 10 mother-calf pairs were recorded. In addition to gray whales, humpback whales, bottlenose dolphins, Risso’s dolphins and a minke whale were observed. Additionally, elephant seals, harbor seals, California sea lions and sea otters frequented the area. The gray whale observed off Orange County last week with a metal frame, possibly part of a fishing pot, was sighted migrating past Piedras Blancas by our visual observer team and this information was reported to stranding, response and rescue organizations. Marine and terrestrial bird sightings at the research site continue to be reported to eBird (see http://ebird.org/content/ebird/) by Bernardo Alps and Dave Weller continues his efforts to lead a "virtual research mission" for elementary school students in classrooms across the US (see http://whaletimes.org/?page_id=83). This week we expect the offshore component of the migration to significantly decline while the frequency of mother-calf pairs begins to climb to peak numbers later in the month. John Durban and Holly Fearnbach, followed shortly thereafter by Wayne Perryman, will arrive to the site later in the week to prepare for UAS operations that are expected to begin on or about 17 April. This one-of-a-kind time series on gray whale calf production is greatly benefited by the participation of observers from nearly all of the programs within MMTD as well as volunteers from the broader research community. See https://swfsc.noaa.gov/textblock.aspx?Division=PRD&id=12166&ParentMenuId=211 and for details contact Dave Weller, Wayne Perryman or John Durban.

Week of 3 April 2017
Health Assessment of North Atlantic Right Whales, Cape Cod Bay, MA, 13-31 March – John Durban (MMTD) and Holly Fearnbach (SR3) successfully flew 37 flights with an unmanned hexacopter from a 55’ sailing sloop piloted by Michael Moore from Woods Hole Oceanographic Institution (WHOI) last week, the last of the 2017 season for this project. They were joined in the field by Peter Corkeron from NOAA/NEFSC, Carolyn Miller / Amy Apprill from WHOI, Victoria Pease from MMTD, and Amy Knowlton / Marianna Haglbloom from the New England Aquarium. Aerial images were collected from 15 different whales (for a total of 31 whales for the project) along with blow samples from 14 whales (17 total). Genetic analyses of these blow samples will be analyzed to describe respiratory microbiome, and aerial images will be measured to assess changes in growth and body condition of individually recognizable whales that can by matched to the NEAQ photo-id catalog. Work is underway to match aerial images to 33 whales measured in 2016, and three matches have already been identified to enable longitudinal monitoring.

Two aerial photographs of the same adult female North Atlantic right whale, repeatedly imaged in Cape Cod Bay in March 2016 (left) and 2017 (right). Photogrammetry measurements will be used to assess changes in condition, and for juvenile whales we will also measure growth rates. Images taken from an unmanned hexacopter >150ft above the whale, with research authorized by NMFS permit #17355.

Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, California 27 March-26 May – SWFSC’s survey to estimate the annual calf production of eastern North Pacific gray whales is successfully underway. During the first week (3/27-3/31) the migration was characterized by mostly adult whales, largely singletons and pairs, traveling along the offshore corridor. Despite the presence of high winds, 45.5 hrs of effort were completed during which time 220 whales and 3 mother-calf pairs were recorded. In addition to gray whales, humpback whales, bottlenose dolphins, harbor porpoise and Steller sea lions were observed. Marine and terrestrial bird sightings at the research sight were reported to eBird (see http://ebird.org/content/ebird/) by Bernardo Alps and Dave Weller is leading a "virtual research mission" for elementary school students in classrooms across the US (see http://whaletimes.org/?page_id=83). This week we expect the offshore component of the migration to gradually diminish while the frequency of mother-calf pairs begins to increase. This one-of-a-kind time
series on gray whale calf production is greatly benefited by the participation of observers from nearly all of the programs within MMTD as well as volunteers from the broader research community. For more information see https://swfsc.noaa.gov/textblock.aspx?Division=PRD&id=12166&ParentMenuId=211 and contact dave.weller@noaa.gov, wayne.perryman@noaa.gov, or john.durban@noaa.gov.

Leatherback Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, spring-summer - This season’s focus of this multi-year project is to collect skin clips from nesting females for genetic fingerprinting. These samples will be compared with the genetic fingerprints of hatchlings, from which skin clips were collected in 2009, as a tool to estimate age to maturity for this population. The Duke University sea turtle class (see photo) finished up the travel portion of the course in St. Croix, patrolling for 5 long nights before finding a nesting leatherback on their last few hours on the island - she was a turtle first tagged in 2007, and then seen again in 2011 and 2014. On the 31 March, St. Croix celebrated the Centennial Transfer Day - 100 years since the US acquired the Danish West Indies. The Secretary of the Interior, Ryan Zinke, visited St. Croix to participate in the ceremony and met with the Duke class briefly. The intern team for the leatherback nesting season at USFWS arrived on 31 March and began training immediately. They were able to see a turtle on their first night, the same one that the Duke class saw - right outside our accommodations at Cottages by the Sea. Since then, they've seen and tagged two turtles, one a neophyte from this year, returning for her second nest, and a new re-migrant turtle, last seen in 2013, when she nested six times. She was originally tagged in 2007. Training continues this week for genetic sampling. Contact Kelly.Stewart@noaa.gov for more information.

Week of 27 March 2017

Health Assessment of North Atlantic Right Whales, Cape Cod Bay, MA, 13-31 March – The flight team of John Durban (MMTD) and Holly Fearnbach (SR3) successfully completed 32 flights last week with an unmanned hexacopter from a 55’ sailing sloop piloted by Michael Moore from Woods Hole Oceanographic Institution (WHOI). They were joined in the field by Carolyn Miller from WHOI, along with Marilyn Marx and Marianna Haglbloom from the New England Aquarium (NEAQ). Aerial images were collected from 16 different whales along with three blow samples. These blow samples will be analyzed by Carolyn in Amy Apprill’s lab at WHOI to describe respiratory microbiome and identify emerging diseases. Aerial images will be analyzed by MMTD’s Cetacean Health and Life History program to assess the growth and body condition of individually recognizable whales that can be matched to the NEAQ photo-id catalog. Contact John.Durban@noaa.gov for more information.
Leatherback Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, spring-summer – This season’s focus of this multi-year project is to collect skin clips from nesting females for genetic fingerprinting. These samples will be compared with the genetic fingerprints of hatchlings, from which skin clips were collected in 2009, as a tool to estimate age to maturity for this population. Night surveys have begun and 3 female leatherbacks, two of which were first-time nesters at Sandy Point and carrying no tags, were sampled. Nest numbers are increasing and are above last year's totals at this point. Full-night surveys begin on 3 April. The Duke Marine Lab Sea Turtle class will assist with fieldwork, followed by USFWS interns in a few weeks. This research is an ongoing collaboration between USFWS, NOAA and The Ocean Foundation. Contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov for more information.

Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, California 27 March-26 May – The 24th consecutive year (1994-2017) of SWFSC's survey to estimate the annual calf production of eastern North Pacific gray whales begins this week. In 2012, this survey was expanded to also include shore-based photo-identification to catalog mother-calf pairs and in 2015 UAS operations were initiated to collect information on the body condition and health of these pairs. This one-of-a-kind time series is greatly benefited by the participation of observers from nearly all of the programs within MMTD as well as volunteers from the broader research community. For more information see https://swfsc.noaa.gov/textblock.aspx?Division=PRD&id=12166&ParentMenuId=211 and contact dave.weller@noaa.gov, wayne.perryman@noaa.gov, or john.durban@noaa.gov.

Green Turtle Monitoring, Raine Island, Australia - Raine Island is situated in the northern part of Australia’s Great Barrier Reef and is an important green turtle nesting beach (as well as an important place for nesting seabirds). The Queensland government conducts research annually to enhance management and conservation of the island. Green turtle hatching success has declined during the past decade, and a recovery team has been established. Tomo Eguchi is an invited biometrician/biologist for the scientific advisory group for the recovery team, and a field biologist for the research. During this trip, Tomo will participate in field work, conduct data analyses, participate in development of future sampling
plans, and attend a meeting of the scientific advisory group. For more information, please contact Tomo.Eguchi@noaa.gov.

Week of 20 March 2017

Health Assessment of North Atlantic Right Whales, Cape Cod Bay, MA, 13-31 March – The weather around Cape Cod Bay was not kind last week for field work. No aerial images or blow samples were collected, but the field team of John Durban (MMTD), Holly Fearnbach (SR3) and Michael Moore (WHOI) were able to conduct boat-based surveys on two days, observing right whales (7 individuals and 2 individuals, respectively) on both days. Fingers are crossed for better weather for UAS operations this coming week. For further information contact John.Durban@noaa.gov

Leatherback Age of First Reproduction, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands – On 15 March, Kelly Stewart traveled to St. Croix to begin preparing for the 2017 nesting season. The focus will be to collect skin clips for genetic analysis from nesting female. These samples will be compared with the genetic fingerprints of hatchlings in 2009 as a tool to estimate age to maturity for this population. Fieldwork will ramp up at the beginning of April. This is an ongoing work cooperative between USFWS, NOAA and The Ocean Foundation. Contact Peter.Dutton@noaa.gov for more information.

Marine Turtle Nesting Beach Research, Sao Tome and Principe (Africa), 14-28 March - Manjula Tiwari will provide scientific and technical support to the marine turtle nesting beach project managed by the NGO Associação Tartarugas Marinhas. Contact Manjula.Tiwari@noaa.gov for more information.

Week of 13 March 2017

Health Assessment of North Atlantic Right Whales, Cape Cod Bay, MA, 13-31 March – This week fieldwork will re-commence on the third year of a collaborative study of large whale health assessment. For the next three weeks John Durban (MMTD) is partnering with MMTD research associate Holly Fearnbach (SR3) and Michael Moore from Woods Hole Oceanographic Institution (WHOI) to study the condition of North Atlantic right whales returning to Cape Cod Bay, Massachusetts. The team is using an unmanned hexacopter to obtain vertical images of the whales for photogrammetric measurements of growth and body condition, and to collect blow samples for studies of respiratory microbiology. Photogrammetry images will be analyzed by MMTD's Cetacean Health and Life History Program and blow samples will be analyzed by Amy Apprill’s lab at WHOI. Funding support for this field effort is provided by the NEFSC's Large Whale Team, and by SWFSC through support from the NMFS Office of Science and Technology. For further information contact John.Durban@noaa.gov.

Week of 20 February 2017
Passive Acoustic Research on Ocean Noise, Channel Islands National Marine Sanctuary (CINMS), 13-17 February – This research was conducted by Jay Barlow and Jennifer Keating using Drifting Acoustic Spar Buoy Recorders (DASBRs) deployed from a small boat (the CINMS research vessel Shark Cat) on daytrips out of Channel Islands Harbor. Soundtrap hydrophone recorders with stereo hydrophones were deployed at depths of 50, 100, 200, 300, and 400 m to measure variation in ocean noise at different depths. The study was done in the vicinity of the Channel Islands Ocean Noise Monitoring Station, a recording hydrophone at 800-m depth south of Santa Cruz Island, for comparison to deep-ocean noise. Studies included an evaluation of a new DASBR configuration that may be used during the 2017 Hawaiian Islands Cetacean & Ecosystem Assessment Survey (in collaboration with PIFSC). An autonomous towed hydrophone was also tested. Contact Jay.Barlow@noaa.gov for more information.

Antarctic Whale Ecology and Health Research, Antarctic Peninsula, Jan-Feb – This annual project concluded last week with the research team of John Durban (MMTD), Holly Fearnbach (SR3) and Leigh Hickmott (Open Ocean Consulting) completing 19 flights with an unmanned hexacopter to collect aerial images of 40 Type B2 killer whales. This season, the team obtained aerial images of all three killer whale ecotypes found around the Antarctic Peninsula (Type A, B1, and B2). Subsequent photogrammetry measurements will describe morphometric differences between the ecotypes and be used to infer their prey requirements and health. Aerial images have also been obtained from humpback whales, Antarctic minke whales and Arnoux’s beaked whales. The hexacopter has also been used to collect 10 blow samples from humpback whales for identification of respiratory microbiome and disease agents using genetic techniques, in collaboration with Woods Hole Oceanographic Institution. Together with aerial images describing whale body condition, characterization of respiratory microbiome will enable a comparison of humpback whale health on different feeding grounds, with ongoing studies around the
Antarctic Peninsula, off Cape Cod and in the coastal waters of British Columbia/Washington State. For more information contact John.Durban@noaa.gov.

Aerial photograph of Type B2 killer whales in the coastal waters of the Antarctic Peninsula. Images obtained from >30m (100ft) above the whales using a small unmanned hexacopter. Research conducted under NMFS Permit No. 19091 and Antarctic Conservation Act Permit ACA 2017-029.

*Week of 13 February 2017*
Antarctic Whale Ecology and Health Research, Antarctic Peninsula, Jan-Feb – This past week the research team of John Durban (MMTD), Holly Fearnbach (SR3) and Leigh Hickmott (Open Ocean Consulting) began the final trip of the year to the Antarctic Peninsula onboard the National Geographic Explorer with Lindblad Expeditions. A very notable achievement was obtaining the first ever overhead images from Type B1 (“Pack Ice”) killer whales, extremely challenging to find in their primary habitat deep in the pack ice where they search for ice seals. A group of seven whales was photographed with an unmanned hexacopter; these images will be combined with altitude data in photogrammetry estimates of size and body condition. A number of the individuals appeared quite lean, and one adult female was in very poor body condition (see image). This season, the team has now obtained images of all three killer whale ecotypes around the Antarctic Peninsula (Types A, B1 and B2), and subsequent analysis will enable a comparison of morphometric differences between them, and used to infer the prey requirements and health of these top predators. For more information contact mailto:John.Durban@noaa.gov.

Passive Acoustic Research on Ocean Noise, Channel Islands National Marine Sanctuary (CINMS), 13-17 February – Jay Barlow and Jennifer Keating will deploy floating strings of multiple hydrophones and recording instruments at depths from 50m to 400m to measure variation in ocean noise with water depth. Work will be concentrated above a seafloor hydrophone recorder (one of the NOAA Ocean Noise Reference Stations) in the Santa Cruz Basin aboard the CINMS Shark Cat research vessel with daytrips out of Channel Islands Harbor, Oxnard. Contact Jay.Barlow@noaa.gov for more information.
Leatherback Nesting Population Assessment - best practices workshop and field research, Oaxaca, Mexico, January 27 - February 3 – Peter Dutton and Kelly Stewart travelled to Oaxaca, Mexico, to help lead a leatherback nesting population assessment best practices Workshop, and conduct field research with Mexican partners (CONANP and Kutzari) at an Index monitoring beach (Barra de la Cruz) for Pacific leatherbacks. Mexican researchers and field personnel were trained in field sampling protocols as part of a collaboration to determine hatchling and maternal genotypes and infer the male gentotypes from known mothers and hatchlings from Mexico. This information will be used to calculate population vital rates and breeding sex ratios for the Mexico population. Samples collected this nesting season will be sent to the SWFSC genetics laboratory for analysis. Contact Peter.Dutton@noaa.gov for more information.

Week of 6 February 2017

Antarctic Whale Ecology and Health Research, Antarctic Peninsula, Jan-Feb – MMTD’s John Durban has had another successful week of data collection on whale health aboard the expedition ship National Geographic Explorer in Antarctica. Together with collaborators Holly Fearnbach (SR3) and Leigh Hickmott (Open Ocean Consulting) the team successfully flew 38 flights last week with an unmanned hexacopter. Overhead images are being used in photogrammetry analyses to estimate the size, prey requirements and body condition of whales, which are top predators in this ecosystem. Total number of individuals photographed last week: 25 Type B2 killer whales, 20 humpback whales and one Antarctic minke whale. Additionally, the team has used the hexacopter to fly through whale blow; 10 blow exhale samples from humpback whales were collected last week. These are being used to study respiratory microorganisms and emerging diseases, in collaboration with Woods Hole Oceanographic Institution as part of a comparative study of health of humpback whales on different feeding grounds, including around the Antarctic Peninsula, off Massachusetts, and the coastal waters of the NE Pacific. For more information contact John.Durban@noaa.gov.
Aerial photographs of (left to right) Type A killer whales, Type B killer whales and humpback whales around the Antarctic Peninsula. Note an elephant seal in the mouth of a Type A killer whale. Images obtained from >30m (100ft) above the whales using a small unmanned hexacopter. These vertical images are being used to measure size and monitor body condition of these top predators to infer the status of this rapidly-changing marine ecosystem. Research conducted under NMFS Permit No. 19091 and Antarctic Conservation Act Permit ACA 2017-029.

Week of 30 January 2017

Antarctic Whale Ecology and Health, Antarctic Peninsula, Jan-Feb – The research team of John Durban (MMTD/SWFSC), Holly Fearnbach (SR3) and Leigh Hickmott (Open Ocean Consulting) successfully completed 21 flights last week with an unmanned hexacopter, week 2 of this season’s effort, collecting vertical images from 35 Type A killer whales, seven Arnoux’s beaked whales and five humpback whales. These will provide the first photogrammetry data for Arnoux’s beaked whales and Type A killer whales, and contribute to a comparison of humpback whale condition on different feeding grounds (Antarctic Peninsula, Cape Cod and the coastal waters of British Columbia/Washington State). Notably the Type A killer whales were imaged carrying and consuming a southern elephant seal – this prey species was only documented from the aerial perspective. This research is made possible in part by a grant and ship time from Lindblad and National Geographic. For more information contact john.durban@noaa.gov.

Week of 23 January 2017
Antarctic whale ecology and health, week 1 report – This week saw the commencement of annual field work on the ecology of top predators (killer whales) and top krill consumers (large whales) around Antarctic Peninsula. The research team of John Durban (MMTD/SWFSC), Holly Fearnbach (SR3) and Leigh Hickmott (Open Ocean Consulting) are being hosted onboard the expedition ship National Geographic Explorer, with the primary aim of assessing the health of whales in this rapidly-changing ecosystem. The team will be using a small hexacopter to collect vertical images for assessing body condition, and to collect whale blow samples to identify respiratory microbiome and disease agents using genetic techniques. This week the team crossed the Drake Passage from Argentina, have completed preparatory flight checks and are now ready to begin data collection. For further information contact John.Durban@noaa.gov

North Atlantic Right Whale Health Assessment, Fernandina Beach, FL, January – North Atlantic right whales were hard to find this past week off Fernandina Beach, FL, despite lots of search effort. Nonetheless, six more hexacopter flights were conducted with further blow samples obtained from one of the adult females that was imaged last week. The team from SWFSC/MMTD, Woods Hole Oceanographic Institution and NEFSC’s Large Whale Team will now break until mid-February, when we hope to encounter more right whales to assess body condition and sample blow microbiome. For further information contact John.Durban@noaa.gov

[Photo: Overhead image of the open blowhole of a North Atlantic right whale, taken when an unmanned hexacopter was descending to collect a blow sample. Genetic analysis of samples will be used to identify respiratory microbiome and possible disease agents. Research approach of whales using UAS was authorized by NMFS permit #17355.]

California Sea Lion Census and Diet Research, Channel Islands, Southern California Bight, quarterly – Mark Lowry and Morgan Lynn will travel to San Nicolas Island on January 23-25 to collect California sea lion scat samples for diet analysis. Mark Lowry and Jim Carretta will travel to San Clemente Island on January 27-30 to collect California sea lion scat samples for diet analysis and to count pinnipeds.

Week of 16 January 2017
North Atlantic Right Whale Health Assessment, Fernandina Beach, FL, January - Last week saw a very successful re-start to this ongoing collaborative study of large whale health assessment. LTJG Jacob Barbaro (MMTD) is partnering with Michael Moore from Woods Hole Oceanographic Institution (WHOI) and Lisa Conger from NOAA/NEFSC to use a small, unmanned hexacopter to obtain high quality vertical images of whales for photogrammetric measurements of growth and body condition, and to collect blow samples for studies of respiratory microbiology. The hexacopter was successfully flown to collect images (Figure 1) from two female/calf pairs, and blow samples from both. Photogrammetry images will be analyzed by John Durban and colleagues in the Cetacean Health and Life History Program at SWFSC; blow samples will be analyzed by Amy Apprill’s lab at WHOI. Funding support for this field effort is provided by the NEFSC’s Large Whale Team, and by SWFSC through support from the NMFS Office of Science and Technology. For further information contact John.Durban@noaa.gov.

Overhead images of a mother and calf North Atlantic right whale, with bottlenose dolphins in attendance. Taken from an unmanned hexacopter >120ft above the whales. Measurements will be combined with altitude logs to estimate length and monitor calf growth, and body of the mother condition will be inferred from shape profiles. Research approach of whales using UAS was authorized by NMFS permit #17355.

Week of 12 December 2016
Green sea turtle ecological research, Seal Beach National Wildlife Refuge, 7 December 2016 – Jeff Seminoff, Camryn Allen and Joel Schumacher were joined by Dan Lawson (West Coast Regional Office) and Arthur Barranza (CSU-Long Beach) to conduct green turtle capture efforts in Seal Beach Wildlife Refuge. The team caught three juvenile green turtles, one of which was caught in the fall of 2015 at the same location. Turtles all appeared healthy, and a range of sampling was done to examine foraging habits, genetics, contaminants and hormone levels. Of the 19 turtles captured in Seal Beach since 2012, this is the second time an individual has been recaptured. Contact Jeffrey.Seminoff@noaa.gov for more information.

Week of 7 November 2016

Green Sea Turtle Ecological Research, San Diego Bay, 2 November – The Marine Turtle Research Programs conducted their first green turtle capture efforts in San Diego Bay since mid-August and caught an adult female weighing 124 kg. This turtle had been caught 6 times previously since 2004. Given the high number of barnacles attached to her and recent cuts and ‘mating’ scars found on her flippers and carapace (see photo), it’s very likely she just returned to the bay from her nesting grounds in the Revillagigedos Islands or mainland Mexico. Blood and skin samples were collected to examine hormone levels and stable isotope values, respectively. Please contact Jeff Seminoff (jeffrey.seminoff@noaa.gov) for more information.

California Sea Lion Census and Diet Research, Channel Islands, Southern California Bight, quarterly – Molly Groskreutz and Mark Lowry will travel to San Clemente Island on November 4-7 to collect California sea lion scat samples for diet analysis and to count pinnipeds.

Week of 24 October 2016

Pinniped Census and Diet Studies, Southern California Bight, 20-26 October – Beth Jaime is conducting an aerial photographic survey of California sea lions and other pinnipeds at the Channel Islands in southern California during October 20-26. The Navy (Naval Base Ventura County) is funding the chartered aircraft from Aspen Helicopters, as well as Beth’s travel costs and overtime pay for the survey of the Channel Islands.
California Sea Lion Census and Diet Research, Channel Islands, Southern California Bight, quarterly – Alex Curtis and Kathryn Sherman will travel to San Clemente Island on October 24-27 to collect California sea lion scat samples for diet analysis and to count pinnipeds. Mark Lowry and Libby Ehlers will travel to San Nicolas Island on October 24-26 to collect California sea lion scat samples for diet analysis.

Week of 17 October 2016

Sea Turtle Research, Mariana Islands, 23 Oct - 1 Nov – In collaboration with PIFSC, Camryn Allen will participate in in-water capture of foraging green and hawksbill sea turtles within the Mariana Islands (Guam, Tinian, and Saipan) from October 23 - November 1. Samples collected during this trip will add to the batch of samples (n = 32) Camryn collected earlier this year at the Mariana Islands to determine sex ratio at these foraging grounds. Camryn will also give a presentation on the use of molecular approaches to reveal climate impacts on endangered sea turtle populations at PIFSC on October 21, 2016.

Week of 3 October 2016

Passive Acoustic Survey of Cetacean Abundance Levels (PASCAL), California Current, 19 August - 30 September – The Passive Acoustic Survey of Cetacean Abundance Levels (the PASCAL Cruise) on the NOAA ship Bell M. Shimada ended on Friday, September 30, 2016. Drifting buoy recorders (DASBRs) were deployed 30 times (see map) over the course of the 40-day survey for a total of 422 days (1.16 years) of recording time. Deployments included 20 uniformly-spaced, quasi-random locations, one re-deployment along the Big Sur coastline, and 9 deployments on or near seamounts in Southern California. All deployed equipment was recovered. In addition to the buoy recordings, the cruise collected visual and towed acoustic survey data on most days. Several groups of beaked whales were seen and acoustically detected on these transects, particularly on calm-weather days. Dolphin and whale sightings and acoustic detections were common on most days. The last survey leg was led by Jay Barlow and included Jennifer Keating and Eric Keen as acoustic technicians and Bob Pitman, Eric Archer, and Colette Cairns (from NMFS’ Office of Protected Resources) as visual observers. Annette Henry, Survey Coordinator, lead the unloading effort on Friday. Acoustic data from the DASBRs will be analyzed over the course of the next year and are expected to provide much more precise estimates of beaked whale and sperm whale abundance than provided by previous visual survey. This study was funded in part by the U.S. Department of the Interior, Bureau of Ocean Energy Management through Interagency Agreement MI6PG00011 with the U.S. Department of
Leatherback Turtle Feeding Ecology
Research, Monterey Bay, CA, 28 August – 1 October – The 2016 leatherback turtle sampling effort finished strong last week during two consecutive capture/tagging days with exceptional weather conditions off San Francisco, CA. Patience was rewarded as the team captured five adult/sub-adult leatherbacks for sampling and tagging, and deployed ‘TurtleCam’ cameras on three to obtain video footage of foraging behavior (see top photo). Among the seven leatherbacks captured during the 2016 season, two had PIT tags from western Pacific nesting beaches. Five of the seven turtles have continued apparent foraging behavior in the area where they were captured, while two have left coastal waters to initiate their seasonal southwestward migration. Between capture/tagging operations, the aerial team completed additional fine-scale surveys to obtain leatherback density data within the 10 x 15 nmi foraging patch. Aerial field efforts concluded on 1 Oct with a final survey between Monterey Bay and Humboldt County, CA, which confirmed that the only apparent turtle foraging region was within the sampled area. This project was supported by a NOAA Stock Assessment Improvement Plan award to NOAA’s Southwest Fisheries Science Center, as well as NOAA’s Aircraft Operations Center (AOC) and Moss Landing Marine Laboratories. We thank all for their outstanding support. Research was conducted under NMFS Permit 15634. Please contact Scott.Benson@noaa.gov for additional information.
Whale Health & Condition Assessment, Vancouver Island, August - September – Fieldwork concluded this past week for this project using an unmanned hexacopter for remote health assessment of killer whales and humpback whales. Forty-eight additional hexacopter flights were successfully completed, contributing to a total of 258 flights over the past two months in the coastal waters of Washington State and British Columbia. Vertical images have been collected from all killer whales sighted, including all 82 members of the endangered Southern Resident population, 40 individuals from the neighboring Northern Resident killer whale population and 27 Bigg’s (“Transient”) killer whales. These images will be used in comparative photogrammetry analyses of growth and body condition. Additionally, vertical images have been obtained from 20 humpback whales, coupled with 12 blow samples that were collected using the hexacopter. The vertical images will be used to assess body condition and the blow samples will be analyzed for respiratory pathogens, to contribute to ongoing comparative health assessment of humpback whales in different stocks and contrasting feeding habitats. For more information contact John.Durban@noaa.gov.

Leatherback Turtle Feeding Ecology Research, Monterey Bay, CA, 28 August - 30 September – With improving weather conditions, the leatherback team returned by boat and plane to the area off Half Moon Bay, CA, where three leatherbacks were sighted during the previous week’s aerial survey. The aerial team (Karin Forney, Camryn Allen, Joel Schumacher, Katherine Whitaker, and pilots Rob Mitchell and Rick DeTriquet aboard the NOAA Twin Otter N57RF) completed fine-scale surveys and located multiple leatherbacks for in-water ‘Turtle-cam’ deployments and capture/tagging operations. The vessel-based team (Scott Benson, Tomo Eguchi, Heather Harris, Lisa Komoroske, and Moss Landing Marine Laboratories’ Capt. John Douglas and Jackson Winn aboard RV Sheila B) deployed suction cup-attached cameras and time-depth recorders on three different turtles for about 20-60 minutes each. The obtained video and data record provide detailed data on leatherback foraging behavior and leatherback prey. Two leatherback turtles were successfully captured and outfitted with satellite-linked transmitters to monitor movements within the foraging grounds and during their seasonal migration. Field efforts will continue...
through the end of the month, as weather conditions permit. Please contact Scott.Benson@noaa.gov for additional information.

Passive Acoustic Survey of Cetacean Abundance Levels (PASCAL), California Current, 19 August - 30 September –
Over the past week, the PASCAL cruise aboard the NOAA R/V Bell Shimada has been traveling south from Washington to southern California, picking up DASBR recorders #16, 17, 18, and 19 (see map). Only three of the original buoy recorders (deployed on the first two legs) remain to be recovered. All except one (which malfunctioned) contained a wealth of acoustic data. Preliminary scans of the data show many beaked whale, sperm whale, and dolphin detections. Unfortunately, the weather over the past week has not been conducive to visual surveys. In fact, the 20+ kts winds have prevented us from towing the hydrophone array on several days. The ship's crew and their skill with grappling hooks has been a vital part of our success in recovering buoys in rough seas. A new experiment to see if beaked whales are concentrated over seamounts off southern California was initiated this past week. Two DASBRs on San Juan Seamount and one "control" buoy about 6 miles away were deployed this past Friday. On Saturday, the same deployments were made on Rodriguez Seamount. These data will complement a San Juan Seamount
deployment that was done on Leg 2. We will return to pick up these buoys (and other remaining buoys) in a few days, after we return from a trip north to retrieve a DASBR off Carmel. These data will allow us to determine whether the density and species composition of beaked whales on seamounts is different from surrounding waters. Weather is expected to improve early next week, and we hope to conduct visual and towed hydrophone surveys of the seamounts as well. The PASCAL cruise will end on Friday, September 30. Contact Jay.Barlow@noaa.gov and Jeff.E.Moore@noaa.gov and see the survey website https://swfsc.noaa.gov{textblock.aspx?Division=PRD&ParentMenuId=259&id=21732 for more information.

Week of 19 September 2016

*Whale Health & Condition Assessment, Vancouver Island, August - September* – Last week (week 6 of this season’s product) was another productive one around the San Juan Islands, Washington State. A total of 32 hexacopter flights were successfully completed, increasing our sample coverage of vertical images to 75 of 82 individuals in the endangered population of Southern Resident killer whales. These images of uniquely recognizable individuals are enabling photogrammetry comparisons of growth and body condition across years and between seasons (see Figure). Vertical images were also collected from a single humpback whale (16 humpbacks in total). The flight team of John Durban, Holly Fearnbach (SWFSC) and Lance Barrett-Lennard (Vancouver Aquarium) were joined in the field for a day by Mike Ford, the director of the Conservation Biology Program at NOAA/NWFSC. Contact John.Durban@noaa.gov for more information.

Vertical images of “J36”, a 17-year old reproductive female from the endangered Southern Resident killer whale population. This graphically displays how we are using vertical images to assess changes in condition (width profiles) across years and seasons; J36 was notably lean in May compared to the September images, and photogrammetry measurements are underway to quantify these changes. Images taken using an unmanned hexacopter at an altitude of >100ft, research approaches authorized by NMFS permits 16163 &19091 and airspace clearance by the FAA (2015-ESA-200-COA).

*Passive Acoustic Survey of Cetacean Abundance Levels (PASCAL), California Current, 19 August - 30 September* – Seven recording buoys (DASBRs) were recovered during the first week of Leg 3 of the PASCAL survey. All but one of the retrievals occurred during the night. Most of the flashing lights failed
on these buoys (flooded), but the crew was very adept at finding their reflective tape with spotlights. Expert grappling by the ship's crew recovered the buoys on the first pass. All of the DASBRs recorded the expected amount of data, but two ended their recordings early because they were recording nearly continuously rather than on their programmed duty cycle. A preliminary review of data collected on the two southern offshore DASBRs showed an average of more than one beaked whale detected per day and included two detections of Kogia (the first for our DASBRs) and several sperm whales. In contrast, the visual and towed acoustic results have been disappointing. The only identified sightings include striped dolphins, common dolphins and a blue whale. The towed array added sperm whales to this list. Despite searching an average of 11+ hours per day, the results have been meager. Weather has not been cooperative, with lots of Beaufort 4/5, and only one day of Beaufort 2/3. The beaked whales are apparently waiting for beaked whale weather to show. We expect to collect the final three northern DASBRs in the next few days and to turn the corner for the southward leg of our journey. If we can stay ahead of schedule, we hope to search for beaked whales wherever we can find calmer seas. Contact: Jeff Moore and Jay Barlow, co-Chief Scientists and see the survey website https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=259&id=21732 for more information.
Leatherback Turtle Feeding Ecology Research, Monterey Bay, CA, 28 August - 30 September – Low clouds and wind have continued to hamper field efforts, but this week there was a 1-day break in the weather on September 14, and the leatherback team successfully completed a survey of nearshore waters between Monterey Bay and Cape Blanco Oregon. Three leatherbacks were seen off San Francisco in a patch of their primary jellyfish prey species (the brown sea nettle, *Chrysaora fuscescens*). Off northern California and Oregon, some additional regions with patchy egg yolk jellies (*Phacellophora camtschatica*) and purple-striped jellies (*Chrysaora colorata*) were observed, but no leatherbacks were seen. Jeff Seminoff and Peter Dutto will join the team on 21 Sept. Field efforts will continue through the end of the month, as weather conditions permit. Please contact Scott.Benson@noaa.gov for additional information.

Pacific Ocean Whale and Environmental Research Survey, Western & Central Pacific, 2 July – 30 August – Final report from SWFSC, MMTD biologist Jim Gilpatrick. The survey was conducted aboard the Japanese *R/V Yushin-maru no.3* in the Central North Pacific as a cooperative oceanic cetacean survey effort between the International Whaling Commission, NOAA Fisheries, and Fisheries Agencies in Japan. Pelagic seabirds and marine debris were also identified, photographed and recorded. A total of 3,444 nautical miles of track-line were surveyed during the 60-day effort. Marine mammal sightings included: 1 Central North Pacific blue whale, 1 sei whale, 32 Bryde’s whales, 32 sperm whale pods, 5 Cuvier’s and 3 *Mesoplodon spp.* beaked whales, 2 short-finned pilot whale schools, 1 school of pygmy killer whales, 2 Risso’s dolphin schools, 1 school of bottlenose dolphins, 8 common dolphin schools, 5 striped dolphin schools, and 1 school of pan-tropical spotted dolphins. Photographs were cataloged (nearly 2,400 cetacean photos taken) for most sightings and 23 biopsy (skin/blubber) samples were collected from: 1 blue whale, 1 sei whale, 16 Bryde’s and 5 sperm whales. Biopsy samples will be used in ongoing cetacean population genetics studies; analyses will be conducted by MMTD-SWFSC scientists and at the genetics lab at The National Research Institute of Far Seas Fisheries.
(NRIFSF) in Shizuoka Prefecture, Japan. Numerous oceanic seabirds were sighted, identified and photographed (some 1,700 seabird photographs were cataloged with meta-data). The R/V Yushin-maru no.3 returned to the Port of Shiogama, Miyagi Prefecture on 30-Aug.-2016. On 31-August, Gilpatrick met with Professor Hidehero Kato and his staff and graduate students at the Tokyo University School of Marine Science and Technology. Discussions centered around the status of large whale populations in the North Pacific and future cetacean ship-based surveys out of Japan and the NOAA, Southwest Fisheries Center. Gilpatrick returned to La Jolla on 2-September. Contact Lisa.Ballance@noaa.gov for more information.

**Week of 12 September 2016**

**Whale Health & Condition Assessment, Vancouver Island, August - September** – This past week was an extremely productive one around the San Juan Islands, Washington State. A total of 48 hexacopter flights were successfully completed, collecting vertical photogrammetry images of 70 different Southern Resident killer whales from a population currently numbering 82 individuals. Image measurements will be compared to hexacopter photogrammetry from 2015 and earlier in 2016, and helicopter photogrammetry from 2008 and 2013 to examine growth and changes in condition of individuals in this endangered population. Matching vertical images (condition) and blow samples (respiratory pathogens) were also collected from two humpback whales, to add to 15 whales imaged in neighboring British Columbia in August. The hexacopter flight team of John Durban and Holly Fearnbach also presented a public lecture at The Whale Museum in Friday Harbor on the use of UAS technology for whale health assessment, specifically focusing on endangered Southern Resident killer whales. Contact John.Durban@noaa.gov for more information.

Vertical images of endangered Southern Resident killer whales. Left: aerial photograph of “J2” - an iconic, post-reproductive Southern Resident killer whale female, estimated to be >100yrs old and the oldest member of the this endangered population. Right, photograph of “J27”, a 25-yr old adult male, about to breach clear of the water. Images taken using an unmanned hexacopter at an altitude of >100ft above the whales, with research approaches authorized by NMFS permit # 19091 and airspace clearance by the FAA (2015-ESA-200-COA).

**Leatherback Turtle Feeding Ecology Research, Monterey Bay, CA, 28 August – 30 September** - The 2016 field effort remained suspended last week due to unfavorable weather and sighting conditions. Low clouds and fog are forecast through the first half of this week. The survey and in-water capture effort
will resume when the weather improves. Please contact Scott.Benson@noaa.gov for additional information.

Figure: Locations of PASCAL DASBR deployment locations (Legs 1&2), retrieval locations (Leg 2), and buoy drifts through 9 Sep 2016.

Passive Acoustic Survey of Cetacean Abundance Levels (PASCAL), California Current, 19 August - 30 September – The third and final leg of the SWFSC PASCAL cruise began on Sunday, Sep. 11. The continuing survey crew, Bob Pitman and Jennifer Keating, were joined by Jay Barlow (co-chief scientist), Eric Archer, Eric Keen, and Colette Cairns (from NMFS HQ). The goal of the third leg is to pick up the 17 drifting acoustic spar buoy recorders (DASBRs) that were deployed during Legs 1 and 2, and to conduct visual and towed acoustic surveys of cetaceans between DASBR retrieval stations. During Leg 3 we hope to obtain visual identifications of beaked whale species and to link those species to the sounds that they make. Contact Jay.Barlow@noaa.gov or Jeff.E.Moore@noaa.gov for more information.
Week of 6 September 2016

*Whale Health & Condition Assessment, Vancouver Island, August - September* – This past weekend field operations moved from British Columbia to Washington State waters around the San Juan Islands, to primarily assess the body condition and health of endangered Southern Resident killer whales (SRKWs). John Durban, Holly Fearnbach (MMTD) and Lance Barrett-Lennard (Vancouver Aquarium) successfully completed 25 hexacopter flights in the first two days of the project, obtaining photogrammetry images from 34 different SRKWs, including members of all three pods (“J”, “K” and “L”). Photogrammetry measurements will be used to assess growth and changes body condition of individual SRKWs that were also imaged in in 2008, 2013, 2015 and May 2016, and also to compare to similar measurements from Northern Resident killer whales in Canada (sampled in 2014, 2015 and 2016). This comparison across years and populations will enable an analysis of growth and condition relative to changes in the availability of Chinook salmon, their primary prey (see podcast for more information: [http://www.fisheries.noaa.gov/podcasts/2015/10/uav_killer_whale.html](http://www.fisheries.noaa.gov/podcasts/2015/10/uav_killer_whale.html)). The team was also joined in the field by Don LeRoi (Aerial Imaging Solutions) to successfully test and adopt hexacopter equipment upgrades. For more information contact John.Durban@noaa.gov.

![Adult female Southern Resident killer whales in contrasting body condition. Left: a 39-year old adult female (K14) in relatively robust condition - note the salmon in mouth. Right: a very lean adult female (J28, 23 years old) with first year dependent calf (J54, also lean). Image taken using an unmanned hexacopter at an altitude of >100ft above the whales, with research approaches authorized by NMFS permit # 19091 and airspace clearance by the FAA (2015-ESA-200-COA).](image)
Passive Acoustic Survey of Cetacean Abundance Levels (PASCAL), California Current, 19 August - 30 September
– Leg 2 of PASCAL, conducted aboard the NOAA ship Bell M Shimada, will be completed this week, on Wednesday, 7 September. The five drifting acoustic spar
buoy recorders (DASBRs) that were deployed during Leg 1 have been retrieved, and an additional 17 DASBRs, to be retrieved on Leg 3, have been deployed. Towed hydrophone arrays have made several beaked whale detections, and we visually search for beaked whales when conditions allow. On two occasions, visual and acoustic detections of *Mesoplodon* beaked whales were matched, but neither were identified to species. Other sightings of note included two sperm whale groups (a pair, and a group of 7+, including a calf). An unexpected highlight was a Nazca booby! There are only a handful of records of this species in the USA.

Leatherback Turtle Feeding Ecology Research, Monterey Bay, CA, 28 August – 30 September – The 2016 field effort was suspended last week due to strong and persistent northwest winds. The unfavorable
weather is expected to continue this week. The survey and in-water capture effort will resume when the weather improves. Please contact Scott.Benson@noaa.gov for additional information.

Week of 29 August 2016

Whale Health & Condition Assessment, Vancouver Island, August - September – Last week was a very successful one, with 45 hexacopter flights successfully completed (cumulative 105 flights over three weeks for the Canadian leg of this study). During these flights, photogrammetry images were collected from 40 individual Northern Resident killer whales. All of these individuals, except three new calves, were also imaged in both 2014 and 2015, which will enable a comparison of body condition across years relative to changes in the availability of Chinook salmon, their primary prey. Photogrammetry images were also collected from 9 different humpback whales (15 to date this year), along with five more blow samples (9 in total) to examine respiratory pathogens. This week the research team of John Durban, Holly Fearnbach (MMTD) and Lance Barrett-Lennard (Vancouver Aquarium) will move operations to Washington State to assess the comparative body condition of endangered Southern Resident killer whales. Further photogrammetry images and blow samples will also be opportunistically collected from humpback whales to contribute to our comparative health assessment of humpbacks in different stocks and contrasting feeding habitats. For more information contact John.Durban@noaa.gov.

Left: Photogrammetry image of an adult female Northern Resident killer whale with a newborn calf. Right: the head of a humpback whale photographed during a descent to collect a blow sample with the hexacopter – note the open blowholes during exhalation. Images collected using an unmanned hexacopter, permitted in Canada under the Species at Risk Act (Marine Mammal License 18) and flight authorizations from Transport Canada (SFOC # 11939499)
Passive Acoustic Survey of Cetacean Abundance Levels (PASCAL), California Current, 19 August - 30 September – The focal study species of this survey are beaked whales (family Ziphiidae), sperm whales, and dwarf and pygmy sperm whales. Data are being collected from a network of drifting acoustic spar buoy recorders (DASBRs), which should allow us obtain new and improved density and abundance estimates for these groups. A towed hydrophone array will provide additional data on the geographic and depth distribution of beaked whales and visual observations will validate species identification. This is truly an unprecedented opportunity to collect data on these cryptic species for which NOAA stock assessments contain relatively little information.

Leg 1 is complete: Shannon Rankin deployed five drifting acoustic spar buoy recorders (DASBRs) from the NOAA ship Bell M Shimada during its transit from Newport to San Diego. Leg 2 is currently under way, led by Jeff Moore. To date, an additional 5 DASBRs have been deployed and another 10 will be deployed this week. A new array (called Trident) is being towed at 10 knots, substantially faster than any prior tetrahedral array, so the survey is already yielding some new successes. A skeleton crew of visual observers has so far detected blue whales, fin whales, short-beaked common dolphins, striped dolphins, Risso’s dolphins and offshore bottlenose dolphins. At this writing, no beaked whales have yet been detected. PASCAL is being funded in part by the Bureau of Ocean Energy Management (BOEM). More info about PASCAL can be found here: https://swfsc.noaa.gov/ textblock.aspx?id=21732 &ParentMenuId=259

Behavioral Response of Cetaceans to Navy Sonar, Southern California Bight, August - Last week, Jay Barlow participated in this Navy-sponsored, multi-institutional study. Jay was operating a towed
hydrophone array using a 30-ft Navy Interceptor vessel operating off San Clemente Island. He was aided by Katy Laveck from Cascadia Research Collective. A Navy ship with a 53-type sonar and Navy helicopters with dipping sonar systems were available for experimental playback trials. The team did not find any beaked whales on this trip, but did locate several groups of Risso's dolphins, both acoustically and visually. Unfortunately, the tagging vessels were not successful in tagging any cetaceans at times when Navy sonar was available for an experiment. We did, however, witness a killer whale attack on a Risso's dolphin. A large male killer whale rammed the dolphin in the side and disabled it. No blood was seen in the water, so it is not clear if they ate it or whether the dolphin died of its injuries. Jay was aided with shore-side support from Jennifer Keating and Annette Henry.

Leatherback Turtle Feeding Ecology Research, Monterey Bay, CA, 28 August – 30 September - The 2016 field season began this past weekend. The aerial team onboard a NOAA de Havilland Twin Otter was able to seize a brief and narrow weather window on the afternoon of 28 August, and surveyed transects between Monterey Bay and the Sonoma coast with very good sighting conditions. Although just a few egg yolk jellies were encountered, one leatherback turtle was found directly west of the Golden Gate Bridge (in the shipping lane). Multiple large *Mola mola* were found off the San Mateo coast in an area that has traditionally been favorable for leatherbacks. Although a few whales were sighted in Monterey Bay, no turtles or jellies were sighted. Unfortunately, the weather forecast for next week is not favorable for aerial surveys or in-water sampling. Unusually strong winds for this time of year are expected for about a week. The survey and in-water capture effort will continue when the weather improves. Please contact [Scott.Benson@noaa.gov](mailto:Scott.Benson@noaa.gov) for additional information.

Week of 22 August 2016

*Whale Health & Condition Assessment, Vancouver Island, August - September* – This week 43 hexacopter flights were successfully completed and photogrammetry images were collected from 22 killer whales, comprising 20 Northern Residents and 22 Bigg’s killer whales. The images from Bigg’s killer whales (mammal-eaters, formerly known as “Transients”) will provide a key comparison in body condition and length-at-age relationships to the salmon-eating Residents, notable because Bigg’s killer whales have been increasing rapidly in abundance in this area over the last four decades and are apparently healthy. Photogrammetry images were also collected from 11 different humpback whales, along with four blow samples to examine respiratory pathogens. The research team of John Durban, Holly Fearnbach (MMTD) and Lance Barrett-Lennard (Vancouver Aquarium) also gave a presentation about this ongoing research at the Telegraph Cove Whale Interpretive Center. For more information contact [John.Durban@noaa.gov](mailto:John.Durban@noaa.gov).
Passive Acoustic Survey of Cetacean Abundance Levels (PASCAL), California Current, 19 August – 30 September – PASCAL began last Friday as the R/V Bell Shimada left Newport Oregon. Shannon Rankin, Cruise Leader, has deployed four of 20 drifting acoustic spar buoy recorders (DASBRs) while en route to San Diego (see Figure). The fifth is expected to be deployed today off Point Conception. Robert Holland is also aboard and is setting up the computer systems for Leg 2 of PASCAL which will begin on Tuesday, August 23 after the remainder of the gear and personnel are loaded. PASCAL is being funded in part by the Bureau of Ocean Energy Management (BOEM). Contact Jeff.E.Moore@noaa.gov and Jay.Barlow@noaa.gov and see the project website for more information:

https://swfsc.noaa.gov/textblock.aspx?id=21732&ParentMenuId=259

Behavioral Response of Cetaceans to Navy Sonar, Southern California Bight, August - Jay Barlow is working from a Navy Interceptor vessel this week based out of San Clemente Island, as part of a larger Navy-funded study. Jay will use passive acoustics (a towed hydrophone) to find beaked whales, sperm whales, and Risso's dolphins for tagging and sonar-playback studies. In addition to the Navy, collaborators include Cascadia Research, Southall Associates, and the University of St. Andrews. Contact Jay.Barlow@noaa.gov for more information.
Pacific Ocean Whale and Environmental Research Survey, Western & Central Pacific, July-August – Weekly Report #7 from SWFSC, MMTD Biologist Jim Gilpatrick aboard the Japanese R/V Yushin-maru no.3 (YS3). Our research survey is a cooperative oceanic cetacean survey effort between the International Whaling Commission, NOAA Fisheries and Fisheries Agencies in Japan. A total of 680 nmi of transit line were surveyed last week for marine mammals, seabirds and marine debris. Marine mammal sightings included 22 Sperm Whale (Physeter macrocephalus) groups; 2 Cuvier’s beaked whales (Ziphius cavirostris); 1 Mesoplodon spp; 2 Short-Fin Pilot whale (Globicephalus macrorhynchus) groups and 1 school of striped dolphins (Stenella coeruleoalba). Photographs were collected for all sightings except for the quick-diving Mesoplodon spp, and biopsy samples were collected from Bryde’s and Sperm whales. Seabirds included Brown, Red-Footed and Masked booby, White- and Red-tailed tropicbird, Great Frigatebird, Hawaiian and Juan Fernandez petrel, Wilson’s Storm Petrel, Brown Noddy, Sooty and White tern, Wedge-Tailed Shearwater and an Artic Skua. Shorebirds included multiple Pacific Golden Plovers and a solitary Cattle Egret. A high point of the week was a fast-moving, feeding (preying on flying squid and small fishes) school of Skipjack and Yellowfin tuna with several hundred diving and feeding seabirds including Sooty Terns, Wedge-Tailed Shearwaters, Boobies and Magnificent Frigatebirds. The YS3 is now transiting and surveying in “passing mode” towards the coast of Japan on a WNW course of 289°. Contact Lisa.Ballance@noaa.gov for more information.

Week of 15 August 2016

Whale Health & Condition Assessment, Vancouver Island, August - September – This week fieldwork resumed on the collaborative project undertaking whale health assessment off Vancouver Island. The research team of John Durban and Holly Fearnbach (MMTD) and Lance Barrett-Lennard (Vancouver Left: Photogrammetry image of part of the A30 matriline of Northern Resident killer whales; these whales were also imaged in 2014 and 2015, enabling a comparison of body condition across years. Right: Photogrammetry image of a humpback whale, which will be used to compare body condition and health for this species in different feeding areas. Images collected using an unmanned hexacopter at altitudes of >100ft above the whales, permitted in Canada under the Species at Risk Act (Marine Mammal License 18) and flight authorizations from Transport Canada (SFOC # 11939499).
Aquarium) completed 17 flights with an unmanned hexacopter, obtaining photogrammetry images from 16 Northern Resident killer whales and two humpback whales of northern Vancouver Island, Canada. These images will be used to infer the nutritional status and reproductive success of Northern Resident killer whales, relative to the abundance of their preferred prey (Chinook salmon). This will build on photogrammetry studies of this population since 2014 to provide a key comparison to the status of endangered Southern Resident killer whales, which will be measured during follow-on studies this coming September on the U.S. side of the border around southern Vancouver Island. The images of humpback whales will contribute to ongoing health comparisons for this species on different feeding grounds, ranging from pristine (e.g., around Antarctica) to relatively urban (e.g., off Massachusetts), in collaboration with colleagues at Woods Hole Oceanographic Institution. For more information contact John.Durban@noaa.gov.

Passive Acoustic Survey of Cetacean Abundance Levels (PASCAL), California Current, 19 August – 30 September – PASCAL is a dedicated acoustic survey for cetaceans throughout the U.S. portion of the California Current. Focal study species are beaked whales (family Ziphiidae), sperm whales, and dwarf and pygmy sperm whales. Data will be collected from a network of 20 drifting acoustic spar buoy recorders (DASBRs), which will be deployed during legs 1 and 2 of study and retrieved during legs 2 and 3. These should allow us obtain new and improved density and abundance estimates for these groups. We will also tow a hydrophone array between deployment and retrieval stations to gather additional data on the geographic and depth distribution of beaked whales and to visually validate species identification for some beaked whale acoustic signals. This is truly an unprecedented opportunity to collect data on these cryptic species for which NOAA stock assessments contain relatively little information. PASCAL will be conducted from the NOAA research vessel Bell M. Shimada. Leg 1 departs on 8/19 from Newport, Oregon, and will be led by Shannon Rankin. Legs 2 and 3 depart 8/23 and 9/11, from San Diego and will be led by Jeff Moore and Jay Barlow, respectively. Jennifer Keating is the lead acoustician. SWFSC scientists Bob Pitman, Karin Forney and Eric Archer will participate as visual observers. SIO grad students Eric Keen, AJ Schlenger and Ashlyn Giddings will also participate. Annette Henry is the Survey Coordinator. PASCAL is being funded in part by the Bureau of Ocean Energy Management (BOEM). Contact Jeff.E.Moore@noaa.gov and Jay.Barlow@noaa.gov and see the project website for more information: https://swfsc.noaa.gov/textblock.aspx?id=21732&ParentMenuId=259

Pacific Ocean Whale and Environmental Research Survey, Western & Central Pacific, July-August – Weekly Report #6 from SWFSC, MMTD biologist Jim Gilpatrick aboard the Japanese R/V Yushin-maru no.3 - Our research survey is a cooperative oceanic cetacean survey effort between the International Whaling Commission, NOAA Fisheries, and Fisheries Agencies in Japan. This past week 495 nmi were surveyed for marine mammals, seabirds and marine debris. The ship is approx. 180 nmi north of the Hawaiian Island of Kauai with current course to the S/SW at 11.5 kts. Tropical storm weather systems continue to influence research operations with scattered rain squalls, winds up to 25 kts, rough seas and swells up to 4.0 meters. Marine mammal sightings included two Sperm Whale (Physeter macrocephalus) groups (photographs and biopsy samples collected from both), two Cuvier’s beaked whales (Ziphius cavirostris) and a school of striped dolphins (Stenella coeruleoalba), also photographed. Brown Boobies, White- and Red-tailed Tropicbirds, Great Frigatebirds, Hawaiian and Juan Fernandez Petrels, Red-necked Phalaropes and a Sooty Tern were seabird species recorded. Contact Lisa.Ballance@noaa.gov for more information.

Week of 8 August 2016
Leatherback Genetic Identity Sampling, Sandy Point National Wildlife Refuge, St. Croix, US Virgin Islands, spring/summer - This index nesting beach has been comprehensively monitored using a variety of Capture-Mark-Recapture (CMR) methods for the last 35 years. Kelly Stewart is leading the effort to comprehensively sample every nesting turtle at Sandy Point this year to update population structure, refine delineation of the genetic boundaries of leatherback populations within the Caribbean and quantify breeding sex ratios. The 2016 field season concluded last week with a final 3 nests sampled, and morning surveys for green and hawksbill turtles, and excavation of hatched leatherback nests. These excavations provide a good opportunity to count hatched eggshells and study eggs/embryos that did not hatch. Graduate student Shreya Banerjee is studying hatchling size related to paternal identity, and genetic similarities of embryo twins. Research assistant Romina Ramos is studying hatchling morphometrics as a function of nest incubation temperature. Both of these projects will be presented at the International Sea Turtle Symposium next April. Contact Kelly.Stewart@noaa.gov or Peter.Dutton@noaa.gov for more information.

Final totals for the 2016 season:
Nests detected: 209  Female turtles sampled: 49
Nests sampled: 93   Hatchlings sampled: 2134

Pacific Ocean Whale and Environmental Research Survey, Western & Central Pacific, July-August – Weekly Report #5 from SWFSC, MMTD biologist Jim Gilpatrick aboard the Japanese R/V Yushin-maru no.3 (YS3): Our research survey is the Pacific Ocean Whale and Ecosystems cruise (POWER 2016) and it is a cooperative oceanic cetacean survey effort between the IWC, NOAA Fisheries and Fisheries Agencies in Japan. A total of 468 nmi of transit line were surveyed for marine mammals, seabirds and marine debris last week. Current position is approximately 420 nmi NW of the Hawaiian Islands with the ship progressing to the NW in survey mode during daylight hours at 11.5 kts. Tropical storm weather systems influenced research operations last week. Scattered rain squalls, winds up to 26 kts, rough seas and swells up to 4.5 meters were encountered. Two marine mammal sightings were recorded: a solitary bull Sperm Whale (Physeter macrocephalus) and a school of 12 striped dolphins (Stenella coeruleoalba) with 2 mother/calf pairs observed, and photographs collected. Seabirds included Brown Boobies, White-tailed Tropicbirds, Flesh-footed Shearwaters, Great Frigatebirds, Hawaiian and Juan Fernandez Petrels and a Sooty Tern. Contact Lisa.Ballance@noaa.gov for more information.

Week of 1 August 2016
Leatherback Genetic Identity Sampling, Sandy Point National Wildlife Refuge – St. Croix, U.S. Virgin Islands, spring/summer – This index nesting beach has been comprehensively monitored using a variety of Capture-Mark-Recapture (CMR) methods for the last 35 years. Kelly Stewart is leading the effort to comprehensively sample every nesting turtle at Sandy Point this year to update population structure, refine delineation of the genetic boundaries of leatherback populations within the Caribbean and quantify breeding sex ratios. Winding down the season with one more week to go, we are nearing our goal of sampling hatchlings from every female leatherback that nested at Sandy Point. We have just 3 females left to sample and a couple of nests with unknown mothers that are due to hatch. During early June, there were only a handful of nests laid in the refuge and we are seeing that result this past week with few nests hatching 60 days incubation time). Next week should see a final increase in the number of nests hatching as the turtles made a resurgence in early June. Erin LaCasella joins the team for the final week of the project. Contact Kelly.Stewart@noaa.gov or Peter.Dutton@noaa.gov for more information.

Nests to date: 208  Individual females: 49  Nests sampled: 90  Hatchling samples: 1910

Green Sea Turtle Ecological Research, Southern California

– The SWFSC Marine Turtle Ecology and Assessment Program conducted green turtle field research at the Seal Beach Wildlife Refuge (SBWR) during the past week. This is a collaborative effort with the West Coast Regional Office - Long Beach (Dan Lawson and Tina Fahy). Three juvenile turtles (mean length = 70.7 cm, SE = 0.81, mean mass = 42.3 kg, SE = 1.2) were caught, one which was a recapture from 2013. New turtles were tagged with metal flipper tags and passive-integrated transponder (PIT) tags. Biological samples were collected for genetic, contaminant, hormone, and isotope studies. A graduate student at CSU Long Beach is obtaining a master’s degree through a study of determining concentrations of metal and toxins in blood and scutes. Contact PI Tomo.Eguchi@noaa.gov for more information.
Improving Cetacean Passive Acoustic Monitoring Methods, Catalina Basin, Southern California Bight, 18 - 30 July – Jay Barlow is continuing his collaborative work with Cornell University, University of St. Andrews, Oregon State, and Scripps in comparing acoustic detections of cetaceans in the Catalina Basin. DASBR (Drifting Acoustic Spare Buoy Recorders) are re-deployed each day (see Figure) to keep these instruments within the acoustic range of a SeaGlider, two HARPS (high-frequency acoustic recording packages), and one QuePhone. Instruments fill a small boat. The mission has been successful so far, and in the first five days of deployments, we found a dozen acoustic encounters with beaked whales (Ziphius cavirostris). Contact Jay.Barlow@noaa.gov for more information.

July 22, 2016 DASBRS drift tracks (fine colored lines) and SeaGlider tracks (black dashed line) relative to HARP sea-floor recorders (red dots). Blue dots with concentric rings indicate nominal turn-around points for the glider. Similar 8-9 mile DASBR drifts were achieved each day, with currents tending consistently to the northwest.

Pacific Ocean Whale and Environmental Research Survey, Western & Central Pacific, July-August – Weekly Report #4 from SWFSC, MMTD biologist Jim Gilpatrick aboard the Japanese R/V Yushin-maru no.3 (YS3). Our research survey is the Pacific Ocean Whale and Ecosystems cruise (POWER 2016) and it is a cooperative effort between the IWC, NOAA Fisheries and Fisheries Agencies in Japan. A total of 458 nmi of transit line were surveyed for marine mammals, seabirds and marine debris during the past week. At this writing, the ship is approx. 420 nmi east of the Hawaiian Islands. Low pressure weather systems influenced operations last week with scattered rain squalls, trade winds up to 25 kts, rough seas and swells up to 4.5 meters. Only one marine mammal sighting was made, an unidentified Mesoplodon spp. Laysan Albatross, Brown Boobies, Tropicbirds, Shearwaters, Hawaiian and Juan Fernandez Petrels and a Great Frigatebird were sighted and photographed. Contact Lisa.Ballance@noaa.gov for more information.
Week of 25 July 2016

California and Steller sea lion aerial survey, US West Coast, July – The California sea lion and Steller sea lion survey was completed on July 18. A total of 34.2 hours of flight time were logged while surveying and photographing sea lions at the Channel Islands in southern California and along the coast and islands from Point Conception, California to Coos Bay, Oregon. Approximately 91GigaBytes of data containing over 7,000 photographs were collected during the two-week survey. The survey used a Partenavia P-68 Observer aircraft, chartered from Aspen Helicopters. The glass nose of this aircraft gives the pilot excellent forward and downward vision which makes it possible to fly precisely over sea lion haulout sites and rookeries (needed for the narrow coverage of the camera). Contact Mark.Lowry@noaa.gov for more information.

Leatherback Genetic Identity Sampling, Sandy Point National Wildlife Refuge – St. Croix, U.S. Virgin Islands, spring/summer – This index nesting beach has been comprehensively monitored using a variety of Capture-Mark-Recapture (CMR) methods for the last 35 years. Kelly Stewart is leading the effort to comprehensively sample every nesting turtle at Sandy Point this year to update population structure, refine delineation of the genetic boundaries of leatherback populations within the Caribbean and quantify breeding sex ratios. Twenty nests were observed hatching last week, nine of which were sampled. Our goal is to sample six more this season. Nest excavations continue, including one laid by an un-sampled female along the north shore of St. Croix and detected after hatching by one of our research assistants (Gabby Carvajal). More than 60 hatchlings made it to the water from this nest and yolkless eggs were collected to determine the maternal identity. These data allow further refinement of estimates of clutch frequency for turtles that may not be as faithful to nesting at Sandy Point. Morning beach patrols also continue and allow tracking of all 3 turtle species (leatherbacks, greens and hawksbills) in the refuge.
Nests to date: 208  Individual females: 49
Nests sampled: 84  Hatchling samples: 1793

For more information, please contact Kelly.Stewart@noaa.gov or Peter.Dutton@noaa.gov.

Improving Cetacean Passive Acoustic Monitoring Methods, Catalina Basin, Southern California Bight, 18 – 30 July – Jay Barlow is continuing an ONR-funded collaborative acoustic research project in collaboration with Oregon State University, Cornell, Scripps and the University of St. Andrews. The team has deployed 12 acoustic recording systems, including eight Drifting Acoustic Spar Buoy Recorders (Jay's DASBRs), a Glider sampling from 0-1000m depth, a QuePhone profiling buoy at 500m depth, and two seafloor High-frequency Acoustic Recording Packages (HARPs). The objective of this research is to compare the distances at which beaked whales and other species are detected on this wide assortment of instruments. Jennifer Keating and Eiren Jacobson have assisted with deployments aboard the chartered dive boat Horizon; Shannon Rankin and Annette Henry have provided shore-based logistic support. Currently the team is staying at the USC Wrigley Field Station on Catalina Island and is re-positioning the drifting buoys every day to keep the instruments together in a functioning array. Contact Jay.Barlow@noaa.gov for more information.

Pacific Ocean Whale and Environmental Research Survey, Western & Central Pacific, July-August – Weekly Report #3 from SWFSC, MMTD biologist Jim Gilpatrick aboard the Japanese R/V Yushin-maru no.3 (YS3) in the Central North Pacific (17-23 July-2016). A total of 612 nmi were surveyed for marine mammals, seabirds and marine debris last week on this collaborative effort between the IWC, NOAA Fisheries and Fisheries Agencies in Japan. The current course is S-SW, progressing in survey mode during day-light hours at 11.5 kts. By end of week the ship should be within 450 nmi of the Big Island of Hawaii. Air temperature ranged btwn. 20.7°C - 24.9°C and Ocean SST ranged btwn. 21.2°C - 23.8°C. One Bryde’s whale was sighted, photographed and a biopsy sample was collected. Also sighted was a school of 16 pygmy killer whales (Feresa attentuata), including two mother/calf pairs. Laysan Albatrosses, Brown Boobies, a Hawaiian Petrel, Shearwaters and Tropicbirds were observed and photographed. Survey effort was interrupted at times due to Trade-winds (15-22 kts) and scattered rain squalls. On 21-July, a glass buoy originating from the Dept. of Oceanography at Oregon State University was retrieved (at 29°-19.7'N/138°-36.6'W) and Dr. Bruce Mate at OSU has been contacted and given the information. Contact Lisa.Ballance@noaa.gov for more information.

Week of 18 July 2016

Improving Cetacean Passive Acoustic Monitoring Methods, Catalina Basin, Southern California Bight, 18 – 30 July – Next week the MMTD acoustics program will be conducting a 2-week collaborative field project in the Catalina Basin with researchers from the University of Oregon, Cornell University, Scripps Institution of Oceanography, and the University of St. Andrews. This ONR-funded project will compare four different approaches to passive acoustic monitoring of cetaceans. Jay Barlow will be deploying eight of his Drifting Acoustic Spar Buoy Recorders (DASBRs). Other acoustic recording platforms will include an undersea glider, two seafloor recorders (HARPs), and a vertical profiling buoy. Instruments will be deployed on Tuesday from a charter vessel (the dive boat Horizon). Buoys will be re-positioned daily to maintain an array configuration to localize cetacean sources. These locations will allow detection range to be estimated for the other instruments. After the initial deployment, the field team will be staying at the USC Wrigley Station on Catalina Island and will be making excursions in a small USC charter vessel. Contact Jay.Barlow@noaa.gov for more information.
Leatherback Genetic Identity Sampling, Sandy Point National Wildlife Refuge – St. Croix, U.S. Virgin Islands, spring/summer – This index nesting beach has been comprehensively monitored using a variety of Capture-Mark-Recapture (CMR) methods for the last 35 years. Kelly Stewart is leading the effort to comprehensively sample every nesting turtle at Sandy Point this year to update population structure, refine delineation of the genetic boundaries of leatherback populations within the Caribbean and quantify breeding sex ratios. Hatch rates have been relatively high (45 to 70 hatchlings per nest) this year. Hatchlings from an additional 21 nests were sampled last week bringing the season total to 130 nests sampled. This includes nests from 36 of the 49 females nesting and 21 nests with unknown mothers. Hawksbill turtles (a Critically Endangered species) also nest on this beach and we have seen some hatchlings begin to emerge. This week Robin LeRoux joins the team and we will also train Paul Hillbrand (Master’s student at University of the Virgin Islands), who will study hawksbill paternity at Buck Island Reef National Monument (NPS) later this summer in collaboration with us. Contact Kelly.Stewart@noaa.gov or Peter.Dutton@noaa.gov for more information.

Nests to date: 207  Individual females: 49  Nests sampled: 75  Hatchling samples: 1637

Hexacopter Calibration of Cetacean School Size Estimates, Main Hawaiian Islands, 26 June - 30 July – The UAS team of LTJG Hollis Europe and Ensign Jacob Barbaro completed another 8 flights last week with the APH-22 hexacopter from the NOAA Ship Oscar Elton Sette. Species photographed were killer whales (photo), pilot whales, melon-headed whales, and pygmy killer whales. Flight totals for this collaborative cruise led by Dr Erin Oleson from the Pacific Islands Fisheries Science Center are now at 41 missions and about an hour of flight time. These operations aboard the Sette represent the first use of the versatile hexacopter from a NOAA research ship and, thanks to the support of a great team of Officers and crew aboard the ship, operations are going very smoothly. Contact Wayne.Perryman@noaa.gov for more information.

Pacific Ocean Whale and Environmental Research Survey, Western & Central Pacific, July-August – Weekly Report #2 from SWFSC, MMTD biologist Jim Gilpatrick aboard the R/V Yushin-maru no.3 in the Central North Pacific (10-16 July 2016). This past week survey transit progressed from 34° 44’ N
Lat./174° 41’ W Long. to 27° 54’ N Lat./146° 13’ W Long, with 398.5 nmi surveyed for marine mammals, seabirds and marine debris. Air temperature ranged between 21.6° - 25.4° C and water temperature ranged between 21.9° - 24.5° C. Eight Bryde’s whale, 2 Sperm whale and 1 Risso’s dolphin sightings were recorded; biopsy samples were collected from 3 Bryde’s whales; photo-id shots were taken from 6 Bryde’s whales. Numerous Albatrosses, Shearwaters and Tropicbirds were observed and photographed. Survey effort has been interrupted as a tropical depression is near-by and Hurricane Carly appears to be on its way. Winds are up to 25 kts and rough seas with swells to 4.5 m at present. Contact Lisa.Ballance@noaa.gov for more information.

**Green Sea Turtle Ecological Research, Southern California** – The Marine Turtle Ecology and Assessment Program conducted green turtle field research at the Seal Beach Wildlife Refuge (SBWR) and San Diego Bay (SDB) during the past three weeks. At SBWR, one adult female was caught (length = 95 cm, mass = 128 kg), the largest turtle ever caught in the refuge. At SDB, five juvenile and two adult female green turtles were caught, with lengths ranging from 62.3 cm to 101.3 cm (mass from 33 kg to 141 kg); the largest of which was first captured in 1998 and has been captured seven times since then. Of the 10 turtles captured in San Diego Bay so far this season, five were ‘first captures’; this marks the highest proportion of first-time captures in more than a decade. A second recapture was first caught in 2004; this most recent capture was only the second capture of this turtle. Our capture records—and recapture rates—are used to estimate abundance and survival rates as well as somatic growth rates. Biological samples were collected for genetic, toxicology, hormone, and isotope studies. New turtles were tagged with metal flipper tags and passive-integrated transponder (PIT) tags. Three of the four turtles caught in SDB were outfitted with GPS-enabled satellite transmitters to determine their home ranges and movement patterns. The telemetry study is a collaborative effort with the Navy and the Unified Port of San Diego. For more information, please contact Tomo.Eguchi@noaa.gov.

**California and Steller sea lion aerial survey, US West Coast, July** - This survey being conducted by Mark Lowry continued up the California coast to southern Oregon last week. No California sea lions were found in southern Oregon or northern California though Steller sea lions were abundant and all of their major west coast rookeries were photographed. California sea lions were abundant in central California, with many pups being born at Año Nuevo Island. Normally around 100 pups are born at that rookery, but examination of the photographs taken on Sunday, July 17 shows that several hundred were born there this year. The increase in California sea lion pup production at Año Nuevo Island is likely due to the recent El Niño warm water conditions at the Channel Islands in southern California. The aerial survey continues this week, with the Farallon Islands, a stretch of coastline between Bodega and Año Nuevo Island, and Vandenberg Air Force Base near Point Conception planned. Contact Mark.Lowry@noaa.gov for more information.

*Week of 11 July 2016*
Aerial Photographic Survey of California Sea Lions and Steller Sea Lions, Channel Islands & coastal California/Oregon, 5-20 July – The California sea lion aerial survey being conducted by Mark Lowry and Beth Jaime is going well. All eight Channel Islands have been surveyed, with all pinnipeds sighted photographed from the aircraft. This week the survey continues up the California coast from Point Conception to the Oregon border, then into Oregon. For more information contact Mark.Lowry@noaa.gov.

Leatherback Genetic Identity Sampling, Sandy Point National Wildlife Refuge – St. Croix, U.S. Virgin Islands, spring/summer - This index nesting beach has been comprehensively monitored using a variety of Capture-Mark-Recapture (CMR) methods for the last 35 years. Kelly Stewart is leading the effort to comprehensively sample every nesting turtle at Sandy Point this year to update population structure, refine delineation of the genetic boundaries of leatherback populations within the Caribbean and quantify breeding sex ratios. No new nests are expected this season so the focus is sampling of hatchling. Last week 21 new nests emerged and most were sampled. July 4th was especially productive, with 4 nests emerging; each yielded nearly 50 hatchlings! A total of 180 turtles we sampled that night and the team watched fireworks from the refuge beach. Daybreak morning surveys for sea turtle tracks are now being conducted. Nests that have hatched are also excavated for nest inventories: categorizing the development status of each egg (hatched, unhatched, undeveloped, dead or live) to evaluate female productivity. By identifying males through genetic sampling of their hatchlings, we can also evaluate male productivity - something that has never before been assessed for any sea turtle species.

Nests to date: 205 Individual females: 49
Nests sampled: 54 Hatchling samples: 1021

For more information, please contact Kelly.Stewart@noaa.gov or Peter.Dutton@noaa.gov.

Pacific Ocean Whale and Environmental Research Survey, Western & Central Pacific, July-August -
The *R/V Yushin-maru no 3* continues its transit from the coast of Japan to the survey area, which includes international waters and areas within the US EEZ near the Hawaiian Islands. The starting point will be at 25° N Latitude/135° W Longitude and the ship is expected to arrive there on 18 July. Sightings for the past week included a blue whale (photo), numerous Bryde’s whales, Common, Striped, and Risso’s dolphins, and a Sei whale. Photographs and/or skin and blubber biopsy samples were collected from all species of whales. Oceanic birds and marine debris are being photographed as well. This research effort is a collaboration between the International Whaling Commission, NOAA Fisheries (with Jim Gilpatrick aboard), and Fisheries Agencies in Japan. Contact Lisa.Ballance@noaa.gov for more information.

**Week of 5 July 2016**

*Leatherback Genetic Identity Sampling, Sandy Point National Wildlife Refuge – St. Croix, U.S. Virgin Islands, spring/summer* - This index nesting beach has been comprehensively monitored using a variety of Capture-Mark-Recapture (CMR) methods for the last 35 years. Kelly Stewart is leading the effort to comprehensively sample every nesting turtle at Sandy Point this year to update population structure, refine delineation of the genetic boundaries of leatherback populations within the Caribbean, and quantify breeding sex ratios.

Nesting patrols came to an end on 30 June, with the five previous nights of no turtles. On 30 June a spectacular light show from offshore storms accompanied 2 nesting turtles: Molly (her third nest) and Leia (her eighth nest). Fiona, originally tagged in 1995, wins the title for being the largest nesting female of the season (172 cm in curved carapace length). Hatchlings have been keeping the team busy as well, with several hatchouts each night. National Geographic photographer Brian Skerry visited last week to capture photos of 3 nesting females (Panini, Perdita and Molly) under the full moon. And we were treated to a surprise visit by Sylvia Earle, who shared a few inspiring words with us, "Continue to do what you are doing and educate."

Joining the hatchling sampling team is Nicky Beaulieu and Amy Frey.

- Nests to date: 205
- Individual females: 49
- Nests sampled: 43
- Hatchling samples: 819

Nesting team research assistant Romina Ramos sits with a dawn nesting turtle.
For more information, please contact Kelly Stewart (mailto:Kelly.Stewart@noaa.gov) or Peter Dutton (mailto:Peter.Dutton@noaa.gov).

**Aerial Photographic Survey of California Sea Lions and Steller Sea Lions, Channel Islands & coastal California/Oregon, 5-20 July** - Mark Lowry and Beth Jaime will conduct this survey. Funding for aircraft was provided by Navy (Naval Base Ventura County - Channel Islands survey) and SWFSC (mainland coast survey). Contact Mark.Lowry@noaa.gov for more information.

**California Sea Lion Census and Diet Research, Channel Islands, Southern California Bight, quarterly** - On July 8-11, Jim Carretta and Alex Curtis will travel to San Clemente Island to collect California sea lion scat samples for diet analysis and to count pinnipeds. Contact Mark.Lowry@noaa.gov for more information.

**Photogrammetry with an unmanned aerial system to assess body condition and growth of Blainville’s beaked whales, Abaco Island, northern Bahamas, 8-30 June** - This past week saw the completion of this field project. Funded by the U.S. Office of Naval Research, this month-long collaboration between MMTD (John Durban, Holly Fearnbach) and the Bahamas Marine Mammal Research Organization (Diane Claridge, Charlotte Dunn) was very successful in collecting photogrammetry data from beaked whales, and other species. This was the first photogrammetry study of any beaked whale species, which are notoriously difficult to study due to their long foraging dives (>1 hr) and cryptic surfacing behavior. A total of 52 flights were successfully completed, collecting aerial photogrammetry images of Blainville’s beaked whales (11 individuals, 30 flights), Sperm whales (8 individuals, 5 flights), dwarf sperm whales (2 individuals, 2 flights) and bottlenose dolphins (35 individuals, 15 flights). Data analysis will now begin to assess measurement variability across repeated photographs of the same individuals, and to assess key differences in condition and length between individuals of known age and life history status. For more information contact John.Durban@noaa.gov.
Aerial photogrammetry images of an adult male Blainville’s beaked whale (left), and a bottlenose dolphin mother and juvenile (right). Photographs taken from an unmanned hexacopter, with flight clearance from the Bahamas Department of Civil Aviation and a permit for research on marine mammals granted by the Bahamas Department of Marine Resources.

Hexacopter Calibration of Cetacean School Size Estimates, Main Hawaiian Islands, 26 June - 30 July A team from the Marine Mammal and Turtle Division working in collaboration with scientists from the Pacific Islands Fisheries Science Center completed the first week of a one-month cruise aboard the NOAA Ship Oscar Sette dedicated, in part, to evaluate the ability of a small unmanned aerial platform to calibrate dolphin school size estimates. The flight team consisting of LTJG Hollis Europe and Ens. Jacob Barbaro completed a total of 33 flights which included launches and retrievals from the ship and a 19’ rigid hull inflatable. The aircraft performed perfectly and the two pilots did an outstanding job. We are still working out the kinks on how to best take advantage of big ships and small boat platforms when sampling small
cetaceans at sea but results so far look very promising. Contact Wayne.Perryman@noaa.gov for more information.

Pacific Ocean Whale and Environmental Research Survey, Western & Central Pacific, July-August - Jim Gilpatrick departed for this IWC survey aboard the R/V *Yushin-maru no.3* from the Port of Shiogama, Miyagi Prefecture, Japan on 2 July. The survey area extends from offshore of Japan to EEZ waters of Hawaii and east towards Baja California, Mexico. Gilpatrick is the U.S. NOAA Fisheries Scientist and will be involved with marine mammal observations and photography, large whale biopsy and data management and seabird photography. Marine debris will also be systematically recorded. The survey is expected to take two months. Contact Lisa.Ballance@noaa.gov for more information.

*Week of 27 June 2016*

Hexacopter Calibration of Cetacean School Size Estimates, Main Hawaiian Islands, 26 June - 30 July - LTJG Hollis Europe, Ens. Jacob Barbaro and Wayne Perryman will sail aboard the NOAA Ship *Oscar Sette* for Cruise number SE-16-04, in collaboration with Erin Oleson of the PIFSC. This will be the first operation of the APH-22 hexacopter from a NOAA research vessel. A primary goal of this 30-day survey is to evaluate the effectiveness of a small Unmanned Aerial System as a tool for calibrating observer estimates of the number of animals in large aggregations during cetacean assessment surveys. We will also evaluate the systems’ effectiveness for identifying naturally marked cetaceans and collecting morphometric data for life history studies. Contact Wayne.Perryman@noaa.gov for more information.

Leatherback Genetic Identity Sampling, Sandy Point National Wildlife Refuge – St. Croix, U.S.Virgin Islands, summer - This index nesting beach has been comprehensively monitored using a variety of Capture-Mark-Recapture (CMR) methods for the last 35 years. Kelly Stewart is leading the effort to comprehensively sample every nesting turtle at Sandy Point this year to update population structure, refine delineation of genetic boundaries of leatherback populations within the Caribbean, and quantify breeding sex ratios. Last week Laura Ferguson (Knauss Fellow from NMFS Office of Science & Technology) visited the field site to learn about and participate in all aspects of the project. Also joining the team is Shreya Banjerjee, SWFSC volunteer and UCSD masters student; she will remain for the duration of the season to collect data for her degree on the influence of paternity on hatchling size.

Nests to date: 203  Individual females: 49
Nests sampled: 30  Hatchling samples: 604

For more information, please contact Kelly Stewart (Kelly.Stewart@noaa.gov) or Peter Dutton (Peter.Dutton@noaa.gov).

Photogrammetry with an unmanned aerial system to assess body condition and growth of Blainville’s beaked whales, Abaco Island, northern Bahamas, 8 – 30 June - Relatively high winds limited photogrammetry efforts last week. Working with colleagues from the Bahamas Marine Mammal Research Organization, John Durban and Holly Fearnbach flew 6 hexacopter flights, collecting
photogrammetry images of a group of five Blainville’s beaked whales and two bottlenose dolphins. Flight operations conclude on Wednesday this week, and a favorable weather forecast should see a busy finish. For more information contact John.Durban@noaa.gov.

Aerial photogrammetry images of a group of Blainville’s beaked whales (left) and a bottlenose dolphin (right). Photographs taken from an unmanned hexacopter, with flight clearance from the Bahamas Department of Civil Aviation and a permit for research on marine mammals granted by the Bahamas Department of Marine Resources.

Week of 20 June 2016

Leatherback Genetic Identity Sampling, Sandy Point National Wildlife Refuge – St. Croix, US Virgin Islands, spring-summer 2016 - This index nesting beach has been comprehensively monitored using a variety of Capture-Mark-Recapture (CMR) methods for the last 35 years. Kelly Stewart is leading the effort to comprehensively sample every nesting turtle this year to update population structure, refine delineation of the genetic boundaries of leatherback populations within the Caribbean, and quantify breeding sex ratios. There has been a slight increase in number of nests laid this past week, with many females laying their 7th and 8th nests of the season, plus a couple of first nesters. Hatchlings are now regular with at least two nest emergences each night.

Nests to date: 195
Nests sampled: 23
Individual females: 49
Hatchling samples: 414

For more information, please contact Kelly Stewart (Kelly.Stewart@noaa.gov) or Peter Dutton (Peter.Dutton@noaa.gov).

Photogrammetry with an unmanned aerial system to assess body condition and growth of Blainville’s beaked whales, Abaco Island, northern Bahamas, 8 – 30 June. - John Durban and Holly Fearnbach flew 15 hexacopter flights last week, collecting photogrammetry images of Blainville’s beaked whales, sperm whales and bottlenose dolphins. Of note, a total of 19 flights
have now been flown over Blainville’s beaked whales, the primary target species, collecting >2000 images, with multiple repeat images of eight different whales. These will be used to examine measurement variability in length and width profiles of the same whales and to compare condition and size between whales. Our colleagues at the Bahamas Marine Mammal Research Organization (Diane Claridge, Charlotte Dunn) have a 25-yr photo-identification catalog for this species, enabling measurements to be linked to whales of known identity, gender, age class and life history. So far we have imaged two adult males, one sub-adult, two adult females and their dependent calves, and one single adult female that we believe to be pregnant. This is the first ever photogrammetry research on beaked whales, and these data will be essential for validating the approach and developing protocols and comparative datasets for future assessments of growth and condition of whales using Navy test ranges. For more information contact John.Durban@noaa.gov.
Leatherback Genetic Identity Sampling, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands - This index nesting beach has been comprehensively monitored using a variety of Capture-Mark-Recapture (CMR) methods for the last 35 years. Kelly Stewart is leading the field effort this year to comprehensively sample every nesting turtle at Sandy Point for the purpose of updating population structure, refining delineation of the genetic boundaries of leatherback populations within the Caribbean, and quantifying breeding sex ratios. On 9 June, the team found the first naturally-emerging large nest of this season and sampled all emerging hatchlings (38).

Our ultimate goal is to sample one nest from every nesting female to get an accurate assessment of all breeding males that contributed to the population this year. Even as nests begin to emerge, females continue to lay new nests. Ten new nests were found this week, including one laid by Flounder (SPP254), who has now laid 7 nests within the refuge boundaries. Our satellite and camera-tagged turtle (SPP001) returned to the beach on 4 June. The tags were removed and graduate student Ayaka Asada (Texas A&M) will sort through hundreds of hours of camera footage and dive profiles to quantify the turtle’s movements during her 10 days at sea. Nests to date: 187 from 47 females; Nests emerged: 13; Hatchling samples: 210. For more information, please contact Kelly Stewart (Kelly.Stewart@noaa.gov) or Peter Dutton (Peter.Dutton@noaa.gov).

Photogrammetry with an unmanned aerial system to assess body condition and growth of Blainville’s beaked whales, Abaco Island, northern Bahamas, 8 – 30 June - This collaboration between MMTD (John Durban, Holly Fearnbach) and the Bahamas Marine Mammal Research Organisation (Diane Claridge, Charlotte Dunn) aims to demonstrate the utility of photogrammetry using an unmanned hexacopter for monitoring the body condition and growth of beaked whales, to facilitate an understanding of the effect of disturbance on individual health. This has direct relevance for ongoing monitoring to understand population-level effects of disturbance in navy operation areas, specifically for Blainville’s beaked whales in the Bahamas, but also other species on other Navy test ranges. This project is funded by the U.S. Office of Naval Research. This week flight operations commenced and in the first two days the team has already imaged two groups of Blainville’s beaked whales – the ever first aerial photogrammetry images of this cryptic species. During 15 hexacopter flights, other species imaged/measured included bottlenose dolphins, sperm whales and dwarf sperm whales. For more information contact John.Durban@noaa.gov.
Aerial photogrammetry images of Blainville’s beaked whales: adult male on left (see erupted teeth) and adult female with calf on right. Photographs taken from an unmanned hexacopter from >100ft altitude, with flight clearance from the Bahamas Department of Civil Aviation and a permit for research on marine mammals granted by the Bahamas Department of Marine Resources.

Week of 6 June 2016

Leatherback Genetic Identity Sampling, Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands, April - August 2016 - This index nesting beach has been comprehensively monitored using a variety of Capture-Mark-Recapture (CMR) methods for the last 35 years. Kelly Stewart is leading the effort to comprehensively sample every nesting turtle to update population structure, refine delineation of the genetic boundaries of leatherback populations within the Caribbean, and quantify breeding sex ratios.

Twelve females laid nests last week and seven nests were observed with hatchlings emerging. Sampling of these emerging nests include recording number of hatched, unhatched, dead and live turtles, and collecting tiny skin clips from the flippers. Because maternal DNA is contained in eggshells, we also collect yolkless eggs (or spacers) from nests laid earlier in the season. Additionally, two new nesting females (neophytes) were sampled last week. These neophyte samples are of particular interest; they will be compared to hatchlings sampled since 2009 to determine age of reproductive maturity (through genetic matching). And, we are expecting the return of a turtle that was equipped with a video data
recorder and satellite transmitter on 3 June (deployed by graduate student Ayaka Asada of Texas A&M). During the last 10 days, the turtle has spent time over the deepwater canyon (4000 m) just north of Sandy Point. For the last two days, she has been staging along the north shore of St. Croix and has ventured close to the beaches there, but now is poised a few km directly off Sandy Point. Nests to date: 177; Individual females: 47; Nests emerged: 8; Neophytes: 27%, Remigrants (tagged in previous seasons): 73%. For more information, please contact Kelly.Stewart@noaa.gov or Peter.Dutton@noaa.gov.

Green Sea Turtle Ecological Research, San Diego Bay, June 2016 - The Marine Turtle Ecology and Assessment Program conducted capture efforts in San Diego Bay on 1 June and caught a sub-adult green turtle weighing 44 kilograms and measuring just shy of 70 cm straight carapace length (SCL). This was the first time this turtle had been captured in the 20 years that SWFSC has been monitoring the site. Samples collected included blood to determine sex, skin for stable isotope analysis and genetic stock origin, and scutes to quantify contaminant loads. In addition, a satellite tag was attached to examine fine-scale movement patterns within San Diego Bay. Contact Tomo.Eguchi@noaa.gov for details.

Field Testing of Acoustic Recorders, Coastal San Diego, 7 & 9 June - The cetacean acoustics group (Jay Barlow and Shannon Ranking) will deploy and test newly-developed passive acoustic equipment, conduct localization tests using sonobuoys, deploy drifting buoy recorders (DASBRs) for 48 hrs to test some new designs, and field test a new autonomous towed recording system. Vessel days are scheduled on the local dive boat Horizon. Contact Jay.Barlow@noaa.gov for additional information.

Week of 31 May 2016

Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, CA 28 March - late May - MMTD scientists completed the final week of the shore-based survey of northbound gray whale cows and calves last Friday. In 54 hours of survey effort, the team detected 16 northbound cow/calf pairs, with no calves sighted on the final day of effort. This brings the total count for the season to 367 northbound calves indicating the 5th consecutive season of very strong recruitment to this population. The team for the last week of the survey comprised Morgan Lynn, Lynn Evans, Heather Colley, and Annette Henry. The 23rd consecutive season for these surveys was the second that combined the sighting surveys with vertical photographs of cows and calves from the APH-22 hexacopter. The survey counts combined with measurements of size and shape from the aerial photographs will provide an enhanced understanding of the impact of changing environmental conditions and gray whale reproductive output. Contact Wayne.Perryman@noaa.gov for details.

Heather Colley on watch during the final week of the gray whale calf survey.
Leatherback Turtle Genetic Identity Sampling, Sandy Point National Wildlife Refuge, St. Croix, US Virgin Islands, April - August 2016 - This index nesting beach has been comprehensively monitored using a variety of Capture-Mark-Recapture (CMR) methods for the last 35 years. Kelly Stewart is leading the effort to comprehensively sample every nesting turtle here this year to update population structure, refine delineation of the genetic boundaries of leatherback populations within the Caribbean, and investigate breeding sex ratios. So far this year only 46 individuals have nested, compared to 85 turtles at this time last year. Nemo (SPP308) nested for the 6th time last week and hatchlings were sampled from two excavated nests. Graduate student Ayaka Asada (Texas A&M) deployed a video data recorder and satellite transmitter on a nesting turtle; both will be retrieved when the turtle returns to nest. Nests to date: 165; Individual females: 46; Nests emerged: 4. Contact Kelly.Stewart@noaa.gov or Peter.Dutton@noaa.gov for more information.

Green Sea Turtle Ecological Research, San Diego Bay, May 2016 - SWFSC researchers conducted their first green turtle capture efforts in San Diego Bay in 2016 on 10 May. The team caught two large female green turtles, weighing 139 kg and 141 kg, and measuring 110 cm and 108 cm, respectively, in carapace length. Both were recaptures, and one still had a satellite tag on her that was deployed at the end of 2015. Sample collection and general health assessments were done, and both were affixed with new satellite GPS tags to examine movement within the bay. The team’s next capture efforts will be conducted on 1 June 2016. Contact Tomo.Eguchi@noaa.gov or Jeffrey.Seminoff@noaa.gov for more information.

Week of 23 May 2016

Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, CA 28 March - late May - Morgan Lynn, Jim Carretta, Krista Catelani, and Tina Nguyen clocked 50.5 hours of sighting effort last week (the 8th of this season’s survey) and recorded 22 cow-calf pairs (a drop from last week’s 129), bringing this season’s total to 351. Other species sighted included humpback whale, bottlenose dolphin, and Risso’s dolphin. Contact Wayne.Perryman@noaa.gov for details.
Health Assessment of Resident Killer Whales, Washington and Vancouver Island, Canada, May 2016 - Southern Resident killer whales were not sighted this past week (week 2 of 3 for this spring field effort), but photogrammetry images were obtained of the sympatric population of Bigg’s (“Transient”) killer whales. John Durban, Holly Fearnbach (MMTD) and Lance Barrett-Lennard (Vancouver Aquarium) conducted 18 flights with an unmanned hexacopter, obtaining vertical images of 22 different Bigg’s killer whale individuals. Bigg’s killer whales prey on marine mammals, and this population of “West Coast Transients” has been increasing steadily over the past four decades, tracking abundance increases in their prey. Therefore these images will be useful for comparative measures of body condition and size relative to the endangered Southern Residents that are thought to be limited by availability of their primary prey, Chinook salmon. For more information contact John.Durban@noaa.gov.
Leatherback Genetic Identity Sampling, Sandy Point National Wildlife Refuge, St. Croix, USVI, April - August 2016 -

Aerial photograph of a group of Bigg’s (“Transient”) killer whales. Image taken using an unmanned hexacopter at an altitude of >100ft above the whales, with research approach authorized by NMFS permit # 16163 and airspace clearance by the FAA (2015-ESA-200-COA).

Right: The team (SCA research assistants) with a rare dawn turtle. Left: A dawn turtle (Jasmine – seen 3 times this season, and first tagged in 2006), slips back into the water after nesting.
Kelly Stewart is leading the field effort on this index nesting beach (which has been comprehensively monitored for the past 35 years) to comprehensively sample every nesting turtle this year; data will be used to update population structure, refine delineation of the genetic boundaries of leatherback populations within the Caribbean, and quantify breeding sex ratios. Last week 22 females nested, including 5 neophytes (not seen previously this season, some never previously seen) and 17 return nesters (this season). The latter included Ursula (SPP360) now seen nesting 5 times, Nemo (SPP308) seen 3 times and Crush (SPP400) seen four times. These three turtles were first tagged as putative neophytes in 2013 or 2014. And finally, hatching has begun! Two nests emerged last week and hatching sampling will now begin in earnest with a goal of comprehensively sampling one full clutch from each nesting female. Our samples are tiny tissue clips from hatchling flippers or embryonic tissue left behind after hatching, which allow us to determine maternal and paternal lineage and refine estimates of total number of nesting females. Our nesting turtles continue to arrive with new scars and injuries, most likely from tiger shark attacks. Many have been bitten on the face and head. Nests to date: 149; Individual females: 43; Nests emerged: 2. For more information, please contact Kelly.Stewart@noaa.gov or Peter.Dutton@noaa.gov.

Week of 16 May 2016

Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, CA 28 March - late May - During the seventh week of the survey (9-13 May), no time was lost to weather. In 60-hours of sighting effort, 129 cow-calf pairs were detected, the highest for the 2016 season thus far. The 2016 season total is now 329. Other species sighted last week included killer, humpback, minke, and blue whales, bottlenose, Pacific white-sided, and common dolphins. On May 13th, the team sighted NOAA ship Reuben Lasker to the northwest of the count site. Team members were Jim Carretta, Krista Catelani, Alex Curtis, and Paul Fiedler. Contact Wayne.Perryman@noaa.gov for details.

Leatherback Genetic Identity Sampling, Sandy Point National Wildlife Refuge, St. Croix, USVI, April - August 2016 - It’s been another busy week at Sandy Point! Since last Sunday night (8 May) we have had 23 new nests, at least 10 of which were laid by turtles we had already encountered this season. On our busiest night there were five turtles nesting, including Catalina (flipper tag: SPP214), who laid her 4th...
nest of the season. Total number of nests on the refuge thus far is 134; we have encountered 38
individuals. This week we also assisted researchers from Texas A&M and graduate student Ayaka Asada
to attach a satellite transmitter and video camera to a nesting turtle. Ayaka hopes to video-document the
movements of the turtle as well as any foraging activity. For more information, contact
Kelly.Stewart@noaa.gov or Peter.Dutton@noaa.gov.

Health Assessment of Resident Killer Whales, Washington and Vancouver Island, Canada, May 2016 -
This week a new field season began in the ongoing photogrammetry study to assess the health of the
endangered Southern Resident killer whale population using coastal waters around southern Vancouver
Island and Washington State. John Durban and Holly Fearnbach (MMTD) are partnering with Lance
Barrett-Lennard (Vancouver Aquarium) for a third year using an unmanned hexacopter to obtain aerial
photogrammetry images of killer whales for the assessment of nutritional status and reproductive
success. This field effort specifically aims to add a seasonal comparison to the assessment, with sampling
in both May and September, to compare the condition and growth of whales across years and between
seasons. The team was helped by excellent weather conditions and has already conducted 34 flights,
resulting in photogrammetry images from ~27 different Southern Resident individuals. Additionally,
aerial images were collected of seven Bigg’s (‘Transient”) killer whales for comparison of body
condition and size to Southern Residents, and also of two humpback whales to contribute to an ongoing
study of the health of recovering humpback populations worldwide. For more information contact
John.Durban@noaa.gov.

Aerial photograph of J42, a 9-yr old female Southern Resident killer whale, chasing a Chinook salmon. Aerial images can
be linked to whales of known age and life history using the distinctive pattern of saddle patch pigmentation that can be
matched to long-term photo-identification catalogs. Photogrammetry is being used to track growth and body condition
of individuals to make inference about nutritional status relative to prey (primarily Chinook salmon) availability. Image
taken using an unmanned hexacopter at an altitude of >100ft above the whale, with research approach authorized by
NMFS permit # 16163 and airspace clearance by the FAA (2015-ESA-200-COA).

Week of 9 May 2016
Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, CA 28 March - late May - The sixth week of survey was completed last week in excellent weather conditions; only half an hour was lost to fog. In 59.5 hours of sighting effort, 70 cow-calf gray whale pairs and 2 adult and juvenile individuals were detected bringing this season’s total to 200 cow-calf pairs. The daily rate of cow-calf pairs was lower at the end of this week suggesting the peak migration period is over. The team continued to observe northbound blue and humpback whales. The good weather conditions enabled additional photogrammetric sampling of cow-calf pairs. Thirty-nine flights were conducted, collecting aerial photogrammetry images from 26 gray whale cow-calf pairs, and bringing the total for the 2016 three-week sampling effort to 88 flights and 67 pairs photographed. This is comparable to the 2015 sample of 66 cow-calf pairs during the first year of hexacopter operations, and will enable interannual comparisons of the condition of gray whale females and the growth of their calves. Hexacopter flight operations concluded this past week and the hexacopter flight team of John Durban and Holly Fearnbach now travel to Washington State to begin photogrammetry of Southern Resident killer whales next week. Contact Wayne.Perryman@noaa.gov for details.

Sea Turtle Satellite Telemetry, Oman and Cape Verde, 5 - 23 May - In collaboration with local Non-Governmental Organizations and the Omani Ministry of Environment, Manjula Tiwari will deploy satellite transmitters on nesting loggerhead sea turtles along the coast of Oman to determine their spatial and temporal interaction with local fisheries. She will then travel to Cape Verde to attend a strategy meeting for West African sea turtle projects organized by the MAVA Foundation. For more information contact Manjula.Tiwari@noaa.gov.

Long-term Sea Turtle Monitoring, Guam/Saipan, 8-18 May - Camryn Allen will join researchers Summer Martin and T. Todd Jones (both of Pacific Islands Fisheries Science Center), on their long-term monitoring project to determine the abundance and genetic origin of foraging green and hawksbill sea turtles in this region. Camryn will collect blood samples for hormone analysis in order to determine sex of juvenile turtles and sex ratios of the foraging aggregations. These data will ultimately be used in population modelling for abundance estimates. Contact Jeffrey.Seminoff@noaa.gov or Camryn.Allen@noaa.gov for further information.
Leatherback Genetic Identity Sampling, Sandy Point National Wildlife Refuge, St. Croix, USVI, April - August 2016 - This index nesting beach has been comprehensively monitored using a variety of Capture-Mark-Recapture (CMR) methods for the last 35 years. Kelly Stewart is leading the effort to comprehensively sample every nesting turtle at Sandy Point this year for the purpose of updating population structure, refining delineation of the genetic boundaries of leatherback populations within the Caribbean, and quantifying breeding sex ratios.

May is the peak nesting month for leatherback turtles at Sandy Point, and we expect to see more females nesting with an influx of new nesters (neophytes) that have never been observed nesting. To date, we have found 12 neophytes. With 105 nests on the refuge laid by 35 individuals, we are on track to have a good season. The first nest should soon be hatching; we expect an emergence about 14 May.

Most of the turtles seen nesting have some type of scarring from previous predator attacks or anthropogenic events; recently each turtle has new scars from fresh wounds. Several turtles now show shark scars and teeth scrapes. Part of our injury study (documented by Duke Masters student Sarah DeLand) will be to look at the rate of healing of these new wounds. For more information, contact Kelly.Stewart@noaa.gov or Peter.Dutton@noaa.gov.

Week of 2 May 2016

Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, CA 28 March - late May - Last week was the fifth week of the survey and high winds significantly reduced our sighting and photogrammetry efforts. In 32 hours of sighting effort, 36 cow-calf pairs were detected (bringing this season’s total to 130) plus 6 adult and juvenile individuals. The team also observed northbound blue and humpback whales. The windy weather provided few opportunities for UAS operations: John Durban and Holly Fearnbach completed 9 flights with the hexacopter, on four different days, and obtained vertical images from 6 gray whale cow-calf pairs (41 pairs in total this year). The forecast for this coming week is good, and we expect to get in more survey and photogrammetry effort. SWFSC Director and Deputy Director, Cisco Werner and Kristen Koch, will be on site this week to observe the survey effort and to watch the hexacopter used for photogrammetric sampling first hand. Contact Wayne.Perryman@noaa.gov for details.

Green Sea Turtle Ecological Research, Seal Beach National Wildlife Refuge, Southern California, 28 April - Scientists from the Marine Turtle Ecology and Assessment Program conducted a green turtle capture effort as part of a continuing collaborative research project with the West Coast Region, Long Beach office, and California State University, Long Beach. Two green turtles (65.6 and 47.5 cm straight carapace length) were captured, both for the first time in this multi-year project. Both were given flipper and passive integrated transponder tags, and biological samples (skin and blood) were collected for
Leatherback Turtle Genetic Identity Sampling, Sandy Point National Wildlife Refuge, St. Croix, USVI, April - August 2016 - The leatherback nesting season continues at Sandy Point National Wildlife Refuge on St. Croix, US Virgin Islands. This index nesting beach has been comprehensively monitored for the last 35 years. Kelly Stewart is leading the effort to comprehensively sample every nesting turtle at Sandy Point this year for the purpose of updating population structure, refining delineation of the genetic boundaries of leatherback populations within the Caribbean, and looking at breeding sex ratios.

Since 15 April, rate of nest laying has increased with 12 new nesting turtles identified and sampled, and 32 individuals seen overall. There are now 81 nests on the refuge. On 18 April, a female turtle leaving her nest on the beach was attacked by a shark. The Student Conservation Association (SCA) team observed the entire attack, which lasted for 20 minutes in water about 40 feet deep. The turtle appeared to escape, but has not been observed nesting since then. This year we are particularly interested in documenting injuries to nesting females to assess risk to the population from natural predators (e.g., sharks), and anthropogenic sources (e.g., fisheries interactions, boat strikes). This is the subject of Duke University graduate student Sarah DeLand’s Masters project (co-supervised by Kelly Stewart). Sarah will join the team this week.

Efforts are also underway this week to target hatchlings from nests that were laid in the early season for genetic sampling with a goal of identifying the mothers of those nests through genetic fingerprinting. Our goal is to identify every female nesting here and better characterize the male population. We will also host Luis Crespo (and volunteers) from ATMAR (Amigos de las Tortugas Marinas - http://www.tortugasmaunabo.com/), of Maunabo, Puerto Rico for genetic sampling training and information exchange on leatherback nesting and overlap between the two islands as part of our comprehensive efforts to better characterize the population structure of leatherbacks in the Northern Caribbean. For more information, please contact Kelly.Stewart@noaa.gov or Peter.Dutton@noaa.gov.

Week of 25 April 2016

Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, CA 28 March - late May – Last week, the fourth of this shore-based survey, was one of beautiful weather and a sharp increase in the number of cow/calf pairs. In 53 hours of sighting effort we detected 65 cow-calf gray whale pairs, and 14 adult and juvenile individuals. This brings our total number of calves for the 2016 season to 94 as we head into the peak of the migration over the next two weeks. The great weather allowed 39 hexacopter flights to be conducted for photogrammetric assessment of the condition of gray whale females and the growth of their calves. John Durban and Holly Fearnbach collected vertical images of 35 female-calf pairs and four juveniles - already over half the sample size collected in the full three-week sampling last year, with still two weeks remaining of the 2016 photogrammetry effort. The team also sighted nice northbound blue whales which is unusual for this early in the season. Contact Wayne.Perryman@noaa.gov for details.
Week of 18 April 2016

Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, CA 28 March - late May - Although high winds cut our effort from a scheduled 60 hrs to 39 hrs, we sighted 22 cow/calf pairs, 12 single adults, and 6 juveniles last week. Our total of 29 calves by April 15th is right in line with what we have recorded the previous four seasons, which have all resulted in high calf estimates (over 1000) by the end of the respective surveys. This week MMTD’s hexacopter flight team, John Durban and Holly Fearnbach, will begin a second year of photogrammetry sampling to assess interannual variability in the condition of gray whale females and the growth of their calves. Test flights were successfully conducted this past weekend, with the collection of the first gray whale vertical images of the year. Photogrammetry images will be collected over the next three weeks. Contact Wayne.Perryman@noaa.gov for details.
Leatherback Genetic Identity Sampling, Sandy Point National Wildlife Refuge, St. Croix, USVI, April - August 2016 - The leatherback nesting season has begun at Sandy Point National Wildlife Refuge (SPNWR) on St. Croix, US Virgin Islands, an index nesting beach that has been comprehensively monitored using a variety of Capture-Mark-Recapture (CMR) methods for the last 34 years that is managed by the USFWS as one of the most important leatherback nesting beaches under US jurisdiction (Dutton et al. 2005). This year, the SWFSC is collaborating closely with USFWS to maximize the scientific focus and output of this long-term project. The richness and consistency of the demographic data collected for this population offers unique opportunities for research and development of tools & approaches for determining vital rate parameters that are needed to improve stock assessments in sea turtles.

Sandy Point National Wildlife Refuge is located on the western tip of St. Croix, US Virgin Islands.
In 2009 MMTD researchers began a project jointly with USFWS to sample and genotype hatchlings at SPNWR. Hatchling genetic “fingerprints” can be compared to those of new nesting females each year. Eventually, we hope to match a turtle that left the nesting beach in a known year with a first-time nester. This information would provide the first direct evidence of age of reproductive maturity in leatherbacks. We are now entering a new “recapture” phase in this long-term research effort, as we focus on sampling all the new nesting females to identify whether any are turtles that we sampled as hatchlings when they were born. It has now been 6 years since the first large cohort of hatchlings were sampled, and we will have the first opportunity to test the hypothesis put forward by some studies that leatherbacks mature within 5-6 years.

Kelly Stewart is leading MMTD’s scientific team. Additional research includes updating population structure, refining delineation of the genetic boundaries of leatherback populations within the Caribbean, and looking at breeding sex ratios. We have been able to use kinship analysis to compare the genetic identity of hatchlings with that of their mother to derive paternal genetic identities and census the cryptic male breeding population. Since sea turtles have temperature-dependent sex determination, there is growing concern that warming trends on nesting beaches will skew sex ratios. However, our results to date show that there are as many males as females breeding in the St. Croix breeding population (Stewart and Dutton 2014). Kelly is also helping Claudia Lombard, USFWS refuge biologist, train six Student Conservation Association (SCA) Interns and two Masters students in all aspects of nesting beach biology and data collection. In the future, we hope to further expand the scope of the scientific work, and this will be achieved with closer partnerships with the USFWS and other entities under a Cooperative Agreement being developed between the two agencies.

Leatherback nesting began on 28 February and nest numbers have been increasing since then. To date, there are 45 nests in the refuge; 17 genetic samples have been collected. For more information, please contact Peter.Dutton@noaa.gov or Kelly.Stewart@noaa.gov.

Week of 11 April 2016

*Development of Non-invasive Health Indices for Large Whales, Cape Cod, MA* - This week fieldwork was completed on North Atlantic right whale health assessment in Cape Cod Bay, MA; a collaboration between John Durban and Holly Fearnbach (MMTD), and Michael Moore (Woods Hole Oceanographic Institute). In total 67 flights were conducted with a small, unmanned hexacopter over the last three weeks, collecting high quality vertical images of ~35 different whales (see photo below) and 16 blow samples for studies of respiratory microbiology in collaboration with Amy Apprill and Carolyn Miller at WHOI. For further information contact John.Durban@noaa.gov or Holly.Fearnbach@noaa.gov.
Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, CA 28 March - late May – A day and a half of effort was lost to weather last week; the scientific team recorded 6 cow/calf pairs plus 36 adult and 4 juvenile gray whales during the rest of the week. The transition from the adult/juvenile phase of the migration is clearly now underway; we expect to see a continued rise in northbound calves and a concurrent drop in adults migrating without calves. See https://swfsc.noaa.gov/textblock.aspx?ParentMenuId=230&id=1431 and contact Wayne.Perryman@noaa.gov for details.

California Sea Lion Census and Diet Research, Channel Islands, Southern California Bight, quarterly - On 12-14 April 2016, Mark Lowry and Beth Jaime will travel to San Nicolas Island to collect California sea lion scat samples for diet analysis. Contact Mark.Lowry@noaa.gov for more information.

Week of 4 April 2016
Development of Non-invasive Health Indices for Large Whales, Cape Cod, MA - The collaborative team of John Durban and Holly Fearnbach (MMTD) and Michael Moore (Woods Hole Oceanographic Institute) conducted 31 flights with a small, unmanned hexacopter last week to obtain high quality vertical images of ~20 North Atlantic right whales for photogrammetric measurement of body condition. Some 35 individual whales have now been photographed for the study this season. A total of 10 blow samples have been collected for studies of respiratory microbiology (see Figure) in collaboration with Amy Apprill and Carolyn Miller at WHOI. For further information contact John.Durban@noaa.gov or Holly.Fearnbach@noaa.gov.

Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, CA 28 March – late May – The 23rd consecutive year of surveys of northbound eastern (and maybe some western) north Pacific gray whale calves began last week. One day was lost to high winds, but the remaining days included 46 hours of effort by a team led by Morgan Lynn and a total of 139 adults, 16 juveniles, and 1 gray whale calf recorded. See https://swfsc.noaa.gov/textblock.aspx?ParentMenuId=230&id=1431 and contact Wayne.Perryman@noaa.gov for details.

Week of 28 March 2016

Eastern North Pacific Gray Whale Calf Production Survey, Piedras Blancas Lighthouse, CA 28 March – late May - On Saturday, 26 March, a team from the MMTD traveled north to the Piedras Blancas Light Station to begin the 23rd consecutive shore-based survey of northbound eastern north Pacific gray whale calves. Based on results from previous surveys we have demonstrated that calf production for this population is linked to the timing of the melt of seasonal ice in the Arctic. We hypothesize that ice acts as a physical barrier, blocking access to prey for pregnant females and impacts the probability that existing pregnancies will be taken to term. This is the second season during which we will collect vertical aerial images of northbound cow/calf pairs from our APH-22 hexacopters, piloted by John Durban. The aircraft operations team also includes Holly Fearnbach who uses live video from the aircraft to help the pilot hover the aircraft over the northbound whales. Measurements from images collected from this small
A drone will be used to assess the impacts of rapidly changing environmental parameters in the Arctic on the condition of reproductive females and their calves. Contact Wayne.Perryman@noaa.gov for details. More information at https://swfsc.noaa.gov/textblock.aspx?ParentMenuId=230&id=1431.

Left: Gray whale cow/calf pair as viewed from hexacopter of Piedras Blancas. Right: MMTD observers on watch at Piedras Blancas for cow/calf pairs. Photo credits: NOAA.

*California Sea Lion Census and Diet Research, Channel Islands, Southern California Bight, quarterly* - Mark Lowry, Cisco Werner (SWFSC Director), and William Stelle (Regional Administrator, West Coast Region) traveled to San Clemente Island 25-28 March to collect California sea lion scat samples for diet analysis and to count pinnipeds. Contact Mark.Lowry@noaa.gov for information.

*Development of Non-invasive Health Indices for Large Whales, Cape Cod, MA* - This was a great week for photogrammetry-quality photographs as part of an ongoing collaborative project on large whale health assessment. MMTD Scientists John Durban and Holly Fearnbach, partnering with Michael Moore and colleagues from Woods Hole Oceanographic Institution (WHOI), were able to use a small unmanned hexacopter to obtain amazing resolution to see natural marks and entanglement scars (see caudal peduncle area of whale in photograph at fluke insertion), and their altitude data will enable precise photogrammetric measurements of body condition. The team will also collect blow samples for studies of respiratory microbiology. In combination, these approaches are being used to develop non-invasive health indices for large whales. This field effort (representing a second partnership between MMTD and WHOI) will focus on North Atlantic right whales in Cape Cod Bay, Massachusetts, building on a successful first field study of humpback whales in July 2015 (http://www.whoi.edu/news-release/whalecopter). Wayne Perryman’s team at SWFSC will analyze photogrammetry images, and funding support for this field effort is provided by the NEFSC’s Large Whale Team. Contact John.Durban@noaa.gov or Holly.Fearnbach@noaa.gov for additional information.
Week of 21 March 2016

Development of Non-invasive Health Indices for Large Whales, Cape Cod, MA - This week a new field effort will begin for an ongoing collaborative project on large whale health assessment. MMTD Scientists John Durban and Holly Fearnbach are partnering with Michael Moore and colleagues from Woods Hole Oceanographic Institution (WHOI) to use a small unmanned hexacopter to obtain high quality vertical images of whales for photogrammetric measurement of body condition, and to collect blow samples for studies of respiratory microbiology. In combination, these approaches are being used to develop non-invasive health indices for large whales. This field effort (representing a second partnership between MMTD and WHOI) will focus on North Atlantic right whales in Cape Cod Bay, Massachusetts, building on a successful first field study of humpback whales in July 2015 (http://www.whoi.edu/news-release/whalecopter). Photogrammetry images will be analyzed by Wayne Perryman’s team at SWFSC, and funding support for this field effort is provided by the NEFSC’s Large Whale Team. Contact John.Durban@noaa.gov or Holly.Fearnbach@noaa.gov for additional information.

Week of 16 February 2016

Eastern North Pacific Gray Whale Abundance Survey, Granite Canyon Field Station, California, 3 December-13 February - The 2015/2016 gray whale abundance survey was successfully completed last week. Infrared cameras have been autonomously recording the numbers of whales migrating south past the field station since 3 December, thus far collecting nearly 1,800 hours of data, and will continue to record southbound and northbound whales until 1 June. Visual observations began on 30 December and
finished on 12 February. Last week the number of group sightings per day declined to 12-15, as expected for this point in the migration, and the onset of a notable number of northbound whales was recorded. Other cetaceans sighted included: common dolphins, bottlenose dolphins and humpback whales. For details, please contact Dave.Weller@noaa.gov or Wayne.Perryman@noaa.gov.

Week of 8 February 2016

Eastern North Pacific Gray Whale Abundance Survey, Granite Canyon Field Station, California, 3 December-13 February - The 2015/2016 gray whale abundance survey successfully completed week 6 of 7. Infrared cameras have been autonomously recording the numbers of whales migrating south past the field station since 3 December, thus far collecting nearly 1,600 hours of data. Visual observations began on 30 December and will continue until 13 February. Last week, the number of group sightings per day declined to 25-35, as expected for this point in the migration, and the onset of a notable number of northbound whales was recorded. Other cetaceans sighted included: common dolphins, Risso’s dolphins, bottlenose dolphins and humpback whales. This week, the visual observer team is Hollis Europe, Jim Gilpatrick, and Morgan Lynn. For details, please contact Dave.Weller@noaa.gov or Wayne.Perryman@noaa.gov and see a new NOAA Fisheries story on the project at http://www.nmfs.noaa.gov/stories/2016/01/automatic_whale_detector_version2.0.html.

Harbor Porpoise Passive Acoustic Research, Monterey Bay, CA - Eiren Jacobson (SIO graduate student) and Karin Forney successfully retrieved 11 moorings with C-PODs (harbor porpoise echolocation-click detectors) from Monterey Bay last week. Operations were conducted aboard the Moss Landing Marine Laboratories (MLML) R/V Sheila B with the capable assistance of Captain John Douglas and two teams of MLML scientific divers. Seven moorings were retrieved by triggering an acoustic release installed just above the anchor weight. Three shallow water moorings with sand anchors and one acoustic release mooring that malfunctioned were retrieved by the divers. The array of 11 C-PODs was deployed in late August 2015 and collected 5 months of continuous data on harbor porpoise occurrence within northern Monterey Bay. Eiren will analyze the new data along with data collected during the previous two years as part of her doctoral research at SIO. For additional information contact Karin.Forney@noaa.gov.

Week of 1 February 2016

Eastern North Pacific Gray Whale Abundance Survey, Granite Canyon Field Station, California, 3 December-13 February - The 2015/2016 gray whale abundance survey successfully completed week 5 of 7. Infrared cameras have been autonomously recording the numbers of whales migrating south past the field station since 3 December, thus far collecting nearly 1,450 hours of data. Visual observations began on 30 December and will continue until 13 February. Last week, the number of group sightings per day ranged from 72-83. Other cetaceans sighted included: common dolphins, Risso’s dolphins, bottlenose dolphins, and humpback whales. This week, the visual observer team is Hollis Europe, Morgan Lynn, and Dave Weller. For details, please contact Dave.Weller@noaa.gov or Wayne.Perryman@noaa.gov and see a new NOAA Fisheries story on the project at http://www.nmfs.noaa.gov/stories/2016/01/automatic_whale_detector_version2.0.html.
Hawksbill Sea Turtle Research, Coiba National Park, Panama, 30 January-5 February - Jeff Seminoff and Alexander Gaos will travel this week to The Coiba Archipelago National Park in the Panamanian Pacific to study foraging and nesting hawksbill turtles. Hawksbills are one of the rarest sea turtles in the eastern Pacific and previous research by Seminoff, Gaos, and colleagues has highlighted Coiba NP as one of the most important hotspots for foraging juvenile and adult hawksbills in the entire eastern Pacific. Joined by biologists from Panama’s Ministry of the Environment and Conservation International the team will undertake capture efforts at the numerous coral reefs in the area and conduct night patrols for nesting activity. Contact Jeffrey.Seminoff@noaa.gov for additional information.

Week of 25 January 2016

Eastern North Pacific Gray Whale Abundance Survey, Granite Canyon Field Station, California, December 2015 – June 2016 - The 2015/2016 gray whale abundance survey continues to go well despite some stormy weather encountered last week. Infrared cameras have been autonomously recording the numbers of whales migrating south past the field station since 3 December, thus far collecting nearly 1,300 hours of data. Visual observations began on 30 December and will continue until 13 February. Last week, the number of groups sighted per day, hampered by poor weather and some loss of effort, ranged from 27-80 for a total of nearly 230 whales. This week, the visual observer team is Kerri Danil, Brittany Hancock-Hanser and Dave Weller. For details, please contact Dave.Weller@noaa.gov or Wayne.Perryman@noaa.gov and see a new NOAA Fisheries story on the project at http://www.nmfs.noaa.gov/stories/2016/01/automatic_whale_detector_version2.0.html.

Week of 18 January 2016

Eastern North Pacific Gray Whale Abundance Survey, Granite Canyon Field Station, California, December 2015 – June 2016 - The 2015/2016 gray whale abundance survey continues to go well. Infrared cameras have been autonomously recording the numbers of whales migrating south past the field station since 3 December, thus far collecting nearly 1,100 hours of data. Visual observations began on 30 December and will continue until 13 February. Last week, high numbers of migrating gray whales were counted, with the number of group sightings per day ranging from 69-107 for a total of nearly 850 whales. This coming week the visual observer team is Susan Chivers, Brittany Hancock-Hanser, and Alexa Kownacki. For details, please contact Dave.Weller@noaa.gov or Wayne.Perryman@noaa.gov and see http://www.fisheries.noaa.gov/stories/2015/02/gray_whale_survey_thermal_imaging.html.

Antarctic Killer Whale Research, Antarctic Peninsula, January – March - Fieldwork has begun for the eighth consecutive year of investigations into the ecology of killer whales around the Antarctic Peninsula. This long-term study is collecting empirical data to evaluate the trophic impacts of killer whales as top predators within this rapidly-changing system. John Durban and Holly Fearnbach (MMTD) are onboard the expedition ship National Geographic Explorer, hosted by Lindblad Expeditions and National Geographic Society. The ship conducts expeditions in the Antarctic Peninsula area, providing an excellent opportunistic research platform. Contact John.Durban@noaa.gov for details.

Week of 11 January 2016
Eastern North Pacific Gray Whale Abundance Survey, Granite Canyon Field Station, California, December 2015 – June 2016 - The 2015/2016 gray whale abundance survey is going well despite stormy conditions last week. Infrared cameras have been autonomously recording the numbers of whales migrating south past the field station since 3 December, thus far collecting nearly 900 hours of data. Visual observations began on 30 December and will continue until 13 February. In addition to high numbers of migrating gray whales last week, sightings were also made of humpback whales, Risso’s dolphins and common dolphins. This week, the visual observer team is Susan Chivers, Paul Fiedler, and Alexa Kownacki. For details, please contact Dave.Weller@noaa.gov or Wayne.Perryman@noaa.gov and see http://www.fisheries.noaa.gov/stories/2015/02/gray_whale_survey_thermal_imaging.html.

Week of 4 January 2016

Green Sea Turtle Ecological Field Work, San Diego Bay, 15-Dec-2015 - The Marine Turtle Ecology & Assessment Team caught one adult turtle during a field outing into San Diego Bay on Tuesday, 15 Dec. The 138 kg female green has been caught 4 times since her first capture in 1998, when she weighed just 12 kilos! A satellite GPS tag was attached to her carapace to examine movement and habitat use in the bay (see photo). This satellite tracking is being conducted through a partnership between NMFS, Navy, and the Unified Port of San Diego. Contact Tomo.Eguchi@noaa.gov for more information.
cameras have been autonomously recording the numbers of whales migrating south past the field station since 3 December, thus far collecting more than 750 hours of data. Bob Brownell, Wayne Perryman, and Dave Weller began visual observations on 30 December. This human observer effort will continue until 13 February and represents the 28th abundance survey conducted on the population since 1967. In addition to high numbers of migrating gray whales last week, sightings were also made of humpback whales, Risso’s dolphins, and common dolphins. This week, the visual observer team will be Paul Fiedler, Michael Smith, and Dave Weller. For details, please contact Dave.Weller@noaa.gov or Wayne.Perryman@noaa.gov and see http://www.fisheries.noaa.gov/stories/2015/02/gray_whale_survey_thermal_imaging.html

**Week of 7 December 2015**

*Expedición Internacional Vaquita Marina 2015, Upper Gulf of California, Mexico, 27 November - 3 December 2015* – Vaquita Expedition 2015 concluded on December 3 in San Felipe, Mexico. All Primary and Core transect lines were completed. Vaquita went from the most common species sighted in 2008 to one of the most rare in 2015, confirming the strong decline in abundance indicated by acoustic monitoring data. A meeting of expert analysts has been scheduled for late March and release of the abundance estimate from this 2015 survey is expected in May. We are very grateful to SEMARNAT and SWFSC, NOAA Fisheries, the two sponsoring agencies of this survey, and to many other parties (fully acknowledged in the summary report posted on the Vaquita Expedition website). Read more about the survey and see photos and video at https://SWFSC.noaa.gov/MMTD-vaquita2015 and/or contact Barbara.Taylor@noaa.gov for details.

*Gray Whale Abundance Survey - Granite Canyon Field Station, California, December 2015 – May 2016* - Week two is underway. On 4 December, Morgan Lynn, Hollis Johnson and Dave Weller worked to get a thermal sensor camera system set up and running. These cameras will now autonomously record the numbers of whales migrating by the field station (southbound and northbound) through 31 May (see http://www.fisheries.noaa.gov/stories/2015/02/gray_whale_survey_thermal_imaging.html). This effort will be augmented with a full visual observer effort, representing the 28th abundance survey since 1967, during the southbound migration between 30 December 2015 and 13 February 2016. Special
thanks to Ravi Shiwmangal for his technical expertise on this project. For details, please contact
dave.weller@noaa.gov or wayne.perryman@noaa.gov.

Week of 30 November 2015

Expedición Internacional Vaquita Marina 2015, Upper Gulf of California, Mexico, 27 November - 3 December 2015 – Although exceptionally windy conditions persist, we managed a few excellent days of survey last week. On November 24 we hosted 13 representatives of the fishing communities from this region. The day was chosen to give the best opportunity possible to have the fishermen see not only our work but vaquitas themselves. We were successful on both counts. Only a few fishermen actually got to see vaquitas, but there were none in the group denying the existence of vaquitas by day’s end. As was the case in 2008, the exchange of information with leadership of the fishing cooperatives was a positive experience. November 27 was another exceptional day as we closed the final large gap in the survey tracklines. We now have even coverage across the planned study area and any additional good weather will be used to concentrate on increasing precision in the proportion of vaquitas seen in front of the ship. Despite the conditions being much worse than average for this time of year, the study is essentially complete. More details will be given in the final survey weekly when the survey ends later this week. Read more about the survey and see photos and video on the Vaquita Expedition 2015 website at https://SWFSC.noaa.gov/MMTD-vaquita2015 and/or contact Barbara.Taylor@noaa.gov details.

Gray Whale Abundance Survey, Granite Canyon Field Station, California, December 2015 – February 2016 - This week marks the beginning of the 2015/2016 gray whale abundance survey. Thermal sensor cameras to autonomously record the numbers of whales migrating by the Granite Canyon field station will be started on 3 December (see http://www.fisheries.noaa.gov/stories/2015/02/gray_whale_survey_thermal_imaging.html). This census will be augmented with a full visual observer effort between 30 December 2015 and 13 February 2016 during the southbound migration, representing the 28th census since 1967. The eastern north Pacific stock of gray whales migrates annually along the west coast of North America from high latitude feeding grounds to winter breeding grounds in the lagoons and adjacent ocean areas off Baja California, Mexico. Population models based on past survey data show that gray whales have recovered from whaling in the 19th and 20th centuries, with the 2010/2011 population estimate totaling nearly 21,000 whales (Durban et al., in press). For details, please contact dave.weller@noaa.gov, wayne.perryman@noaa.gov or john.durban@noaa.gov.

Week of 23 November 2015
Expedición Internacional Vaquita Marina 2015, Upper Gulf of California, Mexico, 27 November - 3 December 2015 – Exceptionally windy conditions have continued for most of Leg 2. On one of our good days we had three vaquita sightings. All were within a tiny area (within the green box in the figure) as were sightings from 2 other days. The remaining vaquitas are consistently found in only a few places. The pink dots in the figure show the location of sightings from surveys in 1993, 1997 and 2008. Confirmed vaquita sightings from 2015 (black circles) show that we are seeing fewer vaquitas in a smaller area relative to previous years. You can see a video of these vaquitas at https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=676&id=21364 (thanks to Suzanne Yin and her iPhone through the ‘big eyes’ with Ernesto Vázquez as editor). Read more about the survey and see photos and video on the Vaquita Expedition 2015 website at https://SWFSC.noaa.gov/MMTD-vaquita2015 and/or contact Barbara.Taylor@noaa.gov details.

Week of 16 November 2015

Collaborative (SWFSC/AFSC) Large Whale Survey (CLaWS), West Coasts of U.S. & Canada, 9 July - 9 November - NOAA ship Reuben Lasker returned to San Diego on 9 November after nearly four months surveying for large whales off the U.S. and Canadian west coasts between northern California and Kodiak, Alaska. Major achievements of this effort include: (1) the first range-wide assessment of gray whales that summer south of the Aleutian Islands, (2) a dedicated visual line-transect and acoustics survey for critically endangered right whales in the Gulf of Alaska, and (3) sampling (photographic and biopsy) of blue, humpback and fin whales. Nearly 3,000 cetacean sightings, 10,000 photo-identification images and 100 biopsies were collected. The successful completion of CLaWS marks the first scientific mission for NOAA Ship Reuben Lasker. Details of this project and related summary reports can be found at https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=276&id=20861 and/or contact Dave.Weller@noaa.gov.
Week of 9 November 2015

Collaborative SWFSC/AFSC Large Whale Survey (CLaWS), West Coasts of U.S. & Canada, 9 July - 9 November - NOAA ship Reuben Lasker and the CLAWS science team spent last week working the area from Monterey Bay to Catalina Island. While no gray whales were seen, photographs for individual identification and biopsy samples were obtained from several other species, including blue whale, fin whale, humpback whale, bottlenose dolphin, and long-beaked common dolphin. While in Monterey Bay, we contacted fellow MMTDers Karin Forney and Scott Benson for real-time data on sightings within the bay. They were conducting a carcass survey on the beach at the time (on a weekend; we confirmed this through our 25x binoculars and from our RHIB) and provided us with the location of bottlenose dolphins within their sight. Other highlights included the retrieval of a deep-sea ocean noise buoy from the vicinity of Santa Cruz Island and the re-deployment of the buoy with a new recording package. Kudos to the crew of Reuben Lasker and Dale Hubbard of Oregon State University for a save and successful redeployment. On Monday, 9 November, CLAWS will come to a successful close and so too, will the maiden voyage of the Lasker. Many thanks to the crew and command for a save and very successful survey and to all the scientists that participated in a wide diversity of weather conditions and venues over all 5 legs! Details of this project can be found at https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=276&id=20861 and/or contact Dave.Weller@noaa.gov, Jim.Carretta@noaa.gov or Annette.Henry@noaa.gov.
Expedición Internacional Vaquita Marina 2015, Upper Gulf of California, Mexico, 27 November - 3 December 2015 – The summary of the first leg of Expedición Internacional Vaquita Marina 2015 is now posted (https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=676&id=20991) and includes maps of effort completed and locations of vaquita sightings. Photos and videos from Leg 1 are also posted (https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=676&id=21006) and include video of vaquitas taken through the ‘big eyes’ by Suzanne Yin with her iPhone, and a time-lapse video showing how observations are done through the ‘big eyes’ taken by Ernesto Vázquez using his GoPro. Leg 2 of the survey began Sunday, 1 November, with some new scientists, including Co-Chief Scientist Dr. Lorenzo Rojas-Bracho (see the survey page for their biographies). A team from Discovery Latin America doing a series on endangered species visited the ship for 2 days. And windy conditions limited effort severely, but better weather is anticipated for this week. Read more about the survey and see photos and video on the Vaquita Expedition 2015 website at https://SWFSC.noaa.gov/MMTD-vaquita2015 and/or contact Barbara.Taylor@noaa.gov details.

Behavioral Response of Odontocete Cetaceans to Navy Sonar, US Navy's Atlantic Test and Evaluation Center (AUTEC), Bahamas, 24 October – late November - Breezy weather prevented further whale tagging opportunities this week. However, the four satellite tags deployed last week on Blainville's beaked whales continue to provide movement and diving data into the second week of deployments (see
This week fleet readiness exercises begin, involving the use of sonar, and these tags will be used to identify and evaluate the extent of displacement and foraging disruption to beaked whales that regularly use the AUTEC range. For more information contact John.Durban@noaa.gov.

Dive depths (left) of an adult female Blainville's beaked whale, recorded by a small satellite transmitter tag deployed on her dorsal fin (right). The plot shows repeated foraging dives in excess of 1000m (max = 1689m) over the 10 days since tag deployment. Future data from the tag will be used to evaluate any foraging disruption associated with sonar exposure during fleet-readiness exercises. Photograph courtesy of the Bahamas Marine Mammal Research Organisation.

Green Turtle Ecological Research, San Diego Bay, 5 November - SWFSC marine turtle researchers were successful in capturing a large adult male green turtle in south San Diego Bay last week. The turtle was in excellent condition and measured 93.5 cm straight carapace length and 125 kg (275 lbs). He was last captured in 2001 and measured only 71.8 cm straight carapace at the time (a size consistent with immature status). Interestingly, based on analysis of blood samples collected in 2001, in early 2014 Camryn Allen conducted the hormone analysis and determined that this turtle was a male. This record was included in her recently published paper in PLoS One and provides yet another example of the value of hormone studies to examine sea turtle sex ratios in the wild! In addition to measurements and tissue sampling, the turtle was equipped with an ARGOS-linked GPS transmitter (photo) as part of a collaboration with the Unified Port of San Diego and U.S. Navy. This is the 4th such transmitter to be deployed this year. Contact PIs Robin.LeRoux@noaa.gov, Tomo.Eguchi@noaa.gov, or Jeffrey.Seminoff@noaa.gov for more information.

Left: Transmitter placed on green turtle. Right: Turtle being gently returned to the water by Tomo Eguchi (back) and Jeff Seminoff (front). Photo credit: Ralph Pace; photos taken under NOAA Permit 16803.
Week of 2 November 2015

Collaborative (SWFSC/AFSC) Large Whale Survey (CLaWS), West Coasts of U.S. & Canada, 9 July - 9 November - NOAA Ship *Reuben Lasker* departed Port Angeles, WA on 26 October to begin the final leg (#5) of the survey. Cruise leader Jim Carretta is joined by Nick Kellar, Bernardo Alps, Amy Van Cise, Melanie Good, Alisa Schulman-Janiger, and Angelica Patyten. Gray whales were located in the area around Cape Flattery on the first day of effort and 3 biopsy samples and a handful of photographs for individual identification were obtained before the weather prevented further sampling. Later that day, the winds calmed and a group of Bigg’s (transient) killer whales were located, from which one biopsy sample was obtained, along with several photographs for individual identification. Alisa-Schulman Janiger confirmed that female T075B (shown below) was present in this group. This animal is known to have had at least two calves. Later in the week, we encountered approximately 15 gray whales in the vicinity of Cape Blanco, OR. The small boat was launched and the team returned with 6 biopsy samples and many more identification photos. Signs of mating behavior were apparent in this group and it was clear that the whales were utilizing this area that day, with no signs of southward migration. The Cape Blanco area is beautiful - Bernardo Alps captured the essence of the region in a series of photos, with two of our favorites below and now appearing on NOAA Ship *Reuben Lasker* Facebook page. *Reuben Lasker* is working its way south towards Point Conception, where we expect to find, among other things, offshore bottlenose dolphins near the northern Channel Islands. Details of this project can be found at [https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=276&id=20861](https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=276&id=20861) and/or contact Dave.Weller@noaa.gov, Jim.Carretta@noaa.gov or Annette.Henry@noaa.gov.

Expedición Internacional Vaquita Marina 2015, Upper Gulf of California, Mexico, 27 November - 3 December 2015 - Windy conditions largely limited effort last week (the last week of Leg 1) but on the last day of this leg, three vaquita sightings were made. The total number of confirmed vaquita sightings for this 32-day leg was 15 along 593 nm of search effort, consistent with past data estimates of a very small population. All 2015 sightings have been made in the same area as sightings on previous surveys (1993, 1997, and 2008). Also of note for Leg 1, the Mexican Navy is clearly enforcing the ban on gillnet fishing in the range of the vaquita, as there were few fishing vessels sighted in this region. The first leg of
Expedicion Internacional Vaquita Marina 2015 ended on 28 October, when the scientists disembarked in San Felipe, Baja California Norte for a brief break from at-sea life, and the Ocean Starr proceeded to Guaymas to re-fuel and re-provision for Leg 2. Read more about the survey and see photos and video on the Vaquita Expedition 2015 website at [https://SWFSC.noaa.gov/MMTD-vaquita2015](https://SWFSC.noaa.gov/MMTD-vaquita2015) and/or contact Barbara.Taylor@noaa.gov for details.

Behavioral Response of Odontocete Cetaceans to Navy Sonar, US Navy's Atlantic Test and Evaluation Center (AUTEC), Bahamas, 24 October – late November - Four Argos satellite transmitter tags were deployed on Blainville's beaked whales (*Mesoplodon densirostris*) last week, an exciting accomplishment for the first week of the project. These small LIMPET tags will transmit for a period of weeks, providing key data on the movement and diving behavior of these elusive whales, to assess their behavioral response to sonar exposure during fleet readiness exercises. These tags contribute to a database from 22 tag deployments on this species since 2009, to enable comparison of behavior both in the presence of sonar and during quiet times. This has been a long and challenging field effort, and this successful achievement has required great patience from a very committed team of collaborators: MMTD, the Bahamas Marine Mammal Research Organization and the US Naval Undersea Warfare Center, with funding from then US Navy's Living Marine Resources Program. For more information contact John.Durban@noaa.gov.

California Sea Lion Census & Diet Research, Channel Islands, Southern California Bight, quarterly - On 2-4 November, Mark Lowry will be accompanied by two distinguished field assistants, Cisco Werner and Kristen Koch. They will travel to San Nicolas Island to collect California sea lion scat samples for diet analysis. Contact Mark.Lowry@noaa.gov for information.

Week of 26 October 2015
Collaborative SWFSC/AFSC Large Whale Survey (CLaWS), west coasts of U.S. & Canada, 9 July - 9 November – Last week’s final week of CLaWs’ leg 4 was another successful one for the team aboard NOAA Ship Reuben Lasker. The team located and documented gray whales along the northern and southern shores of Vancouver Island, and using the ship’s rigid hulled inflatable boat (RHIB), added 25 new gray whales to the CLaWS photo-identification catalog and 14 skin and blubber samples. These additions bring the total number of gray whales photographically identified during leg 4 to 87 with 58 of them with skin and blubber samples for future molecular analyses. In addition to spending more than half of Leg 4’s days at sea in the RHIB documenting gray whales, the team surveyed approximately 450 nautical miles of British Columbia’s coastal waters and recorded 132 sightings of cetaceans. The cetacean species identified included humpback, fin and killer whales, Dall’s and harbor porpoises, and Pacific white-sided and northern right whale dolphins. Photographs of humpback and killer whales will contribute to on-going research documenting the whereabouts and longevity of known individuals in the populations of these species. The killer whales were sighted just north of Calvert Island, British Columbia in Hecate Strait and have been identified as members of the northern resident’s “I-11” matriline. NOAA Ship Reuben Lasker is now preparing for Leg 5, the final leg of CLaWS. A new team of scientists will join the ship for this leg, and Jim Carretta will be the Cruise Leader. Details of this project can be found at https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=276&id=20861. Contact Dave.Weller@noaa.gov, Susan.Chivers@noaa.gov, or Annette.Henry@noaa.gov for details.

One of this week’s highlights was a spy hopping gray whale observed while photographing whales from the small boat (left). The Leg 4 scientific team (center) included Bingyao Chen, Paul Fiedler, Susan Chivers (L-R, back row), Sergio Martinez, Alisa Schulman-Janiger, Karin Forney, and Alicia Amerson (front row). Survey effort was conducted from the flying bridge (top deck under canopy) of the NOAA Ship Reuben Lasker using ‘big eye’, 25 x binoculars (right). Marine mammal photo taken under NOAA/NMFS Permit No. 14097. All photos were taken by Alisa Schulman-Janiger.

Expedición Internacional Vaquita Marina 2015, Upper Gulf of California, Mexico, 27 November - 3 December 2015 - Three hours of survey effort on 18 October and 5 hours on 22 October were conducted in good survey conditions (Beaufort sea state <3) and two confirmed and three possible vaquita sightings along 84 nmi of trackline effort were made. One of these sightings resulted in
the first good vaquita photographs of 2015 (see photo below). The rest of the week was too windy for useful transect effort in this specialized study. “Possible vaquita” sightings are now being recorded with a special species code and a score that reflects the observer’s confidence in the identification. For each “possible vaquita” sighting, the survey effort is suspended, the ship turned and all observers attempt to relocate the sighting to confirm the identification. (Even with 6 pairs of 25 power binoculars and observers with a cumulative 220 years of experience, relocating vaquita is not always possible.) Contact Barbara.Taylor@noaa.gov and/or visit https://swfsc.noaa.gov/MMTD-Vaquita2015/.

Left: One of a pair of vaquitas showing their characteristic triangular dorsal fin 8.5 miles off San Felipe (seen in background). Photo taken from the R/V Ocean Starr by Paula Olson. Right: Same pair of vaquitas (both visible here) taken from a photography boat that can approach vaquitas more closely. Photo taken by Todd Pusser.

Loggerhead Turtle Research, Southern California Bight, September-October - Scientists from the Marine Turtle Ecology & Assessment Program completed an aerial line-transect survey of loggerhead turtles last week. The current warm water conditions have resulted in unprecedented numbers of turtles of this species and the team used a NOAA DeHavilland Twin Otter to look for clusters of turtles (with hopes to conduct in-water work from a small vessel). From the 20th to 24th of October, 892 nautical miles were surveyed during 3 flights, and 23 loggerhead and 1 unidentified turtles were sighted. The survey totaled 2,627.5 nautical miles and 215 loggerhead turtles. Other species sighted included hammerhead sharks, manta rays, common dolphins, blue whales, and bottlenose dolphins. All planned survey lines were not completed due to periodic high winds, low clouds, aircraft mechanical problems, and military exercises that temporarily closed a large part of the study area, nevertheless the high number of turtles sighted and sampled (from previous weeks) make this project a success. Please contact Chief Scientist Tomo.Eguchi@noaa.gov for more information.

Figure - Study area, completed track lines (orange), on-effort (blue, light blue, and red circles, indicating small, medium and large turtles, respectively), and an off-effort (green circle) sightings of loggerhead turtles and a green turtle sighting near Santa Barbara (blue +).

Behavioral Response of Odontocete Cetaceans to Navy Sonar, US Navy's Atlantic Test and Evaluation Center (AUTEC), Bahamas, 24 October – late November - Fieldwork has commenced for the final year in this multi-year collaboration between MMTD, the Bahamas Marine Mammal Research Organization and the US Naval Underseas Warfare Center (ongoing since 2009), with funding from then US Navy's Living Marine Resources Program. The focus is on deploying Argos satellite transmitter tags on beaked whales and other odontocetes to monitor their behavioral response to sonar exposure during fleet readiness exercises. For more information contact John.Durban@noaa.gov.

Pinniped Census and Diet Studies, Southern California Bight, 22-28 October - Mark Lowry is conducting an aerial photographic survey of California sea lions and other pinnipeds at the Channel Islands. The National Park Service (Dept. of Interior) is providing a chartered aircraft for the survey. Contact Mark.Lowry@noaa.gov for details.

Week of 19 October 2015

Collaborative SWFSC/AFSC Large Whale Survey (CLaWS), west coasts of U.S. & Canada, 9 July - 9 November - This week (the third of Leg 4) started with the NOAA Ship Reuben Lasker continuing to shelter from the big low pressure system that brought hurricane force winds and rain to the waters off the
coast of British Columbia. During this time, however, there were several opportunities to observe marine mammals in calm coastal waters of Fitzhugh Sound, including opportunities to photograph approximately a dozen different humpback whales feeding in the Sound and to make a short acoustic recording of their sounds. By Tuesday, the seas were calm enough to return to this leg’s primary mission: locating gray whales. The team surveyed the areas off northern Vancouver Island and the mainland coast and islands bordering Hecate Strait, and found gray whales along the north side of Hope Island and the western shores of Dundas and Porcher Islands. Whale densities were much lower here than off southern Vancouver Island. Thirteen individual gray whales were photographed and nine biopsy samples from those photographed were collected. This brings this leg’s totals to 64 photographically identifiable gray whales with 44 of them having skin and blubber samples preserved for future molecular analyses. Details of this project can be found at https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=276&id=20861. Contact Dave.Weller@noaa.gov, Susan.Chivers@noaa.gov or Annette.Henry@noaa.gov for details.

Expedición Internacional Vaquita Marina 2015, Upper Gulf of California, Mexico, 27 November - 3 December 2015 - Last week windy conditions allowed limited transect effort but this week conditions were wonderful. Most days had light winds in the morning, increased but still light winds in the middle of the day, and calm conditions again in the afternoon. We covered 369 nmi of trackline, with a total of 173 sightings of marine mammals, including 11 sightings of 19 vaquitas. Consistent with the pattern of past vaquita surveys, most sightings for the week occurred during a single hour on one day. And the week brought other days in great viewing conditions with no vaquita sightings. This highly clumped distribution is one of the reasons it is difficult to obtain a precise estimate of abundance. On Friday, 9 October, two more people joined the project (an officer in the Mexican Navy, and a fisheries biologist in INAPESCA), and on Tuesday 13 October, four visitors joined for just the day: two from the U.S. Department of State and two from PROFEPA (the environmental enforcement agency within Mexico). Operations are going well and we are ahead of schedule in terms of the number of transect miles we hoped to cover to estimate vaquita abundance. For more information contact Barbara.Taylor@noaa.gov and/or visit https://swfsc.noaa.gov/MMTD-Vaquita2015/.

California Sea Lion Census and Diet Studies, Channel Islands, Southern California Bight, Quarterly - Mark Lowry and Alex Curtis were on San Clemente Island 16-19 October to collect scat samples for diet analysis and to count pinnipeds. Contact Mark.Lowry@noaa.gov for more information.

Passive Acoustic Research and Testing, Southern California Bight, 13-15 October - Last week Jay Barlow led a mini-expedition aboard the Outer Limits, a local sportfishing vessel. Three drifting acoustic spar buoy recorders (DASBRs) were deployed about 15 miles offshore of Oceanside to test a new design and to measure ocean noise. Instruments were deployed on Tuesday, 13 October and picked up on Thursday, 15 October. Amy Van Cise, Jeff Seminoff and William Bone were aboard the vessel on 13 October to assist and to search for loggerhead turtles to tag (none were found). Eiren Jacobson aided in
buoy retrieval on 15 October and participated in tests of other acoustic recording devices (Soundtraps). An experiment was conducted by Shannon Rankin and Jennifer Keating on 13 October to test the reception range for deployed sonobuoys using antennas on the 4th floor balcony of the SWFSC. Good DIFAR signals were received at a range of approximately 14 miles. The excellent crew on the Outer Limits aided efforts by finding a humpback whale and a group of pilot whales offshore of Del Mar. Photo identifications and recordings were obtained from the pilot whales. Other unusual sightings included jumping manta rays and a particularly high abundance of flyingfish. Contact Jay.Barlow@noaa.gov for additional information.

Humpback whale breaching (left) and pilot whales (right) encountered during recent acoustic research and tests off Oceanside, CA. Marine mammal photos taken under NOAA/NMFS Permit No. 14097.

**Week of 12 October 2015**

*Collaborative SWFSC/AFSC Large Whale Survey (CLaWS), west coasts of U.S. & Canada, 9 July - 9 November* - Scientists aboard the NOAA Ship *Reuben Lasker* continued to sample gray whales along the western shore of Vancouver Island last week (the second in Leg 4). Twenty-two gray whales were identified by their distinctive color and dorsal ridge patterns, and biopsy samples were collected from 17 of them. This week’s sampling success brings this leg’s totals to 51 photographically identifiable gray whales with 35 of them having skin and blubber samples preserved for future molecular analyses. This week’s work in the Lasker’s small boat also provided the team opportunities to collect three acoustic recordings of gray whales that will contribute to characterizing their vocalizations, and two fecal samples that will provide information about their diet. Mid-week, the team repositioned themselves to sample north of Vancouver Island. A half-day survey of the Scott Islands off the northwestern tip of Vancouver Island yielded no gray whale sightings. While conducting this survey, the massive low pressure system developing in the North Pacific brought high winds and rain to the area precluding further work and forcing the ship to seek shelter in the coastal waters of British Columbia. Details of this project can be found at https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=276&Id=20861. Contact Dave.Weller@noaa.gov, Susan.Chivers@noaa.gov, or Annette.Henry@noaa.gov for details.
Teamwork is essential to at-sea research projects, and all the ship’s personnel and scientists work together to collect data. Here, the science team is shown surveying the waters off British Columbia, Canada using ‘big eyes’ (25x binoculars) to find gray whales (left), processing biopsy samples collected from a small boat launched from the ship (center) and a gray whale surfacing in view of the NOAA Ship Reuben Lasker (right). Marine mammal photo taken under NOAA/NMFS Permit No. 14097; Photo credit: Alisa Schulman-Janiger.

Loggerhead Aerial Survey, Southern California Bight, September-October - SWFSC Scientists continue an aerial line-transect survey for loggerhead turtles in the Southern California Bight. The current warm water conditions have resulted in unprecedented numbers of loggerheads within the bight. During the week of 4 October the team surveyed 814 nautical miles in the central offshore and northern coastal portions of the study area (total survey effort to date = 2004 nautical miles). Efforts were based out of San Nicolas Island and the surveys continued to use the ’N-56' NOAA DeHavilland Twin Otter aircraft, flying at 100 knots and 500 ft elevation. A total of 125 loggerhead turtles (and 1 green turtle!) were sighted during the 3 flights, for a grand total of 192 loggerhead turtles seen during ‘on effort’ flying (and more than 200 total turtles when including turtles observed while ‘off effort’). Other species sighted included hammerhead sharks, common dolphins, blue whales, Risso’s dolphins, and bottlenose dolphins. Please contact Chief Scientist Tomo.Eguchi@noaa.gov for more information.

Map of study area (left) - completed track lines (orange), on-effort (blue circles), and an off-effort (green circle) sightings of loggerhead turtles and a green turtle sighting near Santa Barbara (blue +). Survey Team for the week of 4 October (L-R): Kevin Doremus, Tomo Eguchi, Jeff Seminoff, Nicky Beaulieu, Scott Benson, Joel Schumacher, Rick De Triquet.
Expedición Internacional Vaquita Marina 2015, Upper Gulf of California, Mexico, 27 October - 3 December 2015 - Last week was the second of Expedición Internacional Vaquita Marina 2015, a project of the Mexican Ministry of the Environment and Natural Resources (SEMARNAT). Windy conditions limited the time we could search for vaquitas with the “big eyes.” We managed to conduct some survey effort that would be OK for most species (Beaufort 3–4), but we know the probability of detecting vaquitas in such conditions is low. When conditions allowed us to work, we had a total of 32 marine mammal sightings in 43.4 nautical miles (80.4 km) of transect effort, but no vaquitas were seen. The map this week includes sightings and effort from the beginning of the cruise on 27 September through 8 October. We are hoping for better conditions next week.

Cetacean Passive Acoustics Testing and Loggerhead Turtle Tagging – Collaborative Field Work, Southern California Bight, 13-15 October - MMTD scientists will conduct this project on a charter survey aboard the R/V Outer Limits, a local sport fishing vessel chartered through the NOAA Cooperative Research Program. Jay Barlow will be testing some new designs of his Drifting Acoustic Spar Buoy Recorder (DASBR) system as well as a new autonomous acoustic recorder. Shannon Rankin and Jennifer Keating (ashore) will simultaneously test the range of reception for sonobuoys that will be deployed. Jeff Seminoff will be searching for loggerhead turtles to capture and tag.

Week of 5 October 2015

Collaborative SWFSC/AFSC Large Whale Survey (CLaWS), west coasts of U.S. & Canada, 9 July - 9 November - During the first week of CLaWS, Leg 4, scientists aboard the NOAA Ship Reuben Lasker surveyed from Ketchikan, Alaska to southwestern Vancouver Island recording cetacean sightings along the way. Humpback whales were the most frequently sighted cetacean and accounted for over half of the 55 sightings recorded along the 140 nmi survey track. Fin whales and gray whales were also sighted along with several small cetaceans: Pacific white-sided and Northern right whale dolphin, and Dall’s and harbor porpoises. Weather conditions were calm enough off Vancouver Island for the team to get out in the small boat to sample gray whales. The team collected photo identification photographs of approximately 34 whales and biopsy samples from 20 of the whales photographed. These data will be valuable to on-going
research to understand the movement patterns and stock structure of gray whales in the North Pacific. Details of this project can be found at https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=276&id=20861. Contact Dave.Weller@noaa.gov, Susan.Chivers@noaa.gov or Annette.Henry@noaa.gov for details.

These gray whales were sampled off southwestern Vancouver Island between Hesquit Peninsula and Pachena Bay this week: 28 September - 3 October. The photographs highlight some of the variability in identifiable characteristics of gray whales and their preference for nearshore coastal waters. Marine mammal photos taken under NOAA Permit No. 14097. Photo credit: Alisa Schulman-Janiger.

Expedición Internacional Vaquita Marina 2015, Upper Gulf of California, Mexico, 27 November - 3 December 2015 -This week marked the beginning of Expedición Internacional Vaquita Marina 2015, a project of the Mexican Ministry of the Environment and Natural Resources (SEMARNAT). The main goal of the project is to estimate the current abundance of the critically endangered porpoise Phocoena sinus, the vaquita or Gulf of California porpoise. NOAA scientists from the Southwest Fisheries Science Center, Marine Mammal and Turtle Division, are assisting Mexican colleagues with the line-transect portion of the project aboard the chartered vessel Ocean Starr. Lorenzo Rojas-Bracho and Barbara Taylor are the Mexican and U. S. Chief Scientists, respectively.

On Friday, 25 September, the international team of 13 scientists on Leg 1 of the survey met at SWFSC for training. The next day the team drove from San Diego to San Felipe and boarded the ship. During the first 5 days, 27 September - 1 October, mostly light winds allowed 193 nautical miles of transect lines to be surveyed and a total of 110 sightings of 5 species to be recorded. The first 4 sightings of vaquitas occurred on 30 September. Three of the sightings occurred close to San Felipe in an area where vaquitas had not previously been seen. Bottlenose dolphins and long-beaked common dolphins comprised most of the dolphin sightings, but there have also been over 30 sightings of whales, both fin and Bryde’s.

The first of October was a special day when the ship was visited by a large group of Mexican dignitaries, including the Secretary of SEMARNAT and the Governor of Baja California. In an amazingly fortunate sequence of events, the Mexican dignitaries were able to see vaquitas for themselves through the high-power binoculars. Hopefully the excitement of the day will be the turning point for the survival of the species. Contact Barbara.Taylor@noaa.gov and/or visit https://swfsc.noaa.gov/MMTD-Vaquita2015/.
Clockwise from top: Scientists at work on the flying bridge; center right: Secretariat Pacchiano sees his first vaquita; bottom right: Director Aguilar of Fisheries and Aquaculture spots a vaquita; bottom left: Dignitaries enjoying vaquita science; center left: Chief Scientists briefing dignitaries.
Loggerhead Aerial Surveys and In-water Research, Southern California Bight, September-October - SWFSC Scientists continue an aerial line-transect survey for loggerhead turtles in the Southern California Bight. The current warm water conditions have resulted in unprecedented numbers of loggerheads within the bight. The team surveyed 767.9 nautical miles in the southern and central inshore portions of the bight this past week, for a grand total of 1,190 nautical miles surveyed so far for the project. A total of 75 turtles have been seen, with other sighted species including hammerhead sharks, common dolphins, blue whales, and bottlenose dolphins. Please contact Chief Scientist Tomo.Eguchi@noaa.gov for more information.

Week of 28 September 2015

Collaborative SWFSC/AFSC Large Whale Survey (CLaWS), west coasts of U.S. & Canada, 9 July - 9 November – Leg 4 of CLaWS begins this week (28 September) in Ketchikan, Alaska. Twenty-five days of survey effort will be concentrated in waters off British Columbia, Canada. Cruise Leader Susan Chivers (SWFSC) will be joined by scientists: Alicia Amerson, Bingyao Chen, Paul Fiedler, Karin Forney, Sergio Martinez and Alisa Shulman-Janiger. Details of this project can be found at https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=276&id=20861. Contact Dave.Weller@noaa.gov, Susan.Chivers@noaa.gov or Annette.Henry@noaa.gov for details.

After surveying waters off Alaska for Legs 1-3, the survey will begin working in Canada on 28 September. Left: one of many fin whales encountered on Leg 3. Center: NOAA Ship Reuben Lasker off Yakutat, Alaska. Right: the splendid scenery provided by Alaska. Marine mammal photo taken under NOAA Permit No. 14097. All photos were taken by Bernardo Alps.
Vaquita Expedition 2015, Upper Gulf of California, Mexico, 27 November - 3 December 2015 - The Vaquita Expedition 2015 is a collaborative international cruise funded primarily by Mexico (SEMARNAT) with scientists from Mexico, the United States, Germany and the United Kingdom, as scientists on the survey, and as members of an expert panel to analyze data. Vaquita, the Gulf of California porpoise, is the most endangered species of marine mammal in the world. With fewer than 100 remaining, the current survey has special designs to maximize precision in estimating abundance of the population through a combination of visual and acoustic methods. The survey will be conducted aboard R/V Ocean Starr. Lorenzo Rojas-Bracho (Mexico) and Barbara Taylor (US-SWFSC) are Co-Chief Scientists. Please contact Barbara.Taylor@noaa.gov for details and visit the survey website at https://swfsc.noaa.gov/MMTD-vaquita/.

Loggerhead Aerial Surveys and in-water research, Southern California Bight, September-October - Scientists from the Marine Turtle Ecology & Assessment Program initiated an aerial line-transect survey of loggerhead turtles in the Southern California Bight this week. The current warm water conditions have resulted in unprecedented numbers of turtles of this species within the bight and the team will use a NOAA DeHavilland Twin Otter to look for clusters of turtles (with hopes to conduct in-water work from a small vessel). Last week, 491.6 nautical miles were surveyed in the southern portion of the study area and a total of 37 loggerhead turtles were sighted in the first two days. Other species sighted included hammerhead sharks, common dolphins, Cuvier’s beaked whales, and Risso’s dolphins. Please contact Chief Scientist Tomo.Eguchi@noaa.gov for more information.
Leatherback Turtle Research, Gulf of Mexico, September 13-26, 2015 - In collaboration with Dr. Chris Sasso (SEFSC) and Dr. Brian Stacey (DVM, F/PR), Scott Benson and Karin Forney participated in the first successful capture and tagging of free-swimming leatherback turtles in the northern Gulf of Mexico. Obtaining data on leatherback turtles in the Gulf of Mexico has been a priority for SEFSC because pelagic longline fisheries regularly interact with this species but little is known about their distribution, movements, or origins. Using coordinated aerial and boat-based capture methods that were first developed off central California, six leatherbacks were successfully captured and tagged, and all transmitters are reporting. Scott provided technical training, advice, and expertise on the capture vessel. Karin led and trained the aerial team aboard NOAA Twin Otter N48RF piloted by Matt Nardi and Alex Johnston. For more information, contact Scott.Benson@noaa.gov.
Collaborative SWFSC/AFSC Large Whale Survey (CLaWS), west coasts of U.S. & Canada, 9 July - 9 November – The last week of Leg 3 began with a survey of Yakutat Bay, an amazing view of Hubbard Glacier, and numerous harbor porpoise sightings. After leaving the bay, high winds, large swell, and not-so-scattered showers were the norm all along the coast of southeastern Alaska, as were humpback whales, Dall’s porpoises, and harbor porpoises. Just when it began to look like our last week would end on a low note, the skies cleared, the winds died, and fin whale sightings were scattered between Sitka Sound and Dixon Entrance. The last sighting for Leg 3 was a group of approximately 45 fin whales spread throughout a relatively small area within the waters of Dixon Entrance. We collected several biopsy samples, the last of which was set adrift when the line tethering the bolt snapped and our valuable sample temporarily disappeared from sight. The successful retrieval of this sample depended on the coordinated efforts of both scientists and crew and highlighted what a great team we have had on the LASKER for this leg! Details of this survey can be found at https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=276&id=20861. Contact Dave.Weller@noaa.gov, Aimee.Lang@noaa.gov, or Annette.Henry@noaa.gov for details.

Week of 21 September 2015

Scott Benson, Chris Sasso, and the aerial support team for leatherback capture operations: (left to right: Paul Nagelkirk, Scott Benson, Stephani Durkacz, Alex Johnston, Karin Forney, Heidi Malizia, Matt Nardi, and Chris Sasso).
Southern Resident Killer Whale Health Assessment, Puget Sound, WA, August - September - This past week saw the completion of a hugely successful season of whale photogrammetry studies around Vancouver Island. Since early August the collaborative team from MMTD (John Durban and Holly Fearnbach) and the Vancouver Aquarium (Lance Barrett-Lennard) have flown a total of 248 flight missions over whales with an unmanned hexacopter, flying a combined 296 kilometers to collect overhead images. Preliminary analysis indicates that high quality aerial images have been obtained from all individual whales encountered, including 74 Northern Resident killer whales, 20 West Coast Transient killer whales and the entire endangered population of 81 Southern Resident killer whales. These images will be measured to compare growth and body condition across populations to make inference about nutritional status, a key component of recovery plans aimed at maintaining adequate food supplies. The team was joined in the field this week by Lynne Barre from the NOAA West Coast Region, to observe successful flight operations over Southern Resident killer whales and discuss how these photogrammetry data can fill key data gaps to inform management. It has been a very busy, and hugely productive six weeks. For more information contact John.Durban@noaa.gov.
Gulf of Mexico Leatherback Turtle Research, Destin, Florida, 13-26 September - Scott Benson and Karin Forney are participating as invited experts in this SEFSC-led research to capture and tag free-swimming leatherback turtles in the Gulf of Mexico. Although a pelagic longline fishery regularly interacts with leatherbacks in the Gulf of Mexico, little is known about distribution, movements, or origins of leatherbacks in the Gulf. The project aims to attach satellite-linked transmitters to eight turtles. Scott will provide technical training, advice, and expertise to the SEFSC in-water team, and Karin will provide the same for the aerial team. Contact Scott.Benson@noaa.gov for additional information.

Week of 14 September 2015

Collaborative SWFSC/AFSC Large Whale Survey (CLaWS), west coasts of U.S. & Canada, 9 July - 9 November - During the second week of CLaWS Leg 3, we continued our efforts to collect photo-ids and biopsies from gray whales off of Kodiak Island, finding some whales that had been identified in this area during previous weeks of the survey as well as some “new” whales. Then, we headed offshore towards an area where multiple sightings of blue whales were made on Leg 2. Although no blue whales were to be found, we worked a few fin whale sightings before moving closer to shore to avoid an incoming storm. After the storm had passed (albeit leaving behind high swell that made for quite a rocky ride!), we began our transit across the Gulf of Alaska to Yakutat Bay. For the remainder of leg 3 we will survey south to Sitka in the hopes of finding more gray whales, and (time and weather permitting) hope to also spend some time on the shelf break looking for sperm whales. Details of this survey can be found at Small boat operations to collect photographs and tissue samples of fin whales in the Gulf of Alaska. Photo taken under NMFS Permit No. 14097; photo credit: Charlotte Boyd.
Southern Resident Killer Whale Health Assessment, Puget Sound, WA, August - September - This past week was hugely successful for the photogrammetry team from MMTD and the Vancouver Aquarium. The unmanned hexacopter (“Mobley”) was flown for 46 flights, collecting high quality aerial images of 40 individual southern resident killer whales (67 individuals so far for the survey from a population of 81). This included images to measure the size of a neonate calf that was first documented this week by our colleagues at the Center for Whale Research (see photos at http://www.whaleresearch.com/#/home-2015/c608). Images of all the whales will be used to measure growth and body condition to make inference about nutritional status, a key component of recovery plans aimed at maintaining an adequate food supply for this endangered population. Additionally, aerial images were collected from seven humpback whales to contribute to an ongoing study of the health of recovering humpback populations worldwide, adding to photogrammetry data recently collected in collaboration with Woods Hole Oceanographic Institute off New England and upcoming studies of humpback whales in Antarctica. For more information contact John.Durban@noaa.gov.

Collaborative SWFSC/AFSC Large Whale Survey (CLaWS), west coasts of U.S. & Canada, 9 July - 9 November - During the first week of CLaWS Leg 3, our efforts to collect photo-ids and biopsies from gray whales off of Kodiak were successful as numerous whales were sighted near Ugak Island. After the first couple of days, fog moved into this area and the focus of the survey shifted further offshore, where right whale sightings and recordings have been made. Thus far, the species encountered on Leg 3 include Pacific white-sided dolphins, Dall’s porpoise, killer whales, gray whales, and lots of humpback whales. For the second week, survey effort in areas considered hotspots for gray and/or right whales will continue, followed by (weather permitting) effort further offshore to an area where multiple sightings of blue and fin whales were made last leg. Details of this survey can be found at

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Southern Resident Killer Whale Health Assessment, Puget Sound, WA, August - September - This week the killer whale photogrammetry survey relocated to the waters around southern Vancouver Island and the San Juan Islands (Washington State) for studies of the endangered Southern Resident population. This is the first time we have used the unmanned hexacopter to obtain aerial photogrammetry images for the continued assessment of nutritional status and reproductive success, replacing manned aircraft platforms. This week John Durban and Holly Fearnbach (MMTD) and Lance Barrett-Lennard (Vancouver Aquarium) were joined in the field by Wayne Perryman. Despite some challenging weather early in the week, it has been a very successful start: 24 flights over members of all three pods (J, K and L) with good photogrammetry images from an estimated 30 whales from the population of 81. We have a favorable weather forecast and hope to improve on population coverage in the coming two weeks. For more information contact John.Durban@noaa.gov.

Photo on left: Aerial photogrammetry image of K37, a young male (12-yr old) Southern Resident killer whale. Aerial images can be linked to whales of known age and life history using individually-distinct patterns of saddle patch pigmentation that can be matched to long-term photo-identification catalogs. Photogrammetry is being used to track growth and body condition of individuals to make inference about nutritional status over the long and short-term. Photo on right: Aerial photogrammetry image of a Southern Resident killer whale female J16 with her new calf in its first year; both mother and baby appear in robust body condition despite the challenges of lactation. All images taken using an unmanned hexacopter at an altitude of >100ft above the whales, with research approach authorized by NMFS permit # 16163 and flight authorization under an MOU between NOAA and the FAA (Class G MOU # 2015-ESA-4-NOAA).
Week of 31 August 2015

Collaborative SWFSC/AFSC Large Whale Survey (CLaWS), west coasts of U.S. & Canada, 9 July - 9 November - On 27 August the second leg of CLaWS concluded in Kodiak, Alaska. Under the leadership of Brenda Rone (AFSC/NMML) leg 2 covered nearly 2500 nm, documented 408 sightings of 10 cetacean species, and acoustically recorded 9 species. Highlights of this leg included: gray, blue, fin, humpback, sei, sperm and killer whales and two acoustic contacts of right whales. Based on what has been learned during legs 1 and 2, NOAA Ship Reuben Lasker will continue working off Kodiak for about 10 days at the beginning of leg 3, working with gray whales (near locations where they were found on legs 1 and 2), and searching for right whales and blue whales in the areas where they were heard or sighted during leg 2. Having the Lasker in the Kodiak area will also provide eyes on the water with respect to monitoring the current Large Whale Unusual Mortality Event (UME) in western Gulf of Alaska. Dr. Aimée Lang (SWFSC) is the cruise leader and will be joined by scientists: Eric Archer, Charlotte Boyd, Bernardo Alps, Alyssa Baldo, Nikki Vollmer, and Elyssa Watford. Details of this survey can be found at https://swfsc.noaa.gov/textblock.aspx?Division=PRD&ParentMenuId=276&id=20861. Contact Dave.Weller@noaa.gov, Brenda.Rone@noaa.gov, Aimee.Lang@noaa.gov, or Annette.Henry@noaa.gov for details.

On left: Survey track of the LASKER during Leg 2, 6-27 August 2015. At right: "Brownell's type" Pacific white-sided dolphin photographed during leg 2. Bob Brownell (SWFSC) first described this anomalous color pattern in a 1965 publication. Photo credit: Bernardo Alps.

2015 Health Assessment of Resident Killer Whales, Vancouver Island, Canada, August – September, Week 3 report - This week saw the completion of the first leg of the 2015 killer whale health assessment using a small unmanned hexacopter. The research team of John Durban and Holly Fearnbach (MMTD) and Lance Barrett-Lennard (Vancouver Aquarium) completed photogrammetry sampling of Northern Resident killer whales off northern Vancouver Island. A further 15 Resident (salmon-eating) killer whales were photographed this week that were new for this 2015 survey, contributing to a total of 74 different individual Northern Resident whales and 14 (mammal-eating) Bigg’s Transients for the year. Notably, 45 of these whales were also imaged in 2014, which will allow an inter-annual comparison of body condition and pregnancy rates relative to changes in the abundance of their preferred Chinook salmon prey. The mammal-eating Transients will provide a further comparison from a population that is not thought to be food-limited, and has been increasing in abundance over the past four decades. The survey now relocates to the waters around southern Vancouver Island and the San Juan Islands (Washington State) for September, where the hexacopter will be used to obtain aerial photogrammetry images of the endangered Southern Resident killer whale population for a comparative assessment of nutritional status and reproductive success. For more information, contact John.Durban@noaa.gov.
International Whaling Commission Pacific Ocean Whale and Ecosystems Research (POWER) Survey, Central Tropical Pacific, 2 July - 30 August - On August 22 the Yushin-Maru No. 3 finished the designated IWC tracklines for the cetacean survey adjacent to the northwestern Hawaiian Islands. On Sunday, 23 August the research vessel began the long transit (1680 nmi) to the port of Shiogama, Miyagi Prefecture, Japan. The original research plan was to survey to the WNW in passing mode to attain cetacean geographic distribution data on the transit line back to Japan. Fate would have it…Typhoons Atani and Goni led interference and for most of the week the ship was in 10-15 foot seas and high winds. Air temperature ranged between 28.2 °C and 31.7 °C, and sea surface temperature 29.2 °C to 31.1 °C. The total searching distance for the week was 265.9 nmi. Sightings for the week (some with biopsy samples also collected) included Bryde’s whale, and rough toothed and pantropical spotted dolphin. The ship arrived at the port of Shiogama, Japan on Sunday morning (30 August) at 0900 hrs. The survey final report is in draft form and Jim Gilpatrick (MMTD) will work with Dr. Matsuoka at the Institute of Cetacean Research (ICR) in Tokyo on 31 August to finalize the draft report for IWC review. Contact Robert.Brownell@noaa.gov for information.
Southern California Green Turtle Monitoring Efforts - The Marine Turtle Ecology and Assessment Program conducted green turtle monitoring efforts in the Long Beach area (Seal Beach National Wildlife Refuge and San Gabriel River) on 8/25 and 8/26 and in San Diego Bay on 8/27. Efforts in Long Beach are conducted in collaboration the West Coast Regional Office (Dan Lawson and Tina Fahy). Five green turtles were caught at the Seal Beach Wildlife Refuge, none of which has been caught before. Lengths of these turtles ranged from 51.5 to 72.6 cm straight carapace length (SCL), whereas mass ranged from 18 to 45 kg. In San Diego Bay, three turtles were caught; two of which were recaptures from previous years. Their lengths ranged from 75.2 to 102.5 cm SCL and mass from 66 to 152 kg. As part of a collaborative project with the Navy, three GPS-enabled satellite transmitters were deployed on the three turtles in San Diego Bay. Biological samples (blood, skin, etc.) were collected from each of the captures. Contact Jeffrey.Seminoff@noaa.gov for details.