

Gray whale stranding records in Mexico during the 2020 winter breeding season

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ABSTRACT

While the occasional death and stranding of gray whales (*Eschrichtius robustus*) occurs as part of their life cycle, sometimes unusual mortality events occur (UME) when; gray whale mortalities increase above an average annual rate. In the spring and summer of 2019, 215 gray whales stranded along the North Pacific Coast of North America, prompting the U.S. National Oceanic and Atmospheric Administration to declare a gray whale UME (NOAA 2020). Examination of some of the stranded whales suggested that a decline in body condition resulting from nutritional stress (lack of sufficient food) may have contributed to the increase in gray whale mortality by starvation. Gray whale stranding records collected in Mexico between December 2019 and April 2020 indicated that at least 87 gray whales stranded along the Pacific coast of Baja California and the Gulf of California, Mexico. The majority of the dead whales (79.3%) were encountered in Ojo de Liebre lagoon (LOL) and the surrounding areas. Twenty-three of these were female gray whales, 36 were males, and 18 were of undetermined sex. The age classes of the dead whales were: 28 adults, 27 subadults, 18 yearling whales, 13 calves and 1 of unknown age. Compared to mortalities reported in Mexico in the previous year (2019), the number of stranded females decreased from 52 to 23, but the number of stranded male whales doubled from 18 to 36. The number of unidentified animals increased from 11 to 28 due to the advanced decomposition and position of the whales when they were discovered on the beach in 2020. The number of stranded calves increased from 2 in 2019 to 13 in 2020, while the number of stranded yearling whales decreased from 26 in 2019 to 18 in 2020. The number of stranded subadult and adult whales were 51 whales in 2019 and 55 in 2020. The gray whale strandings in 2020 appears to be related to a decline in body condition as numerous whales observed in

the gray whales' winter aggregation areas and breeding lagoons appeared to be "emaciated" and "skinny".

INTRODUCTION

The natural deaths of marine mammals can be related to: predation, parasitism, disease and starvation (Cardenas, 2004), and other anthropogenic causes such as hunting, entanglements in fishing gear, collisions with ships, poisoning and trauma (Evans, 1987). Gray whales migrate and aggregate along and on the relatively shallow continental shelf waters of North America, which brings these whales into close contact with human development throughout their range. Because of their coastal distribution, stranded gray whales frequently wash ashore and are discovered, rather than being lost at sea (Martínez-Aguilar *et al.*, 2019).

Between 1999 and 2000, a gray whale UME resulted in at least 319 stranded dead whales were discovered in the whales' breeding and aggregation areas in Mexico (NOAA 2020). Some of the stranded whales appeared to be "skinny" and very thin, suggesting that they were suffering from nutritional stress, starvation (LeBoeuf *et al.* 2000). Moore *et al.* (2001), suggested that the increase in gray whale mortality at that time was a result of the North Eastern Pacific gray whale population increasing to an abundance level that exceeded the "carrying capacity" of the gray whales' feeding grounds.

In 2019 another increase in gray whale strandings began; 215 gray whale strandings occurred along the North Pacific coast of North America (i.e., México, USA, and Canada). In response, a second gray whale UME was declared in May 2019 (NOAA 2020). Of those strandings, 81 occurred in México, and was comprised of mainly subadult and adult whales (Martínez-Aguilar *et al.*, 2019). Subsequently, renewed efforts to monitor and report gray whale strandings throughout their range in Mexico were undertaken in 2020. Nevertheless, many isolated areas occur along the Pacific coast of Mexico where is difficult to discover and report additional whale strandings. Thus, the number of dead stranded gray whales reported from Mexico for 2020 can be considered a minimum number.

METHODS

Information on dead stranded gray whales was collected from three sources. Whenever possible, the following data were collected for each gray whale stranding: Date, GPS position, location, number of whales, sex, age class, body length and physical condition (good, fair, or poor/skinny). The age for each stranded whale was estimated from each whale's body length and categorized with age-length criteria established by the UME stranding investigating panel: calves less than 7.9-m; yearlings 8 - 8.9 m; sub-adults from 9-11 m for males, and 11.6 m for females; and adults larger than 11.1 m for males and 11.7 m for females.

Sources of stranding data for 2020 included:

1.- Strandings in Laguna San Ignacio and Bahía Magdalena-Bahía Almejas complex, BCS., during the period from January 15 to April 4, 2020 were recorded by researchers from the Laguna San Ignacio Ecosystem Science Program (LSIESP) and Marine Mammals Research Program / Universidad Autónoma de Baja California Sur (PRIMMA/UABCS).

2.- Strandings from Ojo de Liebre lagoon, Guerrero Negro lagoon, Baja California Sur, and from Manuela lagoon, Baja California were recorded from December 26, 2019 to April 4th of 2020 by researchers from LSIESP and PRIMMA/UABCS in collaboration with the staff of Departamento de Ecología of Exportadora de Sal S.A.

3.- Four gray whale strandings inside Gulf of California, and from Ensenada, were reported between January 20th to April 12th, 2020 by the "Review of News" on their internet website, and two additional stranding reports along the Pacific Coast of Baja California were reported by the "Museo de la Ballena".

RESULTS

Between December 26 and April 12 of 2020, 87 dead, stranded gray whales were reported: 83 along the Pacific coast of Baja California Peninsula, and 4 inside of Gulf of California (Fig. 1). Of these whales, 23 were females, 36 were males, and 28 were of undetermined sex (Table 2). Their age categories were: 28 adults, 27 subadults, 18 yearling, 13 calves, and one of undetermined age (Table 2).

The advanced decomposition of most of these stranded whales prevented determination of their body condition at the time of their deaths (e.g., "good", "fair", or "poor" condition).

Gulf of California

There were four gray whale strandings inside of the Gulf of California during 2020: one each in Bahía de Loreto., B.C.S., Mulege, B.C.S.; Bahía Kino, Sonora; and Mazatlán, Sinaloa (Fig. 1). All of these gray whale strandings were reported in the "media news".

Bahía Magdalena-Bahía Almejas complex

This complex includes the areas from south to North, Bahía Almejas, Bahía Magdalena, Cabo San Lazaro and Canal de Santo Domingo. In the winter of 2020, six stranded dead gray whales were discovered in these areas: 4 males and 2 whales of undetermined sex. Three were subadults and three were adults (Table1, Fig 1).

Laguna San Ignacio.

In Laguna San Ignacio, Baja California Sur, during the 2020, seven gray whales stranded, which is the highest number of stranded whales since 2014. Of these, 4 were females, 2 males, and one of undetermined sex. One was a yearling, 2 were subadults, and 4 were adults (Table 1, Fig 2).

Laguna Ojo de Liebre (Scammons lagoon), Laguna Guerrero Negro y Laguna Manuela

These three lagoons are located within the northern portion of the "El Vizcaíno Biosphere Reserve." In the winter of 2020, 69 stranded dead gray whales were discovered in these areas, which is 79.3% of the total stranded gray whales reported for Mexico in 2020. Of these stranded whales: 18 were females, 29 were males, and 22 were of undetermined sex (Fig. 3). The age classes of these whales included: 13 calves, 16 yearling animals, 17 subadults, 22 adults, and 1 animal of undetermined age (Fig. 4).

DISCUSSION

Although the number of stranded gray whales reported in Mexican waters were similar in 2019 and 2020 (81 and 87 respectively), the proportion of the sexes of the stranded whales were different in each year. The proportion of females stranded in 2019 decreased from 64.1% (n=52) to 26.4% (n=23) in 2020, while the proportion of males increased from 22.2% (n=18) to 41.3% (n=36) (Table 2)., Also, the number of whales whose sex could not be determined increased from 11 to 28 due to the advanced decomposition of the carcasses at the time of discovery, and due to the position of the whales when they beached (ventral side down on the sand, hiding the genital region from view).

The age distribution of stranded gray whales remained similar in both 2019 and 2020, only with an increase in the number of stranded calves (2 in 2019 and 13 in 2020) (Table 2). The winter of 2020 was the third consecutive year with low number of calves reported in the gray whale breeding lagoons in Baja California, along with an increase in the number of stranded sub-adult and adult gray whales. These changes in the composition of the strandings of gray whales could be related to a decline in overall body condition of the whales from 2018 to 2020 (Ronzón-Contreras et al. 2019, 2020). Similar decreases in numbers of calves were seen in the gray whale breeding lagoons in the years following the UME of 1999-2000 (Le Boeuf et al. 2002, Gulland et al. 2005, Urbán et al. 2003, 2011). Unfortunately, due to the advanced decomposition of many of the stranded whales examined in 2020, a correlation with "poor" body condition could not be established or confirmed in all of the whales examined.

In Laguna San Ignacio, the number of stranded gray whales ranged from one to seven whales annually since 2009. The seven stranded whales discovered there in 2020 represents the highest number of stranded gray whales reported since 2014, but these corresponds only to yearling, subadults, and adults whales, and not to calves which have been the most frequent age class of stranded gray whales during the period from 2011 – 2017. The decrease of stranded dead gray whale calves is likely related to the overall decline of female-calf pairs observed in Laguna San Ignacio since 2018 (Urbán et al. 2018, 2019, 2020).

Similar to 2019, the highest percent of the stranded dead gray whales were observed in Laguna Ojo de Liebre and the surrounding areas (Fig. 1). These high percentages of stranded whales could be expected because this lagoon is the largest gray whale aggregation and breeding lagoon area in Baja California Peninsula (Urbán et al. 2003).

The main area where the stranded whales occur is on the outer shores of Isla Arena, the barrier island at the entrance of Laguna Ojo de Liebre. At this location 36.7% (n=32) of the total number of stranded gray whales, were discovered, but the body condition of most could not be evaluated due to the advanced decomposition of the carcasses at the time of their discovery. Many of these carcasses had evidence of shark bites that suggests that these whales died in the ocean, and the marine currents and winds brought them to the shores of the island.

Finally, the number of reported gray whale strandings is likely an underestimate of actual mortalities, because of the differences in detectability and search effort conducted along many areas of the Baja California Peninsula, the fact that some gray whale carcasses may have floated away from the coast and sank at sea, and also because of the environmental factors as tides and marine currents could move the carcasses before they can be discovered and reported.

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Tables and Figures

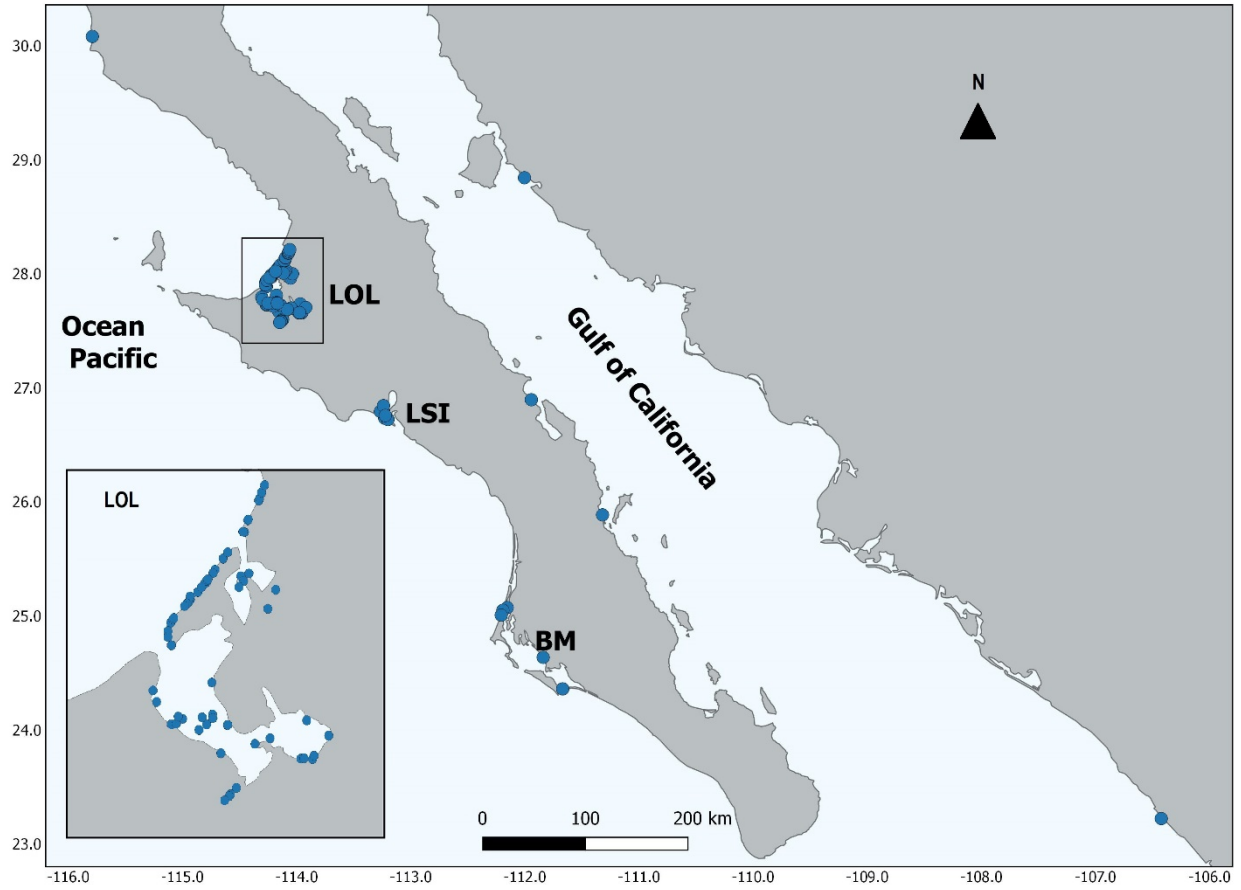


Figure 1. Distribution of gray whales stranded in Baja California Peninsula, in Mexico. from December 2019 to April 2020. (the zoom square corresponds to Ojo de Liebre lagoon (Scammon's lagoon) at the bottom, Guerrero Negro lagoon in the middle and Manuela Lagoon at the Top)

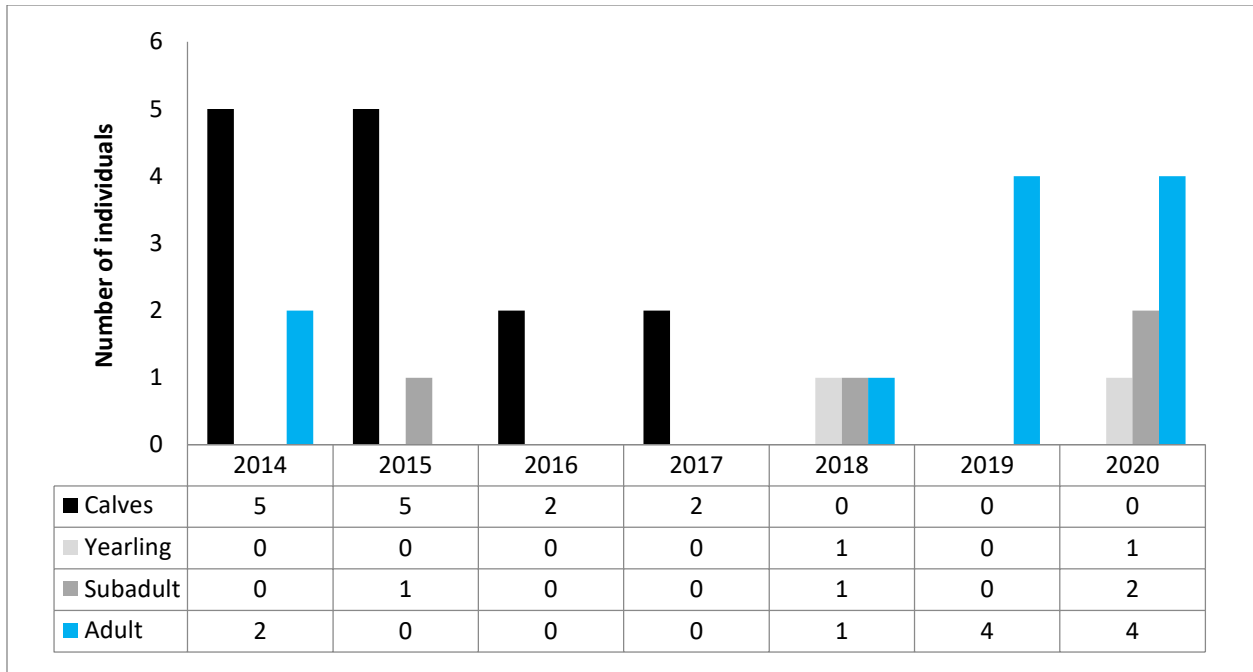


Figure 2. Total number of gray whales stranded in San Ignacio Lagoon (2014-2020), separated by age categories and years

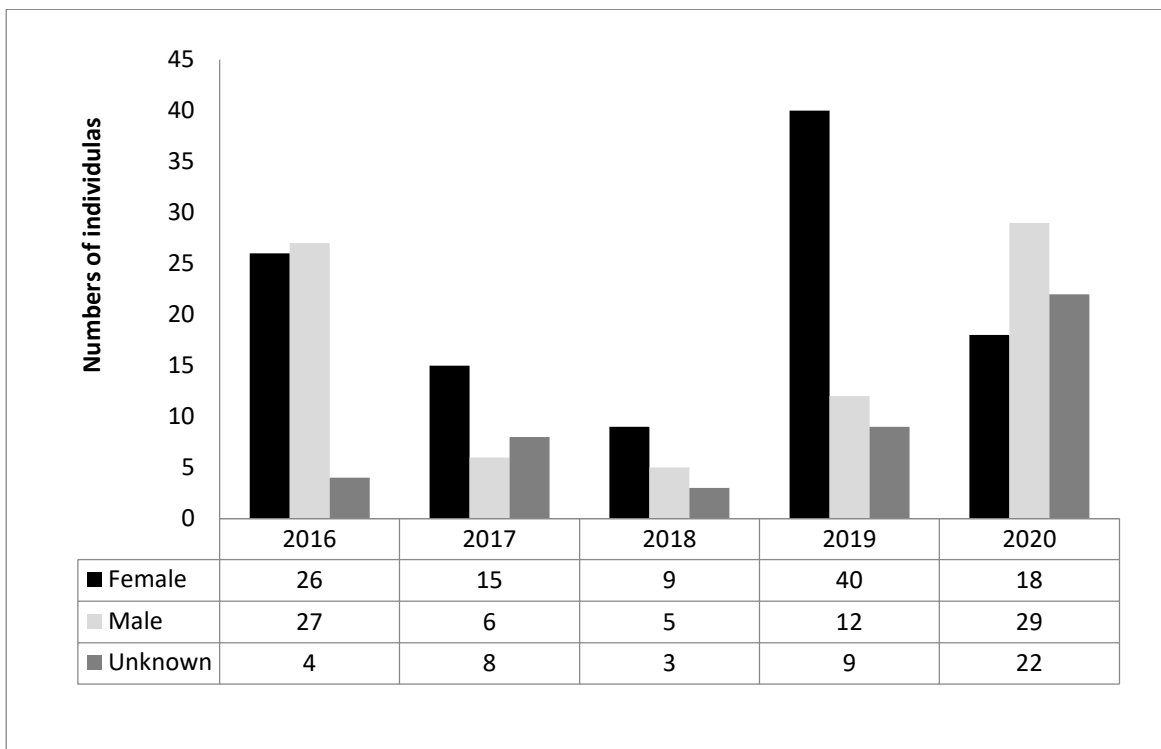


Figure 3. Total number of gray whales stranded in Ojo de Liebre, Guerrero Negro and Manuela Lagoons (2016-2020), separated by sex categories and years.

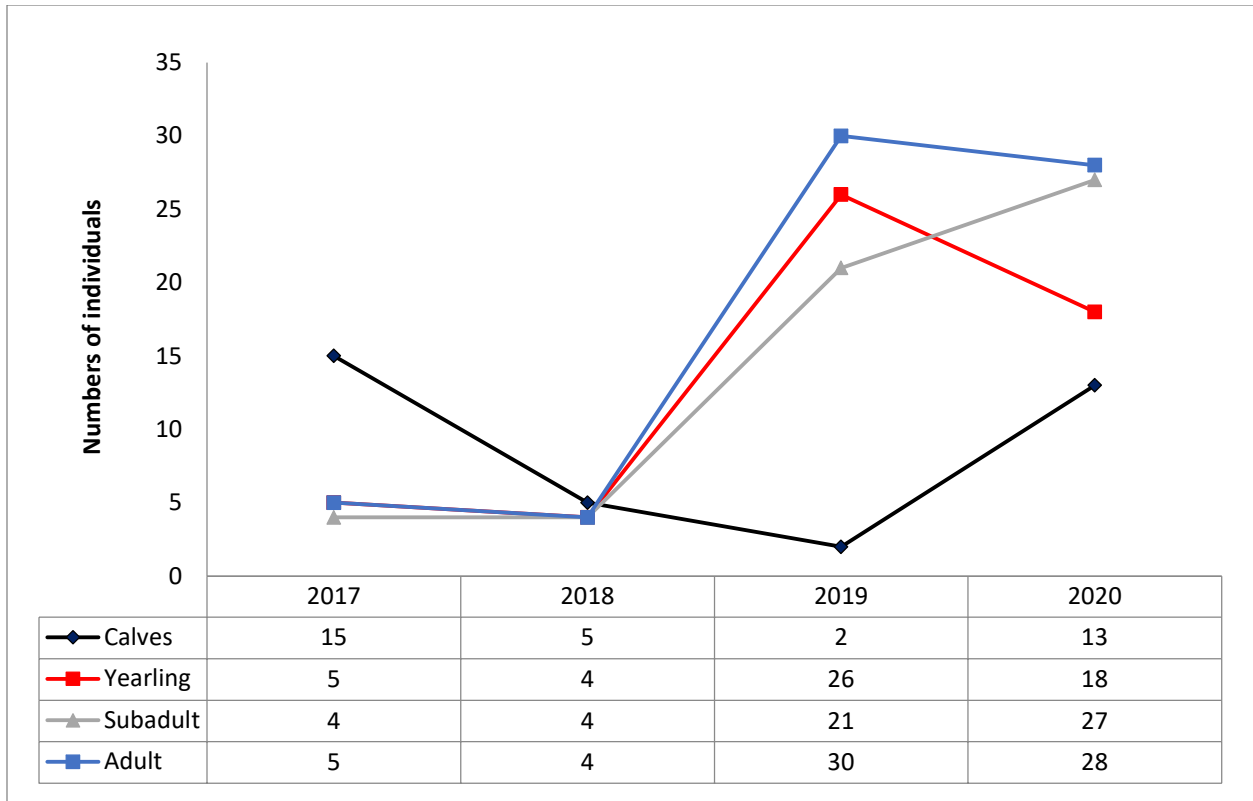


Figure 4. Total number of gray whales stranded in Ojo de Liebre, Guerrero Negro and Manuela Lagoons (2017 – 2020), separated by age categories and years.

Table 1. Data for gray whales stranded in México from December 2019 to April 2020. (Field Id includes Initials from the place of stranding: Bahía Magdalena-BM, Laguna San Ignacio-LSI, Laguna Ojo de Liebre-LOL, Bahías de Loreto-LOR, Mazatlán-MAZ, Bahía Kino-KIN, Mulege-MUL, Isla San Lazaro-ISL). (Province includes Baja California Sur-B.C.S., B.C-Baja California).

Date	Field ID	Province	Sex	Age Class	Length (m)	Observation Status	Locality	Latitude	Longitude	How Observed
26-dic-19	LOL-008	B.C.S	M	yearling	8.15	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	27.99555	-114.20861	Beached
26-dic-19	LOL-009	B.C.S	M	yearling	8.90	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	28.06333	-114.15305	Beached
06-ene-20	LOL-010	B.C.S	F	subadult	9.5	Advanced Decomposition	Paredones, Laguna Ojo de Liebre	27.66888	-114.15805	Beached
06-ene-20	LOL-011	B.C.S	F	subadult	9.5	Advanced Decomposition	Campo el dátil, Laguna Ojo de Liebre	27.81194	-114.17805	Beached
17-ene-20	BM-001	B.C.S	Unk	subadult	11	Advanced Decomposition	Las Palmas, Bahía Magdalena	24.63597	-111.84058	Beached
20-ene-20	LSI-001	B.C.S	F	yearling	8.1	Advanced Decomposition	Isla Ana, Laguna San Ignacio	26.73353	-113.22957	Beached
26-ene-20	MAZ-001	Sinaloa	Unk	yearling	8.5	Fresh	Isla Venados, Mazatlán	23.22250	-106.42460	Beached
27-ene-20	LOR-001	B.C.S	Unk	subadult	unknown	Fresh	Bahía de Loreto	25.88583	-111.32083	Floating
30-ene-20	LOL-012	B.C.S	Unk	calf	4.5	Fresh	Isla Arena, Laguna Ojo de Liebre	27.96138	-114.05472	Beached
30-ene-20	LSI-002	B.C.S	M	subadult	10.3	Advanced Decomposition	Isla Ana, Laguna San Ignacio	26.72749	-113.20300	Beached
30-ene-20	LOL-001	B.C.S	F	subadult	9.6	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	27.93309	-114.26850	Beached
30-ene-20	LOL-002	B.C.S	M	adult	11.85	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	27.97414	-114.22952	Beached
31-ene-20	LOL-003	B.C.S	M	adult	11.7	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	27.97989	-114.22554	Beached
31-ene-20	LOL-004	B.C.S	F	subadult	9.2	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	28.01176	-114.19419	Beached
31-ene-20	LOL-005	B.C.S	Unk	calf	4.7	Advanced	Isla Arena, Laguna Ojo de Liebre	28.04048	-114.17091	Beached

						Decomposition				
31-ene-20	LOL-006	B.C.S	F	yearling	7.47	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	28.06320	-114.15321	Beached
03-feb-20	BM-002	B.C.S	Unk	subadult	9	Advanced Decomposition	Canal de Santo Domingo	25.07251	-112.15604	Floating
03-feb-20	LSI-003	B.C.S	F	adult	13.7	Advanced Decomposition	Punta Piedra, Laguna San Ignacio	26.79660	-113.24040	Beached
06-feb-20	LOL-007	B.C.S	M	Calf	5.1	Fresh	Isla Arena, Laguna Ojo de Liebre	28.03353	-114.17551	Beached
08-feb-20	LSI-004	B.C.S	F	adult	12.65	Moderated Descomposition	Manglar frente a Punta Piedra, Laguna San Ignacio	26.79272	-113.26733	Beached
11-feb-20	LSI-005	B.C.S	M	adult	13.2	Fresh	Bajo, frenta a Campo Cortés, Laguna San Ignacio	26.84350	-113.24000	Floating
11-feb-20	LOL-060	B.C.S	F	yearling	8	Advanced Decomposition	Isla Alambre, Laguna Ojo de Liebre	27.73861	-114.24222	Beached
13-feb-20	LOL-013	B.C.S	M	subadult	9	Moderated Descomposition	camino al Faro, Laguna Guerrero negro	28.02750	-114.11416	Beached
13-feb-20	LOL-014	B.C.S	Unk	calf	4.64	Advanced Decomposition	al norte de Guerrero Negro (manglares)	28.00001	-114.03741	Beached
13-feb-20	LOL-015	B.C.S	F	yearling	8.1	Advanced Decomposition	ocho bombas, Laguna Ojo de Liebre	27.65697	-113.95654	Floating /Beached
13-feb-20	LOL-029	B.C.S	F	yearling	8.46	Advanced Decomposition	ocho bombas, Laguna Ojo de Liebre	27.65780	-113.98219	Floating /Beached
16-feb-20	BM-003	B.C.S	M	subadult	11	Fresh	Bahía Almejas, BCS	24.35999	-111.66985	Floating /Beached
20-feb-20	LOL-016	B.C.S	M	yearling	8	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	28.07592	-114.14301	Beached
20-feb-20	LOL-017	B.C.S	Unk	yearling	8.45	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	28.03296	-114.09637	Beached
20-feb-20	LOL-018	B.C.S	Unk	yearling	8.38	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	28.01755	-114.10826	Beached
20-feb-20	LOL-019	B.C.S	Unk	calf	5	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	28.01566	-114.18945	Beached
20-feb-20	LOL-020	B.C.S	M	adult	11.6	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	28.00525	-114.11831	Beached

20-feb-20	LOL-021	B.C.S	Unk	yearling	8.1	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	27.59869	-114.12391	Beached
21-feb-20	LOL-022	B.C.S	Unk	yearling	8.33	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	27.58561	-114.13687	Beached
21-feb-20	LOL-023	B.C.S	M	adult	11.89	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	27.97584	-114.22841	Beached
21-feb-20	LOL-024	B.C.S	Unk	adult	11.5	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	27.58201	-114.13992	Beached
21-feb-20	LOL-025	B.C.S	Unk	yearling	8.5	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	27.58200	-114.14009	Beached
21-feb-20	LOL-026	B.C.S	M	adult	11.82	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	27.57340	-114.14992	Beached
27-feb-20	LOL-027	B.C.S	F	yearling	8.63	Advanced Decomposition	La Lambra, Laguna Ojo de Liebre	27.72705	-114.18958	Beached
27-feb-20	LOL-028	B.C.S	F	yearling	8.3	Advanced Decomposition	Campo Águilas, Laguna Ojo de Liebre	27.74713	-114.17641	Beached
27-feb-20	ISL-001	B.C.S	M	adult	12.6	Advanced Decomposition	Km 16.3 Isla San Lázaro	25.04916	-112.19416	Beached
02-mar-20	LSI-006	B.C.S	Unk	subadult	unknown	Advanced Decomposition	canal hacia la Pitaya, Laguna San Ignacio	26.72222	-113.20138	Beached
03-mar-20	LSI-007	B.C.S	F	adult	11.9	Advanced Decomposition	Isla Abaroa, Laguna San Ignacio	26.75707	-113.22469	Beached
05-mar-20	BM-004	B.C.S	M	adult	11.96	Advanced Descomposition	Bahía Almejas	24.35999	-111.66985	Beached
06-mar-20	LOL-030	B.C.S	M	calf	3.9	Advanced Decomposition	ocho bombas, Laguna Ojo de Liebre	27.66388	-113.95332	Beached
06-mar-20	LOL-031	B.C.S	F	subadult	unknown	Advanced Decomposition	Campo Aguilas, Laguna Ojo de Liebre	27.72588	-114.14372	Beached
09-mar-20	MUL-001	B.C.S	F	subadult	unknown	Advanced Decomposition	El coyote, Mulege	26.89583	-111.94472	Floating
25-mar-20	ENS-001	B.C.	Unk	subadult	unknown	Advanced Decomposition	El Rosario Baja California	30-08111	-115.79138	Beached
30-mar-20	LOL-032	B.C.S	M	adult	12.2	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	27.88728	-114.26654	Beached

30-mar-20	LOL-033	B.C.S	F	subadult	11.66	Advanced Decomposition	Cerca de La Ventana, Laguna Ojo de Liebre	27.79582	-114.30746	Beached
30-mar-20	LOL-034	B.C.S	F	adult	12.1	Advanced Decomposition	Marismas entre dunas, Laguna Ojo de Liebre	27.72759	-114.26683	Beached
30-mar-20	LOL-035	B.C.S	Unk	subadult	unknown	Advanced Decomposition	Marismas entre dunas, Laguna Ojo de Liebre	27.72865	-114.25629	Beached
30-mar-20	LOL-036	B.C.S	M	adult	11.86	Advanced Decomposition	Isla Alambre, Laguna Ojo de Liebre	27.72615	-114.14292	Beached
30-mar-20	LOL-037	B.C.S	M	adult	11.94	Advanced Decomposition	Laguna Ojo de Liebre	27.77277	-114.29944	Beached
30-mar-20	LOL-038	B.C.S	Unk	subadult	unknown	Advanced Decomposition	Laguna Ojo de Liebre	27.71621	-114.20632	Beached
30-mar-20	LOL-039	B.C.S	Unk	subadult	unknown	Advanced Decomposition	Laguna Ojo de Liebre	27.73972	-114.17611	Beached
30-mar-20	LOL-040	B.C.S	M	subadult	unknown	Advanced Decomposition	Laguna Ojo de Liebre	27.74166	-114.19944	Beached
31-mar-20	LOL-041	B.C.S	M	adult	12.2	Moderated Descompositon	El huevón, Laguna Ojo de Liebre	27.73559	-113.96932	Floating /Beached
31-mar-20	LOL-042	B.C.S	Unk	subadult	unknown	Advanced Decomposition	Hilo del culebrón, Laguna Ojo de Liebre	27.69916	-114.04972	Beached
31-mar-20	LOL-043	B.C.S	Unk	subadult	unknown	Advanced Decomposition	Hilo del culebrón, Laguna Ojo de Liebre	27.68777	-114.08333	Beached
31-mar-20	LOL-044	B.C.S	Unk	subadult	unknown	Advanced Decomposition	Hilo del culebrón, Laguna Ojo de Liebre	27.74333	-114.25194	Beached
31-mar-20	LOL-045	B.C.S	F	subadult	10.3	Fresh	El conchalito, Laguna Ojo de Liebre	27.74132	-114.17020	Floating
31-mar-20	KIN.001	Sonora	M	subadult	11	Advanced Decomposition	Bahía Kino	28.84222	-112.00527	Beached
01-abr-20	LOL-046	B.C.S	M	yearling	7.52	Advanced Decomposition	Cerca del muelle Inglés, Laguna Ojo de Liebre	27.70447	-113.92117	Beached
01-abr-20	LOL-047	B.C.S	Unk	unknown	unknown	Skeleton	Laguna Ojo de Liebre	27.66416	-113.98138	Beached
01-abr-20	LOL-048	B.C.S	F	adult	11.97	Skeleton	El remate, Laguna Ojo de Liebre	27.65854	-113.97552	Beached
01-abr-20	LOL-049	B.C.S	M	calf	4.48	Advanced Decomposition	El remate, Laguna Ojo de Liebre	27.65854	-113.97552	Beached
02-abr-20	LOL-050	B.C.S	M	adult	11.79	Advanced	Isla Arena, Laguna Ojo de Liebre	28.01809	-114.18966	Beached

						Decomposition				
02-abr-20	LOL-051	B.C.S	M	adult	11.79	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	28.00504	-114.20074	Beached
02-abr-20	LOL-052	B.C.S	F	adult	11.73	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	27.98630	-114.22551	Beached
02-abr-20	LOL-053	B.C.S	M	adult	11.58	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	27.97153	-114.23275	Beached
02-abr-20	LOL-054	B.C.S	F	adult	12.85	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	27.93987	-114.26367	Beached
02-abr-20	LOL-055	B.C.S	M	adult	11.63	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	27.91599	-114.27468	Beached
02-abr-20	LOL-056	B.C.S	M	subadult	10.48	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	27.90421	-114.27457	Beached
02-abr-20	LOL-057	B.C.S	M	adult	12.04	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	27.94268	-114.26137	Beached
02-abr-20	LOL-058	B.C.S	M	calf	3.68	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	27.96681	-114.23788	Beached
02-abr-20	LOL-059	B.C.S	Unk	calf	4.26	Advanced Decomposition	Isla Arena, Laguna Ojo de Liebre	28.02094	-114.18647	Beached
03-abr-20	LOL-061	B.C.S	Unk	yearling	8.52	Advanced Decomposition	Between Guerrero Negro y laguna Manuela	28.11666	-114.10625	Beached
03-abr-20	LOL-062	B.C.S	M	adult	11.71	Advanced Decomposition	Between Guerrero Negro y laguna Manuela	28.11752	-114.10950	Beached
03-abr-20	LOL-063	B.C.S	F	adult	12.59	Advanced Decomposition	Between Guerrero Negro y laguna Manuela	28.14059	-114.09891	Beached
03-abr-20	LOL-064	B.C.S	Unk	calf	6.58	Advanced Decomposition	Between Guerrero Negro y laguna Manuela	28.14245	-114.09772	Beached
03-abr-20	LOL-065	B.C.S	M	calf	3.95	Advanced Decomposition	Between Guerrero Negro y laguna Manuela	28.18054	-114.07484	Beached
03-abr-20	LOL-066	B.C.S	Unk	calf	4.26	Advanced Decomposition	Between Guerrero Negro y laguna Manuela	28.18479	-114.07291	Beached
03-abr-20	LOL-067	B.C.S	M	calf	5.2	Advanced Decomposition	Between Guerrero Negro y laguna Manuela	28.19683	-114.06823	Beached
03-abr-20	LOL-068	B.C.S	M	adult	12.22	Advanced	Between Guerrero Negro y laguna	28.19694	-114.06837	Beached

						Decomposition	Manuela			
03-abr-20	LOL-069	B.C.S	Unk	subadult	unknown	Advanced Decomposition	Between Guerrero Negro y laguna Manuela	28.21167	-114.06177	Beached
12-abr-20	ISL-002	B.C.S	M	subadult	unknown	Advanced Decomposition	Oeste de Isla San Lázaro, BCS	25.00666	-112.20861	Beached

Table 2. Total number of gray whales stranded in Mexico (2019 – 2020) separated by sex and age categories

Sex	Age Categories	length range (m)		Total number	Total number
		2019	2020	2019	2020
Female	yearling	7.9 - 8.8	7.47 - 8.63	18	7
Female	subadult	9 - 11	9.2 - 11.66	13	8
Female	adult	12 - 15	11.73 - 13.7	21	8
Male	calf	4.3	3.68 - 5.2	1	6
Male	yearling	8 - 8.7	7.52 - 8.9	7	4
Male	subadult	9 - 10.7	9 - 11	4	6
Male	adult	11.1 - 12.6	11.58 - 13.2	6	20
unknown	calf	4.4 m	4.26 - 6.58	1	7
unknown	yearling	8.3 m	8.1 - 8.52	1	7
unknown	subadult	9.2 - 10	9 - 11	4	12
unknown	adult	12.8 - 13.7	11.5	3	1
unknown	unknown	Unknown	unknown	2	1
Total				81	87