CALIFORNIA GRAY WHALE COALITION

PROTECTING THE MOST ANCIENT BALEEN WHALE ALIVE TODAY

CURRENT THREATS TO THE EASTERN NORTH PACIFIC GRAY WHALE

Compiled by Sue Arnold, Australians for Animals, Int., Byron Bay, Australia
and Tamara Drake, Australians for Animals, US, Ashland, OR
Co-Founders of the California Gray Whale Coalition

C.G.W.C

CALIFORNIA
GRAY WHALE
COALITION

CURRENT THREATS TO THE EASTERN NORTH PACIFIC GRAY WHALE

Compiled by Sue Arnold, Australians for Animals, Int., Byron Bay, Australia
and Tamara Drake, Australians for Animals, US, Ashland, OR
Co-Founders of the California Gray Whale Coalition

Background.

1.1 Each year, the Eastern North Pacific Gray Whale (*Eschrichtius robustus*) (ENPGW) migrates from its feeding grounds in the Arctic to the warm Mexican waters and Lagunas, a journey of 8,500 to 11,000 miles.

1.2 The migration route takes the whales past one of the most heavily industrialised coastlines in the world. Thus exposing the population to marine pollution, vessel traffic, industrial noise and activities associated with the development of the outer continental shelf resources, fishing entanglements, bottom trawling, industrial development, military and non military sonar across its entire range.

1.3 In 1970, the Federal government listed the ENPGW under the provisions of the Endangered Species Act as Endangered. At that time, the estimated population was approximately 12,000.

1.4 In 1994, the ENPGW was delisted when the population was estimated to be approximately 23,000.

1.5 Recent genetic research by Professor Stephen Palumbi, Stanford University suggests the original population numbered approximately 118,000.[1]

1.6 The current population estimate is difficult to ascertain. The last published estimate in 2001 put the population at 18,000 plus. At the International Whaling Commission meeting in Alaska in 2007, the US delegation said the ENPGW population was at 17,000.

1.7 A recent "field report" undertaken by NMFS in 2006/07 is available through the IWC website.[2]The report, which has not been published, suggests the population is at approximately the same numbers as 2000/1-(18,170).

1.8 However, the field report is inadequate as methodology and comprehensive evaluation of the status of the species is not addressed.

1.9 This field report appears to be a violation of the Marine Mammal Protection Act which states that: " *each stock assessment includes a description of the stock's geographic range, a minimum population estimate, current population trends, current and maximum net productivity rates, optimum sustainable population levels and allowable removal levels, and estimates of human-caused mortality and serious injury through interactions with commercial fisheries and subsistence hunters*."[3]

1.10 As a result of the field report being tabled by the US delegation at the 2007 IWC meeting in Anchorage, the IWC Scientific Committee has not been provided with proper advice and quotas have been set in ignorance of the current serious situation.

1.11 The IWC Scientific Committee bases its quotas on the PBR, the Potential Biological Removal level of a population. The PBR is defined as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its OSP (optimum sustainable population level.)

1.12 However, the PBR is only as good as the population estimates used in its calculations.

1.13 An indication of the concern held by the California Gray Whale Coalition in regard to the status of the population can be gleaned from our analysis of the population estimates since from 1967/68 until 87/88 when they were consistently undertaken by Buckland et al.[4]

---

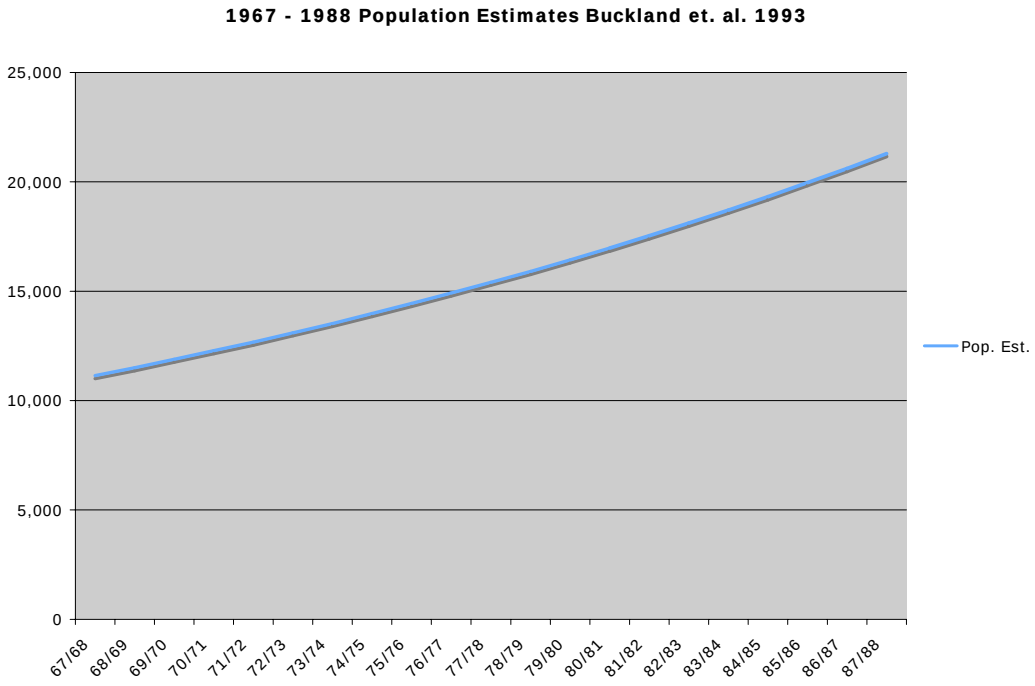
[1] S. Elizabeth Alter, Eric Rynes, and Stephen R. Palumbi (2007). DNA evidence for historic population size and past ecosystem impacts of gray whales. PNAS Online Early Edition for the week of September 10-14, 2007.

[2] Sc/59/BRG1 Field report of the 2006/7 census of the Eastern North Pacific Stock of gray whales. David Rugh, Marcia Muto et al.

[3] Section 117 of the MMPA (16 U.S.C.1361-1407).

[4] Buckland et al Marine Mammal Science Volume 9. No 3 1993

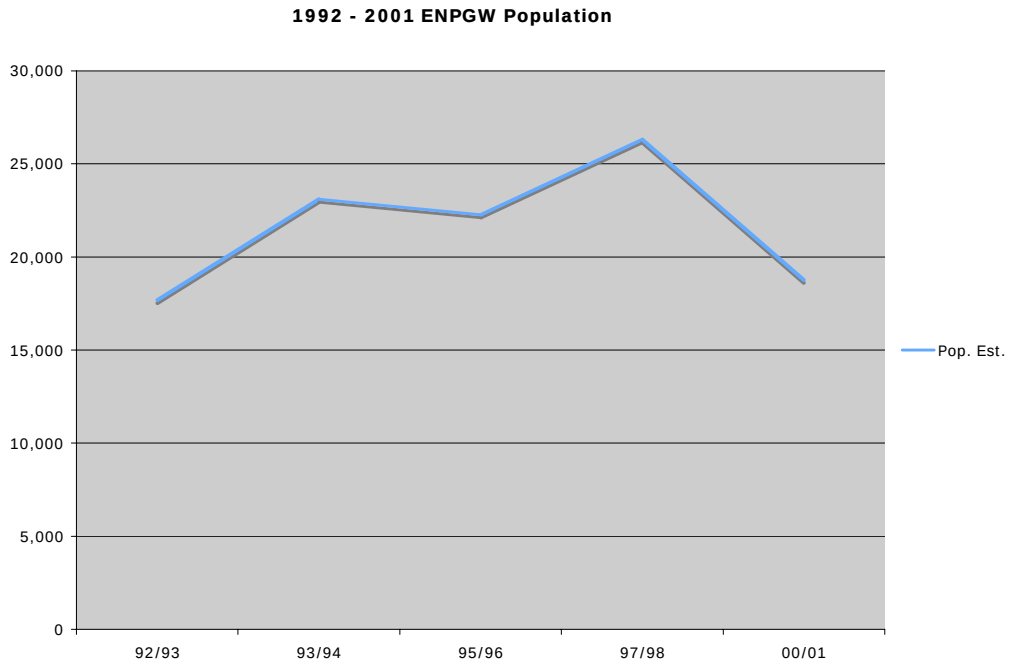
1.14 The annual percentage increase over that period was estimated at 3.2% each year except for a 3.3% increase in 77/78. These figures are in line with projected increases for baleen whales.



1.15 However, once the delisting took place in 1994, the methodology changed and NMFS reported the following increases and decreases.

92/93 - 93/94 - 30.75% increase
94/95 - 95/96 - 3.66% decrease
95/96 - 97/98 - 18.13% increase
97/98 - 00/01 - 22.68% decrease
00/01- 02 - 6.72% decrease

(Illustrated in the chart below)

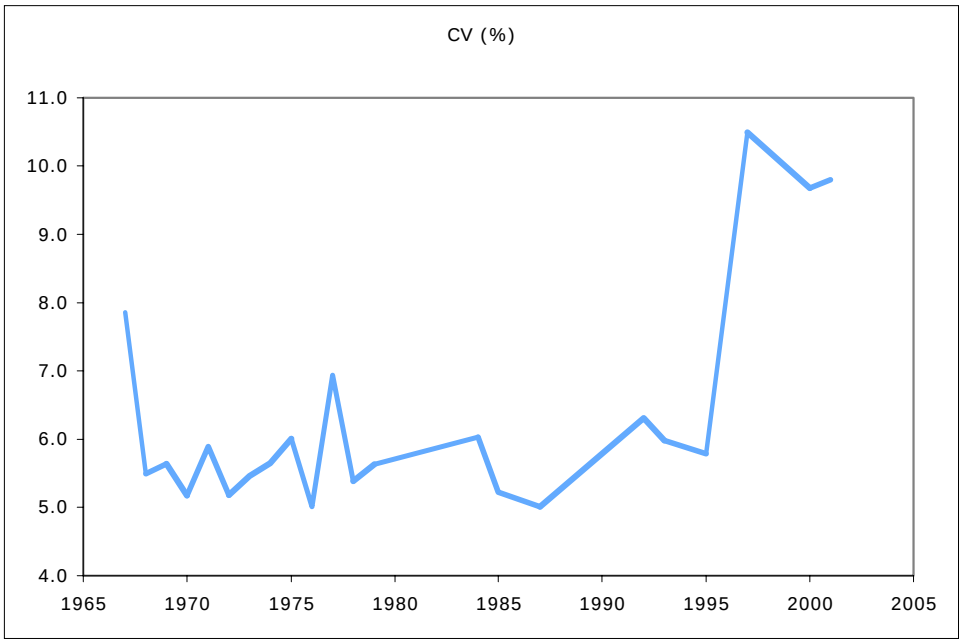


1.16 These increases are biologically impossible and highlight the growing concern over the methodologies used by NMFS and the substantial uncertainties in these NMFS estimates.

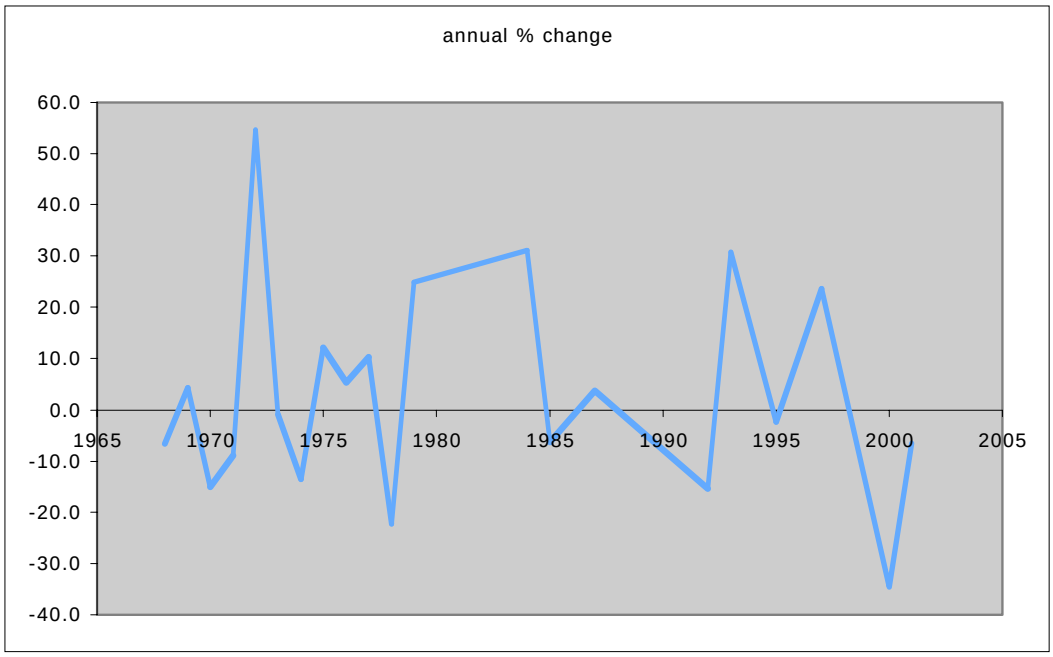
1.17 The uncertainties of NMFS calculations can be further illustrated by the following graphs:

Co-efficient variation (CV) is a measure of the uncertainty of the estimate.

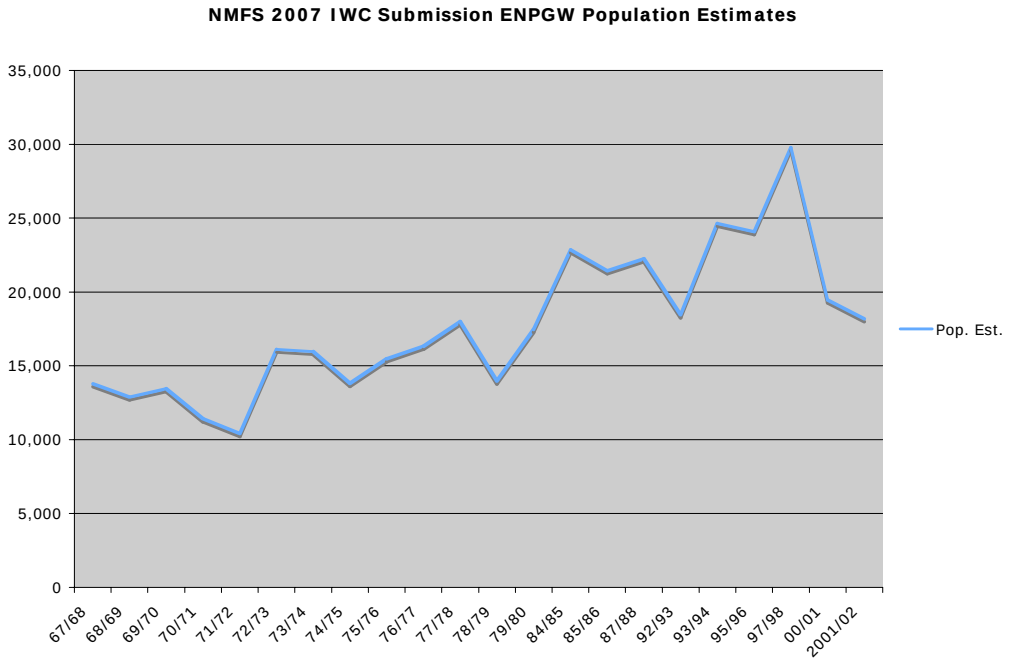
CV change from mid-1990's onward as analytical approach changed



Annual % change from mid-1990's onward as analytical approach changed



1.18 As a further example of the confusion created by NMFS changes in methodology, we chart the " corrected abundances" as outlined in the 2006/7 field report presented to the IWC Scientific Committee at the Anchorage meeting as compared with the abundances charted by Buckland et al from l967/1988.



1.19 An IWC report states " Abundance and trend estimates from shore based censuses led to an estimated annual increase of 2.5% (S.E.=0.4%) "[5]

1.20 The true status of the population is unclear. Canadian researchers suggest the population may be as low as 15,000 [6]

1.21 What is clear is that the numbers have remained low since the major population crash in 1999-2000 and that relevant population indicators since 2001 warrant relisting at least as Threatened.

1.22 Based on the first status review of the ENPGW, NMFS concluded that although no longer in danger of extinction, because of limited calving grounds and coastal habitat which is being subjected to increasing development, the ENPGW stock should not be delisted but should be upgraded to threatened status.[7]

2.0 **RESIDENT WHALES**

2.1 Resident whale populations are found in Oregon, Washington and California.

2.2 It is essential that these discrete populations and their habitats are given the highest protection by both by Federal and State legislatures to ensure the survival of the species.

2.3 It should be noted that the Washington State resident population is at some risk because of the ongoing efforts of the Makah tribe to seek a waiver under the MMPA.

2.4 Studies of mysids and other secondary prey availability in the resident habitats and the protection of these prey is critical in terms of survival parameters.

THREATS TO THE GRAY WHALES

- Climate change.
- Oil and gas exploration and leases in Bering and Chukchi Sea feeding grounds.[8]
- Noise from seismic operations
- Military and non military sonar
- 13 Liquefied Natural Gas terminals planned along migration route.
- Bottom trawling
- Pollution causing increased numbers of "stinky whales".[9]

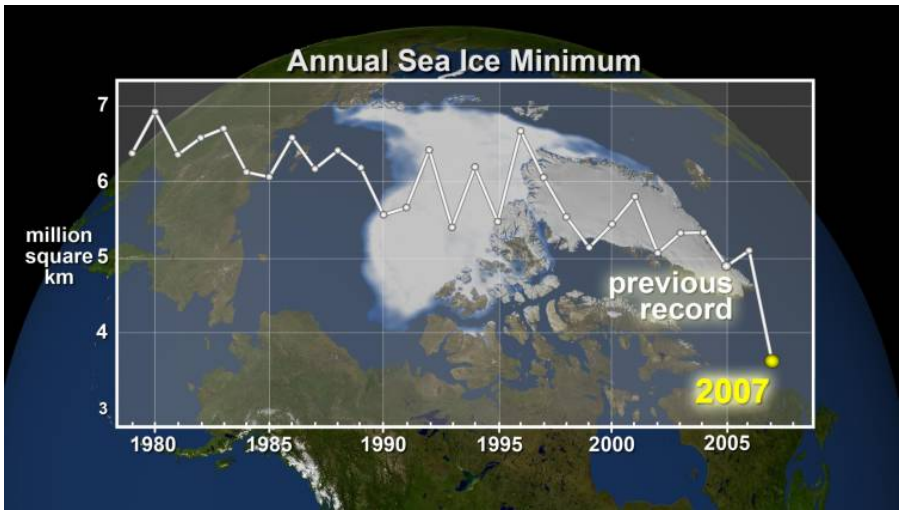
---

[5] IWC Chairman's Report of 46th Annual Meeting, 1994
[6] pers.comm.Dr William Megill
[7] 49 FR 44774 November 9, 1984
[8] Minerals Management Service map of current and proposed leases
http://www.mms.gov/ld/Offshore_Cadastre/Alaska/pdf/akindex.pdf

- Wave Energy projects
- Orca Predation causing mortality rates of up to 30% in some years.[10]
- Lack of substitute prey. ENPGW are specialist feeders, their principal prey (Amphipod macrocephela) requires very cold water to survive.
- Changes in oxygen and nutrient levels in the water column.
- Lack of regular and reliable population monitoring.
- Collapsing calf count as evidenced in 2007 when the lowest mid calf count in 30 years in 2007 was recorded.
- IWC quota of 140 ENPGW per year which is, based on current population analysis, unsustainable.
- The Makah tribe are seeking a waiver under the MMPA to allow the tribe to kill more ENPGW.
- ENPGW is the target species for an Aboriginal Revised Management Scheme being developed by the IWC.
- Failure to provide adequate monitoring programs since delisting.
- Workshops focussed on critical ENPGW survival issues recommended by IWC Scientific Committee and US Marine Mammal Commission have not been funded or supported by NMFS.

3.0 **CLIMATE CHANGE.**

3.1 The latest report by the U.N. Intergovernmental Panel on Climate Change says the Arctic ice cap is warming faster than the rest of the planet and ice is receding, partly due to greenhouse gases.



[9] Organchlorine contaminant concentrations and lipid profiles in eastern North Pacific gray whales (Eschrichtius robustus). J.Cetacean Res. Manage.3(1): 19-29, 2001
Chemical contaminants in Gray Whales (Eschrictius robustus) stranded in Alaska, Washington and California USA. 1993

[10] Pers.comm Nancy Black, researcher Monterey. Pers comm.. Lance Barrett-Lennard

3.2 A new report by the National Research council on the Bering Sea concludes that during the past 50 years, natural changes in ocean environments have combined with the effects of human harvest on whales, other marine mammals and fish to cause a cascading and possibly irreversible sequence of changes in the Bering Sea ecosystem.

3.3 The Program for the Protection of the Arctic Environment (PAME) Working Group found there are 17 Large Marine Ecosystems in the Arctic including the Bering and Chukchi Seas. The five principle causes of LME degradation include:

- Fishing
- Pollution
- Mechanical Habitat destruction
- Introductions
- Climate change.

3.4 According to PAME, the East Bering LME has switched from a long term (170 year) stable cold Arctic ecosystem to sub-Arctic ecosystem after 1976. Arctic LME's are all dynamic systems under great stress due to melting of the sea ice.[11]

3.5 Increased seawater temperatures and diminished ice due to human-induced climate change are two factors creating major problems for ENPGW as well as many other marine mammals.

3.6 Increased vessel traffic as a result of less ice coverage and the associated problems of alien organisms and oil spills could all impact the marine ecosystem on which the ENPGW depends.

4.0 **OIL AND GAS EXPLORATION**

4.1 The US Geological Survey estimates the Arctic has as much as 25 per cent of the world's undiscovered oil and gas. Russia reportedly sees the potential of minerals in its slice of the Arctic sector approaching $2 trillion.

4.2 The Federal Government has recently sold 29.4 million acres in the Chukchi Sea for oil lease sales.[12] Within this lease sale is critical feeding habitat for the ENPGW.

4.3 According to the Minerals Management Service Environmental Impact Statement there is a 33 to 50 per cent chance of a 1000-barrel spill in the area. The estimated probability of an oil spill of greater than 10,000 barrels within the range of the ENPGW, for example, is 14% in southern California, 21-27% in the Bering Sea, 18-34% in the Gulf of Alaska, and 96% in the Chukchi Sea assuming commercially productive amounts of hydrocarbon are found in those areas (NMFS 1993). Similarly, the probability of one or more

[11] PAME Working Group meeting Report No: 11-2006 August 29-30 Murmansk, Russia.
[12] http://www.mms.gov/ld/Offshore_Cadastre/Alaska/pdf/akindex.pdf

pipeline or platform spills of 1000 bbl and greater, and 10,000 bbl and greater in the Chukchi Sea as 92 and 57 percent, respectively (NMFS 1993). Furthermore, because Chukchi Sea oil will be transported by tanker, MMS (1992) predicts a 93 and 81 percent probability of one or more tanker spills of 1,000 bbl or greater and one or more tanker spills of 10,000 bbls or greater, respectively occurring outside of the Chukchi Sea. MMS (1992) also predicts additional tanker and oil spills along the western coast of North America.

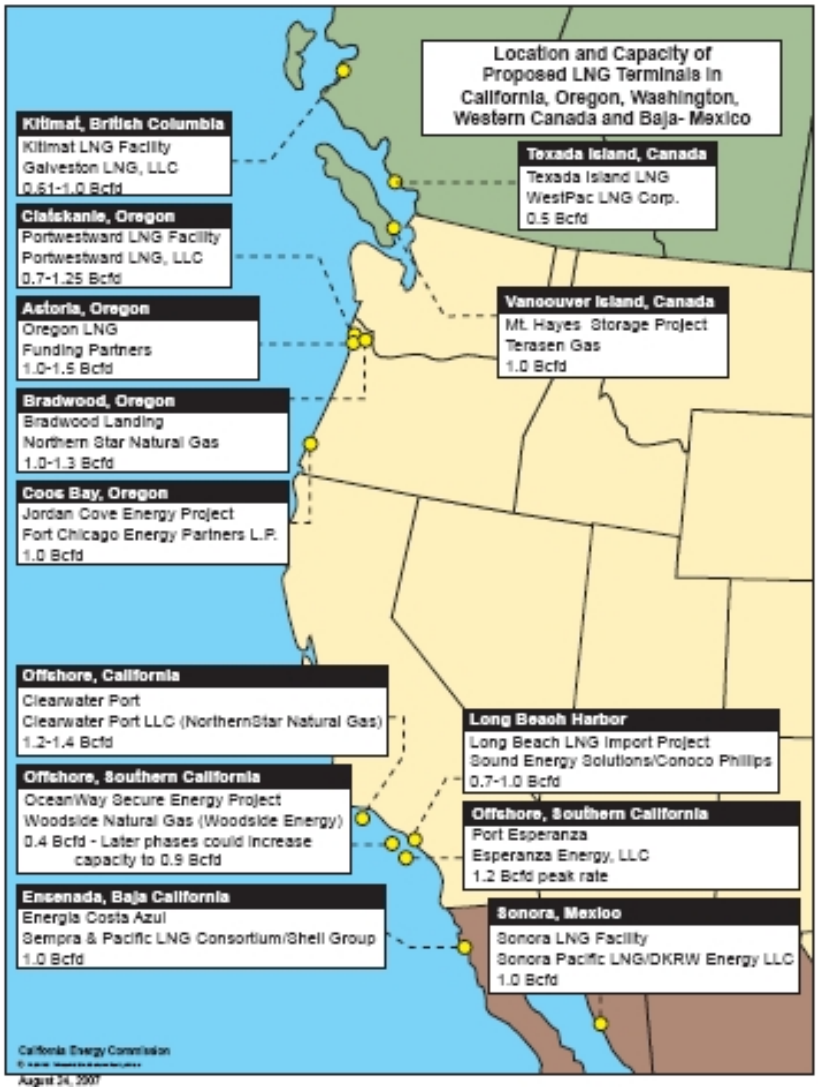
4.4 An oil spill, regardless of its cause or the probability of such an accident, could adversely impact ENPGW and ENPGW habitat. While the impacts of such a spill are undoubtedly higher on the feeding and calving/breeding grounds, migrating whales may also be subject to the adverse effects of an oil spill. Such effects may:

1) Kill or debilitate marine mammals by matting and reducing the insulating quality of fur, by acute or chronic poisoning due to inhalation or ingestion of toxic compounds or ingestion of contaminated food, by irritation of skin, eyes, or mucous membranes, or by fouling of the feeding apparatus of baleen whales;
2) Kill, debilitate, or otherwise reduce the abundance or productivity (availability) of important marine mammal prey species and/or species lower in the marine food web, and cause acute or chronic nutritional deficiencies including starvation;
3) Stress animals making them more vulnerable to disease, parasitism, and/or predation;
4) Interfere with formation of mother/young bonds and cause mothers to abandon their young;

5) Cause animals to abandon or avoid contaminated breeding areas, feeding areas, etc. and/or to concentrate in unaffected areas;
6) Attract animals to debilitated prey making them more vulnerable to contact with harmful compounds and oil and ingestion of contaminated prey (Swartz and Hofman 1991; Albert 1981; Geraci and St. Aubin 1990).

4.5 Oil spills result in high mortality in benthic amphipods on which the ENPGW relies for its primary prey.

5.0 **THIRTEEN PROPOSED LIQUID NATURAL GAS TERMINALS PROPOSED ALONG MIGRATION ROUTE** encompassing California, Oregon, Washington, Western Canada and Baja-Mexico.[13]



5.1 The construction of these terminals would cause underwater noise and the operation of the terminals would exceed current ambient noise levels. Noise can disrupt migration and other important behaviours.

[13] http://68.178.210.134/pdf/WESTCOASTLNG.pdf

5.2 LNG tanker traffic poses a significant threat of collisions or ship-strikes to whales.

5.3 In the event of an LNG spill, exposed marine life could suffer harmful or fatal freezing, asphyxiation from evaporating methane, or burns from high intensity fires – even at a significant distance.

6.0 **NOISE AND GRAY WHALES**.

6.1 Two lawsuits filed in the early 2000's against the Secretary of Commerce by Australians for Animal Int. over noise experiments focussed on heavily pregnant ENPGW and their newborn young demonstrated extreme sensitivity of ENPGW to low, mid and hi frequency noise.[14] [15] Some of the problems caused by noise include disrupting communication between mother and calf; forcing whales to change their migration route and possible temporary or permanent threshold hearing loss.

6.2 **NOISE IMPACTS:**

6.3 Noise associated with industrial development, including oil and gas exploration, and other activities may adversely impact ENPGW by: 1) interfering with or disrupting communications, feeding, breeding, or other vital functions; 2) causing animals to avoid or abandon important feeding area, breeding areas, resting areas, or migratory routes; 3) causing animals to use marginal habitat or to concentrate in undisturbed areas which in turn may result in crowding, over-exploited food resources, increased mortality, and decreased reproduction; 4) stress animals and make them more vulnerable to parasites, disease, and/or predation; and 5) attract animals making them more vulnerable to oil spills, hunting, or harassment (Swartz and Hofman 1991).

6.4 Avoidance behaviour has been reported for ENPGW in response to decibels greater that 120dB for continuous noise and 160-170 dB for pulsed sounds (Tyack 1988). In experiments using the underwater playback of sounds from a Bell 212 turbine helicopter projected at random intervals of 10 seconds to 2 minutes, Malme et al. (1983, 1984) reported significant course changes in apparent avoidance of the sounds. Malme et al. (1984) found a 50 percent probability of an avoidance response of 2.5 km off central California for a seismic airgun array, 1.1 km for a drillship, and 400 m for a single airgun.

6.5 Reactions to noise by ENPGW were more pronounced on their breeding/calving grounds. These impacts included whales vacating the study area during the projection of industry noises (Jones et al. 1991) and changes in the acoustical and observed surface behaviour and distribution (Dahlheim 1988). In response to vessels and to playbacks of vessel noise, Dahlheim (1988) found that ENPGW: 1) increased calling rates; 2) received an increase level of sound; 3) increased the frequency modulation, number of pulses per

---

[14] Australians for Animals v. Evans, 301 F. Supp. 2nd 1114 (N.D. Calif. 2004).

[15] Order Granting Permanent Injunction, Hawaii County Green Party, et al. v. Evans, et al., No. C-03-0078-SC (N.D. Cal.)

series, and repetition rates; and 4) changed their movements both away from and toward the sound source. In response to the playback of oil drilling noise, calling rates were reduced, direct movements away from the sound source were documented, milling rates decreased, and major changes in distribution and a decrease in local whale abundance were documented (Dahlheim 1988, 1988a; 58 FR 3129). In his study of the impact of noise on ENPGW in the San Ignacio Lagoon in 1983 and 1984, Jones et al. (1994) concluded that ENPGW left the lagoons, at least temporarily, in response to underwater playback of noises from boats, industrial activities, and other sources." Such results caused the MMC to suggest that "noise associated with coastal development and related activities could cause whales to avoid and, if exposure to the noise is prolonged, to abandon areas that may be essential to calving, nursing, and breeding (MMC 1994).

6.6 On its feeding grounds, Malme et al. (1986) estimated that there was a 50 percent probability of ENPGW avoidance when the average pulse level of the received noise was approximately 173 dB and a 10 percent probability of avoidance at 163 dB. Noise impacts on the ENPGW feeding grounds may temporarily cause the animals to abandon productive feeding areas if excessively disturbed (NMFS 1993). Because such exploration activities occur from June to September when ENPGW are on their feeding grounds, the adverse impact of such disturbance could force whales to use less-productive areas potentially affecting their body condition and ability to successfully migrate and reproduce.

6.7 Because noise from oil and gas activities occurs at frequencies that overlap ENPGW calling frequencies, however, it may influence other behaviour causing interference with socialization, reproductive behaviour, and communication (NMFS 1993).

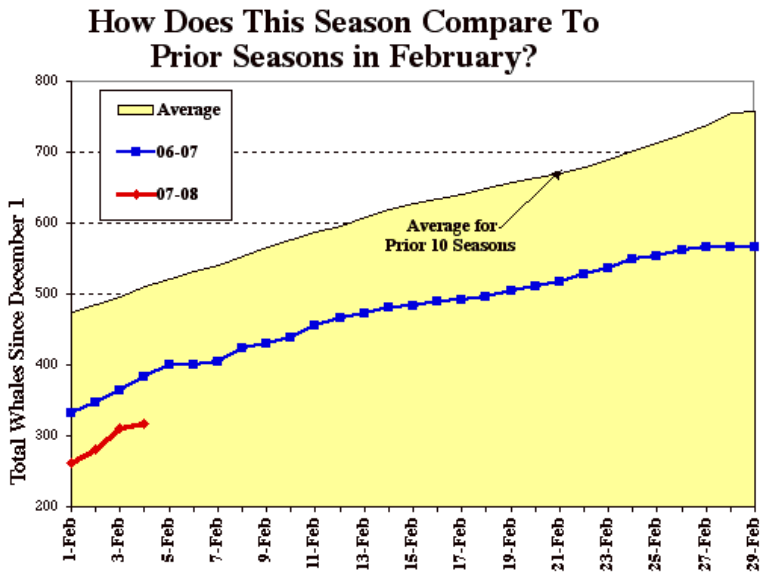
7.0 POPULATION DYNAMICS AND CONCERNS.

7.1 With no reliable population estimate since 2001, the demographics, status and trends of the ENPGW remain unclear. Although NMFS carried out a "field report" in 2006/07 which was submitted to the International Whaling Commission meeting in Anchorage in 2007, the study is inadequate and cannot be compared with previous population estimates due to changing methodologies.

7.2 The calf count in 2007 was the lowest mid point count in 30 years according to Mexican and US scientists.

7.3 The annual count of northbound whales by the American Cetacean Society demonstrates the current situation.[16]

[16] http://www.learner.org/jnorth/images/graphics/gwhale/ACSLA_020408.gif



7.4 A joint research and education project of UCSB's coal oil point reserve, Goleta, American Cetacean Society – Channel Islands, Cascadia Research Collective-WA, Marine Physical Laboratory, Scripps Institution of Oceanography, UCSD, La Jolla cites:

" In 2007 we observed a troubling, estimated drop-off of 46.8% in calves from the previous year, 2006. A similar percentage was reported from other primary, survey stations along the migration route. The confirmation has alerted scientists who are investigating climate changes and access to prey in the primary feeding regions off Alaska. Observed stress on the population points up the importance of consistent monitoring and close collaboration between survey sites. [17]"

8.0 CURRENT SITUATION IN MEXICO

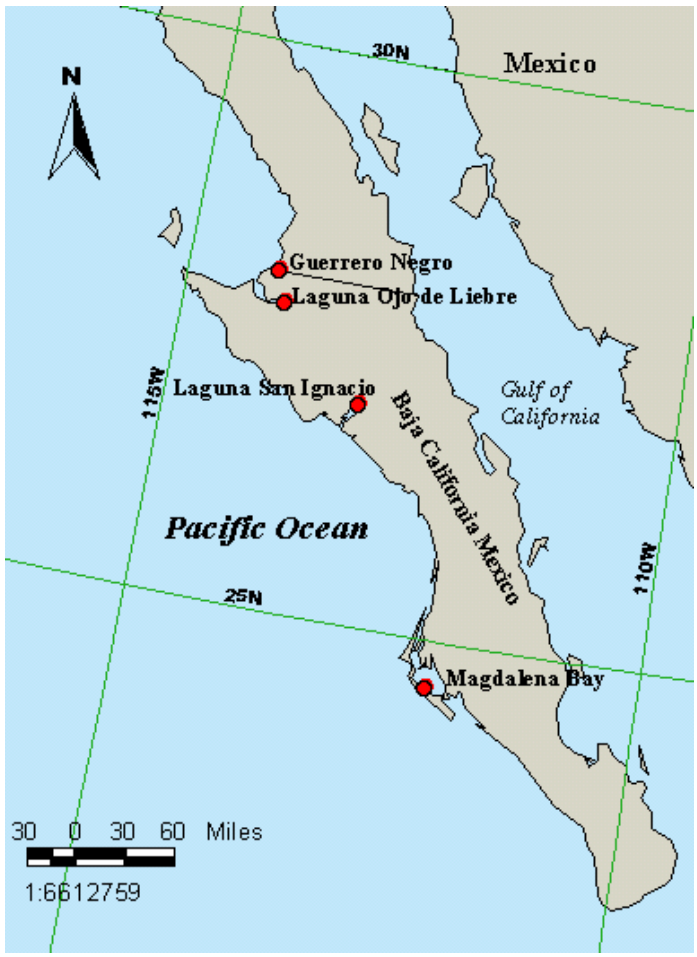
8.1 Steven Swartz, a scientist who has researched the ENPGW in Mexico for many years reported in February 2008 that the reproduction rate of the whales has decreased from one calf every 2.4 years to one every 3 - 4 years which would have a significant effect on recovery of the ENPGW.

Notes of recent discussion with Swartz follow:

- 12% skinny whales in 2007
- 2007 - lowest calf count in 30 years
- Calf production dropped from one calf every 2.4 years to one every 3-4 years
- Water temperature 2 degrees cooler in lagoon
- Experts postulate that the cooler temperature is keeping whales out of lagoons. Whales are being seen coming up the Sea of Cortes, Acapulco, Loreto, Cabo, and other places where not usually seen

[17] http://www.acschannelislands.org/2008ProjectDescrp.pdf

- Big drop in lagoon numbers. Usually 2000 in Guerrero Negro, so far around 600. Usually 300 in San Ignacio -so far, around 120.
- Whales spending more time underwater
- Calves smaller
- Not much mating
- Few juveniles
- Fishermen see whales trying to feed on lagoon bottom, may be sucking up some slugs and shrimp
- Everyone spoke of food shortages causing problems for whales



9.0 RECOMMENDATIONS BY IWC AND MARINE MAMMAL COMMISSION

9.1 Of concern is the failure of the Federal government to pursue recommendations by the IWC Scientific Committee and the Marine Mammal Commission to undertake further studies and monitoring programs.

9.2 IWC Scientific Committee made the following recommendations in 2002:

" *The Scientific Committee recommends additional research to investigate the observed changes and differences in the counts of ENPGW, particularly ENPGW calves observed in the breeding lagoons and along their migration routes, and to better understand the factors that are influencing the productivity of this populations. It further recommends that the Commission co sponsors an intercessional workshop to bring together the most recent and historical data with which to examine process error in ENPGW abundance, including: mother/calf counts; pregnancy rates in catch data; and seasonal distribution at the end of the southbound census. This workshop should also review relative habitat information (e.g. prey base) for examination and analysis relevant to the dynamics of the population. If the workshop is held, the report should be available for the 2003 Committee meeting. "*
Page 38, SC-REPNE. DOC I7/5/02

9.3 The Marine Mammal Commission report in 2002 made the following recommendation:

…"*in 1999 and 2000 calf counts of gray whales migrating north from their calving grounds past Point Piedras Blancas, California declined sharply to the lowest levels on record. Between 1994 when the Service began annual counts and 1998 an average of nearly 375 calves was counted annually, with a maximum of 501 calves in 1997 and a low of 194 calves in 1995. In 1999 and 2000 the counts dropped to 141 and 96.*

As this information became available, the Commission wrote to the Service on 7th August, 2001 and again on 15th January 2002 recommending the Service develop a second five year research plan, complete a stranding response plan to better coordinate ENPGW stranding investigations; assess effects of 1999-2000 die-off on the population's status, and review planned research to ensure that information is adequate to assess the population's status and conservation needs.

On 5th March 2002 the Service responded to the Commission's letters. Based on information gathered since 1994 the Service continued to believe that the ENPGW population was neither threatened nor endangered and did not warrant protection under the Endangered Species Act. A second five-year monitoring program under the Act's post-listing provisions, therefore was not required."

9.4 It should be noted that the ENPGW is targeted as the only relevant species for an Aboriginal Revised Management Scheme under the IWC.

SOLUTIONS.

- **An urgent comprehensive review of the conservation status and population trends of the ENPGW which includes all parameters relevant to the survival of the species.**

- **Protection of the habitat of resident whales in Oregon, Washington, California.**
- **Relisting the ENPGW under the ESA.**
- **Investigation of the status of secondary prey including mysids, crustaceans and other organisms.**
- **Evaluating the economic worth of the ENPGW to the tourist industry in the US, Mexico, Canada and Alaska.**

March 1, 2008

ACRONYMS AND ABBREVIATED TERMS

bbl	Barrel
CV	Co-efficient variation
DB	Decibels
ENPGW	Eastern North Pacific Gray Whale
IWC	International Whaling Commission
LME	Large Marine Ecosystems
LNG	Liquefied Natural Gas Terminals
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
NMFS	National Marine & Fisheries Service
OSP	Optimum Sustainable Population level
PBR	Potential Biological Removal Level
UCSB	University of California Santa Barbara