

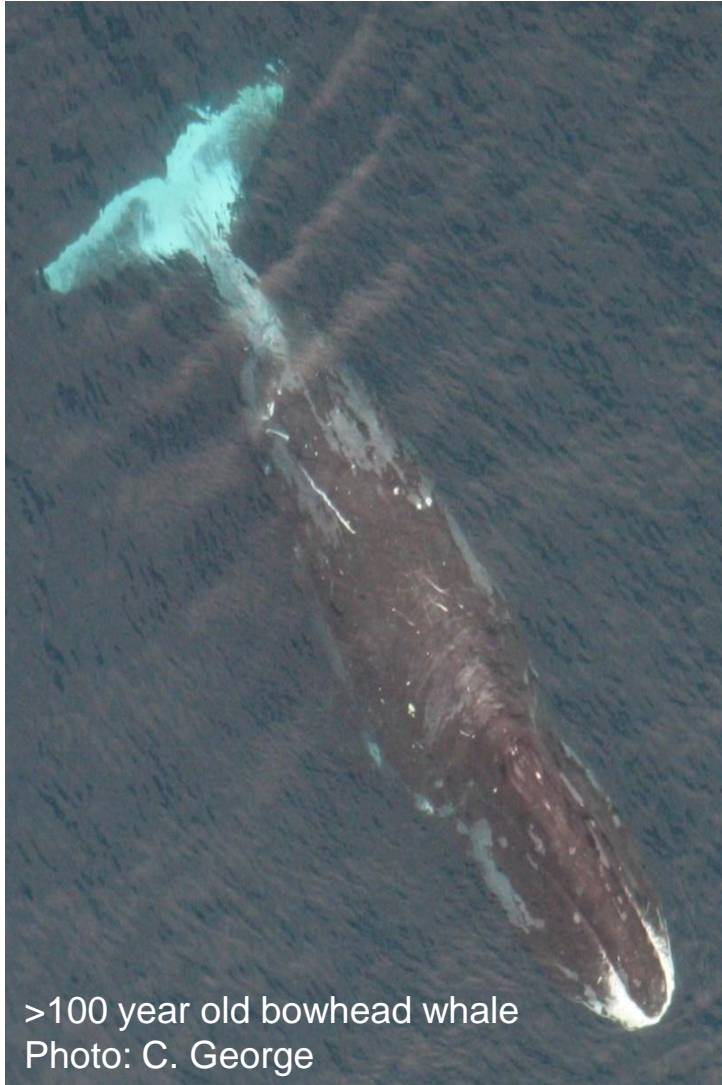
Marine Mammals in the 'New Normal' Arctic

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NOAA/Fisheries
Office of Science & Technology



Marine Mammal Commission – Annual Meeting
6 May 2014

Outline

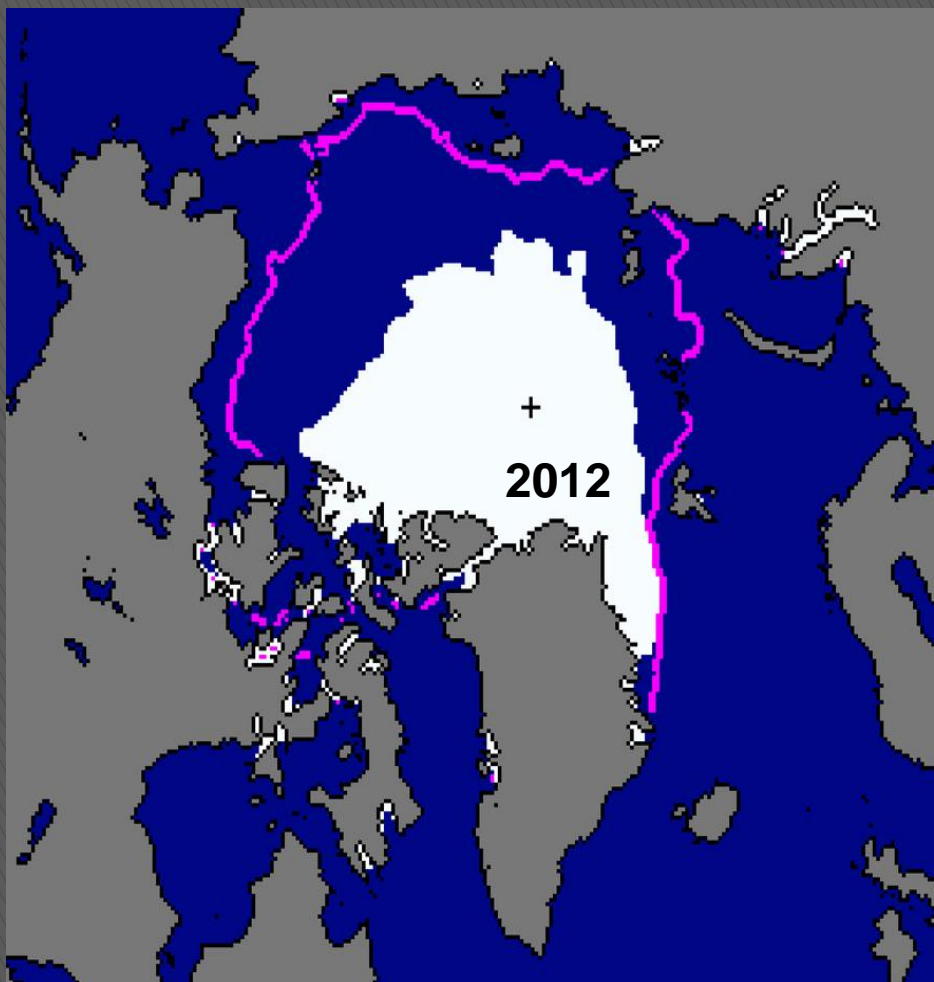


>100 year old bowhead whale
Photo: C. George

- The **‘New Normal’** Arctic Ocean
Sea Ice, Storms & Productivity
- Marine Mammals in the **‘New Normal’**
Pacific Arctic: Losers & Winners
- IWC Workshop: Anthropogenic Impacts
on Cetaceans in the Arctic

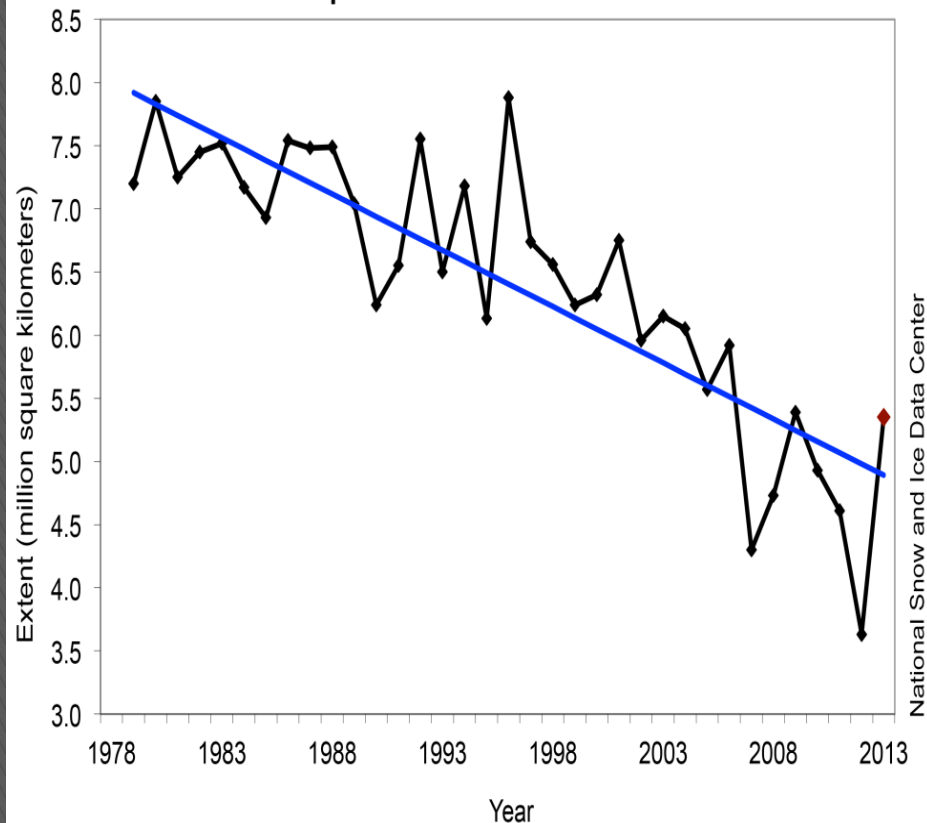


SEPTEMBER 2012 = New Sea Ice Minimum 50 % Reduction in Surface Area



September median extent: 1981-2010

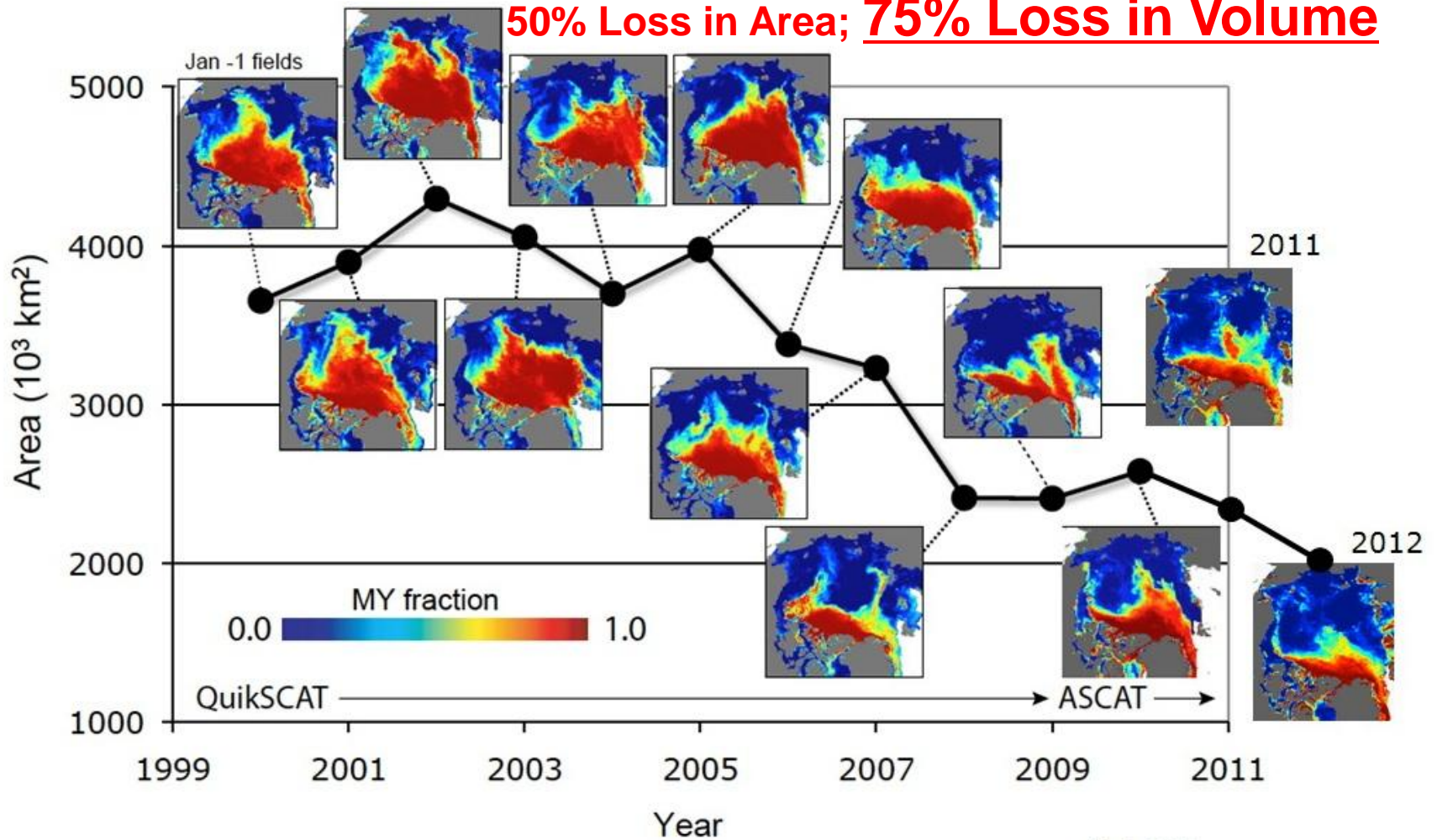
Average Monthly Arctic Sea Ice Extent September 1979 - 2013



September 2013: 6th lowest sea ice extent

Decline in Arctic Ocean Multiyear Sea Ice Coverage

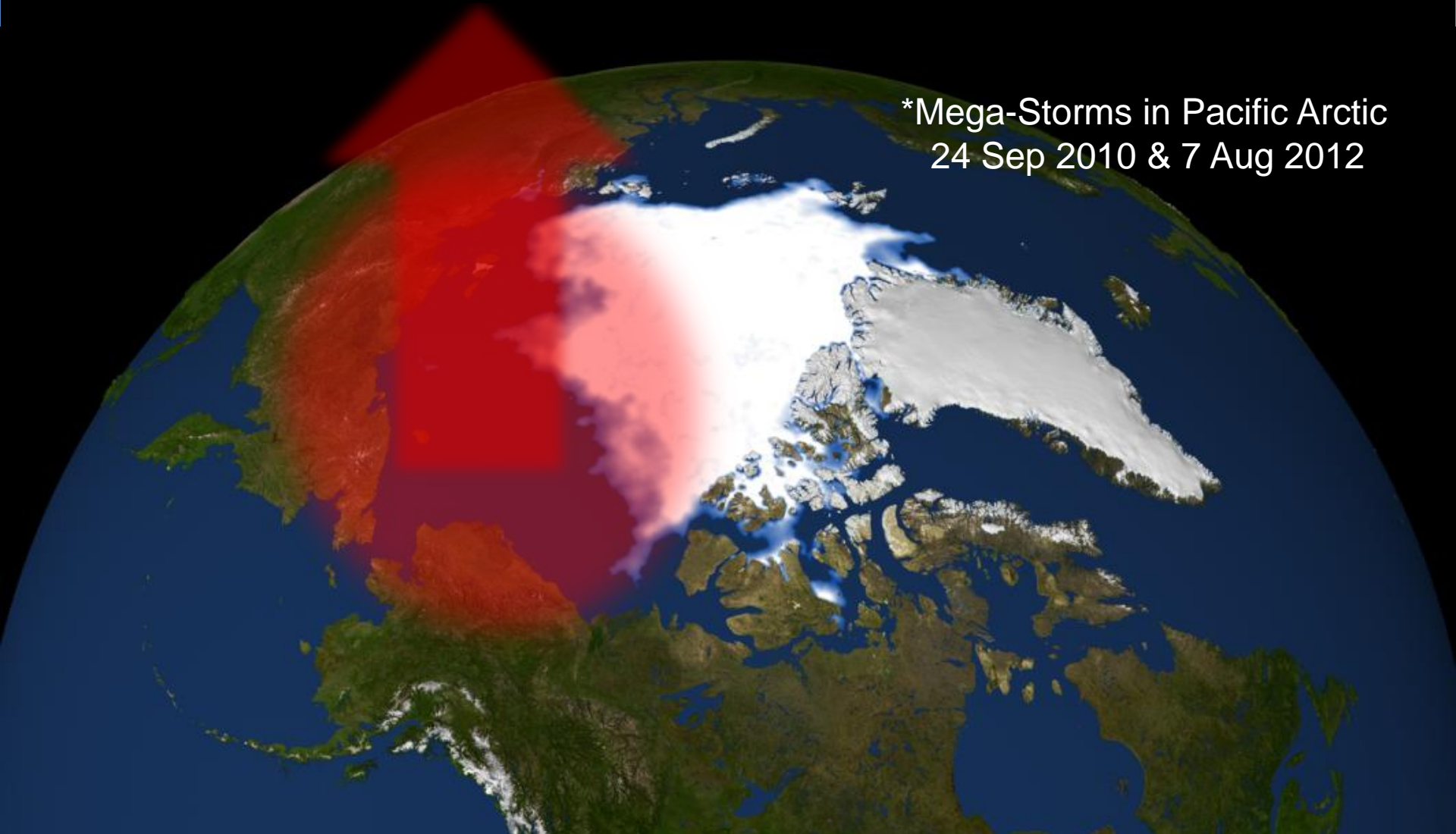
50% Loss in Area; 75% Loss in Volume



(Kwok, 2010)

Added Ocean Heat Storage and Heat Flux from New Sea Ice Free Areas = More Storms

*Mega-Storms in Pacific Arctic
24 Sep 2010 & 7 Aug 2012



'New Normal' Bio-Physics Headlines

SEA ICE

- Record Seasonal Retreats in 2007 & 2012
- Sea Ice Loss -50% by area; **75% by volume**
- Strong regional differences in seasonal Ice-free areas

HEAT & STORMS

- **Big Storms** in High Arctic – deep mixing & upwelling
- Bering Strait Inflow & Mackenzie Plume = **warm** & **fresh** Beaufort

PRIMARY PRODUCTION

- **Primary Production** up by an average 20%, to 135% regionally
- Massive under-ice phytoplankton blooms (Arrigo et al. 2012)
- Ice algal deposition to central Arctic basins (Boetius et al. 2012)

Marine Mammals in the 'New Normal'



Walrus, Ice Seals & Polar Bears **no longer** have sea ice platform for resting and hunting...



craig george



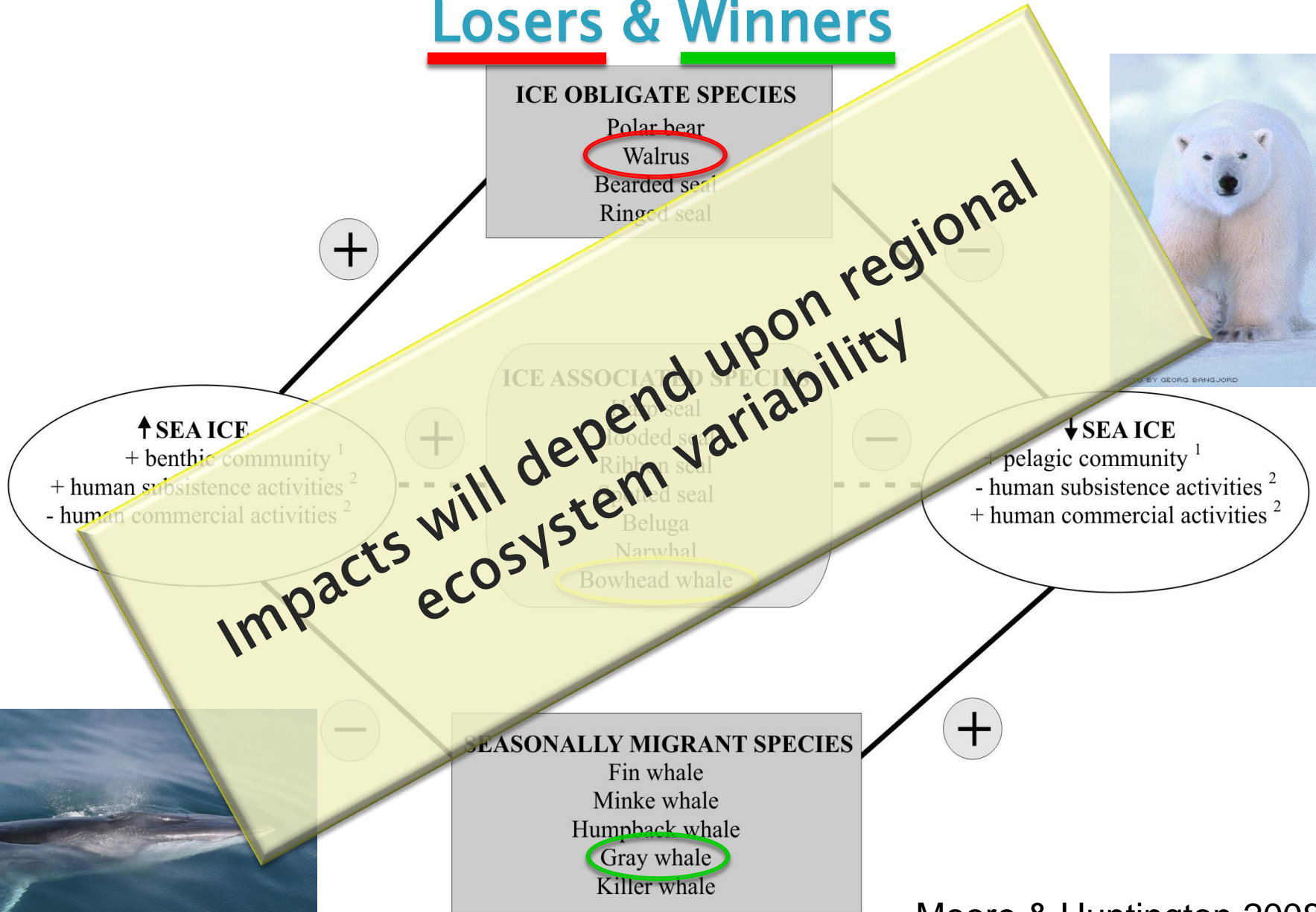
Photo: K. Stafford



...while **Whales** may be finding new feeding opportunities, suggested by shifts in seasonal distribution and relative abundance

Marine Mammal Ecology & Sea Ice

Losers & Winners



Arctic Marine Mammal Resilience Strategies



Ice Obligate

- Adapt to terrestrial haul outs
- Alter foraging strategies: central-place/prey



Ice Associated

- Adapt to novel prey & 'new' competition
- Alter phenology: migratory timing/movements

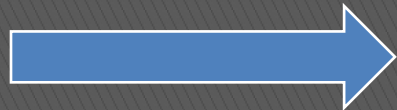


Seasonal Migrant

- Occupy northern habitats, provide 'new' competition
- Alter trophic dynamics: top-down vs. bottom-up



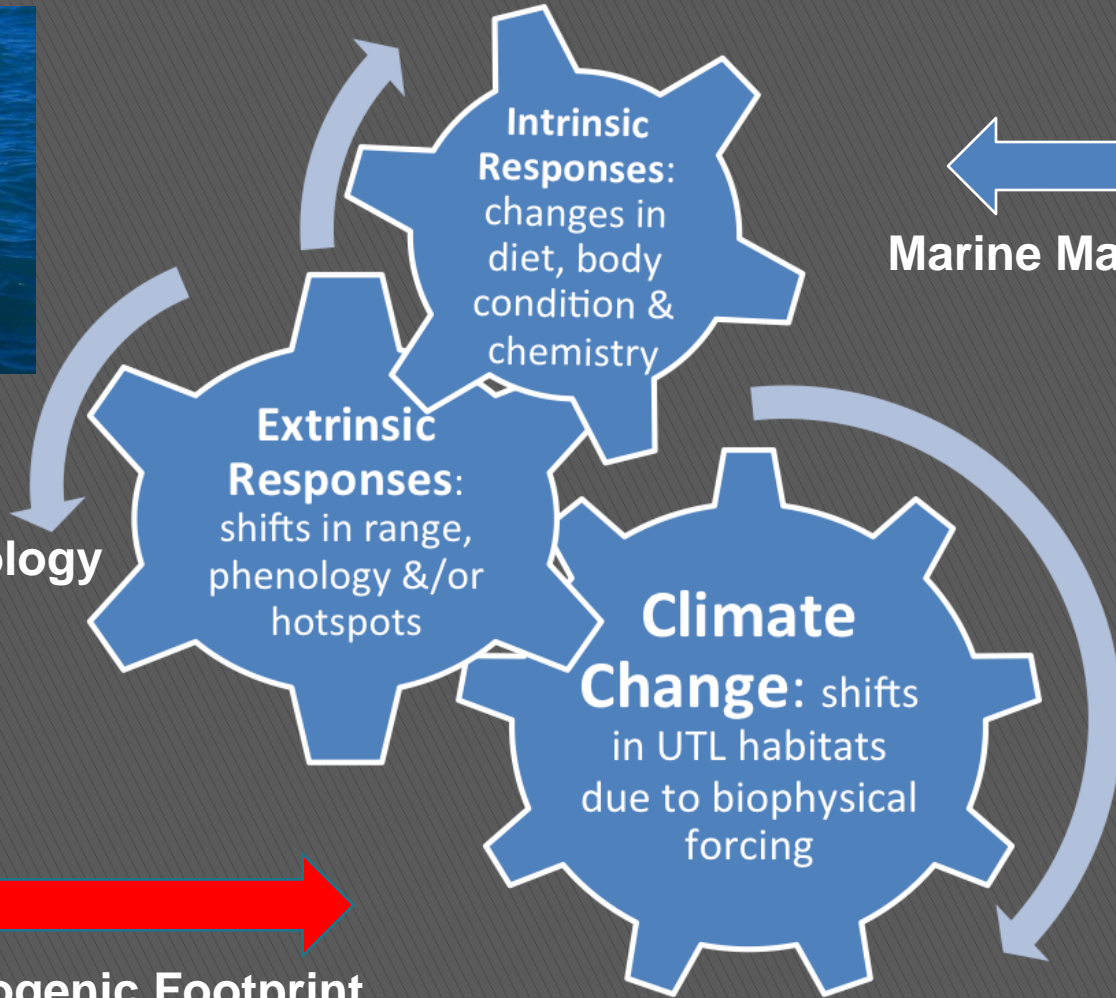
Marine Mammals as Ecosystem Sentinels



Marine Mammal Ecology



Anthropogenic Footprint

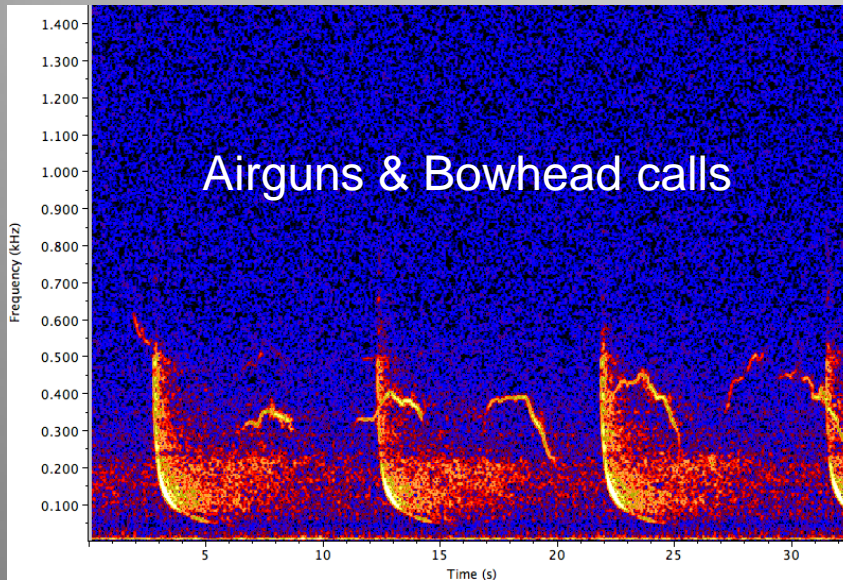


Marine Mammal Health

Challenges from Anthropogenic Footprint

Shipping, Tourism O&G Development

- > Ship Strikes
- > Increased Underwater Noise
- > Exposure to Contaminants
- > New Vectors for Disease





IWC Workshop: Anthropogenic Impacts to Cetaceans in the Arctic

Anchorage, Alaska: 6-7 March 2014

Stakeholder workshop: to identify concerns, knowledge gaps & collaborative opportunities

3 Panel Reviews: Shipping, Oil & Gas Activities, Indigenous Peoples Perspectives

2 Discussion Themes: Threats-Gaps-Collaboration
Monitoring-Mitigation-Collaboration

Overarching goal: improved international coordination of research & management of cetaceans in the Arctic

Marine Mammals Connect People to the Arctic Ocean Ecosystem...



Photo © Bill Hess

That connection can strengthen Science & Management responses to climate change