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Bering Sea Ecosystem Partnership

Marine regions of the Bering Sea shelf and slope

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The Bering Sea Project brings together over 100 scientists and 35 projects in field research and ecosystem modeling to link climate, physical oceanography, plankton, fishes, seabirds, marine mammals, humans, traditional knowledge and economics Its geographic extent spans the Eastern Bering Sea shelf and slope from the Alaska Peninsula to the limit of the U.S. Economic Exclusive Zone with Russia. To synthesize results of the program we set out to delineate regions that would provide a common spatial reference across the projects

Recognizing there is no single discipline for which there is data covering the entire geographical expanse of the program, we looked for a consensus among scientists based on oceanography, bathymetry, benthic fauna, fish, seabird and marine mammal distribution, as well as established survey strata and defined ecological domains (like that of the Pribilof Islands)

Underlying structure (Fig 1,2)
Inner shelf 0 - 50m
middle shelf 50 -100m
outer shelf 100 – 200m

Primary rationale
1 – historical high density catches/abundance (Fig. 3)
2 – 4:inner-middle-outer southeast shelf (Fig. 1,2)
5 – recirculation defines Pribilof domain (Fig. 4)
6 – 7 central inner and central middle shelf with upper limit based on cross-shelf flow (Fig. 2)
8 – outer north shelf (Fig 2)
9 – St. Matthews area (Fig. 2)
10–14 water masses, ice & benthic fauna characteristics (Fig 2,5,6)
15 Seabird density, 3500m isobath (Fig 7)
16– marine mammals/seabird & pollock egg/larvae distribution; west limit 172 W (Fig. 8,9)

Rather than strict bio-geographic domains (Fig 10), these regions represent a negotiated practical spatial division weighted by the spatial aggregation of biological data and/or large scale oceanographic characteristics (Figures 1-9 highlight selected references). We propose these regions as a summary of current knowledge of the general mesoscale structure of the Eastern Bering Sea shelf.

Fig.1 Inner/middle/outer shelf as defined by Coachman 1986, based on fronts, bathymetry & oceanography

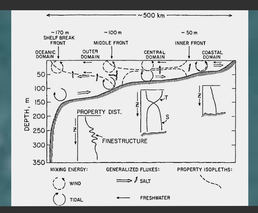


Fig.2 26-year (1979–2004) mean 0–220m circulation & total kinetic energy (Kinney et al. 2009)

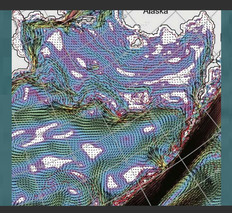


Fig.3 Mean total catches 2003-2007 all species all years AFSC Observer's database

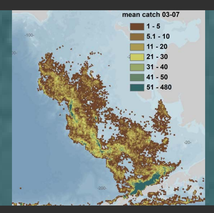


Fig.4 Recirculation around the islands defines the Pribilof domain (Stabeno et al. 2009)

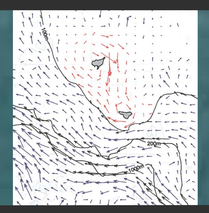


Fig.5 Benthic infauna biomass in the Northern Bering Sea (Grebmeier et al. 2006)

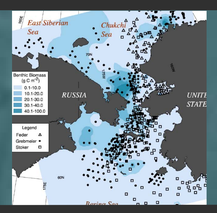


Fig.6 February 2001 sea ice concentration data US National Ice Center (Clement et al. 2005)

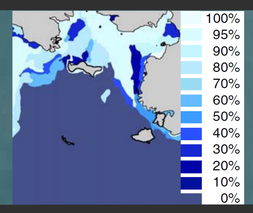


Fig.7 Total seabird density 2006-2008 USFWS/ NPPSD (courtesy Kathy Kuletz, USFWS)

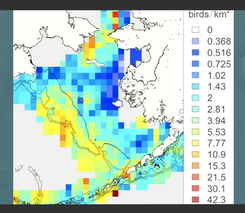


Fig.8 Pollock eggs & larvae historical density 1976-2006 (Bacheler et al. 2010)

Fig.9 Total marine mammals density 2006-2008 USFWS (Kathy Kuletz, USFWS)

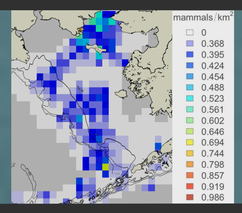
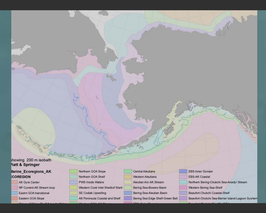


Fig.10 Marine ecoregions by Springer & Piatt (2007), lager scale defines 4 regions in the [U.S.] Bering shelf



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