Large Marine Ecosystems of northern North Pacific:
Comparative Assessments of Oceanography, Climate, Productivity and Fisheries Yields of the East Bering Sea, West Bering Sea, and Gulf of Alaska LMEs

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Revised Map of 18 Arctic LMEs (version 17 April 2013).
OBJECTID:4 LME#:2 LMENAME: Gulf of Alaska

Alaska

Canada

MAKE_MASK_LME.m; Author: Igor Belkin (URI); 04-Jul-2014 22:41:01
Long-Term Variability of Sea Surface Temperature
Annual SST in LME 2: GULF OF ALASKA

GOA

Regime Shift
1976-77

TREND: SST = 0.0011005 * Year + 7.1517
WARMING: 0.06°C since 1957
Regime Shift 1976-77

TREND: SST=0.0043044*Year-3.7274
WARMING: 0.24°C since 1957
Regime Shift
1976-77

Aleutian Islands

Annual SST in LME 65: ALEUTIAN ISLANDS

Temperature, °C

Year

TREND: SST=0.0072962*Year-8.5946
WARMING: 0.40°C since 1957
Regime Shift

Annual SST in LME 53: WEST BERING SEA

TREND: SST=0.0084742*Year-12.2585
WARMING: 0.47°C since 1957
Depth-Averaged Temp. at M2 (SE Bering Sea) ~4°C drop in 3 years
Fishing Yields
LANDINGS BY SPECIES: WEST BERING SEA

Sea Around Us Project 2011

Alaska Pollock

Catch (tonnes '000)


Alaska Pollock
Pacific saury
Pacific herring
Crustaceans
Flatfishes
Squids
Pink salmon
Chum salmon
Sockeye salmon
Japanese flying squid
Mixed group
LANDINGS BY FISHING COUNTRY: GULF OF ALASKA

Catch (tonnes '000)

- USA
- Japan
- Russia
- Korea (South)
- Canada

Year:
- 1950
- 1955
- 1960
- 1965
- 1970
- 1975
- 1980
- 1985
- 1990
- 1995
- 2000
- 2005

Sea Around Us Project 2011
LANDINGS BY FISHING COUNTRY: WEST BERING SEA

Graph showing the catch of fish by country, with peaks and troughs indicating changes over time. The countries highlighted are the USA, Russia, and China.
Chlorophyll-\(a\) and Primary Productivity (Jay O’Reilly)
Annual Catch
(Sea Around Us Project)
Conclusions

- Long-term variations of SST non-linear
- Recent cooling reminiscent of 1950-1970s
- Regime shift of 1976-77 in SST but not in catch data
- Drop in fisheries yields after 1989-90 might have been precipitated by the 1988-1989 regime shift, which has not transpired in SST.
- Primary productivity in GOA and EBS decreased when SST increased but rebounded during the recent cooling.
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THANK YOU!
Northern Bering-Chukchi Seas

Annual SST in LME 54: NORTHERN BERING - CHUKCHI SEAS

TREND: SST=0.011821*Year-23.3803

WARMING: 0.65°C since 1957