

Overview-2: Bering Sea Ecosystems

Contemporary Status and Tendencies in Dynamics of Bering Sea Macroecosystem

Vyacheslav P. Shuntov and Olga S. Temnykh*

Pacific Scientific Research Fisheries Centre (TINRO-Centre), 4 Shevchenko Alley, Vladivostok, 690950, Russia; E-mail, temnykh@tinro.ru

In the Bering Sea the transition from 20 towards 21 century was noted for 8-10 year cyclicality of climate-oceanological processes. Period of 2002-2006 can be regarded as warm, with transition to colder period starting from 2007. Biota response to cyclicality, mentioned above, was equivocal and multidirectional in relation to different hydrobionts in various locations of Bering Sea. Annual dynamics of plankton abundance in the Russian EEZ within the Bering Sea stayed within the range of interannual variability. Sharp decrease of macroplankton biomass in shelf zone of eastern Bering Sea during 2002-2006 was observed. Within Russian EEZ of Bering Sea maximum nekton productivity was observed in 1980-s, which is attributed to very high walleye pollock biomass. In early 1990-s major part of epipelagic layer experienced lowered nekton abundance both in the Bering Sea and in many other areas of North Pacific. During last 10 years gradual increase in nekton abundance was noted. This is related to increase in Pacific salmon, walleye pollock, and, possibly, other fish and squid species abundance. Benthic fish communities experienced similar tendencies. The 2000-s is the period of maximum abundance of Pacific salmon since the start of research of their marine life period. Within the Bering Sea and adjacent Pacific waters off Aleutian Islands their abundance over 2 mln. t. This very abundance did not result in negative effect upon their feeding intensity and environment due to high abundance (primarily within basin and shelf break zones) of major food components – macroplankton and small nekton. Due to adequate food supply, no sharp food competition and strong influence of density-dependence upon Pacific salmon abundance was observed. Generally, Bering Sea macroecosystem biota is characterized by the normal functional status. Evidently the warm period resulted in increase of Pacific salmon reproductive success within northern areas and pronounced northern migration trend (this was most evident for eastern Bering Sea). Undoubtedly, expansion of southern species into the Bering Sea is a result of its significant warm up in late summer (Pacific saury, Pacific pomfret). However, in 2000-s total abundance estimates of immature Pacific salmon (age .1 and older) have exhibited trend towards decrease. Critical analysis of current ideas on causes, that drive ecosystem changes, is provided. Insufficient understanding of these mechanisms is emphasized. In particular, no adequate explanation can be provided for some phenomena that took place in the eastern Bering Sea shelf zone (grey whales (*Eschrichtius robustus*) mass mortality in Alaskan waters, high abundance of coccolithophore (*Emiliana huxleyi*) in late 1990-s - early 2000-s in central and eastern shelf zone and multifold decrease in macroplankton biomass (despite of high biomass of small- and medium-sized fractions of zooplankton).