STATUS OF STURGEON FISH STOCKS IN SIBERIAN WATER BODIES

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This article contains description of catches and status of sturgeon and sterlet stocks in the Ob-Irtysh basin, Lake Baikal and the Lena River. The reasons behind decrease in the population level are made clear which are as follows: construction of hydro power plants, poorly regulated fishing and intensive poaching. Introduction of separate populations of sturgeon fish into the Red Books of endangered species proved to be an ineffective stock replacement measure. Proposals have been made to raise the level of artificial reproduction of sturgeon and to strengthen the respective conservation measures.

Keywords: Siberian sturgeon *Acipenser baerii*, sterlet *Acipenser ruthenus*, Ob and Lena Rivers, Novosibirsk Reservoir, Lake Baikal, stock status, catches, unregulated fishing.

A STRATEGY OF REPRODUCTION OF PACIFIC SALMON
IN THE SAKHALIN DISTRICT

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In the face of increasing anthropogenic pressures on salmon ecosystems of the Sakhalin region, artificial reproduction is the first that can maintain salmon stocks at the appropriate level, as well as increase their production. However, there is no any program of artificial reproduction of Pacific salmon in Sakhalin region and, virtually, no reliable and easily accessible database on the hatcheries and wild salmon populations. To create them it is required: evaluating the effectiveness of the existing hatcheries; identifying the management units of chum and pink salmon and other species and developing an online database on Pacific salmon stocks (including current catches in each fishing area, incubated eggs in each hatchery, escapements, bioanalyses, etc.); optimizing the species' and populations' composition of farmed salmon and the proportion of artificial and natural reproductions. To solve these problems it is required to: characterize all salmonid species in each river of the Sakhalin region; allocate each stock unit and prohibit the transfer of fertilized eggs; performe extensive identification of hatchery and wild Pacific salmon populations from Sakhalin region using otolith marking and DNA markers; assess the effectiveness of each hatchery in Sakhalin region, closing or restructure inefficient ones; demand strictly that the hatchery followed with all specified requirements for artificial reproduction; save river basins and maintain wild populations of Pacific salmon in the Sakhalin region.

PACIFIC CAPELIN: DISTRIBUTION, PECULIARITIES
OF BIOLOGY, BIOMASS DYNAMICS, PROBLEMS AND PERSPECTIVES
OF ITS FISHERIES
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Various aspects of biology of the Pacific capelin, such as seasonal distribution, spawning peculiarities and others which are important for fishery management, are considered in this paper. Differences in capelin interannual and long-term abundance dynamics are revealed in different habitat areas, and biomass estimates obtained in the last one-third of the 20th century are presented for all of the eastern seas of Russia. A history of the capelin fishery, including an experimental catch, is given beginning since the 1940s. The main reasons for the capelin low fishery intensity are stated as well as the possible outlooks of increase in its catches in the Far Eastern fishery basin in a new climatic period.

AGE COMPSITION OF THE MALE SNOW CRABS
IN THE TRAP CATCHES IN THE BARENTS SEA
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Age composition of the male snow crabs catches in 2016 was calculated by analysis of size frequencies distribution. Within the range of carapace width 60-160 mm 10 age cohorts with normal distribution of size classes and means 69, 75, 86, 94, 105, 114, 123, 142, 150 mm were distinguished. These data and their standard deviations were used for age-length key construction. The average increment of the carapace width per molt is about 12 mm. It is suggested that maximal longevity is about 22 years. The index connecting relation of chela height and carapace width logarithms is proposed for preliminary division of adolescent (small-clawed) and adult (large-clawed) males. When the index exceeds 1,27 the majority of males becomes large-clawed.

FISHERY AND BIOLOGICAL CHARACTERISTICS OF THE ZANDER POPULATION *SANDER LUCIOPERCA* DELTA OF RIVER VOLGA IN THE PRESENT PERIOD

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The article gives an assessment of the current state of the fishing of pike perch in the delta and the delta delta. Volga taking into account unaccounted seizures. A comparative analysis of the qualitative characteristics of the pikeperch population from 2000 to 2016 has been carried out. It is established that in recent years (2013−2016) there has been some increase in the population of the pike perch and, as a consequence, an increase in its catch.

Keywords: pike perch, *Sander lucioperca*, delta and avandelta of the river Volga, the dynamics of catches, size and weight, age and sex composition, catch for fishing effort.

STOCK DYNAMICS, FISHERY AND POSSIBILITY OF THE CATCH FORECASTING OF NORTHEAST HADDOCK *MELANOGRAMMUS AEGLEFINUS* BASED ON THE FUTURE CATCH OF COD

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Against the context of brief analysis of the dynamics of the stock and regulatory measures for the fishery of the Barents Sea haddock for 1950-2016, the possibility of prediction the catch taking into account the volumes of TAC by cod is discussed. When comparing the values of commercial biomass of cod and haddock, a rather high correlation *(r)* between them is revealed. During 1960-2016 the correlation coefficient *(r1)* was 0.84, and for 1980–2016 the correlation coefficient *(r2)* was 0.94. From the objectively existing synchronism in the dynamics of these stocks and the geographic community of their fishing range, as well as from the biological justification for following the annual changes of TAC to the annual stock fluctuations, there is a logical consequence of the desire to achieve synchronization in the designated TAC for these species. An example of a procedure for calculating the predicted TAC value of haddock by TAC value of cod using the same proportion of the predicted haddock stock to the predicted cod stock is given in our paper.

Keywords: the Barents Sea haddock, cod, spawning stock, recruits, TAC, prediction, management of fisheries.

LENGTH-AGE STRUCTURE AND FISHERIES OF THE BLACK SEA SPRAT *SPRATTUS SPRATTUS PHALERICUS* (CLUPEIDAE)

© 2018 y. G.V. Zuyev, V.A. Bondarev, Yu.V. Samotoy

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The correlation between fishing regime and length-age structure of the Black Sea sprat *Sprattus sprattus phalericus* from two regions of the Black Sea (Western and Crimean) with similar climatic and trophic conditions was studied. Regional differences of length-age structure parameters of sprat have been found. Negative correlation between the unfortunate state of sprat population in the Crimean region and catch indicating impact of fishing regime in this region on the population state has been showed. Optimum value of sprat catch ensuring stable state of population in the Crimean region has been offered.

Keywords: Black Sea sprat, length-age structure, catch, Black Sea, overfishing, correlation.

IMPACT OF MODERN CHANGES OF OCEANOGRAPHIC CONDITIONS IN THE SEA OF JAPAN ON STATE OF THE PRIMORYE POLLOCK POPULATION

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Year-to-year dynamics of recruitment is considered for the Primorye population of walleye pollock (northwestern Japan Sea, with the main spawning ground in Peter the Great Bay) on the data of bottom trawl surveys. It has a negative tendency and 5–11-years cyclic fluctuations reasoned by negative relationship between the recruitment and stock because of overloading the carrying capacity of the biotope for the species. This relationship is approximated by nonlinear function with the parameter, of carrying capacity that is negatively depended on water temperature in the pollock habitat (Intermediate water mass). Besides, the abundance of 1–2 strong year-classes, which form once in a cycle in conditions of the minimal stock, depends directly on winter SST, negatively as well. Frequency of these strong year-classes appearance also depends on carrying capacity: the larger the capacity – the shorter the cycles and more frequent the blooms. Modern environmental changes distinguished by warming of all layers in the Japan Sea, in particular in the intermediate layer, are unfavorable for the pollock reproduction because of the carrying capacity decreasing. On the base of these regularities, using a simple population model, the pollock stock changes in the next decade are forecasted: the stock growth is expected until 2019 when it will exceed 100,000 t, then it will go down below 80,000 t in the middle of 2020s, and possibly will not restore again if warming of the Intermediate water will continue.

Keywords: walleye pollock, year-class strength, carrying capacity, climate warming, Japan Sea.

HARVEST CONTROLE RULE FOR THE ISLAND SCALLOP WITHIN THE NEW APPROACH TO THE BARENTS SEA STOCK ASSESSMENT

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The paper presents brief results of the Barents Sea Iceland scallop stock status estimation and fishery management. At present, the Iceland scallop *Chlamys islandica* stocks in the Barents Sea Cape Svyatoy Nos settlement are in the depressive state. The long-term dynamics of the commercial stock shows approximately five time reduction during the fishery exploitation period. A stochastic version of the Shaefer production model was used for the integrated assessment of the stock status, the calculation of TAC and reference points and the forecast of the biomass dynamics. The reference point by the commercial stock biomass (*Btr*) of the Iceland scallop from the Cape Svyatoy Nos settlement equaled to 224 thousand t. A median value of the target reference point by exploitation (*Ftr*) was estimated at 0.002. It can be expected that if the dragging has been temporarily stopped and there is no strong recruitment of the Iceland scallop stock in the Barents Sea, it will, probably, take the Iceland scallop 15-20 years, at least, to recover to the biological safe level.

Keywords: the Iceland scallop *Chlamys islandica*, the Barents Sea, stock status, harvest control rule.