DYNAMICS OF STOCKS AND CATCHES OF COMMERCIAL FISH SPECIES OF THE MAGADAN REGION

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The main biological indicators, the dynamics of the stocks of the main commercial fish of the Magadan Region (herring, pollock, salmon, char) in the northern part of the Sea of Okhotsk, their total permissible and recommended catch are considered. The review of the fishery's progress is given.

Keywords: aquatic bioresources, herring *Clupea pallasi*, pollock *Theragra chalcogramma*, pink salmon *Oncorhynchus gorbuscha*, chum salmon *Oncorhynchus keta*, loach *Salvelinus*, stock, catch.

ON THE NEED FOR THE PREDATION COUNT OF THE BARENTS SEA COD *GADUS MORHUA MORHUA* IN ITS FISHERY REGULATIONS

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Short background into the postwar history (since 1946) of the cod fishery regulating measures in the Barents Sea is presented. Most measures, such as mesh increasing in trawl's cod ends, rising of minimum commercial fish size and restriction of undersized cod by-catch, sorting grids, prohibited zones for trawls, were aimed at protecting of younger. In fact, the restrictions on total allowable catch (TAC) volumes through as much as possible spawning stock biomass (SSB) maintenance have imposed also for the sake of herd recruitment with high-quantitative year-classes. After 2009, in conditions of feed deficiency, cannibalism of cod as a predator significantly increased, that led to a sharp decline of new generations contribution into commercial fish stock by 2016. According to the authors, in similar situations at reducing cod commercial stock, when SSB exceeds 2*B*pa 000 t), to avoid increased exposure of a predator on other commercial species and through cannibalism on own fishing stock, it can not be considered justified parallel reduction of TAC.

Keywords: the Barents Sea cod, spawning stock, recruits, predation, cannibalism, TAC.

NEW APPROACHES TO NORTH-EAST ARCTIC COD STOCK ASSESSMENT AND FORECASTING TAKING INTO CONSIDERATION THE FISHERY AND CLIMATE DATA

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ICES Arctic Fisheries Working Group traditionally implements mathematical models based on scientific and fishery data for cod stock size and TAC (Total Allowable Catch) assessment. In 2016 и 2017 some of scientific surveys in the Barents Sea were not properly conducted or were not conducted at all. This decreased the quality of the results and gave rise to interest in implementation of additional sources of information. Such an additional source of information was

the data from the “Rybolovstvo” Information System. The results of the assessment showed that the current state of cod stock allows to increase TAC for 2018 for more than 20% with respect to the value adopted by ICES Arctic Fisheries Working Group. The values of AMO (Atlantic Multidecadal Oscillation) Index, which revealed high correlation with the stock biomass, were used for forecasting the spawning stock biomass till 2025 what resulted in substantially different estimates of cod fishery perspectives in comparison to the results of implementation of traditional methods. The results obtained show the necessity of broadening of information basis used for cod stock assessment and forecasting in the cases of deficit of traditional data.
Keywords: stock assessment, North-East Arctic cod, total allowable catch.

CURRENT STATE OF FISHERIES FOR GREENLAND TURBOT *REINHARDTIUS HIPPOGLOSSOIDES MATSUURAE* (PLEURONECTIDAE) IN THE WESTERN BERING SEA AND OFF THE EASTERN KAMCHATKA

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The basis of this paper is the catch statistics obtained from the data of vessel daily reports from the sectoral monitoring system of the Federal Agency for Fisheries of the Russian Federation for 2009-2017, in which the captures of the Greenland turbot were registered. Additionally, monitoring data on fishing vessels operated with longlines, trawls and Danish seines collected in 2009-2017 were used. The inter-annual and seasonal variability of dislocation and structure of fishing fleet, catches of Greenland turbot in the Western Bering Sea zone, Karaginskaya and Petropavlovsko-Komandorskaya subzones were summarized and analyzed.
Keywords: Greenland turbot *Reinhardtius hippoglossoides matsuurae*, fishery, fishing gear, catch dynamics, Western Bering Sea zone, Petropavlovsko-Komandorskaya subzone, Karaginskaya subzone.

ESTIMATION OF BYCATCH AND DISCARDS OF LONGLINE FISH IN FAR EAST SEAS

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Characteristics of commercial development objects are by-catch in the extraction of bottom longline fisheries in the Far Eastern basin. It was revealed that the current to date fishing regulation mechanisms in respect of by-catch, not solved the problem of discards. As before, the data of ship daily reports and scientific observations are significantly different. It was noted, on the one hand, a slight

improvement in the development of by-catch species, and on the other, - an increase in low-value catch discards.
Keywords: catch, longline, multispecies fishery, efficiency.

HYDROLOGY IMPACT OF UST-SREDNEKANSKY RESERVOIR ON STATUS STOCKS OF LIVING AQUATIC RESOURCES IN THE KOLYMA RIVER

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Kolyma River is a reservoir of the highest category. As a result of the construction and operation of UST-Srednekanskoj HES there has been a change in the hydrological regime of the river. There is a slow warm water masses during the growing season, due to discharges in the lower water HPS more cold water, which have a negative impact on the environment and the reproduction of most species of fish. As a result, their impact on the environment of Habitat of major commercial fish species, spawning which occurs in the River, their stocks dropped. In this situation, you must compulsory implementation of complex compensation events.

Keywords: Kolyma, UST-Srednekanskaja HES, fish stocks, spawning, compensation events.

INCLUSION OF BACTERIAL BIOMASS AND PROTEIN HYDROLYSATS INTO A COMPOSITION OF STARTING FEEDS FOR WHITEFISH (COREGONIDAE)

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Bacterial biomass on natural gas, fish enzymolysates, chicken hydrolysates have been tested in starting feeds for whitefish with a mass of 8–9 mg. Best results have been obtained with inclusion of bacterial biomass, especially with the addition of liquid soy-bean phosphatides after making a feed (BBF-2). The soluble protein fraction of bacterial biomass has distinguished by large variety of peptides by molecular mass (from small to large ones). Final mass of whitefish and muksun has been respectively 310 and 389 mg on BBF-2 feed, 224 and 205 mg on feed with fish enzymolysate №1, 187 and 156 mg in the control , 243 and 282 mg on imported feed. The addition of phosphatides is ineffective in larva reached a mass of 100 mg. All the fry had a normal physiological state.

*Keywords***:** starting feeds, larvae of whitefish (Coregonidae), bacterial biomass, fish enzymolysates, chicken hydrolysates, peptides, free amino acids, imported feeds, growth of larva, physiological state.

SOME ASPECTS OF PHENOMENOLOGY IN PINK SALMON POPULATION DYNAMICS ON THE EXAMPLE OF SAKHALIN-KURIL STOCKS

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A simple phenomenological model based on the Ricker discrete mapping was used to show that a two-year cyclicity may be disrupted in pink salmon adjacent generations being in equilibrium, as a result of abrupt reductions in carrying

capacity, even short-term. All of the short-duration failures in a regular catch dynamics within the existing historic observation period were revealed to be timed to the peaks of the solar activity index time series. There was suggested a hypothesis that these failures are conjugated with pink salmon transition from one level of abundance to another on the region scale. An applied aspect of this hypothesis was considered in the task of forecasting pink salmon catches, based on the theory of channels and Jokers.

Keywords: Sakhalin-Kuril pink salmon, dominant changing, Ricker discrete mapping, nonlinear dynamics, channels and Jokers, carrying capacity, solar activity.

USE OF FISHERIES STATISTICS FOR SPATIAL STRATIFICATION THROUGH STUDIES OF MARINE BENTHAL INVERTEBRATES

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Spatial stratification is used both to increase the accuracy of integral stock assessment and to analyze the spatial patterns of the stock dynamics. Algorithm of water area division through fisheries statics data is given in terms of the stock of the snow crab (*Chionoecetes opilio*) of the northern part of the Sea of Okhotsk. Algorithm is based on analysis of similarities and differences in long-term dynamics of annual CPUE on preliminary defined primary patches. Connection of distinguished regions with functional structure of the population is discussed.

Keywords: fisheries statistics, CPUE, commercial invertebrates, spatial distribution, stratification.

SUBSTANTIATION OF COMMERCIAL SIZE LENGTH OF THE PACIFIC MUSSEL *MYTILUS TROSSULUS* (BIVALVIA: MYTILIDAE)

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Data on primary spawning of the Pacific mussel in Tauisk Bay at the age of 1 year of 10– 20 mm size group, mass maturing of gonads at mollusks of two and three-year age spawning 2–3 times, are discussed. Spawning period of different size groups of mollusks and length and mass values of mussels according to age groups are considered. Maximal sizes of mussels in different areal regions of the Far East fishery basin are compared. Recommendations about minimal commercial measure of the Pacific mussel for the northern part of the Sea of Okhotsk, ocean coast and adjacent islands of Kamchatka are given.

Keywords: Pacific mussel, commercial size, sexual maturity, spawning, settlement types, littoral, biomass.