Kibal'chich, A. A., and R. G. Borodin, 1982. Estimate of the basic parameters of the Pacific walrus population, pp. 160-161. In Studies, Protection and Rational Use of Marine Mammals. USSR Ministry of Fisheries, Astrakhan'. (abstract) (Transl. F. H. Fay)

The expansion of range and increasing numbers of Pacific walruses in recent times raises the qestion of the status of the population in the past, since the data from aerial censuses that were conducted in the beginning of the 1960's cannot be explained by the known rate of reproduction.

We based our work on such biological data from walruse as: polygamy, 15-16 month pregnancy, sex-age differentiation of coastal haulouts and ice haulouts in the summer-fall period, and continual breeding from 5-6 years onward.

The data on harvests of walruses were obtained from the work of V.I. Krylov (1967) and from official statistics compiled by the regulatory agencies in the USSR and USA.

For estimating the basic parameters characterizing the status of the stocks and harvests of Pacific walruses we employed the method of mathematical modeling. The initial size of the harvestable stock of males (N_1) in 1931 was determined with the help of a "rank analysis." Data on age composition of the harvested animals were taken from the work of Krylov (1968) and Kibal'chich (1978, 1979, 1981) and extrapolated from them to earlier years. From the age distribution of males (their ages are determined more precisely than for females) the coefficient of instantaneous total mortality (Z) was found to be 0.093 in 1980. The mortality from harvests per year (E=0.04) was determined from the known kill, together with data from aerophotographic censuses (about

130 thousand males), from which was derived the coefficient of instantaneous natural mortality (M=0.05). Then, a retrospective analysis of the age composition of the annual harvest was conducted, and taking M=0.05, the size of the harvestable stock of males in 1931 was estimated as N_1 = 155 thousand. From that, employing a recurrent procedure for calculating the annual recruitment, losses from natural causes, and annual kill, the dynamics of the stocks were investigated. The analysis showed that the size of the stock (males) under effective hunting was abruptly reduced to about 50 thousand by the 1960's and again rose to 125 thousand by 1980. The number of sexually mature females in 1931 was estimated at 110 thousand.

If the principal of maximal stable harvest (MSD) is taken as the basis for management, then a mixed harvest (males and females simultaneously) should be conducted. For that, the size of the stock safely producing the MSD must be composed of approximately 85 thousand males and 140 thousand females. The amount of MSD for males is about 6.5 to 7 thousand and for females, 2 thousand. These estimates should be considered as preliminary.