

3-4. Production Trends and Carrying Capacity of Salmon (Oral-29)

Global and Regional Elements of Ecological Capacity of the Pacific Salmon Habitat

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Not all variations in the number of animals should be related to environmental capacity. The capacity issue emerges only under extremely high abundance. The habitat capacity for each specific stock is mostly limited in the period which is the restricting one: It is early sea period of life and the first winter in the ocean. The winter temperature conditions impact the intensity of convective mixing enriching the upper layers with nutrients needed for vegetation of phytoplankton as the initial trophic link. Since the food supply in winter is the lowest the ecological habitat capacity in winter that determines the advent of salmon during the succeeding spring/summer period. This is true for the Pacific salmon in general. In the 1990-s a number of researches found relationship between the rise in most species and stocks of salmon and the decline in their length, body weight and greater maturation age. Some references linked this with regulation of density at sea at common feeding grounds of salmons from various stocks (Gritsenko et al. 2000; Ishida 1993; Bigler et al. 1996; Klovach 2003). In the 2000s this link disappeared though salmon became still more abundant. In addition, they became larger. Based on that one could assume that the capacity of habitat had increased, and food supply had gone up. The upper limit of abundance in each specific population is governed by the environmental capacity at the stage of ontogenesis where its number is most restricted. Therefore, the ecological niches of individual Pacific salmon stocks vary; their capacities differ accordingly. Throughout the life cycle the ecological capacity is set by combined global and regional capacities in the critical periods of life; it is restricted by abiotic and biotic conditions typical of each population.