Methods for Reservoirs Conflict Problems Solution on the Climate Warming Background

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In the eastern part of the Black Sea region, under the complex relief, vertical zoning of geographic elements and intense atmospheric precipitation mountain rivers are characterized by high energy potential and copious bottom sediment. The sea for centuries by such sediments has created an accumulative coastline with wide beaches. The towns, communications and infrastructure located on it are protect by coastal shorelines from waves. Such beeches are creating by waves and streams from the river bottom sediments.

The states of the region – Georgia, Turkey and Russia are the most frequently used reservoirs for efficient use of rivers. Such an objects is now a serious negative – it has a long time locked in sediment flow and is intensely solutes. Conflict problems arise due to this: Its regulating volume decreases with energy, irrigation and recreational indicators; the sediment starts growing on the shore, with the degradation of the beaches and the shore of the coast; the probability of catastrophic flooding of population and infrastructure is rising because of the rise and elevation of the riverbeds in the upper bay; it is unused to remain in the water reservoir, as the beach filler and inert material.

Global warming, which operates in the region since the 1900s, significantly strengthens the negative results of water reservoirs. The influence of air temperature in the region's mountainous region has increased by 1,0-1,3^{0}C for 2010; The glaciers retreated at 100-120 m and created critical supplies of the material that intersects the surface water in the river. As a result, glacial rivers deposits and runoff increased by 7-10% and the sea level' absolute growth reached 0.18 m by 2016. In the same period the annual number of strong storms increased by 25-30%. This phenomenon significantly accelerated the process of water reservoir and increased the likelihood of risks created with these problems.

Usually, removal of the deposits from the reservoir is carried out by the "washing method". This method presents the opening of the dam bottom galleries and the volley of water over the galleries. According to multi-year monitoring data, such a flow of water can produce a small (≤ 20%) part of sedimentary fractions (d≤5,0 mm) from the reservoir. Water velocity is not sufficient for large and consolidated sedimentation and it almost completely remains in the reservoir. At the same time, water turbidity is much higher than the ecologically permissible limits, which seriously damages the ichthyofauna and bentos at the tailrace.

The boom of the construction of mountain reservoirs and the need to extend the period of their operation, required the creation of a more efficient method. To this end, a series of Natural experiments was carried out on small mountain streams, and for the study of the silting prisms existing reservoirs used expeditionary methods, methods of GPS and underwater measurements. The generalization of data and their statistical analysis showed that: the reservoir holds almost twice as much of its size as the prism and its train; the length of the sediment prism is almost twice the length of the reservoir and is function of the height of weir dam, sediment' diameter and of the river gradient; in the cascade of reservoirs, the upper reservoir is most intensively silted. In the lower reservoir, the silting process reaches its maximum, when the prism of silting reaches its own limiting volume and the river develops an equilibrium channel. Therefore, the cascade layout of the water reservoirs is the most effective form of long-term maintenance of their performance characteristics. In the cascade, the duration of the operation of the reservoir is directly proportional to the

volume and intensity of the process of siltation of the upper reservoir; the use of the river in the lower portion of the river is not effective for transporting the sediment by itself, due to low speed of flow.

These data confirmed the opinion of many scientists, that it is impossible to completely stop the silting process. However, its significant slowdown is possible if a new method of "Reservoir Career Disposal" will be used. In this method, large ($d \geq 5{,}0$ mm) sediment retention should be taken in the deep, large volume pits removed from the riverbeds in the stationary quarries and saplings located in the mobile zone and tributaries of the reservoir. Inpatient careers will act in the reservoir filling and litter phases, while sedimentation will be flooded during floods and floods. Such nutrients can be discharged from accumulated inert material using waterproofing seasons using appropriate techniques. Removed saddle will be accumulated in advance

Selected areas from which the transport conveyor will be permanently supplied to the abrasive beaches and the rest of the customers. By this method it is possible to extend 30-40% of the reservoir expansion period. Currently it is particularly relevant for the degraded beaches of the Georgian coast. This coastline has already begun to increase the sediments caused by Chorokhi and Enguri energy reservoirs cascade on Kobuleti and Gali-Ochamchiri sections. In the nearest decades, the catastrophic abrasion of the coast is inevitable without the artificial filling of the "Reservoir's Career Disposal" method, i.e. artificially filling the beaches.

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