Section 2

Water Management Situation in the Aral Sea Basin

2.1. Water Management Situation in the Basins of the Amu Darya and the Syr Darya

Water Resources

The early conditions of the hydrological year 2016-2017 turned to be well better than in previous years, although water withdrawals in 2016 corresponded to average value over the last decade – 100.6 km^3. The annual water volume in the Syr Darya basin (judging from inflow to three reservoirs, such as Toktogul, Andizhan, and Charvak) was 42.9 km^3, while water content in the Amu Darya (as measured at the section upstream of water intake to Garagumdarya) was 59.3 km^3.

By October 1, 2016, the total accumulation by reservoirs in the Syr Darya basin was 23,244 Mm^3, including 19,897 Mm^3 in the key water bodies in the catchment area. This amount of accumulation was even higher than that by October 1, 2009, i.e. the year prior to the wettest year over the last twenty years.

As to the Amu Darya basin, though the situation related to absolute accumulation (13,300 Mm^3 only) was much worse, it was at the average level of water accumulation by the reservoirs on this river. Autumn, winter, and spring seasons were characterized by relatively good precipitation, close to the level corresponding to average year.

Operation of Reservoir Hydrosystems

Annual inflow to the Toktogul reservoir located on the Naryn was 17 km^3, including 13.4 km^3 (79%) during the growing season. Annual water releases from the reservoir were lower than the inflow and amounted to 14.9 km^3, of which 6.57 km^3 only or 44 % were discharged down the Naryn during the growing season. Such flow re-distribution allowed filling the Toktogul reservoir up to 19.6 km^3 by the end of the growing season.

Inflow to and accumulation in the Nurek reservoir on the Vakhsh were close to the forecast, with considerable exceedance of the forecast values in May and June only. This enabled accumulating all monthly reference quantities, with the average deviation of 6.8%.

Annual inflow to the Nurek reservoir was 25.7 km^3, including 21.9 km^3 or 85% during the growing season. Annual water releases from the reservoir were also 25.7 km^3, but showed different seasonal distribution. During the growing season, 18 km^3 or 70% of annual flow were discharged.

Due to insufficient flow along the Panj, inflow to the Tuyamuyun reservoir (Birata) turned to be lower than the forecast by 11.42 km^3 and amounted to 33.5 km^3 during the growing season. The largest difference between the forecast and the actual inflow to the Tuyamuyun reservoir was observed in July and August: 5,091 and 1,891 Mm^3, respectively. Water releases from the Tuyamuyun reservoir were 31.8 km^3 or 82% of the value scheduled by BWO Amu Darya.

Water Distribution and Water Deficit

The total water withdrawal in the Amu Darya basin amounted to 52.6 km^3, including 38 km^3 during the growing season or 96% of the established limit on water intake to canals (39.7 km^3). The plan of water distribution in the basin was underfulfilled on average by 20%, including minus 13.9% for Tajikistan in the reach from Nurek to Tuyamuyun reservoirs during the growing season. Deviation from the plan was minor in this reach for Turkmenistan and Uzbekistan. Evidently, that deviation for Tajikistan was caused by unpreparedness to water diversions as no obstacles were observed. However, in the reach from Tuyamuyun to Samanbai the situation was worse. During the growing season, Turkmenistan was under-supplied with water by 14%, and Uzbekistan received 6.2% less water than planned.

As to the Syr Darya basin, virtually no deficit of water was observed either with respect to water accumulation by all reservoirs or water distribution. The total water withdrawal in the basin amounted to 14.1 km^3, including 11.2 km^3 during the growing season or 96 % of the established limit on water intake to canals. 2.3 km^3 of water were discharged from the Syr Darya into Arnasai.

Inflow to the Prearalie

A positive point is that under conditions of the average year (in terms of flow) the water supply to the Prearalie and the Aral Sea was: 10.9 km^3 from the Amu Darya and collectors; and, 7.1 km^3 from the Syr Darya. Water discharge from the Northern Aral Sea to Large Aral Sea amounted to 5.2 km^3.

Open Channel Losses

Balance calculations indicate to relative lowering of flow losses: 8.98 km^3 during the growing season and 1.13 km^3 during the non-growing season along the Amu Darya or 10.11 km^3 in total. This is almost 40% less than over the last decade on average. As to the Syr Darya, water losses slightly increased and amounted to 3.3 km^3 a year.

Meeting Demands

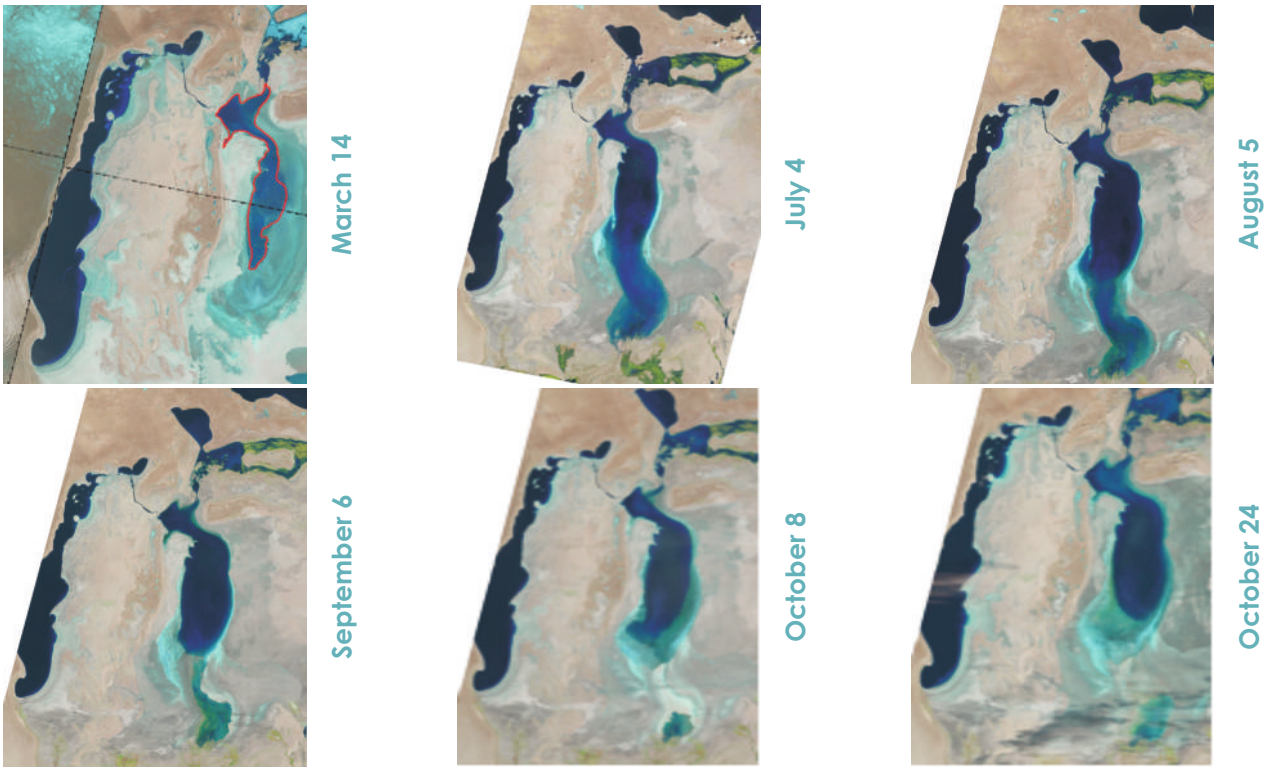
The picture of how water demands of the CA states are met during the growing season is shown in the Table below. In general, no failures in water delivery were observed in the both basins.

CA States	Meeting water demands during the growing season, %	
	Amu Darya	Syr Darya
Kazakhstan	-	101
Kyrgyzstan	-	76
Tajikistan	86	84
Turkmenistan	96	-
Uzbekistan	100	99

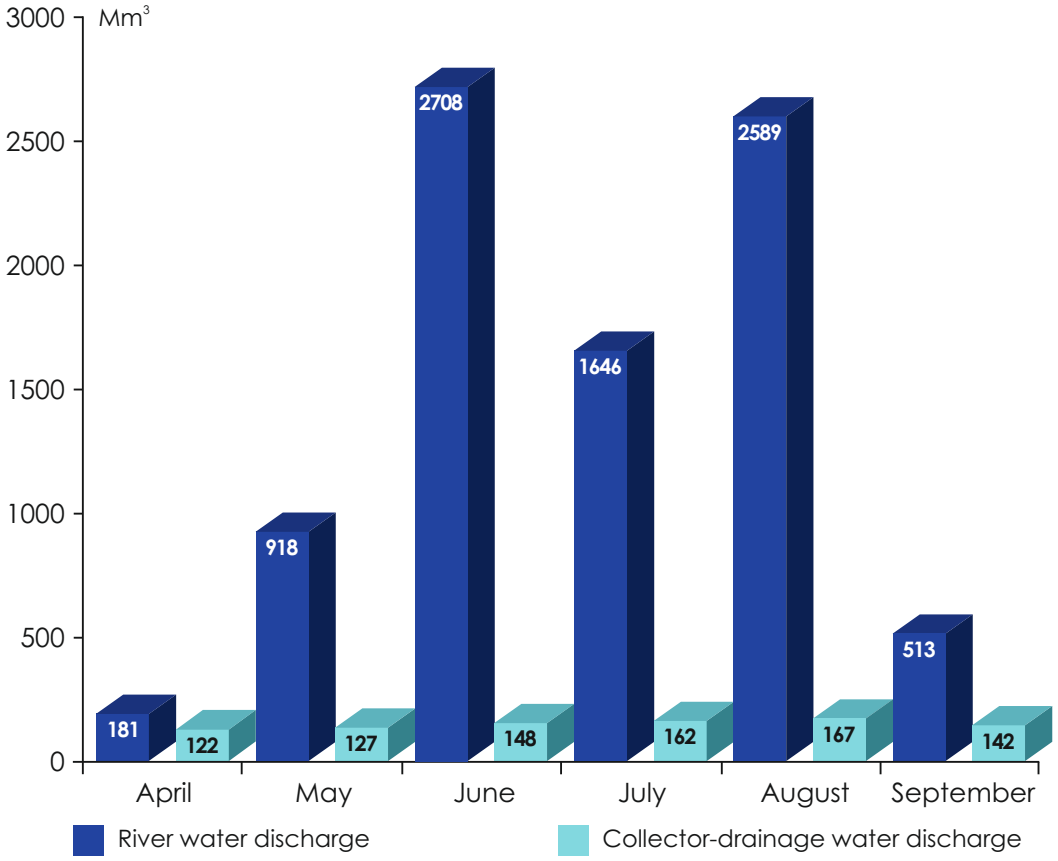
2.2. Dynamics of Changes in the Water Surface Area of Large Aral Sea and South Prearalie

In 2017, SIC ICWC continued monitoring of the dynamics of changes in the water surface area of the Eastern and Western parts of the Large Aral Sea, as well as lake systems of the Amu Darya delta in the South Prearalie through satellite images Landsat 8 OLI. The Center also monitored water supply to the Aral Sea and the Amu Darya delta by using the data of BWO Amu Darya.

Satellite Images Landsat 8 OLI (2017)



Water Supply to the Aral Sea and the Amu Darya Delta in 2017, Mm^3

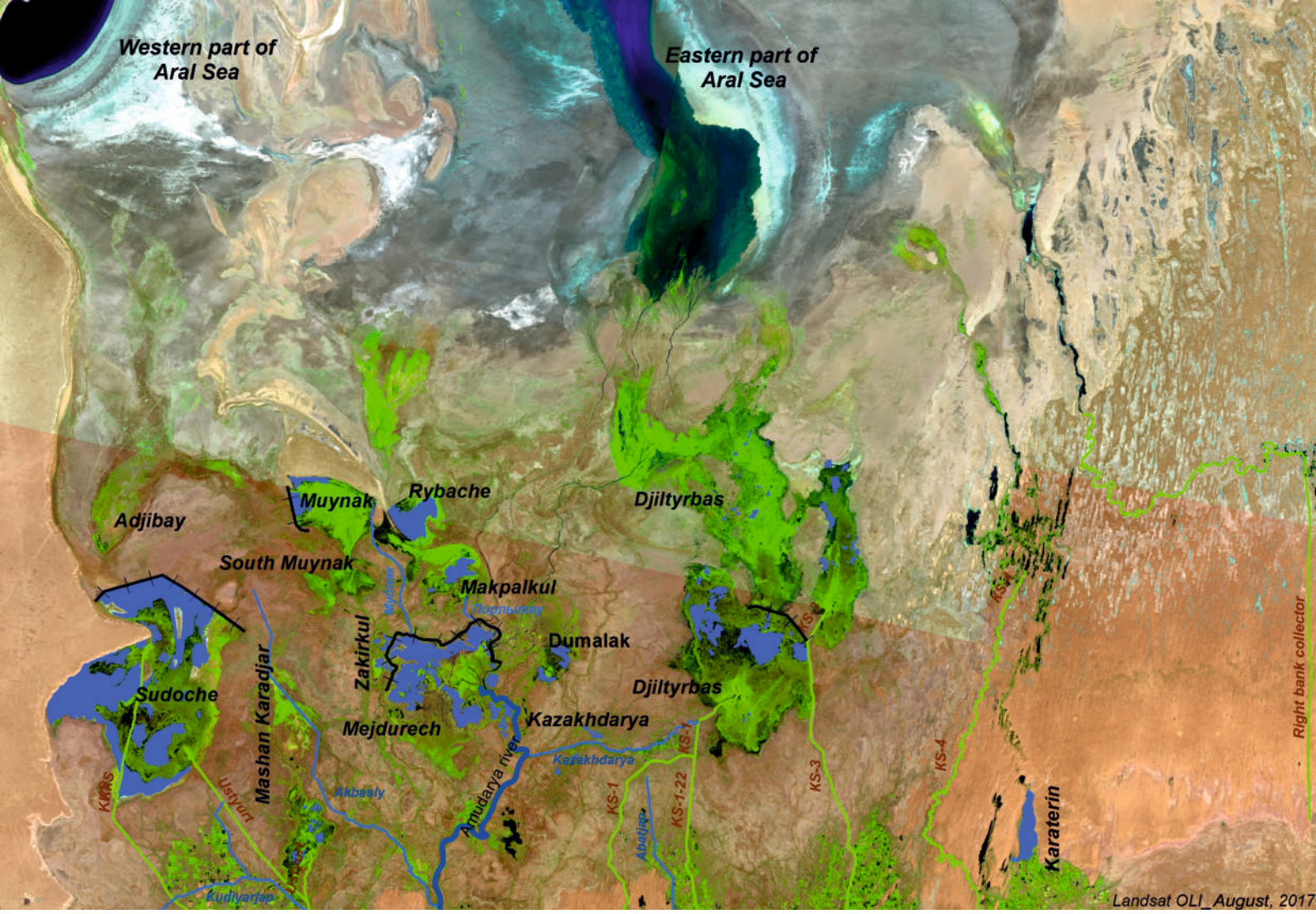


Despite sharp variations of water supply, in 2017 the water surface area of the Western part of the Large Aral Sea was stable, while the area of the Eastern part increased through inflow from March (101,191 ha) till the end of the flooding period (460,805 ha). Then the area was shrinking till the end of the year due to discontinuance of inflow (229,742 ha).

Wetland and Open Water Surface Area of the Western and Eastern Parts of the Large Aral Sea

Date	Mar 14	Apr 23	May 1	Jun 18	Jul 4	Aug 5	Sep 6	Oct 8	Oct 24
Western part of the Aral Sea, ha									
Wetland	278978	278978	278978	280157	284241	283154	286264	290562	290850
Water surface	282372	282372	282372	281194	280109	278195	275085	270788	270499
Eastern part of the Aral Sea, ha									
Wetland	1395633	1327443	1325458	1099641	1075170	10360718	1157626	1245473	1267081
Water surface	101191	169381	171365	397182	421653	460805	339198	251351	229742

The water surface area of lake systems in the Amu Darya delta in the South Prearalie depends on inflow: the area increases till the beginning of irrigation season (June) and then decreases, although almost up to 3 km^3 of river water reaches the lake systems in June and August.



Schematic Map of Lake Systems in the Prearalie

Dynamics of Changes in the Water Surface Area of Lake Systems in the Amu Darya Delta in 2017, thousand ha