



Aral Sea Basin Transboundary Water Early Warning Bulletin

June – July 2023



UNRCCA



A need for drafting and issuing given periodical Bulletin as a product for timely dissemination of information on the state-of-affairs in water, environment, and climate in the Aral Sea basin was raised during a seminar on “Early Warning on Potential Transboundary Water Problem Situations in Central Asia” (Almaty, 26 September 2011). The idea behind was to prevent problems or disputes arising. In the course of discussions with the UN Regional Centre for Preventive Diplomacy for Central Asia the riparian states in the Aral Sea basin have expressed their support for such an initiative as they repeatedly showed their interest in enhanced regional capacities for early warning and preparedness to potential hazards. This was reflected in the Aral Sea Basin Programs (ASBP-3 and ASBP-4). Past Bulletins issued in 2014-2022 have met expectations of the countries regarding such information.

The Bulletin is a resource, which provides all the Central Asian states and their international partners with improved capacity to monitor regularly the status of transboundary rivers and warn early of potential issues that require attention.

Four early warning bulletins are to be issued as part of the Project in 2023. The format and content of the bulletins have been agreed with the client and with all organizations that provided source information. Given second Bulletin contains the actual information on the Syr Darya and Amu Darya basins for June 2023 and the forecast for July. The Bulletin also contains the information on the status of aquatic ecosystems in the South Aral Region that was not published before.

The following data sources were used in the Bulletin:

- BWO Amu Darya and BWO Syr Darya – data on water resources, their distribution in time (daily) and by river reach, operation regimes of reservoirs, inflow (planned versus actual) to the Aral Sea,
- CDC “Energy” – data on operation regimes of hydroelectric power stations (HEPS), electricity generation (planned, actual),
- Aral-Syrdarya BWA – data on lower reaches of the Syr Darya River (components of the water balance from the tail-water of the Shardara reservoir to the Northern Aral Sea),
- Open Internet sources - climatic information.

Additionally, an Internet platform on telegra.ph is to be developed in September 2023 as part of the Project. The platform will contain all Bulletins issued since 2014 in both Russian and English.

Digest of CA news for June

Source: <http://cawater-info.net/news/index.htm>

The issue of improving regional cooperation on climate change and security in Central Asia discussed ([yuz.uz](#))

Roundtable on “Distribution of environmental innovations and technologies around the island” ([mininnovation.uz](#))

Kazakhstan plans amending the trilateral agreement with Kyrgyzstan and Uzbekistan on use of water and energy resources in the Syr Darya Basin — [Tazabek](#)

Mirziyoyev identified the condition for complete refusal from cotton production | Eurasia | Dialogue: Tajikistan and the world ([dialog.tj](#))

UNDP Project attracts the Turkmen youth to climate actions - News Central Asia ([nCa](#))

The Energy Ministry expects 3 billion kWh of electricity shortage in 2023 due to low inflow to the Toktogul reservoir — [Tazabek](#)

The UN Regional Centre for Sustainable Development Goals to be established in Almaty: 23 June 2023, 17:27 – news on [inform.kz](#)

OSCE workshop in Ashkhabad discussed the matters of energy and natural resource management in Central Asia in the context of situation in Afghanistan - News Central Asia ([nCa](#))

An International Conference on financial and investment support to rational water use completed successfully in Turkmenistan - News Central [Asia \(nCa\)](#)

China launched the first observation station for climate outside, in Tajikistan – Tajikistan News - [Avesta.tj](#)

Beyond borders: Why new 'high seas' treaty is critical for the world | UN News ([un.org](#))

Uzbekistan and Tajikistan launched construction of two hydropower projects on the Zarafshan River ([uzdaily.uz](#))

Bakyt Torobaev discussed a project on updating the feasibility study of Kambarata-1 with the WB Regional Director on Europe and CA ([kabar.kg](#))

The Central Asian Climate and Environment Studies University to open in Uzbekistan ([uza.uz](#))

Expansion of environmental cooperation discussed with UNDP ([yuz.uz](#))

Uzbekistan Ministry of Natural Resources renamed into the Ministry of Eco... | CentrAsia ([centrasia.org](#))

World Day to Combat Desertification and Drought - 17 June. History and features of the holiday in the Holiday Calendar 2023 ([calend.ru](#))

New OSCE Office opened in Turkmenistan | Politics ([turkmenportal.com](#))

Qasym-Jomart Toqayev called for more resources in support of the International Fund for saving the Aral Sea: 8 June 2023, 11:52 – news on inform.kz

WB supported 116 Tajik projects at more than \$2.7 billion over 30 years| "SNG Segodnya" – CIS news on [SNG.TODAY](https://sng.today)

President Shavkat Mirziyoyev presented Uzbekistan's vision on prospective development of EU-Central Asia partnership - News Central Asia ([nCa](https://nca.com))

Conference on environmental conservation held in Turkmenistan| "SNG Segodnya" – CIS news on [SNG.TODAY](https://sng.today)

President of Tajikistan, Emomali Rahmon takes part in the second meeting of the Heads of State of Central Asian and the President of the European Council | NIAT "Hovar" (khovar.tj)

Qasym-Jomart Toqayev proposed holding a regional climate summit in Kazakhstan: 2 June 2023, 17:26 – news on inform.kz

The above materials are taken from news media or websites and therefore SIC ICWC shall not bear any responsibility for the content of these materials.

Amu Darya River Basin

Actual Situation in June and Forecast for July

The available usable river water resources estimated as natural, non-regulated river flow plus lateral inflow to the river and minus losses amounted to 10,370 million m³ in June. The flow of the Amu Darya at Kelif section (upstream of intake to Garagumdarya) regulated by the Nurek reservoir was estimated at 8,363 million m³ (about 100% of the forecast). It is expected for July that the available usable water resources will increase to 11,557 million m³, and the river flow at Kelif section will increase to 9,666 million m³.

Inflow to the Nurek reservoir was 3,819 million m³ (by 28% more than the forecast) in June. Water releases from the reservoir amounted to 1,927 million m³ (by 9% higher than the plan). The water volume in the reservoir was recorded at 6,625 million m³ at the beginning of month and 8,854 million m³ at the end of month. Thus, through the increased inflow the reservoir was filled by as high as 2,229 million m³ of water. As a result, the plan of water accumulation was exceeded by 13%. The unrecorded inflow to the reservoir estimated by the balance method was 336 million m³ or 8% of inflow to the reservoir. It is expected that in July 4,018 million m³ of water will flow into the Nurek reservoir. The water volume will increase to 9,917 million m³, and water releases from the reservoir will be 2,955 million m³.

Inflow to Tuyamuyun waterworks facility (TMWF) was 4,302 million m³ (92% of expected inflow) in June. The total water volume in the reservoirs of TMWF (Ruslovoye, Kaparas, Sultansanjar, and Koshbulak) was as small as 2,299 million m³ at the beginning of month and increased to 3,085 million m³ by the end of month. This is by 11% lower than planned. Water releases from TMWF amounted to 1,713 million m³, while water diversion from TMWF into canals was 533 million m³ (57% of the plan). Inflow to TMWF is expected in the amount of 5,669 million m³ in July. TMWF reservoirs will accumulate water through the increased inflow and their water volume is to increase to 4,237 million m³ by the end of month. Water releases from TMWF into the river are also to be increased to 3,309 million m³. Water diversion will be increased to 1,208 million m³.

Nurek HEPS generated 1,043 million kWh of electrical energy in June. The average flow through turbines was 683 m³/s, while the average head at HEPS was 234 m (an increase from 221.7 m до 248.1 m). Sterile spills at Nurek HEPS were not observed.

In June, TMWF HEPS generated 41 million kWh only (1.4 million kWh a day). The head at HEPS was 20 m.

In June, water along the Amu Darya River was distributed unevenly. Inflow to the first reach (Kelif g/s – Birata g/s) was 8,363 million m³, while outflow from the reach (inflow to TMWF) was 4,302 million m³ (92% of expected inflow). Water withdrawal into canals amounted to 2,861 million m³ in the reach or 97% of the plan (established water withdrawal limit (quota)). At the head of the second reach (Tuyamuyun g/s-Samanbay g/s) the flow of the Amu Darya River was 1,713 million m³ only. For this reason, water withdrawal from the river was two times less than planned one – 912 million m³. Flow at Samanbay gauging station was insignificant – 71 million m³. Water shortage was estimated at 3 % of the established limit in the first reach and 50 % in the second reach. In July, inflow is expected to increase to 9,666 million m³ and water withdrawal will increase to 3,188 million m³ in the first reach. Inflow to the second reach is to increase to 3,309 million m³, and water withdrawal will be 2,413 million m³. The river flow at Samanbay g/s is expected in the amount of 112 million m³.

By the end of June 2023, in the South Aral region (Amu Darya basin) the area of wetlands was estimated at 44.7 thousand ha, including: Sudochie lake – 22.4 thousand ha; Mezhdurechie reservoir – 1.6 thousand ha; Dzhyltirbas wetland – 16 thousand ha; Dumalak wetland – 0.8 thousand ha; and, Rybachie lake – 1.0 thousand ha. The total open water surface area of wetlands reached 11.7 thousand ha, including: Sudochie lake – 5.4 thousand ha; Mezhdurechie reservoir – 0.9 thousand ha by the end of June. By the end

of July, the total water surface area of wetlands in the South Aral region is expected to decrease to 6 – 5 thousand ha, including to 3 thousand ha in Sudochie lake.

Source: data of the Regional Information-Analytical Center of SIC ICWC based on RS monitoring of the South Aral region, using Landsat 8-9 images and NDVI.

At present, the Aral Sea is a system of four water bodies: North Aral Sea (Kazakhstan), eastern and western basins of Large Aral Sea, and a small water body (let's call it Central) located between the North Aral Sea and the western basin of Large Aral Sea. The eastern basin of Large Aral Sea fed by Amu Darya River water, water from collecting drains and discharge from the North Aral Sea virtually has no water now. The difference in water levels between the North Aral Sea and the Central water body is about 10 m. This creates favorable conditions for seepage flow from the North Aral to the Central water body. Currently no water is discharged from the North Aral to the Large Aral Sea; however, in the Central water body and the western basin of the Large Aral the water level and the water surface area are maintained (as regular processing of satellite images of this territory by SIC ICWC shows), with insignificant declining dynamics, despite high water losses through evaporation. Hence, one may conclude about recharge of these water bodies from groundwater generated also by seepage from the North Aral.

In June, inflow to the Large Aral Sea (eastern basin) from the Amu Darya River (Samanbay section) and collecting drains amounted to 200 million m³. This is 2.5 times lower than expected inflow. Processing of images for the eastern basin of the Large Aral Sea showed that by the end of June the water surface area of this basin shrank to 0.01 thousand km². The water volume is estimated (from balance calculations) at 0.03 km³, most of which is in aquifers. By the end of July, the water volume in eastern basin of the Large Aral Sea is expected to decrease to 0.01 km³. There will be virtually no water on surface.

Surface water does not flow to Western basin of the Large Aral Sea. Water losses through evaporation are partially compensated by inflow from aquifer. In June-July, in this water body the water volume will remain within 31.0–30.7 km³, the water surface area will be 2.1–2.08 thousand km². Evaporation from 1 km² of water surface of the Large Aral Sea was 0.212 million m³ in June and is expected to be 0.32 million m³ in July.

The sections below show daily and ten-day data on climate and water management (reservoirs, HEPS, water distribution).

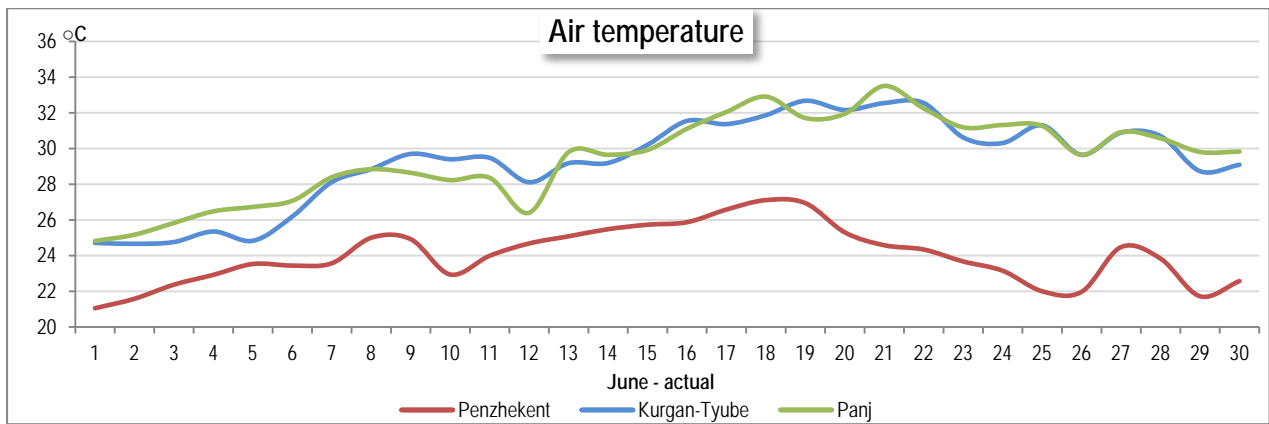


Climate

Weather station Riverhead	Location		
	Latitude	Longitude	Altitude above sea level, m
Kurgan-Tyube	37.82	68.78	429
Penzhekent	39.48	67.63	1015
Panj	37.23	69.08	363

Air temperature (T)

Station	Parameter	June			July		
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day
Panj	Forecast	27.00	31.00	31.00	31.0	33.0	34.0
	Actual	27.02	30.39	31.03			
Kurgan-Tyube	Forecast	27.00	31.00	31.00	31.0	33.0	34.0
	Actual	26.66	30.58	3.64			
Penzhekent	Forecast	23.00	26.00	23.00	24.0	27.0	27.0
	Actual	23.13	25.68	23.23			



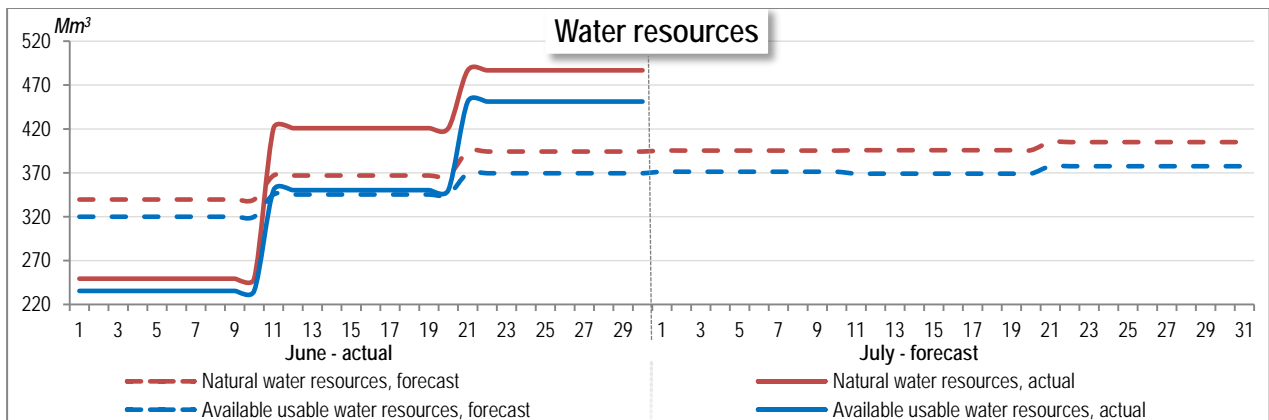


Water resources

Object
Amu Darya
Nurek reservoir
Atamurat gauging station

Water volume (W)

Object	Parameter		June			July		
			I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day
River runoff: Atamurat g/s	W, Mm ³	Forecast	1900.8	2073.6	2333	2246.0	2505.0	2851.0
		Actual	1124	2354	2987			
Water withdrawal: upstream of Atamurat g/s	W, Mm ³	Forecast	1150	1164	1178	1189.0	1193.0	1319.0
		Actual	1013	1085	1116			
Nurek reservoir /filling (+) or draw down (-)	W, Mm ³	Forecast	345.6	432.0	432	518.0	259.0	285.0
		Actual	357.5	769.8	765			
Natural water resources at Atamurat g/s	W, Mm ³	Forecast	3396	3670	3943	3953.0	3958.0	4455.0
		Actual	2494	4209	4868			
Lateral inflow: downstream of Atamurat g/s	W, Mm ³	Forecast	60	58	52	50.0	50.0	56.0
		Actual	60.4	57.6	52			
River water losses: downstream of Atamurat g/s	W, Mm ³	Forecast	257	274	300	291.0	317.0	358.0
		Actual	199.8	763.4	408			
Available usable water resources	W, Mm ³	Forecast	3200	3453	3695	3713.0	3691.0	4153.0
		Actual	2355	3503	4512			



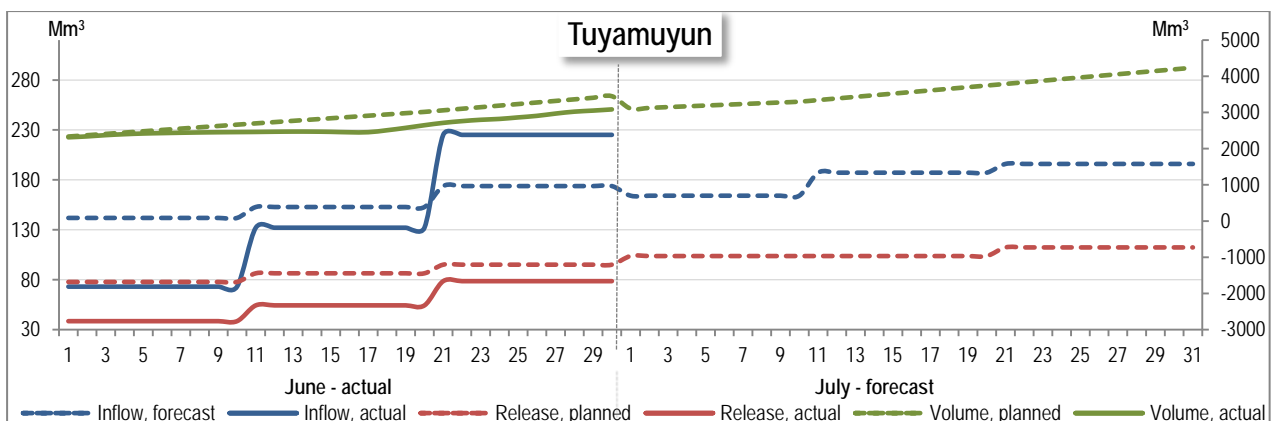
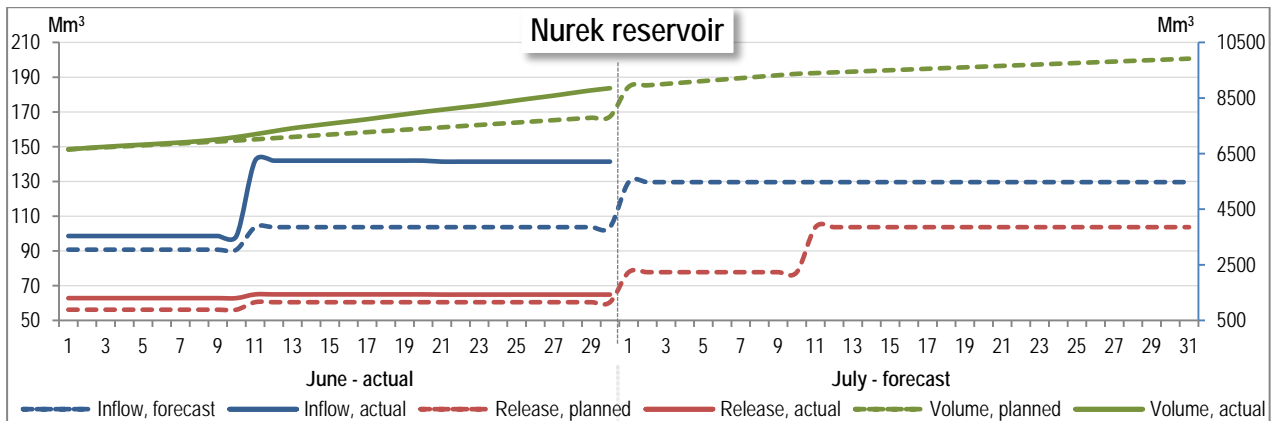


Reservoirs and HEPS

Reservoir	Location			Characteristics				
	Latitude	Longitude	Altitude above sea level, m	Length, km	Width, km	Water-surface area, km ²	Full volume, km ³	Full reservoir level, m
Nurek	38.40	69.47	864	70	1	98	10.50	910
Tuyamuyun	41.03	61.73	130	55	20	670	6.86	130

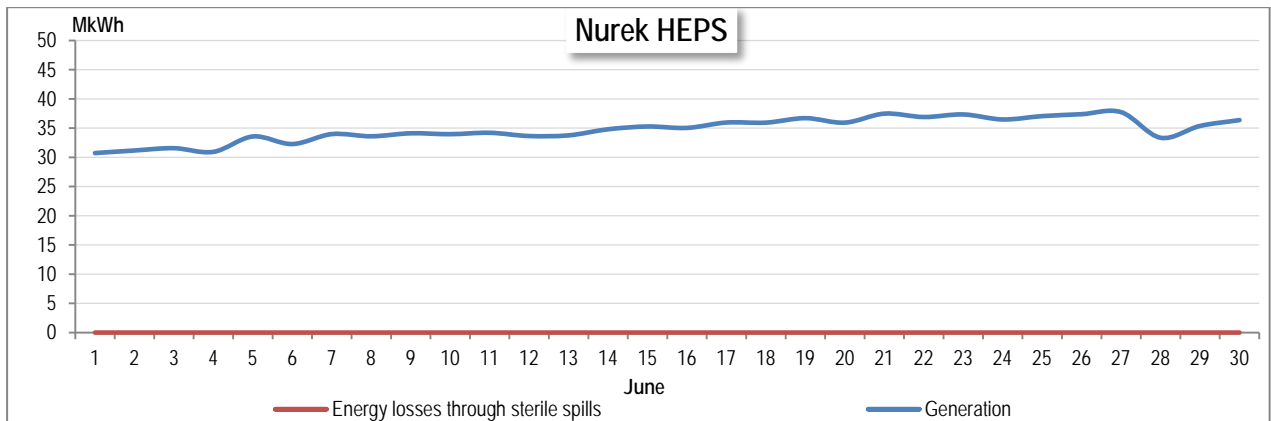
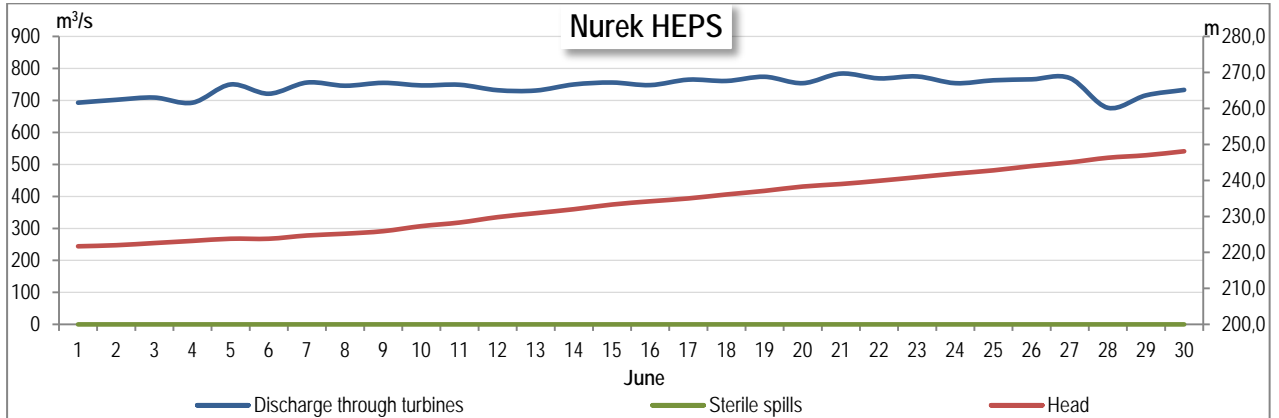
Inflow (I), Releases (R), Volume (W)

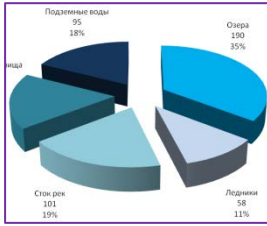
Reservoir	Parameter	June			July			
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day	
Nurek reservoir	I, Mm ³	Forecast	907.2	1036.8	1037	1296.0	1296.0	1426.0
		Actual	985.8	1419.6	1414			
	R, Mm ³	Planned	561.6	604.8	605	778.0	1037.0	1140.0
		Actual	628.3	649.7	649			
	W, Mm ³	Planned	6970.6	7402.6	7835	9372.0	9631.0	9916.0
		Actual	7097	8001	8854			
Reservoirs of Tuyamuyun waterworks facility	I, Mm ³	Forecast	1418.7	1528	1738	1641.0	1872.0	2156.0
		Actual	730.4	1320.8	2251			
	R, Mm ³	Planned	777.6	864.0	950	1037.0	1037.0	1236.0
		Actual	384.6	542.7	785			
	W, Mm ³	Planned	2664	3017	3450	3298.0	3744.0	4237.0
		Actual	2458	2648	3085			



Generation (G), Energy losses through sterile spills (L), Discharge through turbines (Q), Sterile spills (R), Head (H)

HEPS	Parameter		June		
			I ten-day	II ten-day	III ten-day
Nurek	G, M kWh	Actual	325.9	351.3	365.4
	L, M kWh	Actual	0.0	0.0	0.0
	Q, m ³ /s	Actual	727.2	752.0	750.7
	R, m ³ /s	Actual	0.0	0.0	0.0
	H, m	Actual	224.0	233.5	243.5



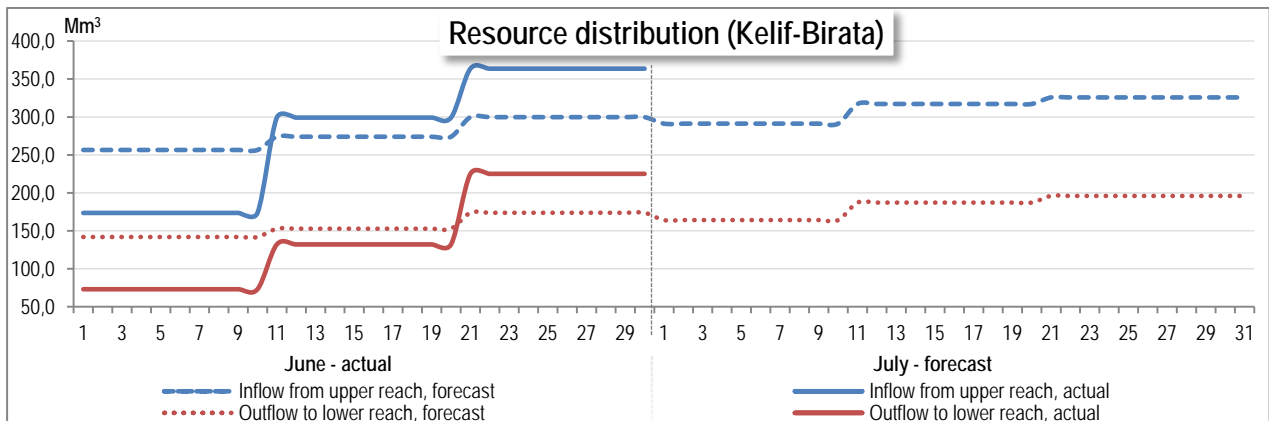


Water distribution

River reaches
Kelif gauging station (upstream of intake to Garagumdarya) – Birata gauging station (Darganata)
Tuyamuyun gauging station (tail water of Tuyamuyun waterworks facility) – Samanbay settlement
Large Aral Sea

Water volume (W)

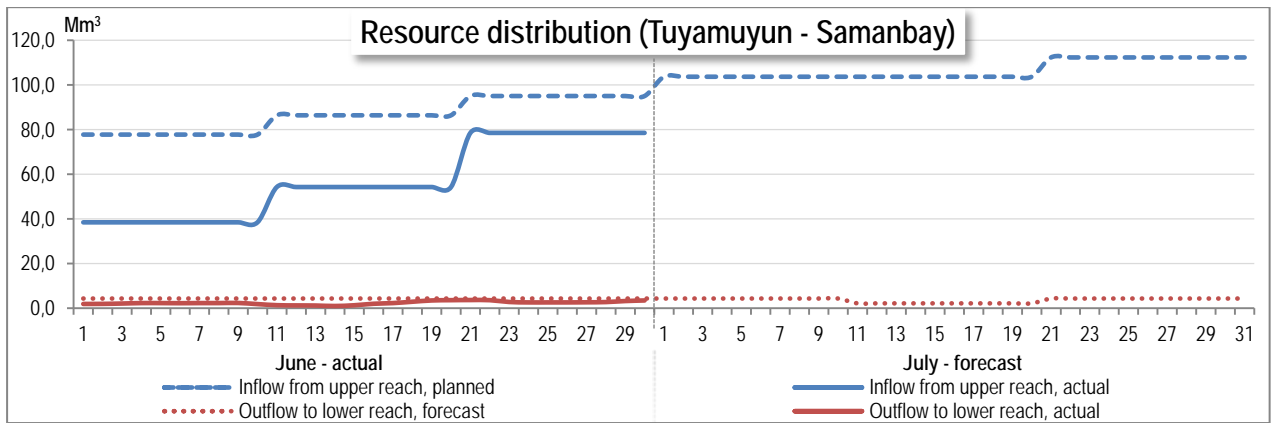
Kelif - Birata	Parameter	June			July			
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day	
Inflow from upper reach	W, Mm³	Forecast	2565	2740	2998	2912.0	3171.0	3583.0
		Actual	1736	2991	3636			
Lateral inflow	W, Mm³	Forecast	60	58	52	50.0	50.0	56.0
		Actual	60	58	52			
Water withdrawal	W, Mm³	Planned	950	995	1013	1030.0	1032.0	1125.0
		Actual	866	965	1030			
Losses	W, Mm³	Forecast	257	274	300	291.0	317.0	358.0
		Actual	200	763	408			
Outflow to lower reach	W, Mm³	Forecast	1418.7	1528	1738	1641.0	1872.0	2156.0
		Actual	730	1321	2251			



Water volume (W)

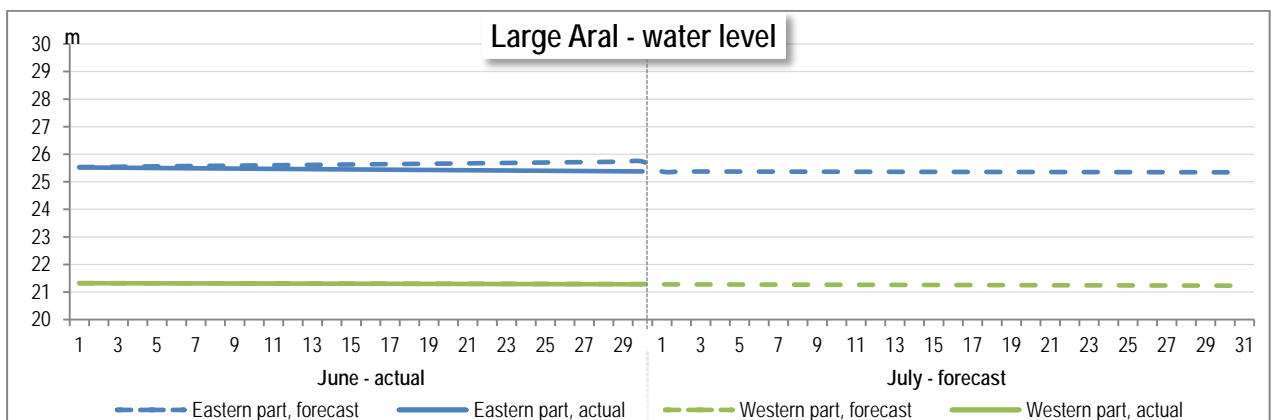
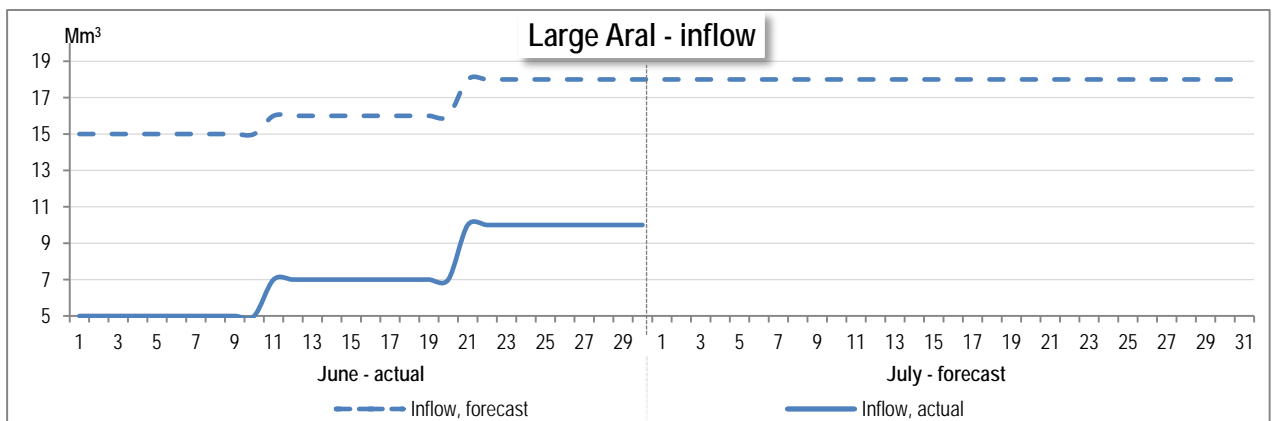
Tuyamuyun - Samanbay	Parameter	June			July			
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day	
Inflow from upper reach	W, Mm³	Forecast	777.6	864	950	1036.0	1037.0	1236.0
		Actual	385	543	785			
Lateral inflow	W, Mm³	Forecast	0.0	0	0	0.0	0.0	0.0
		Actual	0.0	0.0	0			
Water withdrawal ¹	W, Mm³	Planned	535.7	605	674	734.0	799.0	879.0
		Actual	223	296	396			
Losses	W, Mm³	Forecast	198.7	216	233	259.0	216.0	309.0
		Actual	140.6	226	360			
Outflow to lower reach	W, Mm³	Forecast	43.2	43	43	43.0	22.0	48.0
		Actual	21	20	30			

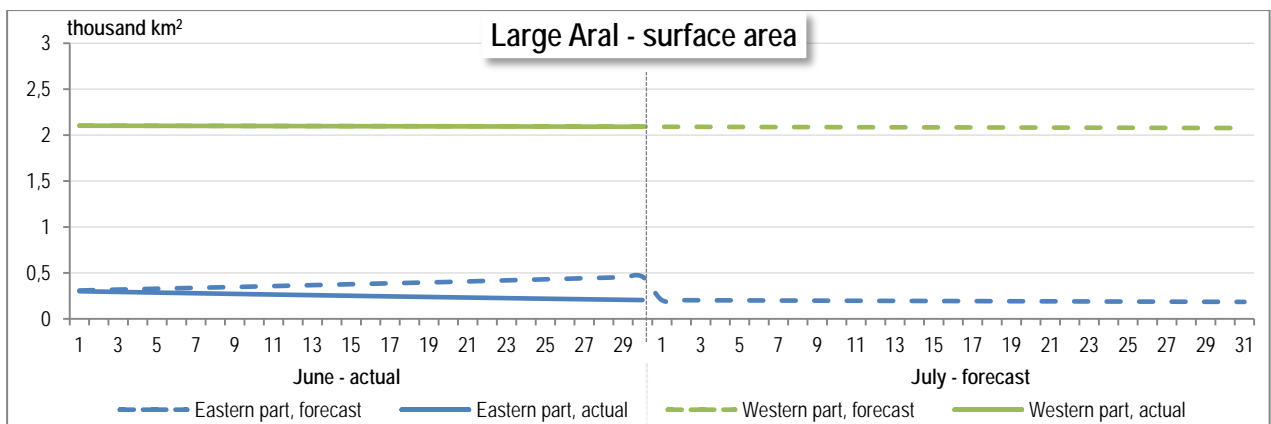
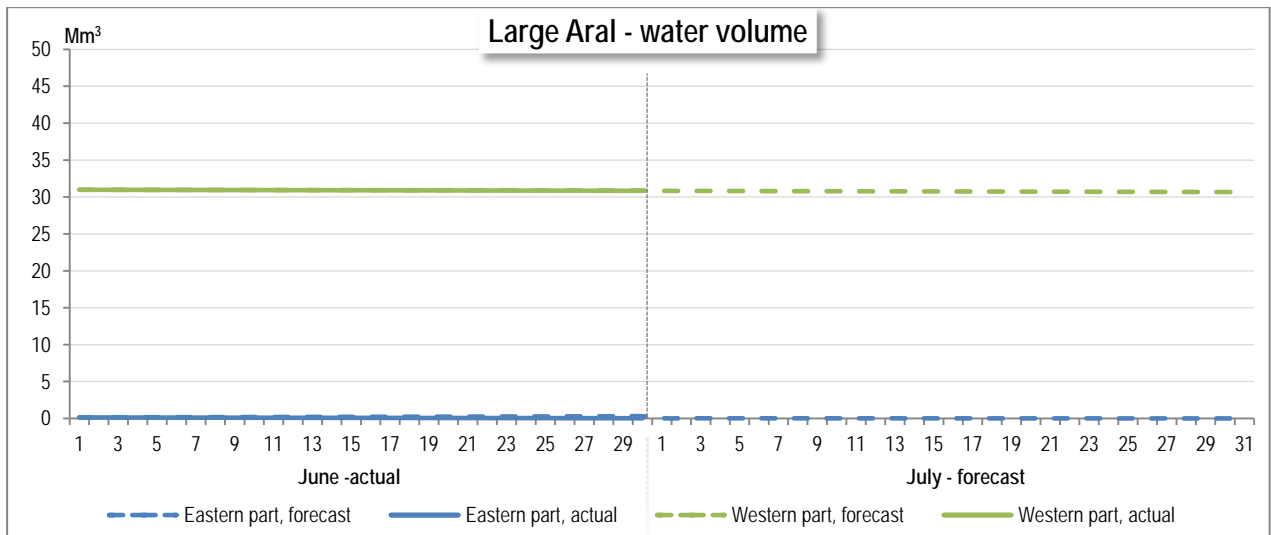
¹ Note: Including supply to the system of lakes and environmental water releases into canals



Water volume (W), Level (H), Surface area (S)

Large Aral Sea	Parameter	June			July			
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day	
Inflow	W, Mm ³	Planned	150.00	160.00	180.00	180.0	180.0	198.0
		Actual	50.00	70.00	100.00			
Eastern part, water volume	W, Mm ³	Forecast	0.17	0.22	0.28	0.0	0.0	0.0
		Actual	0.12	0.08	0.04			
Eastern part, level	H, m	Forecast	25.56	25.63	25.70	25.0	25.0	25.0
		Actual	25.50	25.45	25.40			
Eastern part, area	S, th.km ²	Forecast	0.33	0.38	0.43	0.0	0.0	0.0
		Actual	0.28	0.25	0.22			
Western part, water volume	W, Mm ³	Forecast	30.96	30.92	30.89	30.0	30.0	30.0
		Actual	30.96	30.91	30.86			
Western part, level	H, m	Forecast	21.32	21.31	21.29	21.0	21.0	21.0
		Actual	21.32	21.30	21.29			
Western part, area	S, th.km ²	Forecast	2.10	2.10	2.10	2.0	2.0	2.0
		Actual	2.10	2.10	2.09			





Syr Darya River Basin

Actual Situation in June and Forecast for July

In June, the available usable water resources in the Syr Darya River that were estimated as the sum of rivers' flow based on inflow to Toktogul, Andizhan, and Charvak reservoirs plus lateral inflow to the rivers and minus losses amounted to 5,421 million m³, of which the inflow to the three reservoirs was 4,589 million m³ (106% of the forecast). The available usable water resources for July are expected to decrease to 5,169 million m³, including the inflow to the three reservoirs, to 3,776 million m³.

In June, inflow to the Toktogul reservoir amounted to 2,755 million m³ (120 % of forecast), and only 1,075 million m³ of water was discharged from the reservoir (97% of the plan). The water volume in the Toktogul reservoir increased from 8,611 million m³ to 10,251 million m³ in the course of June. Thus, the reservoir was filled by 1,640 million m³ of water, and the accumulation plan was exceeded by 5%. Based on water balance discrepancy, water losses in the reservoir are estimated at 40 million m³, that is 0.4% of reservoir's water volume. It is expected that in July the Toktogul reservoir will accumulate water and its water volume will increase to 11,309 million m³ by the end of month; the inflow to the reservoir is expected in the amount of 2,285 million m³, and water releases are planned at 1,227 million m³.

Inflow to the Andizhan reservoir amounted to 677 million m³ (90% of forecast), and 421 million m³ of water (59% of the plan) was discharged from the reservoir in June. The water volume was 1,017 million m³ at the beginning of month and 1,256 million m³ at the end of month. Water accumulation exceeded the plan by 20%. Water losses were insignificant (0.6 % of reservoir's water volume). In July, inflow to the Andizhan reservoir is expected to decrease to 495 million m³, while water releases are expected to increase to 670 million m³. As a result, the reservoir's water volume will decrease to 1,081 million m³ by the end of month.

In June, inflow to the Charvak reservoir was 1,156 million m³ (90% of expected inflow), and 1,032 million m³ was discharged (111 % of planned schedule) from the reservoir. The water volume was 1,631 million m³ at the beginning of month and 1,991 million m³ at the end of month (accumulated 2% above the plan). In July, the inflow to the Charvak reservoir is expected to decrease to 996 million m³, and water releases will also decrease to 941 million m³. The water volume is to increase to 2,046 million m³ by the end of month.

In June, the Bakhri Tojik reservoir was drawn down from 3,467 million m³ to 3,100 million m³ but the plan of water accumulation was overfulfilled by 7% by the end of month. The inflow to the reservoir was 775 million m³ (121 % of forecast), while water releases from the reservoir were 1,061 million m³ (89 % of the plan). The discrepancy derived from water balance that can be attributed to water losses was 81 million m³ (3% of reservoir's water volume). In July, inflow to the Bakhri Tojik reservoir is expected to increase to 803 million m³, while water releases will increase to 1,615 million m³. The reservoir will be drawn down to 2,288 million m³.

Inflow to the Shardara reservoir was 624 million m³ in June (113% of expected inflow). Water releases from the reservoir into the river amounted to 953 million m³ (181 % of the plan). Water was not discharged into Arnasai. The reservoir was drawn down to 3,084 million m³. Water withdrawal from the reservoir amounted to 119 million m³ (82% of planned one). In July, inflow to the Shardara reservoir is expected to decrease to 389 million m³, and water releases from the reservoir will increase to 1,339 million m³. The reservoir's water volume will decrease to 1,839 million m³ by the end of month. Water discharge into Arnasai is not planned for July.

In June, the water volume in the Koksarai reservoir decreased from 502 million m³ to 21 million m³. There was no inflow to the reservoir. The discharge from the Koksarai reservoir into the Syr Darya amounted to about 481 million m³ (107% of planned one). In July, the reservoir will accumulate water and will not be drawn down.

In June, the cascade of Naryn HEPS, Kyrgyzstan generated 912 million kWh (93% of the plan), of which 906 million kWh generated under energy mode. The plan of energy generation for July for the cascade of Naryn HEPS is set at 1066 million kWh, that is 117 % of generation in June.

Toktogul HEPS generated 356 million kWh in June. The average discharge through turbines of the Toktogul HEPS was 415 m³/s, the average monthly head at HEPS was 134 m, and no sterile spills were recorded. The plan of energy generation for July for the Toktogul HEPS is set at 428 million kWh (120% of generation in June).

In June, the total generation at large HEPS' of Uzbekistan amounted to 496 million kWh, of which: 413 million kWh at Charvak HEPS, 64 million kWh at Andizhan HEPS, and 19 million kWh at Farkhad HEPS. The average monthly discharge at Charvak HEPS was 378 m³/s, and the head was 143 m. The discharge at Andizhan HEPS was 115 m³/s, and the head was 95 m. For Farkhad HEPS, the discharge was 99 m³/s, and the head was 31 m.

Energy generation by HEPS of the Bakhri Tojik reservoir, Tajikistan amounted to 37 million kWh in June. Shardara HEPS, Kazakhstan generated 54 million kWh. The average monthly water discharge at HEPS of Bakhri Tojik was 351 m³/s, while the head was 21 m. Discharge through turbines of Shardara HEPS was 360 m³/s, and the head was 19 m.

In June, the water shortage was estimated at 13% of the set limit in upper reaches, in the reach of the Naryn River, Toktogul HEPS-Uchkurgan waterworks facility (tail-water). Further downstream, in the reach from Uchkurgan waterworks facility (tail-water) to Akjar g/s (inflow to the Bakhri Tojik reservoir) the water shortage was lower - only 2% of the limit. In the Akjar section the water volume was 775 million m³ or by 21% higher of the amount envisaged in the water distribution plan.

In the middle reaches, from the Bakhri Tojik reservoir (Kyzylkishlak section) to Shardara reservoir, the actual water withdrawal was by 24% lower than planned one. 624 million m³ flowed to the Shardara reservoir from the Syr Darya River; this is 13% higher of the expected inflow.

In the lower reaches of the Syr Darya River the river flow downstream of the Shardara reservoir was 953 million m³, that was by 81% more (!) than the expected discharge from the Koksarai reservoir into the river. Through water releases from the Koksarai reservoir into the river, flow of the latter was increased additionally to 481 million m³. This enabled water withdrawal by 27% above planned one in the lower reaches. However, inflow to the North Aral Sea amounted to only 26 million m³ (see below on the Aral Sea).

River water balance discrepancies that can be attributed to water losses were estimated through balance method as follows: Toktogul HEPS-Uchkurgan waterworks facility – 5% of the Naryn River flow; Uchkurgan waterworks facility-Akjar - 15% of the Syr Darya River flow; losses in the Bakhri Tojik reservoir - Shardara reservoir reach were virtually absent; and, lower reaches - 23%.

In July, it is expected that discharge from the Toktogul waterworks facility will increase 1.2 times, while that from the Uchkurgan waterworks facility will decrease. Inflow at Akjar section is expected by 4% higher than in June. Although water releases will increase 1.6 times from the Bakhri Tojik reservoir, inflow to the Shardara reservoir will decrease. Discharge from the Shardara reservoir will increase 1.4 times, but water withdrawal will increase in the lower reaches and only 11 million m³ will flow to the North Aral Sea.

At present, the Aral Sea is a system of four water bodies: North Aral Sea (Kazakhstan), eastern and western basins of Large Aral Sea, and a small water body (let's call it Central) located between the North Aral Sea and the western basin of Large Aral Sea. The eastern basin of Large Aral Sea fed by Amu Darya River water, water from collecting drains and discharge from the North Aral Sea virtually has no water now. The difference in water levels between the North Aral Sea and the Central water body is about 10 m. This creates favorable conditions for seepage flow from the North Aral to the Central water body. Currently no water is discharged from the North Aral to the Large Aral Sea; however, in the Central water body and the western basin of the Large Aral the water level and the water surface area are maintained (as regular processing of satellite images of this territory by SIC ICWC shows), with insignificant declining dynamics, despite high water losses through evaporation. Hence, one may conclude about recharge of these water bodies from groundwater generated also by seepage from the North Aral.

In June 2023, inflow to the North Aral Sea from the Syr Darya River was about 26 million m³. In July, 11 million m³ will flow to the sea, i.e. inflow will fall 2.4 times. The water volume in this water body decreased from 23.4 km³ to 23 km³ in June. The water surface area shrank from 3 thousand km² to 2.95 thousand km², while the water level dropped from 41.4 m to 41.25 m. In July, the downward trend will remain in the North Aral Sea, with the water volume decreasing to 22.7 km³, the water surface area, to 2.9 thousand km², and the water level, to 41.16 m. There was no discharge from the North Aral into the Large Aral in June, and water discharge is not planned in July as well.

The sections below show daily and ten-day data on climate and water management (reservoirs, HEPS, water distribution).

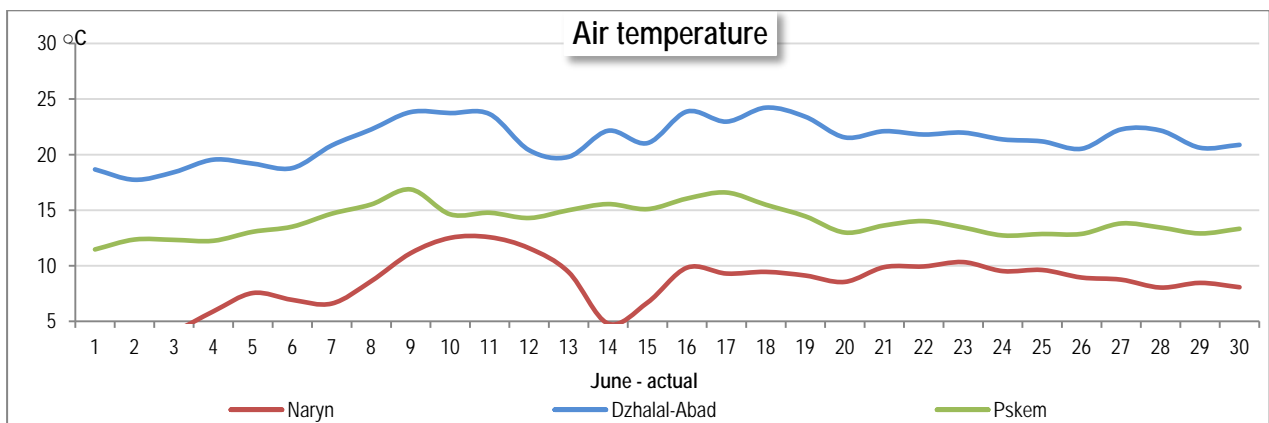


Climate

Weather station Riverhead	Location		
	Latitude	Longitude	Altitude above sea level, m
Naryn	41.43	76.00	2041
Dzhalal-Abad	40.92	72.95	765
Pskem	41.90	70.37	1258

Air temperature (T)

Station	Parameter	June			July		
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day
Naryn	Forecast	7.00	9.00	9.00	10.0	15.0	13.0
	Actual	7.09	9.13	9.16			
Dzhalal-Abad	Forecast	21.00	23.00	22.00	22.0	27.0	27.0
	Actual	20.30	22.31	21.49			
Pskem	Forecast	14.00	15.00	14.00	15.0	20.0	19.0
	Actual	13.67	15.03	13.30			



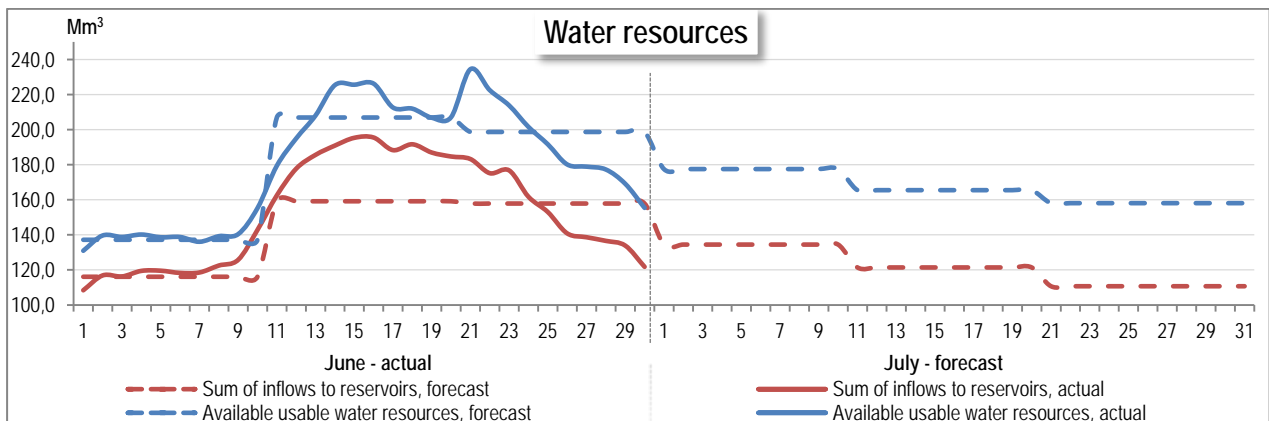


Water resources

Object
Naryn River (inflow to Toktogul)
Karadarya River (inflow to Andizhan)
Chirchik River (inflow to Charvak)
Syr Darya River (up to Shardara)

Water volume (W)

Object	Parameter	June			July			
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day	
Inflow to Toktogul reservoir	W, Mm ³	Forecast	592	851	851.0	737.0	737.0	810.0
	Actual		628	1178	950.0			
Inflow to Andizhan reservoir	W, Mm ³	Forecast	168	294	293.8	216.0	156.0	123.0
	Actual		170	260	247.7			
Inflow to Charvak reservoir	W, Mm ³	Forecast	401	447	433.7	391.0	321.0	283.0
	Actual		411	422	323.8			
Sum of inflows to reservoirs	W, Mm ³	Forecast	1161	1591	1578.5	1344.0	1214.0	1217.0
	Actual		1208	1859	1521.5			
Lateral inflow up to Shardara	W, Mm ³	Forecast	290	556	487.2	486.0	496.0	576.0
	Actual		268	318	482.1			
Losses	W, Mm ³	Forecast	79	79	78.9	55.0	55.0	55.0
	Actual		79	79	78.9			
Available usable water resources	W, Mm ³	Forecast	1372	2069	1986.8	1775.0	1655.0	1738.0
	Actual		1398	2098	1924.8			



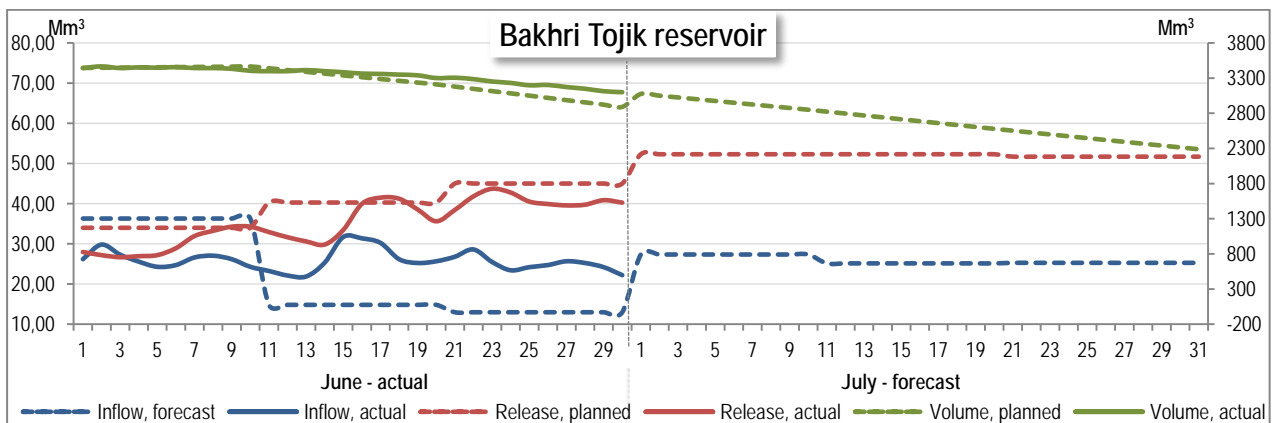
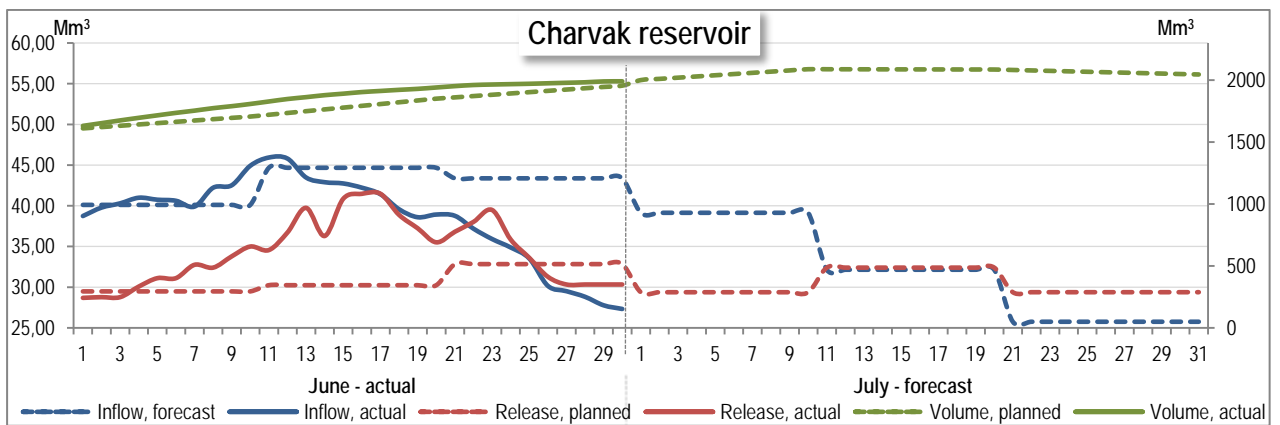
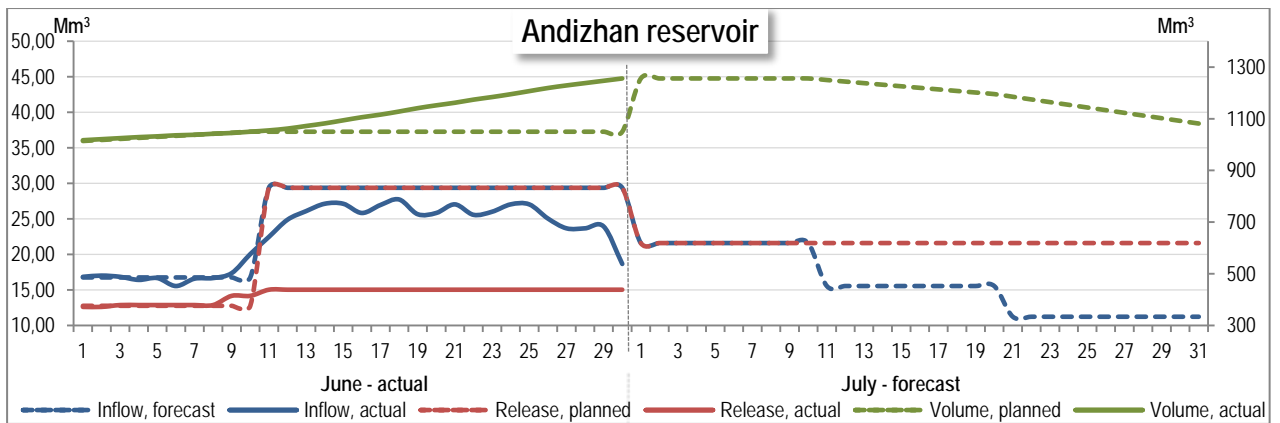
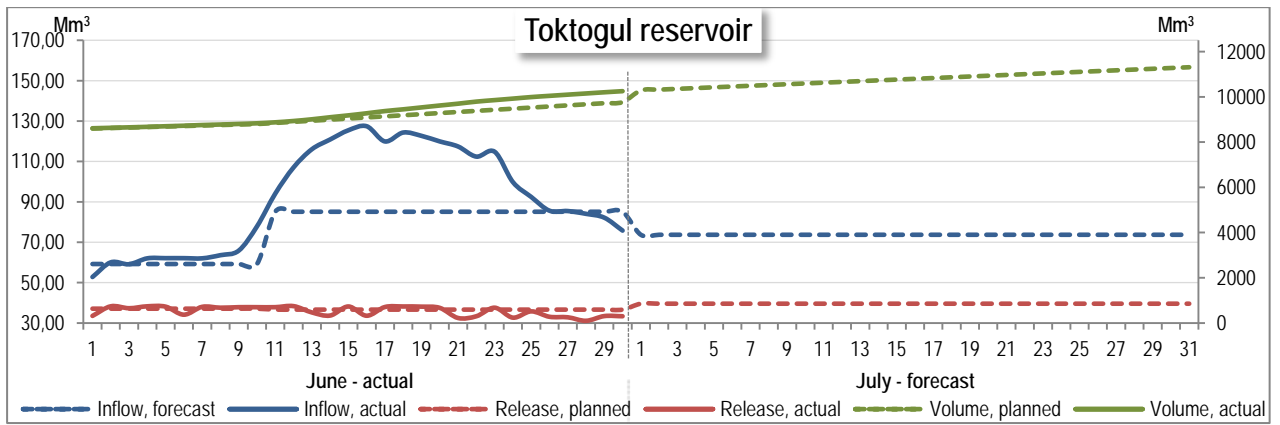


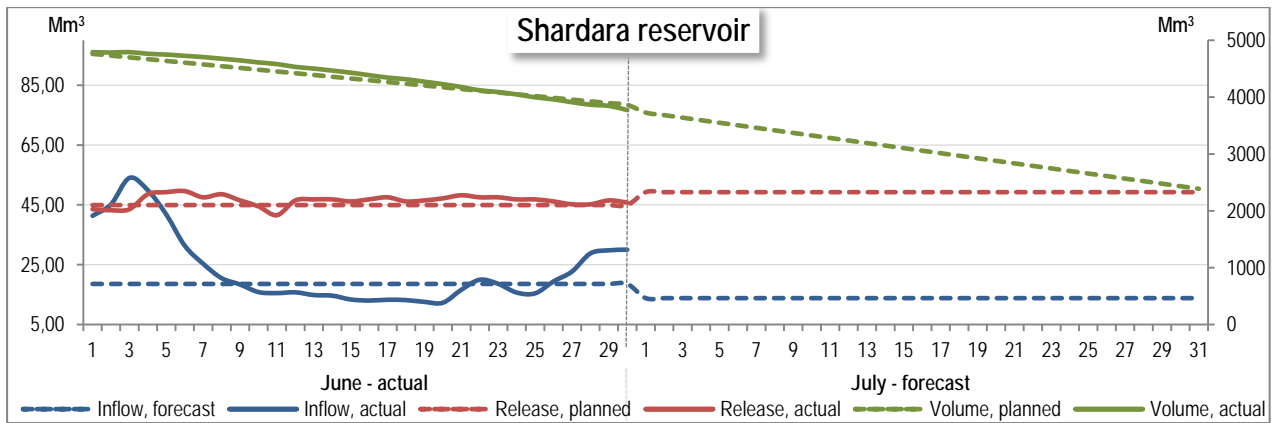
Reservoirs and HEPS

Reservoir	Location			Characteristics				
	Latitude	Longitude	Altitude above sea level, m	Length, km	Width, km	Water-surface area, km ²	Full volume, km ³	Full reservoir level, m
Toktogul	41.80	72.87	880	65	12	284	19.50	215
Andizhan	40.77	73.11	900	36	1.5-12	56	0.19	905
Bakhri Tojik	40.29	70.07	344	75	20	520	4.16	348
Charvak	41.63	70.03	869	15	3	37	1.90	906
Shardara	41.20	67.99	250	80	25	783	5.70	252

Inflow (I), Releases (R), Volume (W)

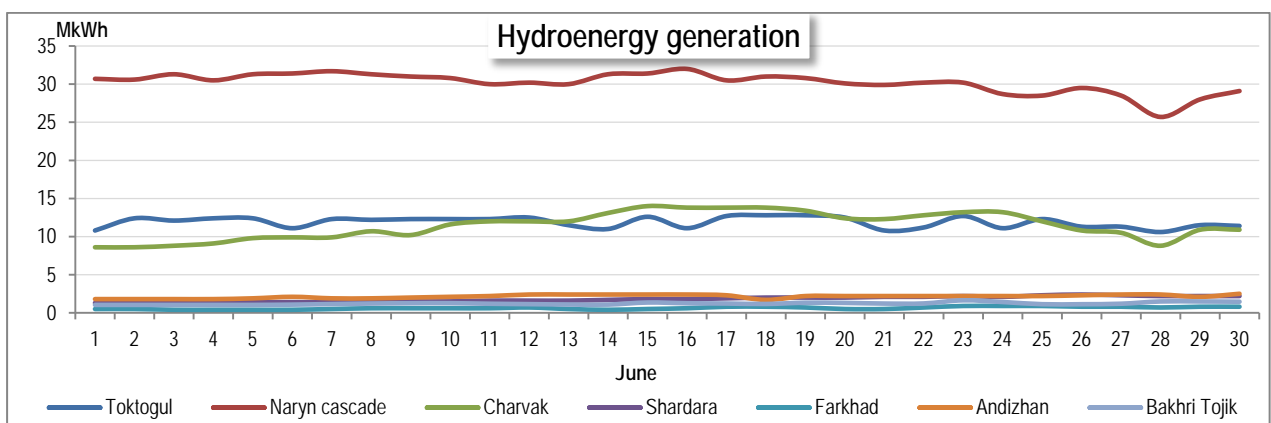
Reservoir	Parameter	June			July			
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day	
Toktogul reservoir	I, Mm ³	Forecast	592.19	851.00	851.00	736.0	736.0	810.0
		Actual	627.52	1177.80	949.97			
	R, Mm ³	Planned	371.00	366.34	366.34	395.0	395.0	435.0
		Actual	370.92	368.67	335.66			
	W, Mm ³	Planned	8798	9283	9768	10592.0	10934.0	11309.0
		Actual	8830	9617	10251			
Andizhan reservoir	I, Mm ³	Forecast	167.60	293.76	293.76	216.0	155.0	123.0
		Actual	170.04	259.72	247.71			
	R, Mm ³	Planned	127.70	293.76	293.76	216.0	216.0	237.0
		Actual	130.81	150.34	150.34			
	W, Mm ³	Planned	1050	1050	1050	1256.0	1196.0	1081.0
		Actual	1050	1152	1256			
Charvak reservoir	I, Mm ³	Forecast	401.10	446.70	433.73	391.0	321.0	283.0
		Actual	410.72	421.58	323.84			
	R, Mm ³	Planned	294.80	302.40	328.32	293.0	324.0	323.0
		Actual	312.42	382.75	336.36			
	W, Mm ³	Planned	1706	1851	1956	2089.0	2086.0	2046.0
		Actual	1808	1941	1991			
Bakhri Tojik reservoir	I, Mm ³	Forecast	362.94	148.08	129.69	273.0	251.0	277.0
		Actual	261.96	262.92	250.47			
	R, Mm ³	Planned	339.93	402.80	450.08	522.0	523.0	568.0
		Actual	298.54	355.31	407.60			
	W, Mm ³	Planned	3466	3211	2891	2850.0	2579.0	2288.0
		Actual	3404	3301	3100			
Shardara reservoir	I, Mm ³	Forecast	118.20	216.00	216.00	126.0	126.0	136.0
		Actual	123.28	198.50	302.49			
	R, Mm ³	Planned	172.80	174.36	179.32	432.0	432.0	475.0
		Actual	205.03	290.65	457.14			
	W, Mm ³	Planned	4045	4035	4020	2683.0	2283.0	1839.0
		Actual	3824	3545	3084			

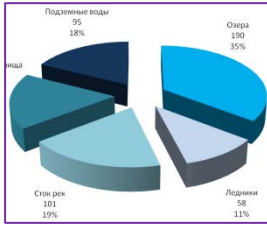




Generation (G), Energy losses through sterile spills (L), Discharge through turbines (Q), Sterile spills (R), Head (H)

HEPS	Parameter		June		
			I ten-day	II ten-day	III ten-day
Naryn cascade	G, M kWh	Actual	328.0	328.0	328.0
	G, M kWh	Actual	118.0	118.0	118.0
Toktogul	Q, m³/s	Actual	429.0	426.8	388.5
	H, m	Actual	131.5	133.4	137.0
	G, M kWh	Actual	19.1	22.6	22.7
Andizhan	Q, m³/s	Actual	103.4	121.0	121.0
	H, m	Actual	95.0	95.0	95.0
	G, M kWh	Actual	11.2	12.1	13.4
Bakhri Tojik	Q, m³/s	Actual	313.6	346.7	394.0
	H, m	Actual	21.0	20.6	20.0
	G, M kWh	Actual	4.9	6.1	7.8
Farkhad	Q, m³/s	Actual	78.2	95.7	122.7
	H, m	Actual	30.6	30.6	30.6
	G, M kWh	Actual	97.2	130.3	115.4
Charvak	Q, m³/s	Actual	331.2	426.0	376.7
	H, m	Actual	139.7	143.9	146.1
	G, M kWh	Actual	14.1	18.0	22.1
Shardara	Q, m³/s	Actual	234.0	344.0	503.0
	G, M kWh	Actual	19.9	19.1	17.9



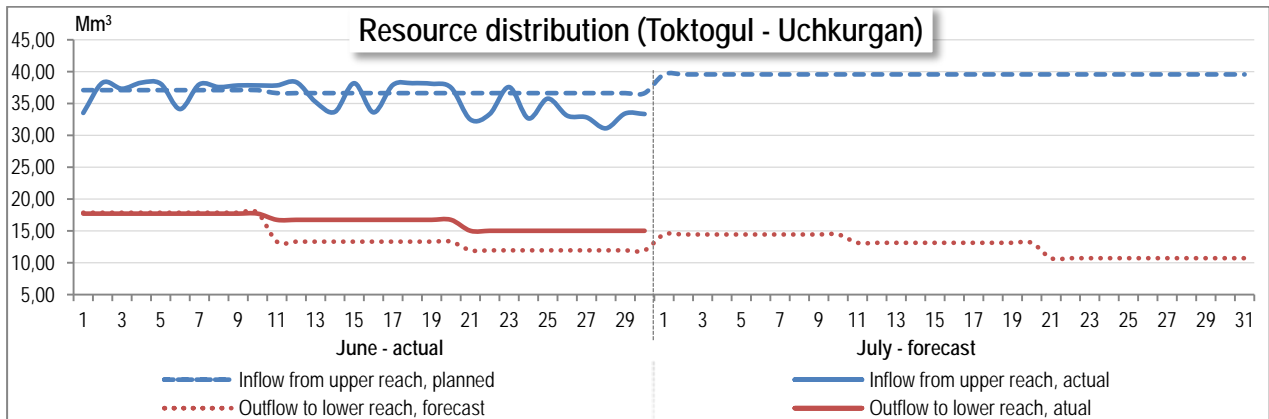


Water distribution

River reach
Naryn River: tail water of Toktogul reservoir– Uchkurgan waterworks facility
Naryn River: Uchkurgan waterworks facility - Syr Darya River: inflow to Bakhri Tojik reservoir
Syr Darya River: tail water of Bakhri Tojik reservoir – inflow to Shardara reservoir
Syr Darya River: tail water of Shardara reservoir – inflow to North Aral Sea (Karateren settlement)
North Aral Sea

Water volume (W)

Toktogul - Uchkurgan	Parameter	June			July			
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day	
Inflow from upper reach	W, Mm ³	Planned	371.00	366.34	366.34	395.0	395.0	435.0
		Actual	370.92	368.67	335.66			
Lateral inflow ²	W, Mm ³	Forecast	46.31	93.27	93.27	62.28	62.0	68.0
		Actual	45.45	48.21	46.66			
Water withdrawals	W, Mm ³	Planned	212.82	264.21	277.86	287.0	300.0	359.0
		Actual	213.31	228.05	217.43			
Losses	W, Mm ³	Forecast	25.92	62.29	62.29	25.0	25.0	25.0
		Actual	25.94	21.47	14.73			
Outflow to lower reach ³	W, Mm ³	Forecast	178.57	133.11	119.46	144.0	131.0	117.0
		Actual	177.12	167.36	150.16			



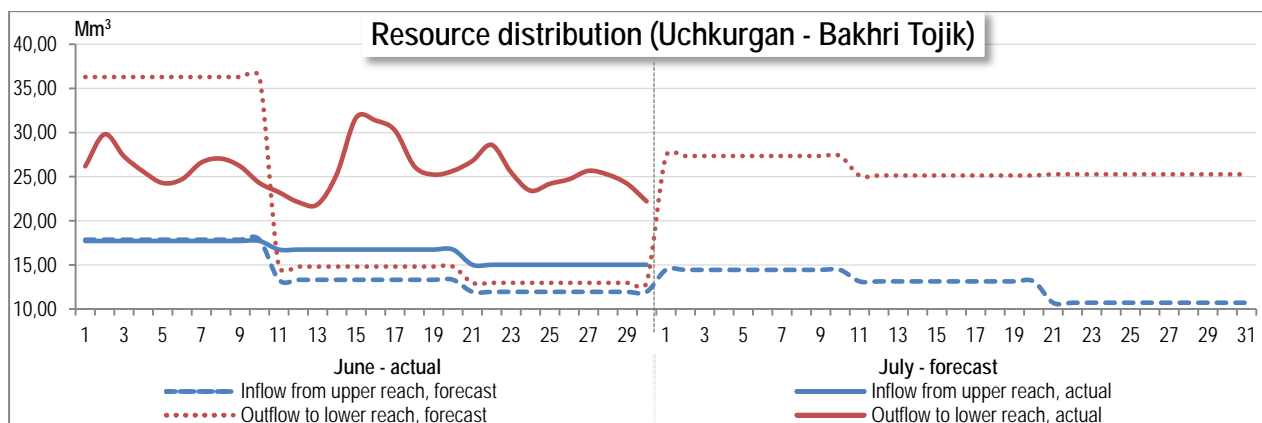
Water volume (W)

Uchkurgan – Bakhri Tojik	Parameter	June			July			
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day	
Inflow from upper reach	W, Mm ³	Forecast	178.57	133.11	119.46	144.0	131.0	117.0
		Actual	177.12	167.36	150.16			
Lateral inflow	W, Mm ³	Forecast	240.03	72.98	69.94	198.0	193.0	240.0
		Actual	177.12	167.36	150.16			
Water withdrawals	W, Mm ³	Planned	25.66	28.01	29.71	38.0	43.0	47.0
		Actual	25.72	26.78	28.56			
Losses	W, Mm ³	Forecast	30.00	30.00	30.00	30.0	30.0	33.0
		Actual	66.56	45.02	21.29			
Outflow to lower reach ⁴	W, Mm ³	Forecast	362.94	148.08	129.69	273.0	251.0	277.0
		Actual	261.96	262.92	250.47			

² Incl. Karasu left and right

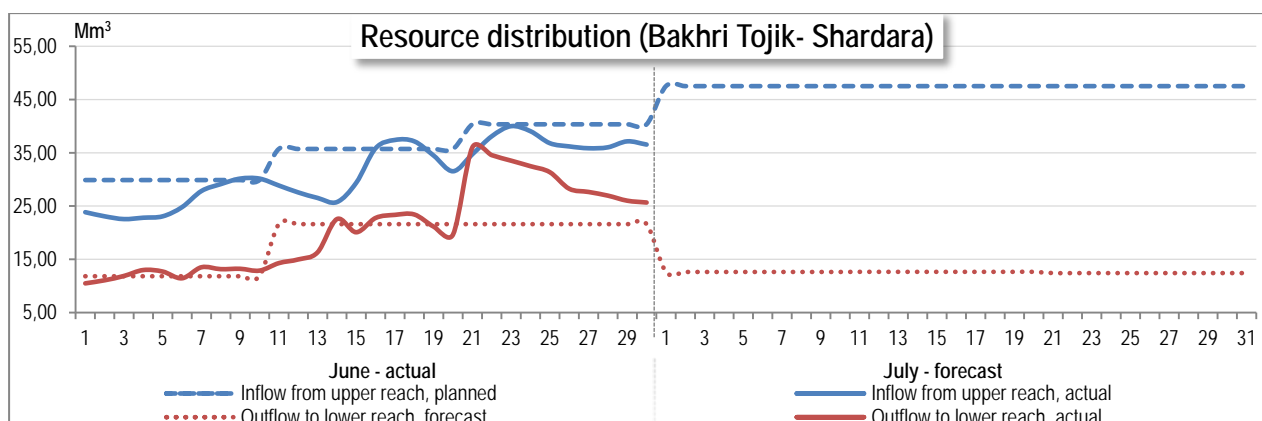
³ Uchkurgan waterworks facility

⁴ Akdzhar g/s



Water volume (W)

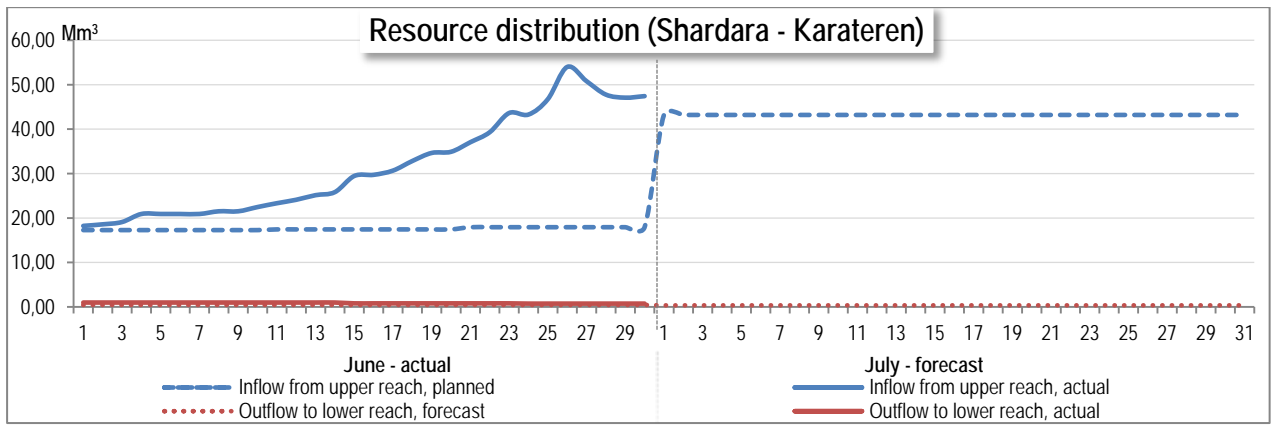
Bakhri Tojik - Shardara	Parameter	June			July			
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day	
Inflow from upper reach ⁵	W, Mm ³	Planned	298.80	357.20	403.50	475.0	475.0	522.0
		Actual	257.39	314.50	370.48			
Lateral inflow	W, Mm ³	Forecast	63.31	402.40	356.10	244.0	254.0	275.0
		Actual	142.20	210.58	150.08			
Water withdrawals	W, Mm ³	Planned	213.91	513.60	513.60	563.0	573.0	629.0
		Actual	234.58	315.46	370.92			
Losses	W, Mm ³	Forecast	30.00	30.00	30.00	30.0	30.0	33.0
		Actual	41.72	11.11	-152.84			
Outflow to lower reach	W, Mm ³	Forecast	118.20	216.00	216.00	126.0	126.0	136.0
		Actual	123.28	198.50	302.49			



Water volume (W)

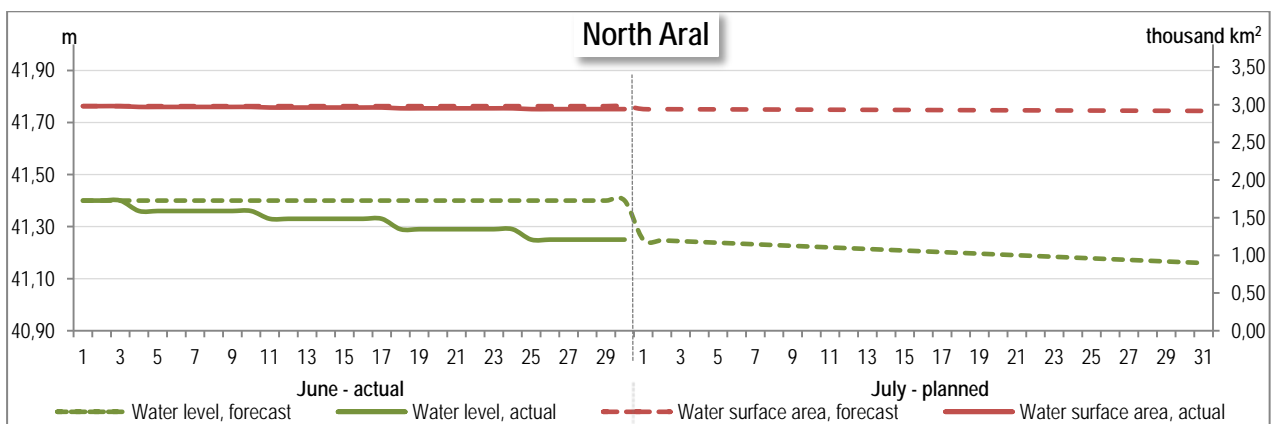
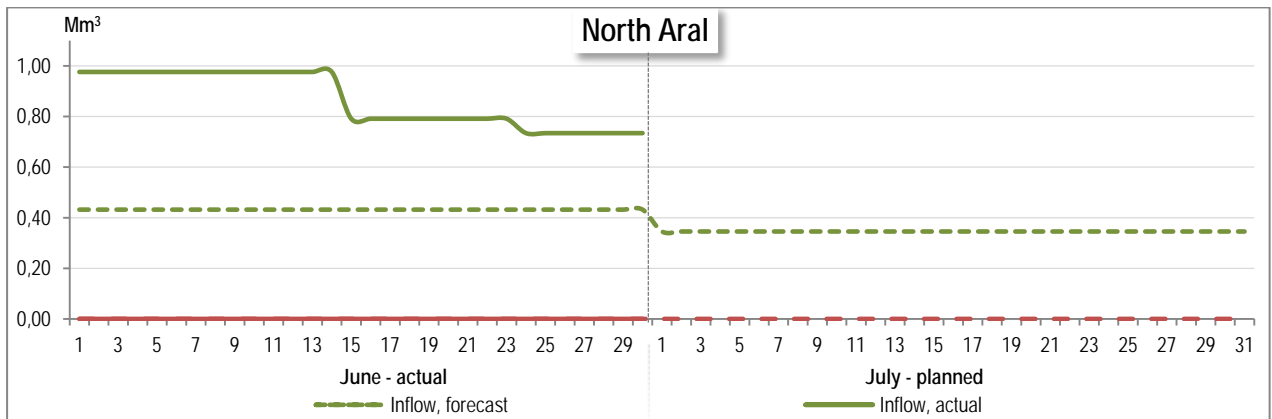
Shardara - Karateren	Parameter	June			July			
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day	
Inflow from upper reach	W, Mm ³	Planned	173	174.4	179.32	432.0	432.0	475.0
		Actual	205	290.6	457.14			
Lateral inflow	W, Mm ³	Forecast	5.6	5.6	5.62	8.0	5.0	5.0
		Actual	0.04	0.043	0.04			
Filling (+), draw down (-) of Koksarai reservoir	W, Mm ³	Planned	200.0	150.0	100.00	0.0	0.0	0.0
		Actual	276.5	177.1	27.65			
Water withdrawals	W, Mm ³	Planned	300.0	300.0	250.00	387	384.0	416.0
		Actual	363.7	357.8	361.05			
Losses	W, Mm ³	Forecast	74.1	25.7	30.62	50	50.0	61.0
		Actual	108.1	101.3	116.27			
Outflow to lower reach	W, Mm ³	Forecast	4.3	4.3	4.32	3.0	3.0	3.0
		Actual	9.8	8.7	7.52			

⁵ Kyzylkishlak g/s



Water volume (W), Level (H), Surface area (S).

North Aral	Parameter	June			July			
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day	
Inflow	W, Mm ³	Forecast	4.32	4.32	4.32	3.0	3.0	3.0
		Actual	9.76	8.65	7.52			
Water volume	W, Mm ³	Forecast	23.44	23.44	23.44	22.0	22.0	22.0
		Actual	23.35	23.19	23.04			
Water level	H, m	Forecast	41.40	41.40	41.40	41.0	41.0	41.0
		Actual	41.37	41.32	41.27			
Water surface area	S, th.km ²	Forecast	2.98	2.98	2.98	2.0	2.0	2.0
		Actual	2.97	2.96	2.95			
Water releases into the Large Aral Sea	W, Mm ³	Forecast	0.00	0.00	0.00	0.0	0.0	0.0
		Actual	0.00	0.00	0.00			



Information sources

Basin Water Organization "Amu Darya"

Basin Water Organization "Syr Darya"

Aral-Syrdarya Basin Water Authority

Coordination Dispatch Center "Energy"

Website of the Center of Hydrometeorological Service (Uzbekistan) meteo.uz

Central Asia Water and Ecological Knowledge Portal cawater-info.net

Website "Weather and Climate" pogodaiklimat.ru

For detailed analysis of water-related situation by SIC ICWC, please, visit the CAWATER-info portal

cawater-info.net/analysis/index.htm