Aral Sea Basin Transboundary Water Early Warning Bulletin

May - June 2020

UNRCCA

A need for production and periodic and timely issue of the Bulletin as an information product for timely collection and dissemination of information on water-related, environmental, and climatic situation in the Aral Sea basin with the purpose to prevent problems or disputes arising was addressed during a seminar on "Early Warning on Potential Transboundary Water Problem Situations in Central Asia", which was held in the city of Almaty on 26th of September 2011. The states in the Aral Sea basin have expressed their support for such initiative in discussions with the UN Regional Centre for Preventive Diplomacy for Central Asia. The Central Asian states have repeatedly shown their interest in enhancing the regional capacities for early warning and preparedness to potential hazards.

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 will be issued as part of the Project in 2020. The format and content of the bulletins have been agreed with the client and with all organizations that provided source information. The fourth bulletin in 2020 contains the actual information on the Syr Darya and Amu Darya basins for May and the forecast for June.

Data sources:

- BWO Amu Darya and BWO Syr Darya – data on water resources, their distribution in time (day) 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.

Digest of CA news for May

Source: cawater-info.net/news/index.htm

©	Breakdown of the Sardoba reservoir. Tashkent and Nur-Sultan discuss flood relief measures regnum.ru
©	Kazakhstan estimates initial damage from the breach at the Sardoba dam theworldnews.net
©	MFA: Kazakhstan will not send a note to Uzbekistan for the dam breach centralasia.media
©	Partial breach of the Sardoba dam causes huge damage to settlements, communications and agriculture podrobno.uz
©	Mirziyoyev: Uzbekistan will invite international experts and make thorough examination of the whole Sardoba dam podrobno.uz
©	The Sardoba reservoir has lost one third of its water kun.uz
©	EIA report: CASA-1000 will not change the operation modes of Nurek and Toktogul dams tazabek.kg
©	Uzbekistan consumes two- to three-fold more energy that developed countries regnum.ru
©	Uzbekistan adopts the country energy concept for 2020−2030 ca-irnews
©	Hydroenergy import from Tajikistan started uz.sputniknews.ru
©	Special representative of the UN Secretary-General supports the efforts of Presidents of Kazakhstan and Uzbekistan in addressing the breach at the Sardoba dam unrcca.unmissions.org
©	NASA publishes images depicting the situation before and after the Sardoba dam breach kun.uz
©	WB allocates additional $55 million for Kyrgyzstan to improve disaster resilience kabar.kg
©	Uzbekistan gets the status of observer at EAEU sng.today
©	Ecology of the Small Aral Sea is becoming better dknews.kz
©	UNRCCA takes part in an international conference on preventive diplomacy unrcca.unmissions.or
©	Supplemental agreement approved to the commissioning project of the second aggregate at Kambarata-2 kyrtag.kg
©	The Tajik Government reserves the “golden shares” of Roghun and TALCO centrasia.org
©	Meeting of the deputy foreign ministers of Central Asian countries and Russia in the videoconference format uztag.info
©	UN Climate Change launches Russian language communications tools unfccc.int
©	Kazakhstan presented a draft agreement with Uzbekistan on transboundary water management kaztag.kz
©	Kyrgyzstan considers buying electricity from Tajikistan ritmeurasia.org
©	Discussions on the draft national review of SDGs in Uzbekistan: three days, three videoconferences and more than four hundred participants uzdaily.uz
©	EU-CA-Afghanistan videoconference of deputy foreign ministers kabar.kg
©	Bulletin of the Interstate Commission for Water Coordination in Central Asia icwc-aral.uz

Amu Darya River Basin

Actual Situation in May and Forecast for June

In May, the available usable river water resources estimated as natural, non-regulated river flow plus lateral inflow into the river and minus losses amounted to 6,868 Mm^3. The regulated flow of the Amu Darya in the section upstream of intake to Garagumdarya is estimated at 6,189 Mm^3 (90% of the forecast).

It is expected that in June the flow of the Amu Darya River in the section upstream of intake to Garagumdarya will be 8,389 Mm^3, i.e. will increase by 36%.

Inflow to the Nurek reservoir was 2,063 million m^3 in May or 77% of the forecast. Water releases from the reservoir amounted to 1,555 million m^3 (91% of planned releases). The reservoir was filled with water by 708 million m^3 and reached the volume of 7,003 million m^3 by the end of month (96% of BWO Amu Darya's schedule). Water losses in the reservoir were not observed. Unrecorded inflow (estimated as balance discrepancy) was detected in the amount of 200 Mm^3 (2.7 % of reservoir's water volume). It is expected that in June 3,582 million m^3 of water will flow into the Nurek reservoir. The water volume in the reservoir will increase to 8,123 million m^3, and water releases from the reservoir will be 2,464 million m^3.

In May, inflow to Tuyamuyun waterworks facility (TMWF) was 3,298 million m^3 or 82% of expected flow (estimated from channel balance when forecasting flow transformation along the river channel). The water volume in the reservoirs of TMWF increased from 2,851 million m^3 at the beginning of month to 3,242 million m^3 at the end of month. Water releases from the reservoirs amounted to 1,611 Mm^3 (78% of those scheduled by BWO Amu Darya). Water diversion from the reservoirs amounted to 720 million m^3 (84% of the plan). Water losses in the reservoirs of TMWF (calculated as water balance discrepancy) were estimated at 576 Mm^3, i.e. about 17% of water volume in the reservoirs by the end of April. Inflow to TMWF is expected to be 4,369 million m^3 in June. TMWF reservoirs will accumulate water moderately and their volume will be 3,939 by the end of month. Water releases from the reservoirs are planned in the amount of 2,730 million m^3.

Nurek HEPS generated 769 million kWh of electric energy in May (by 43% more than in April). The discharge through turbines increased to 581 m^3/s, while the head rose to 225 m. Sterile spills were not observed.

In May, HEPS of the Tuyamuyun waterworks facility generated 46 million kWh; and, the head at HEPS was 20 m.

In May, water along the Amu Darya River was distributed unevenly: in the middle reaches at Kelif g/s (section upstream of intake to Garagumdarya) – Birata g/s (inflow to TMWF) the water shortage was 18% of the plan, and in the lower reaches at Tuyamuyun g/s (tail-water of TMWF) – Samanbay g/s (inflow to the Aral Sea) the water shortage was 31% of the plan. Water balances in the reaches showed negative discrepancies that can be attributed to water losses: 899 Mm^3 (15% of river flow at Kelif g/s) in the middle reaches and 544 Mm^3 (34% of river flow downstream of TMWF!) in the lower reaches.

In May, flow of the Amu Darya River changed as follows by key gauging station: Kelif g/s – 6,189 Mm^3, Birata g/s – 3,298 Mm^3 (53% of flow at Kelif g/s), Tuyamuyun g/s (downstream of TMWF) – 1,611 Mm^3 (26% of flow at Kelif g/s), and Samanbay g/s (inflow to the Large Aral Sea) - 103 Mm^3 (less than 2% of flow at Kelif g/s).

In June, water withdrawal will be increased from 2,271 to 2,958 Mm^3 in the first reach and from 964 to 1,909 Mm^3 in the second reach. Flow along the river will change as follows: Kelif g/s – 8,389 Mm^3 (by 36% more than in May), Birata g/s – 4,369 Mm^3 (by 32% more than in May), Tuyamuyun g/s – 2,730 Mm^3 (by 69% more than in May), and Samanbay g/s - 281 Mm^3.

In May, inflow to the Large Aral Sea from the Amu Darya River and collecting drains (collectors) amounted to 210 Mm^3 (68% of expected inflow) and, if we add flow from the Northern Aral Sea to the Eastern part of the Large Aral Sea, the inflow was 423 Mm^3 (79% of inflow in April).

In May, the water level in the Eastern part of the Large Aral Sea averaged 28.3 m, the water surface area was 3.9 thousand km^2, and the water volume was 5.4 km^3. In the Western part, the water level was 21.66…21.6 m, the water surface area was 2.2…2.18 thousand km^2, and the water volume was 32.1…31.9 km^3. Evaporation from 1 km^2 of water surface of the Large Aral Sea was 0.105 Mm^3 in May.

It is expected that in June the total inflow to the Large Aral Sea will be 503 Mm^3, including 473 Mm^3 from the Amu Darya River and collectors and 30 Mm^3 as inflow from the Northern Sea. By the end of June, in the Eastern part of the Large Aral Sea the water level will be 28.23 m, the water surface area will be 3.81 thousand km^2, and the water volume will be 5.14 km^3. In the Western part of the Large Aral Sea the water level will be 21.5 m, the water surface area will be 2.15 thousand km^2, and the water volume will be 31.5 km^3. Evaporation from 1 km^2 of water surface of the Large Aral Sea will be 0.212 million m^3 in June.

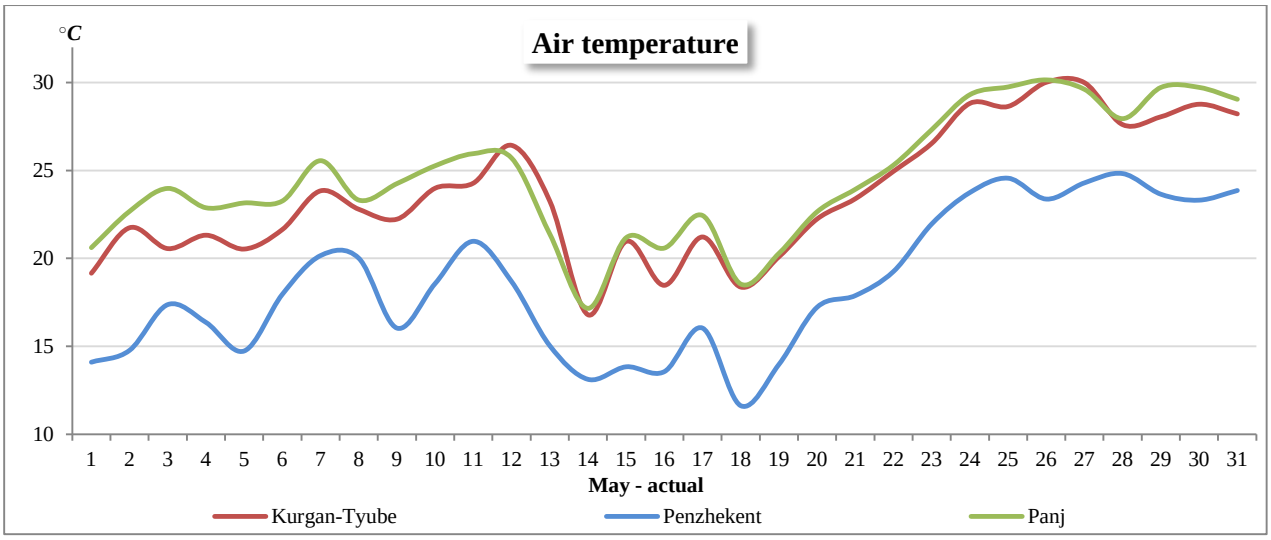
The sections below show daily and ten-day data on climate and water management (reservoirs, HEPS, water distribution).

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		May			June		
			I ten-day	*II ten-day*	*III ten-day*	*I ten-day*	*II ten-day*	*III ten-day*
Panj	*T*, °C	*Forecast*	23.00	22.00	28.00	28.00	30.00	33.00
		Actual	23.49	21.59	28.34			
Kurgan-Tyube	*T*, °C	*Forecast*	22.00	22.00	27.00	28.00	31.00	35.00
		Actual	21.78	21.21	27.72			
Penzhekent	*T*, °C	*Forecast*	17.00	16.00	22.00	24.00	26.00	29.00
		Actual	17.01	15.41	22.80			

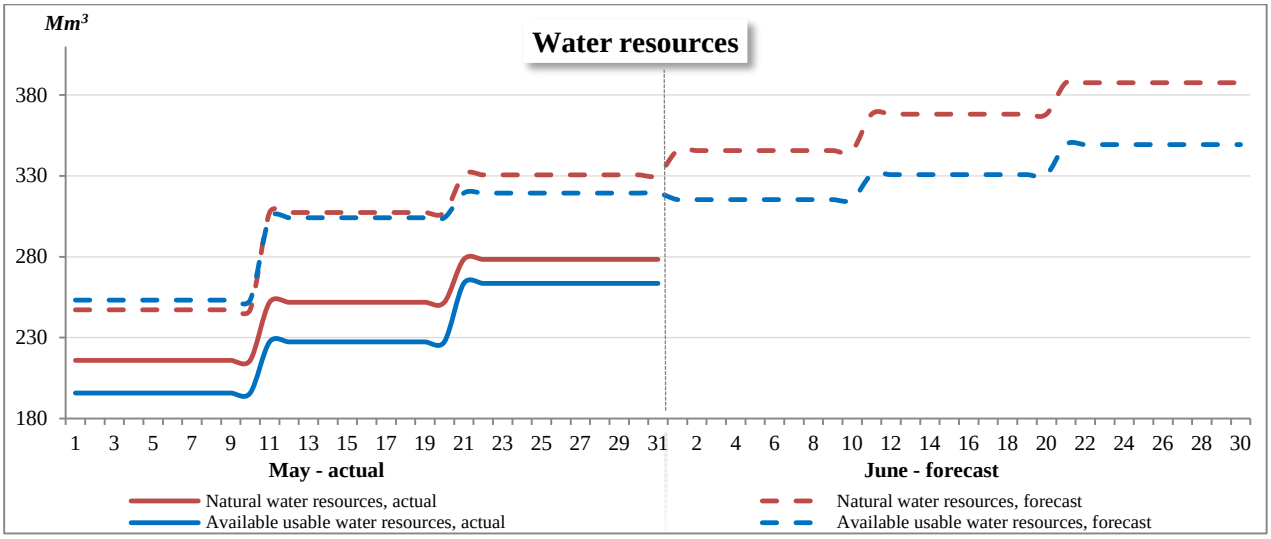


Water resources

Object
Amu Darya
Nurek reservoir
Atamyrat gauging station

Water volume (**W**)

Object	Parameter		May			June		
			I ten-day	*II ten-day*	*III ten-day*	*I ten-day*	*II ten-day*	*III ten-day*
River runoff: Atamyrat g/s	*W, Mm³*	*Forecast*	1270	1585	1879.2	1900.8	2160.0	2333
		Actual	1241	1475	1683			
Water withdrawal: upstream of Atamyrat g/s	*W, Mm³*	*Forecast*	1012	1056	1107	1153	1167	1181
		Actual	823	875	881			
Nurek reservoir /filling (+) or draw down (-)	*W, Mm³*	*Forecast*	190	432	320	403	354	363
		Actual	97	169	219.46			
Natural water resources at Atamyrat g/s	*W, Mm³*	*Forecast*	2471.7	3073.6	3306.4	3457	3682	3876
		Actual	2160.6	2519.4	2784.2			
Lateral inflow: downstream of Atamyrat g/s	*W, Mm³*	*Forecast*	101.1	97.4	74	92	81	82
		Actual	101.1	97.4	74			
Open channel losses: downstream of Atamyrat g/s	*W, Mm³*	*Forecast*	41.4	130.1	187	396	456	465
		Actual	303.8	342.5	222			
Available usable water resources	*W, Mm³*	*Forecast*	2531	3041	3193	3153	3307	3493
		Actual	1958	2274	2636			

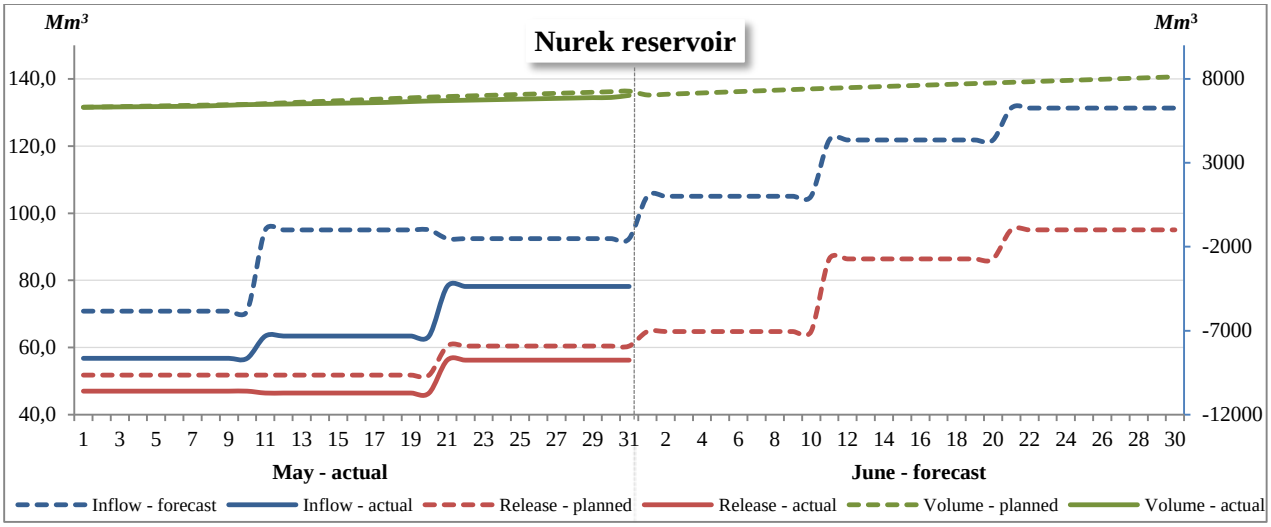


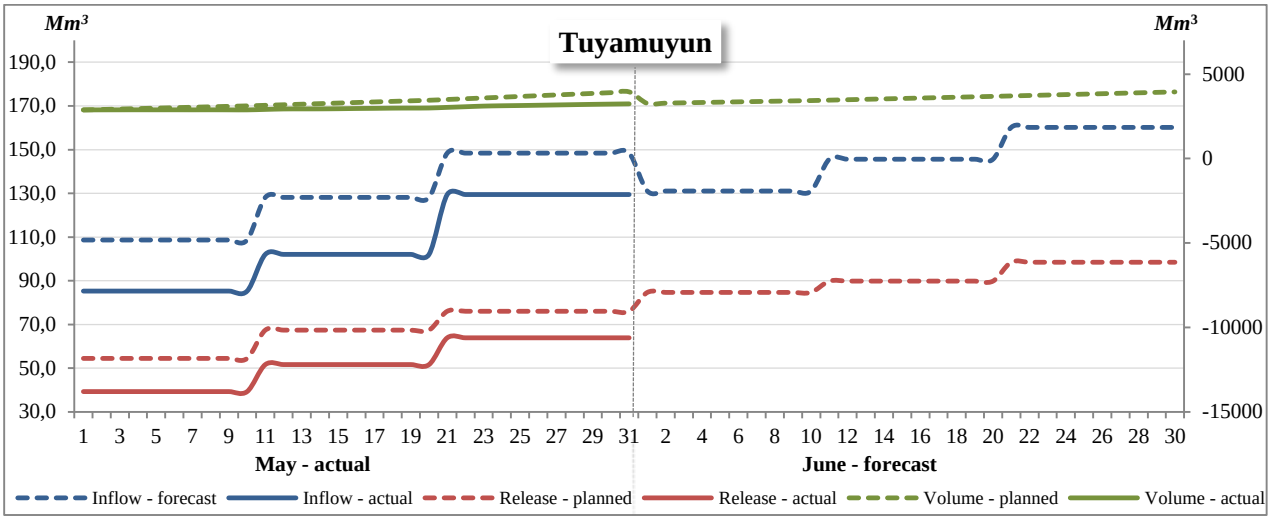
Reservoirs and HEPS

Reservoir	Location			Characteristics				
	Latitude	Longitude	Altitude above sea level, m	Length, km	Width, km	Water-surface area, km²	Full volume, km³	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		May			June		
			I ten-day	*II ten-day*	*III ten-day*	*I ten-day*	*II ten-day*	*III ten-day*
Nurek reservoir	*I, Mm³*	*Forecast*	708	950	1017	1050.6	1218.2	1313
		Actual	568.0	634.3	860			
	R, Mm³	*Planned*	518	518	665	648.0	864.0	950
		Actual	471	465	619			
	W, Mm³	*Planned*	6485.1	6917.1	7268.7	7406.0	7760.2	8123
		Actual	6458	6674	7003.4			
Reservoirs of Tuyamuyun waterworks facility	*I, Mm³*	*Forecast*	1087.0	1281.8	1632.7	1310.9	1456	1602
		Actual	853.2	1020.9	1424			
	R, Mm³	*Planned*	544.3	673.9	836.4	846.7	898.6	985
		Actual	392	516	703			
	W, Mm³	*Planned*	3117	3449	3941	3430	3677	3939
		Actual	2880	2993	3242.1			

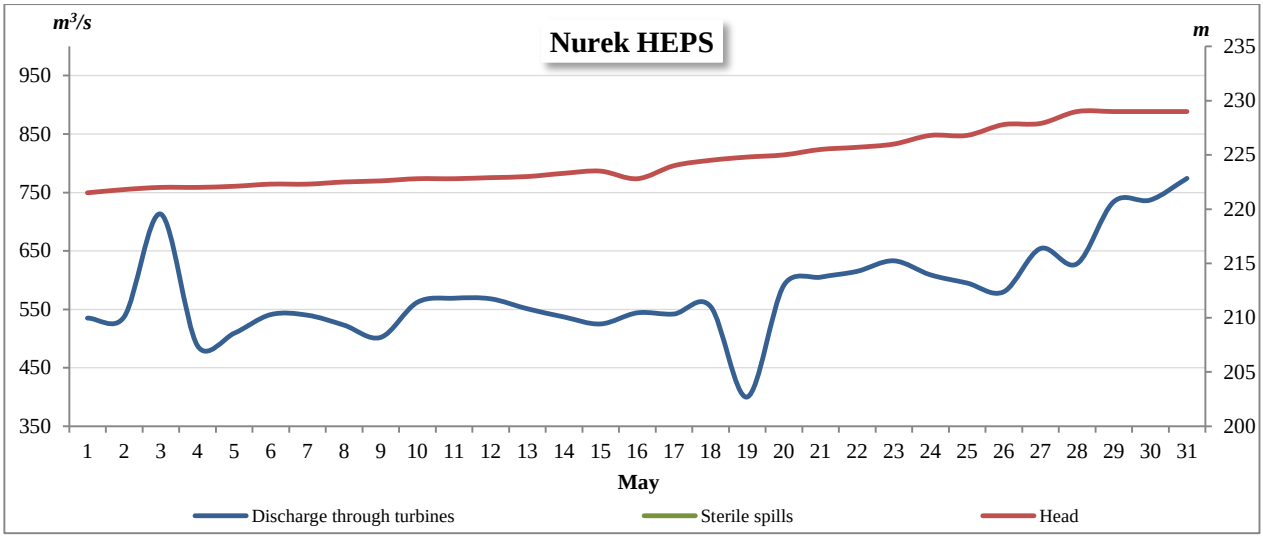


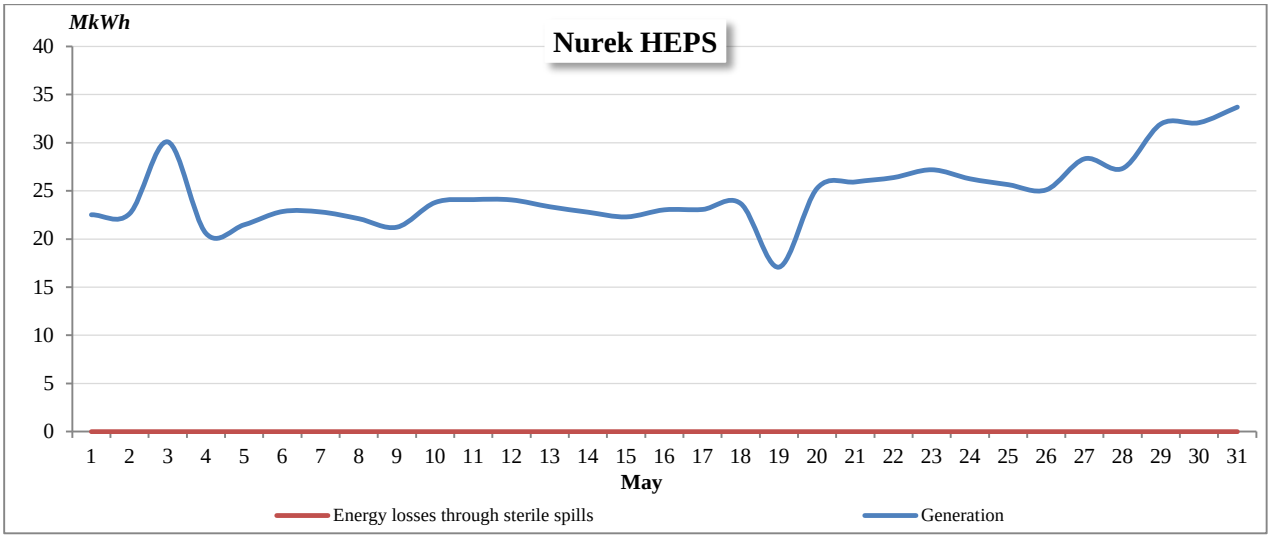


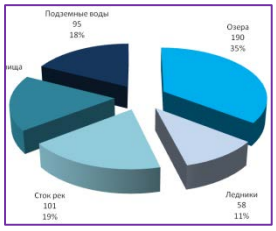
Generation (**G**), Energy losses through sterile spills (**L**), Discharge through turbines (**Q**), Sterile spills (**R**), Head (**H**)

HEPS	Parameter		May		
			I ten-day	*II ten-day*	*III ten-day*
Nurek	*G, M kWh*	*Actual*	230.07	228.69	309.78
	L, M kWh	*Actual*	0.00	0.00	0.00

	Q, m³/s	*Actual*	545.00	538.20	651.27
	R, m³/s	*Actual*	0.00	0.00	0.00
	H, m	*Actual*	222.19	223.66	227.50





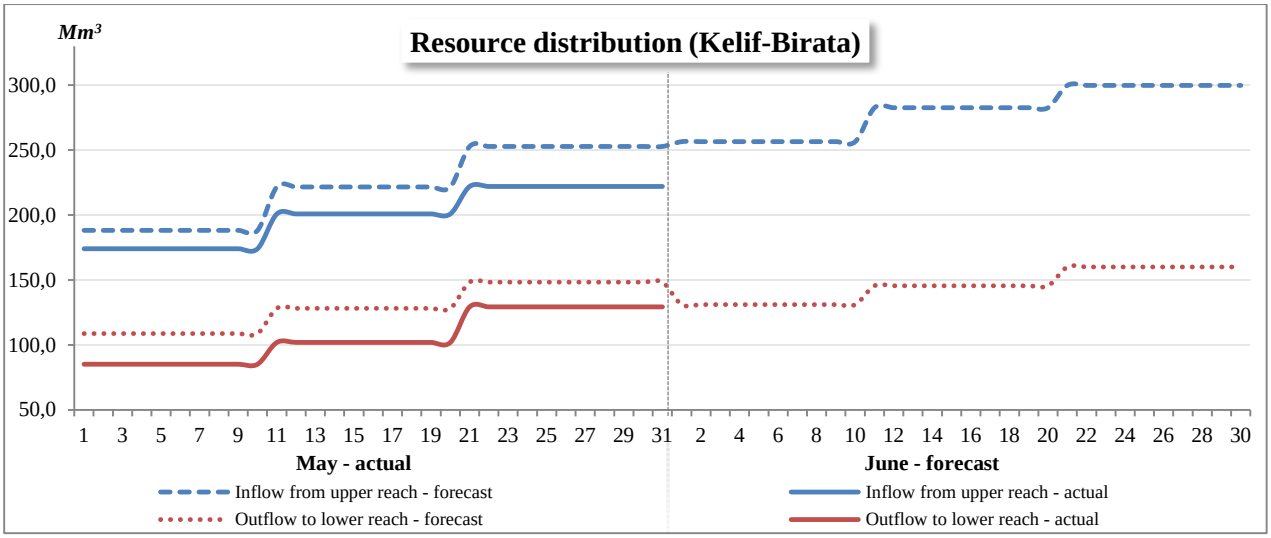


Water distribution

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)

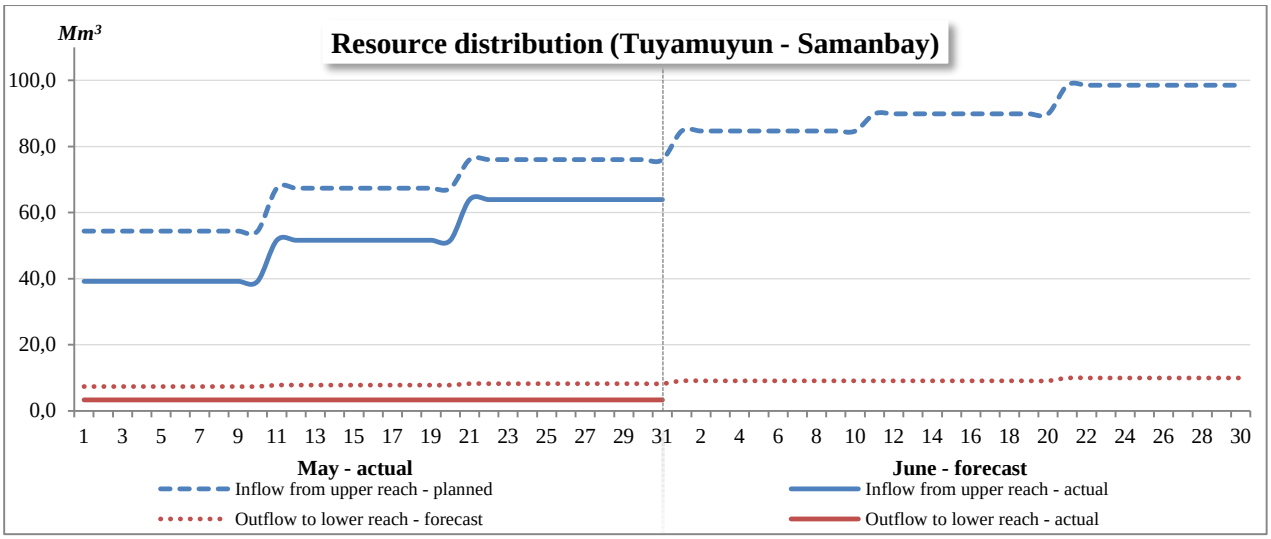
Kelif - Birata	Parameter		May			June		
			I ten-day	*II ten-day*	*III ten-day*	*I ten-day*	*II ten-day*	*III ten-day*
Inflow from upper reach	*W, Mm³*	*Forecast*	1883	2217	2781	2565	2826	2998
		Actual	1740	2008	2441			
Lateral inflow	*W, Mm³*	*Forecast*	101	97	81	92	81	82
		Actual	101	97	81			
Water withdrawal	*W, Mm³*	*Planned*	855	902	1024	950	995	1013
		Actual	675	742	855			
Losses	*W, Mm³*	*Forecast*	41.4	130.1	206	396	456	465
		Actual	312	343	244			
Outflow to lower reach	*W, Mm³*	*Forecast*	1087.0	1281.8	1633	1310.9	1456	1602
		Actual	853.2	1020.9	1424			



Water volume (W)

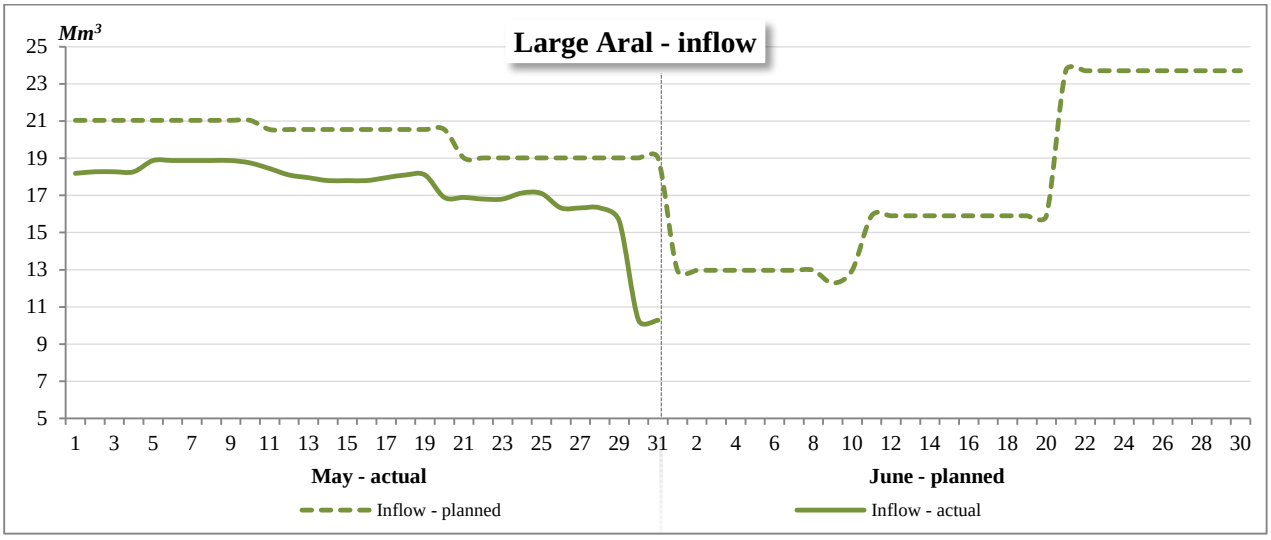
Tuyamuyun - Samanbay	Parameter		May			June		
			I ten-day	*II ten-day*	*III ten-day*	*I ten-day*	*II ten-day*	*III ten-day*
Inflow from upper reach	*W, Mm³*	*Forecast*	544.3	673.9	836	846.7	899	985
		Actual	392.2	516.2	703			
Lateral inflow	*W, Mm³*	*Forecast*	0.0	0.0	0.0	0.0	0.0	0.0
		Actual	0.0	0.0	0.0			
Water withdrawal [1]	*W, Mm³*	*Planned*	363	462	580	587.5	631	691
		Actual	250.2	276	437			
Losses	*W, Mm³*	*Forecast*	108	134	166	168.5	177	194
		Actual	109	207	228			
Outflow to lower reach	*W, Mm³*	*Forecast*	73.44	77.76	90.29	90.7	91	99
		Actual	33.2	33.09	36.88			

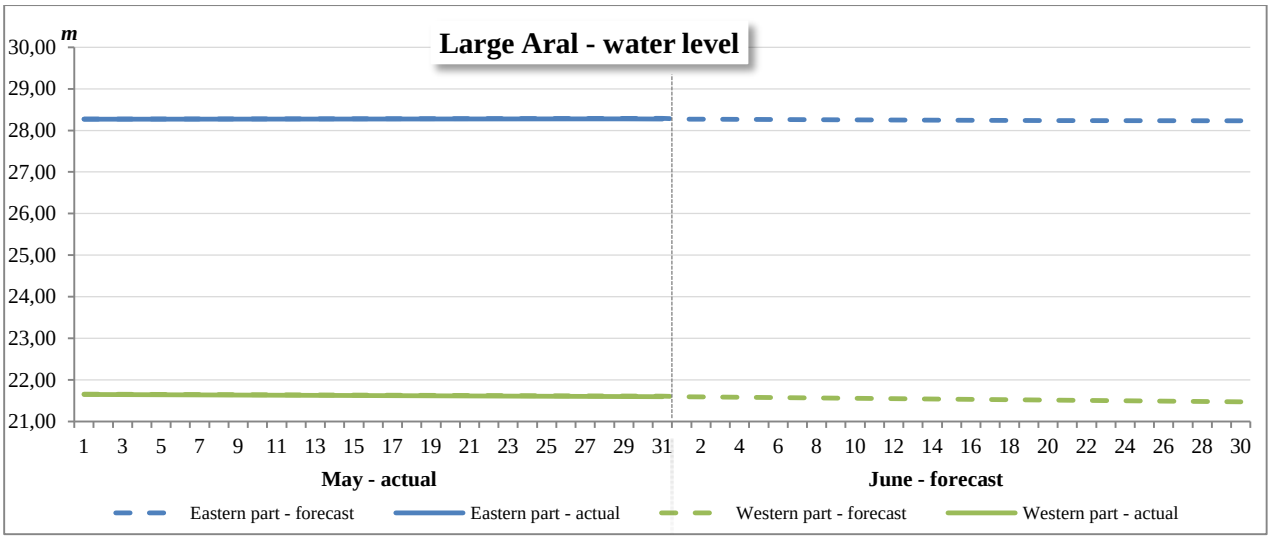
[1] *Note: Including supply to the system of lakes and environmental water releases into canals*

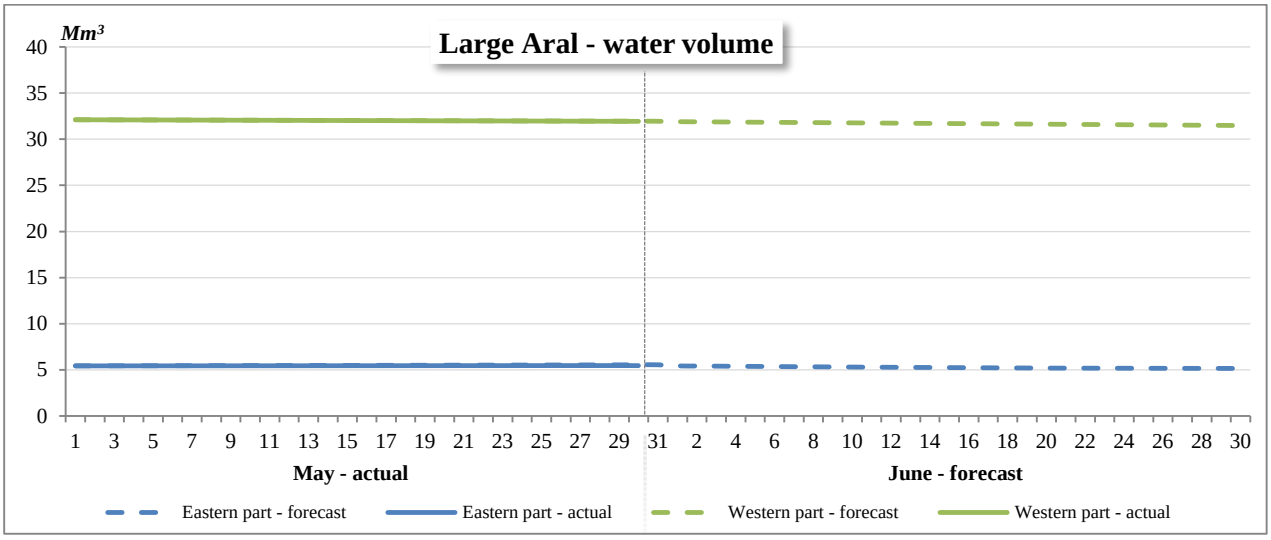


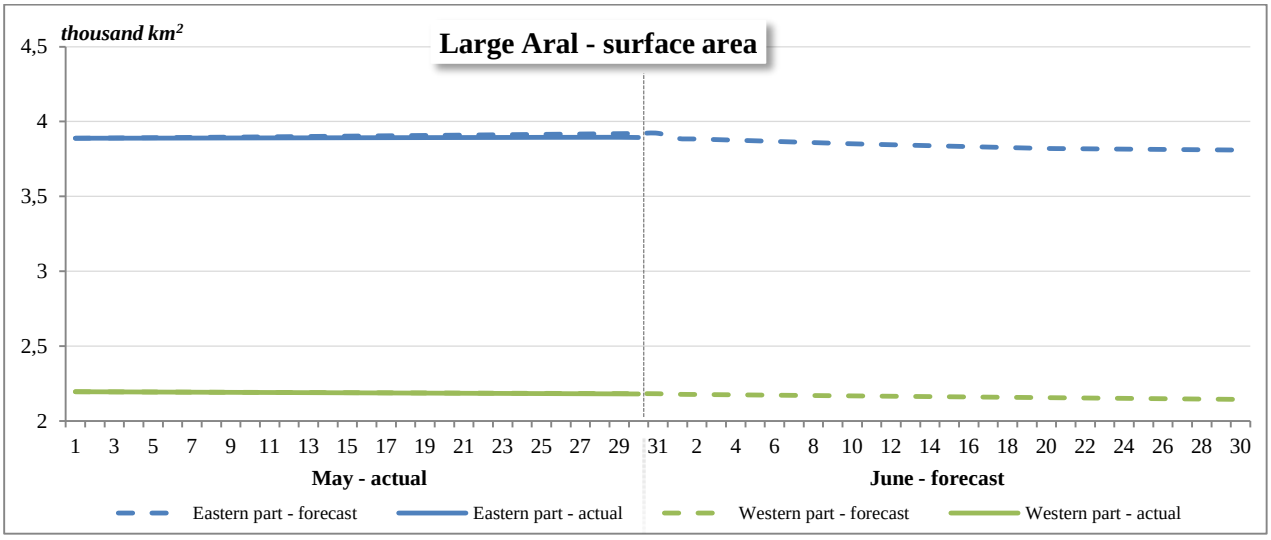
Water volume (**W**), Level (**H**), Surface area (**S**)

Large Aral Sea	Parameter		May			June		
			I ten-day	*II ten-day*	*III ten-day*	*I ten-day*	*II ten-day*	*III ten-day*
Inflow	*W, Mm³*	*Planned*	210.32	205.41	209.14	129.00	159.00	237.00
		Actual	186.19	178.98	169.96			
Eastern part, water volume	*W, Mm³*	*Forecast*	5.46	5.50	5.54	5.37	5.24	5.16
		Actual	5.44	5.45	5.46			
Eastern part, level	*H, m*	*Forecast*	28.27	28.28	28.29	28.26	28.24	28.23
		Actual	28.27	28.27	28.27			
Eastern part, area	*S, th.km²*	*Forecast*	3.89	3.90	3.92	3.87	3.83	3.81
		Actual	3.89	3.89	3.89			
Western part, water volume	*W, Mm³*	*Forecast*	32.10	32.04	31.99	31.85	31.71	31.56
		Actual	32.09	32.03	31.96			
Western part, level	*H, m*	*Forecast*	21.65	21.63	21.62	21.58	21.53	21.49
		Actual	21.65	21.63	21.61			
Western part, area	*S, th.km²*	*Forecast*	2.19	2.19	2.18	2.17	2.16	2.15
		Actual	2.19	2.19	2.18			




Large Aral - water level
m
30,00
29,00
28,00
27,00
26,00
25,00
24,00
23,00
22,00
21,00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
May - actual
June - forecast
Eastern part - forecast
Eastern part - actual
Western part - forecast
Western part - actual


Large Aral - water volume
Mm³
40
35
30
25
20
15
10
5
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
May - actual
June - forecast
Eastern part - forecast
Eastern part - actual
Western part - forecast
Western part - actual


Large Aral - surface area
thousand km²
4,5
4
3,5
3
2,5
2
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
May - actual
June - forecast
Eastern part - forecast
Eastern part - actual
Western part - forecast
Western part - actual

Syr Darya River Basin

Actual Situation in May and Forecast for June

In May, the available usable water resources in the Syr Darya that were estimated as the sum of river flows based on inflow to Toktogul, Andizhan, and Charvak reservoirs plus lateral inflow to the rivers and minus losses amounted to 4,503 million m^3, of which the inflow to the three upper reservoirs was 2,480 million m^3 (80% of the forecast).

In June, the available usable water resources are expected in the amount of 5,521 Mm^3, including 4,291 Mm^3 of inflow to three upper reservoirs or 173% of the flow in May.

In May, inflow to the Toktogul reservoir was 1,117 million m^3 or 77% of the expected volume, and water releases from the reservoir amounted to 734 million m^3 or 73% of BWO Syr Darya's schedule. The water volume in the Toktogul reservoir increased from 11,672 million m^3 at the beginning of month to 12,617 million m^3 by the end of month. The reservoir's water balance showed a positive discrepancy of 558 Mm^3 (!), indicating to unrecorded inflow to the reservoir or (and) to inaccurate flow accounting at entrance to the reservoir (underestimation) and at outlet (overestimation). Excessive water releases from the reservoir of Toktogul waterworks facility (if any) may be one of factors contributing to increased negative flow discrepancy in the reach of Toktogul waterworks facility – Uchkurgan waterworks facility (tail-water) showing to both unrecorded losses or diversions in this reach and inaccurate flow measurements. It is expected that in June the Toktogul reservoir will accumulate water and by the end of month the water volume will be 26,536 million m^3; the inflow to the reservoir is expected in the amount of 2,258 million m^3, and water releases are planned at 999 million m^3.

In May, inflow to the Andizhan reservoir was 294 million m^3 (only 58% of the forecast); thus, this confirms the expected lower water content of the Karadarya River as compared to that of the Naryn River during the growing season. Water releases from the Andizhan reservoir were 308 million m^3. The reservoir's water volume decreased to 762 million m^3 by the end of month. Water losses were estimated by balance discrepancy at 5 Mm^3. In June, inflow to the Andizhan reservoir is expected to increase to 639 million m^3 and water releases will increase to 415 million m^3. The reservoir will accumulate water to 1,755 million m^3.

Inflow to the Bakhri Tojik reservoir was 926 million m^3 (71% of the forecast), while water releases from the reservoir were in the amount of 949 million m^3 (73% of the plan) in May. The water volume in the reservoir did not change – 3,516 Mm^3. The unrecorded inflow to the reservoir was detected from the balance method in the amount of 23 Mm^3. In June, inflow to the Bakhri Tojik reservoir is expected to decrease to 777 million m^3, and 1,170 million m^3 are to be discharged from the reservoir. Consequently, the reservoir will be emptied to 3,123 million m^3.

In May, the Charvak reservoir was filled with water from 754 million m^3 to 1,367 million m^3. Inflow to the reservoir was 1,069 million m^3 (93% of forecast), and water releases amounted to 408 million m^3 (64% of the plan). Thus, the reservoir accumulated water through water releases that were below the scheduled values. The balance discrepancy was 49 million m^3. This can be attributed to water losses and inaccurate estimation of inflow to the reservoir. In June, the Charvak reservoir will accumulate water and its volume will increase to 3,378 Mm^3 by the end of month. Inflow to the reservoir is expected in the amount of 1,394 Mm^3, while 773 Mm^3 of water will be released.

Inflow to the Shardara reservoir was only 947 million m^3 (42% of the forecast) in May. Water releases from the reservoir amounted to 882 million m^3 (60% of BWO Syr Darya's schedule). The reservoir was emptied from 4,857 Mm^3 to 4,662 Mm^3. Water was not discharged into Arnasai. Balance discrepancy (showing flow uses) amounted to 198 Mm^3 (about 4% of the water volume in the reservoir). In June, inflow to the Shardara reservoir is expected to decrease

further - 793 million m^3, while planned water releases will be 1,296 million m^3. The reservoir's water volume will decrease to 4,040 million m^3 by the end of month. Water discharge into Arnasai is not planned for June.

In May, the Koksarai reservoir did not accumulate water. Water discharge from the reservoir into the Syr Darya River was estimated at 886 Mm^3. The water volume increased from 1,656 million m^3 to 1696 million m^3. In June, it is planned to discharge water from the reservoir in the amount of 575 million m^3. The reservoir will be drawn down to 121 million m^3. In July, the reservoir will be fully emptied.

In May, energy generation by the cascade of Naryn HEPS amounted to 733 million kWh (under energy-generation regime) against planned 877 million kWh, including: Toktogul HEPS - 257 million kWh. The average discharge through turbines of Toktogul HEPS was 269 m^3/s, while the average head was 142 m. No sterile spills were observed. The plan of energy generation for June for the cascade of Naryn HEPS is set at 900 million kWh, including 360 million kWh for Toktogul HEPS.

In May, the total generation at large HEPS of Uzbekistan amounted to 155 million kWh, of which: 86 million kWh at Charvak HEPS, 22 million kWh at Farkhad HEPS, and 47 million kWh at Andizhan HEPS. The discharge at Charvak HEPS was 112 m^3/s, and the head was 120 m. The discharge at Farkhad HEPS was 134 m^3/s, and the head was 31 m. The discharge at Andizhan HEPS was 88 m^3/s, and the head was 95 m.

Energy generation by HEPS of the Bakhri Tojik reservoir amounted to 33 million kWh (by 9 million kWh less than in April), and that by Shardara HEPS was 53 million kWh in May. Water discharge at HEPS of Bakhri Tojik was 310 m^3/s, while the head was 20 m. Discharge at Shardara HEPS was 300 m^3/s, and the head was 21 m (dropped by 10 m as compared to April).

In May, water was distributed unevenly along the Naryn River and the Syr Darya River. In the reach of Toktogul HEPS – Uchkurgan waterworks facility (tail-water) the water shortage amounted to 11 million m^3 or less than 2% of planned water withdrawal. The balance discrepancy that can be attributed to open channel losses was 173 million m^3 (24% of river flow at the head of the reach).

In the reach of the Syr Darya River from Uchkurgan waterworks facility (tail-water) to Akjar g/s (inflow to the Bakhri Tojik reservoir) the water shortage was 12 million m^3 (19% of the plan), and open channel losses were estimated at 27 Mm^3 (10% of water releases from Uchkurgan waterworks facility).

In the reach of Bakhri Tojik reservoir – Shardara reservoir the water shortage amounted to 579 million m^3 (57%), and the balance discrepancy (open channel losses) was 109 million m^3 (13% of water releases from Bakhri Tojik).

In the lower reaches (downstream of Shardara reservoir) the balance discrepancy (open channel losses and unrecorded water withdrawal) was detected in the amount of 434 million m^3 or 49% of the Syr Darya River flow in the tail-water of Shardara reservoir.

In May, the flow along the Naryn – Syr Darya rivers changed as follows: discharge from the Toktogul reservoir – 734 million m^3, discharge from Uchkurgan waterworks facility – 278 million m^3 (38% of water releases from the Toktogul reservoir), Akjar g/s (inflow to the Bakhri Tojik reservoir) – 837 million m^3, inflow to the Shardara reservoir – 947 million m^3, Syr Darya – tail-water of the Shardara reservoir – 882 million m^3, and inflow to the Northern Aral Sea - 112 million m^3.

In June, water withdrawal from the river will be increased: from 618 million m^3 to 878 million m^3 in the reach Toktogul HEPS – Uchkurgan waterworks facility, to 1,587 million m^3 in the reach Uchkurgan waterworks facility – Shardara reservoir; and in the lower reaches (Shardara-Aral) it is planned to decrease water withdrawal to 1,185 million m^3. Inflow to the Northern Aral Sea is expected in the amount of 23 million m^3 only.

In May, inflow to the Northern Aral Sea was 112 million m^3. The water level in the sea varied within 42.2…24.16 m. The water surface area was 3.19…3.18 thousand km^2 and the water volume was 24.2…23.6 km^3. The discharge from the Northern Aral Sea into the Large Aral Sea (Amu Darya Basin) was recorded in the amount of 213 million m^3.

It is expected that in June inflow to the Northern Aral Sea will decrease substantially and will be 23 million m^3 only, and discharge into the Large Aral Sea will be 30 million m^3. The water level will be 42.1 m, the water surface area will be 3.17 thousand km^2, and the water volume will drop to 23.1 km^3 by the end of June.

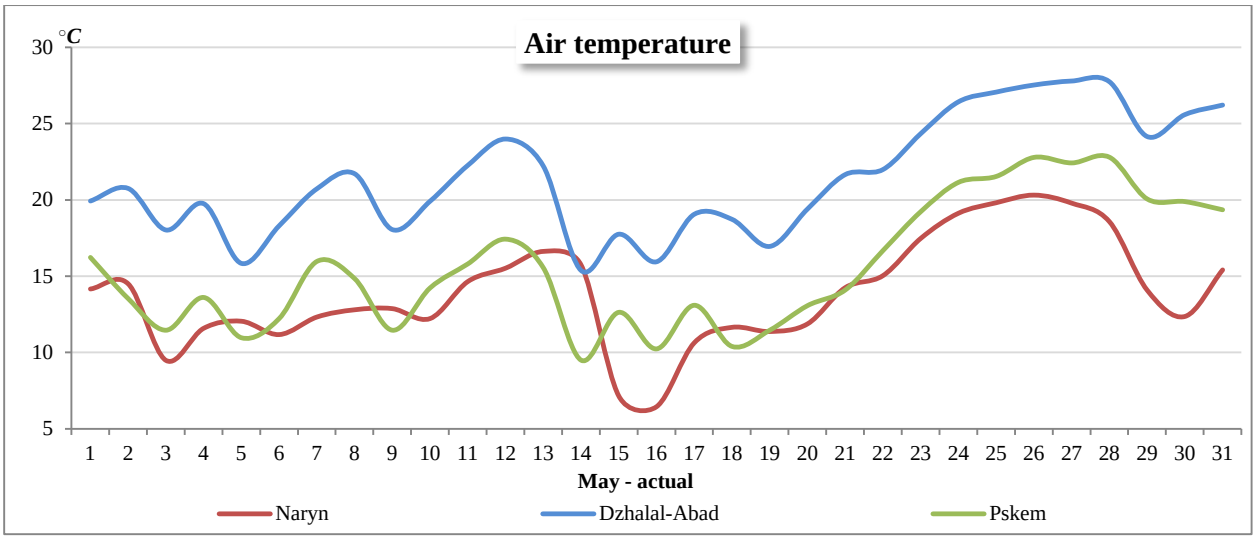
The sections below show daily and ten-day data on climate and water management (reservoirs, HEPS, water distribution).

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		May			June		
			I ten-day	*II ten-day*	*III ten-day*	*I ten-day*	*II ten-day*	*III ten-day*
Naryn	*T*. °C	*Forecast*	13.00	13.00	16.00	18.00	21.00	22.00
		Actual	12.32	12.17	16.93			
Dzhalal-Abad	*T*. °C	*Forecast*	19.00	19.00	25.00	26.00	28.00	32.00
		Actual	19.30	19.17	25.50			
Pskem	*T*. °C	*Forecast*	13.00	13.00	20.00	22.00	24.00	27.00
		Actual	13.44	12.91	20.00			

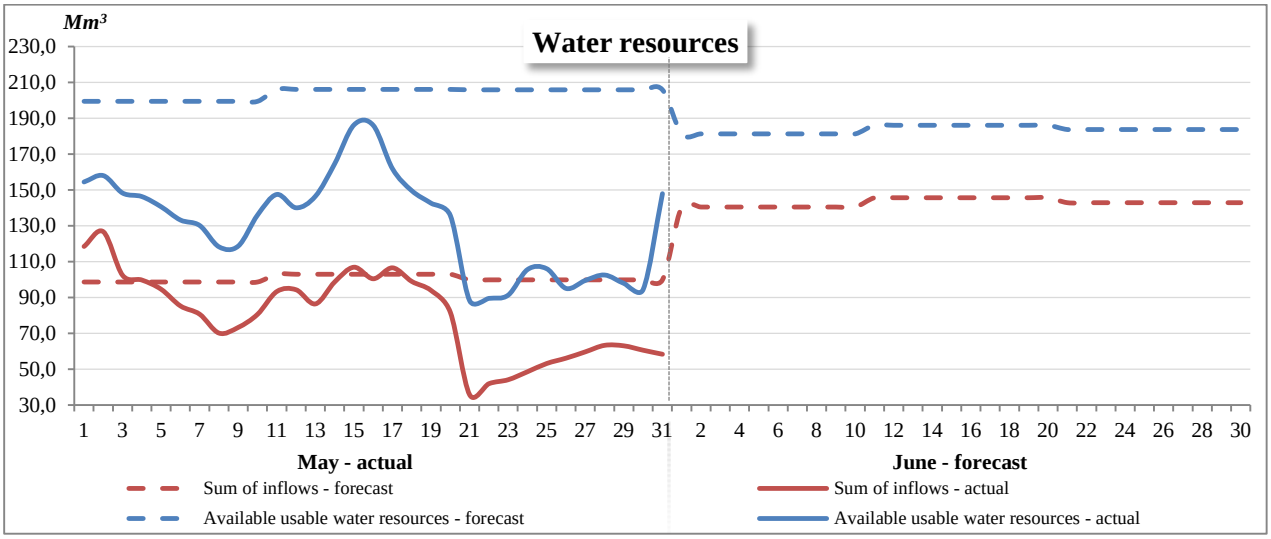


Water resources

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		May			June		
			I ten-day	*II ten-day*	*III ten-day*	*I ten-day*	*II ten-day*	*III ten-day*
Inflow to Toktogul reservoir	*W, Mm³*	*Forecast*	494	494	466.6	753	753	752.5
		Actual	539	538	40.3			
Inflow to Andizhan reservoir	*W, Mm³*	*Forecast*	156	160	190.1	190	233	216.0
		Actual	103	91	100.1			
Inflow to Charvak reservoir	*W, Mm³*	*Forecast*	337	376	441.9	462	471	460.5
		Actual	291	333	445.1			
Sum of inflows to reservoirs	*W, Mm³*	*Forecast*	987	1030	1098.6	1405	1457	1429.1
		Actual	933	962	585.5			
Lateral inflow up to Shardara	*W, Mm³*	*Forecast*	1056	1079	1223.9	482	478	482.3
		Actual	500	648	1028.7			
Losses	*W, Mm³*	*Forecast*	48	48	58.0	74	74	73.9
		Actual	48	48	58.0			
Available usable water resources	*W, Mm³*	*Forecast*	1995	2061	2264.5	1813	1861	1837.5
		Actual	1385	1561	1119			

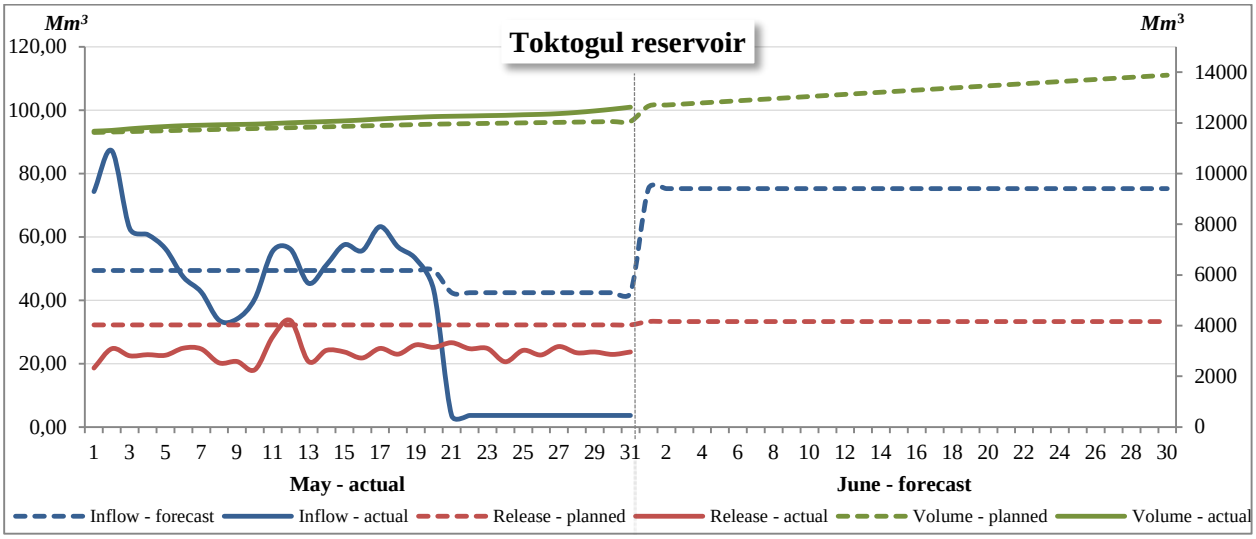


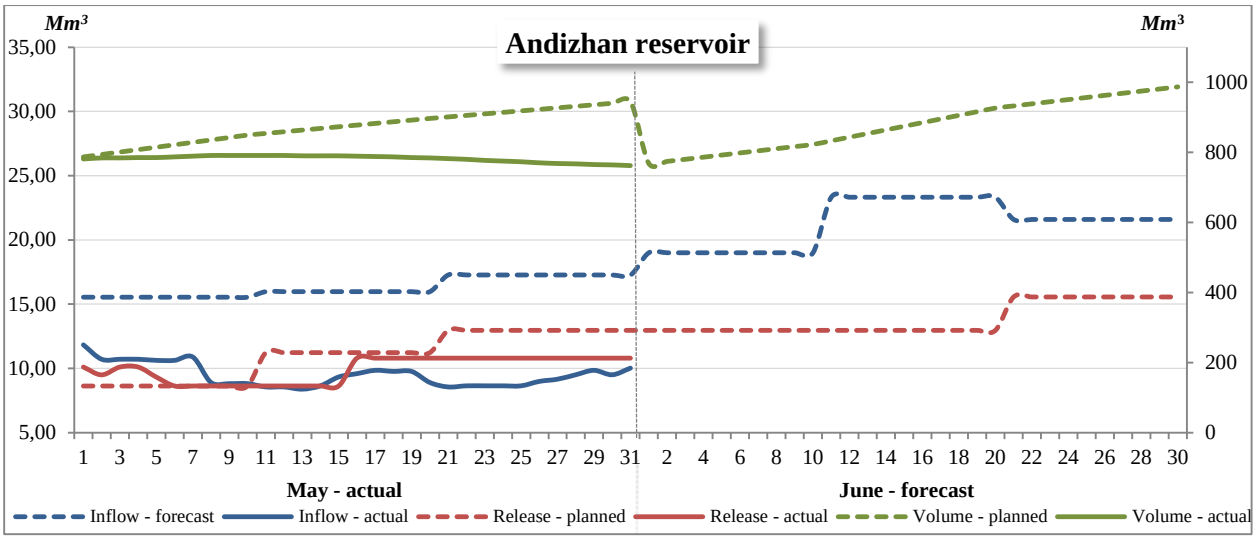
Reservoirs and HEPS

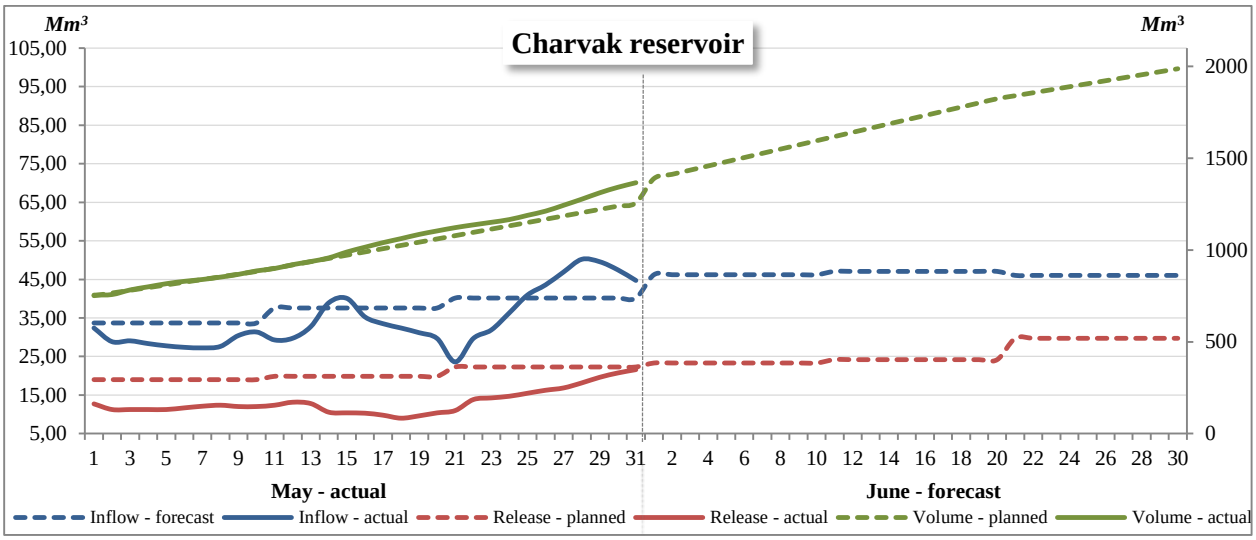
Reservoir	Location			Characteristics				
	Latitude	Longitude	Altitude above sea level, m	Length, km	Width, km	Water-surface area, km²	Full volume, km³	Full reservoir level, m
Toktogul	41.80	72.87	880	65	12	284	19.50	215
Andizhan	40.77	73.11	900	36	1.5-12	56	0.19	905
Bakhri Tojik	40.29	70.07	344	75	20	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

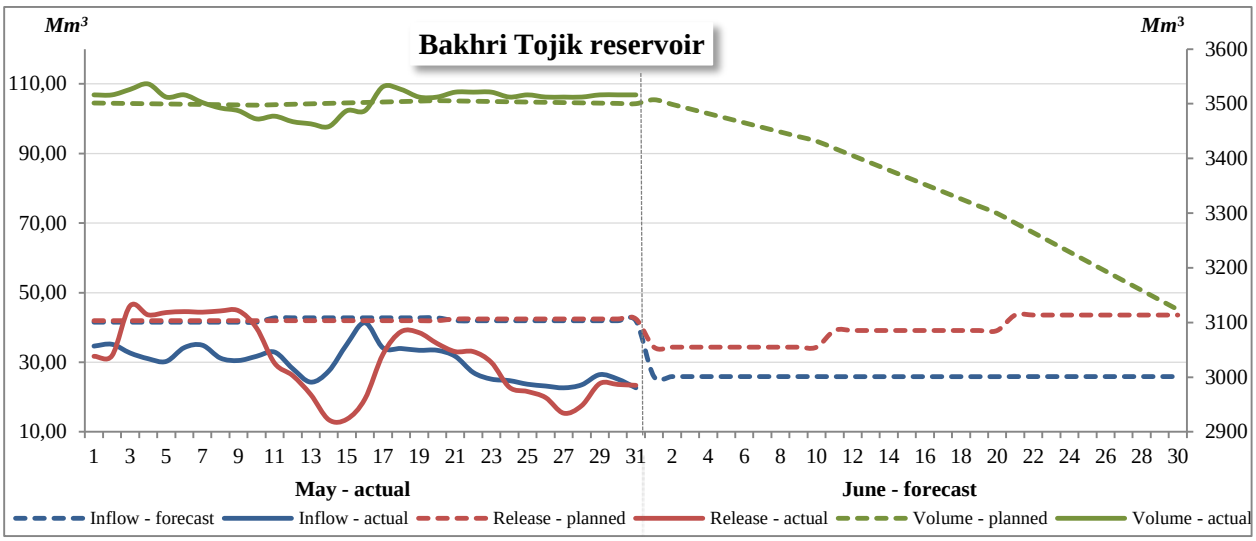
Inflow (**I**), Releases (**R**), Volume (**W**)

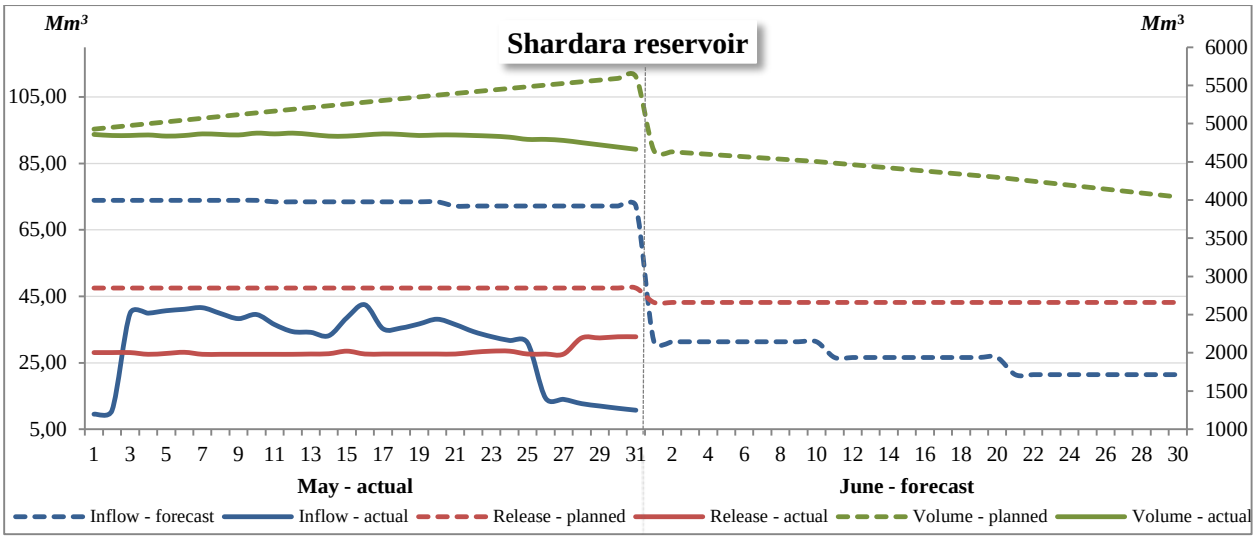
Reservoir	Parameter		May			June		
			I ten-day	*II ten-day*	*III ten-day*	*I ten-day*	*II ten-day*	*III ten-day*
Toktogul reservoir	*I, Mm³*	*Forecast*	494.21	494.21	466.62	752.54	752.54	752.54
		Actual	539.40	537.67	40.32			
	R, Mm³	*Planned*	322.27	322.27	354.53	332.64	332.64	332.64
		Actual	219.63	251.25	262.66			
	W, Mm³	*Planned*	11776	11948	12060	13037	13457	13877
		Actual	11952	12247	12617			
Andizhan reservoir	*I, Mm³*	*Forecast*	155.52	159.84	190.08	190.08	233.28	216.00
		Actual	102.64	91.32	100.14			
	R, Mm³	*Planned*	86.40	112.32	142.56	129.60	129.60	155.52
		Actual	92.36	97.20	118.80			
	W, Mm³	*Planned*	849	897	944	822	926	987
		Actual	791	784	762			
Charvak reservoir	*I, Mm³*	*Forecast*	336.96	375.84	441.87	462.24	470.88	460.51
		Actual	290.54	332.89	445.09			
	R, Mm³	*Planned*	190.08	198.72	245.19	233.28	241.92	297.32
		Actual	117.76	108.17	182.39			
	W, Mm³	*Planned*	884	1061	1258	1596	1825	1988
		Actual	886	1104	1367			
Bakhri Tojik reservoir	*I, Mm³*	*Forecast*	415.00	427.51	461.10	259.21	259.01	259.21
		Actual	326.25	324.35	275.79			
	R, Mm³	*Planned*	419.33	419.30	466.62	343.53	391.20	435.38
		Actual	416.35	268.39	264.30			
	W, Mm³	*Planned*	3498	3506	3500	3432	3299	3123
		Actual	3472	3512	3516			
Shardara reservoir	*I, Mm³*	*Forecast*	738.91	734.47	794.04	313.20	265.79	214.20
		Actual	340.98	364.63	241.75			
	R, Mm³	*Planned*	475.20	475.20	522.72	432.00	432.00	432.00
		Actual	278.04	277.26	326.42			
	W, Mm³	*Planned*	5140	5372	5613	4503	4298	4040
		Actual	4874	4850	4662			




Andizhan reservoir
Mm³
Mm³
35,00
30,00
25,00
20,00
15,00
10,00
5,00
1000
800
600
400
200
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
May - actual
June - forecast
Inflow - forecast
Inflow - actual
Release - planned
Release - actual
Volume - planned
Volume - actual

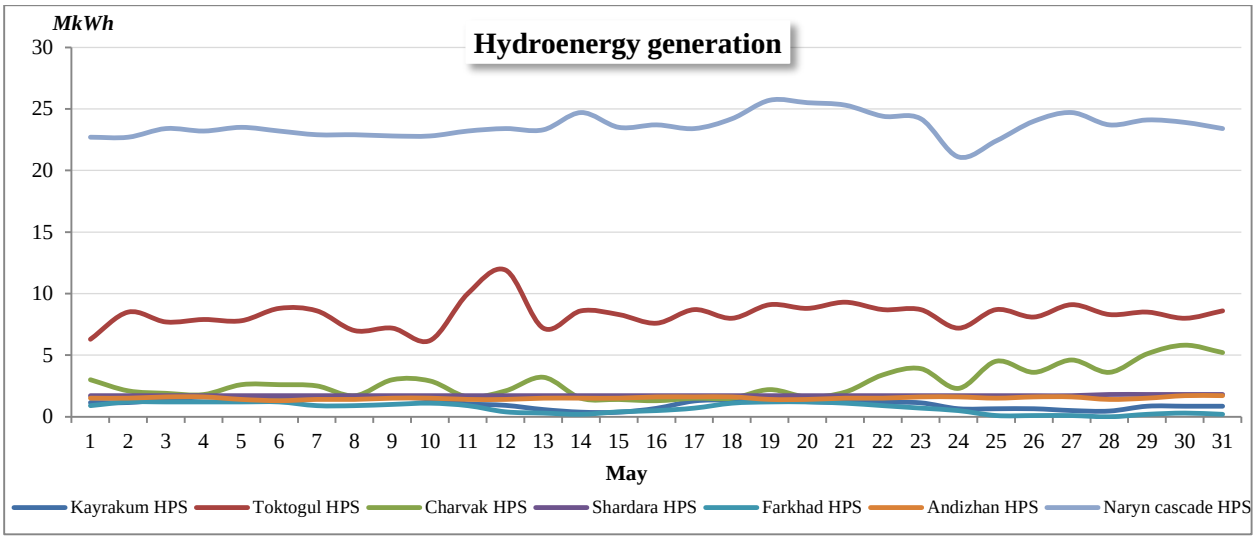

Charvak reservoir
Mm³
Mm³
105,00
95,00
85,00
75,00
65,00
55,00
45,00
35,00
25,00
15,00
5,00
2000
1500
1000
500
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
May - actual
June - forecast
Inflow - forecast
Inflow - actual
Release - planned
Release - actual
Volume - planned
Volume - actual

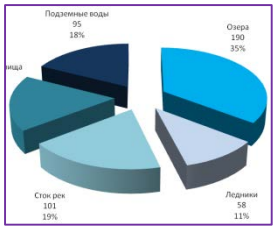

Bakhri Tojik reservoir
Mm³
Mm³
110,00
90,00
70,00
50,00
30,00
10,00
3600
3500
3400
3300
3200
3100
3000
2900
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
May - actual
June - forecast
Inflow - forecast
Inflow - actual
Release - planned
Release - actual
Volume - planned
Volume - actual



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

HEPS	Parameter		May		
			I ten-day	*II ten-day*	*III ten-day*
Naryn cascade	*G, M kWh*	*Actual*	230.10	240.60	261.20
Toktogul	*G, M kWh*	*Actual*	76.00	88.20	93.20
	Q, m³/s	*Actual*	249.00	286.40	272.18
	H, m	*Actual*	145.90	147.10	148.30
Andizhan	*G, M kWh*	*Actual*	14.70	14.90	17.20
	Q, m³/s	*Actual*	82.90	87.30	92.27
	H, m	*Actual*	95.00	95.00	95.00
Bakhri Tojik	*G, M kWh*	*Actual*	14.77	9.21	8.92
	Q, m³/s	*Actual*	432.40	269.80	237.45
	H, m	*Actual*	20.10	20.10	20.10
Farkhad	*G, M kWh*	*Actual*	10.80	6.90	4.20
	Q, m³/s	*Actual*	202.60	126.40	77.63
	H, m	*Actual*	30.60	30.60	30.60
Charvak	*G, M kWh*	*Actual*	24.10	17.90	44.00
	Q, m³/s	*Actual*	105.70	73.30	151.54
	H, m	*Actual*	112.50	119.61	126.80
Shardara	*G, M kWh*	*Actual*	17.00	17.00	19.10
	Q, m³/s	*Actual*	300.00	300.00	300.00
	G, M kWh	*Actual*	20.90	20.90	20.90



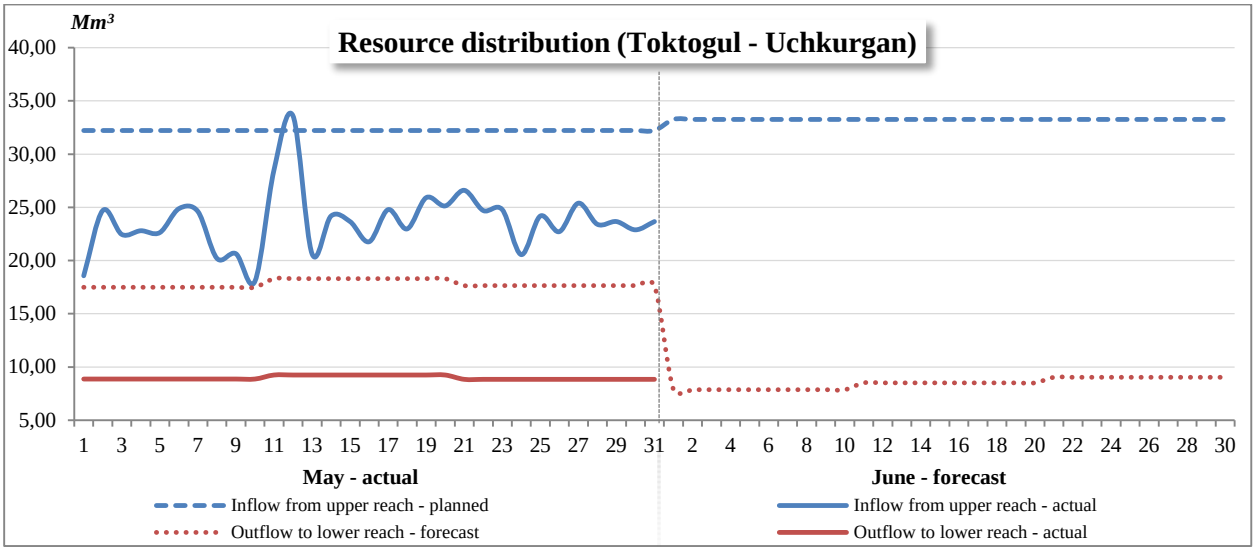


Water distribution

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 Northern Aral Sea (Karateren settlement)
Northern Aral Sea

Water volume (**W**)

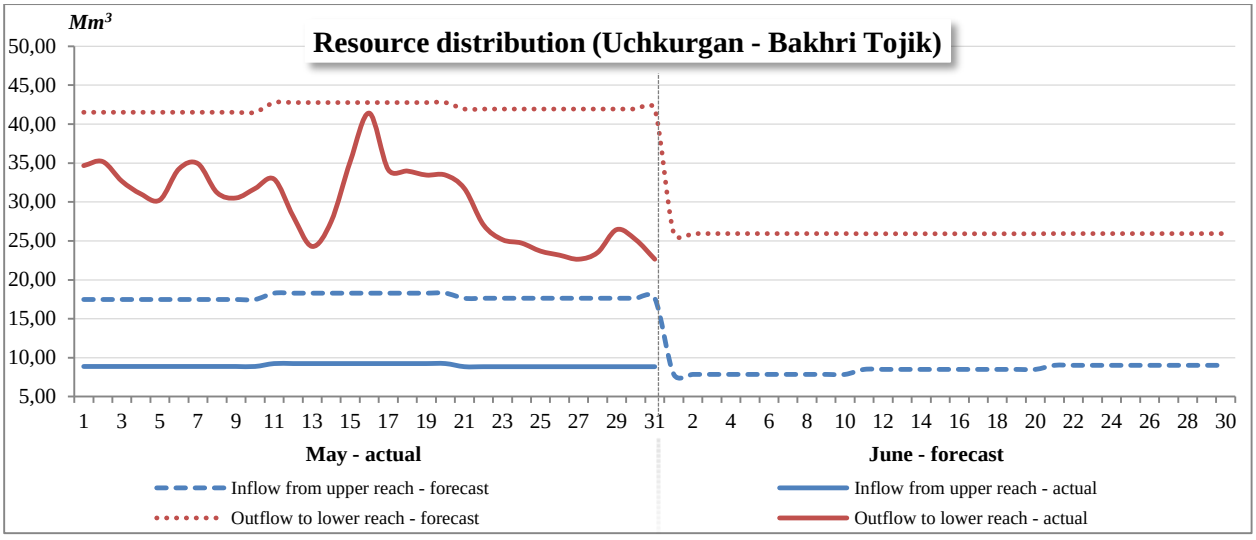
Toktogul - Uchkurgan	**Parameter**		**May**			**June**		
			I ten-day	*II ten-day*	*III ten-day*	*I ten-day*	*II ten-day*	*III ten-day*
Inflow from upper reach	*W, Mm³*	*Planned*	322.27	322.27	354.53	332.64	332.64	332.64
		Actual	219.63	251.25	262.66			
Lateral inflow[2]	*W, Mm³*	*Forecast*	97.68	97.68	107.45	87.70	87.70	87.70
		Actual	127.27	93.66	114.57			
Water withdrawals	*W, Mm³*	*Planned*	206.15	198.03	225.05	298.57	292.14	286.90
		Actual	203.52	194.05	220.66			
Losses	*W, Mm³*	*Forecast*	38.88	38.88	42.77	43.20	43.20	43.20
		Actual	54.73	58.41	59.37			
Outflow to lower reach[3]	*W, Mm³*	*Forecast*	174.92	183.04	194.16	78.57	85.00	90.24
		Actual	88.65	92.45	97.20			



[2] *Incl. Karasu left and right*
[3] *Uchkurgan waterworks facility*

Water volume (**W**)

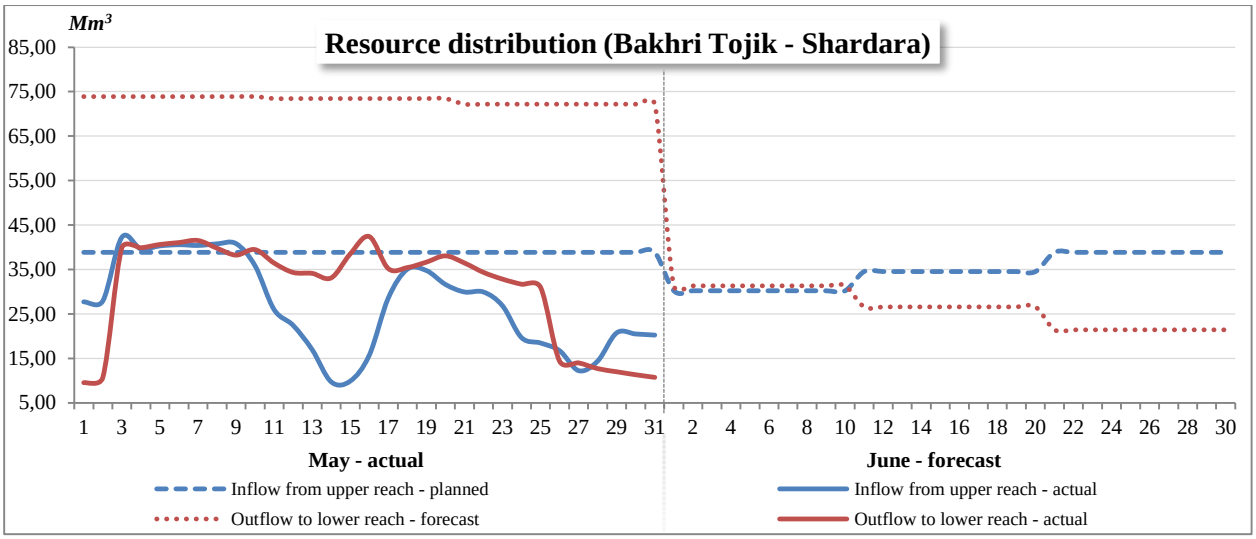
Uchkurgan – Bakhri Tojik	Parameter		May			June		
			I ten-day	*II ten-day*	*III ten-day*	*I ten-day*	*II ten-day*	*III ten-day*
Inflow from upper reach	*W, Mm³*	*Forecast*	174.92	183.04	194.16	78.57	85.00	90.24
		Actual	88.65	92.45	97.20			
Lateral inflow	*W, Mm³*	*Forecast*	290.10	294.51	322.27	206.04	202.02	198.68
		Actual	265.16	261.36	222.57			
Water withdrawals	*W, Mm³*	*Planned*	20.02	20.04	22.33	25.40	28.01	29.71
		Actual	23.81	24.58	25.25			
Losses	*W, Mm³*	*Forecast*	30.00	30.00	33.00	0.00	0.00	0.00
		Actual	3.75	4.88	18.74			
Outflow to lower reach[4]	*W, Mm³*	*Forecast*	415.00	427.51	461.10	259.21	259.01	259.21
		Actual	326.25	324.35	275.79			



Water volume (**W**)

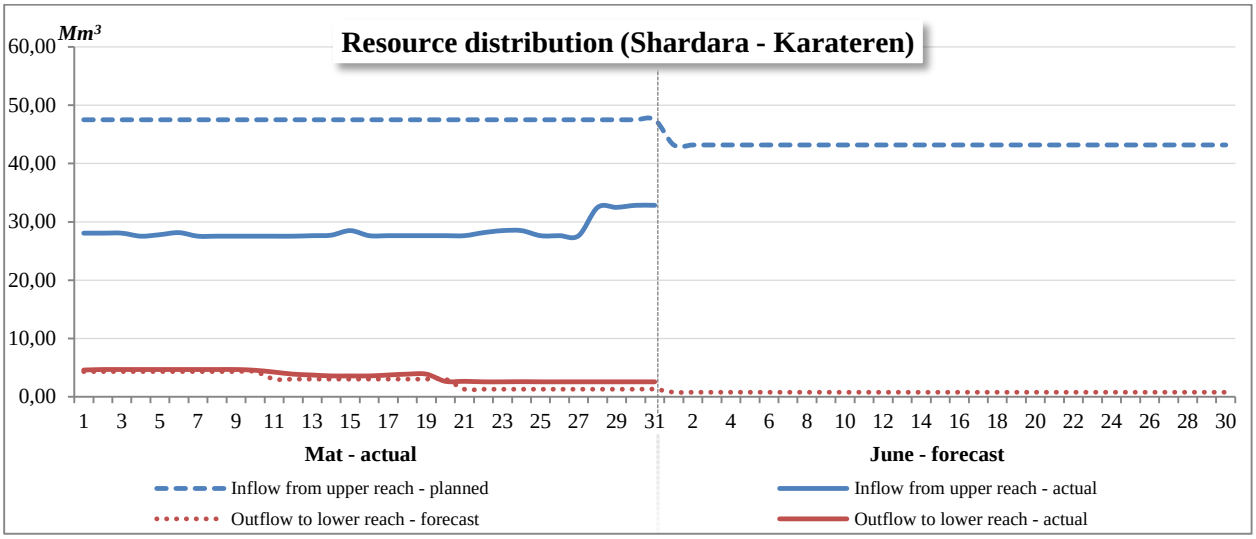
Bakhri Tojik - Shardara	Parameter		May			June		
			I ten-day	*II ten-day*	*III ten-day*	*I ten-day*	*II ten-day*	*III ten-day*
Inflow from upper reach[5]	*W, Mm³*	*Planned*	388.80	388.80	427.68	302.40	345.60	388.80
		Actual	376.32	230.95	229.91			
Lateral inflow	*W, Mm³*	*Forecast*	713.41	720.64	826.71	528.59	486.88	407.64
		Actual	180.01	317.53	155.76			
Water withdrawals	*W, Mm³*	*Planned*	303.30	314.97	394.35	457.79	506.69	522.24
		Actual	101.11	143.88	188.32			
Losses	*W, Mm³*	*Forecast*	60.00	60.00	66.00	60.00	60.00	60.00
		Actual	114.25	39.97	-44.40			
Outflow to lower reach	*W, Mm³*	*Forecast*	738.91	734.47	794.04	313.20	265.79	214.20
		Actual	340.98	364.63	241.75			

[4] *Akdzhar g/s*
[5] *Kyzylkishlak g/s*



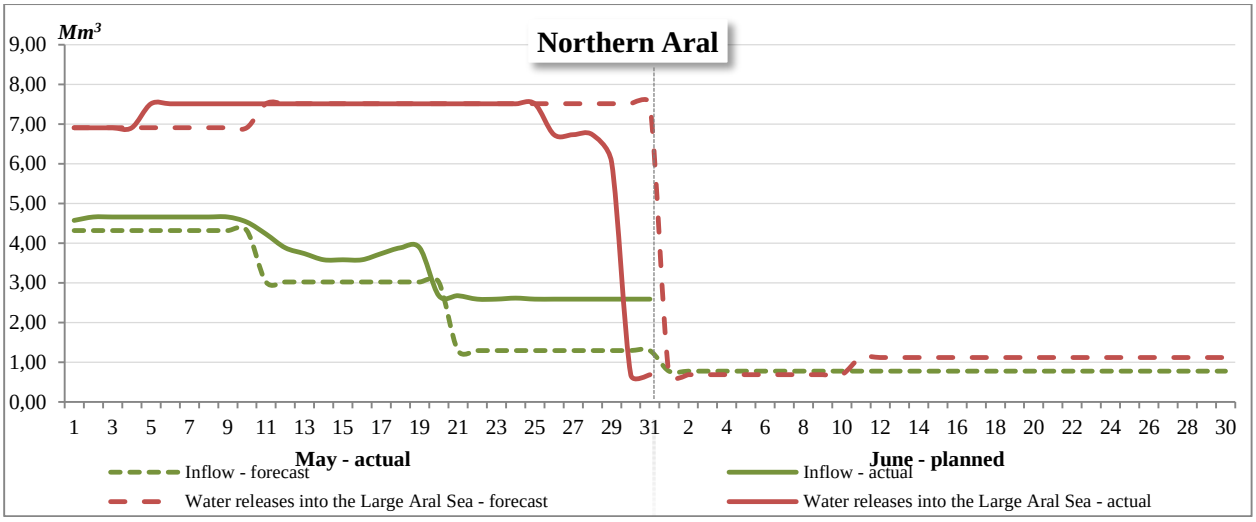
Water volume (**W**)

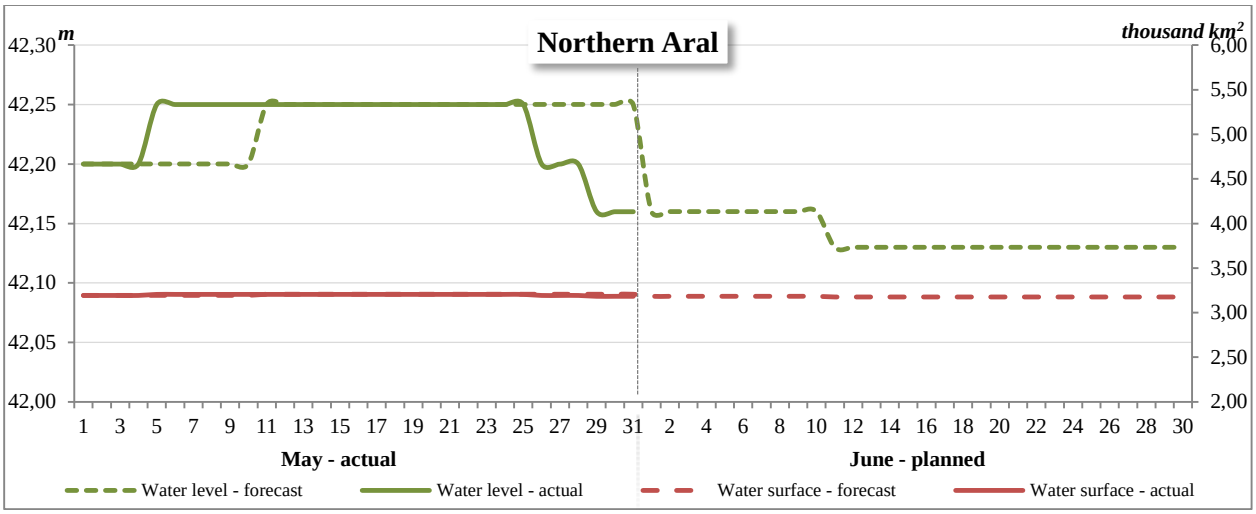
Shardara - Karateren	Parameter		May			June		
			I ten-day	*II ten-day*	*III ten-day*	*I ten-day*	*II ten-day*	*III ten-day*
Inflow from upper reach	*W, Mm³*	*Planned*	475.20	475.20	522.7	432.00	432.00	432.0
		Actual	278.0	277.3	326.4			
Lateral inflow	*W, Mm³*	*Forecast*	0.43	0.43	0	15.0	15.0	15.0
		Actual	12.92	25.26	15.72			
Filling (+), draw down (-) of Koksarai reservoir	*W, Mm³*	*Planned*	259	302.40	333	302.4	229.0	43.2
		Actual	259	293.76	333			
Water withdrawals	*W, Mm³*	*Planned*	347.3	457.1	539.8	414.7	387.9	382.8
		Actual	324.8	424.4	526			
Losses	*W, Mm³*	*Forecast*	344.3	290.7	301.8	326.9	280.2	99.7
		Actual	178.9	135.0	120.1			
Outflow to lower reach	*W, Mm³*	*Forecast*	43.2	30.2	14.3	7.8	7.8	7.8
		Actual	46.4	36.8	28.62			



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

Northern Aral	Parameter		May			June		
			I ten-day	*II ten-day*	*III ten-day*	*I ten-day*	*II ten-day*	*III ten-day*
Inflow	*W, Mm³*	*Forecast*	43.20	30.24	14.26	7.78	7.78	7.8
		Actual	46.44	36.82	28.62			
Water volume	*W, Mm³*	*Forecast*	24.19	22.04	24.24	23.51	23.32	23.13
		Actual	24.12	23.97	23.73			
Water level	*H, m*	*Forecast*	42.20	42.25	42.25	42.16	42.13	42.13
		Actual	42.23	42.25	42.21			
Water surface area	*S, th.km²*	*Forecast*	3.19	3.21	3.21	3.18	3.17	3.17
		Actual	3.20	3.21	3.20			
Water releases into the Large Aral Sea	*W, Mm³*	*Forecast*	69.12	75.17	82.68	6.91	11.23	11.2
		Actual	72.75	75.17	65.23			





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