Aral Sea Basin Transboundary Water Early Warning Bulletin

May – June 2021

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. Moreover, this was reflected in the Aral Sea Basin Programs (ASBP-3 and ASBP-4).

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 2021. The format and content of the bulletins have been agreed with the client and with all organizations that provided source information. The second bulletin contains the actual information on the Syr Darya and Amu Darya basins for May 2021 and the forecast for June.

Information sources include:

- 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: ***http://cawater-info.net/news/index.htm***

Tajikistan and Kyrgyzstan dispute over water annually. Why it turned into outrage this year? — BBC, ***knews.kg***

Unique hydrological structure to be built at Kopetdag foothills in Turkmenistan, ***sng.today***

Kazakh-Chinese reservoir to be built on the Khorgos River, ***kaztag.kz***

Tajikistan analyzed the disaster risk reduction system for agriculture, ***east-fruit.com***

CO_2 reached maximum concentrations over 3 million years, ***vokrugsveta.ua***

What hydrology can tell us about climate change in Central Asia, ***thethirdpole.net***

Central Asia courts green energy investors, ***beltandroad.news***

How Kazakhstan and Kyrgyzstan solve water security issues, ***lenta.inform.kz***

Kazakhstan and China assess water resources in the transboundary river basin, ***kaztag.kz***

Berdymukhamedov acknowledged the expected water shortage and ordered reservoir cleanings, ***hronikatm.com***

Drought in Turkmenistan can be deeper than in 2018, ***hronikatm.com***

Transmission line stretching from Turkmen Mary Hydropower to Afghan Herat is close to completion, ***arzuw.news***

EBRD, EIB and PROPARCO allocate 87.4 million Euros for Total Eren solar plant in Uzbekistan, ***uzdaily.uz***

Institute of Energy Problems will be established in Uzbekistan, ***norma.uz***

Regular 80th meeting of the Interstate Commission for Water Coordination in Central Asia, ***cawater-info.net***

West pushes Central Asia to Afghanistan, ***ia-centr.ru***

Wet and dry hydrological cycles in Toktogul reservoir over the past 36 years, ***kabar.kg***

Free environmental database launched in Kyrgyzstan, ***eco.akipress.org***

Tajikistan and Kazakhstan discuss environmental cooperation aspects, ***avesta.tj***

Coordinated actions for elimination of natural disaster effects in the south of Tajikistan discussed in Kulyab, ***avesta.tj***

Tajikistan boosts collaboration as part of a disaster risk reduction project, ***asiaplustj.info***

7 new automatic weather stations installed in Tajikistan, ***avesta.tj***

UN unanimously adopted a resolution on the status of the Aral Sea region, ***uz.sputniknews.ru***

View from IFAS: UN General Assembly resolution affirms UN's support to efforts and initiatives of Uzbekistan, ***dunyo.info***

Kyrgyzstan, Tajikistan: Solving water puzzle key to preventing fresh fighting, ***eurasianet.org***

C5+1 between Central Asia and Israel is under consideration, ***orient.tm***

Kazakhstan will pay Russia higher price for water as in the past year but get less, ***ru.kyrgyztoday.org***

Tokayev delivered a video message at the Global roundtable, ***zakon.kz***

Regional "Green Central Asia" Initiative discussed in Dushanbe, ***dialog.tj***

President of Turkmenistan took part in the UN High-Level Forum, ***turkmenportal.com***

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 6,828 Mm^3. The regulated flow of the Amu Darya at the Atamyrat (Kerki) section was 4,290 Mm^3 that virtually matched the expected flow. In June, the available usable river water resources are expected to be 9,570 million m^3, i.e. will increase 1.4 times as compared to May.

Inflow to the Nurek reservoir from the Vakhsh River was 2,443 million m^3 in May. Water releases from the reservoir amounted to 1,693 million m^3 (10% less than planned). In May, the reservoir was filled with water by 548 million m^3 and reached the volume of 7,305 million m^3 by the end of month (112% of planned volume). Water losses in the reservoir as water balance discrepancy were zero, and unrecorded inflow was detected in the amount of 249 million m^3 (3% of water volume in the reservoir). It is expected that in June 2,592 million m^3 of water will flow into the Nurek reservoir. The water volume will increase to 7,884 million m^3, and water releases from the reservoir will increase to 2,013 million m^3.

Inflow to Tuyamuyun waterworks facility (TMWF) was 3,192 million m^3 in May (95% of the forecast volume). Water releases from TMWF into the Amu Darya River amounted to 1,643 million m^3 (92%), while water diversion from the reservoir into canals was 534 million m^3 (82% of planned one). In May, the water volume in the reservoirs of TMWF changed slightly from 2,414 million m^3 at the beginning of month to 2,420 million m^3 at the end of month (only 71% of the expected accumulation). Reservoir water balance discrepancy is estimated at 1,048 million m^3 (!); this is about 33% of inflow to the waterworks facility. The discrepancy is negative and indicates to substantial water losses and, probably, to overestimated inflow to the facility. Inflow to TMWF will increase to 4,524 million m^3 in June. TMWF reservoirs will accumulate water and their volume will be about 3,540 million m^3 by the end of month. Water releases from TMWF are planned in the amount of 2,570 million m^3. Water diversion will increase to 840 million m^3.

Nurek HEPS generated 837 million kWh of electrical energy in May. The discharge through turbines was 632 m^3/s, while the head was 225 m. Sterile spills at HEPS were not observed.

In May, TMWF HEPS generated 17 million kWh only. Generation started since the second ten-days of the month.

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 is the amount of 514 million m^3 (18% of the plan), and in the lower reaches at Tuyamuyun g/s – Samanbay g/s the water shortage was 237 million m^3 (20% of the plan).

In May, open-channel balance in the reaches showed negative discrepancies that can be attributed to water losses: 771 million m^3 (13% of river flow at Kelif g/s) in the middle reaches and 617 million m^3 (38% of Amu Darya river flow downstream of TMWF - Tuyamuyun g/s) in the lower reaches.

In May, flow of the Amu Darya River changed as follows by key gauging station: Kelif g/s – 5,950 million m^3 (92% of the forecast), Birata g/s (inflow to TMWF) – 3,192 million m^3 (95% of the forecast), Tuyamuyun g/s (downstream of TMWF) – 1,643 million m^3 (92%), and Samanbay g/s - only 67 million m^3 (54% of planned supply).

In June, water withdrawal will be increased to 2,958 million m^3 in the first reach and to 1,795 million m^3 in the second reach. As expected, flow along the Amu Darya River will be transformed as follows: Kelif g/s – 8,009 million m^3, Birata g/s – 4,524 million m^3, Tuyamuyun g/s – 2,566 million m^3, and Samanbay g/s - 217 million m^3.

In May, inflow to the Large Aral Sea from the Amu Darya River and collecting drains (collectors) amounted to 190 million m^3 and no water was discharged from the Northern Aral Sea. The water level in the eastern part of the Large Aral Sea averaged 26.5 m, the water surface area was 1.2 thousand km^2, and the water volume was 1 km^3. In the western part, the water level varied within 22.14…22.07 m, the water surface area was 2.33...2.31 thousand km^2, and the water volume was 33.8…33.5 km^3. Evaporation from 1 km^2 of water surface of the Large Aral Sea was 0.105 million m^3 in May.

It is expected that the inflow to the Large Aral Sea will be 217 million m^3 in June. By the end of June, in the eastern part of the Large Aral Sea the water level will be 26.4 m, the water surface area will be 1.1 thousand km^2, and the water volume will be 0.9 km^3. In the western part of the Large Aral Sea the water level will be 21.9 m, the water surface area will be 2.3 thousand km^2, and the water volume will be 33.1 km^3. Evaporation from 1 km^2 of water surface of the Large Aral Sea will be 0.212 million m^3 in June.

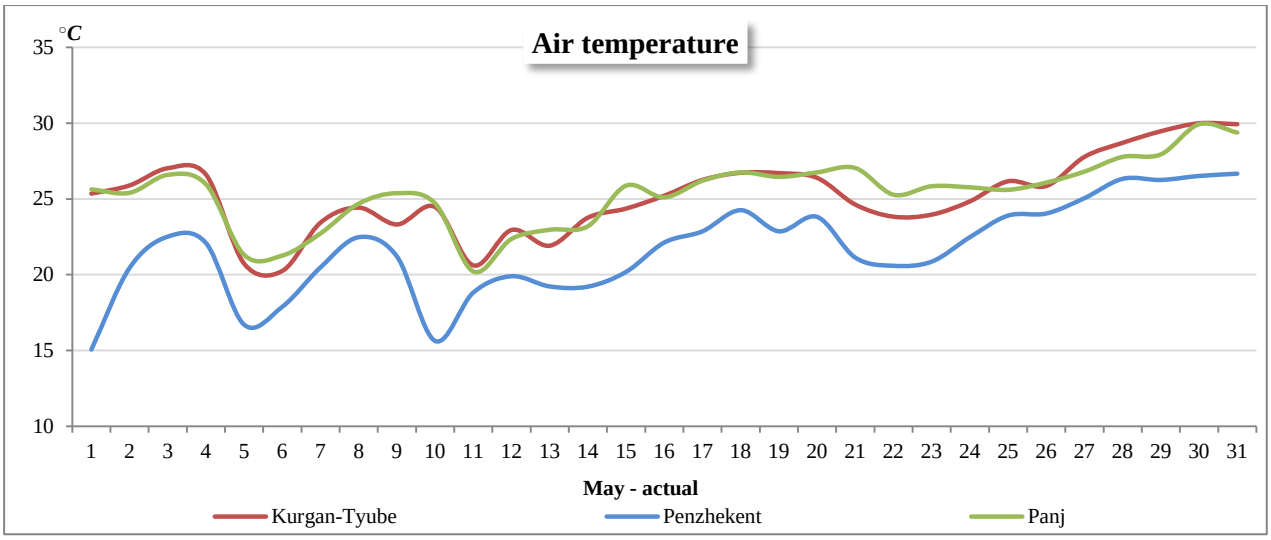
The sections below show daily and ten-day data on climate and water management (reservoirs, HEPS, water distribution).

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*	23.0	24.0	24.0	27.0	28.0	30.0
		Actual	24.3	24.6	27.0			
Kurgan-Tyube	*T*, °*C*	*Forecast*	24.0	24.0	26.0	27.0	28.0	30.0
		Actual	24.1	24.4	26.8			
Penzhekent	*T*, °*C*	*Forecast*	19.0	21.0	23.0	24.0	25.0	27.0
		Actual	19.4	21.3	23.9			

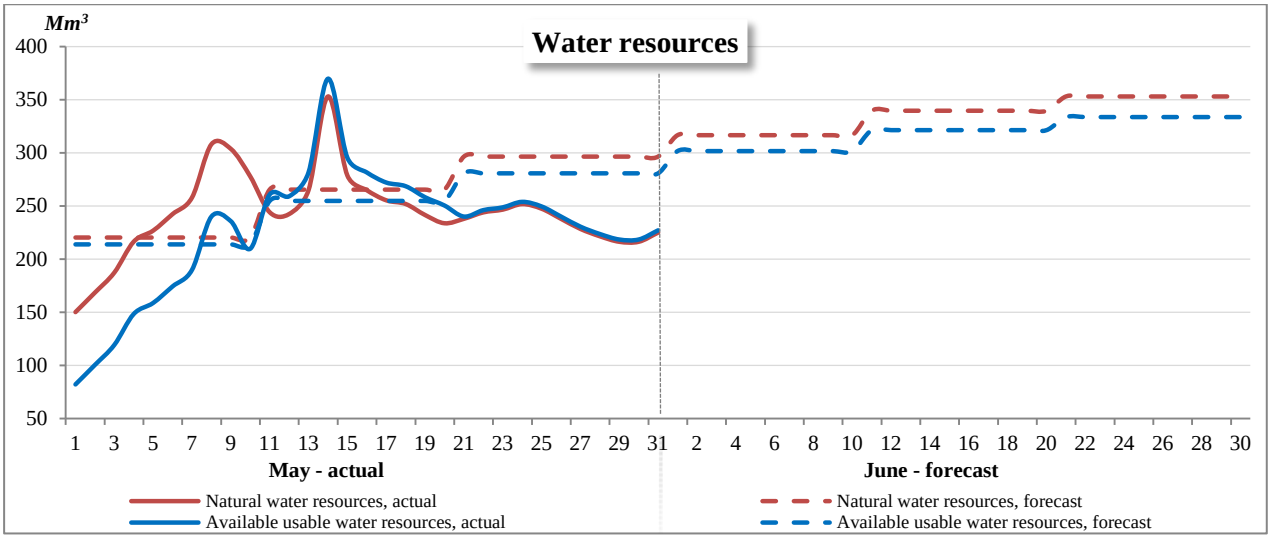


Water resources

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*	1106	1469	1728.0	1814.4	2039.0	2160
		Actual	1237	1693	1360			
Water withdrawal: upstream of Atamyrat g/s	*W, Mm³*	*Forecast*	1012	1056	1107	1153	1167	1181
		Actual	823	805	855			
Nurek reservoir /filling (+) or draw down (-)	*W, Mm³*	*Forecast*	0	86	130	198.7	190.1	190
		Actual	279	134	133.92			
Natural water resources at Atamyrat g/s	*W, Mm³*	*Forecast*	2117.5	2611.4	2965.1	3166	3397	3531
		Actual	2339.7	2631.0	2348.9			
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*	165.7	203.7	231	241	264	276
		Actual	781.3	-69.7	53			
Available usable water resources	*W, Mm³*	*Forecast*	2053	2505	2808	3017	3214	3337
		Actual	1660	2798	2370			

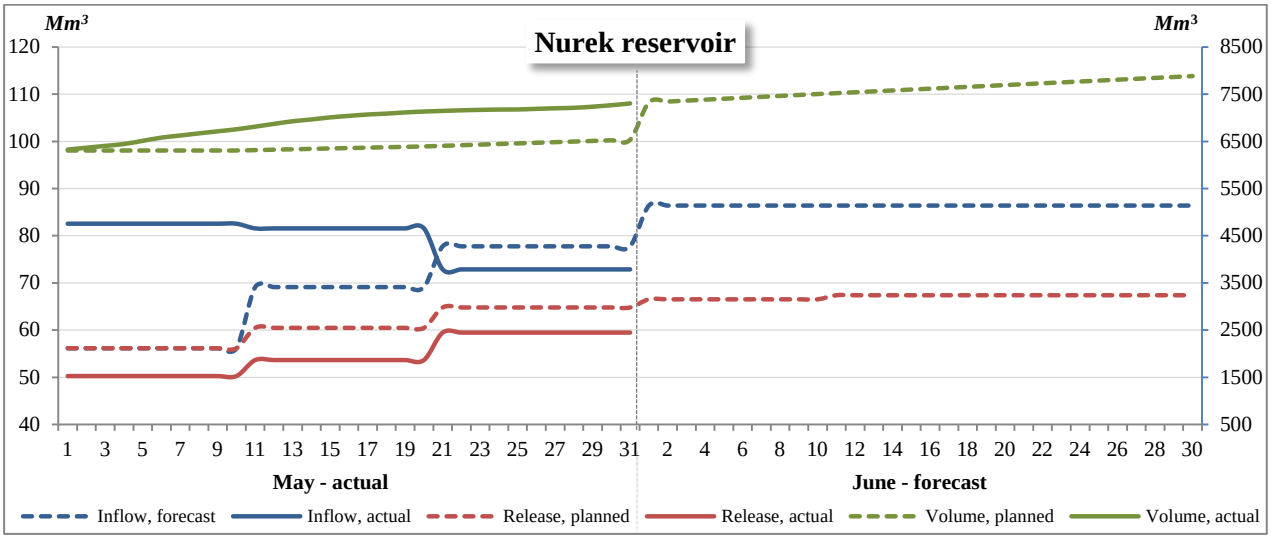


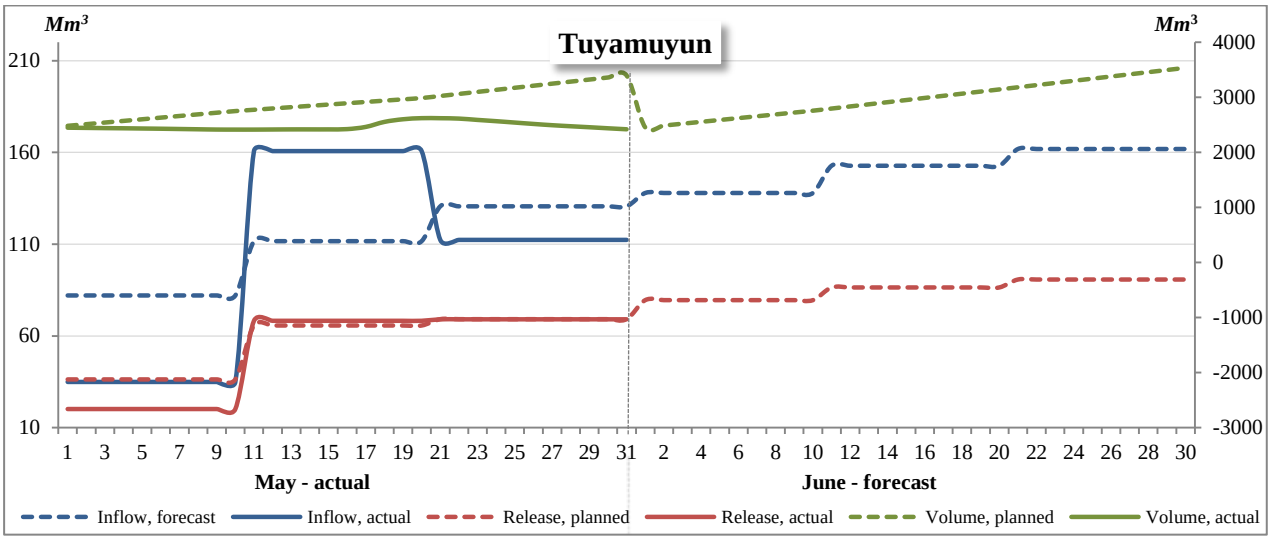
Reservoirs and HEPS

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**)

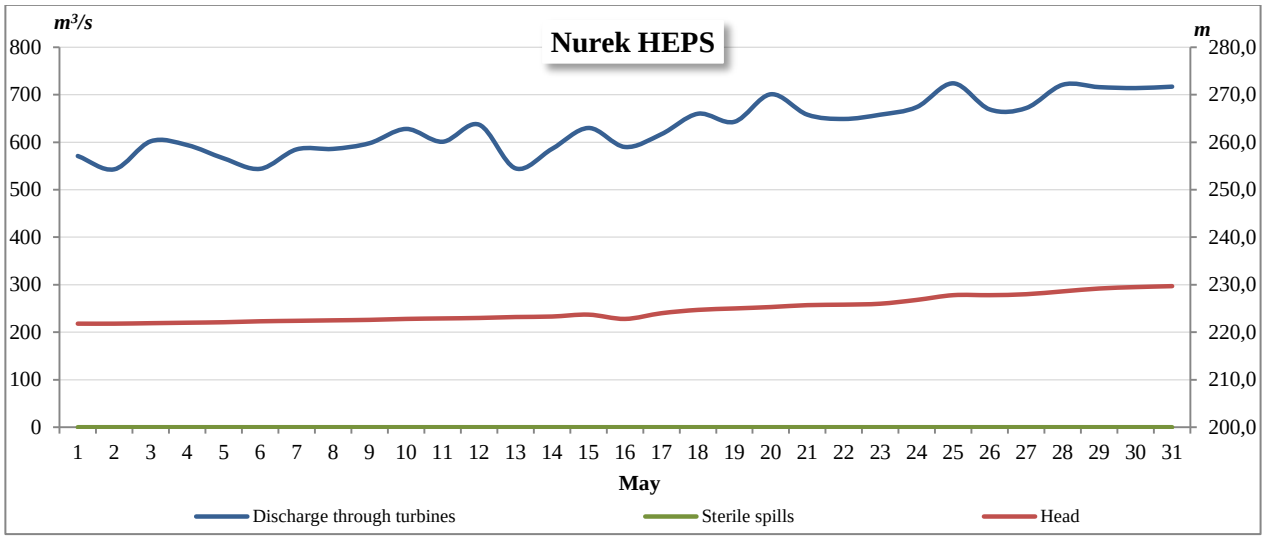
Reservoir	Parameter		May			June		
			I ten-day	*II ten-day*	*III ten-day*	*I ten-day*	*II ten-day*	*III ten-day*
Nurek reservoir	*I, Mm³*	*Forecast*	562	691	855	864.0	864.0	864
		Actual	825.6	815.6	802			
	R, Mm³	*Planned*	562	605	713	665.3	673.9	674
		Actual	503	537	654			
	W, Mm³	*Planned*	6307.0	6393.4	6536.0	7503.7	7693.8	7884
		Actual	6757	7133	7305			
Reservoirs of Tuyamuyun waterworks facility	*I, Mm³*	*Forecast*	820.4	1116.3	1436.8	1378.8	1527	1618
		Actual	349.1	1607.0	1236			
	R, Mm³	*Planned*	362.9	656.6	760.3	794.9	864.0	907
		Actual	201	682	759			
	W, Mm³	*Planned*	2751	2987	3398	2758	3144	3536
		Actual	2414	2622	2420			

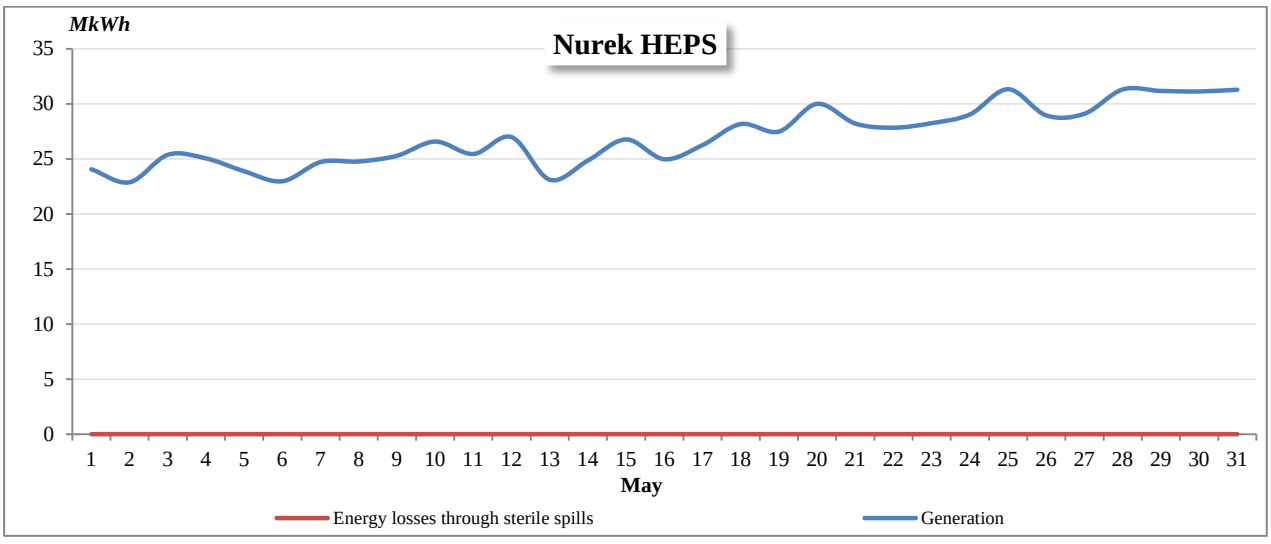


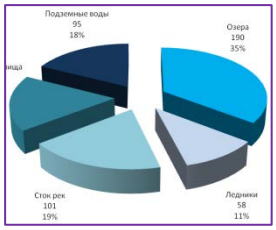


Generation (**G**), Energy losses through sterile spills (**L**), Discharge through turbines (**Q**), Sterile spills (**R**), Head (**H**)

HEPS	Parameter		May		
			I ten-day	*II ten-day*	*III ten-day*
Nurek	*G, M kWh*	*Actual*	26.58	30.01	31.34
	L, M kWh	*Actual*	0.0	0.0	0.0
	Q, m^3/s	*Actual*	581.7	621.0	688.3
	R, m^3/s	*Actual*	0.0	0.0	0.0
	H, m	*Actual*	222.2	223.7	227.7





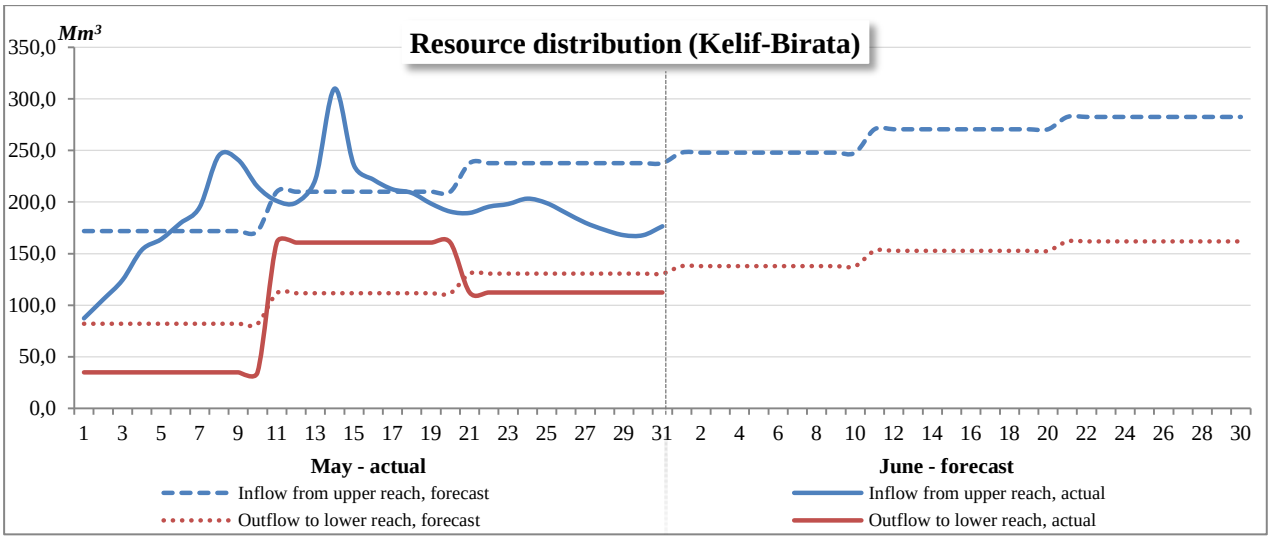


Water distribution

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)

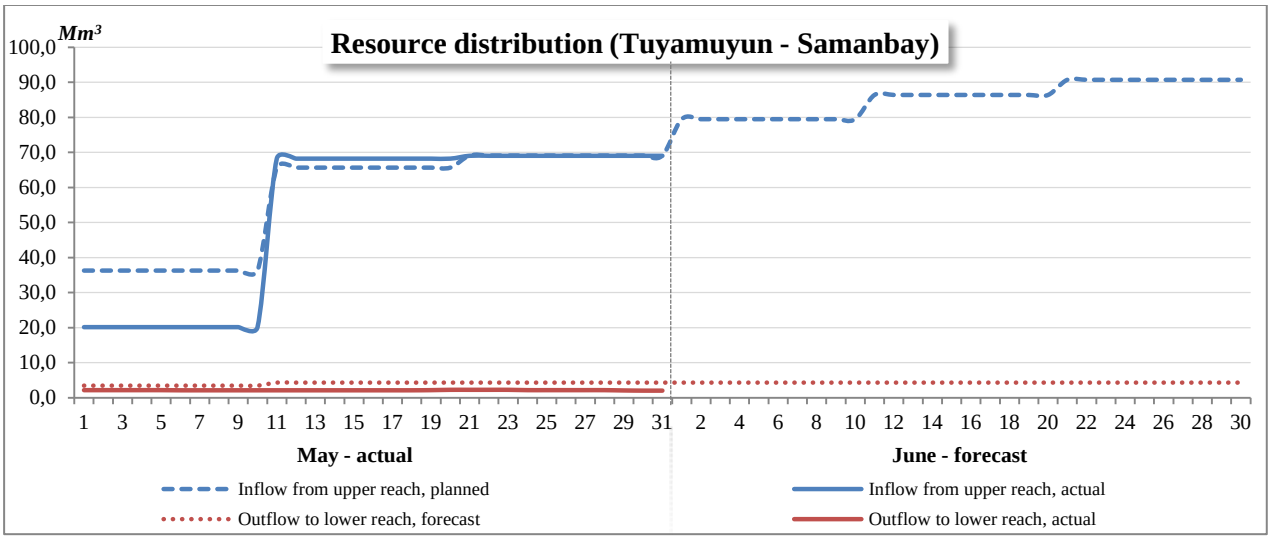
Kelif - Birata	Parameter		May			June		
			I ten-day	*II ten-day*	*III ten-day*	*I ten-day*	*II ten-day*	*III ten-day*
Inflow from upper reach	*W, Mm³*	*Forecast*	1718	2100	2615	2479	2705	2825
		Actual	1710	2200	2040			
Lateral inflow	*W, Mm³*	*Forecast*	101	97	81	92	81	82
		Actual	101	97	81			
Water withdrawal	*W, Mm³*	*Planned*	855	902	1024	950	995	1013
		Actual	680	759	827			
Losses	*W, Mm³*	*Forecast*	143.9	179.0	235	241	264	276
		Actual	782	-69	58			
Outflow to lower reach	*W, Mm³*	*Forecast*	820.4	1116.3	1437	1378.8	1527	1618
		Actual	1718	2100	2615			



Water volume (W)

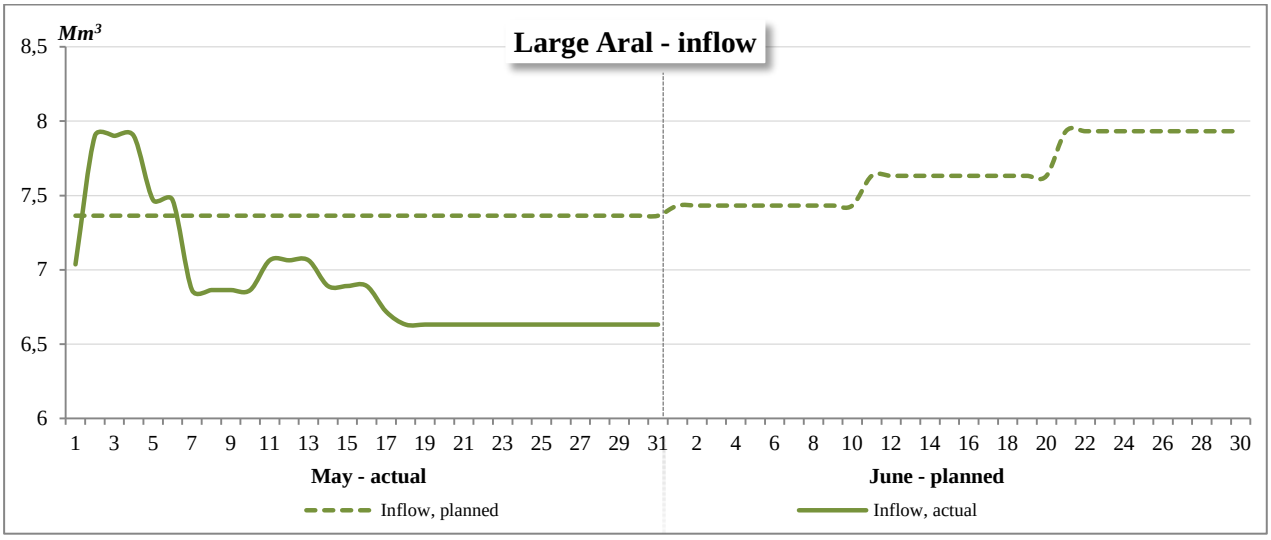
Tuyamuyun - Samanbay	Parameter		May			June		
			I ten-day	*II ten-day*	*III ten-day*	*I ten-day*	*II ten-day*	*III ten-day*
Inflow from upper reach	*W, Mm³*	*Forecast*	362.9	656.6	760	794.9	864	907
		Actual	201	682	759			
Lateral inflow	*W, Mm³*	*Forecast*	0	0	0	0	0	0
		Actual	0	0	0			
Water withdrawal [1]	*W, Mm³*	*Planned*	225	449	523	553.0	605	638
		Actual	131.9	335	493			
Losses	*W, Mm³*	*Forecast*	104	164	190	198.7	216	226
		Actual	104	164	190			
Outflow to lower reach	*W, Mm³*	*Forecast*	34.56	43.20	47.52	43.2	43	43
		Actual	21.5	21.4	23.7			

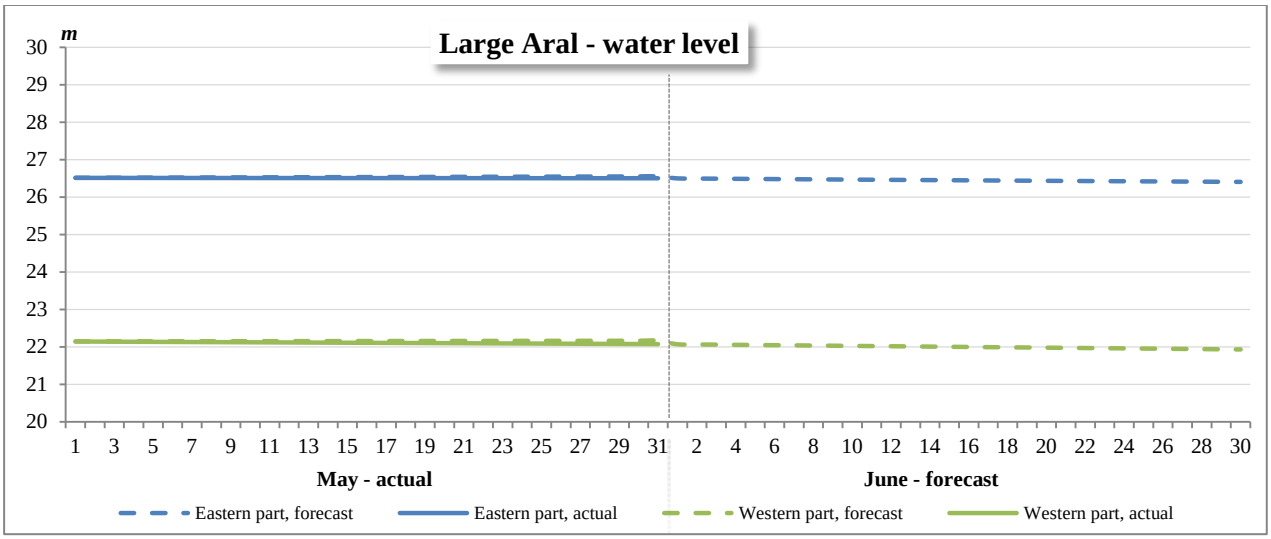
[1] *Note: Including supply to the system of lakes and environmental water releases into canals*

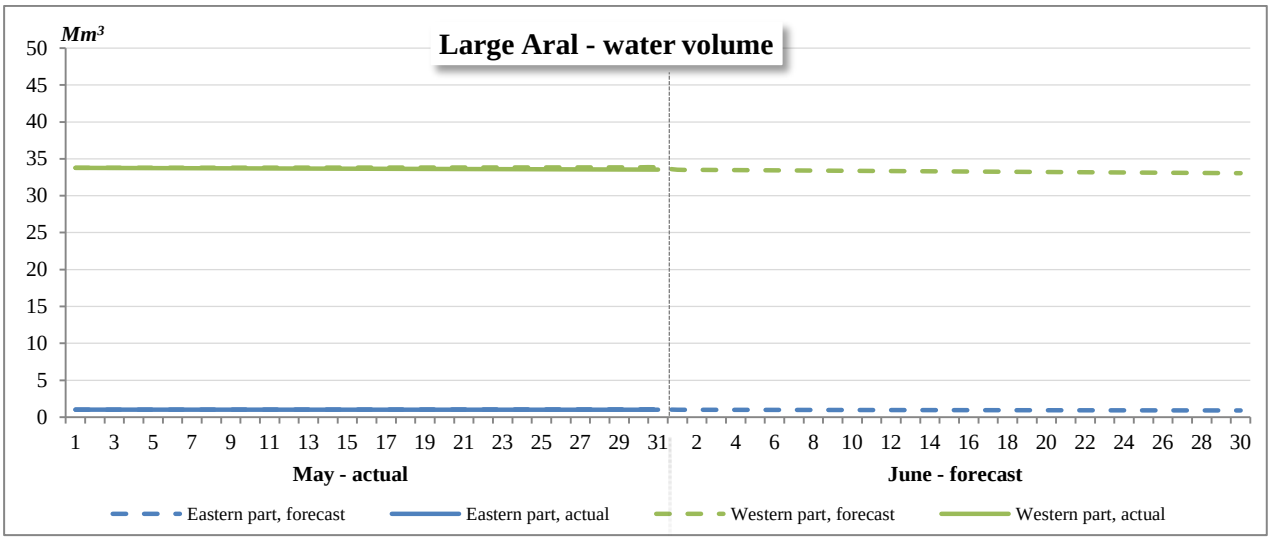


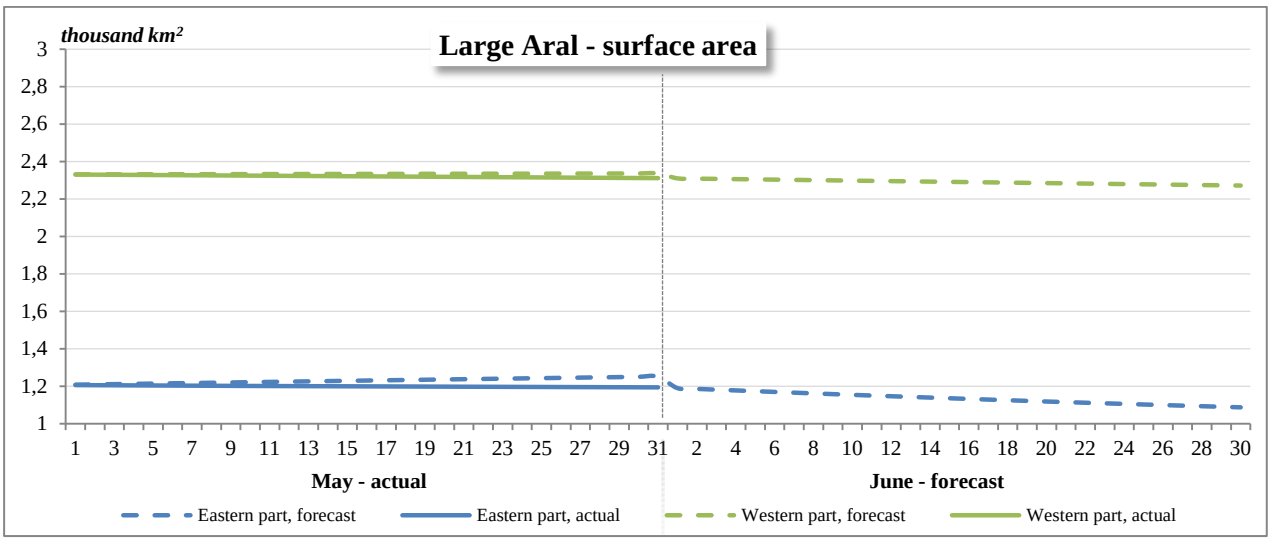
Water volume (**W**), Level (**H**), Surface area (**S**)

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*	65.00	65.00	71.50	70.00	72.00	75.00
		Actual	60.00	62.00	68.20			
Eastern part, water volume	*W, Mm³*	*Forecast*	1.04	1.05	1.06	0.99	0.96	0.92
		Actual	1.02	1.02	1.01			
Eastern part, level	*H, m*	*Forecast*	26.52	26.53	26.55	26.48	26.45	26.42
		Actual	26.51	26.51	26.50			
Eastern part, area	*S, th.km²*	*Forecast*	1.21	1.23	1.24	1.17	1.13	1.10
		Actual	1.20	1.20	1.20			
Western part, water volume	*W, Mm³*	*Forecast*	33.80	33.82	33.85	33.45	33.29	33.12
		Actual	33.70	33.62	33.58			
Western part, level	*H, m*	*Forecast*	22.15	22.15	22.16	22.05	22.00	21.95
		Actual	22.15	22.11	22.08			
Western part, area	*S, th.km²*	*Forecast*	2.33	2.33	2.34	2.30	2.29	2.28
		Actual	2.33	2.32	2.31			




Large Aral - water level
m
30
29
28
27
26
25
24
23
22
21
20
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
50
45
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
3
2,8
2,6
2,4
2,2
2
1,8
1,6
1,4
1,2
1
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 River that were estimated as the sum of flows of the Naryn, the Karadarya and the Chichik rivers based on inflow to Toktogul, Andizhan, and Charvak reservoirs plus lateral inflow to the rivers and minus losses amounted to 6,027 million m^3. The cumulative inflow to the three reservoirs was 4,129 million m^3. In June, the available usable water resources are expected in the amount of 5,235 million m^3, including 3,694 million m^3 of inflow to the three reservoirs.

In May, inflow to the Toktogul reservoir was 2,266 million m^3, and water releases from the reservoir amounted to 749 million m^3. The water volume in the Toktogul reservoir was only 8,680 million m^3 by the beginning of month and in the course of May increased by 1,480 million m^3(!), reaching 10,160 million m^3 (109% of accumulation plan) by the end of month. The reservoir water balance showed a negative discrepancy of 37 million m^3, indicating to water losses in the reservoir. It is expected that in June the Toktogul reservoir will accumulate water and by the end of month the water volume will be 11,297 million m^3; inflow to the reservoir is expected in the amount of 2,132 million m^3, while water releases are planned at 995 million m^3.

In May, inflow to the Andizhan reservoir was 686 million m^3, and water releases from the reservoir were 319 million m^3. The reservoir's water volume increased from 798 million m^3 at the beginning of month to 1,184 million m^3 at the end of month. In June, inflow to the Andizhan reservoir is expected to be 367 million m^3 and water releases will be 337 million m^3. The reservoir will accumulate water to 1,214 million m^3.

Inflow to the Bakhri Tojik reservoir was 1,051 million m^3 (given the forecast of 1,039 million m^3), while water releases from the reservoir were 1,094 million m^3 (given the plan of 1,029 million m^3) in May. The water volume changed insignificantly from 3,458 million m^3 at the beginning of month to 3,477 million m^3 by the end of month. The unrecorded inflow to the reservoir was detected by the balance method in the amount of 63 million m^3. In June, inflow to the Bakhri Tojik reservoir is expected to decrease to 797 million m^3, while water releases from the reservoir will increase to 1,274 million m^3. The reservoir will be drawn down to 3,000 million m^3.

In May, the Charvak reservoir was filled with water from 781 million m^3 to 1,519 million m^3 (20% more than planned). Inflow to the reservoir was 1,177 million m^3, and water releases were 586 million m^3. In June, the Charvak reservoir will accumulate water and its volume will increase to 2,108 million m^3 by the end of month. Inflow to the reservoir is expected in the amount of 1,194 million m^3, while 605 million m^3 of water is to be released.

Inflow to the Shardara reservoir was 281 million m^3 only (60% of the forecast) and water releases from the reservoir amounted to 690 million m^3 (50% of planned) in May. The reservoir was drawn down from 4,841 million m^3 to 4,120 million m^3, and water was not discharged into Arnasai. Water diversion from the reservoir amounted to 114 million m^3. Balance discrepancy (indicating to flow losses) was 189 million m^3 (about 5% of the reservoir's water volume). In June, inflow to the Shardara reservoir is expected to increase to 518 million m^3, while planned water releases will increase to 1,348 million m^3. This will lead to lowering of reservoir's water volume to 3,109 million m^3 by the end of month. Water discharge into Arnasai is not planned in June.

The Koksarai reservoir did not accumulate water in May. Water discharge from the reservoir into the Syr Darya River amounted to 873 million m^3. The water volume in the reservoir decreased from 1,806 million m^3 to 938 million m^3. Water losses in the reservoir were estimated at 5 million m^3. Accumulation of water in the Koksarai reservoir is not planned in June. It is planned

to discharge water from the reservoir into the river in the amount of 691 million m^3. The reservoir will be drawn down to 247 million m^3.

In May, energy generation by the cascade of Naryn HEPS amounted to 765 million kWh (under energy-generation regime) against planned 651 million kWh, including: Toktogul HEPS - 244 million kWh. The average discharge through turbines of Toktogul HEPS was 278 m^3/s, and the average head at HEPS was 136 m. No sterile spills were observed. The plan of energy generation for June for the cascade of Naryn HEPS is set at 855 million kWh, including 333 million kWh for Toktogul HEPS.

In May, the total generation at large HEPS of Uzbekistan amounted to 199 million kWh, of which: 143 million kWh at Charvak HEPS, 14 million kWh at Farkhad HEPS, and 42 million kWh at Andizhan HEPS. The discharge at Charvak HEPS was 176 m^3/s, and the head was 124 m. The discharge at Farkhad HEPS was 79 m^3/s, and the head was 31 m. For Andizhan HEPS, the discharge was 69 m^3/s, and the head was 95 m.

Energy generation by HEPS of the Bakhri Tojik reservoir and by Shardara HEPS amounted to 40 million kWh, respectively, in May. Water discharge at HEPS of Bakhri Tojik was 374 m^3/s, while the head was 20 m. Discharge at Shardara HEPS was 249 m^3/s, and the head was 21 m only.

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 accounted for 6% of planned water withdrawal. The balance discrepancy that can be attributed to open channel losses was 90 million m^3 (12% of river flow at the head of the reach). In the reach of Uchkurgan waterworks facility (tail-water) – Akjar g/s (inflow to the Bakhri Tojik reservoir) water shortage was estimated at 21%, and the balance discrepancy (water losses) was 19% of the flow at the head of the reach. In the reach of Bakhri Tojik reservoir – Shardara reservoir water shortage accounted for 15%, and the open-channel balance discrepancy (losses) was 13%. In the lower reaches of the Syr Darya River (downstream of Shardara reservoir) the open-channel balance discrepancy was recorded at 288 million m^3 - 18% of river flow at the head of the reach (downstream of spillway from the Koksarai reservoir into the river).

In May, the flow along the Naryn – Syr Darya rivers changed as follows: discharge from the Toktogul reservoir – 749 million m^3 (93% of BWO SyrDarya's schedule), Akjar g/s (inflow to the Bakhri Tojik reservoir) – 1,051 million m^3 (101% of the forecast), inflow to the Shardara reservoir – only 281 million m^3 (60% of the forecast), Syr Darya – tail-water of the Shardara reservoir – 690 million m^3 (50% of BWO SyrDarya's schedule), and, inflow to the Northern Aral Sea - 24 million m^3 (89% of the forecast).

In May, inflow to the Northern Aral Sea was 24 million m^3 only. No water was discharged from the Northern Aral Sea into the Large Aral Sea (Amu Darya Basin). The water level varied within 41.9…42 m. The water surface area was 3.11…3.14 thousand km^2 and the water volume was 24.9…25.2 km^3.

It is expected that in June inflow to the Northern Aral Sea will decrease to 13 million m^3, and no discharge into the Large Aral Sea will be made. The water level will be 41.8 m, the water surface area will be 3.1 thousand km^2, and the water volume will be 24.6 km^3 by the end of month.

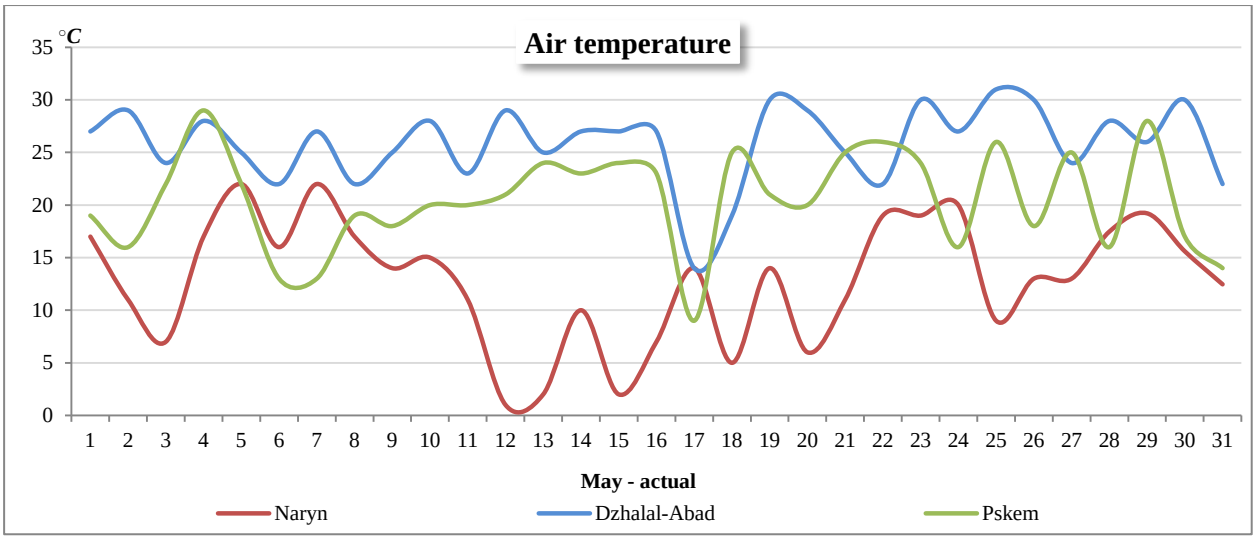
The sections below show daily and ten-day data on climate and water management (reservoirs, HEPS, water distribution).

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*	12.0	12.0	14.0	16.0	17.0	19.0
		Actual	15.8	7.1	15.3			
Dzhalal-Abad	*T*. °C	*Forecast*	22.0	22.0	24.0	28.0	30.0	32.0
		Actual	25.7	25.0	26.8			
Pskem	*T*. °C	*Forecast*	18.0	19.0	22.0	22.0	23.0	24.0
		Actual	19.1	21.0	21.3			

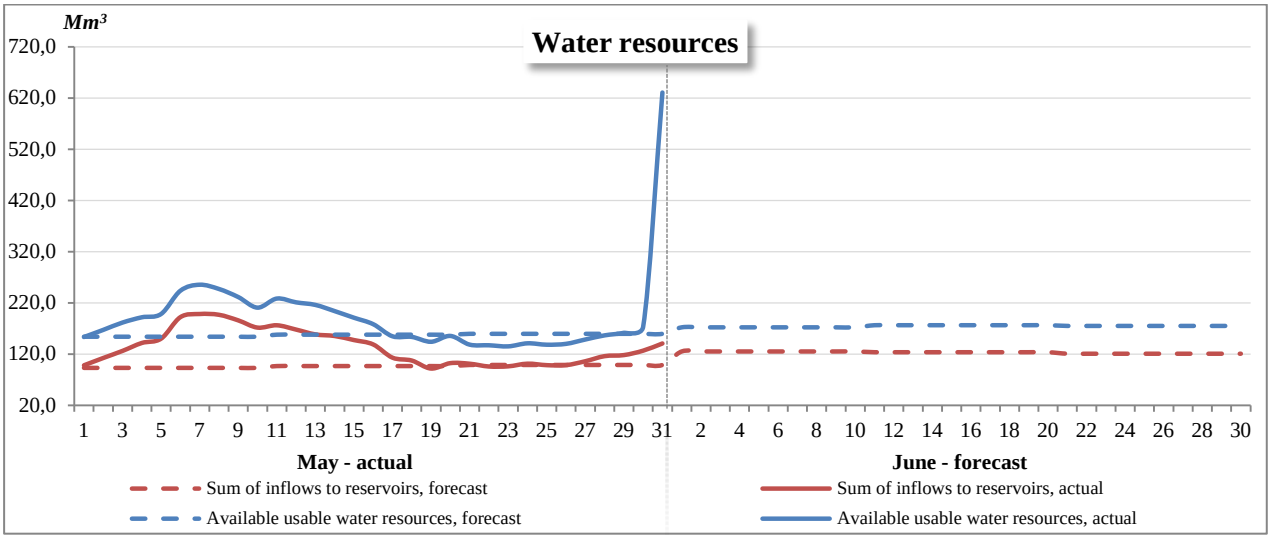


Water resources

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*	467	467	513.8	711	711	710.8
		Actual	926	713	627.6			
Inflow to Andizhan reservoir	*W, Mm³*	*Forecast*	173	173	190.1	143	121	103.7
		Actual	270	260	156.7			
Inflow to Charvak reservoir	*W, Mm³*	*Forecast*	290	326	382.1	397	404	392.3
		Actual	377	386	413.8			
Sum of inflows to reservoirs	*W, Mm³*	*Forecast*	930	966	1086.0	1251	1236	1206.8
		Actual	1573	1358	1198.1			
Lateral inflow up to Shardara	*W, Mm³*	*Forecast*	643	647	710.3	532	588	603.3
		Actual	542	522	943.5			
Losses	*W, Mm³*	*Forecast*	34	34	41.3	60	60	60.4
		Actual	34	34	41.3			
Available usable water resources	*W, Mm³*	*Forecast*	1539	1579	1755.0	1722	1764	1749.6
		Actual	2081	1846	2100.4			

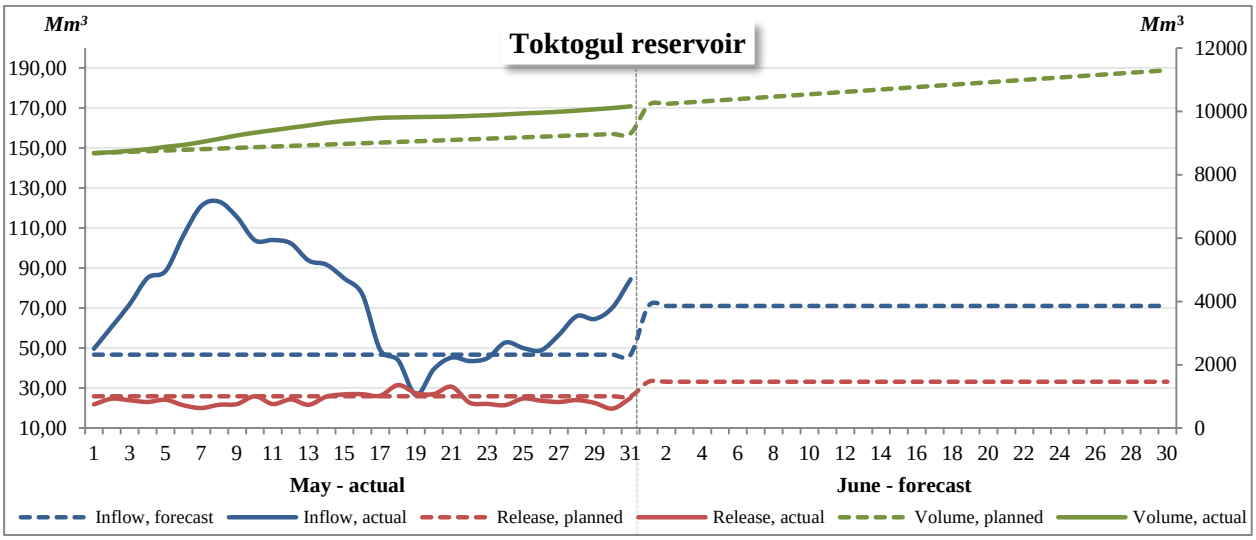


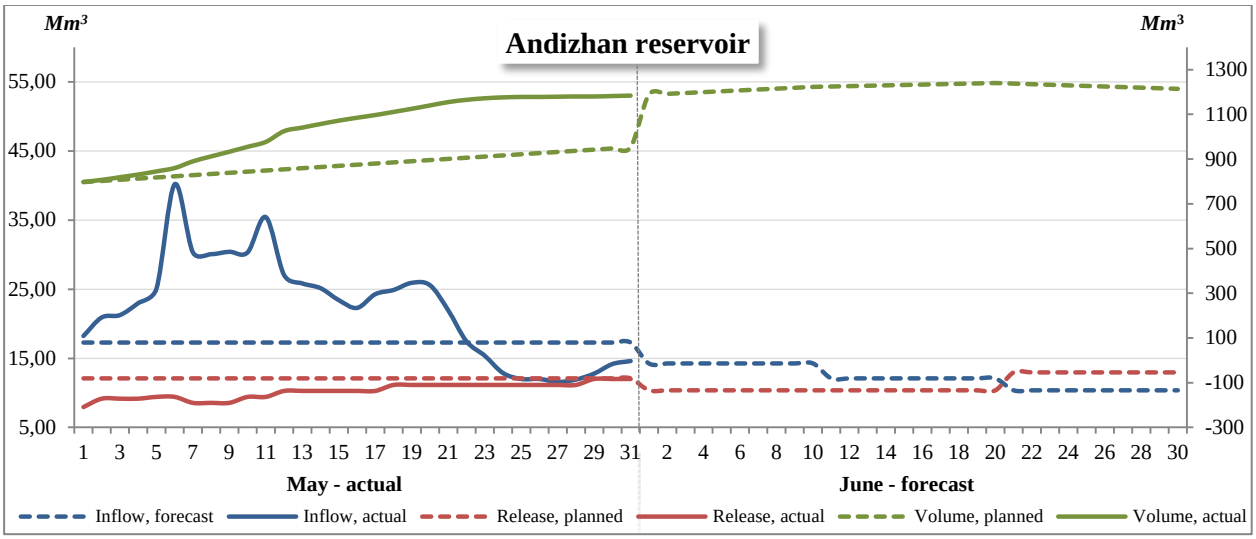
Reservoirs and HEPS

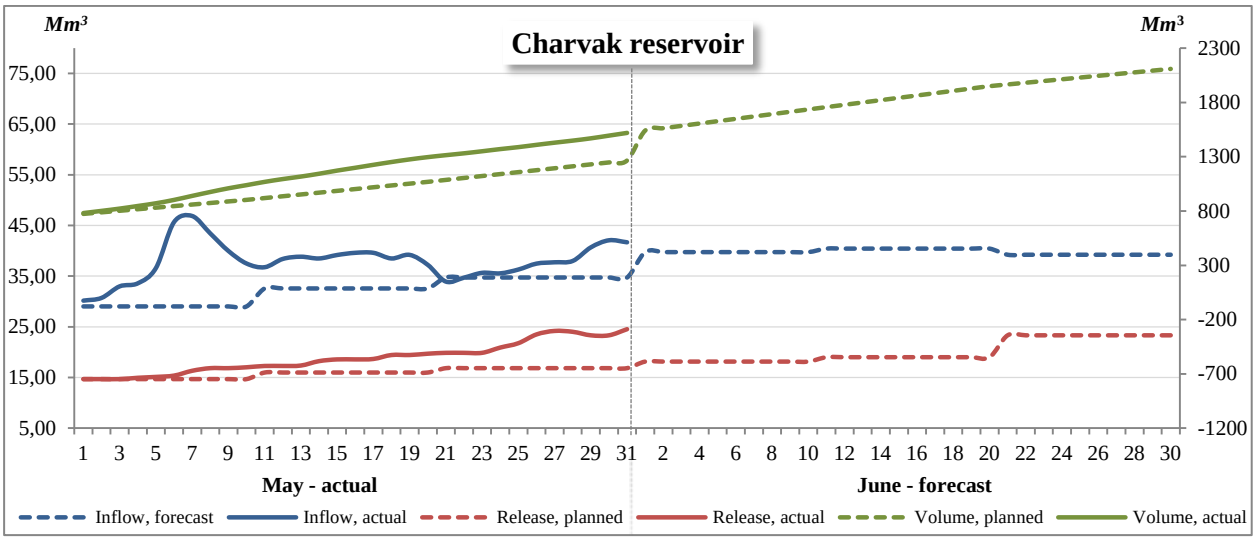
Reservoir	Location			Characteristics				
	Latitude	Longitude	Altitude above sea level, m	Length, km	Width, km	Water-surface area, km²	Full volume, km³	Full reservoir level, m
Toktogul	41.80	72.87	880	65	12	284	19.50	215
Andizhan	40.77	73.11	900	36	1.5-12	56	0.19	905
Bakhri Tojik	40.29	70.07	344	75	20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

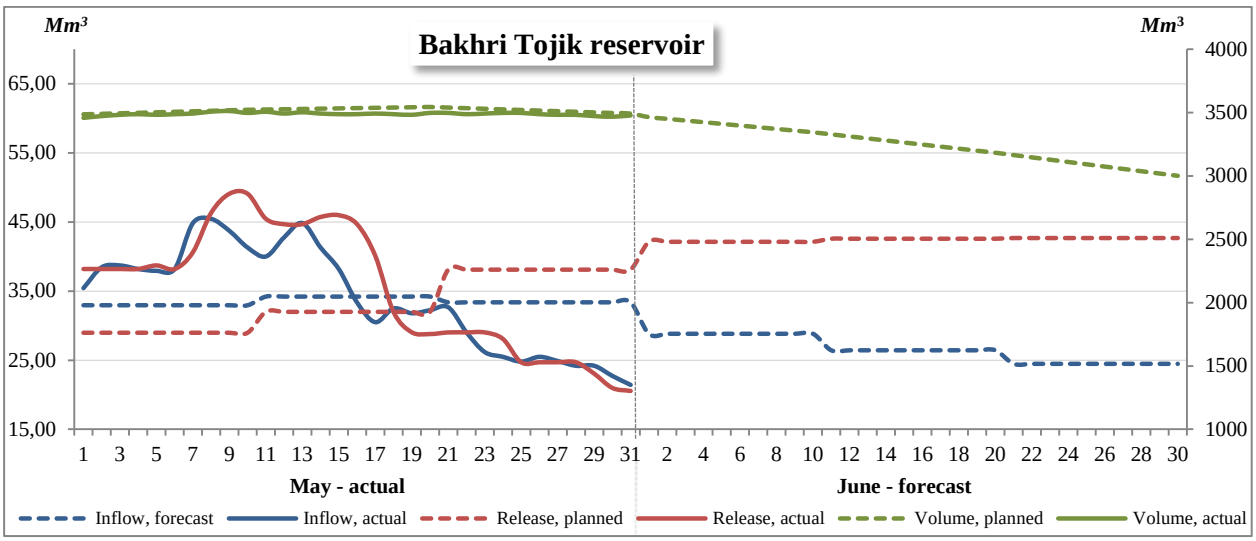
Inflow (**I**), Releases (**R**), Volume (**W**)

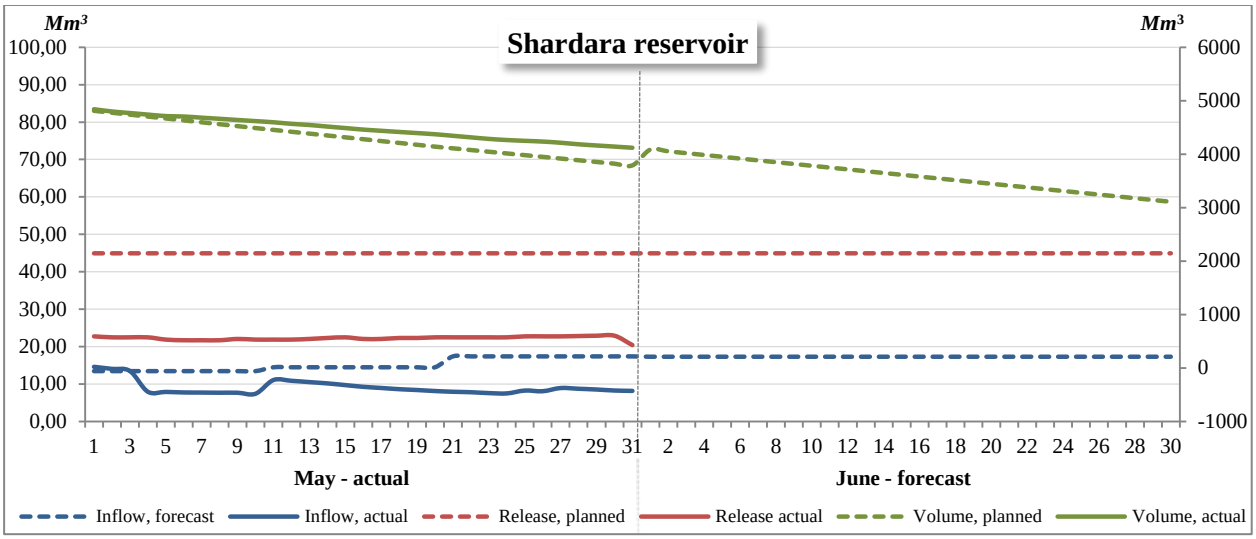
Reservoir	Parameter		May			June		
			I ten-day	*II ten-day*	*III ten-day*	*I ten-day*	*II ten-day*	*III ten-day*
Toktogul reservoir	*I, Mm³*	*Forecast*	467.11	467.11	513.82	710.81	710.81	710.81
		Actual	925.78	712.63	627.61			
	R, Mm³	*Planned*	259.20	259.20	285.12	331.78	331.78	331.78
		Actual	228.87	259.89	259.98			
	W, Mm³	*Planned*	8868	9076	9305	10539	10918	11297
		Actual	9328	9827	10160			
Andizhan reservoir	*I, Mm³*	*Forecast*	172.80	172.80	190.08	142.56	120.96	103.68
		Actual	269.74	259.80	156.73			
	R, Mm³	*Planned*	120.96	120.96	133.06	103.68	103.68	129.60
		Actual	89.34	104.54	125.19			
	W, Mm³	*Planned*	844	896	953	1223	1240	1214
		Actual	955	1140	1184			
Charvak reservoir	*I, Mm³*	*Forecast*	290.30	325.73	382.05	397.44	404.35	392.26
		Actual	377.48	385.80	413.80			
	R, Mm³	*Planned*	146.88	159.84	185.33	181.44	190.08	233.28
		Actual	156.56	184.55	245.20			
	W, Mm³	*Planned*	902	1068	1265	1735	1949	2108
		Actual	1038	1296	1519			
Bakhri Tojik reservoir	*I, Mm³*	*Forecast*	329.50	342.02	367.13	288.22	264.33	244.75
		Actual	402.19	367.46	281.06			
	R, Mm³	*Planned*	289.73	319.94	419.10	421.29	425.76	426.74
		Actual	414.77	401.12	278.52			
	W, Mm³	*Planned*	3522	3544	3492	3344	3183	3001
		Actual	3497	3497	3477			
Shardara reservoir	*I, Mm³*	*Forecast*	134.31	144.62	191.07	172.80	172.80	172.80
		Actual	96.01	95.51	89.57			
	R, Mm³	*Planned*	449.28	449.28	494.21	449.28	449.28	449.28
		Actual	220.92	221.62	247.02			
	W, Mm³	*Planned*	4489	4141	3791	3783	3446	3109
		Actual	4619	4373	4120			




Andizhan reservoir
Mm³
Mm³
55,00
45,00
35,00
25,00
15,00
5,00
1300
1100
900
700
500
300
100
-100
-300
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

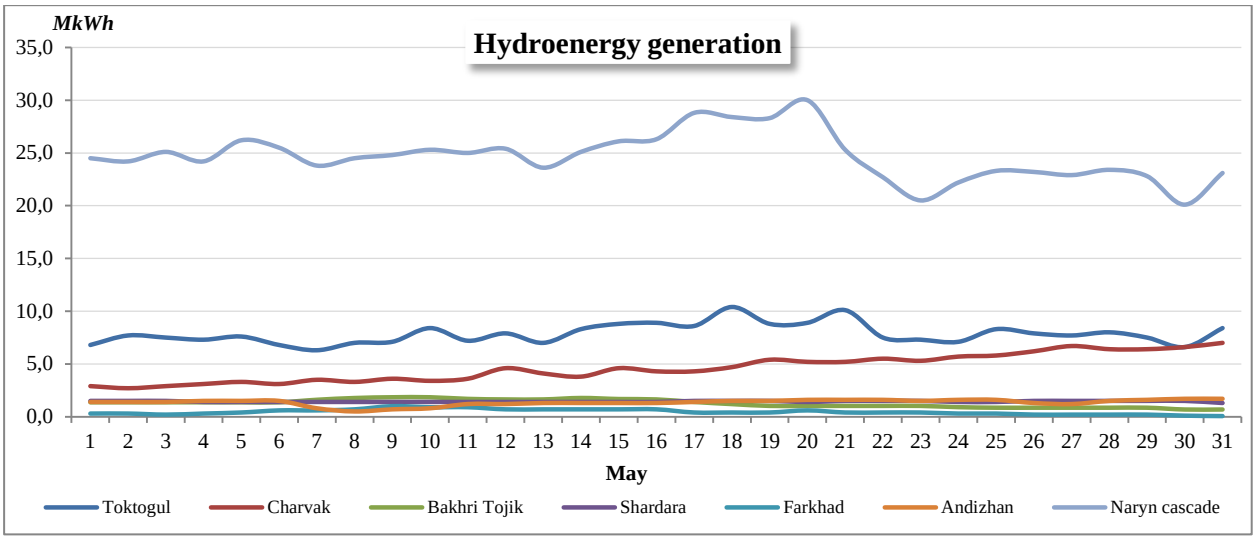

Charvak reservoir
Mm³
Mm³
75,00
65,00
55,00
45,00
35,00
25,00
15,00
5,00
2300
1800
1300
800
300
-200
-700
-1200
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
May - actual
June - forecast
Inflow, forecast
Inflow, actual
Release, planned
Release, actual
Volume, planned
Volume, actual

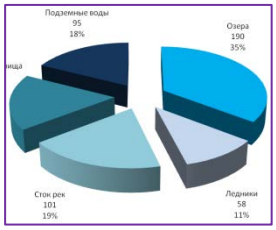

Bakhri Tojik reservoir
Mm³
Mm³
65,00
55,00
45,00
35,00
25,00
15,00
4000
3500
3000
2500
2000
1500
1000
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
May - actual
June - forecast
Inflow, forecast
Inflow, actual
Release, planned
Release, actual
Volume, planned
Volume, 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*	26.2	30.0	25.3
Toktogul	*G, M kWh*	*Actual*	8.4	10.4	10.1
	Q, m^3/s	*Actual*	263.0	298.9	272.6
	H, m	*Actual*	132.7	136.1	138.2
Andizhan	*G, M kWh*	*Actual*	1.5	1.6	1.7
	Q, m^3/s	*Actual*	58.5	70.5	76.7
	H, m	*Actual*	95.0	95.0	95.0
Bakhri Tojik	*G, M kWh*	*Actual*	1.8	1.7	1.0
	Q, m^3/s	*Actual*	446.9	430.5	255.9
	H, m	*Actual*	20.1	20.1	20.1
Farkhad	*G, M kWh*	*Actual*	1.0	0.9	0.4
	Q, m^3/s	*Actual*	90.4	93.0	55.1
	H, m	*Actual*	30.6	30.6	30.6
Charvak	*G, M kWh*	*Actual*	3.6	5.4	7.0
	Q, m^3/s	*Actual*	132.5	172.0	219.0
	H, m	*Actual*	115.4	125.1	131.5
Shardara	*G, M kWh*	*Actual*	1.5	1.5	1.5
	Q, m^3/s	*Actual*	250.0	250.0	247.2
	G, M kWh	*Actual*	20.9	20.6	20.2



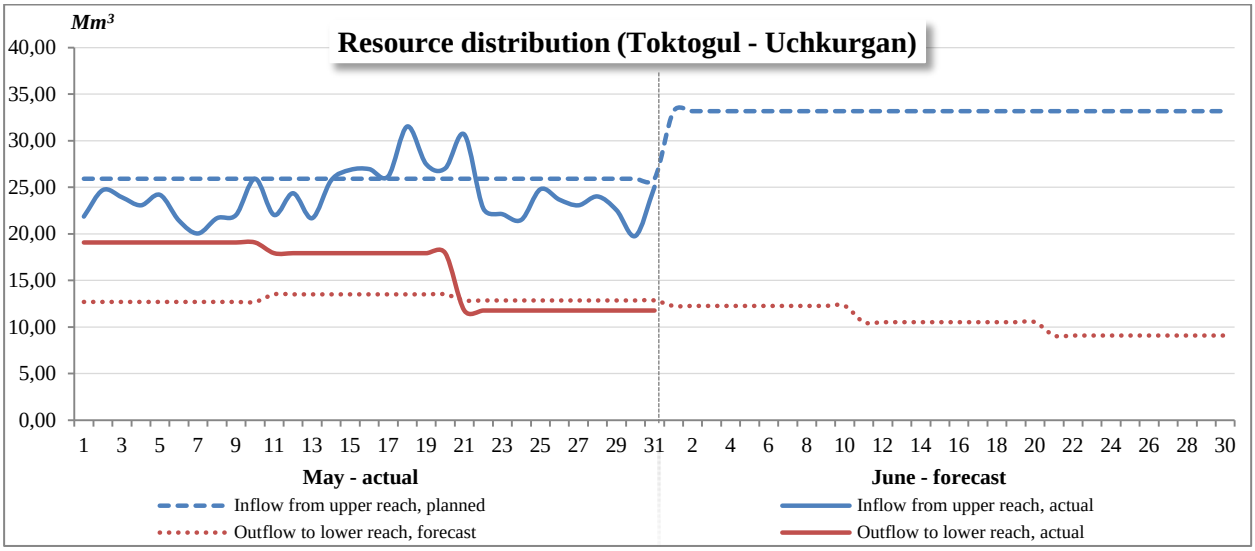


Water distribution

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*	259.20	259.20	285.12	331.78	331.78	331.78
		Actual	228.87	259.89	259.98			
Lateral inflow[2]	*W, Mm³*	*Forecast*	93.50	93.50	102.85	83.93	83.93	83.93
		Actual	178.68	147.31	105.75			
Water withdrawals	*W, Mm³*	*Planned*	206.15	198.03	225.05	226.97	244.43	258.77
		Actual	189.01	198.88	203.58			
Losses	*W, Mm³*	*Forecast*	19.60	19.60	21.56	66.09	66.09	66.09
		Actual	27.77	29.04	32.68			
Outflow to lower reach[3]	*W, Mm³*	*Forecast*	126.95	135.07	141.36	122.65	105.19	90.85
		Actual	190.77	179.28	129.47			

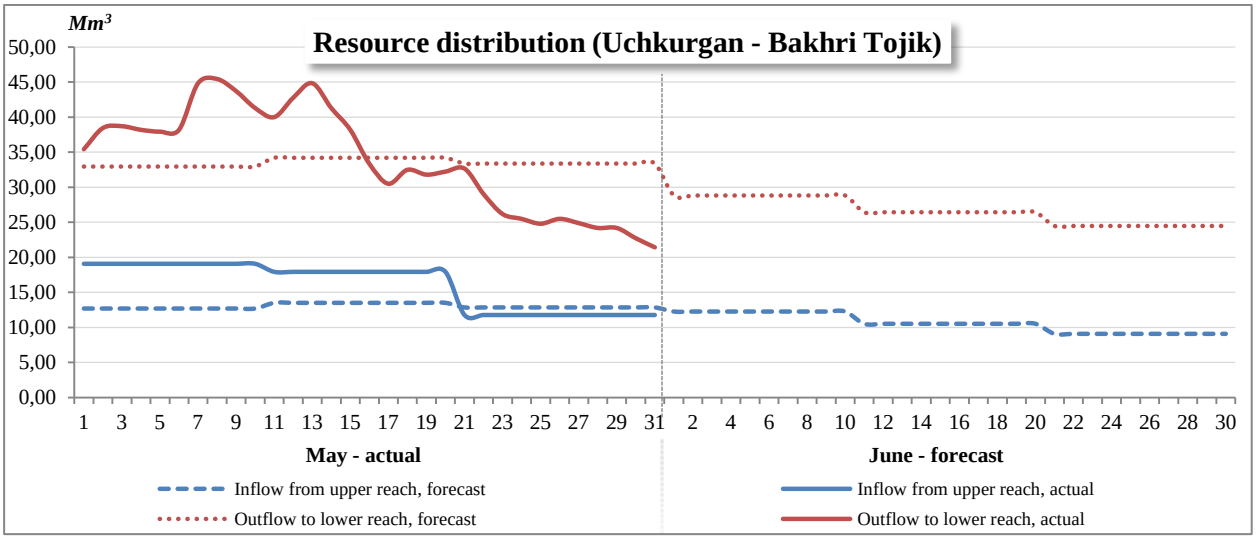


Water volume (**W**)

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*	126.95	135.07	141.36	122.65	105.19	90.85
		Actual	190.77	179.28	129.47			
Lateral inflow	*W, Mm³*	*Forecast*	232.57	236.99	259.09	220.97	217.15	213.61
		Actual	283.48	229.94	210.86			

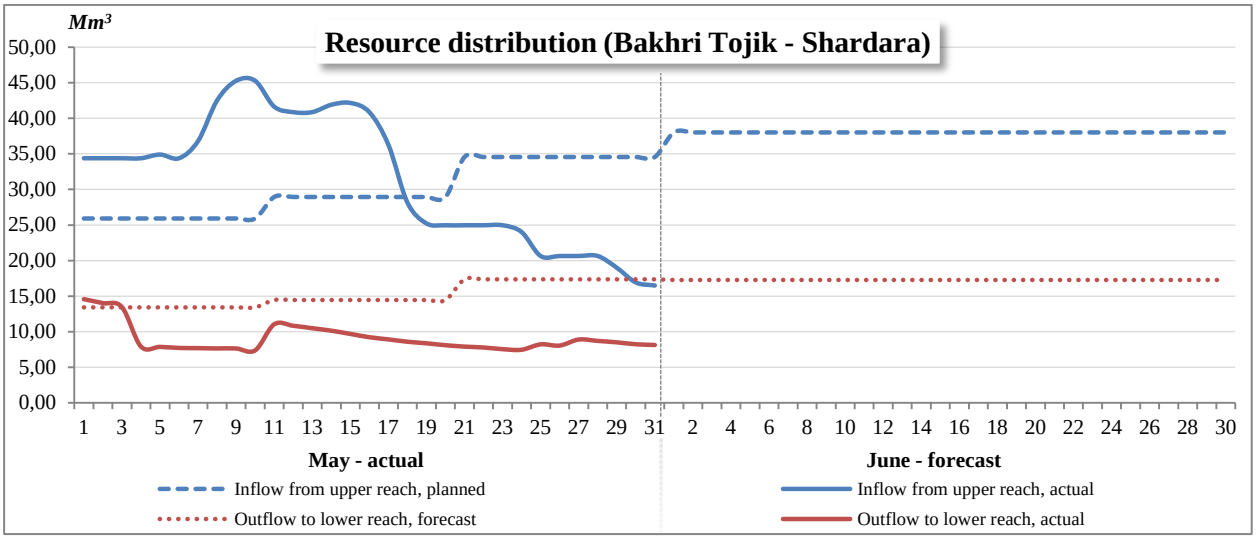
[2] *Incl. Karasu left and right*
[3] *Uchkurgan waterworks facility*

Water withdrawals	*W, Mm³*	*Planned*	20.02	20.04	22.33	25.40	28.01	29.71
		Actual	25.52	25.12	28.38			
Losses	*W, Mm³*	*Forecast*	10.00	10.00	11.00	30.00	30.00	30.00
		Actual	46.54	16.64	30.89			
Outflow to lower reach[4]	*W, Mm³*	*Forecast*	329.50	342.02	367.13	288.22	264.33	244.75
		Actual	402.19	367.46	281.06			



Water volume (**W**)

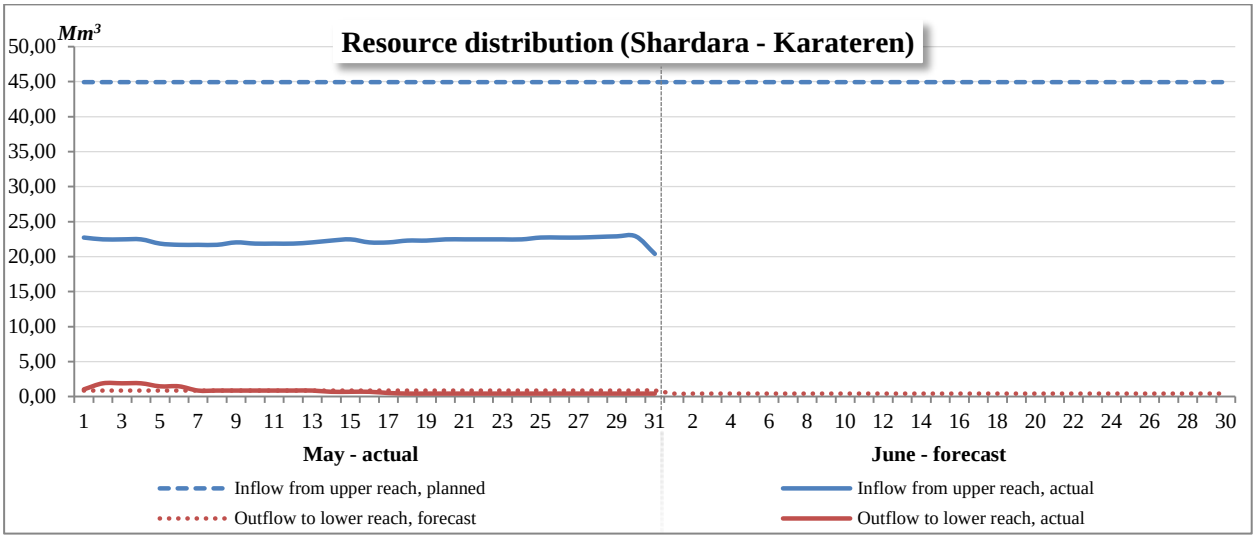
Bakhri Tojik - Shardara	**Parameter**		**May**			**June**		
			I ten-day	*II ten-day*	*III ten-day*	*I ten-day*	*II ten-day*	*III ten-day*
Inflow from upper reach[5]	*W, Mm³*	*Planned*	259.20	289.44	380.16	380.16	380.16	380.16
		Actual	376.70	362.97	233.97			
Lateral inflow	*W, Mm³*	*Forecast*	221.37	213.11	238.26	275.64	333.65	349.14
		Actual	117.58	110.85	110.97			
Water withdrawals	*W, Mm³*	*Planned*	316.26	327.93	394.35	453.00	511.01	526.50
		Actual	316.87	345.16	241.98			
Losses	*W, Mm³*	*Forecast*	30.00	30.00	33.00	30.00	30.00	30.00
		Actual	81.41	33.15	13.39			
Outflow to lower reach	*W, Mm³*	*Forecast*	134.31	144.62	191.07	172.80	172.80	172.80
		Actual	96.01	95.51	89.57			



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

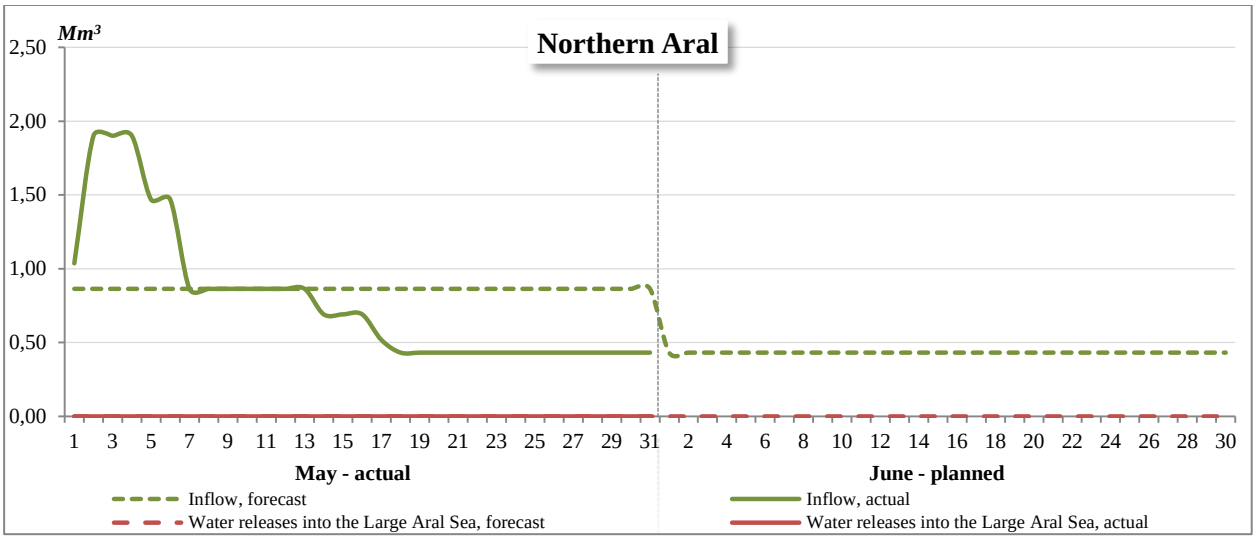
Water volume (**W**)

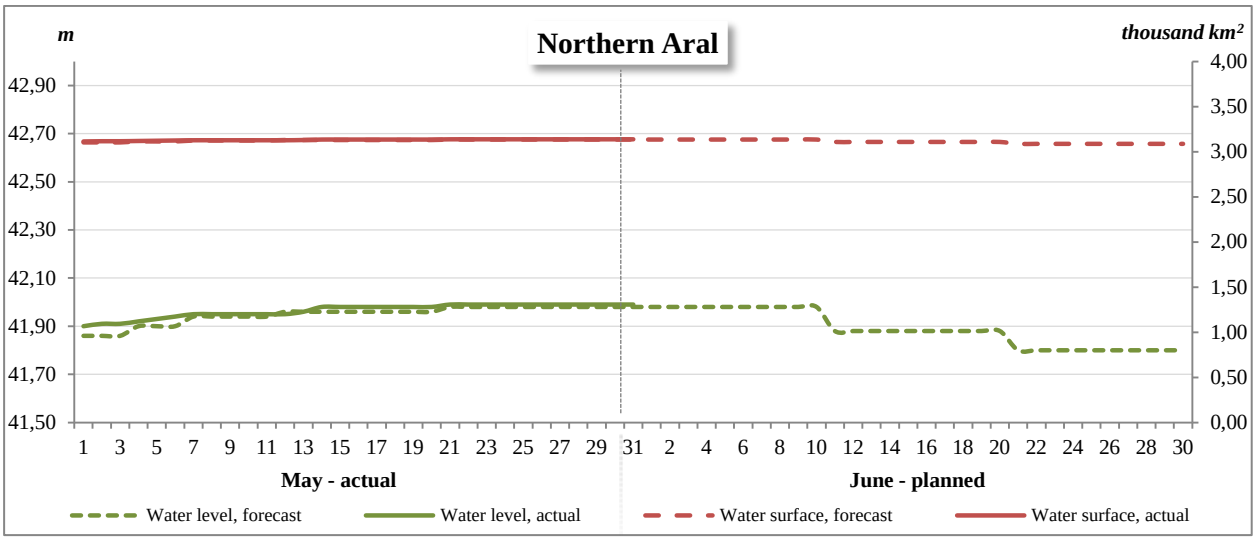
Shardara - Karateren	Parameter		May			June		
			I ten-day	*II ten-day*	*III ten-day*	*I ten-day*	*II ten-day*	*III ten-day*
Inflow from upper reach	*W, Mm³*	*Planned*	449.28	449.28	494	449.3	449.3	449.28
		Actual	220.92	221.62	247			
Lateral inflow	*W, Mm³*	*Forecast*	11.30	25.00	17	6.0	6.0	6.00
		Actual	9.40	9.77	6			
Filling (+), draw down (-) of Koksarai reservoir	*W, Mm³*	*Planned*	259.2	302.4	333	328.3	216.0	146.88
		Actual	259.2	290.3	323			
Water withdrawals	*W, Mm³*	*Planned*	310.0	406.7	471	374.6	356.0	347.31
		Actual	324.8	424.4	526			
Losses	*W, Mm³*	*Forecast*	401.1	361.3	362	404.7	310.9	250.53
		Actual	151.6	90.8	46			
Outflow to lower reach	*W, Mm³*	*Forecast*	8.6	8.6	10	4.3	4.3	4.32
		Actual	13.1	6.5	5			



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*	9.0	9.0	9.50	4.32	4.32	4.32
		Actual	13.13	6.48	4.75			
Water volume	*W, Mm³*	*Forecast*	24.94	25.1	25.2	25.17	24.87	24.63
		Actual	25.02	25.15	25.20			
Water level	*H, m*	*Forecast*	41.90	41.96	41.98	41.98	41.88	41.80
		Actual	41.93	41.97	41.99			
Water surface area	*S, th.km²*	*Forecast*	3.11	3.13	3.13	3.13	3.11	3.09
		Actual	3.12	3.13	3.14			
Water releases into the Large Aral Sea	*W, Mm³*	*Forecast*	0.00	0.00	0.00	0.00	0.00	0.00
		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