



Aral Sea Basin Transboundary Water Early Warning Bulletin

April – May 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 third bulletin in 2020 contains the actual information on the Syr Darya and Amu Darya basins for April and the forecast for May.

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 April

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

- © Regular 78th meeting of the Interstate Commission for Water Coordination cawater-info.net
- © A. Saleh, a member of the Tajik ethnic group, becomes the 1st Vice-President of Afghanistan centrasia.org
- © Development of Afghanistan's first Agro-climatic Zoning Atlas fao.org
- © Bakhrom Sirodjev: the Roghun Project needs external investments for completion dialog.tj
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- © Afghanistan- Central Asia: challenges of fragile states for regional water cooperation menafn.com
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- © Turkmenistan elected again a member of two commissions at the UN's Economic and Social Council turkmenportal.com
- © G20's agricultural ministers discuss the impact of the coronavirus pandemic on global agro-industry mcx.ru
- © Presentation of the UN World Water Development Report 2020 ekois.net
- © About the imminent risk of siltation of the reservoir at Roghun HEPS - K. Sirojedinov centrasia.org
- © Turkmenistan holds global on-line session of the UN on voluntary national reviews turkmenportal.com
- © Draft country program of cooperation between Turkmenistan and UNDP discussed tdh.gov.tm
- © Turkmenistan holds online negotiations with the Secretary General of the Energy Charter turkmenportal.com
- © Uzbek Parliament approves joining the EAEU as an observer uztag.info
- © A proportion of the population living near the Sardoba reservoir was evacuated due to breakage of the dam podrobno.uz
- © CASA-1000: 432 km of access roads needed for construction. What are the roles of different departments? azabek.kg
- © Turkmenistan adopts a rational water use strategy centralasia.news
- © Liquidation of AO Uzbekenergo started uzdaily.uz
- © The Aral Sea Day kazaral.org
- © International Scientific Conference "Construction, hydraulic engineering and water resources" (CONMECHYDRO 2020) (23-25 April 2020, Tashkent, Uzbekistan) ice.spbstu.ru

Amu Darya River Basin

Actual Situation in April and Forecast for May

In April, the available usable river water resources estimated as natural, non-regulated river flow plus lateral inflow into the river and minus losses amounted to 2,959 Mm³ (56% more than March's flow). The regulated flow of the Amu Darya in the section upstream of intake to Garagumdrya is estimated at 4,303 Mm³ (95% of forecast).

It is expected that in May the flow of the Amu Darya River in the section upstream of intake to Garagumdrya will be 6,880 Mm³, i.e. will increase by 52%.

Inflow to the Nurek reservoir was 1,240 million m³ in April or 102% of the forecast. Water releases from the reservoir amounted to 1,119 million m³ (96% of planned releases). The reservoir was filled with water by 166 Mm³ and reached the volume of 6,295 million m³ by the end of month (102 % 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 45 Mm³ (0.7 % of reservoir's water volume). It is expected that in May 2,676 million m³ of water will flow into the Nurek reservoir. The water volume in the reservoir will increase to 7,269 million m³, and water releases from the reservoir will be 1,702 million m³.

In April, inflow to Tuyamuyun waterworks facility (TMWF) was 1,798 million m³ or 101% of expected flow (estimated from channel balance when forecasting flow transformation along the river channel). The water volume in the reservoirs of TMWF increased slightly - from 2,801 million m³ at the beginning of month to 2,851 million m³ at the end of month. Water releases from the reservoirs amounted to 975 Mm³ (i.e. as scheduled by BWO Amu Darya). Water diversion from the reservoirs amounted to 518 million m³ (95% of the plan). Water losses in the reservoirs of TMWF (calculated as water balance discrepancy) were estimated at 256 Mm³, i.e. about 9% of water volume in the reservoirs by the end of April. Inflow to TMWF is expected to be 4,002 million m³ in May. TMWF reservoirs will accumulate water and their volume will be 3,941 by the end of month. Water releases from the reservoirs are planned in the amount of 2,055 million m³.

Nurek HEPS generated 536 million kWh of electric energy in April (10% lower than in March). The discharge through turbines was 432 m³/s, while the head was 218 m. Sterile spills were not observed.

In April, HEPS of the Tuyamuyun waterworks facility generated 22.8 million kWh; and, the head at HEPS was 20 m.

In April, water along the Amu Darya River was distributed unevenly: in the middle reaches at Kelif g/s (section upstream of intake to Garagumdrya) – Birata g/s (inflow to TMWF) the water shortage was 2% of the plan, and in the lower reaches at Tuyamuyun g/s – Samanbay g/s no water shortage was observed. Moreover, excessive water withdrawal was recorded at 9% of planned one (if one takes into account that water withdrawal from TMWF was 5% less than planned, the excess of withdrawal in the lower reaches was not more than 2% as a whole). Water withdrawal was 2,012 Mm³ in the first reach and 650 Mm³ in the second reach. Water balances in the reaches showed negative discrepancies that can be attributed to water losses: 811 Mm³ (19% of river flow at Kelif g/s) in the middle reaches and 221 Mm³ (23% of river flow downstream of TMWF) in the lower reaches.

In April, flow of the Amu Darya River changed as follows by key gauging station: Kelif g/s – 4,303 Mm³, Birata g/s (inflow to TMWF) – 1,798 Mm³ (42% of flow at Kelif g/s), Tuyamuyun g/s (downstream of TMWF) – 975 Mm³ (23%), and Samanbay g/s (inflow to the Large Aral Sea) - 104 Mm³ (2% of flow at Kelif g/s).

In May, water withdrawal will be increased to 2,781 Mm³ in the first reach and to 1,405 Mm³ in the second reach. Flow along the river will change as follows: Kelif g/s – 6,880 Mm³, Birata g/s – 4,002 Mm³, Tuyamuyun g/s – 2,055 Mm³, and Samanbay g/s - 241 Mm³.

In April, inflow to the Large Aral Sea from the Amu Darya River amounted to 104 Mm³ (80% of expected inflow) and, if we add flow from collecting drains (collectors), 213 Mm³ (75%). 207 million m³ were discharged from the Northern Aral Sea, and, thus, the cumulative inflow into the Eastern part of the Large Aral Sea was 420 million m³ (97% of the inflow in March).

In April, the water level in the Eastern part of the Large Aral Sea averaged about 28.3 m, the water surface area was 3.9 thousand km², and the water volume was 5.3 km³. In the Western part, the water level was 21.7 m, the water surface area was 2.2 thousand km², and the water volume was 32.3 km³. Evaporation from 1 km² of water surface of the Large Aral Sea was 0.081 Mm³ in April.

It is expected that in May the total inflow to the Large Aral Sea will be 537 Mm³ (128% of the inflow in April), including 310 Mm³ from the Amu Darya River and collectors and 227 Mm³ as inflow from the Northern Sea. By the end of May, in the Eastern part of the Large Aral Sea the water level will be 28.3 m, the water surface area will be 3.9 thousand km², and the water volume will be 5.6 km³. In the Western part of the Large Aral Sea the water level will be 21.6 m, the water surface area will be 2.2 thousand km², and the water volume will be 32.0 km³. Evaporation from 1 km² of water surface of the Large Aral Sea will be 0,105 million m³ in May.

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

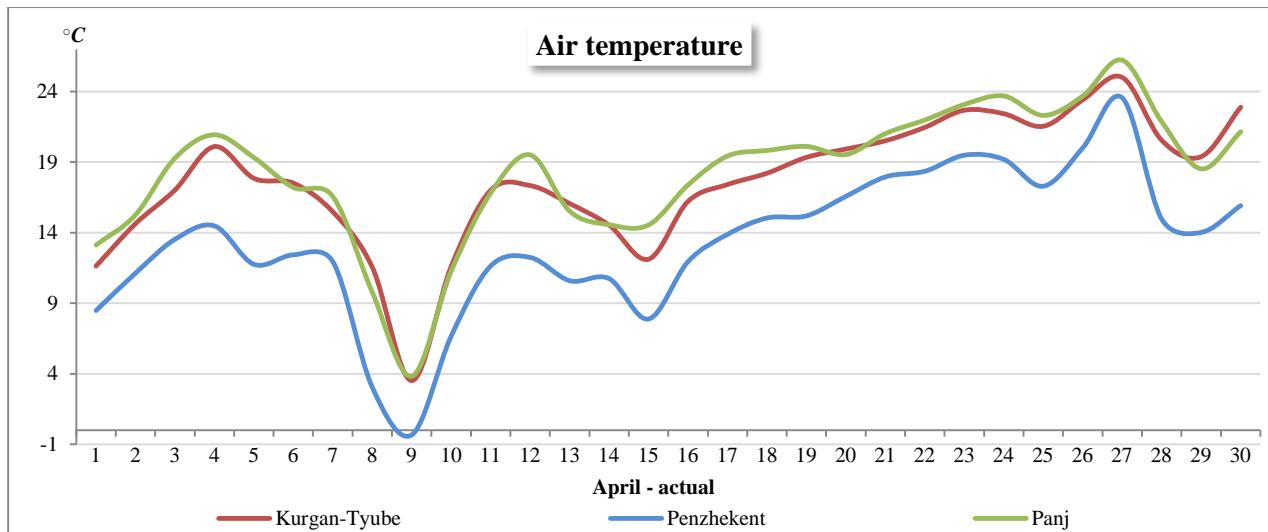


Climate

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

Air temperature (T)

Station	Parameter	April			May			
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day	
Panj	$T, {}^{\circ}\text{C}$	Forecast	15.00	17.00	22.00	23.00	22.00	28.00
		Actual	14.66	17.73	22.36			
Kurgan-Tyube	$T, {}^{\circ}\text{C}$	Forecast	15.00	17.00	22.00	22.00	22.00	27.00
		Actual	14.09	16.82	21.98			
Penzhikent	$T, {}^{\circ}\text{C}$	Forecast	10.00	12.00	18.00	17.00	16.00	22.00
		Actual	9.32	12.58	18.08			

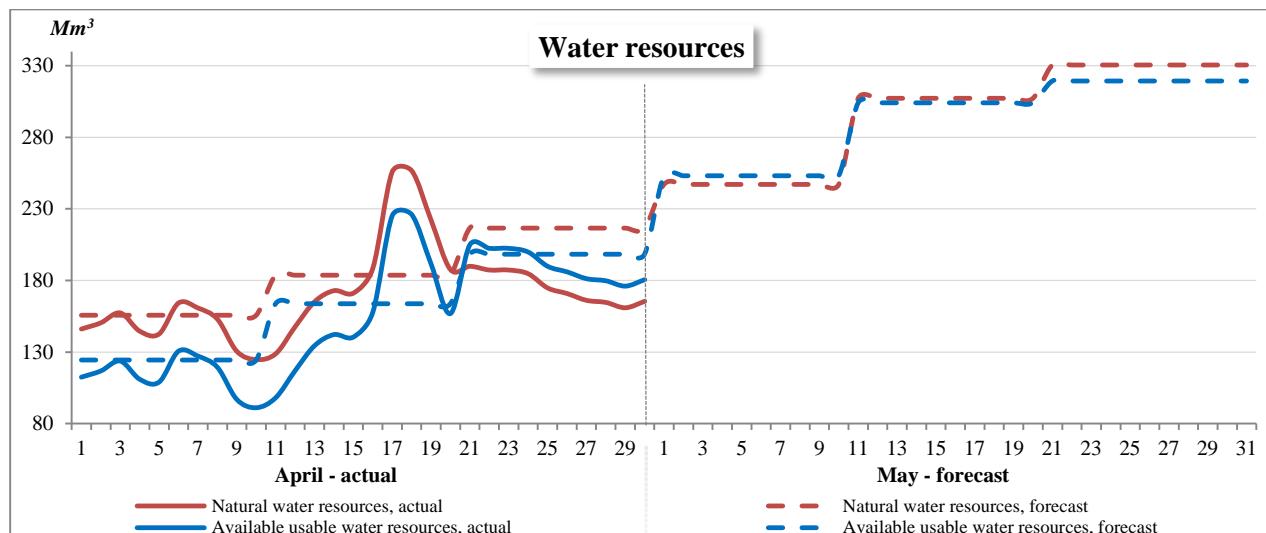


Water resources

Object
Amu Darya
Nurek reservoir
Atamyrat gauging station

Water volume (W)

Object	Parameter	April			May			
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day	
River runoff: Atamyrat g/s	W, Mm^3	Forecast	829.4	963.4	1144.8	1270	1585	1879.2
		Actual	843	1196	838			
Water withdrawal: upstream of Atamyrat g/s	W, Mm^3	Forecast	771.3	848.0	961.1	1012	1056	1107
		Actual	684	631	812			
Nurek reservoir /filling (+) or draw down (-)	W, Mm^3	Forecast	-43	26	60	190	432	320
		Actual	-52	70	103			
Natural water resources at Atamyrat g/s	W, Mm^3	Forecast	1558	1837	2166	2471.7	3073.6	3306.4
		Actual	1475	1897	1752			
Lateral inflow: downstream of Atamyrat g/s	W, Mm^3	Forecast	103	101	99	101.1	97.4	74
		Actual	109	105	105			
Open channel losses: downstream of Atamyrat g/s	W, Mm^3	Forecast	416	301	282	41.4	130.1	187
		Actual	445	412	-46			
Available usable water resources	W, Mm^3	Forecast	1245	1638	1984	2531	3041	3193
		Actual	1138	1589	1903	0	0	0

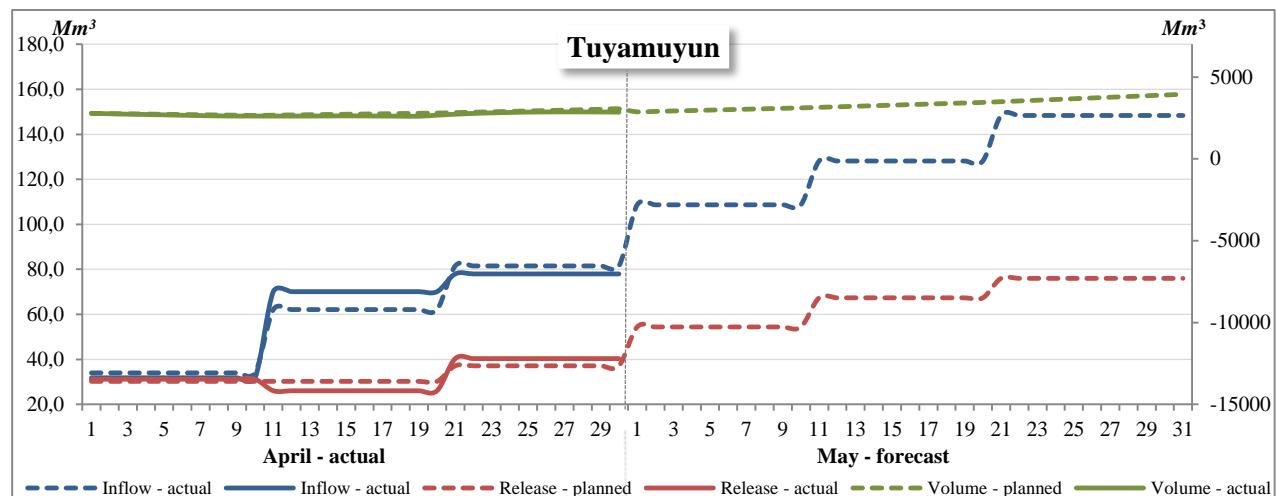
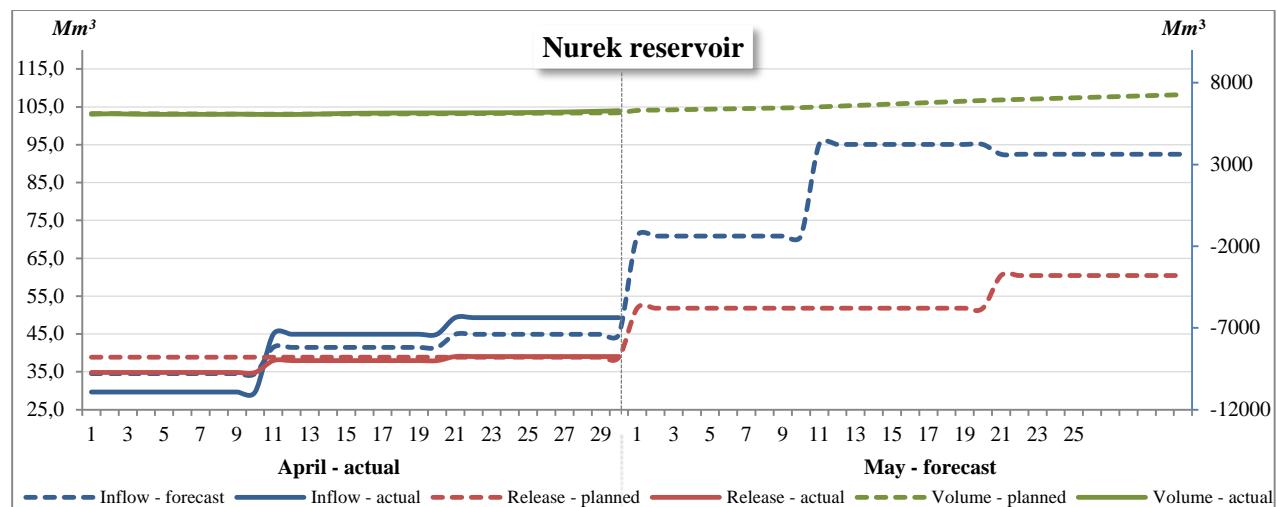


Reservoirs and HEPS

Reservoir	Location			Characteristics				
	Latitude	Longitude	Altitude above sea level, m	Length, km	Width	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

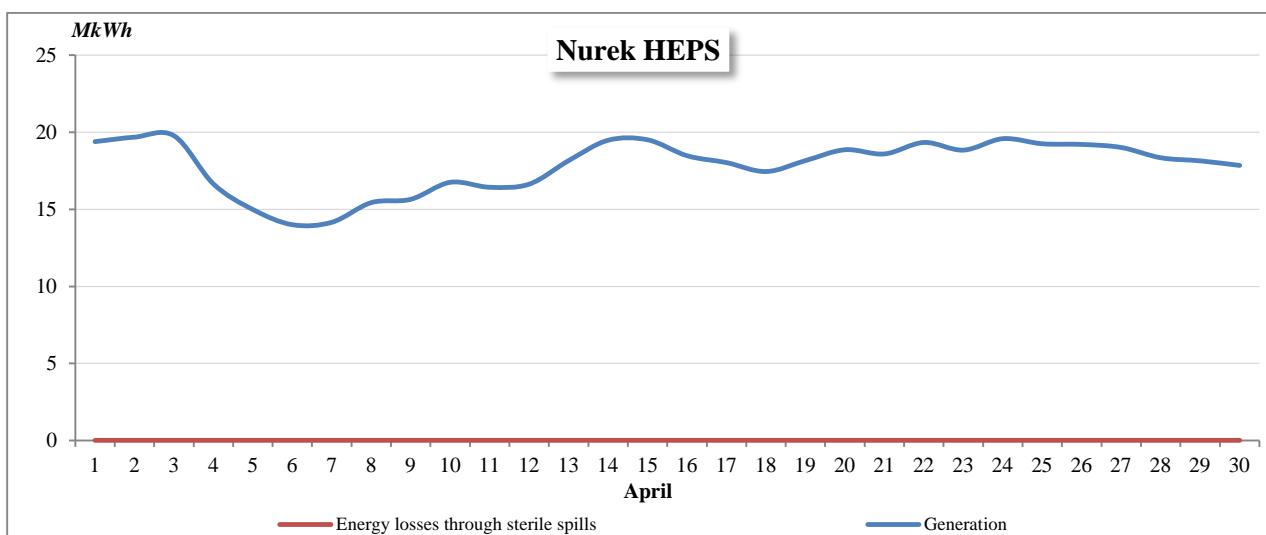
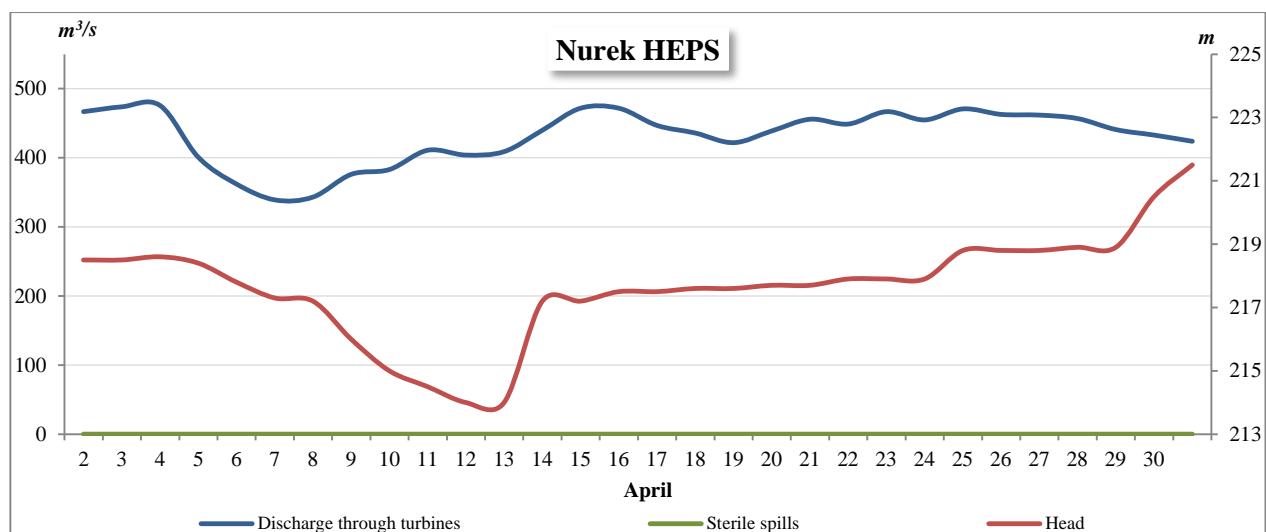
Inflow (I), Releases (R), Volume (W)

Reservoir	Parameter	April			May			
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day	
Nurek reservoir	I, Mm^3	Forecast	345.6	414.7	449.3	708	950	1017
		Actual	296.7	449.5	493.3			
	R, Mm^3	Planned	388.8	388.8	388.8	518	518	665
		Actual	348.4	379.9	390.7			
	W, Mm^3	Planned	6086	6112	6172	6485.1	6917.1	7268.7
		Actual	6060	6151	6295			
Reservoirs of Tuyamuyun waterworks facility	I, Mm^3	Forecast	339.7	621.2	815.3	1087.0	1281.8	1632.7
		Actual	318.1	700.7	779.4			
	R, Mm^3	Planned	302.4	302.4	371.5	544.3	673.9	836.4
		Actual	311.6	260.2	402.9			
	W, Mm^3	Planned	2662	2805	3058	3117	3449	3941
		Actual	2606	2661	2851			



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

HEPS	Parameter	April			
		I ten-day	II ten-day	III ten-day	
Nurek	$G, M kWh$	Actual	166.43	181.16	188.13
	$L, M kWh$	Actual	0.00	0.00	0.00
	$Q, m^3/s$	Actual	403.20	439.70	452.20
	$R, m^3/s$	Actual	0.00	0.00	0.00
	H, m	Actual	217.18	216.80	219.00

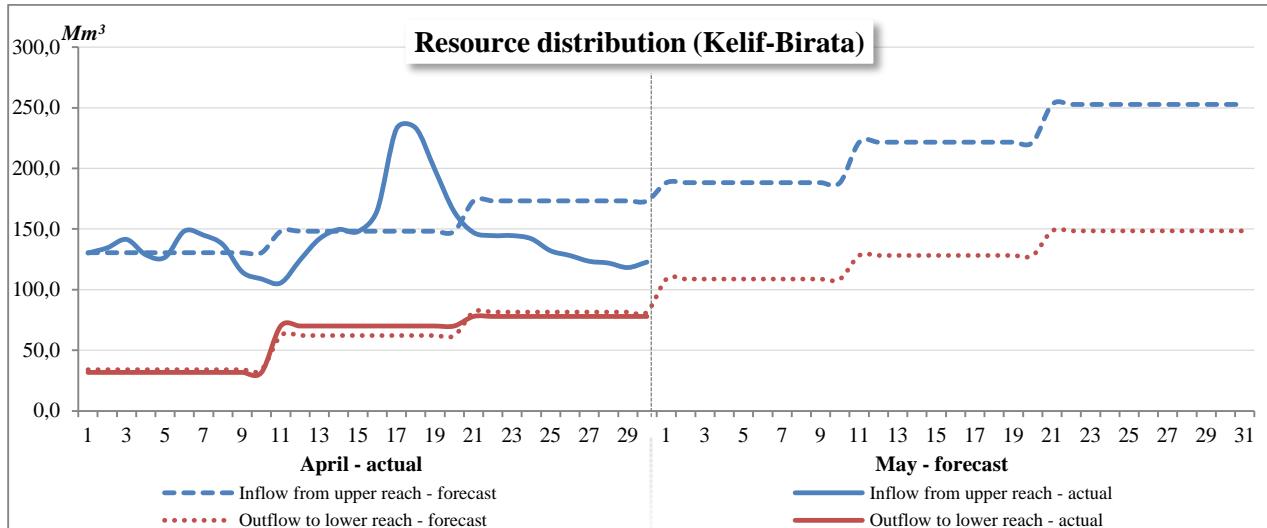


River reaches						
Kelif gauging station (upstream of intake to Garagumdyra) – Birata gauging station (Darganata)						
Tuyamuyun gauging station (tail water of Tuyamuyun waterworks facility) – Samanbay settlement						
Large Aral Sea						

Water volume (W)

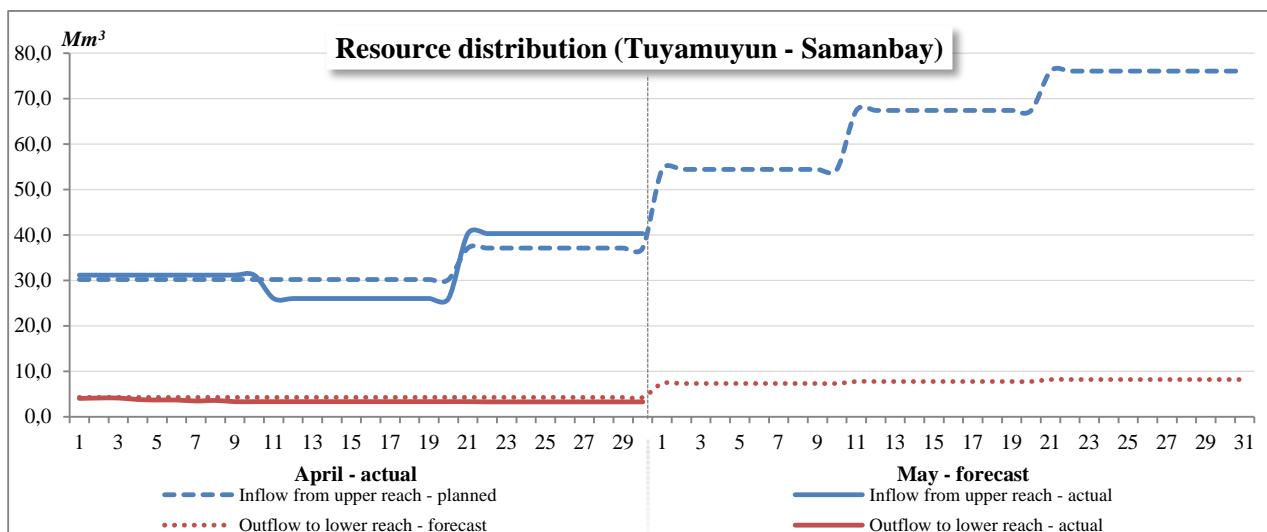
Kelif - Birata	Parameter	April			May		
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day
Inflow from upper reach	W, Mm ³	Forecast	1305	1482	1732	1883	2217
		Actual	1315	1663	1325		
Lateral inflow	W, Mm ³	Forecast	103	101	99	101	97
		Actual	109	105	105		81

Water withdrawal	W, Mm^3	Planned	652	661	734	855	902	1024
		Actual	661	655.5	696			
Losses	W, Mm^3	Forecast	416	301	282	41.4	130.1	206
		Actual	445	412	-46			
Outflow to lower reach	W, Mm^3	Forecast	340	621	815	1087.0	1281.8	1633
		Actual	318.1	700.7	779			



Water volume (W)

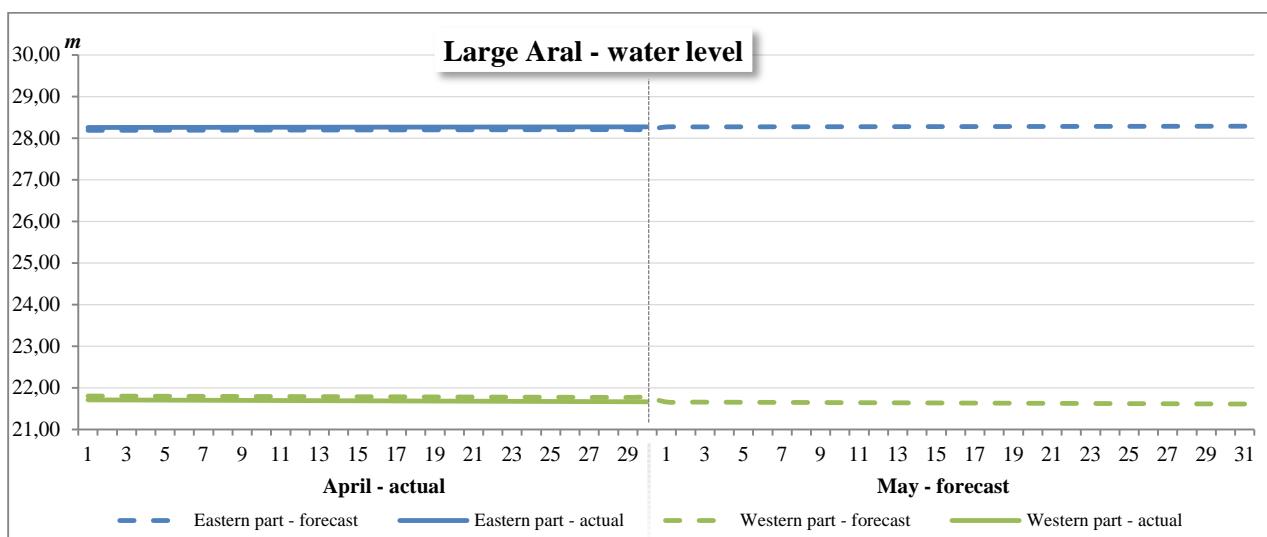
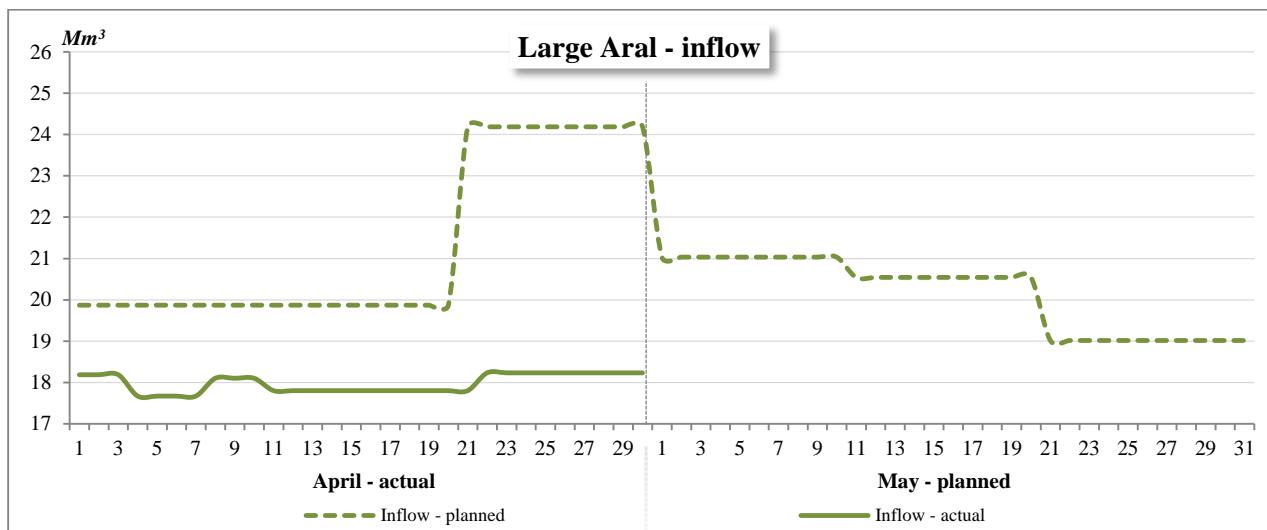
Tuyamuyun - Samanbay	Parameter	April			May			
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day	
Inflow from upper reach	W, Mm^3	Forecast	302	302	372	544.3	673.9	836
		Actual	312	260	403			
Lateral inflow	W, Mm^3	Forecast	0	0	0	0	0	0
		Actual	0	0	0			
Water withdrawal ¹	W, Mm^3	Planned	181	181	233	363	462	580
		Actual	230	167	254			
Losses	W, Mm^3	Forecast	78	78	95	108	134	166
		Actual	44	60	116			
Outflow to lower reach	W, Mm^3	Forecast	43	43	43	73.44	77.76	90.29
		Actual	37	33	33			

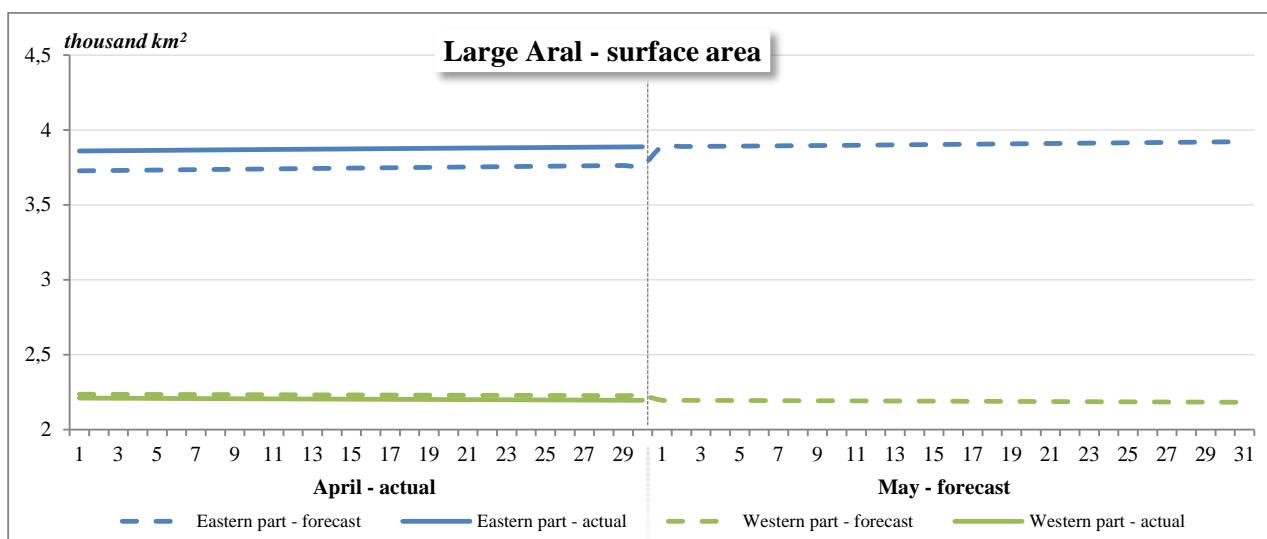
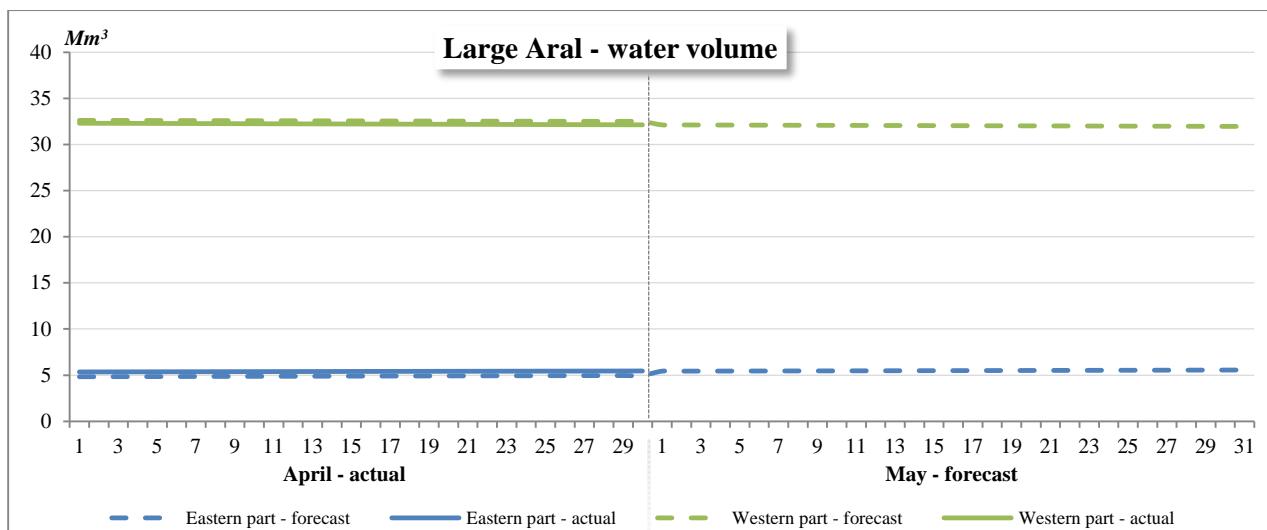


¹ Note: Including supply to the system of lakes and environmental water releases into canals

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

Large Aral Sea	Parameter	April			May			
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day	
Inflow	W, Mm^3	Planned	198.68	198.68	172.76	210.32	205.41	209.14
		Actual	179.53	178.00	181.89			
Eastern part, water volume	W, Mm^3	Forecast	4.86	4.90	4.95	5.46	5.50	5.54
		Actual	5.35	5.39	5.42			
Eastern part, level	H, m	Forecast	28.19	28.20	28.20	28.27	28.28	28.29
		Actual	28.26	28.26	28.27			
Eastern part, area	$S, th.km^2$	Forecast	3.73	3.75	3.76	3.89	3.90	3.92
		Actual	3.87	3.87	3.88			
Western part, water volume	W, Mm^3	Forecast	32.58	32.54	32.50	32.10	32.04	31.99
		Actual	32.27	32.21	32.15			
Western part, level	H, m	Forecast	21.79	21.78	21.77	21.65	21.63	21.62
		Actual	21.70	21.68	21.67			
Western part, area	$S, th.km^2$	Forecast	2.23	2.23	2.23	2.19	2.19	2.18
		Actual	2.21	2.20	2.20			





Syr Darya River Basin

Actual Situation in April and Forecast for May

In April, 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 3,759 million m³, of which the inflow to the three upper reservoirs was 1,796 million m³ (113% of forecast).

In May, the available usable water resources are expected in the amount of 6,320 Mm³, including 3,115 Mm³ of inflow to three upper reservoirs or 196% of the flow in April.

In April, inflow to the Toktogul reservoir was 946 million m³ or 137% of the expected volume, and water releases from the reservoir amounted to 962 million m³ or 85% of BWO Syr Darya's schedule. Thus, given the inflow exceeding the forecast, actual water releases from the reservoir were below scheduled ones. However, the water volume in the Toktogul reservoir decreased from 11,641 million m³ at the beginning of month to 11,604 million m³ by the end of month. The reservoir's water balance showed a negative discrepancy of 21 Mm³, indicating to water losses in the reservoir or (and) to inaccurate flow accounting at entrance to the reservoir (overestimation). It is expected that in May the Toktogul reservoir will accumulate water and by the end of month the water volume will be 12,060 million m³; the inflow to the reservoir is expected in the amount of 1,455 million m³, and water releases are planned at 999 million m³.

In April, inflow to the Andizhan reservoir was 229 million m³ (85% of the forecast); thus, as compared to the actual water content of the Naryn River (which was above than expected one), the water content in the Karadarya River was below the forecast. Water releases from the Andizhan reservoir were 262 million m³. The water volume decreased from 820 million m³ at the beginning of month to 780 million m³ at the end of month (in total, 88% of the plan). Water losses were estimated by balance discrepancy at 7 Mm³. In May, inflow to the Andizhan reservoir is expected to increase to 505 million m³ and water releases will be 341 million m³. The reservoir will accumulate water to 944 million m³.

Inflow to the Bakhri Tojik reservoir was 1,428 million m³ (91% of the forecast), while water releases from the reservoir were in the amount of 1,099 million m³ (93% of the plan) in April. The water volume increased from 3,036 Mm³ at the beginning of month to 3,502 Mm³ at the end of month. The unrecorded inflow to the reservoir was detected from the balance method in the amount of 137 Mm³. In May, inflow to the Bakhri Tojik reservoir is expected to be 1,304 million m³, and 1,305 million m³ are to be discharged from the reservoir. The reservoir will allow natural flow to pass through it and its volume virtually will not change.

In April, the Charvak reservoir was filled with water from 470 million m³ to 737 million m³. Inflow to the reservoir was 620 million m³ (98% of forecast), and water releases amounted to 298 million m³ (75% of the plan). Thus, the reservoir accumulated water through water releases that were below the scheduled values. The balance discrepancy was 56 million m³. This can be attributed to water losses and inaccurate estimation of inflow to the reservoir. In May, the Charvak reservoir will accumulate water and its volume will increase to 1,258 Mm³ by the end of month. Inflow to the reservoir is expected in the amount of 1,155 Mm³, while 634 Mm³ of water will be released.

Inflow to the Shardara reservoir was 1,174 million m³ (148% of the forecast) in April. Water releases from the reservoir amounted to 661 million m³ (only 48% of BWO Syr Darya's schedule). The reservoir accumulated water from 4,879 Mm³ to 4,904 Mm³ (119% of the plan).

Water was not discharged into Arnasai, and water withdrawal from the reservoir amounted to 137 Mm³ (93% of the plan). Balance discrepancy (showing flow uses) was substantial and amounted to 350 Mm³ (about 7% of the water volume in the reservoir). The analysis of water losses from the reservoir over the past years shows that the balance discrepancy cannot be fully attributed to water losses in the reservoir; measurement errors are possible in the Syr Darya River flow, namely in inflow to the Shardara reservoir. In May, inflow to the Shardara reservoir is expected to increase to 2,267 million m³, while planned water releases will increase to 1,473 million m³. The reservoir's water volume will increase to 5,613 million m³ by the end of month. Water discharge into Arnasai is not planned for May.

In April, the Koksarai reservoir virtually did not accumulate water. Water diversion into the reservoir amounted to 9 million m³ only. Water discharge from the reservoir into the Syr Darya River is estimated at 372 Mm³. The water volume decreased from 2,019 million m³ to 1,656 million m³. In May, accumulation of water in the Koksarai reservoir will be stopped. It is planned to discharge water from the reservoir into the river in the amount of 894 million m³. The reservoir will be drawn down to 762 million m³.

In April, energy generation by the cascade of Naryn HEPS amounted to 897.6 million kWh (under energy-generation regime) against planned 990 million kWh, including: Toktogul HEPS - 329.7 million kWh (83% of the plan).

The average discharge through turbines of Toktogul HEPS was 362 m³/s in April (142 m³/s less than in March), while the average head was 144 m. No sterile spills were observed. The plan of energy generation for May for the cascade of Naryn HEPS is set at 877 million kWh, including 350 million kWh for Toktogul HEPS.

In April, the total generation at large HEPS of Uzbekistan amounted to 106 million kWh, of which: 48.6 million kWh at Charvak HEPS, 20.7 million kWh at Farkhad HEPS, and 36.7 million kWh at Andizhan HEPS. The discharge at Charvak HEPS was 78 m³/s, and the head was 101 m. The discharge at Farkhad HEPS was 130 m³/s only (decreased by 104 m³/s as compared to March), and the head was 31 m. The discharge at Andizhan HEPS was 76 m³/s, and the head was 95 m.

Energy generation by HEPS of the Bakhri Tojik reservoir amounted to 42 million kWh (43 million kWh less than in March), and that by Shardara HEPS was 45 million kWh in April. Water discharge at HEPS of Bakhri Tojik was 425 m³/s, while the head was 20 m. Discharge at Shardara HEPS was 238 m³/s, and the head was 31 m (dropped by 10 m as compared to March).

In April, 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 7 million m³ or 1% of planned water withdrawal. The balance discrepancy that can be attributed to open channel losses was 138 million m³ (14% 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) almost no water shortage was observed, and the balance discrepancy (open channel losses) was 53 Mm³.

In the reach of Bakhri Tojik reservoir – Shardara reservoir water shortage amounted to 301 million m³ (34%), and the balance discrepancy (open channel losses) was 57 million m³. In the

lower reaches (downstream of Shardara reservoir) the balance discrepancy (open channel losses and unrecorded water withdrawal) of 694 million m³ was detected.

In April, the flow along the Naryn – Syr Darya rivers changed as follows: discharge from the Toktogul reservoir – 962 million m³, discharge from Uchkurgan waterworks facility – 564 million m³ (59% of water releases from the Toktogul reservoir), Akjar g/s (inflow to the Bakhri Tojik reservoir) – 1,428 million m³, inflow to the Shardara reservoir – 1,174 million m³, Syr Darya – tail-water of the Shardara reservoir – 661 million m³, inflow to the Northern Aral Sea - 119 million m³.

In May, water withdrawal from the river will be increased: to 629 million m³ in the reach Toktogul HEPS – Uchkurgan waterworks facility, to 1,074 million m³ in the reach Uchkurgan waterworks facility – Shardara reservoir, and to 1,344 million m³ in the lower reaches (Shardara-Aral). Inflow to the Northern Aral Sea is expected in the amount of 88 million m³.

In April, inflow to the Northern Aral Sea was 119 million m³. The water level in the sea was 42.2 m. The water surface area was 3.19 thousand km² and the water volume was 24.4 km³. The discharge from the Northern Aral Sea into the Large Aral Sea (Amu Darya Basin) was recorded in the amount of 207 million m³ in April. It is expected that in May inflow to the Northern Aral Sea will be 88 million m³, while discharge into the Large Aral Sea will be 227 million m³. The water level will be 42.3 m, the water surface area will be 3.2 thousand km², and the water volume will be 24.3 km³ by the end of month.

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

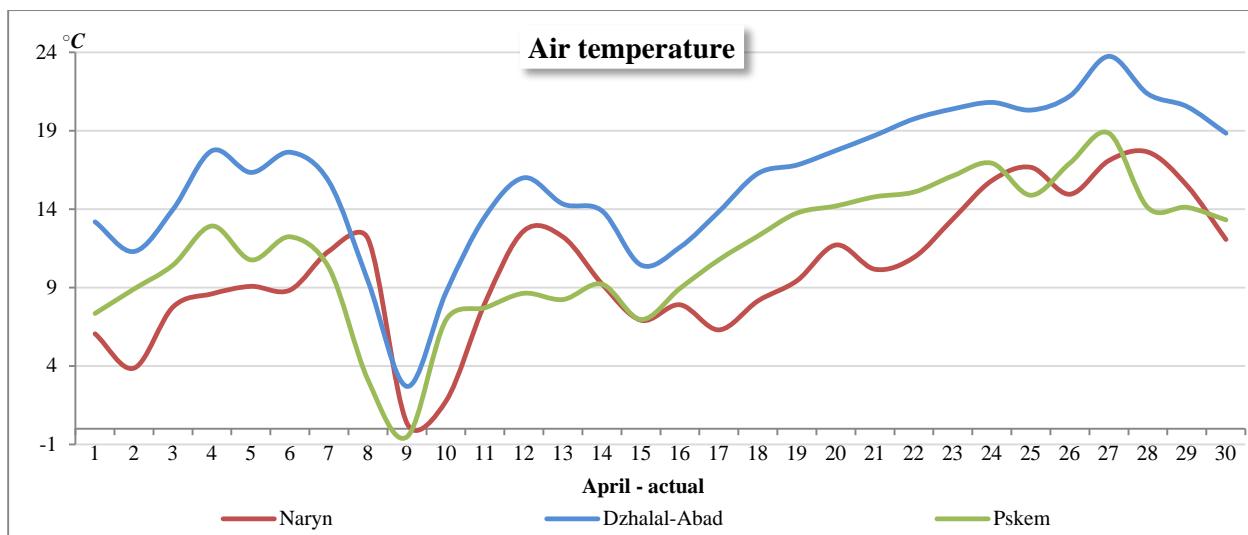


Climate

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	April			May			
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day	
Naryn	T. °C	Forecast	7.00	9.00	15.00	13.00	13.00	16.00
		Actual	6.97	9.25	14.42			
Dzhalal-Abad	T. °C	Forecast	13.00	15.00	21.00	19.00	19.00	25.00
		Actual	12.67	14.44	20.56			
Pskem	T. °C	Forecast	8.00	11.00	15.00	13.00	13.00	20.00
		Actual	8.24	10.07	15.51			

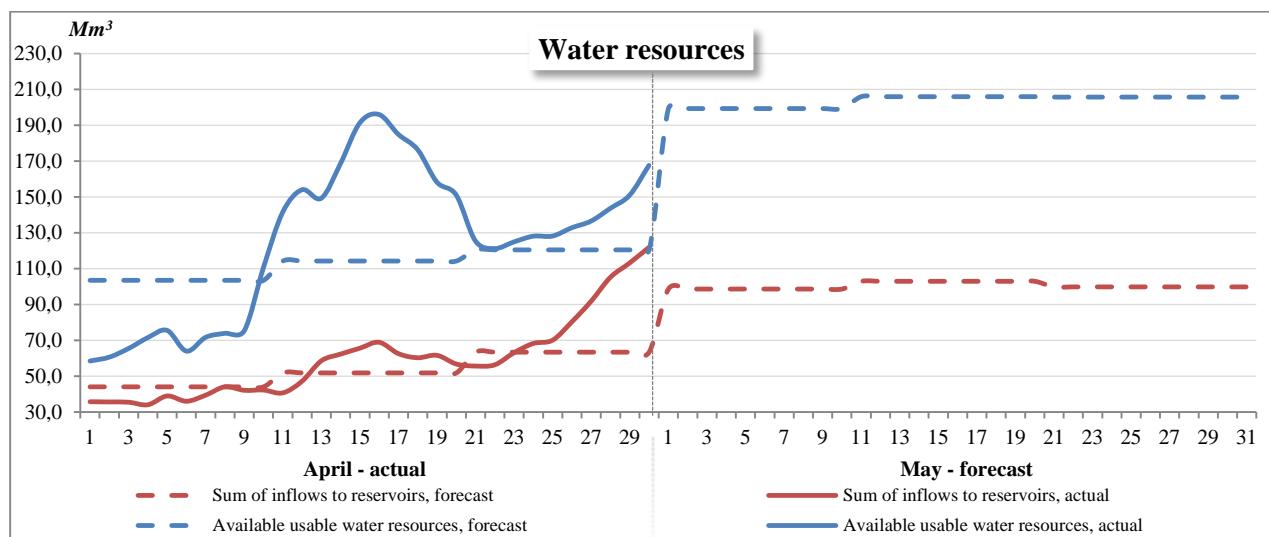


Water resources

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	April			May			
		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	230	230	229.8	494	494	466.6
		Actual	202	274	470.0			
Inflow to Andizhan reservoir	W, Mm^3	Forecast	69	79	121.0	156	160	190.1
		Actual	40	90	99.8			
Inflow to Charvak reservoir	W, Mm^3	Forecast	142	210	283.4	337	376	441.9
		Actual	142	222	256.3			
Sum of inflows to reservoirs	W, Mm^3	Forecast	441	518	634.2	987	1030	1098.6
		Actual	385	585	826.1			
Lateral inflow up to Shardara	W, Mm^3	Forecast	606	636	581.8	1056	1079	1223.9
		Actual	355	1099	544.7			
Losses	W, Mm^3	Forecast	12	12	11.1	48	48	58.0
		Actual	12	12	11.1			
Available usable water resources	W, Mm^3	Forecast	1035	1142	1204.8	1995	2061	2264.5
		Actual	728	1672	1359.7			

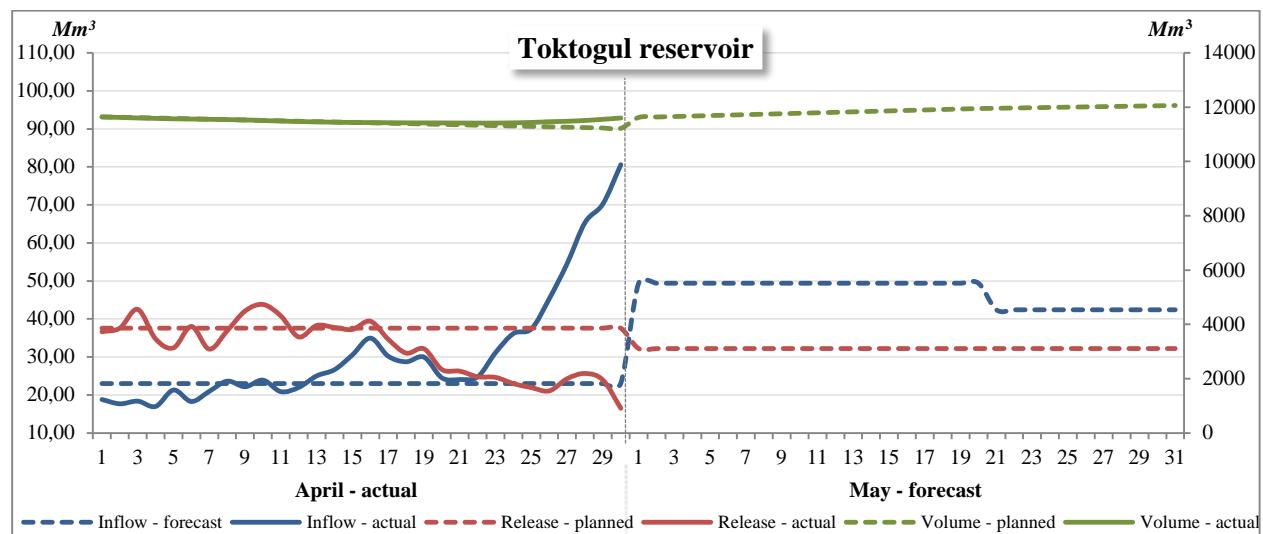


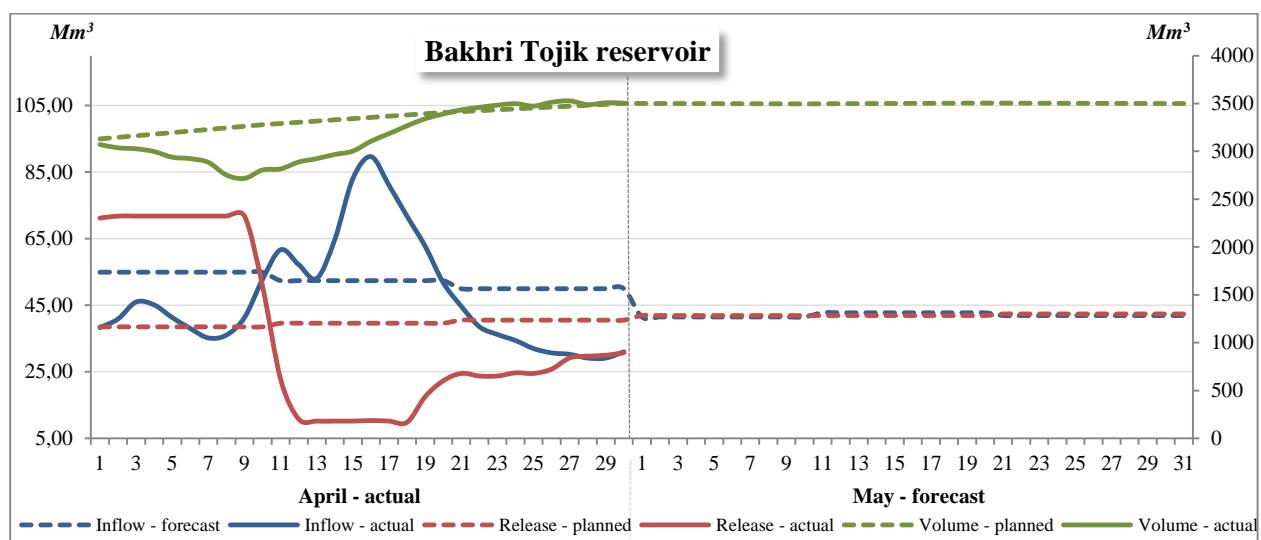
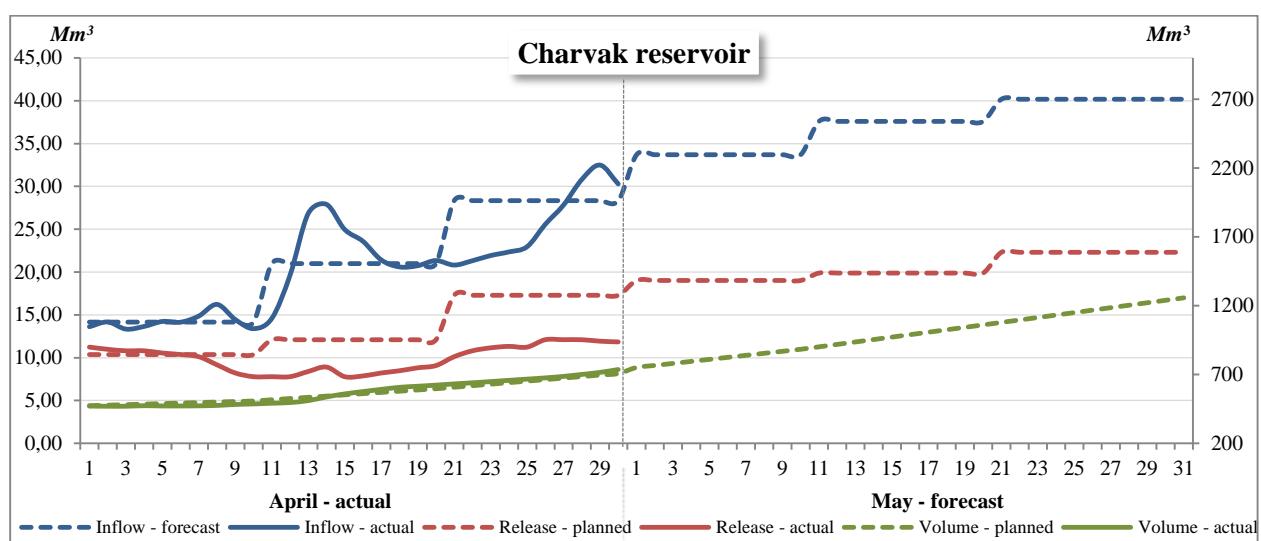
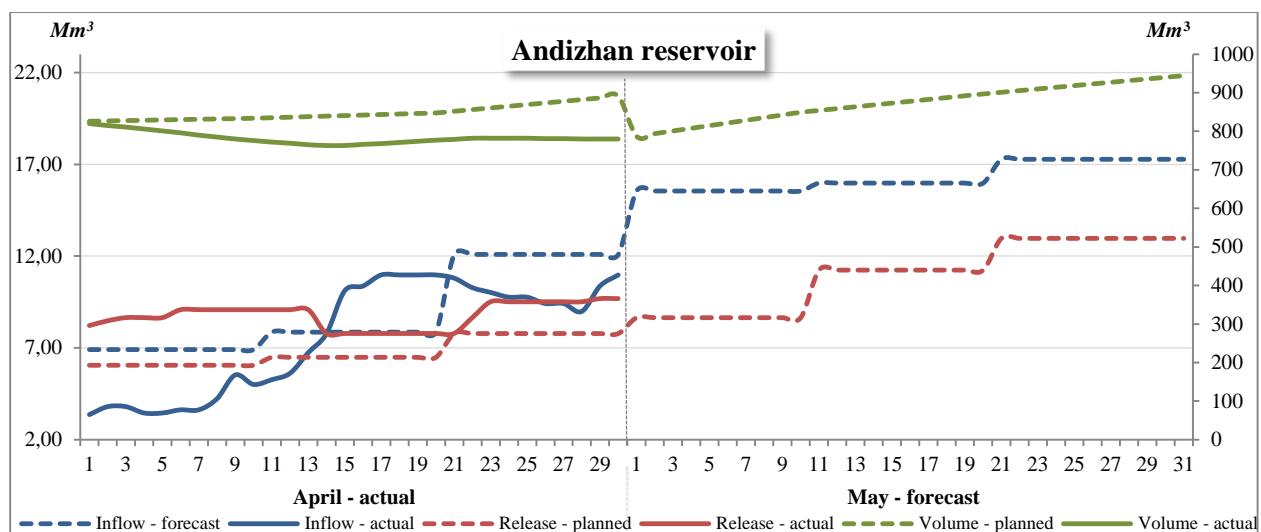
Reservoirs and HEPS

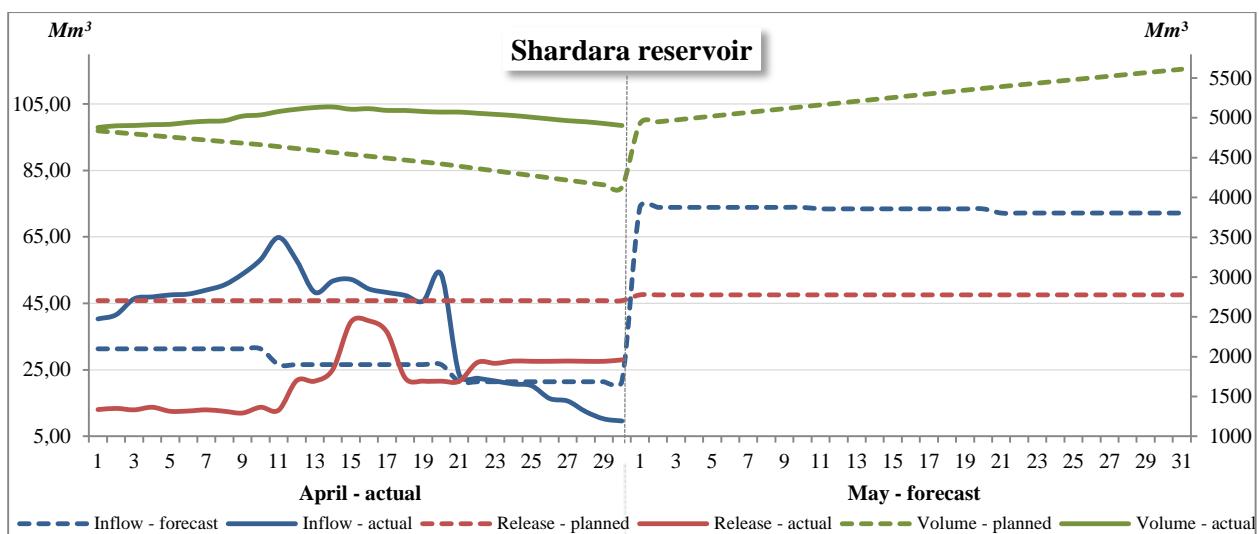
Reservoir	Location			Characteristics				
	Latitude	Longitude	Altitude above sea level, m	Length, km	Width, km	Water-surface area, km^2	Full volume, km^3	Full reservoir level, m
Toktogul	41.80	72.87	880	65	12	284	19.50	215
Andizhan	40.77	73.11	900	36	1.5-12	56	0.19	905
Bakhri Tojik	40.29	70.07	344	75	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	April			May			
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day	
Toktogul reservoir	<i>I, Mm³</i>	Forecast	229.82	229.82	229.82	494.21	494.21	466.62
		Actual	202.44	273.80	470.02			
	<i>R, Mm³</i>	Planned	375.84	375.84	375.84	322.27	322.27	354.53
		Actual	376.70	353.20	232.07			
Andizhan reservoir	<i>W, Mm³</i>	Planned	11513	11367	11221	11776	11948	12060
		Actual	11506	11414	11604			
	<i>I, Mm³</i>	Forecast	69.12	78.62	120.96	155.52	159.84	190.08
		Actual	39.92	89.77	99.79			
Charvak reservoir	<i>R, Mm³</i>	Planned	60.48	64.80	77.76	86.40	112.32	142.56
		Actual	87.96	81.65	92.79			
	<i>W, Mm³</i>	Planned	834	847	891	849	897	944
		Actual	776	777	780			
Bakhri Tojik reservoir	<i>I, Mm³</i>	Forecast	141.70	209.95	283.39	336.96	375.84	441.87
		Actual	142.25	221.62	256.31			
	<i>R, Mm³</i>	Planned	103.68	120.96	172.80	190.08	198.72	245.19
		Actual	99.96	83.03	114.65			
Shardara reservoir	<i>W, Mm³</i>	Planned	508	597	708	884	1061	1258
		Actual	486	623	737			
	<i>I, Mm³</i>	Forecast	549.68	524.26	499.98	415.00	427.51	461.10
		Actual	414.81	676.77	335.92			
	<i>R, Mm³</i>	Planned	385.02	395.92	405.35	419.33	419.30	466.62
		Actual	696.40	135.00	267.19			
	<i>W, Mm³</i>	Planned	3279	3407	3502	3498	3506	3500
		Actual	2805	3389	3502			
	<i>I, Mm³</i>	Forecast	313.20	265.79	214.20	738.91	734.47	794.04
		Actual	481.86	519.09	172.76			
	<i>R, Mm³</i>	Planned	457.92	457.92	457.92	475.20	475.20	522.72
		Actual	129.51	262.57	269.31			
	<i>W, Mm³</i>	Planned	4663	4422	4129	5140	5372	5613
		Actual	5038	5074	4904			

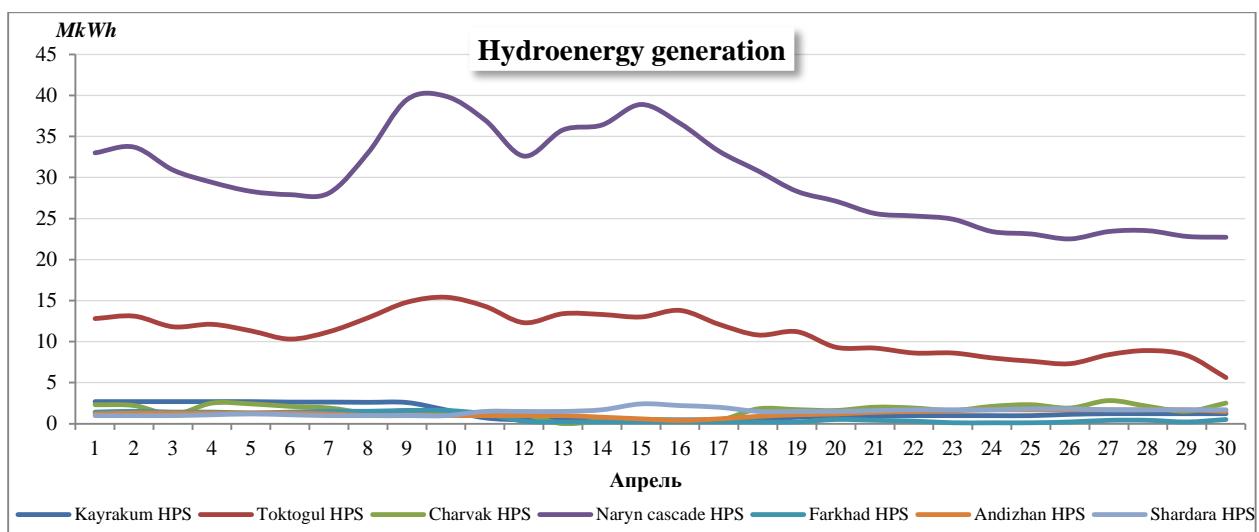


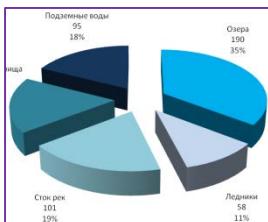




Generation (G), Energy losses through sterile spills (L), Discharge through turbines (Q), Sterile spills (R), Head (H)

HEPS	Parameter	April			
		I ten-day	II ten-day	III ten-day	
Naryn cascade	G, M kWh	Actual	323.70	336.70	237.20
	G, M kWh	Actual	125.70	123.50	80.50
Toktogul	Q, m³/s	Actual	414.00	406.80	265.10
	H, m	Actual	144.50	143.90	144.20
Andizhan	G, M kWh	Actual	11.90	8.60	16.20
	Q, m³/s	Actual	73.60	73.30	81.30
	H, m	Actual	95.00	95.00	95.00
Bakhri Tojik	G, M kWh	Actual	25.47	5.57	10.73
	Q, m³/s	Actual	801.30	170.90	301.30
	H, m	Actual	18.70	19.10	21.00
Farkhad	G, M kWh	Actual	14.60	3.40	2.70
	Q, m³/s	Actual	270.30	63.00	57.20
	H, m	Actual	30.60	30.60	30.60
Charvak	G, M kWh	Actual	18.80	9.10	20.70
	Q, m³/s	Actual	96.80	43.30	94.20
	H, m	Actual	95.80	101.05	106.60
Shardara	G, M kWh	Actual	10.40	17.30	17.10
	Q, m³/s	Actual	155.00	261.00	298.00
	G, M kWh	Actual	21.80	21.30	21.10



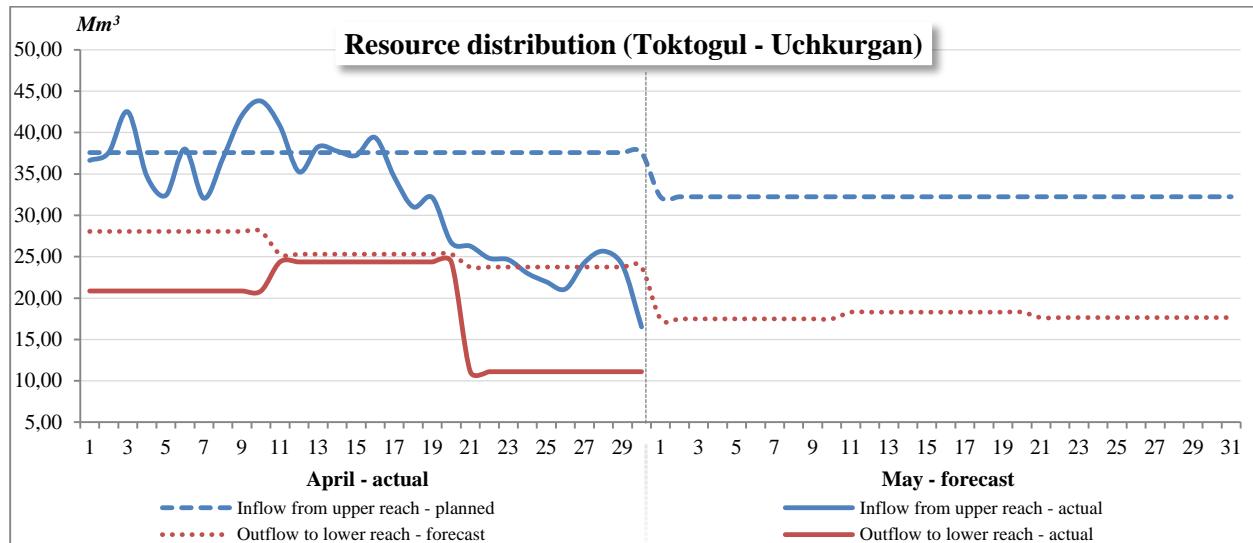


Water distribution

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	April			May			
		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	375.84	375.84	375.84	322.27	322.27	354.53
		Actual	376.70	353.20	232.07			
Lateral inflow ²	W, Mm ³	Forecast	66.86	66.86	66.86	97.68	97.68	107.45
		Actual	34.39	108.43	120.10			
Water withdrawals	W, Mm ³	Planned	153.45	180.92	196.47	206.15	198.03	225.05
		Actual	152.30	176.27	195.27			
Losses	W, Mm ³	Forecast	8.64	8.64	8.64	38.88	38.88	42.77
		Actual	50.13	41.54	45.88			
Outflow to lower reach ³	W, Mm ³	Forecast	280.61	253.14	237.59	174.92	183.04	194.16
		Actual	208.66	243.82	111.02			

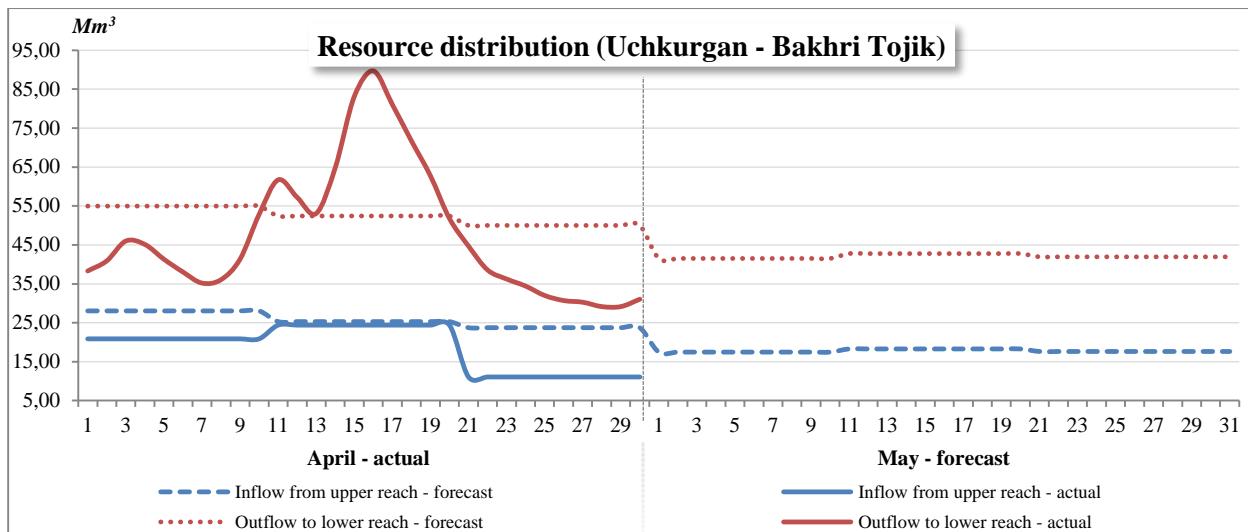


² Incl. Karasu left and right

³ Uchkurgan waterworks facility

Water volume (W)

Uchkurgan – Bakhri Tojik	Parameter	April			May			
		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	280.61	253.14	237.59	174.92	183.04	194.16
		Actual	208.66	243.82	111.02			
Lateral inflow	W, Mm ³	Forecast	320.74	323.20	314.63	290.10	294.51	322.27
		Actual	290.91	426.91	263.09			
Water withdrawals	W, Mm ³	Planned	21.67	22.08	22.24	20.02	20.04	22.33
		Actual	21.95	21.22	20.93			
Losses	W, Mm ³	Forecast	30.00	30.00	30.00	30.00	30.00	33.00
		Actual	62.81	-27.26	17.26			
Outflow to lower reach ⁴	W, Mm ³	Forecast	549.68	524.26	499.98	415.00	427.51	461.10
		Actual	414.81	676.77	335.92			

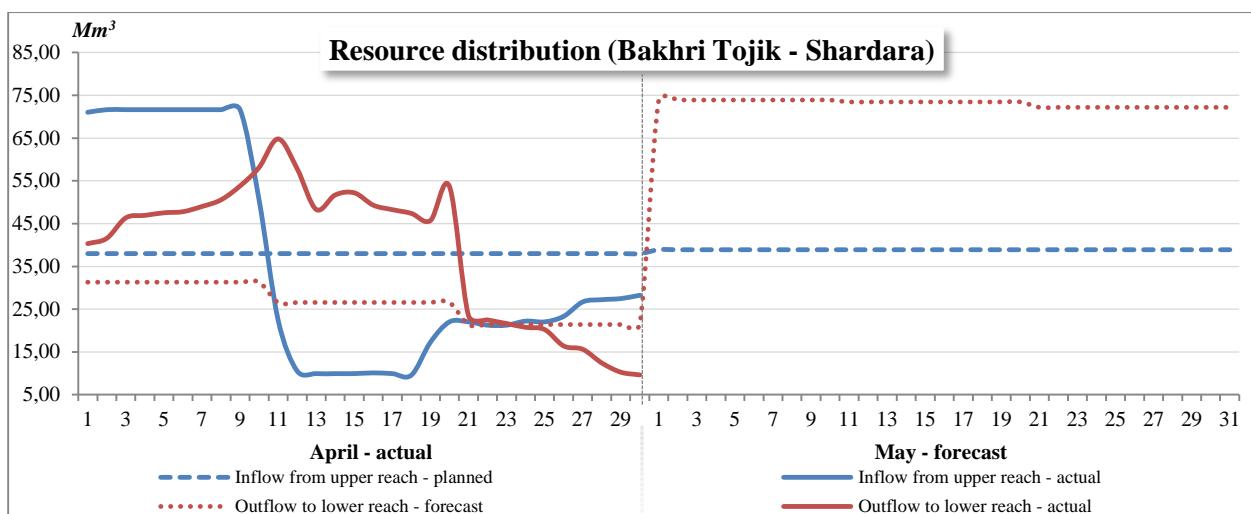


Water volume (W)

Bakhri Tojik - Shardara	Parameter	April			May			
		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	380.16	380.16	380.16	388.80	388.80	427.68
		Actual	694.57	131.76	241.75			
Lateral inflow	W, Mm ³	Forecast	271.69	252.14	269.54	713.41	720.64	826.71
		Actual	246.72	345.31	146.61			
Water withdrawals	W, Mm ³	Planned	248.79	306.67	321.11	303.30	314.97	394.35
		Actual	268.27	101.00	206.66			
Losses	W, Mm ³	Forecast	89.86	59.84	114.39	60.00	60.00	66.00
		Actual	191.16	-143.02	8.94			
Outflow to lower reach	W, Mm ³	Forecast	313.20	265.79	214.20	738.91	734.47	794.04
		Actual	481.86	519.09	172.76			

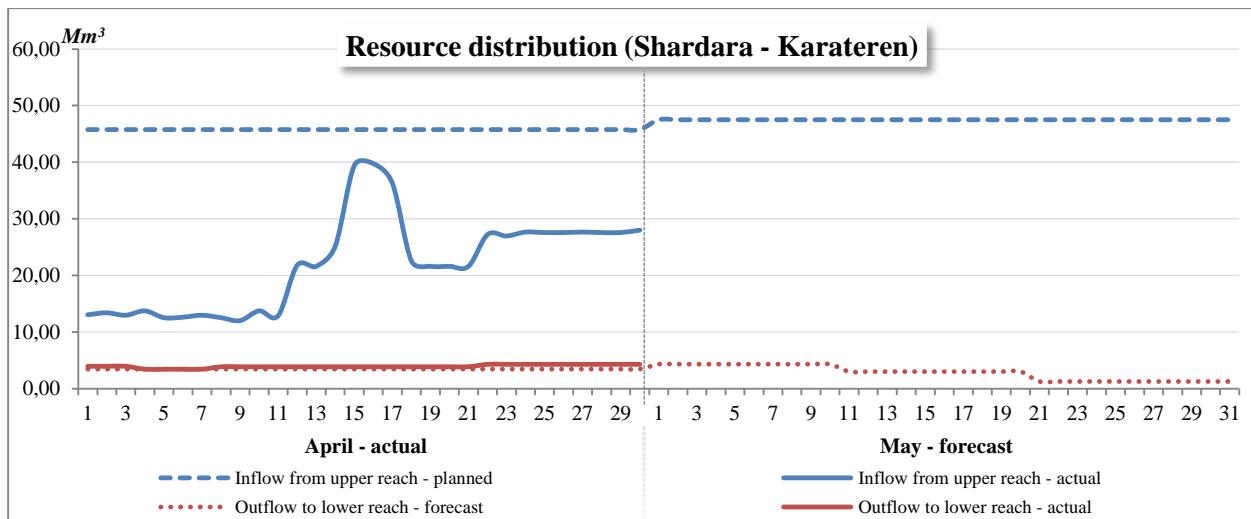
⁴ Akdzhар g/s

⁵ Kyzylkishlak g/s



Water volume (W)

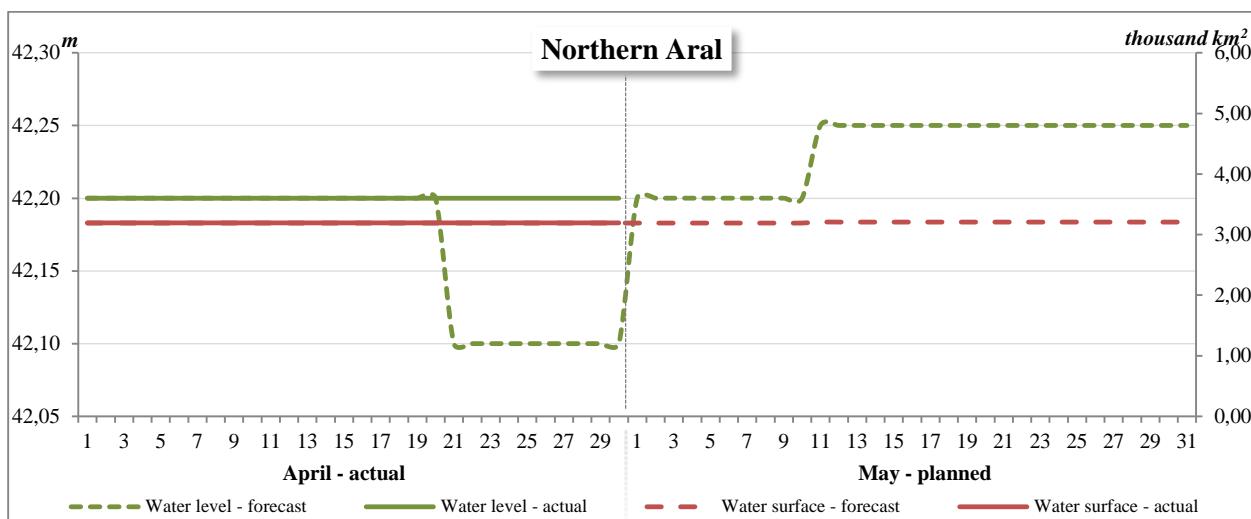
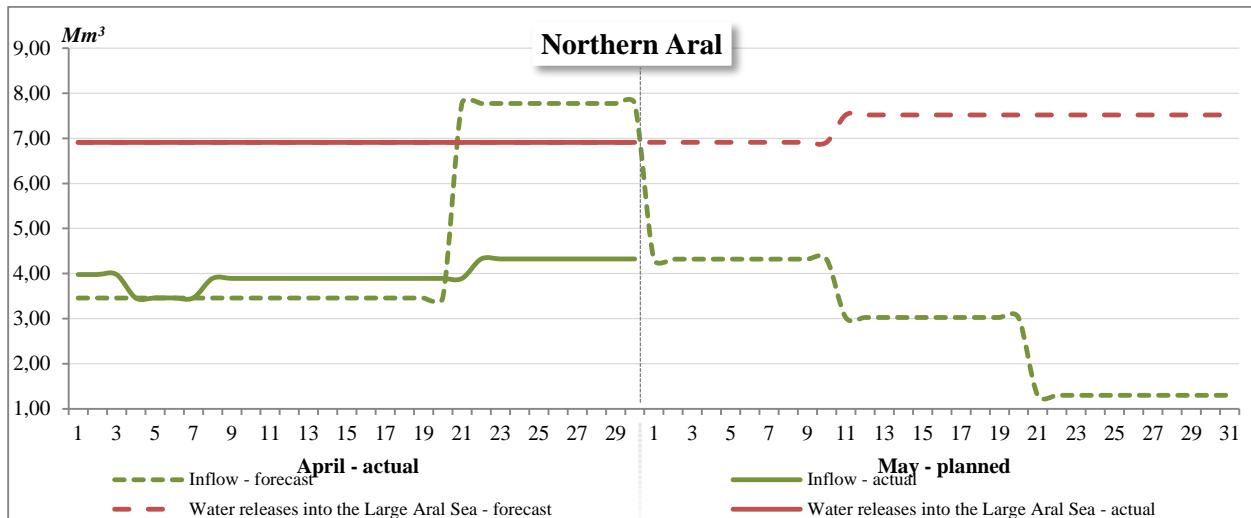
Shardara - Karateren	Parameter	April			May			
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day	
Inflow from upper reach	W, Mm ³	Planned	457.92	457.92	457.92	475.2	475.2	522.7
		Actual	129.51	262.57	269.31			
Lateral inflow	W, Mm ³	Forecast	6.05	6.05	6.05	0	0.43	0
		Actual	10.54	37.07	12.36			
Filling (+), draw down (-) of Koksarai reservoir	W, Mm ³	Planned	0.00	172.80	259.20	259	302.40	333
		Actual	-8.64	120.96	250.56			
Water withdrawals	W, Mm ³	Planned	80.35	247.97	362.88	347	457.06	540
		Actual	38.91	50.44	181.51			
Losses	W, Mm ³	Forecast	349.06	354.24	325.73	344	290.74	302
		Actual	55.09	331.27	307.95			
Outflow to lower reach	W, Mm ³	Forecast	34.56	34.56	34.56	43	30.24	14
		Actual	37.41	38.88	42.77			



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

Northern Aral	Parameter	April			May			
		I ten-day	II ten-day	III ten-day	I ten-day	II ten-day	III ten-day	
Inflow	W, Mm ³	Forecast	34.56	34.56	77.76	43.20	30.24	14.26
		Actual	37.41	38.88	42.77			
Water volume	W, Mm ³	Forecast	24.42	24.40	24.48	24.19	22.04	24.24
		Actual	24.38	24.30	24.22			

Water level	H, m	<i>Forecast</i>	42.20	42.20	42.10	42.20	42.25	42.25
		<i>Actual</i>	42.20	42.20	42.20			
Water surface area	$S, th.km^2$	<i>Forecast</i>	3.19	3.19	3.19	3.19	3.21	3.21
		<i>Actual</i>	3.19	3.19	3.19			
Water releases into the Large Aral Sea	W, Mm^3	<i>Forecast</i>	69.12	69.12	69.12	69.12	75.17	82.68
		<i>Actual</i>	69.12	69.12	69.12			



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