

ANNEX

Table 1. Hydrologic and Salinity Characteristics of the Aral Sea, 1960-2010^a

Year	Level (meters)	Area km ²	% of 1960	Volume km ³	% of 1960	Salinity g/l	% of 1960
1960 (whole sea) ^b	53.4	67,499	100	1089	100	10	100
<i>Large Sea</i>	53.4	61,381	100	1007	100	10	100
<i>Small Sea</i>	53.4	6,118	100	82	100	10	100
1971 (whole sea) ^b	51.1	60,200	89	940	86	11	110
1976 (whole sea) ^b	48.3	55,700	83	763	70	14	141
1989 (whole sea) ^c		39,734	59	332	33		
<i>Large Sea</i>	39.32	36,307	60	332	34	28	280
<i>Small Sea</i>	40.2	2,804	46	23	28	28	280
1996 (whole sea) ^c		33,395	49	260	24		
<i>Large Sea</i>	36.5	30,340	49	235	23	48	480
<i>Small Sea</i>	41.2	3,055	50	25	30	22	220
2003 (whole sea) ^c		17,158	25	108	10		
<i>Large Sea</i>	30.4	14,293	23	85	8	48 (East. Sea) >60 (West. Sea)	480 600
	40.4	2865	47	23	28	20	200

<i>Small Sea</i>								
2011 (whole sea)		10,033	15	92	8			
Large sea ^d	27.3	6,113	10	53	5	~190	1900	
Small Sea ^e	45.1	3,920	64	39	48	~15	150	

^aValues derived from Soviet data, data from Glavgidromet of Uzbekistan, data from Shivareva, *et al* from information provided by the GIS Research Center, Nukus, Karakalpakstan, and from annualized water balance and salt balance models developed by the author as well as from a 1:500,000 bathymetric map and satellite imagery of the Aral. ^b annual average ^c on January 1 ^d the sea will have divided into a western and eastern part ^e assumes implementation of north Aral project in 2004

Table 3. Alien species in the Aral Sea

N	Taxonomic Group	Species	Source	Year(s) of introduction	Year of first finding	Status after acclimatization	Status in 1990s	Ecological status	Way of introduction	Effect
1	Pisces	<i>Alosa caspia</i>	Caspian Sea	1929—1932	-	-	-	N	del	0
2		<i>Acipenser stellatus</i>	Caspian Sea	1927—1934 /1948-1963	1958	-	-	N	del	0
3		<i>Acipenser nudiventris derjavini</i>	Ural River Delta	1958	-	-	-	N	del	-
4		<i>Acipenser guldenstadti</i>	?	1978-1980	1981	Rare	-	N	del	0
5		<i>Clupea harengus membras</i>	Balthic Sea	1954-1959	1957	Rare	?	N	del	+
6		<i>Mugil auratus</i>	Caspian Sea	1954-1956	-	-	-	N	del	0
7		<i>Mugil saliens</i>	Caspian Sea	1954-1956	-	-	-	N	del	0
8		<i>Ctenopharyngodon idella</i>	China	1960-1961	1963	Commercial fish	-	N	del	+
9		<i>Hypophthalmichthys molifrix</i>	China	1960-1961	1963	Commercial	-	N	del	+

						fish				
10		<i>Aristichthys nobilis</i>	China	1960-1961	?	Rare	-	N	del	+
11		<i>Platichthys flesus</i>	Azov Sea	1979-1987	1981	Commercial fish	Commercial fish	N	del	+
12		<i>Mylopharyngodon piceus</i>	China	1960—1961	1963	Commercial fish	-	N	assoc	0
13		<i>Syngnathus abaster caspius</i>	Caspian Sea	1954—1956	?	Rare	-	N	assoc	-
14		<i>Atherina boyeri caspia</i>	Caspian Sea	1954—1956	1959	Numerous	Limited number	N	assoc	-
15		<i>Pomatoschistus caucasicus</i>	Caspian Sea	1954—1956	1958	Numerous	?	N	assoc	-
16		<i>Neogobius fluviatilis</i>	Caspian Sea	1954—1956	1958	Numerous	?	N	assoc	-
17		<i>Neogobius melanostomus</i>	Caspian Sea	1954—1956	1959	Numerous	-	N	assoc	-
18		<i>Neogobius syrman</i>	Caspian Sea	1954—1956	1959	Limited number	-	N	assoc	-
19		<i>Proterorichinus marmoratus</i>	Caspian Sea	1954—1966	1959	Limited number	?	N	assoc	-
20		<i>Neogobius kessleri</i>	Caspian Sea	1954—1956	1959	Limited number	-	N	assoc	-
21		<i>Ophicephalus(Channa) argus</i>	Karakum canal	1960s	1965	Commercial fish	Commercial fish in river delta	N	assoc	+
22	Monogenea	<i>Nitzschia sturionis</i>	Caspian Sea	1927—1934	?	Common	-	Par	assoc	-
23	Coelenterata	<i>Polipodium hydriforme</i> Ussov	Caspian Sea	1927—1934	?	Common	-	Par	assoc	-
24	Mysidacea	<i>Paramysis baeri</i>	River Don	1958—1960	-	?	-	N/B	del	0
25		<i>Paramysis lacustris</i>	River Don	1958—1960	1961	Numerous	In river deltas	N/B	del	+
26		<i>Paramysis intermedia</i>	River Don	1958—1960	1961	Numerous	-	N/B	del	+
27		<i>Paramysis ullskyi</i>	River Don	1958—1960	1963	Limited number	-	N/B	inc	+

28		<i>Limnomysis benedeny</i>	?	?	1975	Limited number	-	N/B	inc	+
29	Decapoda	<i>Palaemon elegans</i> (squilla)	Caspian Sea	1954—1966	1957	Numerous	Numerous	N/B	assoc	?
30		<i>P. adspersus</i>	Caspian Sea	1954—1966	-	?	-	N/B	assoc	?
31		<i>Rhithropanopeus harrisi</i> <i>tridentata</i> (Maitland)	Azov Sea	1965, 1966,	1976	Numerous	Numerous	B	assoc	+
32	Copepoda	<i>Calanipeda aquaedulcis</i>	Azov Sea	1965, 1966/1970	1970	Numerous	Numerous	P	del	+
33		<i>Heterocope caspia</i> Sars	?	1971	-	-	-	P	del	0
34		<i>Acartia clausi</i>	?	1985, 1986	-	-	-	P	del	0
35	Polychaeta	<i>Nereis diversicolor</i>	Azov Sea	1960—1961	1963	Numerous	Numerous	B	del	+
36	Bivalvia	<i>Abra ovata</i>	Azov Sea	1960, 1961,1963	1967	Numerous	Numerous	B	del	+
37		<i>Monodacna colorata</i> (Eichw.)	?	1964,1965	-	-	-	B	del	0
38		<i>Mytilus galloprovincialis</i> Lam	Azov Sea	1984-1986	-	-	-	B	del	0
39		<i>Mya arenaria</i> Linne	Azov Sea	1984-1986	-	-	-	B	del	0

Way of introduction: del, deliberately, inc, incidentally, assoc, in association with deliberate acclimatizants

Ecological status: N, necton, B, benthos, N/B, nectobenthos, P, plankton

Effect: -, negative, +, positive, 0, none, ?, unknown