

**CHAPTER 9 EIA FOR ALMOUT WATER DIVERSION PROJECT**

9.2	Existing Environmental Conditions .....	9.1
9.4	Impact of Taleghan and Almout Water Diversion to Manjil Dam .....	9.15
9.3	EIA Procedure in Iran .....	9.51

**Table 9.2.2.2 List of Flora in the Almount River Basin (Long List)**

**Shrubs+ Herbs**

No.	Family	Scientific Name
1	Adiantaceae	Adiantumcapillus veneris
2	Alliaceae	Allium hirtifolium
3	Amarylidaceae	Exilirion tataricum
4	Asclepiadaceae	Vincetoxicum funebre
5	"	Periploca raeca
6	"	Vincetoxicum funebre
7	Asteraceae	Achilea millefolium
8	"	Achilea tenaifolia
9	"	Achilea Sp
10	"	Achilea micrantha
11	"	Artemisia oliveriana
12	"	Artemisia anna
13	"	Artemisia scoparia
14	"	Bidens tripartia
15	"	Callicephalus nitens
16	"	Cantaurea aucheri
17	"	Cantaurea behen
18	"	Cantaurea depressa
19	"	Cantaurea gilanica
20	"	Cantaurea virgata
21	"	Cantaurea solstitialis
22	"	Conyzanthus sguamatus
23	"	Cousinia esfandiaril
24	"	Cousinia crispa
25	"	Cousinia mnililoba
26	"	Cousinia pichlenana
27	"	Crepia sancta
28	"	Crepis sp
29	"	Echinops sp
30	"	Echinops cephalotes
31	"	Garhadiolus angulosus
32	"	Hieracium sp

**Table 9.2.2.3 List of Flora in the Almount River Basin (Long List)**

**Shrubs+ Herbs (Cont.)**

No.	Family	Scientific Name
33	Asteraceae	Jurinea sp
34	"	Leohtodona sperrimus
35	"	Dittrichia graveolens
36	"	Hieraium sp
37	"	Leontoda asperrimus
38	"	Ligularia persia
39	"	Lapsana communis
40	"	Pulicaria gnaphalodes
41	"	Scorzonera ramosissima
42	"	Tanacetum pinnatum
43	"	Tanacetum polgcephalum
44	"	Tanacetum myriophyllum
45	"	Crisium sp
46	"	Crisium arvense
47	"	Crisium hygrophilum
48	"	Un muan
49	Brassicaceae	Alkann bracteosa
50	"	Anchusa iranica
51	"	Arnebia euchroma
52	"	Asperugo procumbens
53	"	Cerinthe minor
54	"	Heliotropium sp
55	"	Lappula barbata
56	"	Lappula sp
57	"	Lithospermum-cF- officinale
58	"	Lithosper-Mum-sp
59	"	Mgosotis sp
60	"	Nonnea persica
61	"	Onosma microcarpa
62	"	Onosma sp
63	Brassicaceae	Alliaria officinalis
64	"	Anchonium elichrysofolium
65	"	Arabis caucosica
66	"	Camelina rumelica

**Table 9.2.2.4 List of Flora in the Almount River Basin (Long List)**

**Shrubs+ Herbs(Cont.)**

No.	Family	Scientific Name
67	Brassicaceae	Capsellabursa pastoris
68	"	Cardamin uliginosa
69	"	Fibigia-cF-umbellata
70	"	Fibigia suffruticosa
71	"	Graellsia saxifragifolia
72	"	Hesperis-cF-persica
73	"	Isatis capadocica
74	"	Nastuetium officinalis
75	"	Neslia apiculata
76	"	Parlatoria rostrata
77	"	Physoptychis gnophalodes
78	"	Pseudocomeline glaucophylla
79	"	Sisymbrium irio
80	"	Sterigmotemum inconum
81	Caparidaceae	Cleome iberica
82	Caprifoliaceae	Lonicera nummularifolia
83	Caryophllaceae	Mínidium laevigatum
84	Caparidaceae	Silene chlorifolia
85	Chenopodiaceae	Atriplex nitens
86	"	Chenopodium botrys
87	Cistaceae	Helionthemum sp
88	Colchicaceae	Colchicum kotschyi
89	Companulaceae	Asyneuma cichoriiforme
90	"	Componula stevenil
91	"	Componula glomerata
92	"	Componula sp
93	Cornaceae	Cornus australis
94	Corylaceae	Corylus arcellana
95	Cyperaceae	Carez divulsa
96	"	Carex sp
97	"	Cyperus rotundus
98	Dipsacaceae	Petrocephalus canus
99	"	Petrocephalus-cF-plummosus
100	Elaeagnaceae	Hippophae rdamondides

**Table 9.2.2.5 List of Flora in the Almount River Basin (Long List)**  
**Shrubs+ Herbs(Cont.)**

No.	Family	Scientific Name
101	Ephedraceae	Ephedra distachya
102	"	Ephedra interrodia
103	"	Ephedra procera
104	Fumariaceae	Corydalis verticillaris
105	Genetianaceae	Centaurium minus
106	"	Gentiana pontica
107	Geraniaceae	Biebersteinia mutifida
108	"	Erodium sp
109	Hypericaceae	Hypericum lysimachioides
110	"	Hypericum sp
111	Iridaceae	Iris-cF-barnumae
112	Juncaceae	Juncus inflexus
113	Lamiaceae	Calamintha grandiflora
114	"	Clinopodium vulgare
115	"	Dracecephalum moldavica
116	"	Eremostachys larigata
117	"	Lallemantia sp
118	"	Lumium album
119	"	Leonurus cardiaca
120	"	Maorrubium asteracanicum
121	"	Melissa officinalis
122	"	Mentha longifolia
123	"	Molucella levis
124	"	Nepeta fissia
125	"	Nepetapogonos perma
126	"	Nepetapogonos racemosa
127	"	Phlomis concellata
128	"	Phomis olivieri
129	"	Salvia ceratophylla
130	"	Salvia hypoleuca
131	"	Salvia spinosa
132	"	Salvia verticillata
133	"	Salvia virgata
134	"	Salvia fruticulosa

**Table 9.2.2.6 List of Flora in the Almount River Basin (Long List)**

**Shrubs+ Herbs(Cont.)**

No.	Family	Scientific Name
135	Lamiaceae	Stachys inflata
136	"	Stachys lavandulifolia
137	"	Teucrium chamaedrys
138	"	Teucrium orientalis
139	"	Teucrium polium
140	"	Ziziphora chnopodioides
141	Liliaceae	Eremurus cF-spectabilis
142	"	Eremurus kopetedughen
143	"	Fritillaria kotschyana
144	"	Tulipa biflora
145	"	Tulipa montana
146	"	Tulipa sp
147	"	Tulipa chrgsantha
148	Linaceae	Linum album
149	"	Linum sp
150	Malvaceae	Hibiscus trionum
151	Orchidaceae	Histera orato
152	"	Unknown
153	Papaveraceae	Popaver dubium
154	Papilionaceae	Alhagi persarum
155	"	Astragalus aegobromus
156	"	Astragalus podocarpus
157	"	Astragalus strictifolius
158	"	Astragalus submites
159	"	Astragalus trachyacanthus
160	"	Astragalus hymenostegis
161	"	Astragalus chrysostachys
162	"	Astragalus sp
163	"	Astragalus eriostylus
164	"	Cicer sp
165	"	Colutea buhsei
166	"	Coronilla varia
167	"	Coronilla balansae
168	"	Clycrrhiza gelabra
169	"	Lathyrus aphaca

**Table 9.2.2.7 List of Flora in the Almount River Basin (Long List)**

**Shrubs+ Herbs(Cont.)**

No.	Family	Scientific Name
170	Papilionaceae	Lathyrus rotundifolius
171	"	Lathyrus sp
172	"	Medicago polymorpha
173	"	Onobrychis carnuta
174	"	Onobrychis aracantha
175	"	Ononis spinosa
176	"	Pisum sativum
177	"	Securigera securidaca
178	"	Trifolium compestra
179	"	Trifolium repens
180	"	Trigonella elliptica
181	"	Vicia persica
182	Plantaginaceae	Plantago lanceolata
183	Plumbayinceae	Acantolimon aspadanum
184	"	Acantolimon bromifolium
185	"	Acantolimin erinaceum
186	"	Plumbago europaea
187	Poaceae	Aegilops sp
188	"	Agropyron tauri
189	"	Botrichloa ischaemum
190	"	Cynodon dactylon
191	"	Echinaria capitata
192	"	Eragrostis barrelieri
193	"	Eremopoa sp
194	"	Melica persica
195	"	Pannisetum orientalis
196	"	Poa araratica
197	"	Poa sinaica
198	"	Saccharum ravennae
199	"	Setaria viridis
200	Podophyllaceae	Leontic armenica
201	Polygonaceae	Polygonum avietulore
202	"	Polygonum patulum
203	"	Polygonum patulum

**Table 9.2.2.8 List of Flora in the Almount River Basin (Long List)**  
**Shrubs+ Herbs(Cont.)**

No.	Family	Scientific Name
204	Polygonaceae	Rumex chalepensis
205	"	Rumex-cF-dentatus
206		Rumex elbursensis
207	Primulaceae	Rrimula aurieulata
208	Ranunculaceae	Ranunculus-cF-trichocarpus
209	"	Thalictram minus
210	Typha	Typha sp
211	"	Typha australis
212	Urticaceae	Parietaria Judaica
213	Valerianaceae	Valeriana sisymbriifolia
214	"	Valertiana-cF-amblyotis
215	"	Valerianella coronata
216	"	Valerianella vesicaris

**Table 9.2.2.9 List of Flora in the Almount River Basin (Long List)**  
**Trees+ Herbs:**

No.	Family	Scientific Name
1	Anacardiaceae	Pistacia atlantica
2	Berberidaceae	Berberis vulgaris
3	Caprifoliaceae	Loniceranumulariifolia
4	Cornaceae	Cornus australis
5	Corylaceae	Corylus avellana
6	Cupressaceae	Juniperus excelsa
7	Juglandaceae	Juglans regia
8	Moraceae	Ficus johannis
9	Punicaceae	Punica granatum
10	Rhamnaceae	Paliurus spina-christi
11	Rosaceae	Amygdalus eburnea
12	"	Amygdalus lycioides
13	"	Crataegus melanocarpa
14	"	Crataegus microphylla
15	"	Crataegus sp
16	"	Cotoneaster nummularia
17	"	Malus orientalis
18	"	Mespilus germanica
19	"	Prunus spinosa
20	Ulmaceae	Celtis australis

**Table 9.2.2.10 List of Flora in the Almort River Basin (Long List)**

Medicinal herbs:

No.	Family	Scientific Name
1	Adiantaceae	Adiantumcapillus veneris
2	Asteraceae	Artemisia oliveriana
3	Boraginaceae	Anchusa iranica
4	Brassicaceae	Nastuetium officinalis
5	Linaceae	Sisymbrium irion
6	Hypericaceae	Hypericum lysimachioides
7	"	Dracecephalum moldavica
8	"	Eremostachys larigata
9	"	Melissa officianis
10	"	Salvia verticillata
11	"	Zizipora chnopodioides
12	Liliaceae	Eremurns spectbills
13	Linaceae	Limum album
14	Papaveraceae	Popaver dubium
15	Papilionaceae	Clycrrhiza gefabra

**Table 9.2.2.11 List of Flora in the Almort River Basin (Long List)**

Woodlands:

Name	Location	Surface area (ha)	Type of trees
Beidelan	Between Alamout river and Taleghan river (shirkuh)heights	400	Pistacia atlantica Juniperus excelsa Crataegus sp.
Ailan	Atan- Talah- Balavenash- Painvenash	800-900	Juniperus excelsa
Yalaan Asadi	Below and opposite to Aveh	225	Juniperus Excelsa
Narmelat	Between Dineh Rud and Garma Rud	150-200	Juniperus Excelsa
Kouchenan	About Kouchenan valley	40-45	Juniperus Excelsa
Larak	End of Aveh mountain	40	Juniperus Excelsa
Khob Kuh	South west of pain Rouch	20	Juniperus Excelsa
Ameshk & Dineh Kuh	Southern side of Beidelan	50	Juniperus Excelsa Pistacia atlantica
	Variable	150-200	Crataegus sp.

Table 9.2.2.12 List of Mammal Species in the Almut Basin



















Taxonomical Hierarchy			Common name	Range	Habitat	Size	Characters	CITES/AUCN Categories	
Family	Genus	Species							
Felidae (Cat Family)				There are approximately 36 species in the cat family as the classification of taxonomy. This successful family is distributed almost worldwide, being absent only from Antaratasia, Australasia, Madabascar and some other island. However the fine fur of the cats has long been coveted by human, and many species have been hunted until they are rare and indanger of extinction.					
	Panthera	pardus	Leopard/Pauther	Middle East ; Africa, Asia: Siberia to Korea, Sli Lanka	Desert to forest, lowland plains to mountains	Body:1.3-1.9m Tail:1.1-1.4m	Although it wsa formerly widespread, now the leopard is patchly distributed and many of its sub-species have become extinct or endangered. A strong, but elegant cat it has long body and relatively short legs. Leopards are solitary and normally hunt day or night, but in area where they are persecuted, they are nocturnal. They swim and climb well and often basking in the sun on the branch. Their sight and sense of smell are good, and their hearing is exceptionally acute. The prey includes mammals such as antelope, apes, birds, snakes, fish and domestic livestock.	EN	
									
Bovidae	capra	aegajrus	Persian ibex	Middle East & European Alps	Alps to 3,000m	Body:1.5m-1.5m Tail:1.2-1.5m	From Roman times, different parts of these animals have been regarded as processing healing powers, and ibex were hunted the point of extinction. Today, however a few small protected herd survive in preserves. The ibex live above the tree line, only descending to upper limits of forest in the harshest winter condition. In summer, they climb up to alpine meadow, where they graze on grass and flower. The male ibex has long, back ward sweeping horns and female has short horns. Only in the winter rutting season, males rejoin the female herds. The female give birth to 1 young after a gestation of period between 5 and 6 months.	VU	
									
Ursidae	Ursus	arctos	Big brown bear	Aresbaran area Zagros mountain Khazar forest of Iran Europe & Asia & Africa	Forest, tundra	Body:1.5-2.5m Tail: absent	The 9 species of bear are an evolutionary offshoot of doglike ancestors and the family also includes the species panda. The bears live alone or in family groups and are active night or day, where bears have been persecuted, they are nocturnal. The diet varies to live different area but may include plant materials such as fruits, nuts, roots as well as insects, fish, small vertebrates and carrion. Females breed every 2 or 3 years and produce litters of 1 to 4 infant after a gestation of 6 months.		
									
Canidae	Canis	lupus	Persian/red wolf	Every region of Iran & U.S.A. & Asia region	Open woodland and forest	Body:1-1.4m, Tail:30-48cm	One of the ancestors of the domestic dog, the Persian wolf muscular animal with a thick bushy tail. Intelligent, social animal wolves live in family group or in packs that sometimes include more than one family or other individuals besides the family. The pack members hunt together, cooperating to run down prey such as deer, caribou and wild horses, and they also eat small animals such as mice, fish and crabs. Social pack is well organized by ritualized gestures and postures. The female gives birth to 3 to 8 pups after a gestation about 60 days.	LR: lc	
		aureus	golden jackal	Iran & U.S.A. & Asia					
	Vulpes	vulpes	Red fox	Europe, Asia to Japan, Indo-China, introduced in Australia	Desert, Semi arid	Body: 37-41cm, Tail: 19-21cm	The versatile, intelligent red fox adapts well to different conditions and has excellent senses and powers of endurance. Although sometimes it moves at all hours, it is most typical active at night. It lives alone outside the breeding season and is a skilful hunter, prey on rodents but also on rabbits, hares, birds, insects and invertebrates. Fruit and berries are eaten in autumn.		
									
Vespertilionidae	Myotis	mystacinus	Whiskered bat	Azerbayejan-Kermanshah-Tehran & Europe & Asia & north of Africa	arid scrub land	Body:5-7cm, Wingspan:17-19cm	Vespertilionidae (evening bat family): There are 318 species in this family, found around the world from the tropics to as far as about 68° north. Many species hibernate for 5 to 6 months to survive the winter in harsh northern latitudes. Ear sizes of these species very enormously and the body color is generally quite dull. All these bats make use of echo location for finding prey and for plotting their fright course.	Protected	
	Miniopterus	schreibersi	Schreiber's bat	Whole region in Iran except Kerman Hormozgan & Sistan & Europe & Asia & Africa & north of Australia					
									
Mustelidae	Martes	foina	Beech marten	North of Iran beside the sea Golestan Province, Europe , Asia	Farmland, Woodland	Body:18-23cm, Tail:5-7cm	There are about 65 species in 23 genera from region of the world except Australia & Madagascar. This species is the smallest carnivore. It is most active by night, but will hunt in the daytime. 1 or 2 litters a year of 4 or 5 infant are born.		
		melles	Eurasian badger	north of Iran Goresfan Province					
									
Mustelidae	Lutra	lutra	European otter	west north to east region of Iran	Rivers, lakes sheitered coasts	Body:55-80cm, Tail:30-50cm	Although agile on land, otters have become well adopted for an aquatic life. Otter are solitary, elusive living things and now rare in much in their range. It eat fishes, frogs, water birds, voles and water creatures.		
									

Table 9.2.2.13 List of Mammal Species in the Almut Basin

Taxonomical Hierarchy			Common name	Range	Habitat	Size	Characters	CITES/IUCN Categories	
Family	Genus	Species							
Suidae	Sus	scrofa	Wild boar	west-north of Africa, west Asia and ever region of Iran	Forest, woodland	Body:1.1-1.3m Tail:15-20cm	There is one family in this order, containing a single species lives in Africa. Its relationship to other animal groups is obscure. This ancestor of the domestic pig has a heavy body covered with dense, bristly hair, slim legs and long snout.		
Leporidae	Lepus	capensis	Cape/brown hare	All part of Iran & Africa & Europe & Asia	Open country, farmland, woodland	Body:45-75cm Tail:7-11cm	A fast running hare, with long limbs. Daytime, it remains in a shallow depression in the ground. It feeds on leaves, buds, roots, berries, fruit, fungi and bark twins. It is usually solitary animal.		
Microtidae	Arvicola	terrestris	Water vole	Europe, east to Siberia and Mongolia	Freshwater banks, grassland	Body:14-19cm Tail:4-10cm	Although competent in water, this species is less agile than the more specialized beavers and muskrats. It makes burrow in the bank of a river or stream. Grasses and other plant material are its main food. Water voles breed in summer, producing several litters of 4 to 6 young.		
	Microtus	arvalis	Common vole						
	Cricetus	migratorius	Gray hamster						
Erinaceidae	Erinaceus	concolor	European hedgehog	forest of Khazar area up to Azarbayebayan & Kordestan & Telran Province	Scrub, forest, cultivated land	Body:13-27cm Tail:1-5cm	One of the most familiar small animals in Iran. Its called hedgehog is from a pig like habit of rooting round for invertebrate prey in the hedgerows. The upper part of the head and the back are covered in short, banded spines. Hedgehog produce 1, sometimes 2 litters of about 5 to 6 infant each year.		
Gerbillidae	Meriones	persicus	Persian jird	All region of Iran & western area of Asia	Arid scrubland	Body:10-14cm Tail:11-12cm	There are 87 members of this subfamily of rodents, all of which come from central and western Asia and Africa. They are all well adapted for arid conditions and many occur only apparently in hospitable deserts.		
Muridae	Apodemus	syvaticus	Wood mouse	All part of Iran except Kerman & Sistan & Asia & Europe & Africa	Forest edge	Body:8-13cm Tail:7-9.5cm	The wood mouse is one of the common Europe to Central Asia small rodent. Wood mice emerge from their nests under the roots of trees in the evening. They often forage in pairs for seeds, insects, and seasonal berries. They usually breed between April and November.		
Soricidae	Soricidae			Soricidae Shrew Family; There are more than 280 species of shrew, distributed throughout most of world except Australia and New Zealand, the west Indies and most of south Africa. Shrews are insectivores and most lead offensive lives among the debris on the forest floor or on pastureland. they feed on many types of invertebrate. Carrion may also be included in the shrew 's diet. Shrew are active creature with high metabolisms. Their hearts may beat more than 1,200 times/minute and they have enormous appetites relative to their body size. Even in cold northern regions, they do not hibernate in winter, it would be impossible for them to build up sufficient fat reserves. Some species of shrew are reported to eat their own feces and perhaps those of other creatures.  By doing so, they boost their intake vitamins B and K and some other nutrients. Shrews rely on heavily their senses of smell and hearing when hunting and their eyes are tiny and probably a little use.					
	Crocidae	leucodon	Bicoloured White-toothed Shrew	S. Europe, S Asia, Africa	Semiarid, grassland, scrub, rocky hillsides	Body: 3.5-5.5cm, Tail: 2.5-3cm	Usually regarded as the world smallest terrestrial mammals. a fully grown this species weights about 2g. How such a tiny mammal can survive is not fully understood, but it must has a constant and reliable source of food. That is one reason why it is restricted to the warmer parts of the old World. Its coat is dense to prevent under heat loss from its tiny body. They eat spiders and insects almost as large as themselves including grasshoppers and cockroaches.		
	Mus musculus	musculus	House mouse	All over the world	Fields, associated with human	Body:6-10cm, Tail:6-11cm	Mice eat a little feeds, but they spoil vast quantities of stored food such as grain. Wild mice are nocturnal and feed on grass seeds and plant stems and occasionally feed on insects.		



Table 9.2.2.14 List of Mammal Species in the Almut Basin

Taxonomical Hierarchy			Common name	Range	Habitat	Size	Characters	CITES/IUCN Categories
Family	Genus	Species						
Hystriidae	Hystrix	indica	Hystrix indica	Iran & Kazar area & Gilan Province	Forest	Body:15-18cm, Tail:13-16cm	Old World Porcupin Family; The 11 species in this family are all rodents, unmistakable in their appearance, with long spines, derived from hairs, covering back, sides and parts of the tail. Porcupine live in desert, forest and savanna regions of Africa, part of Asia. They are usually nocturnal animals and live in burrows, which they dig or in holes or crevices. They feed on plant materials such as roots, bulbs, tubers and fruit and bark, and on some carrion	
								
Gliridae	Glis	glis	Fat dormouse				There are about 21 species of dormouse found in Africa, Europe, northern Asia, and Japan. These nocturnal rodents resemble short, fat squirrels and most have bushy tails. The largest of its family has long bushy tail and rough pads on its paws which help to facilitate climbing. In late summer and autumn, most dormice build up their body reserves fat and then hibernate during the winter. They wake periodically to feed on the fruit and nuts that they store for winter consumption.	
								

Source: Lar Consultant

Reference

- 1) The Encyclopedia of Animals, The Simon & Schuster Editions Rockefeller Center (1998), ISBN 0-684-85237-3
- 2) Fauna of Iran, Eskandar Firouz, Iran University Press (2000), ISBN 964-01-0956-8
- 3) Golestan National Park, Department of the Environment (DOE) (1999), ISBN 964-6065-22-8
- 4) Mammals of Iran, Department of the Environment, (1996)

Table 9.2.2.15 List of Birds Species in the Almount Basin

Taxonomical Hierarchy			Common name	Range	Habitat	Size	Characters	CITES/IUCN Categories	
Family	Genus	Species							
Accipiteridae (Hawks Family)				This is the largest family in the Falconiformes order and contains about 239 species of diverse predatory and carrion eating birds. Representative occur almost all region of the world except Antarctica, northern parts of Arctic and small oceanic islands. The family includes the 14 or so carrion-feeding Old World vultures, the true hawks (buzzard and eagles), harrier eagle, serpent eagle, harrier kites and fish eagle and a few of specialized types. Most species nest in trees, while some of larger eagle and buzzard use cliff edges. They have small clutches of 1 or 2 eggs.					
	Accipiter	gentilis	Northern Goshawk	N. America, Europe, N. Asia, Iran, Turkey, China, Japan	Forest woodland	50-67cm, wingspan: 120cm	These aggressive hawks are the largest birds in the genus Accipiter and are efficient killer. A goshawk is capable of killing birds as large as pheasant and grouse and mammals size of rabbits and hares. The birds are often trained for falconry. Goshawk pairs usually mate for life. The pairs roost together while nest making and a screaming duet each day before sun rise in the spring. The clutch contains from 1 to 5 eggs, usually 3, but the number is affected by the availability for suitable prey. The female incubates the clutch for 35 to 38 days. Some northern populations of goshawks migrate to south after breeding.		
	Aquila	chrysaetos	Golden Eagle	N. Africa Mexico	Moor, Mountains forest	75-90cm	Golden eagles are probably the most numerous large eagles in the world. When hunting they soar for long times then dive to seize and kill the animals with its talons. Mammals such as hares and rabbits are the mainly prey and carrion is an important food source. Golden eagle performs spectacular height display over the nest site. Some pairs have several nests, in used rotation. The 2 eggs are usually incubated by female.		
	Buteo	buteo	Common buzzard	Europe, Africa, Middle East, China, Japan	Woodland, moorland	56cm	The buzzard is not bold hunter and spend more time perching than on the wing. Once aloft it soars well. It eats mainly small ground mammals, reptiles, insects, carrion and some ground birds. The area of the breeding territory varies from year to year according to food supplies. A nest is built on the tree or crag and female lays 2 to 6 eggs.		
Accipiteridae (Hawks Family)	Neophron	percnopterus	Egyptian vulture	Europe, Africa, Middle East, India	Open country	60-70cm	The Egyptian vulture is a small species. It also eats insects and other bird eggs it is one of the few creatures to use a tool. In order to break into a eggs the vulture drops rocks on it to crack it open. The parents incubate 1 or 2 eggs for about 40 days.	VU	
	Gypaetus	barbatus	Bearded vulture	Europe, Africa, Middle East	Mountains	95-105cm	It spends most of its day on the wing and feeds on carrion of all of sorts, including human, but defers to larger vultures at carcasses. Each breeding pair holds a large territory and the birds perform spectacular diving and swooping flight display. They nest in cliff niches or on legs and lay 1 Or 2 eggs which are incubate for about 53 days.	Protected	
Accipiteridae	Milvus	migrans	Black/red kite	Europe, Africa, Middle East	Woodland, open country	60-65cm	The red kite is a large bird with long wings and a distinctive, deeply forked tail. It breeds in woodland but hunts in open country. Small animals up to the size of a weasel, birds, reptiles, frogs, fish, insects and carrion are all eaten, and red kite also kills domestic poultry. A breeding pair nests in the tree and usually 3 to 4 eggs are laid and incubate the eggs for 28 to 30 days.	IR: lc	
	Aegypius	monachus	Black vulture					VU	
	Hieraetus	fasciatus	Bonillis eagle vulture	Europe, Africa, Middle East, India	Forest, woodland				
	Gyps	fulvus	Giffon vulture						

Table 9.2.2.16 List of Birds Species in the Almut Basin

Taxonomical Hierarchy			Common name	Range	Habitat	Size	Characters	CITES/IUCN Categories
Family	Genus	Species						
Falcon Family (Falcon Family)				The 63 species of falcon are all day-time hunting birds of prey. They are found all over the world. Males and female look similar, but females usually larger males. Many falcon have so called tomial teeth, which it is cutting edge on the upper bill with corresponding notches in the lower bill.				
	Falcon	cherrug/tinnunculus	Common kestrel	Europe, Asia, Africa	Open country, plains, cultivated land	34-38cm	Keatrels hunt over open ground and are the hovering specialist in the hawk family. They fly some 10 to 15m above ground in order to search for prey over an area. The staple diet of kestrel consists of small animals, but they will also catch small birds, reptiles, insects. The clutch of 4 to 9 eggs is laid on a edge, in a hole in a tree in the abandoned nest of other bird. Female does the greater share of incubation, which lasts between 27n to 29 days.	
		naumanni	Lesser kestrel					
		pelegrinoides	Barbary					
		peregrinus	Peregrine falcon	Almost worldwide	Varied, open mountains	38-51cm	The peregrine's wings are tapered and pointed and its tail is slim and short. This species is virtually without equal in the speed and precision of its flight and it can also chase prey through the air, changing direction easily. Because of its skills, it is most highly prized birds of falconry. These birds are seriously declining in numbers, partly because of poisoning through the incidental ingestion of pesticides, which reach them through the food chain	
		tinnuculus	Saker falcon					
Falconidae								
	Sylvia	althaca	Lesser white throat/black cap	Europe, Africa, Middle East, China (migratory)	Woodland gardens, orchards	14cm	The male blackcap is distinguished from other Sylvia warblers by his glossy black crown and gray neck. He has a ripping song and is also accomplished mimic. It is an active, lively bird and forages in trees and bushes for insects. This species eats more fruit than any other warblers. the parents incubate the clutch of between 3 to 6 eggs for between 10 to 15 days.	Protected
	Matacilla	alba	White wagftail	Europe, Asia, N. Africa; winter south to Africa to S. Asia	River bank, steep, cultivated land	18cm	These species often roost on a tree of a forest and reed beds of plant and occasionally wade in shallow water. They take off a fast run into undulating flight and catch insects in the air. The cup-shape grassy nest is usually made in a hollow in a steep bank. The 2 or 3 times broods of 5 or 6 eggs and incubated for 2 weeks.	
	Hirundo	kustica	Barn swallow	Egypt, Middle East	Open cultivated country with building, near water	20cm	The barn swallow is absent only from very high altitudes and some oceanic island. They feed on insects, which are caught on the wings or plucked from surface of water. The female lays a clutch of 4 to 5 eggs and incubates them for about 15 days. Broth parents feed the nestling, which can fly at about 3 weeks after.	Protected
	Luscinios	megarhynchos	Persian nightingale	Europe, Africa, Middle East, China	Woodland, hedgerows	16cm	The nightingale sings from down to dusk or even to midnight, and its melodious song is the most characteristics feature. The breeding season begins in May, the female builds a nest of leaves on or close to the ground, amid vegetation.	Protected
	Erithacus	rubecula	European robbin					

Table 9.2.2.17 List of Birds Species in the Almut Basin

Taxonomical Hierarchy			Common name	Range	Habitat	Size	Characters	CITES/JU CN Categories	
Family	Genus	Species							
Columbidae				Order Columbiformes this order includes 2 living family - sand grouse and the pigeons and the new extinct dodo family. Columbidae: Pigeon Family: The only family in this order contains 310 sp species of pigeon and dove found in most part of the world except the Atlantic and some oceanic islands. The great variety occurs in Asia and Australia, where there are extremely beautiful species. The name 'pigeon' is generally used to describe in large bird in family, while 'dove' is applied smaller forms, but rock dove is another species. Pigeons and doves vary in size from birds about the size of a sparrow to a few almost as large as turkey. Most have dense soft plumage, rounded and compact bodies, and relatively small heads. Many pigeons and doves spend much of their lives in and around trees, eating seeds, fruit, buds and other plant materials. Pigeons and doves are strong fliers with good homing abilities.					
	Columba	livia	Rock dove/pigeon	Countries bordering Mediterranean, Europe, India and Sri Lanka	Sea and cliffs, fields	33-36cm	This species is the ancestor of all the domestic pigeons, including the homing pigeon, and of the feral pigeons found in town almost worldwide. Rock doves generally move in pairs and small groups, although large flocks are quite frequent. They feed on open ground, mainly on seeds, especially cultivated grains, but also on grasses, snails and other mollusks. The nest is flimsily made of twigs and grass on a shelter ledge or in a hole in a cliff, in a building or occasionally in a tree. Two eggs laid, which incubate for about 18 to 18 days.		
		oenas	Stok dove						
Columbidae	Columba	polumbus	Rock dove/pigeon	Countries bordering Mediterranean, Europe, India and Sri Lanka	Sea and cliffs; fields	33-36cm	This is ancestor of all the domestic pigeons, including the homing pigeon and of the feral pigeons found in town almost worldwide.		
	Streptopelia	turtur	European turtle	Ireland, Britain, Europe, India, Sri Lanka introduced in Middle East, China, Japan	Town, village, arid scrubland	32cm	This species has enormously expanded its range over recent years by adopting to live in close associated with human in both towns and countryside. The scanty twiggy nest is made in a tree or bush or on a ledge of the building, and female lays 2 eggs which are incubated for about 14 to 16 days.		
		senegalensis	Laughing dove (migrately)	Europe, Africa, Asia	Forest, woodland, moors	33cm	The male cuckoo's song, the origin of its common name, pilots arrival of spring, when flies north to breed in Europe and Asia. A slim, long tail bird, it leads a solitary bird outside the breeding season and haunts trees hedges and thickets, where eats large insects, particularly hairy caterpillars. Female lays a single egg, each in a different egg until		
Cuculidae	Cuculus	canorus	Common cuckoo	Europe, Middle East, Asia	Open country, farmland and small woods	15-71cm	This order contains 143 species of cuckoos in 6 families Cuculidae (Old World and rears her young cuckoos), Centropodidae (coucals), Coccyzidae (American cuckoos), Opisthocomidae (hoatzin), Crotaphagidae (anis cuckoos), and Neomorphidae (roadrunners and ground cuckoos). They range between 15 to 71cm long, and most are slender bodied, with long tail and short legs. The female of many species in the family lay their eggs in the nest of another species which then incubates. In some species this habit of nest parasitism is now highly developed, and cuckoos eggs resemble those of the host species.		
Sturnidae (Starling and Mockingbird Family)				This family of 148 species divides into tribes; (1) the starling and (2) the mockingbird. Apart from species introduced into other location by humans, all 114 species occur in the Old World with greatest diversity of Asia. Starling are medium size songbirds with a sturdy appearance and active habits. Many starlings live in open country and feed on the ground. They feed on almost everything, but largely on insects, larvae, earthworm, slugs, snails and centipedes, among other invertebrates, including fruit, grain, berries and seeds.					
Sturnidae	Sturnus	vulgaris	Common starling (migrate)	Europe, Asia; introduced almost worldwide	Cultivated land	22cm	This species is one of the most familiar birds in city area and roost in large numbers on the building. Starling are adaptable birds and take to a wide variety of habitats, although deciduous woodland and built-up areas preferred in the breeding season. They feed on insects, larvae, earthworm, slugs, snails and centipedes, among other invertebrates, including fruit, grain, berries and seeds. Starlings breed in colonies and in separates in pairs. The nest is usually built in a hole in a tree or building or among rocks, and is made of stems, leaves and other plant materials. The female lays 4 to 9 eggs, which both parents incubate for 12 or 13 days. Northern populations migrate in winter.		

Table 9.2.2.18 List of Birds Species in the Almut Basin






Taxonomical Hierarchy			Common name	Range	Habitat	Size	Characters	CITES/IUCN Categories
Family	Genus	Species						
Passerinae: Sparrow Subfamily				Sparrow and relative s are found Africa and Eurasia to Indonesia; some species have been introduces other parts of the World. Sparrows are generally gregarious and roost, feed and breed together. Most of 36 species are ground feeders found in open habitats, though there are some woodlands habitats species.				
	Passer	hispaniolensis	Spanish sparrow					
		montanus	European tree					
Anatidae	Anas	platyrhynchos	Mallard (Ducks)	Throughout northern hemisphere	Almost anywhere near water	41-61cm	The mallard is a typical dabbling duck with feeding tail-up in shallow water. The female lays her 8 to 10 eggs in a nest on the ground. The mallard duck is the ancestor of all domestic ducks except for muscovies.	
								
Coraciidae	Coracias	garrulus	European Roller (migrate)	Breed in Europe, N. Africa, S.W. Asia Winter in E. & S. Africa, Middle East	Forest, woodland, open country	30ccm	Order: Coraciiformes There are 9 families in this order- rollers, ground rollers, cuckoo-roller, motmots, bee-eaters and three families of kingfisher. These birds generally have large bill in proportion to their body size and bright plumage. Roller family is most of 12 species live in Africa and from Europe to Australia. Their common name originates from their tumbling acrobatic courtship displays. Robast, gregarious bird, European rollers like to perch above the ground ( telephone wires are particularly favored spots) in order to watch for prey such as insects, small lizards, frogs and birds. they dart out to seize the pray and return to the perch due to feed. The nest is made in an existing hole in a tree, wall or bank. Both parents incubate the clutch of between 4 to 7 eggs for a total of 18 to 19 days. and also share the care of young.	
								
Corvinae: Crow, Bird parasise, Currwong and Oriole subfamily				The 297 families of this subfamily make up 4 tribes. The 117 of crows, and magpies are successful, intelligent and adaptable birds. They occur worldwide, apart from the polar regions. All species are large with powerful and hooked bill. The jays are most brightly colored and crows are mainly block.				
	Corvus	corax	Common raven/Rock (migrate)	Europe, Middle east China and East Asia	Open country and farmland with of tree or woods	45cm	The glossy black raven distinguished by patch of bare skin on its face in front of eyes and shaggy. Loose feathers on its figures. It feeds brain and earthworms, which it obtains by driving its bill into the earth. Insects and invertebrates, small mammals, young birds, eggs, nuts and fruit are also included in its diet. Colonies nest at the top of tall tree, each pairs making a nest of sticks and twigs. The male feeds female while she incubates the 3 to 5 eggs for 16 to 18 days. Northern birds migrate south in winter.	
								
	Pica	pica	Common magpie	Europe to N. Africa , Asia to Himalayas, S.E. Asia, Alaska	Open country with tree, Woodland edge, grassland	44-57cm	This magpie has black and white plumage and a long tail. They have habit to collect something bights in the nest and warble well. Insects, snakes, slugs and spiders are main foods, but grain, small animals, and carrion may also be taken. The large and domed nest is made in the tree of bush by a pair of parents. the male feeds the female while she incubates the 5 to 8 eggs for 17 to 18 days	
								
	Pyrrhocorax	pyrrhocorax	Red billed chough	Scandinavia, Britain, Mediterranean regions,				
Phasianidae				Order: Galliformes are typical gamebirds. Their are three families in the order (1) Pheasants, (2) Guineafowl and (3) New World quails. Many members of this family have been successfully introduced outside their native range. Some are well known as gamebirds, hunted for sport and eaten by human.				
	Ammoperdix	briseogularis	Partridge					

Table 9.2.2.19 List of Birds Species in the Almut Basin

Taxonomical Hierarchy			Common name	Range	Habitat	Size	Characters	CITES/IUCN Categories
Family	Genus	Species						
Phasianidae	Coturnix	coturnix	Common quail	Europe, Asia, Lake Bickal; winter Mediterranean coast	Grassland, farmland	18cm	One of the smallest birds in the pheasant family, the quail is a neat, rounded bird with a weakbill and legs.	
								
	Perdix	perdix	Common Partridge					
<b>Rallidae: Rail Family</b>				There are 142 species of rail, crane, wood rail, gallinule and coot in this distinctive, major family. They are grounded living birds, often found in or around water and marshy areas, and are well adapted for life in dense vegetation. Typical species are small to medium size birds 14-50cm long with moderately long legs and toes and short rounded wings.				
Rallidae	Fulica	atra	Eurasian coot (reference; American coot)	World wide	Swamps, marshes, ponds, slow river with cover on banks	30cm	Coots are aquatic feeders and dive or surfact to bottom in search of a variety of underwater plant and animal foods. (For reference shows American coot)	
Sittidae	Sitta	tephranota	Eastern rock					
	Sittene	mager						
<b>Strigidae</b>				The 161 species of typical owl occur the world over, except some oceanic islands. They are soft-feathered, short tail birds, with big head and enormous eyes set in a circular facial disc. Most owls hunt at night and all feed entirely on animals, namely insects, invertebrates, birds and medium size mammals such as rabbits. They have exceptionally keen eyesight and excellent hearing.				
	Strix	aluco	Tawny owl	Britain, Europe, N. Africa, W & C to Korea	Woods, gardens, parks, urban areas	38cm	One of the most common European owls, it is distinguished from the long-eared and short eared owls by its lack of ear tufts and its dark eyes. It is strictly nocturnal, roosting in the tree during the day and hunting rodents, birds and insects at night. Breeding start in late March. The tawny owls nest in a hole in a tree or occasionally on the ground or an old nest another species. Usually 2 to 4 eggs laid and female incubates the clutch for 28 to 30 days	
<b>Syruridae</b>				Sparrows and relatives are found in Africa and Eurasia to Indonesia; some species introduced into other parts of the world. Most of 36 species are ground feeder found in open habitats, though there are some wood land species.				
	Patronia	petronia	Rock sparrow	N. Africa, S.W. Europe, Balkans and C. Asia to N. China	Stony mountain slopes, ruined buildings and semi desert	14cm	Although they are not relationship with humans as the house sparrow, but it often lives near villages and dwellings. It is a gregarious bird and moves in flocks, searching for seeds, insects and berries. The nest is made a crevice in a rock, wall or building or sometimes in a tree or a rodent's burrow. The female lays a clutch of 4 to 8 eggs .	
	Patronia	brachyactyla	Spanish sparrow					
<b>Upupidae</b>				The members of this order all have long, slightly down curved beaks used for probing the ground and crevices for insects and other small animals. There are 3 families Upupidae (hoopoe), Phoeniculidae (wood hoopoes) and Rhinopomastidae (scimitar-bills)				
	Pryocopus	marritius						
	Upupa	epops	Hoopoe	Europe, N. Africa, Asia	Open country with tree, forest edge, gardens, orchards	28cm	The hoopoe has pinkish to cinnamon body plumage, boldly barred wings and tails and a huge crest, which is usually held flat. It walks and run swiftly, probing the ground for worms, insects and invertebrates. The female incubates a clutch of 5 to 8 eggs for 16 to 19 days in a hole in a tree, wall or building.	
<b>Motacillidae Family</b>				The family of long claws, pipits and wagtail live in all over the world except for the extreme north and small oceanic islands. Most of the 65 species are characterized by a long tail, which they wag up and down. All forms are essentially ground -living birds with strong claw and slender body, among the wagtails have an elongated appearance.				

Source: Lar Consultant

Reference

- 1) The Encyclopedia of Animals, The Simon & Schuster Editions Rockefeller Center (1998), ISBN 0-684-85237-3
- 2) Fauna of Iran, Eskandar Firouz, Iran University Press, (2000)
- 3) Golestan National Park, Department of the Environment (DOE), (1999)

Table 9.2.2.32 List of Reptile Species in the Almut Basin

Taxonomical Hierarchy			Common name	Range	Habitat	Size	Habitats Area	CITES/IU CN Categorie
Family	Genus	Species						
Colubridae				These small to medium sized slender snakes have blunt heads and short tails. The 16 species of burrowing aspms are found in Africa and Middle East. They are secretive snakes, living in leaf litter and burrowing into the soil.				
	Colube	najadum		Africa to Middle East	Dry, sandy region	30-250cm		
	Coluber	jagularis	Burrowing aspms snakes	Europe, Asia	Dry, vegetative area, hillsides, woodland edge, gardens	1.9m	A slender, elongate snake, the dark -green whips snake has a rounded snout, large eyes and a long tapering tail. Usually active in the daytime, it is a ground -dwelling snake can well climb on rock and bushes. It locates its prey by sight and usually feed on lizards, frogs, mammals, and other snakes. Male compete fiercely for mates in the breeding season. The female lays 5 to 15 eggs among rock or in cracks in the soil. the young hatch in 6 to 8 weeks.	
		ravergieri	Versicolored wood snake					
	Eirenis	collaris	Ringfinger dwarf					
		meda	Striped dwarf snake					
		punctatolineata	Armenian dwarf snake					
	Elaphe	quatuoilineata						
		Q.sauromates	Four-lined red snake					
	Malpolon	monsepeulanti	Montpellier					
	Natrix	tesselata	Grass snake	Europe, Africa, Asia, Mediterranean countries	Damp meadows, marshes, river banks	up to 1.2m, occasionally up to 2m	This species swims well and spends some time in water, and one of the most common species and widespread Europe and Western Asia.	
	Psammophis	schokari	Sand snake					
Boidae	Eryx	jaculus familiaris	Javelin Sand Boa					
Typhlopidae	Typhlops	vermicularis	Vermiform blind snake					
Viperidae				This family has 2 subfamilies, namely viperinae (true vipers) and crotalinae (pit vipers). There are about 50 species of viper, found all over the Old World except for Australia and Madagascar. Most species are short, sturdy snakes which live on the ground. A few species have become arboreal and have prehensile tail. Vipers hide and ambush and strike their prey. The most important of these are the organs which give the snakes their common name-sensory pits on each side of the head in front of and just below the eyes which can detect heat and are used by these nocturnal snakes to locate warm-blooded prey.				
	Vipera	albicornuta	Zigzagmountain er	Europe, Middle East	Arid, sandy regions	50cm		
		ursini	Transcaucasian eriwanensis					
		lebetina						
		agkistrodon halys	Asatic-pit viper	Caspioan Sea area, Russia, China	Steep semi arid, Coniferous forest	76cm	One of the few pit vipers found in the Old World, the manushi is found as far as 51° north. it is mainly nocturnal snake and emerges at sunset in order to hunt its prey, which consists mostly of small mammals. This viper is also called the sand viper because of its preference for sandy areas. It avoids woodland but is found in clearings, paths and often in vineyards. Its movement generally are slow, but it can strike rapidly with it fangs to kill small mammals, birds and other snakes. Most vipers hibernate throughout the winter.	
Testudinidae	Testudo	horsfieldii	Spur-thighed Tortoise	N Africa, Europe, Middle East	Meadow, cultivated land, woodlands	15cm	This species tortoise has a moderately domed shell and a small spur in the thigh region of each front limb. They court in spring and the eggs usually 2 Or 3 in a clutch are laid in May to June and generally hatch in September to October, although this varies with the local climate. Thousand of these tortoises are collected and exported as a pets, many of which die because of the unsuitable climate and condition of their new homes.	UV

Source: Lar Consultant  
Reference

1) The Encyclopedia of Animals, The Simon & Schuster Editions Rockefeller Center (1998), ISBN 0-684-85237-3

2) Fauna of Iran, Eskandar Firouz, Iran University Press, (2000)

3) Golestan National Park, Department of the Environment (DOE), (1999)







**Table 9.4.3.5 Shortage of Water at the Manjil Dam**  
**(w/o Taleghan/Almout Water Diversion, Demand=3,644.1MCM, Effective Storage=1,133MCM)**

Year	Mehr	Aban	Azar	Dey	Bah.	Esf.	Far.	Ord.	Kho.	Tir	Mor.	Sha.	Annum
69-70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	158.90	404.04	74.13	637.07
70-71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	249.98	92.61	342.59
71-72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
72-73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	238.19	64.75	302.94
73-74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	272.48	0.00	272.48
74-75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	311.59	80.02	391.61
75-76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.64	62.08	66.72
76-77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	231.78	100.38	332.16
77-78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	120.32	429.49	107.34	657.15
78-79	14.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	225.07	95.56	335.47
79-80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	76.28	418.24	101.72	596.24
80-81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
81-82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	55.12	428.95	100.91	584.98
82-83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
83-84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	223.19	93.15	316.34
84-85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	153.81	87.79	241.60
85-86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210.08	90.20	300.28
86-87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	35.03	408.86	544.00
87-88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
88-89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	524.76	432.17	84.57	1,041.50
89-90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	207.10	414.22	91.27	712.59
90-91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	424.59	426.01	96.36	946.96
91-92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
92-93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	123.55	63.15	186.70
93-94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	104.80	41.18	145.98
94-95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95-96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	93.56	72.79	166.35
96-97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	499.33	437.39	110.10	1,046.82
97-98	3.18	0.00	0.00	0.00	-0.00	0.00	0.00	0.00	0.00	30.21	403.77	96.89	534.05
Average	0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	73.50	229.17	65.76	369.05
Maximum	14.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	524.76	437.39	110.10	1,046.82
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00





Table 9.4.3.6(5) Manjil Dam Operation (w/o Taleghan/Almost Diversion Plan, DM=3,644, IMCM, ES=1,133MCM) (Unit: MCM)

Year	Month	Manjil Inflow	Taleghan Dam			Almost Runoff	Manjil Dam Operation			Shortage
			Inflow	Outflow	Storage		Inflow	Outflow	Spillage	
85-86	Mehr	88.91	0	0	41.41	0	47.50	0.00	0.00	
	Aban	159.93	0	0	155.54	0	45.80	0.00	0.00	
	Azar	231.72	0	0	342.86	0	44.40	0.00	0.00	
	Dey	231.72	0	0	529.68	0	44.90	0.00	0.00	
	Bah.	245.46	0	0	660.04	0	115.10	0.00	0.00	
	Esf.	324.98	0	0	760.42	0	224.60	0.00	0.00	
	Far.	914.94	0	0	1,133.00	0	292.70	249.66	0.00	
	Ord.	1,049.13	0	0	1,133.00	0	734.00	315.13	0.00	
	Kho.	474.34	0	0	803.84	0	803.50	0.00	0.00	
	Tir	116.24	0	0	212.18	0	707.90	0.00	0.00	
	Mor.	32.94	0	0	0.00	0	245.12	0.00	210.08	
	Sha.	38.30	0	0	0.00	0	38.30	0.00	90.20	
	totl	3,908.61	0	0	5,771.97	0	3,343.82	564.79	300.28	
	86-87	Mehr	75.43	0	0	27.93	0	47.50	0.00	0.00
		Aban	179.37	0	0	161.50	0	45.80	0.00	0.00
		Azar	253.50	0	0	370.60	0	44.40	0.00	0.00
Dey		230.43	0	0	556.13	0	44.90	0.00	0.00	
Bah.		255.31	0	0	696.34	0	115.10	0.00	0.00	
Esf.		475.81	0	0	947.55	0	224.60	0.00	0.00	
Far.		835.66	0	0	1,133.00	0	292.70	357.51	0.00	
Ord.		907.98	0	0	1,133.00	0	734.00	173.98	0.00	
Kho.		267.04	0	0	596.54	0	803.50	0.00	0.00	
Tir		76.33	0	0	0.00	0	672.87	0.00	35.03	
Mor.		46.34	0	0	0.00	0	46.34	0.00	408.86	
Sha.		28.39	0	0	0.00	0	28.39	0.00	100.11	
totl		3,631.59	0	0	5,622.59	0	3,100.10	531.49	544.00	
87-88		Mehr	116.38	0	0	68.88	0	47.50	0.00	0.00
		Aban	569.46	0	0	592.54	0	45.80	0.00	0.00
		Azar	249.09	0	0	797.23	0	44.40	0.00	0.00
	Dey	386.47	0	0	1,133.00	0	44.90	5.80	0.00	
	Bah.	421.98	0	0	1,133.00	0	115.10	306.88	0.00	
	Esf.	1,162.35	0	0	1,133.00	0	224.60	937.75	0.00	
	Far.	1,919.88	0	0	1,133.00	0	292.70	1,627.18	0.00	
	Ord.	2,015.76	0	0	1,133.00	0	734.00	1,281.76	0.00	
	Kho.	569.16	0	0	898.66	0	803.50	0.00	0.00	
	Tir	259.54	0	0	450.30	0	707.90	0.00	0.00	
	Mor.	106.06	0	0	101.16	0	455.20	0.00	0.00	
	Sha.	87.32	0	0	59.98	0	128.50	0.00	0.00	
	totl	7,863.45	0	0	8,633.75	0	3,644.10	4,159.37	0.00	
	88-89	Mehr	130.90	0	0	143.38	0	47.50	0.00	0.00
		Aban	200.62	0	0	298.20	0	45.80	0.00	0.00
		Azar	214.36	0	0	468.16	0	44.40	0.00	0.00
Dey		203.21	0	0	626.47	0	44.90	0.00	0.00	
Bah.		202.18	0	0	713.55	0	115.10	0.00	0.00	
Esf.		642.69	0	0	1,131.64	0	224.60	0.00	0.00	
Far.		1,077.52	0	0	1,133.00	0	292.70	783.46	0.00	
Ord.		421.85	0	0	820.85	0	734.00	0.00	0.00	
Kho.		125.88	0	0	143.23	0	803.50	0.00	0.00	
Tir		39.91	0	0	0.00	0	183.14	0.00	524.76	
Mor.		23.03	0	0	0.00	0	23.03	0.00	432.17	
Sha.		43.93	0	0	0.00	0	43.93	0.00	84.57	
totl		3,326.08	0	0	5,478.48	0	2,602.60	783.46	1,041.50	

Table 9.4.3.6(6) Manjil Dam Operation (w/o Taleghan/Almost Diversion Plan, DM=3,644, IMCM, ES=1,133MCM) (Unit: MCM)

Year	Month	Manjil Inflow	Taleghan Dam			Almost Runoff	Manjil Dam Operation			Shortage
			Inflow	Outflow	Storage		Inflow	Outflow	Spillage	
89-90	Mehr	51.84	0	0	4.34	0	47.50	0.00	0.00	
	Aban	136.60	0	0	95.14	0	45.80	0.00	0.00	
	Azar	174.70	0	0	225.44	0	44.40	0.00	0.00	
	Dey	180.40	0	0	360.94	0	44.90	0.00	0.00	
	Bah.	202.44	0	0	448.28	0	115.10	0.00	0.00	
	Esf.	456.52	0	0	680.20	0	224.60	0.00	0.00	
	Far.	878.25	0	0	1,133.00	0	292.70	132.75	0.00	
	Ord.	678.17	0	0	1,077.17	0	734.00	0.00	0.00	
	Kho.	165.53	0	0	439.20	0	803.50	0.00	0.00	
	Tir	61.60	0	0	0.00	0	500.80	0.00	207.10	
	Mor.	40.98	0	0	0.00	0	40.98	0.00	414.22	
	Sha.	37.23	0	0	0.00	0	37.23	0.00	91.27	
	totl	3,064.26	0	0	4,463.71	0	2,931.51	132.75	712.59	
	90-91	Mehr	55.21	0	0	7.71	0	47.50	0.00	0.00
		Aban	114.31	0	0	76.22	0	45.80	0.00	0.00
		Azar	157.85	0	0	189.67	0	44.40	0.00	0.00
Dey		172.63	0	0	317.40	0	44.90	0.00	0.00	
Bah.		206.06	0	0	408.36	0	115.10	0.00	0.00	
Esf.		351.79	0	0	535.55	0	224.60	0.00	0.00	
Far.		1,318.04	0	0	1,133.00	0	292.70	427.89	0.00	
Ord.		519.88	0	0	918.88	0	734.00	0.00	0.00	
Kho.		114.90	0	0	230.28	0	803.50	0.00	0.00	
Tir		53.03	0	0	0.00	0	283.31	0.00	424.59	
Mor.		29.19	0	0	0.00	0	29.19	0.00	426.01	
Sha.		32.14	0	0	0.00	0	32.14	0.00	96.36	
totl		3,125.03	0	0	3,817.07	0	2,697.14	427.89	946.96	
91-92		Mehr	61.95	0	0	14.45	0	47.50	0.00	0.00
		Aban	116.12	0	0	84.77	0	45.80	0.00	0.00
		Azar	213.84	0	0	254.21	0	44.40	0.00	0.00
	Dey	172.37	0	0	381.68	0	44.90	0.00	0.00	
	Bah.	206.06	0	0	472.64	0	115.10	0.00	0.00	
	Esf.	323.72	0	0	571.76	0	224.60	0.00	0.00	
	Far.	1,481.96	0	0	1,133.00	0	292.70	628.02	0.00	
	Ord.	2,341.73	0	0	1,133.00	0	734.00	1,607.73	0.00	
	Kho.	1,274.65	0	0	1,133.00	0	803.50	471.15	0.00	
	Tir	375.24	0	0	800.34	0	707.90	0.00	0.00	
	Mor.	88.39	0	0	433.53	0	455.20	0.00	0.00	
	Sha.	82.76	0	0	387.79	0	128.50	0.00	0.00	
	totl	6,738.79	0	0	6,800.17	0	3,644.10	2,706.90	0.00	
	92-93	Mehr	122.34	0	0	462.63	0	47.50	0.00	0.00
		Aban	170.29	0	0	587.12	0	45.80	0.00	0.00
		Azar	239.76	0	0	782.48	0	44.40	0.00	0.00
Dey		241.06	0	0	978.64	0	44.90	0.00	0.00	
Bah.		273.20	0	0	1,133.00	0	115.10	3.74	0.00	
Esf.		484.58	0	0	1,133.00	0	224.60	259.98	0.00	
Far.		1,121.71	0	0	1,133.00	0	292.70	829.01	0.00	
Ord.		1,129.48	0	0	1,133.00	0	734.00	395.48	0.00	
Kho.		526.04	0	0	855.54	0	803.50	0.00	0.00	
Tir		124.55	0	0	272.19	0	707.90	0.00	0.00	
Mor.		59.46	0	0	0.00	0	331.65	0.00	123.55	
Sha.		65.35	0	0	0.00	0	65.35	0.00	63.15	
totl		4,557.82	0	0	8,470.60	0	3,457.40	1,488.21	186.70	

Table 9.4.3.6(7) Manjil Dam Operation (w/o Taleghan/Almout Diversion Plan, DM=3,644,1MCM, ES=1,133MCM) (Unit: MCM)

Year	Month	Manjil Inflow	Taleghan Dam			Almout			Manjil Dam Operation			Shortage
			Inflow	Outflow	Runoff	Inflow	Runoff	Storage	Outflow	Spillage		
94-95	Mehr	82.68	0	0	0	0	0	35.18	47.50	0.00	0.00	0.00
	Aban	365.47	0	0	0	0	0	354.85	45.80	0.00	0.00	0.00
	Azar	593.31	0	0	0	0	0	903.76	44.40	0.00	0.00	0.00
	Dey	827.37	0	0	0	0	0	1,133.00	44.90	553.23	0.00	0.00
	Bah.	600.31	0	0	0	0	0	1,133.00	115.10	485.21	0.00	0.00
	Esf.	960.90	0	0	0	0	0	1,133.00	224.60	736.30	0.00	0.00
	Far.	1,803.90	0	0	0	0	0	1,133.00	292.70	1,511.20	0.00	0.00
	Ord.	1,382.32	0	0	0	0	0	1,133.00	734.00	648.32	0.00	0.00
	Kho.	479.17	0	0	0	0	0	808.67	803.50	0.00	0.00	0.00
	Tir	193.65	0	0	0	0	0	294.42	707.90	0.00	0.00	0.00
	Mor.	55.98	0	0	0	0	0	0.00	350.40	0.00	104.80	0.00
	Sha.	87.32	0	0	0	0	0	0.00	87.32	0.00	41.18	0.00
totl	7,432.38	0	0	0	0	0	8,061.88	3,498.12	3,934.26	145.98	0.00	
95-96	Mehr	157.08	0	0	0	0	0	109.58	47.50	0.00	0.00	0.00
	Aban	533.17	0	0	0	0	0	596.95	45.80	0.00	0.00	0.00
	Azar	840.33	0	0	0	0	0	1,133.00	44.40	259.88	0.00	0.00
	Dey	407.98	0	0	0	0	0	1,133.00	44.90	363.08	0.00	0.00
	Bah.	450.49	0	0	0	0	0	1,133.00	115.10	335.39	0.00	0.00
	Esf.	574.78	0	0	0	0	0	1,133.00	224.60	350.18	0.00	0.00
	Far.	981.90	0	0	0	0	0	1,133.00	292.70	689.20	0.00	0.00
	Ord.	1,369.73	0	0	0	0	0	1,133.00	734.00	635.73	0.00	0.00
	Kho.	769.77	0	0	0	0	0	1,099.27	803.50	0.00	0.00	0.00
	Tir	228.74	0	0	0	0	0	620.11	707.90	0.00	0.00	0.00
	Mor.	63.75	0	0	0	0	0	228.66	455.20	0.00	0.00	0.00
	Sha.	53.84	0	0	0	0	0	154.00	128.50	0.00	0.00	0.00
totl	6,431.56	0	0	0	0	0	9,606.57	3,644.10	2,633.46	0.00	0.00	
96-97	Mehr	114.05	0	0	0	0	0	220.55	47.50	0.00	0.00	0.00
	Aban	182.22	0	0	0	0	0	356.97	45.80	0.00	0.00	0.00
	Azar	193.62	0	0	0	0	0	506.19	44.40	0.00	0.00	0.00
	Dey	211.77	0	0	0	0	0	673.06	44.90	0.00	0.00	0.00
	Bah.	273.20	0	0	0	0	0	831.16	115.10	0.00	0.00	0.00
	Esf.	368.07	0	0	0	0	0	974.63	224.60	0.00	0.00	0.00
	Far.	1,577.58	0	0	0	0	0	1,133.00	292.70	1,126.51	0.00	0.00
	Ord.	1,620.43	0	0	0	0	0	1,133.00	734.00	886.43	0.00	0.00
	Kho.	505.15	0	0	0	0	0	834.65	803.50	0.00	0.00	0.00
	Tir	143.56	0	0	0	0	0	270.31	707.90	0.00	0.00	0.00
	Mor.	91.33	0	0	0	0	0	0.00	361.64	0.00	93.56	0.00
	Sha.	55.71	0	0	0	0	0	0.00	55.71	0.00	72.79	0.00
totl	5,336.69	0	0	0	0	0	6,933.52	3,477.75	2,012.94	166.35	0.00	
97-98	Mehr	112.49	0	0	0	0	0	64.99	47.50	0.00	0.00	0.00
	Aban	194.40	0	0	0	0	0	213.59	45.80	0.00	0.00	0.00
	Azar	211.77	0	0	0	0	0	380.96	44.40	0.00	0.00	0.00
	Dey	207.62	0	0	0	0	0	543.68	44.90	0.00	0.00	0.00
	Bah.	211.25	0	0	0	0	0	639.83	115.10	0.00	0.00	0.00
	Esf.	242.29	0	0	0	0	0	657.52	224.60	0.00	0.00	0.00
	Far.	501.40	0	0	0	0	0	866.22	292.70	0.00	0.00	0.00
	Ord.	560.32	0	0	0	0	0	692.54	734.00	0.00	0.00	0.00
	Kho.	229.54	0	0	0	0	0	118.58	803.50	0.00	0.00	0.00
	Tir	89.99	0	0	0	0	0	0.00	208.57	0.00	499.33	0.00
	Mor.	17.81	0	0	0	0	0	0.00	17.81	0.00	437.39	0.00
	Sha.	18.40	0	0	0	0	0	0.00	18.40	0.00	110.10	0.00
totl	2,597.28	0	0	0	0	0	4,177.91	2,597.28	0.00	1,046.82	0.00	

Table 9.4.3.6(8) Manjil Dam Operation (w/o Taleghan/Almout Diversion Plan, DM=3,644,1MCM, ES=1,133MCM) (Unit: MCM)

Year	Month	Manjil Inflow	Taleghan Dam			Almout			Manjil Dam Operation			Shortage
			Inflow	Outflow	Runoff	Inflow	Runoff	Storage	Outflow	Spillage		
97-98	Mehr	44.32	0	0	0	0	0	0	44.32	0.00	3.18	0.00
	Aban	153.96	0	0	0	0	0	108.16	45.80	0.00	0.00	0.00
	Azar	151.37	0	0	0	0	0	215.13	44.40	0.00	0.00	0.00
	Dey	151.63	0	0	0	0	0	321.86	44.90	0.00	0.00	0.00
	Bah.	232.50	0	0	0	0	0	439.26	115.10	0.00	0.00	0.00
	Esf.	556.74	0	0	0	0	0	771.40	224.60	0.00	0.00	0.00
	Far.	1,626.86	0	0	0	0	0	1,133.00	292.70	972.56	0.00	0.00
	Ord.	916.82	0	0	0	0	0	1,133.00	734.00	182.82	0.00	0.00
	Kho.	275.34	0	0	0	0	0	604.84	803.50	0.00	0.00	0.00
	Tir	72.85	0	0	0	0	0	0.00	677.69	0.00	30.21	0.00
	Mor.	51.43	0	0	0	0	0	0.00	51.43	0.00	403.77	0.00
	Sha.	31.61	0	0	0	0	0	0.00	31.61	0.00	96.89	0.00
totl	4,265.43	0	0	0	0	0	4,726.65	3,110.05	1,155.38	534.05	0.00	







**Table 9.4.4.5 Shortage of Water at the Manjil Dam  
(with Taleghan/Almout Water Diversion, Demand=3,644.1MCM, Effective Storage=1,133MCM)**

Year	Mehr	Aban	Azar	Dey	Bah.	Esf.	Far.	Ord.	Kho.	Tir	Mor	Sha.	Annum
69-70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	371.17	427.45	90.42	889.04
70-71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	341.77	420.11	109.91	871.79
71-72	9.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.72
72-73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	33.73	416.19	87.27	537.19
73-74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	89.45	365.58	13.53	468.56
74-75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	111.96	444.06	98.09	654.11
75-76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	275.57	83.80	359.37
76-77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	210.96	437.94	112.70	761.60
77-78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	404.36	441.43	122.28	968.07
78-79	21.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	46.78	430.47	108.25	607.40
79-80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	258.15	436.49	111.45	806.09
80-81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	51.10	93.30	144.40
81-82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	134.64	438.82	110.57	684.03
82-83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	78.03	78.03
83-84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	81.38	435.35	106.73	623.46
84-85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	308.97	101.09	410.06
85-86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	369.44	95.67	465.11
86-87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	249.95	435.10	112.50	797.55
87-88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37.66	60.45	98.11
88-89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	638.46	444.87	92.81	1,176.14
89-90	3.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	402.35	427.81	101.31	935.39
90-91	2.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	528.94	436.42	104.21	1,071.58
91-92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
92-93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	287.18	74.68	361.86
93-94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	273.11	65.62	338.73
94-95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
95-96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	204.36	84.42	288.78
96-97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	142.48	648.66	448.07	117.92	1,357.13
97-98	10.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	155.83	420.43	107.21	694.16
Average	1.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.91	162.36	314.28	84.28	567.50
Maximum	21.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	142.48	648.66	448.07	122.28	1,357.13
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



