International Journal of Earth, Energy and Environmental Sciences
ISSN: 2517-942X
Vol:5, No:12, 2011

Ghazal Ozon River and Preserving the Existent Aquatics While Constructing the Siazakh Dam

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***Abstract*—**The main purpose of the dam is to control the surface streams and rivers across the country. Dam construction and formation of river and big water reservoirs and resources happen in the glen is a big incident which would change its surrounding area considerably. In fact, constructing a dam the glen width is close and fishes don't migrate from upstream to downstream and ultimately it would led to their death. To resolve this, it seems necessity to create a passage for fishes during the construction of dam. It is provided establishing a set of stepped pools overlooking each other as a *fish way* or *fish ladder* a proper pathway for moving fishes. In this article we first examine the surrounding environment and then Ghazal Ozon River and preserving the aquatics.

***Keywords*—**Ghazal Ozon River**,** fish way, Dam construction**,** fish

I. Introduction

In general for the water plans especially multipurpose plan have considerable economic interests such as drink and industrial water supplies, water supply for agriculture and flood control for communities. Besides these interests, there are other applications such as tourism development (in the area), water sports (fishing, rowing and swimming), breeding of fishes could provide the plan more and better adaptability to the environment in addition to increase in economic interests of the plan for the community [5].

Because dams tend to be constructed to enhanced socio-economic development activities, they tend to attract people and industry. Subsequently, river ecosystems containing dams must contend with secondary environmental pressures such as increases in pollution as well as increased exploitation and extraction of their resources (primarily water, fish , and substrates), that are independent from and in addition to the direct influences of dams and reservoirs on the physical and biological dimensions of the system[3].

For fish passages constructed at dams to have significant effects on the conservation of migratory species, they must provide good connections to the former habitats by allowing the free transit of individuals both upstream and downstream[2].At a minimum, they should allow the offspring, resulting from spawning in the upper stretches, to reach the lower stretches. This aspect has been systematically ignored in the planning of these constructions and in analyzing proposals for passage mechanisms as a tool to mitigate impacts [2].

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The information obtained from the literature attest that fish ladders are primarily one-way routes: the lentic environment forms an impassible barrier for eggs and larvae during their dispersal to downstream stretches, and strongly limits the possibility that the migrants which ascend upstream to the spawning grounds above the reservoir, ever return as far downstream as the dam. The reduced incidence of fish moving downwards in the ladder and of larvae of migratory species near the dam perfectly attests to the one-way character of these movements. These findings indicate that a review of the decision- making processes regarding the construction of fish passages and a rigorous evaluation of what happens to the fish that pass through the ladders now in operation, are urgent matters. Errors in making decisions to construct fish passages must be recognized and suspension of their functioning must be considered a possibility. Consideration should be given to improving the downstream movement of eggs, larvae juveniles, and post-spawning adults. Fish passages must be constructed only after complete knowledge of the effects of the position of the dam in relation to the home ranges of the local species is available. The ascent of fish should be controlled primarily for genetic rather than for demographic reasons. The low permeability of the connections provided by these management tools can drastically increase the environmental impact which they were invented to mitigate [2].

Siazakh Dam in Kordestan Province located 7 km far from the city of Divadarehand 95 km from Sanandaj. It has located at the 47° 27′ longitude and 35°20′ latitude. The level of dam place in the riverbed is about 1750 above sea level and has been formed by volcanic, sedimentary and slate, tuff and andesite formation and non-karstic resistant limes.

II. The State Of Environment

A. Natural Environment

The natural environment surrounding the Siazakh Dam is much like the natural environment across the Kordestan Province.

B. The Mammals

The mammals living around the Siazakh Dam are similar with the animals living across other regions of the Kordestan Province and frequently they are wolf, jackal, fox, hog, rabbit, wildcat, hedgehog, bear, goat, buck and ewe, ferret, marten [1]

C. The Birds

There are 80 bird species living in the city of Divandareh which some of them are migrants and some are locals.

D. Reptiles and Amphibian

The known reptiles and amphibian around the Siazakh Dam are mostly snakes, lizard, turtle, frog . . .

E. Trees and Shrubs

The most important trees and shrubs in the area are willows, pine, elm, daphne, wild pear, hawthorn, aspic, acacia, tamarisk, bitter almond . . .

F. The fishes in Ghazal Ozon River

According to the studies by the environment Preservation Association (EPA), Ghazal Ozon River is a good place for living, spawning and breeding of aquatics especially fishes. The most important aquatic species in the river are:

(1) Orinary black fish (Capoeta capoeta); (2) Capoeta barroist; (3) bride fish; (4) barbus mursa; (5) barbus barbulus; (6) siluridae; (7) Alburnus charusini; (8) Loggerhead; (9) Water snake; (10) Crabs

III. The Environmental Effects

The environmental effects predicted on three axes

1) Physical environment
2) Natural environment
3) Manmade environment

A. The Physical Environment

1) Floods

The Siazakh Dam, as flood control regarded one of its purposes, plays an important role in this matter. Flood control will have two positive and negative aspects:

Positive aspect: preserving the downstream areas, communities and ecosystems especially wild habits.

Negative aspect: preventing the passage of the small floods which with flowing in spring season there would be some places for resting, hatching and sanctuaries for birds. Of course, with the lake's forming there would be a safe and wide range of area for the birds which over time welcome migrant birds.

2) Quality Of Water

It is clear that reservoir inundation and change in river's hydraulic regime from current to inertia would imply some change in the quality of water. Long retention time is one of the changes which sediments all of solids in water from long and heavy rainfall. Also the hydraulic and physiographic features of reservoir make changes in heat layering of reservoir and heat changes in different depths of water affects the quality of water from reservoir outlet. Also it is expected that the TDS concentration inlet to the reservoir is changed and increased (TDS is considered one of qualitative indices for quality of water concerning the salt concentration in water by liter).

3) Climate

It is expected that the reservoir affects the climate of area and its rotation around the place.

B. Natural Environment

As the most of lands are located at highlands and there is no special habit and rare animals around the lake, there has not been any special effect on rare animals and their habits. As the reservoir is formed a new place is provided for migrant birds to rest, hatching and their sanctuary. It also makes changes in river ecosystem to lake ecosystem but it is not considered a special effect as there has not been any reports on extinction or economically important species.

Poor vegetation of area caused no worry about reservoir inundation and its effect on flora of area (vegetation of area). Of course once the reservoir is inundated some problems arise such as growth of aquatic plants at shallow areas which can be solved with the reservoir management.

C. Manmade Environment

Despite negative effects of Siazakh Dam on manmade environment, the positive effects are considerable and the negative effects are negligible.

The positive effects are

1) Preventing destructive floods
2) Economic growth from agriculture development
3) New job opportunities
4) Creating new ways of access and accessibility to farms
5) Providing economic stability and assured income for the people

IV. Ghazal Ozon River

Ghazal Ozon River is one of the longest River in Iran originated from Kordestan Mountains and joining Shahrood sheds to the Caspian Sea. Ghazal Ozon is a Turkish name consisting two parts of 'Ghazal' meaning red and 'Ozon' meaning float. Its exact meaning is not clear and it has been thought it means a river with gold flowing in it or a red floating river or a river with floating salmon fishes. Its historical name in Greek ancient books is Amarrus (Amard people). In Islamic resources it has been called the White River and in the mid-centuries it was known as White River but later some part of it from Manjil to the Caspian Sea is called White River. The Iranian Academy has picked the White River for the whole stream but now from the headstream to the Manjil Valley is called Ghazal Ozon. The river is originated from forty springs of Kordestan Province and Saral Divandareh area and passing Groos and joining by numerous rivers it enters Khamse Plian and joining Zanjanrood and Abdarchai rivers and extended to the south Gilan Province in the reservoir of Sefidrood Dam River where it joins the big Sharood River and forms the Sefidrood River [6].

V. Fish Way

A fish during hatching seasons swim upstream by instinct to reach the point in which it releases the eggs. It has been done though the years by instinct and it is the only survival and reproduction way from the fish. If the fish encounters a problem in his way upstream tries to overcome it. Therefore the fish dies if it fails to pass. Dam and diversions bring the most problems for the migrant fishes [5]. Establishing the dam the whole width of river section is closed and practically the way is closed for the fish. It kills the fishes at downstream and it is considered a serious threat to the fish resources and it will cause extinction of some species. To resolve this problem in dam design, it is built a structure called the *Fish Way*. The hydraulic condition of current in this should be designed so that the fish could goes upward. The fish way should be designed in accordance with the amount of fish migration [4]. Otherwise it delays the migration process and kills many fishes. Bell and Harris introduced the first way in 1913 to resolve the problems of falling big stones to the Frazer River in British Columbia. In this incident a dam established at the river width which blocked the passage of fishes and killed millions of them. Afterwards they designed a fish way. Of course in Iran it has been limited to the diversion dams and is only regarded a mere option which should be considered in design and it doesn't considered practically afterwards. It hasn't ever been considered in the reservoir dams and in most dams such as Siazakh Dam the connection between the upstream and downstream has been cut during the construction process and it prevents the process of fish migration. Therefore if the water surface increases provisionally due to a sudden flood and group of fishes directed to the downstream, they can't return to the upstream and the directed fishes stay provisionally at a stagnant point of the river and ultimately waste. So these matters need special attention. As Ghazal Ozon River has variety of fish and many of them are rare thus it seems required to take necessary actions to preserve the fishes. Fig 1 shows a provisional solution for preserving the downstream-directed fishes thanks to collaboration with the local EPA and spending some dollars. In this method the downstream- directed fishes were moved to the upstream lake via the diversion tunnel using fishing webs.

Fig. 1 Transferring fishes to the upstream by web in the outlet of diversion tunnel by the Dept of Fishery

In most dams built in the developed countries once the fish way is designed and implemented the passage of fish through the canal is controlled and compared with the post-design options during the operation time and it is modified if there is any problem occurs in the process of fish migration of fishes and again the passage of fish is controlled to ensure at least the process of fish migration is prevented. Unfortunately at the present time the environmental issues get less attention in the developed countries and in dams only water supply is mostly considered. Major concern throughout Asia is that movements of migratory fishes along river courses will be blocked by dams. Additionally, dewatering of stream channel immediately downstream from dams can be a serious problem [8].so the environmental issues, aquatic life preservation and the physical pollutions as well should be considered completely.

References

[1] Ahsani N., A "Review on Divandareh Environment", internal journal, 22-28, 2002
[2] Agostinho, A., et al, " Fish ladder of Lajeado Dam: migrations on one-way routes?", Neotropical Ichthyology, 5(2):121-130,2007
[3] Jackson, D., " The influence of Dams on River Fisheries". World commission o dams, prepared for thematic review II.1: Dams, ecosystem functions and environmental restoration
[4] Ghoravi M. and Izad Doostda,r, A., "Brief studies on environment at Karkhe Water Power Station", 2000.
[5] Mahmodi Kordestani, S,. and Shafaei Bajestan, M,., "Introducing Daniel's Fish Way and Its Comparison with the Fish Gateway", 2000.
[6] Ghorbani, M,. "Some information based on Iran figure, tourism and travel guide", organization of Geographical and Cosmological Cartography, Tehran, 1995.