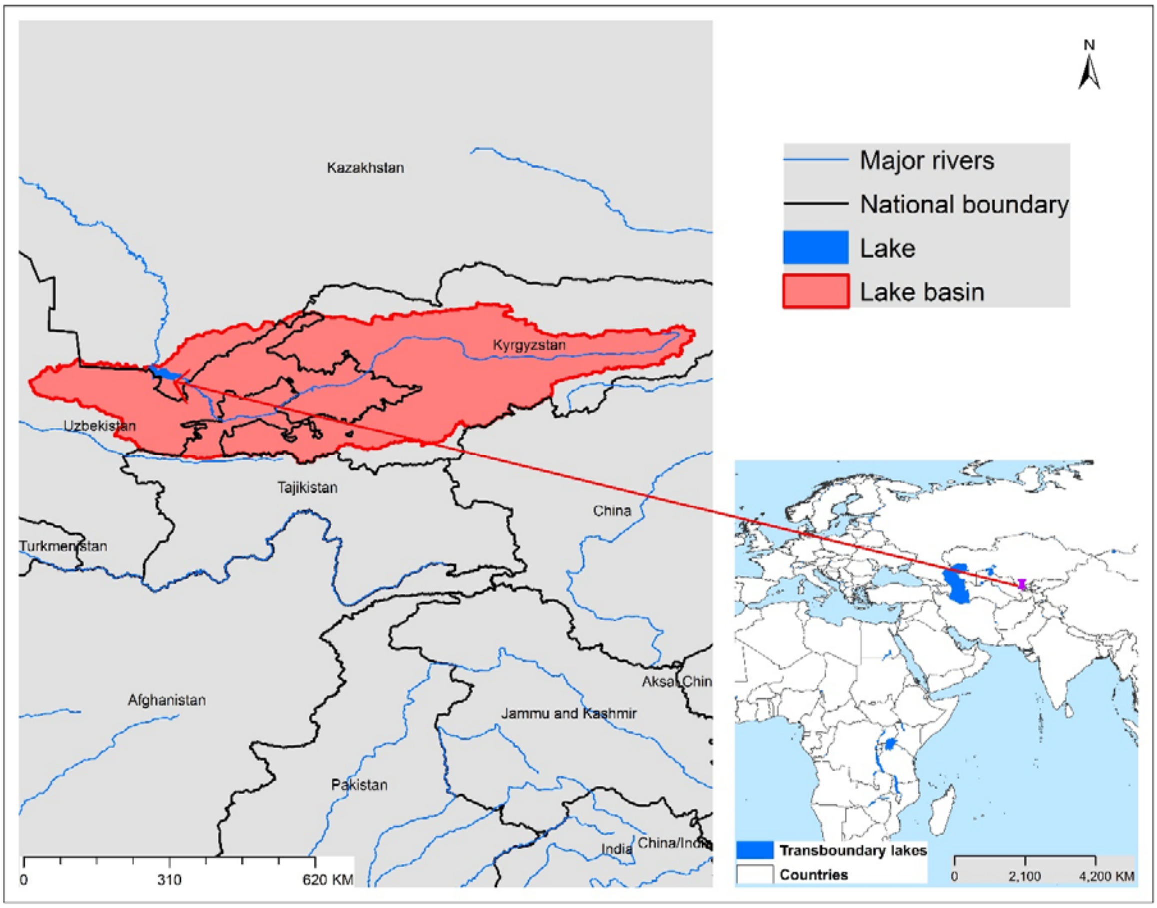
Lake Profile Brief

This is based on the results of Multiple Lake Threat Assessment and its Scenario Analysis. Refer to the Technical Report for details.

Lake Shardara/Kara-kul — Geographic Information

There is little information available regarding Lake Shardara/Kara-kul, which lies in the Kazakhstan – Uzbekistan region in Central Asia. Its situation is closely related to the Aral Sea in regard to transboundary water management efforts in the part of Central Asia. Thus, assessment of GEF-catalyzed management intervention possibilities also will relate to the outcomes of any international discussions related to the Aral Sea, if there should be a follow-up regarding the latter.



TWAP Regional Designation	Eastern & Central Asia		**Lake Basin Population (2010)**	20,281,740
River Basin	Syr Darya		**Lake Basin Population Density (2010; # km^{-2})**	66.5
Riparian Countries	Kazakhstan, Uzbekistan		**Average Basin Precipitation (mm yr^{-1})**	438.7
Basin Area (km^2)	197,325		**Shoreline Length (km)**	301.6
Lake Area (km^2)	746.1		**Human Development Index (HDI)**	0.65
Lake Area:Lake Basin Ratio	0.004		**International Treaties/Agreements Identifying Lake**	No

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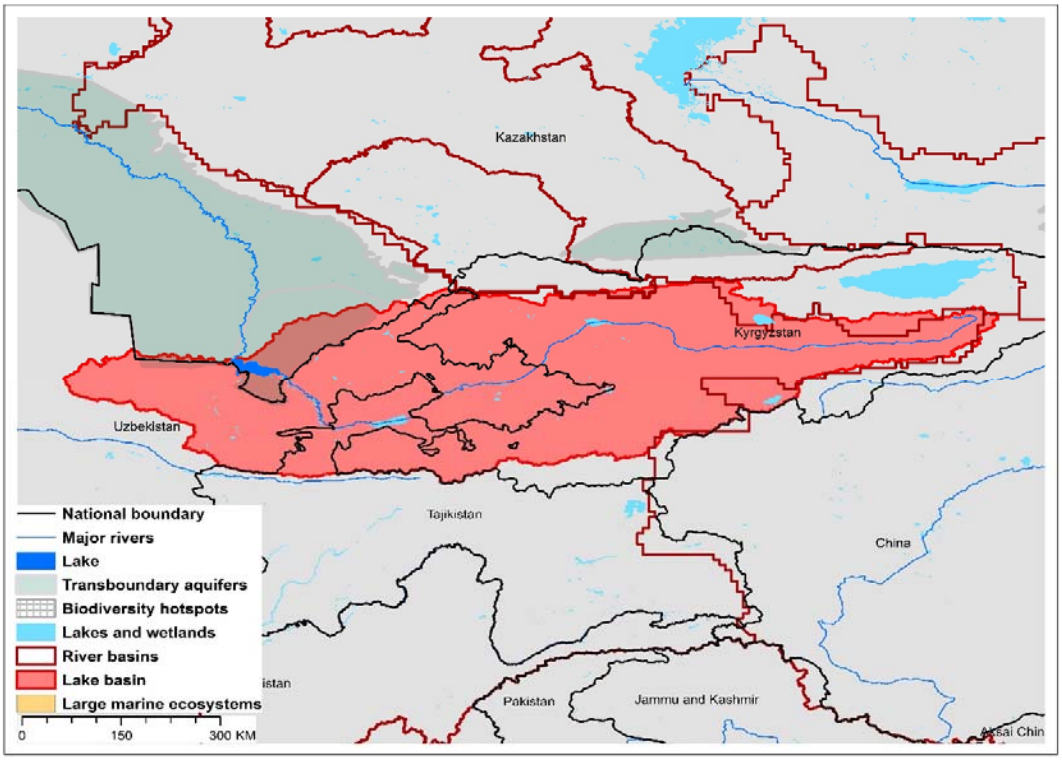
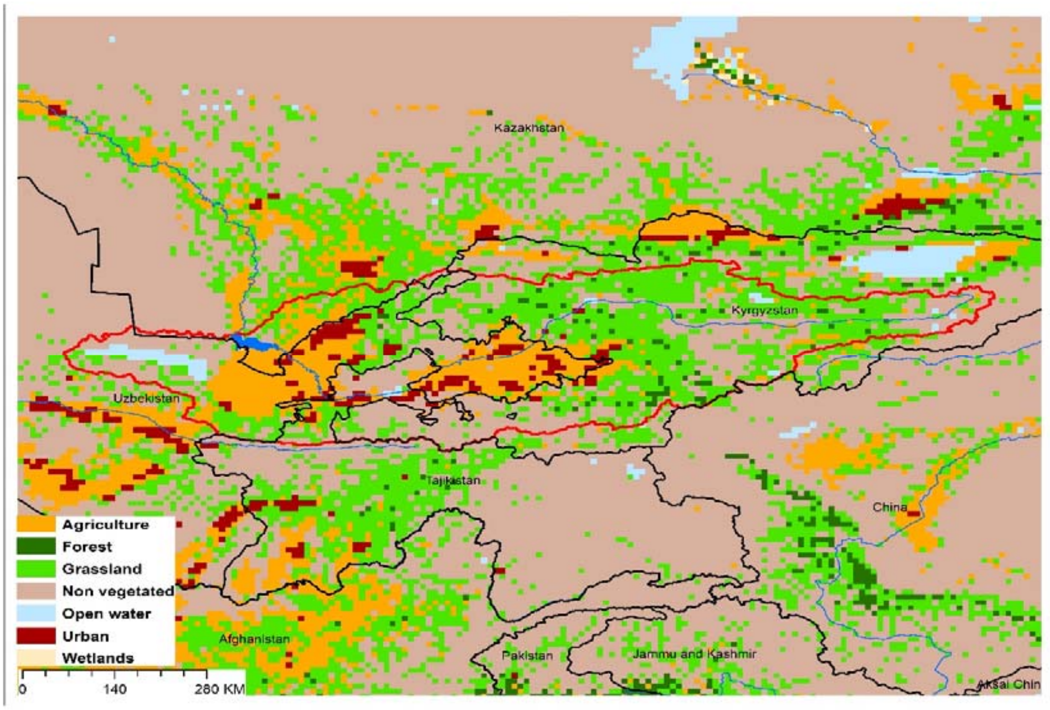
Lake Shardara/Kara-kul Basin Characteristics



(a) Lake Shardara/Kara-kul basin and associated transboundary water systems



(b) Lake Shardara/Kara-kul basin land use

Lake Shardara/Kara-kul Threat Ranking

A serious lack of global-scale uniform data on the TWAP transboundary in-lake conditions required their potential threat risks be estimated on the basis of the characteristics of their drainage basins, rather than in-lake conditions. Using basin characteristics to rank transboundary lake threats precludes consideration of the unique features that can buffer their in-lake responses to basin-derived disturbances, including an integrating nature for all inputs, long water retention times, and complex, non-linear response dynamics.

The lake threat ranks were calculated with a spreadsheet-based interactive scenario analysis program, incorporating data and information about the nature and magnitude of their basin-derived stresses, and their possible impacts on the sustainability of their ecosystem services. These descriptive data for Lake Shardara/Kara-kul and the other transboundary lakes included lake and basin areas, population numbers and densities, areal extent of basin stressors on the lake, data grid size, and other components considered important from the perspective of the user of the data results. The scenario analysis program also provides a means to define the appropriate context and preconditions for interpreting the ranking results.

The Lake Shardara/Kara-kul threat ranks are expressed in terms of the Adjusted Human Water Security (Adj-HWS) threats, Reverse Biodiversity (RvBD) threats, and the Human Development Index (HDI) score, as well as combinations of these indices. However, it is emphasized that, being based on specific characteristics and assumptions regarding Lake Shardara/Kara-kul and its basin characteristics, the calculated threat scores represent only one possible set of lake threat rankings. Defining the appropriate context and preconditions for interpreting the lake rankings remains an important responsibility of those using the threat ranking results, including lake managers and decision-makers.

Table 1. Lake Shardara/Kara-kul Relative Threat Ranks, Based on Adjusted Human Water Security (Adj-HWS) and Reverse Biodiversity Threats, and Human Development Index (HDI) Score

(Estimated risks: red – highest; orange – moderately high; yellow – medium; green – moderately low; blue – low)

Adjusted Human Water Security (Adj-HWS) Threat Score	Relative Adj-HWS Threat Rank		Reverse Biodiversity (RvBD) Threat Score	Relative RvBD Threat Rank		Human Development Index (HDI) Score	Relative HDI Rank
0.86	20		0.54	35		0.65	28

It is emphasized that the Lake Shardara/Kara-kul rankings above are discussed here within the context of the management and decision-making process, rather than as strict numerical ranks. Based on its geographic, population and socioeconomic assumptions used in the scenario analysis program, the calculated Adj-HWS score for Lake Shardara/Kara-kul indicates a moderately high threat rank compared to other priority transboundary lakes.

The Reverse Biodiversity (RvBD) for Lake Shardara/Kara-kul, which is meant to describe its biodiversity sensitivity to basin-derived degradation, places the lake in a moderately low threat rank, compared to the other transboundary lakes. Management interventions directed to improving the biodiversity status must be viewed with caution, however, since we lack sufficient knowledge and experience to accurately predict the ultimate impacts of biodiversity manipulations and preservation efforts. Further, the RvBD scores indicate the relative sensitivity of a lake basin to human activities, and high threat scores *per se* do not necessarily justify management interventions. Such interventions may actually increase biodiversity degradation, noting that many developed countries have already fundamentally degraded their biodiversity because of economic development activities. Thus, activities undertaken to address the Adj-HWS threats may actually degrade the biodiversity status and resources, even if the health and socioeconomic conditions of the lake basin stakeholders are improved as a result of better conditions, thereby increasing stakeholder resource consumption.

The relative Human Development Index (HDI) places the Lake Shardara/Kara-kul basin in a medium threat rank in regard to its health, educational and economic conditions.

Table 2. Lake Shardara/Kara-kul Threat Ranks, Based on Multiple Ranking Criteria

(Scores for Adj-HWS, RvBD and HDI ranks are presented in Table 1; the ranks may differ in some cases because of rounding of tied threat scores; Estimated risks: red – highest; orange – moderately high; yellow – medium; green – moderately low; blue – low)

Adj-HWS Rank	HDI Rank	RvBD Rank		Sum Adj-HWS + RvBD	Relative Threat Rank		Sum Adj-HWS + HDI	Relative Threat Rank		Sum Adj-HWS + RvBD + HDI	Overall Threat Rank
22	28	35		57	21		50	27		85	29

When multiple ranking criteria are considered together in the threat rank calculations, the Adj-HWS and HDI scores considered together place Lake Shardara/Kara-kul in the upper half of the threat ranks. The relative threat is similar when the Adj-HWS and RvBD threats are considered together. Considering all three ranking criteria together, Lake Shardara/Kara-kul exhibits a medium threat ranking.

Further, a series of parametric sensitivity analyses of the ranking results also was performed to determine the effects of changing the importance of specific criteria on the relative transboundary lake rankings. This analysis involved increasing or decreasing the weights applied to the threat ranks derived from multiple ranking criteria to reassess the relative impacts of the weight combinations on the threat ranks. For example, in determining the sensitivity of the Adjusted Human Water Security (Adj-HWS) and Biodiversity (BD) ranking criteria, the threat rank associated with the first was assumed to be of complete (100%) importance (i.e., rank weight of 1.0), while the other was assumed to be of no (0%) importance (i.e., rank weight of 0.0). The relative importance of the two ranking criteria was then successively changed, with weight combinations of 0.9 and 0.1, 0.8 and 0.2, etc., until the first ranking criteria (Adj-HWS) was assumed to be of no importance (rank weight of 0.0) and the second (BD) was of complete importance (rank weight of 1.0). In the case of Lake Shardara/Kara-kul, the 0.5 and 0.5 weight combinations for three cases of parametric analysis for Lake Shardara/Kara-kul resulted in respective threat rankings of 5th, 5th and 5th, respectively, among the total of 8 Asian transboundary lakes in the TWAP study (see Technical Report, Section 4.3.3, pp44-50).

In essence, therefore, identifying potential management intervention needs for Lake Shardara/Kara-kul must be considered on the basis of both educated judgement and accurate representations of its situation. A fundamental question to be addressed, therefore, is how can one decide that a given management intervention will produce the greatest benefit(s) for the greatest number of people in the Lake Shardara/Kara-kul basin? Accurate answers to such questions for Lake Shardara/Kara-kul, and other transboundary lakes, will require a case-by-case assessment approach that considers the specific lake situation and context, the anticipated improvements from specific management interventions, and its interactions with water systems to which the lake is linked.