Capacity: a priority issue for biodiversity conservation in Central Asia

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Abstract Central Asia possesses some of the least known but most spectacular and intact wild landscapes of any region globally, hosting diverse communities of species adapted to temperate and arid grassland ecosystems. Growing recognition of these values and the threats to them posed by rapid economic development are likely to generate increased support and investment for conservation action. We undertook two studies during 2022–2025 to better understand regional conservation priorities and conservation capacity, during which we conducted 117 meetings and online calls with representatives of government, international development, donor and civil society organizations engaged with conservation in the region. Eighty-three per cent of the 55 participants questioned about conservation priorities considered low levels of technical, managerial and leadership capacity to be a significant constraint on the effectiveness of conservation action. We highlight various options for addressing these gaps in skills and knowledge and urge governments and international institutions supporting conservation in Central Asia to make capacity building a priority for their intervention and investment in the region.

Keywords Biodiversity, capacity, environmental protection, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan

The supplementary material for this article is available at doi.org/10.1017/S0030605326103615

Central Asia, comprising Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, is a vast (c. 4 million km²) and ecologically diverse region whose variations in biogeography, topography and climate have created a broad range of ecosystems that also provide important environmental services. These ecosystems support a diverse biota, including 7,000 species of higher plants and > 900 vertebrate species (Chemonics International, 2001; Volis, 2023). These include charismatic species such as the snow leopard *Panthera uncia*, the migratory saiga antelope *Saiga tatarica*, and a guild of mountain ungulates comprising the argali *Ovis ammon*, urial *Ovis vignei*, markhor *Capra falconeri* and Siberian ibex *Capra sibirica*. Lying in the path of three major flyways for migratory birds, the region is particularly important for the conservation of numerous species of breeding water and steppe birds. According to the IUCN Red List (IUCN, 2025), 166 species across the region are globally threatened, with 54% of these categorized as either Endangered or Critically Endangered.

With the exception of efforts to manage water flow to the Aral Sea and several projects benefiting certain charismatic species, Central Asia has until recently received less attention than other regions of conservation importance. Consequently, fewer international donors or conservation organizations have invested significant resources or funding in the region (CEPF, 2017; European Commission, 2019; TRAFFIC, 2024; Neumann et al., 2025).

Reasons for this lesser interest include the limited species richness relative to other more biodiverse areas of Asia, and decades of isolation experienced as part of the Soviet Union and under authoritarian regimes that emerged after independence in 1991. Furthermore, the economic crisis that followed led these new Central Asian states to adopt austerity measures that cut expenditure on what were considered less essential services, including education, research and environmental protection (OSCE, 2003). Yet there are indications this is changing, and interest in preserving Central Asia's biodiversity is moving up national and international agendas. In 2019 the Critical Ecosystem Partnership Fund initiated investment in its Mountains of Central Asia Hotspot (CEPF, 2017), and in the same year the European Commission published a report guiding its strategic approach to biodiversity conservation in the region (European Commission, 2019). In 2024 Uzbekistan hosted CoP 14 of the Convention on the Conservation of Migratory Species of Wild Animals and in 2025 CoP 20 of CITES. This shift has been driven largely by the acknowledgement among regional governments and international donors that protecting biodiversity and natural resources should be a key element in strategies to combat the threat of climate change, address poverty and health concerns, and achieve the required transition to a green economy (European Commission, 2019; OECD, 2022; International Climate Initiative, 2025; Walid & Kang, 2025).

During May 2022–January 2023, the Wildlife Conservation Society conducted a scoping exercise with a view to possible engagement in Central Asia. Among other topics, the study examined regional conservation priorities, as well as how they were being addressed and by whom. In addition, during September 2024–March 2025, the Wildlife

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Received 30 June 2025 UTC. Revision requested 4 November 2025 UTC. Accepted 11 May 2026 UTC.

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Conservation Society was commissioned by the Global Environment Facility to examine conservation capacity needs in the region, with a particular focus on the utility and viability of a proposed master's course in nature conservation at the Central Asian Green University in Tashkent, Uzbekistan. We conducted these studies, and the main findings relating to conservation capacity in Central Asia form the basis for this article. We define conservation capacity here as the skills and knowledge required to design, resource and implement effective interventions to conserve biodiversity. The two studies followed a similar methodology: a desk-based review of documents and websites to update our knowledge and understanding of the Central Asian context, including current ecological, political and socio-economic conditions, followed by semi-structured interviews to identify regional conservation priorities (first study) and conservation capacity needs (second study; Supplementary Materials 1 & 2). All participants had experience implementing or supporting conservation in the region and came from a range of Central Asian and international institutions, including government agencies (16 participants), NGOs and civil society organizations (36), academia (7), and donor and development agencies (15). Because of time and resource constraints, local community organizations were underrepresented (1; Supplementary Table 1). A total of 117 interviews were held across the two studies, with a 97% positive response rate to our approaches. The majority were conducted with individuals, but others took the form of group discussions, with a maximum of six people. Fifty per cent of 102 participants in the first study were Central Asian and 60% of 60 in the second. Interviews were in person whenever possible (55%), and were otherwise conducted remotely (45%).

The conservation priorities identified by interviewees fell into three main categories: species and habitats requiring action, direct threats to biodiversity, and constraints on effective conservation. Although responses often reflected the particular interests of the individual or their organization, they included a number of useful insights regarding pressing conservation issues. Low standards of capacity at every level, and throughout the region, were consistently referenced as a constraint on effective conservation by 83% of the 55 participants questioned about broader conservation priorities. Much of this capacity gap results from the fact that none of the post-Soviet Central Asian states have developed comprehensive conservation education and training programmes. This has resulted in a shortage of instructors familiar with conservation concepts, and of practitioners able to formulate, implement or advise on effective strategies and approaches. One protected area specialist claimed there were no more than 'five to seven valuable conservationists' in his country. Or as a national NGO director from a different country put it, there are 'too few [qualified] people for too much work'. There are competent graduates in zoology, botany and other related sciences but, as highlighted by 54% of the 52 interviewees across both studies who raised the issue of capacity shortfalls, few are trained to use contemporary methodologies and apply their knowledge and skills to the practice of conservation. Nor have sufficient numbers of conservation professionals received formal training in social science disciplines, which are an important component of effective conservation practice (Bennett et al., 2017). Those who have, according to an international conservation academic with long-standing experience in Central Asia, often received it from teachers in the region who have an 'old-fashioned Soviet way of thinking: they don't think about behaviour change, about participation and engagement'. Forty-four per cent of the 52 participants with whom we discussed capacity shortfalls also believed that the training received by many protected area staff is inadequate, particularly in important aspects of their role such as wildlife monitoring and law enforcement, although it appears the situation varies greatly between locations. Although acknowledging there are notable exceptions in each country, 52% of the interviewees who referred to conservation capacity expressed concern about the general ineffectiveness of civil society organizations across the region, with several specifying shortcomings in finance, operations and business management, in addition to conventional technical skills. The result is an abundance of poorly targeted, planned and executed conservation interventions and an over-reliance on foreign technical assistance.

Strengthening conservation capacity in Central Asia requires the creation of a pipeline of competent professionals and educators equipped with theoretical and practical grounding. Several overseas universities offer appropriate courses, but 86% of the 14 interviewees who expressed an opinion on where courses should be located spoke positively about creating opportunities for such training within Central Asia, some citing as reasons the lower costs incurred by students and the higher likelihood they would return to practice conservation in the region. The latter point was underlined by a senior manager from an international NGO active in the region, who stressed the importance of developing a model that does not draw capacity out of the country. The University of Central Asia delivers bachelor-level programmes in environmental science at its campuses in Kyrgyzstan and Tajikistan, but our research did not identify any postgraduate university courses focused specifically on biodiversity conservation in the region. However, the newly established Central Asian Green University in Tashkent, Uzbekistan, is planning to launch a master's programme in nature conservation in 2026. Conscious of regional needs and with aspirations to become Central Asia's academic hub for the environment and conservation sector, courses will be interdisciplinary in design, adapted to the regional context, and taught in English. An alternative approach would be for universities to incorporate conservation-related modules into other

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degree courses spanning the biological sciences but also extending to law, economics and the social sciences, so as to expand knowledge of conservation across a range of relevant professions. However, it is questionable whether there are sufficient qualified academics or potential students at present to assure the viability of more than a few such courses across the region. Whichever approach is adopted, the limited knowledge of conservation among potential students will require providing them with a basic grounding in ecology, threats to biodiversity and conservation principles. This could be augmented if there were opportunities for experiencing conservation work and its human dimensions first-hand (see also Johnson et al., 2015), such as through participation in conservation projects.

University training will not address all capacity gaps, nor is it likely that it will yield discernible results until a significant number of graduates are well established in their conservation careers. Other approaches are required to deliver more immediate improvements in the knowledge, capacity and leadership skills of early- and mid-career scientists and managers from both government and civil society who are already active in conservation but may be unable to participate in full-time education programmes. A number of international initiatives currently exist, including the Germany-based Klaus Toepfer Fellowship Programme, which provides training through a mixture of residential and online modules; the Conservation Leadership Programme (supported by BirdLife International, Fauna & Flora and the Wildlife Conservation Society), which provides training and mentoring as part of its support to conservation projects globally; and the Critical Ecosystem Partnership Fund, which funds projects in its Mountains of Central Asia hotspot, almost all of which have a capacity-building component. International development agencies and NGOs, often in collaboration with national institutions, also deliver a range of practical and relevant field training courses on technical aspects of conservation such as research methodologies and law enforcement techniques. Through long-term collaborative endeavours, international organizations have also helped several NGOs and civil society organizations across the region to enhance their access to resources and strengthen their institutional capabilities. Examples of such partnerships include successful initiatives to conserve flagship species such as the saiga antelope and snow leopard. Notwithstanding this, however, much capacity building in the region remains too small in scale or too ad hoc to have sufficiently wide-ranging, consistent and lasting impact.

All the above approaches could have greater impact if the value of biodiversity was taught from an earlier stage in the education process. This would generate greater awareness of the importance of nature conservation throughout society and better prepare students and practitioners for the study and implementation of conservation. This could be achieved by strengthening the knowledge and skills of schoolteachers, for example by offering them targeted online courses or in-person workshops on biodiversity conservation, and by supporting field trips that reinforce the connection with nature and promote behaviour favourable to the environment.

There are indications that the role of biodiversity conservation in addressing challenges such as climate change, poverty, health concerns and unsustainable development is increasingly recognized in Central Asia, together with a growing resolve to take meaningful action. But the value of such action is likely to be significantly undermined by the prevailing shortfall in conservation capacity. We believe therefore that prompt and concerted efforts to establish comprehensive, durable and effective structures for educating and training both existing and future conservation professionals is a priority for all regional governments and their international supporters.

Author contributions Study design, data collection and analysis, writing: both authors.

Acknowledgements We thank all those, from government and civil society organizations in Central Asia and the international donor and conservation communities, who shared their knowledge and experiences with us. A full list of the organizations to which they were affiliated is provided in Supplementary Table 1. We thank Christopher Holmes and Jonathan Slaght (Wildlife Conservation Society) and John Robinson (Wildlife Conservation Society and Global Environment Facility), for their advice during the formulation and conduct of our studies. Eugenia Bragina (Wildlife Conservation Society) contributed useful information on conservation capacity gaps in Central Asia. This research was based on two separate studies funded by the Wildlife Conservation Society and World Bank – Global Environment Facility, respectively.

Conflicts of interests None.

Ethical standards This research abided by the *Oryx* guidelines on ethical standards. The data that inform this paper were collected as part of two exercises to provide reports for the Wildlife Conservation Society and Global Environment Facility, respectively. The decision to draft this paper was made subsequently, with the full knowledge and approval of Wildlife Conservation Society senior management. All interviewees were made aware of the purpose of the research in advance of and at the beginning of all interviews. To maintain confidentiality, we have not attributed our findings to specific individuals or organizations.

Data availability Data are subject to privacy/ethical restrictions, but are available from the corresponding author upon reasonable request.

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