

**INSTITUTIONAL AND LEGAL MECHANISMS FOR THE PROTECTION OF  
ENDANGERED SPECIES: THE US EXPERIENCE AND PROSPECTS FOR  
IMPLEMENTATION INTO THE LEGISLATION OF THE REPUBLIC OF  
UZBEKISTAN**

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**Abstract**

This article examines the institutional and legal frameworks for protecting endangered species, focusing on modernizing the legislation of the Republic of Uzbekistan through a comparative analysis with the United States' experience. The author identifies a fundamental problem in domestic law enforcement: the predominance of declarative biological statements over strict administrative-legal procedures. Drawing on the US Endangered Species Act (ESA), the study proposes transitioning from "biologized" categories to differentiated legal regimes and rule-making listing processes. Key recommendations include implementing the "critical habitat" concept to provide flexible spatial protection outside traditional reserves and legalizing digital monitoring tools—such as GIS, UAVs, and remote sensing—as official legal evidence. These reforms aim to balance Uzbekistan's economic development with constitutional environmental guarantees, particularly in ecological disaster zones like the Aral Sea region and Ustyurt Plateau.

**Keywords:** Endangered species, environmental legislation, Uzbekistan, US experience, critical habitat, biodiversity conservation, digital monitoring, legal mechanisms, Aral Sea region.

**Introduction**

In the context of increasing global environmental threats, the legal protection of the environment is naturally acquiring the status of a priority vector of state policy in the Republic of Uzbekistan [1, 62]. A qualitatively new conceptual foundation in this field was laid by the new edition of the Constitution of the Republic of Uzbekistan (adopted on April 30, 2023), whose 49th article imperatively enshrined the right of every citizen to a favorable environment and reliable information about its condition [2, 57]. The constitutionalization of environmental rights requires their adequate, mirror-like reflection in sectoral natural resource legislation, which makes it urgent to revise and modernize existing legal mechanisms for protecting biological diversity.

Despite the existence of an extensive regulatory framework, the current state of wildlife objects, especially in ecological disaster zones such as the Aral Sea region [3, 137], dictates an objective necessity for a critical re-evaluation of existing legal constructions. The observed negative trend in the reduction of rare and endangered species populations reveals a fundamental problem in domestic law enforcement: the predominance of declarative norms over direct action mechanisms. Current environmental legislation is often limited to a general statement of the need to protect species, without offering strict, procedural-verified administrative-legal tools

for preventive control, mandatory habitat zoning, and the inevitability of legal liability for causing indirect harm to ecosystems.

In the context of finding effective ways to improve the environmental law of the Republic of Uzbekistan, the experience of the United States of America is of particular scientific and practical interest. The selection of this jurisdiction as a benchmark for comparative legal analysis is conceptually justified. The Endangered Species Act (ESA), adopted by the US Congress in 1973, is recognized in global legal doctrine as one of the most stringent, detailed, and uncompromising regulatory acts in the field of protecting vulnerable flora and fauna.

The long-standing law enforcement practice of the U.S. Fish and Wildlife Service (USFWS) [4, 81] demonstrates a successful benchmark model for the functioning of an institutional-legal mechanism in which the protection of vulnerable species is ensured not by abstract biological postulates, but by strict administrative-legal procedures. The implementation of the most effective elements of the North American model—specifically, advanced legal institutions for monitoring and protecting the environment—has significant potential for transforming the environmental legislation of the Republic of Uzbekistan and ensuring the transition from declarative protection to real, preventive management of biodiversity loss risks.

The fundamental problem of modern environmental and natural resource law is the confusion of scientific (biological) and legal categories. Often, in regulatory acts, concepts characterizing vulnerable species are borrowed from biology without proper legal adaptation. The ambiguity and evaluative nature of such biological categories create declarativeness and their formal use in law, devoid of clear legal consequences, which significantly weakens the mechanism of legal protection [5, 124]. As a result, the norm loses its regulatory rigor, transforming from an imperative prescription into a simple statement of an environmental fact.

In this context, the analysis of the terminological apparatus of the US Endangered Species Act (ESA) is of undoubted scientific interest. The American legislator conceptually divides protected objects into two strict legal categories that represent independent legal regimes:

- "Endangered species" - species threatened with extinction in all or most of their range.[6, 58]
- "Vulnerable" (threatened species) — species that, with a high probability, may pass into the category of endangered in the foreseeable future across the entire range or a significant portion of the range. [6, 58]

The key achievement of the US legal system in overcoming excessive "biologization" is the very mechanism of status assignment—the listing process. The status of a species is not automatically assigned based on the fact of its population decline, but solely through a strict administrative and legal procedure implemented by the Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS). The decision is based on five legally established threat criteria (such as habitat destruction, excessive use, disease, or inadequacy of existing regulatory mechanisms). Thus, the act of including a species in the register is a rule-making act. A biological fact is transformed into a legal fact that automatically generates specific legal relations, varying volumes of restrictions for economic entities, and strict obligations for state bodies.

Comparative legal analysis shows that in the legislation of the Republic of Uzbekistan, specifically in the Law "On the Protection and Use of Wildlife," the conceptual apparatus is

still predominantly descriptive in nature. The application of the generalized term "rare and endangered species of wild animals" in Article 17 of the Law is based on the fact that they are listed in the Red Data Book of the Republic of Uzbekistan [7].

However, the Red Data Book is, by its nature, a scientific-informational collection rather than a purely regulatory one. It is based on a detailed system of threat categories from the International Union for Conservation of Nature (IUCN), such as "Endangered" (EN), "Vulnerable" (VU), and "Near Threatened" (NT) [8, 12]. The problem is that these subtle biological gradations are not adequately reflected in the form of differentiated legal regimes within the text of the Law itself [9, 149]. The absence of a clearly prescribed multi-stage gradation of the legal status of vulnerable species (analogically to the American system) and procedures for their legal recognition deprives state bodies of the opportunity to apply proportional (differentiated) preventive protection measures.

In this regard, the objective necessity of implementing strict legal definitions into domestic legislation has matured. Representatives of legal science must create a unified harmonious model of legal relations, transitioning the protection categories of rare species from the plane of biological description to the plane of administrative-legal regulation.

Enshrining differentiated legal regimes in Article 3 ("Basic Concepts") and Article 17 of the Law of the Republic of Uzbekistan "On the Protection and Use of Wildlife" depending on the officially recognized vulnerability status of the species will allow:

- clearly distinguish between stable "rare" species and species "under threat of total extinction" that require urgent protection measures (such as creating restoration plans and completely prohibiting economic activities in their habitats);
- create a more transparent and effective mechanism for managing biodiversity, eliminating valuation bias and legal loopholes when holding natural resource users legally liable for environmental damage.

In the US environmental law system, the protection of vulnerable species is based not only on a strict prohibition on removing individuals from the natural environment but also on the imperative protection of the spatial basis of their existence. A key institutional tool in this context is the legal concept of "critical habitat" (Critical Habitat), as enshrined in Section 4 of the Endangered Species Act (ESA). This legal regime means that a specific zoned geographical territory (both within the current range and beyond its borders) containing physical or biological features that are absolutely necessary for the preservation, survival, and restoration of the protected species' population is taken under state protection [10, 4-35].

The primary legal force of the Critical Habitat mechanism lies in its extraterritoriality and preventive nature. Based on Section 7 of the ESA Act, this instrument obliges federal agencies to guarantee that economic activities authorized or funded by them will not lead to the "destruction or adverse modification" of the given habitat [11, 763]. Thus, the American legislator implements a comprehensive ecosystem approach: not a scattered set of biological objects, but a unified environment-forming complex is subject to protection.

The projection of this mechanism into the realities of the Republic of Uzbekistan opens up significant reserves for modernizing domestic natural resource legislation. Currently, the spatial protection of the animal world in our country is primarily ensured through the system of

protected natural areas (PNAs) — state reserves, sanctuaries, and national parks. However, the process of establishing classical protected areas, according to legislation, is complex, requires long-term coordination, and typically involves the complete or partial withdrawal of land plots from economic circulation [12, 260]. In practice, rare animals often inhabit or migrate outside existing PAs—on industrial, transport, or forest fund lands—where their legal protection is fragmentary and reduces only to the general requirements of Article 26 of the Law of the Republic of Uzbekistan "On the Protection and Use of Wildlife" regarding the prevention of animal death and the preservation of their migration routes during economic activities.

The introduction of a flexible legal regime for "critical habitats" is becoming particularly relevant for preserving biodiversity in the ecological tragedy zone of the Aral Sea region and the Ustyurt Plateau. These territories, which experience the harshest climatic and anthropogenic pressures, are unique habitats for endemics. A vivid example is the saiga (*Siga tatarica*), whose local populations on the Ustyurt Plateau are on the brink of total extinction (Critically Endangered) due to poaching, harsh climatic conditions, and industrial development of the desert zone [8, 327]. Large-scale projects for geological exploration, hydrocarbon production, and the development of transport infrastructure in these regions inevitably intersect with natural migration routes and breeding grounds for rare species.

Implementing the concept of preventive zoning into the Law of the Republic of Uzbekistan "On the Protection and Use of Wildlife" will allow for the targeted, dynamic protection of populations. Granting a territory the status of "critical habitat" will create a legal mechanism for environmental servitude—enabling the temporary or permanent encumbrance of land plots (regardless of their target category and ownership forms) with special restrictions. This will provide the state with an effective legal lever to block specific types of economic activities that destroy the ecosystem, without the need to go through the complex procedure of creating a full-fledged reserve and seizing land.

Such a differentiated approach is capable of ensuring such a necessary balance between the accelerated economic development of the region and the implementation of the constitutional imperative, according to which the animal world is a national wealth and is subject to state protection, and every citizen of the Republic of Uzbekistan has a guaranteed right to a favorable environment [13, 115].

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Implementing the concept of preventive zoning into the Law of the Republic of Uzbekistan "On the Protection and Use of Wildlife" will allow for the targeted, dynamic protection of populations. Granting the territory the status of "critical habitat" will create a legal mechanism for environmental servitude—enabling the temporary or permanent encumbrance of land plots (regardless of their target category and ownership forms) with special environmental restrictions. This will provide the state with a legal lever to prohibit or strictly regulate specific types of economic activities that destroy the ecosystem, without the need for a complex procedure to expand full-scale protected areas (such as the "Saigachi" integrated landscape sanctuary). Such a differentiated approach is capable of ensuring such a necessary balance between the region's accelerated economic development and the constitutional imperative that the animal world is a national wealth and is subject to state protection.

In conditions of vast spaces and difficult access to the habitats of rare animal species, traditional methods of environmental supervision (visual patrolling, physical control) demonstrate their objective limitations. The modern paradigm of environmental law requires a transition from a reactive model (punishing for the destruction of an individual or environment) to a preventive one (preventing a violation). In this context, the experience of developed countries, particularly

the USA, in integrating digital technologies into the biodiversity protection mechanism deserves deep doctrinal reflection.

Federal environmental agencies are actively implementing Earth remote sensing methods, unmanned aerial vehicles (UAVs), automated camera traps, and spatial modeling technologies into law enforcement practice [14, 10]. The fundamental legal aspect of this model is that spatial data arrays (e.g., satellite recording of illegal intrusion or fragmentation of a "critical habitat") possess the legitimate status of digital evidence. They serve not only as a basis for holding violators strictly accountable but also as an irrefutable legal basis for suspending economic projects that threaten the ecosystem.

The extrapolation of this experience into the legal framework of the Republic of Uzbekistan is of strategic importance for ensuring environmental safety in the Aral Sea region and the Ustyurt Plateau [15, 52]. The vast areas of these arid regions, which are the habitat of unique endemics (such as saigas), make it impossible to conduct effective control solely through the efforts of inspection personnel. An important step in this direction was the consolidation of norms regarding the creation of the Unified Geoinformation Database of the State Monitoring System in bylaws (in particular, in Resolutions of the Cabinet of Ministers of the Republic of Uzbekistan No. 737 and No. 914) [16]. In scientific research on the fauna of Ustyurt, the practice of using automated camera traps is already beginning to be successfully applied.

However, at the level of direct-action legislative acts, digital control mechanisms are still fragmented. In the Law of the Republic of Uzbekistan "On the Protection and Use of Wildlife," there is no imperative prescription regarding the mandatory use of GIS technologies, AI, and UAVs in maintaining the state cadastre and monitoring. There is a significant legal gap regarding the procedural consolidation of remote sensing results as evidence in environmental offense cases.

To improve legislation, it appears scientifically justified to introduce conceptual additions to Article 16 (State Accounting and State Cadastre of Animal World Objects) and Article 21 (Animal World Monitoring) of the aforementioned Law [7]. Granting legal status to digital tools (aerospace monitoring, remote observation) will allow for the formation of an effective preventive environmental supervision mechanism that ensures the inevitability of punishment and minimizes the impact of environmental impact. A comparative legal analysis of institutional mechanisms for protecting endangered animal species in the United States of America and the Republic of Uzbekistan allows for a reasoned conclusion regarding the necessity of conceptual modernization of domestic natural resource legislation. In conditions of escalating environmental crisis, especially in the Aral Sea region's ecological disaster zone, traditional declarative protection methods demonstrate their objective insufficiency. It is necessary to transition to a proactive, preventive model of legal regulation based on the de-biologization of legal terms, imperative zoning of territories, and deep digitalization of environmental control.

Based on the studied advanced experience (in particular, the US Endangered Species Act, ESA), the following theoretical conclusions and practical proposals were formulated aimed at improving the current Law of the Republic of Uzbekistan "On the Protection and Use of Wildlife":

Theoretical conclusions: First, it is necessary to overcome the excessive "biologization" of legal norms. Granting the species the status of "endangered" should become a strict administrative-legal act that automatically entails the establishment of strict restrictive legal regimes for economic entities and nature users.

Secondly, in order to create an effective spatial basis for protection, it is proposed to implement the concept of "critical habitat." This will allow for the establishment of specific environmental easements and prohibitions on economic activities in specific areas of rare species ranges (including industrial, transport, and reserve lands) without the need to withdraw these lands from circulation and undergo the complex procedure of creating full-scale specially protected natural areas (SPNAs).

Thirdly, ensuring the inevitability of responsibility and preventive control in vast and hard-to-reach territories (Ustyurt Plateau, the dried-up bottom of the Aral Sea) requires the legalization of digital environmental supervision tools.

Practical proposals for improving legislation: As a mechanism for the practical implementation of these conceptual provisions, it is proposed to introduce the following amendments and additions to the Law of the Republic of Uzbekistan "On the Protection and Use of Wildlife":

1. Introduce conceptual additions to Article 3 ("Basic Concepts") and Article 26 ("Requirements for Activities Affecting the State of the Animal World"):

- Establish in Article 3 the legal legal concept: *"Critical habitat of rare and endangered species of wild animals."*

- Article 26 shall be supplemented with a direct-action norm of the following content: *"Any geological exploration, urban planning, or other economic activity within critical habitat boundaries that may lead to the destruction or degradation of these territories is prohibited, regardless of the category of the land fund and the form of ownership of the land plot."*

**2. To introduce the following additions to Article 17 ("Protection of rare and endangered species of wild animals") and Article 21 ("Monitoring of the animal world"):**

- Introduce a mandatory requirement in the text of the law to use Earth remote sensing technologies (aerospace imagery, UAVs) and automated systems for continuous monitoring of populations of species listed in the Red Data Book of the Republic of Uzbekistan.

- Legally establish in Article 21 the provision that: *"Digital (spatial) data obtained during automated state environmental monitoring are official legal evidence and serve as sufficient grounds for suspending the economic activities of violators and holding them liable in accordance with the law."*

The implementation of these proposals will allow for the formation of a modern, flexible, and high-tech legal mechanism in the Republic of Uzbekistan capable of ensuring the real preservation and restoration of unique biological diversity in strict accordance with the high environmental guarantees established in the country's updated Constitution.

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