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1 A checklist of the herpetofauna of Krka National Park, Croatia

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Abstract.

Krka National Park in Šibenik-Knin, central Croatia, supports a unique assemblage of herpetofauna owing to its location in the transitional zone between the continental and Mediterranean biomes. We undertook eight seasons of targeted and incidental recording of amphibians and reptiles, as well as a review of available records of herpetofauna from the park and its surrounds. Through a robust verification process, we combined these data sets with current taxonomy to produce an updated, annotated checklist of the herpetofauna of Krka National Park. In total, 38 taxa were recorded comprising 11 amphibian species representing seven families and 11 genera, and 27 reptile species representing eight families and 22 genera (including four non-native turtles). We exclude four non-native turtles isolated to a single, non-breeding, controlled population, and a single amphibian species as a likely misidentification, yielding a final checklist of 33 species (of which, four have uncertain presence). The assemblage includes four species of conservation concern. This updated assessment will serve as a useful tool for monitoring the conservation status of these taxa as climate change, anthropogenic activities, and the presence of invasive, non-native species inevitably affect changes in the distributional range of native species.

Key words. Balkans, distributions, inventory, karst, monitoring, protected species

INTRODUCTION

Croatia supports a rich and diverse herpetofauna, comprising 39 reptile and 20 amphibian species (Jelić et al., 2012; Jelić, 2014). This diversity is strongly shaped by the country's position at the interface of continental and Mediterranean biomes (Radović, 2023), where ecological gradients create transitional zones (ecotones) characterised by high species richness and community turnover. Such ecotonal regions are often particularly sensitive to environmental change, as species distributions shift in response to climatic and habitat pressures (Ortiz-Colin and Hulshof, 2024). Notable species include the phylogenetically distinct cave-dwelling specialist, the olm (*Proteus anguinus*) and several karst specialist lizards (Lacertidae). The herpetofauna assemblage represents a unique blend of continental (e.g., *Rana dalmatina*, *Zamenis longissimus*, *Natrix* spp.) and Mediterranean (e.g., *Algyroides nigropunctatus*, *Zamenis situla*, *Testudo hermanni*, *Podarcis* spp.) taxa. Following its designation in 1985 and subsequent boundary revision in 1997, Krka National Park (KNP) now encompasses 109 km² of the Krka River gorge and the lower course of the Čikola River (Krka National Park Authority, 2025) (Figure 1). The park is characterised by a hot-summer Mediterranean climate, with average temperatures between 23 °C in July and 5 °C in January, and average precipitation of 1078 mm per year, most of which falls in autumn and winter (Krka National Park Authority, 2025).

Habitats within the park comprise rough, *Juniperus*-dominated scrub and grassland, with young *Quercus*-dominated forests on the plateau and *Carpinus*-dominated forests on the gorge slopes and close to the Krka River (Jocque, 2019), where riparian and emergent vegetation typical of karst watercourses is present. Standing water is sparse on the plateau around the gorge owing to the karstic landscape. Despite its recognised ecological important and long history of species recording, KNP lacks a comprehensive taxonomically updated peer-reviewed checklist of its herpetofauna. The availability of multi-year survey data and citizen science records makes KNP an appropriate and timely focus for such an assessment.

Regularly updated species checklists are essential for understanding biodiversity dynamics, particularly in protected areas where conservation management depends on accurate and current data. Species assemblages are inherently dynamic, with climate change, land-use modification, and biological invasions accelerating temporal turnover even within formally protected systems (IPBES, 2019; Biber et al., 2023; Pinsky et al., 2025). Contemporary guidance therefore emphasises frequent, curated checklists that integrate new occurrence data (e.g. citizen science datasets), adopt current taxonomy, and support protected-area planning and monitoring across time (Lo Brutto, 2023; Spear et al., 2026). Updated annotated checklists provide the baseline

needed to detect change, prioritise threatened or range-shifting taxa, and to manage emerging non-native species effectively (Spear et al., 2026).

Here, we present a comprehensive, annotated checklist of the herpetofauna of Krka National Park, based on a synthesis of eight field seasons (2017–2025, excluding 2020), publicly available biological records, and published literature. By applying a structured verification process and current taxonomic standards, we provide an updated assessment of species presence, highlight taxa of uncertain status, and identify key gaps in current knowledge. This work establishes a robust baseline for future monitoring and conservation planning in a climatically and biogeographically sensitive region.

[Figure 1]

METHODS

Data Search.

A search of publicly available biological records data from KNP and its surrounds was undertaken encompassing published books, biological records, and peer-reviewed journals. For the biological records search, we downloaded datasets from the Atlas Bioraznolikosti Hrvatske (BioAtlas, 2025) and the iNaturalist database of research grade herpetological records for Croatia. For the literature review, we searched Google Scholar, ResearchGate and Semantic Scholar using general and taxon-specific search phrases in English and Croatian relevant to the study area (e.g. “Šibenik”, “Krka”, “Šibenik-Knin” combined with “reptiles”, “amphibians”, “herpetofauna”). These platforms were used solely to identify relevant literature, not as primary data sources. We note that no targeted review of Croatian natural history museum collections was undertaken, however key historical compilations were examined. Data Management. We cleaned biological records by first clipping them to a 15 km buffer from the KNP boundary using QGIS (QGIS Development Team, 2026) as per Hughes et al. (2025). We then removed all duplicate records and incomplete records (i.e. we retained only species-level records that contained recorder name, record coordinates or unambiguous location, and date of observation).

All records were then checked for updated nomenclature (IUCN, 2026). Novel and rare species were checked against recent known species distributions using the IUCN Red List (IUCN, 2026). Where novel records were associated with online supplementary material (e.g., photographs submitted to iNaturalist), these materials were examined by the authors to confirm,

refute, or designate uncertain identification. To assess changes in species assemblages over time and to determine the presence status of each species within KNP, we distinguished between historical and recent records, defined by recent records being in the past 10 years (or three generations) and historical records those older than 10 years following IUCN criteria (IUCN, 2018), providing resolution on the contemporary likelihood of species presence.

These datasets are not directly comparable due to differences in sampling design, effort, and observer bias, and are therefore used as complementary sources of evidence rather than for formal quantitative comparison.

Fieldwork.

The fieldwork supporting this assessment was conducted between 2017 and 2025 (excluding 2020, where the COVID-19 pandemic precluded fieldwork). Herpetological surveys and identifications were undertaken by experienced herpetologists and ecologists from Operation Wallacea (Opwall) and BIOTA Group Ltd. (BIOTA). The summer fieldwork season ran from early June to mid-August each year, with some additional records provided on an ad-hoc basis by BIOTA staff when present in the study area outside of this period.

Herpetological surveys used standard techniques (Wilkinson, 2015) including:

- Transect-based visual encounter surveys. Surveys took place on pre-established transects in a variety of habitats within the Krka River gorge and plateau. Each transect was surveyed once per week for the Opwall-BIOTA field season of June – early August (i.e., from eight to ten visits per year, excluding 2020 when the global pandemic precluded surveys). These surveys took place in early morning and were conducted by walking at a constant pace (*c.* 30 m per minute) and recording any visual observations of herpetofauna. Natural refugia such as rocks and logs were checked where appropriate. Standardised surveys were not conducted in 2017 as transects were being established; instead records from this year represent opportunistic observations of reptiles only.
- Targeted night walks. Torchlight evening walks were undertaken throughout the survey season to search for herpetofauna. Routes were not on established transects, but rather targeted habitats and micro-habitats likely to yield observations of nocturnal herpetofauna (e.g. drystone walls in villages and lanes, and rocky gorge slopes and walking trails).
- Incidental observations. Opportunistic surveys and observations included refugia searches, checking known basking spots, and torch surveys of water bodies. Encounters by collegial

147 scientists and survey participants during monitoring for non-target taxa (e.g., mammal,
148 invertebrate, or bird surveys) also contributed to the dataset.

149 Identification of reptiles and amphibians in the field was undertaken referring to standard texts
150 (Arnold and Ovenden, 2002; Speybroeck et al., 2016); field protocols were based on standard
151 best practice for the monitoring of herpetofauna (Gent and Gibson, 2003; McDiarmid et al.,
152 2012).

154 RESULTS

155 *Literature Review.*

156 The Red List of Amphibians and Reptiles of Croatia (Jelić et al, 2012) reports records of
157 37 amphibian and reptile species in the 50 km square within which KNP lies. This area exceeds
158 that of our study area therefore was used as a reference of potential species presence only. No
159 additional species records were found in the search of published literature, either historical or
160 recent. However, contextual data for the distributions of some species was found and is
161 incorporated into the species accounts in the extant species list.

163 *Historical Data: Published Species Lists.*

164 Two key texts were published in 2009, compiling historical species lists of herpetofauna
165 for KNP, both by Drago Marguš. The Amphibians of Krka National Park (Marguš, 2009a)
166 provides a list of nine amphibian species, and Reptiles of Krka National Park (Marguš, 2009b)
167 provides a list of 21 species¹. The nine amphibian and 21 reptile species listed therein are:

- 168 - Amphibians: *Bufo bufo*, *Bufotes viridis*, *Hyla arborea*, *Ichthyosaura* [now *Mesotriton*]
169 *alpestris*, *Lissotriton vulgaris*, *Proteus anguinus*, *Rana dalmatina*, *Rana ridibunda* [now
170 *Pelophylax kurtmuelleri*], and *Salamandra salamandra*.
- 171 - Reptiles: *Algyroides nigropunctatus*, *Anguis fragilis*, *Dalmatolacerta oxycephala*, *Elaphe*
172 *quatuorlineata*, *Emys orbicularis*, *Hemidactylus turcicus*, *Hierophis gemonensis*, *Lacerta*
173 *trilineata*, *Lacerta viridis*, *Malpolon insignitus*, *Natrix natrix*, *Natrix tessellata*, *Platyceps*

¹ Margus later published a monograph on the fauna of the park (Margus, 2019) which provided a list of herpetofauna unchanged from his 2009 publications. It should be noted that all of the three publications by Marguš are popular books rather than research or reference publications and do not provide any locality records.

najadum, *Podarcis melisellensis*, *Podarcis siculus*, *Pseudopus apodus*, *Telescopus fallax*,
Testudo hermanni, *Vipera ammodytes*, *Zamenis longissimus*, and *Zamenis situla*.

Historical Data: Biological Records (< 2015).

Historical records were downloaded from the Atlas Bioraznolikosti Hrvatske (BioAtlas, 2025) Project OPKK gap analysis dataset (MEPGT-IEN, 2024a) comprising herpetofauna records gap analysis, and subsequent herpetofauna observations collected for the development of monitoring programs. The second data source consists of citizen science data collected through the iNaturalist platform (iNaturalist, 2026), filtered prior to 2015.

Following data verification, the Project OPKK gap analysis data for the search comprised 216 records. These consist of 40 records of five amphibian species and 176 records of 19 reptile species. Following data verification and cleaning, the iNaturalist database of biological records (iNaturalist, 2026) yielded a total of 56 historical records, comprising 23 records of three amphibian species and 33 records of nine reptile species. Combined, these sources of historical records provide four additional species present in (or within 15 km of) KNP before 2015, comprising one amphibian (*Bombina variegata*) and three reptiles (*Coronella austriaca*, *Podarcis muralis*, and the non-native *Trachemys scripta*). These additions bring baseline historical assemblage counts to 34 species comprising ten amphibians (seven families; nine genera) and 24 reptiles (seven families and 18 genera).

Recent records (> 2014).

Following data verification and cleaning The Atlas Bioraznolikosti Hrvatske (BioAtlas, 2025) Project OPKK (MEPGT-IEN, 2024b) dataset provided 204 records, comprising 20 records of five amphibian species and 184 records of 21 reptile species. Following data verification and cleaning, the iNaturalist database of biological records (iNaturalist, 2026) yielded a total of 646 recent records, comprising 156 records of 10 amphibian species and 490 records of 24 reptile species. Combined, these sources of recent records provide one additional amphibian species (*Pelobates fuscus*; probable misidentification DJ pers. comm, see discussion) and three additional (albeit non-native) reptile species in (or within 15 km of) KNP comprising *Graptemys pseudogeographica*, *Mauremys sinensis*, and *Pseudemys concinna*.

Fieldwork Results.

Fieldwork carried out by BIOTA and Opwall over eight seasons from 2017 to 2025 (excluding 2020) comprised 1,237 species-level records (287 from walked transects and 950 from opportunistic surveys, which includes night walks, torching, and refugia searches). This resulted in a total of 257 records of seven amphibian species and 980 records of 20 reptile species. Fieldwork did not result in detection of any new species, but included two records of *Anguis fragilis* in 2024, and confirmed field records of *Zamenis longissimus* in 2017 and 2018, *Coronella austriaca* in 2019, and *Lissotriton vulgaris* in 2025, as well as regular encounters of the typically under-recorded *Zamenis situla*.

[Table 1]

[Table 2]

DISCUSSION

Analysis.

The combined historical data form a baseline of 34 recorded species of herpetofauna in the study area, comprising ten amphibians (seven families; nine genera, including the reclassification of *Rana ridibunda* as *Pelophylax kurtmuelleri* and *Ichthyosaura* as *Mesotriton*), and 24 reptile species (seven families; 18 genera). Overall, our datasets capture approximately 40% of amphibian and 56% of reptile species native to Croatia (Jelić, 2014), reflecting the park's high herpetofaunal diversity shaped by its Mediterranean climate and karstic hydrology.

Recent records from citizen science platforms and eight seasons of fieldwork in KNP reveal several notable reported additions relative to this baseline. These include the detection of four reptile species (*Coronella austriaca*, *Graptemys pseudogeographica*, *Mauremys sinensis*, and *Pseudemys concinna*) and one amphibian (*Pelobates fuscus*) not reported in historical datasets, alongside confirmed modern records of *Coronella austriaca*, *Zamenis longissimus*, *Anguis fragilis*, and *Lissotriton vulgaris*. The multiple non-native turtle species, which occur in an urban pond in Šibenik, represent new introductions absent from historical inventories. These are of ecological concern, as *T. scripta* is well documented to outcompete the native *Emys orbicularis* for critical resources such as basking sites and can negatively affect their survival rates (Cadi and Joly, 2003; Cadi and Joly, 2004). As a species listed under EU Regulation 1143/2014 on Invasive Alien Species of Union Concern, its presence is of direct management

relevance. Their presence is recorded at the Šibenik central park, in a well-secured city fountain; as such they are under the supervision of the city authorities and do have neither possibility of escape into the wild nor evidence of reproduction. However, given they have reproductive potential in Croatia (Koren et al., 2018), and their ability to persist and expand without human introduction, their presence requires monitoring and management to ensure they do not spread to waterways further in KNP (Verneau et al., 2011; Balzani et al., 2016).

With these considerations, we exclude them from the final checklist. The uncertain records of *P. fuscus* are outside its current distribution range, although there were historic indications of *Pelobates* sp. in Ravni Kotari region (N-W of Šibenik) (Džukić et al. 2005). Recent records within OPKK project were not publicly published or subject to peer review. Records indicate only tadpoles were recorded without any voucher specimens or photographs, and therefore verified records would constitute a significant range extension. At present, we consider *P. fuscus* records as misidentifications and do not include them in the final checklist. Historical taxa such as *Salamandra salamandra* and *Mesotriton alpestris* persist only as single, spatially limited recent observations, suggesting potential decline or very low detectability, highlighting the need for targeted surveys to determine their true status. However, unpublished datasets from KNP (HR2000918) confirm the presence of *S. salamandra* in 2025, therefore we consider this species present, while *M. alpestris* remains uncertain. These species prefer cooler, more temperate environments, rich in surface water (streams, ponds, lakes, etc.). These are classical continental element species that find their southern range limit in the northern parts of KNP around Knin.

Therefore, explaining their likely absence in the central and southern parts of KNP, which exhibit a dry and warm climate (Mediterranean region). Within 10-15 km N or N-W of Knin, multiple populations are known of both species. The records concerning *Podarcis muralis* also warrant attention, appearing sporadically in historical (three OPKK records) and recent (single OPKK and iNaturalist record) datasets. This species is also a part of the continental herpetofaunal assemblage, preferring cooler montane areas at the south of its range (Schmidtler, 1999), and is naturally distributed only in the northern most parts of KNP. They may also be outcompeted by invading *Podarcis siculus*, common in KNP (Capula et al., 1993; Urošević et al., 2014), which could explain the species local rarity and microhabitat restriction. Another lacertid, *Dalmatolacerta oxycephala*, is supported in the datasets only by OPKK (four historic, five recent), consistent with this species saxicolous, endemic coastal-karst distribution, and the expectation that KNP lies near the northern mainland edge of its Croatian range (Šunje and Jelić, 2014; Bowles, 2024a).

A key biogeographical pattern emerging from our dataset is the clear overlap between continental and Mediterranean herpetofaunal elements within the KNP region. Species distributions suggest a structured transition along a north–south gradient, with predominantly continental taxa extending southwards to Knin, and only rarely reaching further towards the Kistanje–Okalj line. Conversely, Mediterranean-affiliated species extend northwards from the coast and lower Krka valley, typically reaching the Kistanje–Okalj line and only occasionally occurring as far north as Knin. This results in a distinct transitional zone between Kistanje–Okalj and Knin, where faunal elements from both biogeographic regions co-occur.

This pattern reflects the interaction of climatic gradients, karst topography, and habitat heterogeneity across the Krka system, and highlights KNP as a fine-scale ecotone where range limits of multiple species converge. The observed distributional structure supports the interpretation of KNP not only as a biodiversity-rich area, but also as a biogeographically sensitive transition zone, where relatively small environmental shifts may result in measurable changes in species composition. As such, the region may be particularly informative for detecting early responses of herpetofauna to climate-driven range shifts in the Mediterranean–continental interface.

In the context of conservation assessments, seven extant species are of particular concern. The amphibians *S. salamandra* and *Proteus anguinus* are classified as Vulnerable by the IUCN, with the latter also representing an endemic Red Data Book species of the Dinaric Karst. Among reptiles, *Emys orbicularis* (Near Threatened) and *Testudo hermanni* (Vulnerable), together with *Elaphe quatuorlineata*, and *Zamenis situla*, are recognised Red Data Book taxa requiring ongoing protection (Jelić et al, 2012). *Podarcis siculus* are also cited in the Red Data Book, however in KNP they are not considered true natives, and are only protected on island populations from Dubrovnik (Jelić et al, 2012). Data from fieldwork provide consistent records of these species within our survey areas, however these may not be representative of the entirety of KNP. Given the observed shifts in species detectability, the presence of non-native turtles, and the sparse recent records for several historically present species, the synthesis of historical baselines with contemporary records show the importance of updated distribution data and long-term monitoring for maintaining favourable conservation status of herpetofauna in KNP.

Limitations.

Citizen science databases, while providing large sample sizes and annual coverage, are still limited by spatial and temporal biases, unstructured survey efforts, and novelty bias (Boakes et

al, 2016). Fieldwork results are restricted to summer field seasons, which may be a suboptimal time of year for herpetofauna surveys (Gent and Gibson, 2003; McDiarmid et al., 2012), where daytime average high temperatures are 32°C (and often exceed 40°C) (ExtremeWeatherWatch.com, 2026). This may have affected survey efficacy and detection rates, particularly outside of the gorge in the open scrub, scree slopes and oak forest habitat of the surrounding plateau. Notwithstanding, surveys started early in the mornings, with early evening and night-time recording taking place on an ad-hoc basis to mitigate this limitation as much as feasible. Future survey work should ideally, however, encompass key activity periods for most species (i.e., April/May). Additionally, standardised transect-based visual encounter surveys, while facilitating repeatability, can under-represent habitat specialists and microendemic taxa because of their fixed spatial placement, and this surveys reliance on visual detectability biases sampling towards more widespread, mobile, or generalist species, potentially missing cryptic species even under intensive effort (Lovich et al., 2012). Non-detection of a species in recent datasets should therefore not be interpreted as true absence, particularly for cryptic or seasonally active taxa.

CONCLUSION

Our study has refined and updated the understanding of reptile and amphibian diversity in KNP through combined literature reviews, data analysis, and fieldwork. This has provided robust, recent confirmations for several key species and filled important data gaps left since earlier inventories. Importantly, our results highlight Krka National Park as a biogeographical transition zone between continental and Mediterranean herpetofaunal assemblages.

The spatial structuring of species distributions indicates that continental elements predominantly reach their southern limits around the Knin area, while Mediterranean taxa extend northwards to approximately the Kistanje–Okalj line. The zone between these areas represents a clear overlap of faunal elements, reinforcing the role of KNP as a climatic and ecological interface. This transitional character further emphasises the importance of the region for monitoring distributional shifts under ongoing environmental change. In a Mediterranean-karst setting with limited lentic habitat, amphibians (especially caudates) are inherently hard to verify and may now be locally extirpated at some historical sites. Their low detectability is further complicated by species-level uncertainty in larval stages; continued season-appropriate surveys are therefore essential to resolve true presence from non-detection. Likewise, several reptiles may persist as highly localised, and/or range-edge populations showing the need for habitat-

specific search protocols alongside broad monitoring. In summary, we convert historical lists into an updated operational baseline, showing what is present, what is uncertain, and where to focus next. Against Croatia's broader herpetofauna, this provides a foundation for sustained monitoring and targeted management of cryptic amphibians and localised reptiles in KNP.

Each species account below provides a broad description of the species distribution within the park and details the most recent record and the current IUCN conservation status (IUCN, 2026) using standard IUCN codes (IUCN, 2018): **VU** = vulnerable; **NT** = Near Threatened; **LC** = Least Concern. Where separate assessments have been undertaken for different scales, these are denoted: **G** = Global Assessment; **E** = European Assessment. Red Data Book species are denoted as **RDB**. Status within the park was categorised using standard IUCN presence codes and definitions (IUCN Standards and Petitions Committee, 2022) comprising "Extant" - those species with verified records and "Presence Uncertain" relating to species for which records exist but require further evidence or verification, "owing to the uncertainty of the identity or authenticity of the record".

Species removal

The presence of four non-native turtles and one misidentified amphibian species are included in this section, and we exclude them from the checklist of herpetofauna found in KNP.

Family Pelobatidae

Pelobates fuscus (Laurenti, 1768) – Common spadefoot toad / češnjača

Conservation Status: **LC** [G and E] (Krása et al., 2024b)

Comments: Presence of this species within KNP requires confirmation, as our dataset consists of three recent records via OPKK, without taxonomic confirmation or evidence material. We consider these records misidentifications. It is currently absent from the entire Adriatic coast; however, the area of KNP was potentially within the historical range of this species (within the last 100 years) before major land use change (Džukić et al. 2005). Photographic evidence of this species in or around KNP, or along the Adriatic coast in general, would represent a significant distributional note.

Most recent record: OPKK, July 2023

Status within KNP: **Removed**;

Trachemys scripta s.l. (Thunberg and Schoepff, 1792) - Pond slider / Crvenouha kornjača

Conservation status: **Invasive** (Borsic et al., 2018).

Comments: This species has no recorded observations on Opwall-BIOTA surveys and one observation on OPKK. However, iNaturalist holds consistent records of the species, mostly from the same location, with no more than two individuals recorded at a time. As they remain isolated to an urban park pond in Šibenik as a non-breeding controlled population, we do not include them in the checklist for KNP. It originates from northern Mexico, as well as the central and southern United States, but is invasive across the globe (TTWG 2025).

Most recent record: iNaturalist, 9th March 2025

Status within KNP: **Removed: no breeding population present;**

Gratemys pseudogeographica pseudogeographica (Gray, 1831) – Northern false map turtle /

Lažna geografska kornjača

Conservation status: **Non-native**.

Comments: This species has no records from Opwall-BIOTA surveys or OPKK. However, iNaturalist holds records of two observations, located in the same urban-park pond in which *Trachemys scripta* is recorded. Examination of the iNaturalist submitted photos shows the postocular 'boomerang' marking, subocular dot, and curved pattern on carapace which are diagnostic of the species. Endemic to the central United States, this species is non-native (TTWG 2025). As a non-breeding controlled population, we do not include them in the checklist for KNP

Most recent record: iNaturalist, 8th August 2025

Status within KNP: **Removed: no breeding population present;**

Pseudemys concinna (Le Conte, 1930) – River cooter / Riječna kornjača

Conservation status: **Non-native**.

Comments: This species has not been recorded on Opwall-BIOTA surveys, nor is it represented by records in OPKK. However, iNaturalist holds a single observation record from 2025. The observation came from the same urban-park pond in which multiple non-native species of turtles have been recorded (see above). Examination of the photographs submitted to iNaturalist show the neck markings and carapace pattern (with the lightest parts on the marginal scutes being relatively centred and dark markings highlighting the joining of the scutes) typical of the species. As a non-breeding controlled population, we do not include them in the checklist for KNP

Native to the eastern and central United States, this species is non-native (TTWG 2025). It likely entered Croatia through the pet trade and was subsequently released.

Most recent record: iNaturalist, 9th April 2025

Status within KNP: **Removed: no breeding population present;**

Family Geomydidae

Mauremys sinensis (Gray, 1870) – Chinese stripe-necked turtle / Kineska prugasta kornjača

Conservation status: **Non-native.**

Comments: This species has no recorded observation on Opwall-BIOTA surveys or OPKK. iNaturalist has one observation, in 2022. The observation was seen in a known urban park pond, where multiple other non-native species of turtles have been released (see above). Examination of the photograph submitted to iNaturalist show the underside of head and neck pattern, upper highlight of each scute and plastron with dark spots typical of the species. Native to east and southeast Asia. As a non-breeding controlled population, we do not include them in the checklist for KNP

Most recent record: iNaturalist, 25th July 22

Status within KNP: **Removed: no breeding population present;**

417 **SPECIES ACCOUNTS: HERPETOFAUNA IN KRKA NATIONAL PARK**

418 *Class: Amphibia*

419 *Order Caudata (Urodela)*

420 Family Proteidae

421 *Proteus anguinus anguinus* (Laurenti, 1768) - Olm / Čovječja ribica

422 Conservation Status: **RDB** (Jelić et al., 2012); **VU B2ab(ii,iii,v)** [G and E] (Miaud et al.,
423 2024)

424 Comments: This species is endemic to the Dinaric Karst region (Jelić et al., 2012) and has been
425 recorded at five speleological structures in the park, with field observations at Miljacka II,
426 Miljacka III, Miljacka IV, and Jama in Čikola canyon (Vörös et al., 2019), and Bilušića Buk
427 cave through eDNA (Jelić and Konrad Kovač, 2023). Field records include observations
428 (access under permit) from Miljacka II in 2021 and 2025.

429 Most recent record: Opwall-BIOTA, 26th June 2025

430 Status within KNP: **Extant;**

431 Family Salamandridae

432 *Salamandra salamandra* (Linnaeus, 1758) - Fire salamander / Pjegavi daždevnjak

433 Conservation Status: **VU A3ce** [G and E] (IUCN SSC ASG, 2023a)

434 Comments: This species is recorded as present within KNP by Marguš (2009a); however, we
435 were unable to confirm its presence except for a single photo-verified iNaturalist record from
436 August 2019. Unpublished datasets from KNP (HR2000918) confirm its presence in 2025,
437 however spatial resolution regarding local distribution and abundance remains unknown as of
438 the preparation of this manuscript. *S. salamandra* prefers cool, damp shady deciduous forests,
439 which are limited to just the northern part of KNP, explaining low detectability.

440 Most recent record: 2025, Krka National Park authority

441 Status within KNP: **Extant;**

442

443 *Mesotriton alpestris* (Laurenti, 1768) - Alpine newt / Planinski vodenjak

444 Conservation Status: **LC** [G and E] (Denoël et al., 2024a)

445 Comments: This species is listed in Marguš (2009a) as occurring within KNP; however, we
446 identified only a single iNaturalist record from May 2017 in the northern part of the region

(NW of Knin). This record is substantiated with a photograph for verification, but the exact location of the record is obscured with a geographical resolution accuracy of up to 30 km. Closest confirmed population of this species is found in two lakes in Plavno polje (10 km N of Knin) where a large population of a few thousand individuals was observed (Dušan Jelić, *pers. comm.*). Its presence within KNP needs further confirmation.

Most recent record: iNaturalist, May 2017

Status within KNP: **Presence uncertain;**

Lissotriton vulgaris (Linnaeus, 1758) - Smooth newt / Mali vodenjak

Conservation Status: LC [G and E] (Poboljšaj et al., 2024)

Comments: This species lacks historical records; however, it is listed in Marguš (2009a) as present within KNP. Three additional recent iNaturalist records exist, and breeding populations were observed at two separate water bodies during field surveys in 2025. This species requires still water ponds with aquatic vegetation, preferably free of fish, which likely limits potential habitat (especially natural) around KNP.

Most recent record: Opwall-BIOTA, 2nd August 2025

Status within KNP: **Extant;**

[Figure 2]

Order Anura

Family Bombinatoridae

Bombina variegata (Linnaeus, 1758) - Yellow-bellied toad / Žuti mukač

Conservation Status: LC [G and E] (Ogrodowczyk et al., 2024)

Comments: Represented in our dataset with a single historical OPKK record, two unconfirmed recent records from OPKK, and a single recent record of tadpoles from iNaturalist. KNP is within the distribution of this species; however, records are sparse along the Adriatic coast. This species was not detected during field surveys and not listed in literature (Marguš 2009a). Further surveys are required to confirm presence within KNP.

Most recent record: OPKK, 30th June 2023

Status within KNP: **Presence Uncertain;**

Family Bufonidae

477 *Bufo bufo* (Linnaeus, 1758) - Common toad / Smeđa krastača
478 Conservation Status: LC [G] (IUCN SSC ASG, 2023b); LC [E] (Cogălniceanu et al., 2024)
479 Comments: This species is regularly recorded on Opwall-BIOTA surveys and reported through
480 OPKK and iNaturalist. It is likely ubiquitous and seemingly abundant within KNP, with
481 increased sightings following heavy rain and large numbers of juveniles observed emerging
482 from suitable breeding sites during summer months.
483 Most recent record: Opwall-BIOTA, 3rd August 2025
484 Status within KNP: **Extant**;

485
486 *Bufotes viridis* (Laurenti, 1768) - Green toad / Zelena krastača
487 Conservation Status: LC [G] (IUCN SSC ASG, 2023c); LC [E] (Krása et al., 2024a)
488 Comments: This species is inconsistently recorded on Opwall-BIOTA surveys but regularly
489 reported through OPKK and iNaturalist. It is more commonly observed in coastal areas, and
490 there may be unsuitable microhabitats further inland around KNP.
491 Most recent record: Opwall-BIOTA, 20th August 2024
492 Status within KNP: **Extant**;

493 Family Hylidae

494 *Hyla arborea* (Linnaeus, 1758) - Common Tree Frog / Gatalinka
495 Conservation Status: LC [G and E] (Aghasyan et al., 2024a)
496 Comments: This species is consistently recorded across datasets, however usually at low
497 frequencies. Infrequent occurrences during field surveys were usually during or after heavy
498 rain. They prefer areas with high, bushy vegetation close to water and favour bright sunny
499 basking spots, however the Opwall-BIOTA surveys regularly recorded the species inside the
500 entrance to a disused mine.
501 Most recent record: Opwall-BIOTA, 28th July 2025
502 Status within KNP: **Extant**;

503 Family Ranidae

504 *Rana dalmatina* Bonaparte, 1840 - Agile frog / Šumska smeđa žaba
505 Conservation Status: LC [G] (IUCN SSC ASG, 2023d); LC [E] (Kaya et al., 2024)

Comments: This species is consistently recorded on Opwall-BIOTA surveys and reported through OPKK and iNaturalist. It is predominantly found in riparian environments in close proximity to the Krka River, as well as near to other water bodies within the environment.

Most recent record: Opwall-BIOTA, 5th August 2025

Status within KNP: **Extant;**

Pelophylax kurtmuelleri (Gayda, 1940) - Balkan water frog / velika zelena žaba

Conservation Status: **LC** [G and E] (Andreone et al., 2024);

Comments: This species is consistently recorded across datasets and represents one of the most abundant amphibians around water bodies. *Pelophylax* spp. have been the subject of much taxonomic debate due to hybridisation and conserved morphological characteristics, with recent molecular evidence demonstrating a close affinity between *P. ridibundus* and *P. kurtmuelleri* (Papežik et al, 2023; Dufresnes et al, 2024), and recent work designating Croatian populations as *P. kurtmuelleri* (Vucić et al. 2026).

Most recent record: Opwall-BIOTA, 5th August 2025

Status within KNP: **Extant;**

[FIGURE 3]

CLASS: REPTILIA

Order Testudines

Family Emydidae

Emys orbicularis (Linnaeus, 1758) - European pond terrapin / Barska kornjača

Conservation Status: **RDB** (Jelić et al., 2012); **NT** [G] (Tortoise and Freshwater Turtle Specialist Group, 1996); **NT** A2bcde [E] (Luiselli, and Vamberger, 2024b)

Comments: This species has consistent detection rates recorded on Opwall-BIOTA surveys, with low recorded abundance. It is consistently reported in iNaturalist but inconsistently reported through OPKK. Though low abundance is recorded, it is likely a result of their preferential habitat of ponds, lakes and wetlands being located outside of the transect areas.

Most recent record: Opwall-BIOTA, 28th July 2025

Status within KNP: **Extant;**

536

537 Family Testudinae

538 *Testudo hermanni* Gmelin, 1789 - Hermann's tortoise / Kopnena kornjača, čančara

539 Conservation Status: **RDB** (Jelić et al., 2012); **VU** A2acde+4acde [G and E] (Luiselli, 2024a)

540 Comments: This species has had regularly high detection rates on Opwall-BIOTA surveys,
541 especially in recent years. It is regularly reported through OPKK and iNaturalist. Habitat
542 preference is varied, residing in woodland openings, open scrubland, agricultural land and
543 semi-rural anthropogenic habitats. The population found in KNP belongs to the subspecies *T.*
544 *h. boettgeri* (Eastern Hermann's tortoise) (Šarić et al., 2023). Distributed in KNP from Adriatic
545 coast to Knin in the north.

546 Most recent record: Opwall-BIOTA, 2nd August 2025

547 Status within KNP: **Extant**;

548

549 [FIGURE 4]

550

551 *Order Squamata (suborder Sauria)*

552 Family Gekkonidae

553 *Hemidactylus turcicus* (Linnaeus, 1758) - Turkish gecko / Kućni macaklin

554 Conservation Status: **LC** [G] (Aghasyan et al., 2009a); **LC** [E] (Bowles, 2024b)

555 Comments: This species has consistent detection rates recorded on Opwall-BIOTA surveys,
556 with low recorded abundance. It is inconsistently reported through OPKK and iNaturalist.
557 Notwithstanding, low recorded abundance may be due to the species' nocturnal nature and
558 preferential habitat lying outside of areas that contain high-survey effort (i.e., transects). Its
559 recorded distribution stretches from Adriatic coastal areas, where it is most abundant, to the
560 Kistanje-Oklaj region towards the north of KNP. It is not recorded in the northern parts of KNP
561 around Knin.

562 Most recent record: Opwall-BIOTA, 25th July 2025

563 Status within KNP: **Extant**;

564 Family Anguidae

Anguis fragilis Linnaeus, 1758 - Slow worm / Sljepić

Conservation Status: LC [G and E] (Bowles, 2024c)

Comments: This species was confirmed in field surveys from two individuals in 2024. No records for the species are held in the OPKK and iNaturalist datasets. Whilst Marguš (2009b) includes *A. fragilis* in his species list for the park, later publications (Lauš et al. 2012) draw attention to the notable absence of the species. The two recorded observation by Opwall noted their occurrence in forested environments, with mostly closed canopy, in the riparian zone. *A. fragilis* is widely distributed across Europe, however, in Dalmatia their range is mainly in higher altitudes (Lauš et al., 2012). The ranges typically do not overlap with that of *Pseudopus apodus*, as *A. fragilis* primarily feeds on a diet of slugs and snails, which require higher humidity (Baran *et al.*, 1988). The ecotone between Mediterranean and Continental biomes within the park may afford sympatry in the region.

Most recent record: Opwall-BIOTA, 17th June 2024

Status within KNP: **Extant**;

Pseudopus apodus (Pallas, 1775) - Glass lizard / Blavor

Conservation Status: LC [G] (Aghasyan et al., 2021a)

Comments: This species has consistent rates of detection recorded on Opwall-BIOTA surveys, with high abundance. It shows consistent reports on OPKK and iNaturalist. Habitat preferences include forested areas, scrublands and rocky outcrops, Opwall records coincide with these preferences, with most observations occurring in scrublands and forested areas.

Most recent record: Opwall-BIOTA, 17th July 2025;

Status within KNP: **Extant**;

Family Lacertidae

Algyroides nigropunctatus (Duméril and Bibron, 1839) - Dalmatian algyroides / Mrki ljuskavi gušter

Conservation Status: LC [G and E] (Bowles, 2024d)

Comments: This species has inconsistent rates of detection recorded on Opwall-BIOTA surveys, with assumably small, fragmented populations. It shows consistent reporting on iNaturalist but contains no reports on OPKK. Habitat preferences within the region are favoured towards rocky, shaded areas, but may also be distributed amongst agriculture land, rural anthropogenic structures, and urban areas. Within KNP it is mostly found in more shaded, moist habitats such as riverine forest.

598 Most recent record: Opwall-BIOTA, 21st July 2025;

599 Status within KNP: **Extant;**

600

601 *Dalmatolacerta oxycephala* Duméril and Bibron, 1839 - Sharp-snouted lizard / Oštroglava
602 gušterica

603 Conservation Status: **LC** [G and E] (Bowles, 2024a)

604 Comments: This species is restricted to coastal rocky areas and only recorded in historical and
605 recent OPKK records, never being detected by field surveys. KNP likely represents the
606 northernmost edge of its mainland distribution (Šunje and Jelić, 2014), therefore records, and
607 local abundance, are low. We describe this species as extant based on multiple reliable recent
608 OPKK records despite lack of photographic evidence, however targeted surveys are required
609 to establish population persistence. Preferable habitats include rocky outcrops, shrublands,
610 rural gardens and urban areas, with most populations establishing close to coastal areas. Within
611 KNP their known populations are limited to the southern boundaries/buffer zone.

612 Most recent record: OPKK, 19th May 2023

613 Status within KNP: **Extant;**

614

615 *Lacerta trilineata* Bedriaga, 1886 - Balkan green lizard / Veliki zelembać

616 Conservation Status: **LC** [G and E] (Bowles, 2024e)

617 Comments: This species is regularly recorded through field surveys and via citizen science
618 databases. Favourable habitats in KNP are primarily semi-open areas including, agricultural
619 land, shrublands, open-forests, rural gardens and semi-urban areas. Species identification of
620 juveniles and females may be confused with *Lacerta viridis*.

621 Most recent record: Opwall-BIOTA, 29th July 2025

622 Status within KNP: **Extant;**

623

624 *Lacerta viridis* (Laurenti, 1768) - Eastern green lizard / Obični zelembać

625 Conservation Status: **LC** [G] (Crnobrnja-Isailović et al., 2009); **LC** [E] (Bowles, 2024f)

626 Comments: Opwall-BIOTA surveys have consistently reported observations, along with
627 numerous reports through citizen science databases. Favourable habitats in KNP are primarily
628 vegetation in field margins of agricultural land, shrublands, open woodland, forested areas and
629 grasslands. Species identification of juveniles and females may be confused with *Lacerta*
630 *trilineata*.

631 Most recent record: Opwall-BIOTA, 22nd July 2025

632 Status within KNP: **Extant;**

633

634 *Podarcis melisellensis* (Braun, 1977) - Dalmatian wall lizard / Krška gušterica

635 Conservation Status: **LC** [G and E] (Bowles, 2024g)

636 Comments: This species was detected consistently on Opwall-BIOTA surveys. Similarly, it has
637 frequent reports of observation on iNaturalist and consistent records on OPKK. Mostly found
638 in areas with sparse vegetation, within scrubland, grassland, woodland and forests. Niche
639 partitioning with similar-sized lacertids in the area are unclear.

640 Most recent record: Opwall-BIOTA, 5th August 2025

641 Status within KNP: **Extant;**

642

643 *Podarcis muralis* (Laurenti, 1768) - Common wall lizard / Zidna gušterica

644 Conservation status: **LC** [G and E] (Böhme et al, 2009; Bowles, 2024h)

645 Comments: This species is widespread in Europe, reaching the south of its distribution in the
646 Balkan peninsula where it prefers cooler montane habitats. It is sparsely represented in our
647 datasets, with three historical OPKK records, and one recent OPKK and one recent iNaturalist
648 record. Local persistence is unclear, and this species is known for establishing colonies outside
649 its native range (Michaelides et al., 2015). It prefers colder northern areas of KNP buffer zone.
650 Further research is needed to assess population size, distribution and genetic provenance around
651 KNP.

652 Most recent record: iNaturalist, 16th July 2025

653 Status within KNP: **Presence uncertain;**

654

655 *Podarcis siculus* (Rafinesque, 1810) - Italian wall lizard / Primorska gušterica

656 Conservation Status: **RDB** (Jelić et al., 2012); **LC** [E] (Bowles, 2024i)

657 Comments: This species has consistent observations records on Opwall-BIOTA surveys,
658 iNaturalist and OPKK. While native to the Adriatic coast, it is likely expanding further inland.
659 Likely ubiquitous around KNP, with a habitat preference of sparse vegetation, rock walls, and
660 woodland edges. Niche partitioning with similar-sized lacertids in the area are unclear.

661 Most recent record: Opwall-BIOTA, 30th July 2025

662 Status within KNP: **Extant;**

663

664 [FIGURE 5]

665 *Order Squamata (suborder Serpentes)*

666 Family Colubridae

667 *Coronella austriaca* Laurenti, 1768 – Smooth snake / Smukulja

668 Conservation Status: LC [G] (Crnobrnja-Isailović et al., 2017); LC [E] (Bowles, 2024j)

669 Comments: Represented by a historical OPKK record from 2012 and a single record of a
670 leucistic adult individual on an Opwall-BIOTA transect survey in 2019, for which video
671 footage was captured and verified. They are abundant in parts of continental Croatia, however
672 more sparsely distributed along the Adriatic coast likely due to smaller pockets of preferred
673 habitat (sunny shrub dominated, moist meadows). We consider them extant due to a confirmed
674 field record; however further data is required to determine their exact distribution and
675 abundance in the area.

676 Most recent record: Opwall-BIOTA, June 2019

677 Status within KNP: **Extant**;

678
679 *Zamenis longissimus* (Laurenti, 1768) - Aesculapian snake / Bjelica

680 Conservation Status: LC [G] (Aghasyan et al., 2017); LC [E] (Bowles, 2024k)

681 Comments: Inconsistently recorded on Opwall-BIOTA surveys, however a number of citizen
682 science records also exist. This species is likely present, but possibly has low local abundance
683 or detectability, due to its preference for more temperate, forested areas. It prefers colder
684 northern areas of KNP buffer zone.

685 Most recent record: Opwall-BIOTA, 8th July 2019

686 Status within KNP: **Extant**;

687
688 *Zamenis situla* (Linnaeus, 1758) - Leopard snake / Pjegava crvenkrpica

689 Conservation Status: **RDB** (Jelić et al., 2012); LC [G] (Böhme et al., 2009); LC [E] (Bowles,
690 2024l)

691 Comments: This species is consistently recorded on Opwall-BIOTA surveys, however with
692 general low abundance. It is inconsistently reported through OPKK and iNaturalist. Suitable
693 habitat is ubiquitous, and a shift towards nocturnality during summer months may account for

low detection rates (EG, pers. Obs.). Its recorded distribution stretches from Adriatic coastal areas, where it is most abundant, to the Kistanje-Oklaj region towards the north of KNP. It is not recorded in the northern parts of KNP around Knin.

Most recent record: Opwall-BIOTA, 27th July 2025

Status within KNP: **Extant**;

Elaphe quatuorlineata (Lacepede, 1789) - Four-lined snake / Četveroprugi kravosas

Conservation Status: **RDB** (Jelić et al., 2012); **LC** [G and E] (Bowles, 2024m)

Comments: This species is consistently recorded on Opwall-BIOTA surveys and is regularly reported through OPKK and iNaturalist. Likely ubiquitous around KNP, particularly around disturbed areas, although detection rates remain low.

Most recent record: Opwall-BIOTA, 25th July 2025

Status within KNP: **Extant**;

Hierophis gemonensis (Laurenti, 1768) - Balkan whip snake / Šara poljarica

Conservation Status: **LC** [G and E] (Bowles, 2024n)

Comments: This species is consistently recorded on Opwall-BIOTA surveys and is regularly reported through OPKK and iNaturalist. The species is likely ubiquitous in KNP, particularly around dry scrub areas, although encounters remain low due to its avoidant disposition. It is recorded throughout KNP area all the way to Knin.

Most recent record: Opwall-BIOTA, 14th July 2025

Status within KNP: **Extant**;

Platyceps najadum (Eichwald, 1831) - Dahl's whip snake / Šilac

Conservation Status: **LC** [G] (Lymberakis et al., 2009), **LC** [E] (Bowles, 2024o)

Comments: This species is regularly recorded on Opwall-BIOTA surveys and is occasionally reported through OPKK and iNaturalist. It is likely ubiquitous around KNP, particularly around dry scrub areas, although encounters remain low due to its avoidant disposition. Its recorded distribution stretches from Adriatic coastal areas, where it is most abundant, to the Kistanje-Oklaj region towards the north of KNP. It is not recorded in the northern parts of KNP around Knin.

Most recent record: Opwall-BIOTA, 20th June 2025

Status within KNP: Extant;

Telescopus fallax (Fleischmann, 1831) - Cat snake / Crnokrpica

Conservation Status: LC [G] (Aghasyan et al., 2009b); LC [E] (Bowles, 2024p)

Comments: This species is consistently recorded on Opwall-BIOTA surveys and is regularly reported through OPKK and iNaturalist records. It is easily targeted based on its nocturnal, saxicolous habits, frequently inhabiting rock walls adjacent to properties and roads. This makes the species particularly susceptible to road mortalities. Its recorded distribution stretches from Adriatic coastal areas, where it is most abundant, to the Kistanje-Okraj region towards the north of KNP. It is not recorded in the northern parts of KNP around Knin.

Most recent record: Opwall-BIOTA, 4th August 2025

Status within KNP: Extant;

Family Natricidae

Natrix natrix (Linnaeus, 1758) - Grass snake / Bjelouška

Conservation Status: LC [G] (Aghasyan et al, 2021b); LC [E] (Bowles, 2024q)

Comments: The subspecies *N. n. persa* is consistently recorded on Opwall-BIOTA surveys and is regularly reported through OPKK and iNaturalist. It can occur in high abundance around ponds, rivers, streams, and in adjacent riparian environments. It is often observed basking, foraging, swimming, or under refugia. Primarily a diurnal species, nocturnal activity is also recorded during summer months (Spaseni et al., 2024). Whilst *N. natrix* holds an IUCN assessment of Least Concern, no assessment has been carried out to date for the subspecies, *N. n. persa* which occurs in KNP, and as such the conservation status of the subspecies is currently unknown.

Most recent record: Opwall-BIOTA, 3rd August 2025

Status within KNP: Extant;

Natrix tessellata (Laurenti, 1768) - Dice snake / Ribarica

Conservation Status: LC [G] (Mebert et al., 2021); LC [E] (Bowles, 2024r)

Comments: This species is consistently recorded on Opwall-BIOTA surveys and is regularly reported through OPKK and iNaturalist. It can occur in high abundance around lentic and riparian environments. It is often observed basking, foraging, swimming, or under refugia.

Primarily a diurnal species, but nocturnal activity is observed during summer months (EG-JD, pers. Obs).

Most recent record: Opwall-BIOTA, 4th August 2025

Status within KNP: **Extant;**

Family Psammophiidae

Malpolon insignitus (Geoffroy Saint-Hilaire, 1827) - Eastern Montepellier snake / Zmajur

Conservation Status: **LC** [G] (Aghasyan et al., 2024b); **LC** [E] (Bowles and Corti, 2024)

Comments: This species is regularly recorded on Opwall-BIOTA surveys and occasionally reported through OPKK and iNaturalist. Likely ubiquitous around KNP, particularly around dry scrub and disturbed areas, encounters of this species remain low due to its elusive nature. This species is often seen crossing roads or found dead on roads. It seems to be the dominant species in most habitats in KNP, based on general abundance. It is recorded throughout KNP area all the way to Knin.

Most recent record: Opwall-BIOTA, 27th June 2025

Status within KNP: **Extant;**

Family Viperidae

Vipera ammodytes (Linnaeus, 1758) - Nose-horned viper / Poskok

Conservation Status: **LC** [G] (Aghasyan et al., 2009c); **LC** [E] (Crnobrnja-Isailović et al., 2024)

Comments: This species is the only significantly venomous species in the region. This species has been regularly encountered in Opwall-BIOTA surveys post 2022, with occasional earlier records through surveys and OPKK or iNaturalist records. It can be readily encountered basking during the day (particularly early morning in summer) and tends towards nocturnality during summer. It can be found around rocky areas (including rock walls), and woodland edge habitats.

Most recent record: Opwall-BIOTA, 27th July 2025

Status within KNP: **Extant.**

[FIGURE 6]

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1096 TABLES

1097 **Table 1.** Historical and recent records of amphibian species in and around Krka National Park,
1098 Croatia. Status codes P=Considered present; U=Presence uncertain; R=Removed. [†]Indicates
1099 genera reclassification, and ^{††} indicates genus and species reclassification.

Amphibia	Historical			Recent		Opwall-BIOTA 2018	Opwall-BIOTA 2019	Opwall-BIOTA 2021	Opwall-BIOTA 2022	Opwall-BIOTA 2023	Opwall-BIOTA 2024	Opwall-BIOTA 2025	Status
	Marguš (2009a)	OPKK GA	iNaturalist	OPKK (2023)	iNaturalist								
Order Anura													
Family: Bombinatoridae													
Bombina variegata	-	1	-	2	1	-	-	-	-	-	-	-	U
Family: Bufonidae													
Bufo bufo	ü	-	1	4	36	15	16	12	2	7	25	24	P
Bufotes viridis	ü	5	-	5	29	1	1	-	-	-	2	-	P
Family: Hylidae													
Hyla arborea	ü	8	-	6	4	1	2	-	-	1	1	1	P
Family: Pelobatidae													
Pelobates fuscus	-	-	-	3	-	-	-	-	-	-	-	-	R
Family: Ranidae													
Pelophylax kurtmuelleri ^{††}	ü		17		70	35	1	4	1	6	4	13	P
Rana dalmatina	ü	21	5		5	26	6	-	-	9	20	16	P
Order Caudata													
Family: Salamandridae													
Lissotriton vulgaris	ü	-	-	-	3	-	-	-	-	-	-	2	P
Mesotriton alpestris [†]	ü	-	-	-	1	-	-	-	-	-	-	-	U
Salamandra salamandra	ü	-	-	-	1	-	-	-	-	-	-	-	P
Family: Proteidae													
Proteus anguinus	ü	5	-	-	6	-	-	1	-	-	-	1	P

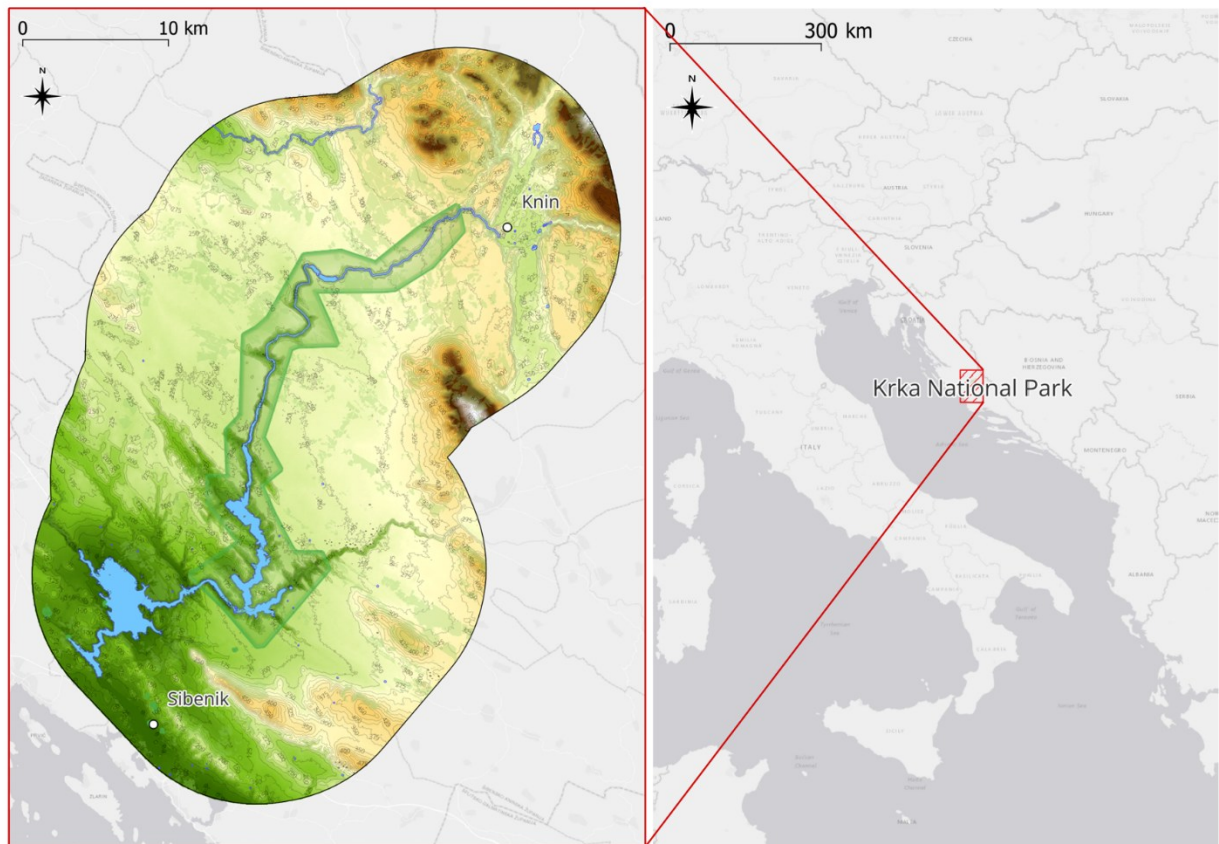
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	Historical			Recent										
	Marguš (2009b)	OPKK GA	iNaturalist	OPKK (2023)	iNaturalist	Opwall-BIOTA 2017	Opwall-BIOTA 2018	Opwall-BIOTA 2019	Opwall-BIOTA 2021	Opwall-BIOTA 2022	Opwall-BIOTA 2023	Opwall-BIOTA 2024	Opwall-BIOTA 2025	Status
Reptilia														
<i>Order Testudines</i>														
Family: Emydidae														
<i>Emys orbicularis</i>	ü	11	1	9	13	39	4	3	1	1	-	2	2	P
<i>Graptemys pseudogeographica</i>	-	-		-	2	-	-	-	-	-	-	-	-	R
<i>Pseudemys concinna</i>	-	-		-	1	-	-	-	-	-	-	-	-	R
<i>Trachemys scripta</i>	-	-	2	1	8	-	-	-	-	-	-	-	-	R
Family: Geoemydidae														
<i>Mauremys sinensis</i>	-	-	-	-	1	-	-	-	-	-	-	-	-	R
Family: Testudinidae														
<i>Testudo hermanni</i>	ü	4	1	19	54	61	4	72	4	9	3	50	33	P
<i>Order Squamata: Lacertilia</i>														
Family: Gekkonidae														
<i>Hemidactylus turcicus</i>	ü	-	-	2	20	-	-	4	-	-	-	11	3	P
Family: Lacertidae														
<i>Algyroides nigropunctatus</i>	ü	2	-	6	2	-	-	13	3	-	-	-	2	P
<i>Dalmatolacerta oxycephala</i>	ü	4	-	5	-	-	-	-	-	-	-	-	-	P
<i>Lacerta trilineata</i>	ü	13	4	24	44	-	18	28	5	4	11	27	18	P
<i>Lacerta viridis</i>	ü	21	-	2	1	-	-	2	-	-	-	2	2	P
<i>Podarcis melisellensis</i>	ü	28	1	15	31	-	11	62	18	4	27	27	26	P
<i>Podarcis muralis</i>	-	3	-	1	1	-	-	-	-	-	-	-	-	U
<i>Podarcis siculus</i>	ü	37	11	6	78	-	91	2	4	2	1	14	2	P
Family: Anguidae														
<i>Anguis fragilis</i>	ü	-	-	-	-	-	-	-	-	-	-	2	-	P
<i>Pseudopus apodus</i>	ü	9	-	27	25	-	3	2	-	1	5	6	13	P
<i>Order Squamata: Serpentes</i>														
Family: Colubridae														
<i>Coronella austriaca</i>	-	1	-	-	-	-	-	1	-	-	-	-	-	P
<i>Elaphe quatuorlineata</i>	ü	1	-	9	13	1	-	5	2	1	1	6	3	P
<i>Hierophis gemonensis</i>	ü	7	-	13	15	-	3	6	2	3	1	10	2	P
<i>Platycephus najadum</i>	ü	4	-	-	6	-	-	3	-	-	3	3	2	P
<i>Telescopus fallax</i>	ü	2	-	10	29	19	-	11	-	3	11	46	12	P
<i>Zamenis longissimus</i>	ü	3	-	1	1	1	-	1	-	-	-	-	-	P
<i>Zamenis situla</i>	ü	3	1	3	11	-	-	1	-	2	1	4	6	P
Family: Psammophiidae														
<i>Malpolon insignitus</i>	ü	-	-	12	13	-	-	29	-	4	4	4	2	P
Family: Natricidae														
<i>Natrix natrix</i>	ü	-	2	7	23	8	6	1	4	-	3	11	17	P
<i>Natrix tessellata</i>	ü	13	10	12	71	6	11	1	2	1	4	1	12	P
Family: Viperidae														

1105 FIGURES



1106
1107 **Figure 1.** Map of the study area in Krka National Park, Croatia, (15km buffer from KNP
1108 boundary) with contour lines and topography.



1109
1110 **Figure 2.** Caudata in Krka National Park. A) *Lissotriton vulgaris* © Edward Gilbert, 2025; B)
1111 *Proteus anguinus anguinus* © Dušan Jelić, 2019.

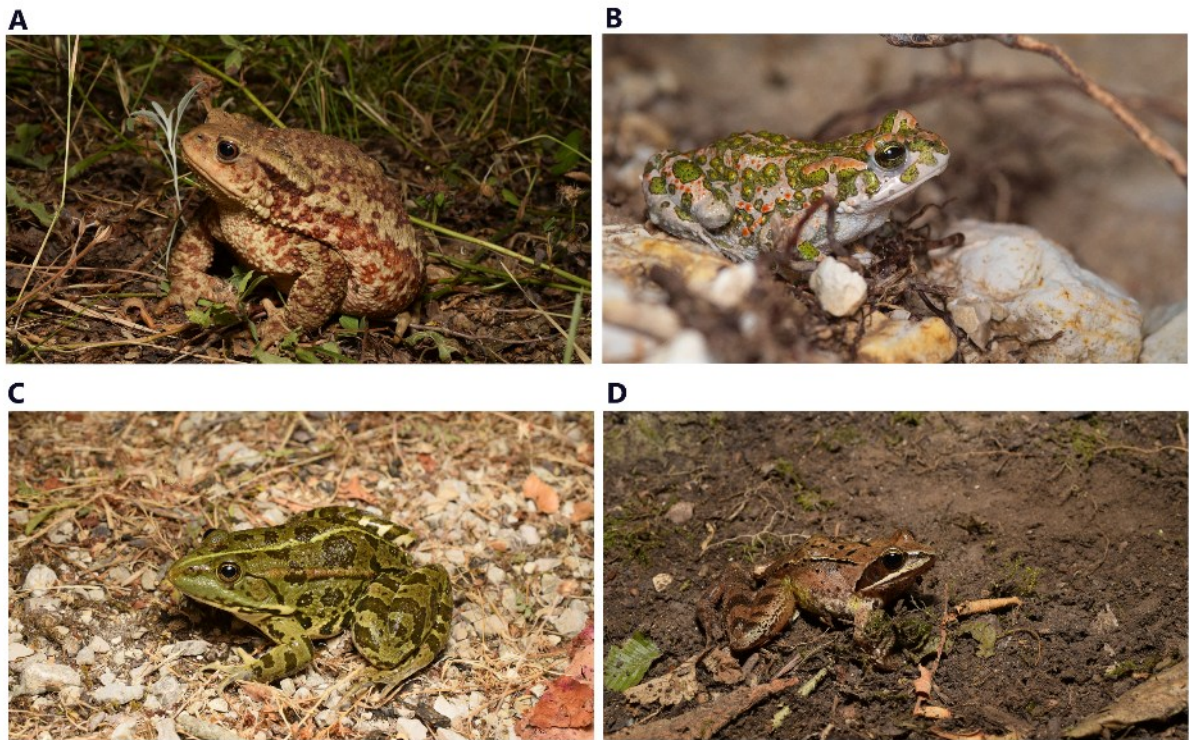


Figure 3. *Anura* in Krka National Park. A) *Bufo bufo* © Edward Gilbert, 2025; b) *Bufotes viridis* © Sam Napaul, 2025; C) *Pelophylax kurtmuelleri* © Edward Gilbert, 2025; D) *Rana dalmatina* © Edward Gilbert, 2025.

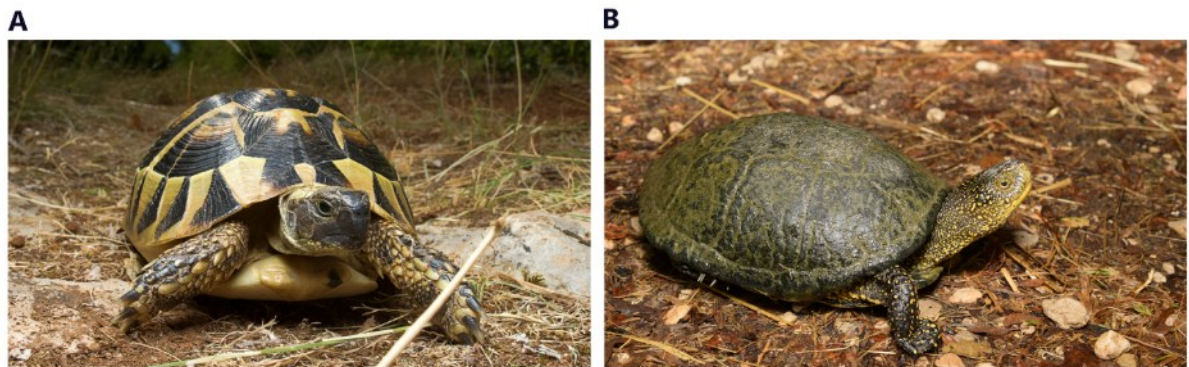


Figure 4. *Testudinae* in Krka National Park. A) *Testudo hermanni* © Josh Phanghura, 2022; B) *Emys orbicularis* © Edward Gilbert, 2025.



Figure 5. Squamata, suborder Sauria in Krka National Park. A) *Algyroides nigropunctatus* © Oliver Thomas, 2021; B) *Hemidactylus turcicus* © Edward Gilbert, 2025; C) *Lacerta trilineata* (subadult) © Edward Gilbert, 2025; D) *Podarcis melisellensis* © Josh Phanghura, 2022; E) *Podarcis siculus* © Josh Phanghura, 2022; F) *Pseudopus apodus* © Sam Napaul, 2025.



Figure 6. *Squamata*, suborder *Serpentes* in Krka National Park. A) *Elaphe quatuorlineata* © Oliver Thomas, 2021; B) *Hierophis gemonensis* © Edward Gilbert, 2025; C) *Natrix natrix* © Edward Gilbert, 2025; D) *Natrix tessellata* © Edward Gilbert, 2025; E) *Telescopus fallax* © Edward Gilbert, 2025; F) *Vipera ammodytes* © Edward Gilbert, 2025; G) *Zamenis situla* © Edward Gilbert, 2025; H) *Coronella austriaca* (leucistic) © Marina Blažević, 2019.