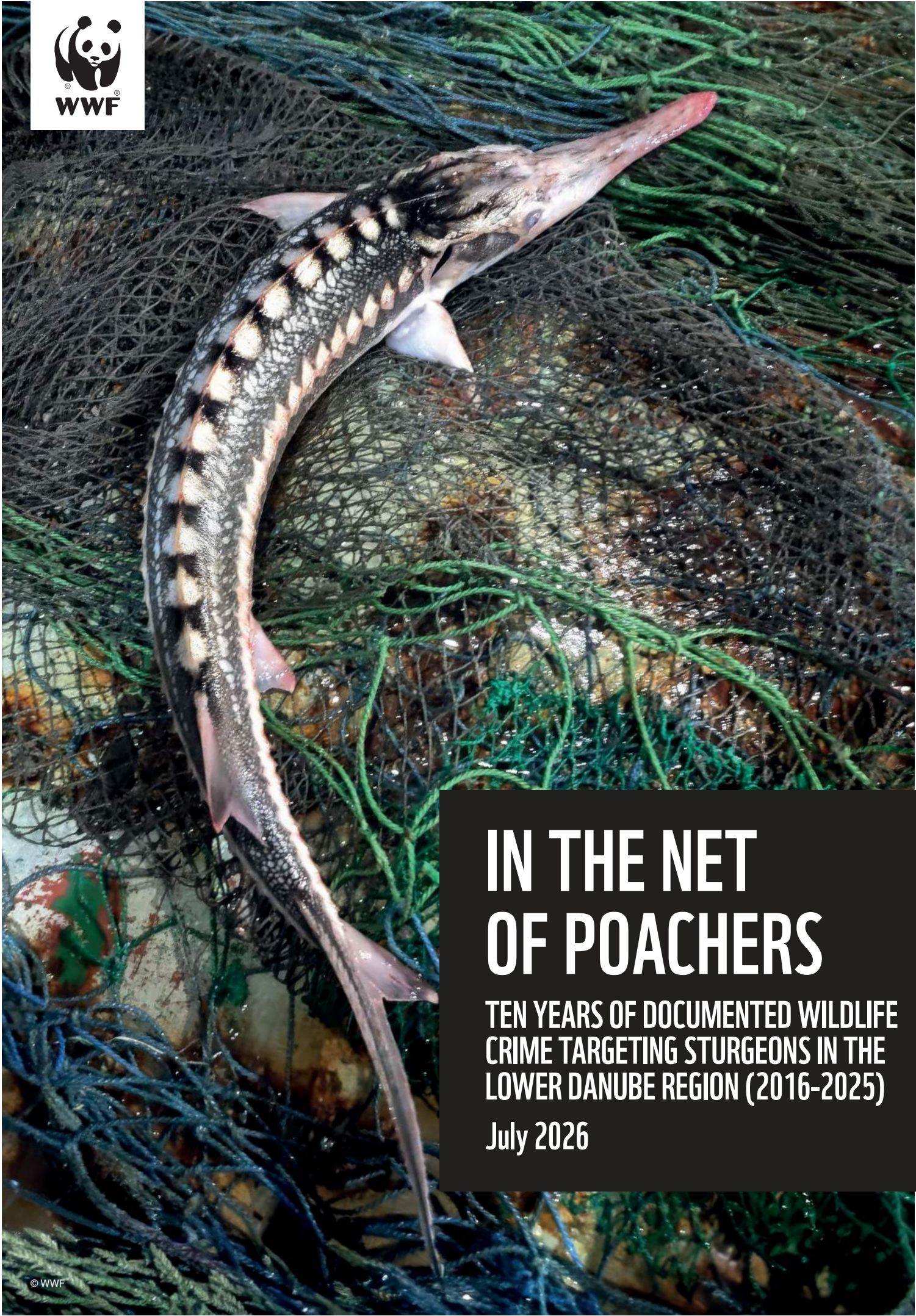


A large sturgeon, likely a European sturgeon, is shown entangled in a green and blue fishing net. The fish has a long, pointed snout and a pattern of dark spots and bands along its body. The net is draped over a rocky surface.

IN THE NET OF POACHERS

TEN YEARS OF DOCUMENTED WILDLIFE
CRIME TARGETING STURGEONS IN THE
LOWER DANUBE REGION (2016-2025)

July 2026

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- Border Police
- National Environmental Guard
- National Agency for Fisheries and Aquaculture
- Customs

UKRAINE:

- State Fisheries Agency, including reports from the Kherson, Chernivtsi, Odesa, Azov Sea, and Black Sea Fishing Patrols
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- Ukrainian State Border Guard Service
- State Environmental Inspection
- State Judicial Administration of Ukraine



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SUMMARY

This study assesses the extent of illegal activities affecting strictly protected sturgeon species in Bulgaria, Romania, and Ukraine over the past decade. It is based on official records of seizures of sturgeon specimens, illegal fishing gear, meat, and caviar, as reported by national law enforcement authorities and systematically compiled and analysed by WWF.

Between 2016 and 2025, a total of 509 seizure cases were documented across the three countries. Beyond reporting case numbers, the study introduces a novel method for estimating the total number of sturgeons affected, resulting in an estimate of at least 3,366 individuals. These figures likely represent only a fraction of the true scale of illegal exploitation, as many cases are likely to remain undetected, undocumented, or unreported.

Romania accounted for the largest share of recorded cases, with 235 cases (46% of the total), followed by Bulgaria with 175 cases (34%), and Ukraine with 99 cases (19%). Lower numbers in Ukraine can be explained by a later onset of systematic data collection and reduced enforcement reports since the onset of the war.

All four sturgeon species present in the Lower Danube were found to be impacted. The sterlet (*Acipenser ruthenus*) is the most frequently reported species, accounting for 42% (1,408 individuals), followed by unidentified sturgeon species (34%, 1,157 individuals), stellate sturgeon – *Acipenser stellatus* (16%, 523 individuals), Russian sturgeon – *Acipenser gueldenstaedtii* (5%, 179 individuals), and beluga sturgeon – *Huso huso* (3%, 99 individuals). Individual seizure events sometimes involved more than 100 fish, particularly for sterlet (*Acipenser ruthenus*) and stellate sturgeon (*Acipenser stellatus*). In the case of beluga sturgeon (*Huso huso*), confiscated individuals included exceptionally large specimens exceeding two metres in length and up to 200 kg in weight. While many animals were found dead, some could be recovered alive and successfully released.

In addition to whole fish or sturgeon meat totalling 6.5 tons, a minimum of 263.36 kg of caviar was seized. Notable cases include a 2019 seizure in Romania involving 91 jars of caviar totalling 40 kg, with an estimated value of €46,500. Given market prices of up to €10,000 per kilogram, even small quantities of caviar can represent substantial economic value and create strong incentives for illegal trade.

Seizures also included large quantities of illegal fishing gear, particularly prohibited hook-lines (*karmaci*), traditionally used for sturgeon fishing. A total of 1,250 such lines were recorded, mainly in Bulgaria, with a combined length exceeding 45 km and approximately 54,000 hooks capable of ensnaring sturgeon.

Geographical hotspots of illegal activity were identified in all three countries. Particularly prominent areas include Tulcea County in Romania and Odesa Oblast in Ukraine — both encompassing the Danube Delta and Black Sea coastal areas — as well as Vratsa Oblast along the Danube in Bulgaria. These areas coincide with critical sturgeon habitats and general fishing grounds; however, spatial patterns in reported cases may also reflect variations in enforcement intensity and reporting practices.

Overall, the findings highlight the persistent and widespread nature of illegal exploitation of sturgeon populations in the Lower Danube region and underscore the urgent need for strengthened enforcement, monitoring, and conservation measures.



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INTRODUCTION

Over the past decades, anthropogenic pressures on sturgeon species in the Lower Danube and the Black Sea have led to their dramatic decline.

Of the six native species once present in the Danube, two —the Atlantic sturgeon (*Acipenser sturio*) and the ship sturgeon (*Acipenser nudiiventris*) —have already disappeared from the region. The remaining four species are classified as Critically Endangered —beluga (*Huso huso*), Russian sturgeon (*Acipenser gueldenstaedtii*), and stellate sturgeon (*Acipenser stellatus*) —or Endangered —sterlet (*Acipenser ruthenus*)^{1,2}.

At the national level, all Lower Danube countries have listed all native sturgeon species as protected species. Bulgaria, Romania, Ukraine, as well as Serbia and Moldova have imposed permanent fishing bans for these species. The same applies to the other countries at the Black Sea: Türkiye (Turkey), Georgia, and Russia. In Bulgaria, Romania, and Ukraine, the bans cover both riverine and marine fishing, and incidentally caught sturgeons (bycatch), whether alive or dead, must be returned to the water.

In the Black Sea, recent developments under the General Fisheries Commission for the Mediterranean (GFCM) have significantly strengthened the protection of sturgeon species³. In 2024, GFCM adopted the first binding regional recommendation

for the permanent prohibition of targeted sturgeon fishing in the Black Sea. The recommendation also introduces enhanced obligations for monitoring incidental catch, improving handling practices, and systematically reporting data.

At the European and international levels, broad legal frameworks support sturgeon conservation. The EU Habitats Directive⁴ lists all Danube sturgeon species under Annex V, obliging Member States to ensure that their exploitation and taking in the wild is compatible with maintaining their Favourable conservation status. Notably, all sturgeon species in Europe are reported by the Member States to be in Unfavourable (or Unknown) conservation status. The Convention on International Trade in Endangered⁵ Species of Wild Fauna and Flora (CITES)⁶ and EU Wildlife Trade Regulations largely restrict international trade in wild-caught specimens and their products and require a rigorous caviar labelling system with the aim of ensuring that all caviar entering the market comes from⁷. The Environmental Crime Directive (2008/99/EC) criminalises serious offences such as the illegal capture, possession, and trade of protected species. The 2022 EU Action Plan against Wildlife Trafficking

1. International Union for Conservation of Nature (IUCN). 2022.

<https://iucn.org/press-release/202207/migratory-monarch-butterfly-now-endangered-iucn-red-list>

2. IUCN Red List. 2023. *Search results for Acipenseriformes species status*.

<https://www.iucnredlist.org/search/grid?taxonomies=100672&searchType=species>

3. General Fisheries Commission for the Mediterranean (GFCM). (2024). Recommendation GFCM/47/2024/11 on establishing measures on sturgeons (Acipenseridae) in the Black Sea. Rome: FAO.

4. Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A01992L0043-20130701>

5. Conf. 12.7 (Rev. CoP17) Conservation of and trade in sturgeons and paddlefish

<https://cites.org/sites/default/files/documents/COP/19/resolution/E-Res-12-07-R17.pdf>

6. Commission Regulation (EC) No 865/2006 (as amended) <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1591263988986&uri=CELEX:32006R0865>

7. European Parliament and Council. 2008. Directive 2008/99/EC on the protection of the environment through criminal law.

https://environment.ec.europa.eu/law-and-governance/environmental-compliance-assurance/environmental-crime-directive_en



Source: Romanian Border Police

further reinforces this framework by outlining strategic priorities to prevent and effectively fight wildlife⁸ trafficking⁹.

However, despite these legal protections, sturgeon poaching and the illegal trade in caviar and sturgeon meat remain persistent and severe challenges in the

Lower Danube region. WWF's most recent analysis highlighted the scale of these crimes^{10,11}. The Pan-European Sturgeon Action Plan, adopted under the Bern Convention and endorsed for implementation under the EU Habitats Directive, highlights the urgent need for the eradication of poaching, identified as a major driver of loss in biodiversity.

8. European Commission. 2022. EU Action Plan against Wildlife Trafficking (COM/2022/581 final).

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2022:581:FIN>

9. European Commission. 2022. EU Action Plan against Wildlife Trafficking (COM/2022/581 final).

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2022:581:FIN>

10. WWF. 2024. Poaching of sturgeon: Still a continuing threat to the survival of wild sturgeon in the Lower Danube Region.

https://wwfint.awsassets.panda.org/downloads/poaching-of-sturgeon_en_low-res_final.pdf

11. WWF. 2021. Evidence for Trafficking of Critically Endangered Sturgeon in the Lower Danube Region.

https://wwfcee.org/pdf_collections/19/Market-survey-final.pdf

WWF Austria & WWF CEE; 63pp https://wwfint.awsassets.panda.org/downloads/market_survey_final.pdf

12. Council of Europe. 2018. Pan-European Action Plan for Sturgeons – Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention). <https://rm.coe.int/pan-european-action-plan-for-sturgeons/16808e84f3>

METHODOLOGY

SOURCES AND TYPES OF DATA

This report is based on a structured compilation of data on illegal sturgeon fishing and trade from Bulgaria, Romania, and Ukraine, collected over a period of 10 years — between 1 January 2016 and 31 December 2025.

Seizure data was provided by competent national law enforcement agencies in response to yearly formal requests. Agencies included fisheries authorities, police forces, border control, Customs, etc. In addition, a limited number of verified media reports (e.g., website articles or social media posts by the respective agencies) were included after careful cross-referencing with official sources. The core methodology remains consistent with previous reports (e.g., 2021¹⁰, 2023¹³ and 2024⁹). These reports summarise and analyse official seizure data from various enforcement authorities and represent them at national and regional levels.

The data were compiled into a centralised database managed by WWF and analysed using structured datasets that include both aggregated case statistics and detailed incident-level information. These datasets encompass various forms of wildlife crime involving sturgeon, such as the use of illegal fishing gear (e.g., *karmaci* hook lines), the poaching of wild sturgeon, and the unlawful transportation or trade of sturgeon products, including meat and caviar. Supplementary insights were derived from raw entries, enabling both quantitative and spatial analysis of patterns across time and countries.

The categories of information compiled include:

- Type and specifications of illegal activity;
- Quantity of specimens or products seized (in kilograms, for specimens additionally in number of individuals);
- Sturgeon species affected;

- Type and specifications of fishing gear seized;
- Date and location of the incident (ideally including Danube River kilometre);
- Apprehending agency.

The current report remains the only publicly accessible dataset on sturgeon-related wildlife crime in the Lower Danube Region. The collected information is generally restricted to the apprehending agency and not shared with other national bodies or across borders.

This synthesis is crucial for improved national and regional cooperation, for understanding cross-border dynamics and for informed coordinated enforcement strategies.



13. WWF. 2023. Poaching of sturgeon: A continuing threat to the survival of wild sturgeon in the Lower Danube Region. https://www.wwf.org/pdf/collections/31/2023_WWF_Report_%20Sturgeon%20Seizure%20Data%20LDR%20FINAL.pdf

LIMITATIONS AND SCOPE OF THE STUDY

Only cases submitted by official bodies or obtained through verified published information are used in this report. It is likely that additional cases were not detected, recorded, or submitted.

Some authorities reported no data or only very limited data, although seizures might have been carried out by these authorities during the reporting period. Therefore, e.g., seizures of caviar in international trade or wildlife crime in parts of the surveyed region might be underrepresented.

Despite progress in data collection, the data presented here had to be interpreted with caution. Due to inconsistent reporting standards and varying levels of detail between countries and agencies, the figures represent minimum verified values rather than comprehensive totals. In some cases, incomplete or missing details prevented inclusion in the analysis.

This is particularly relevant for calculating quantities (e.g., number of specimens, amounts of caviar, or length of gear), as some seizures were only described in qualitative terms (e.g., “several jars of caviar”) or lacked geographic or temporal information.

It must be pointed out that in many cases the source of affected sturgeons cannot be determined. While seizures from nets or fishing boats or at fishing sites indicate illegal sourcing from the wild, this information is often not available; in a few cases (e.g., seizures of exotic species), sourcing from aquaculture is obvious.

METHODOLOGICAL REFINEMENTS

During the analysis process for this report, some corrections were made and important data deficiencies were addressed. This aims to ensure that all information received from authorities is represented as comprehensively as possible and that the most robust assessment achievable of the ongoing sturgeon trafficking and its impact in the Lower Danube region is made available.

In many reported seizure cases, especially from Romania, the number of specimens was not recorded. In previous reports, these cases were therefore omitted when assessing the number of sturgeon individuals involved. This likely resulted in a substantial underestimation of the number of affected individuals.

In the current report, a calculation was applied to approach a more realistic picture of the actual number of individuals affected.

For previously omitted cases, in which the number of individuals was not specified, but a total weight of the whole seizure was included, a calculated “average weight” of sturgeon species was used to assess the number of individuals involved in these cases. This “average weight” is based on reported seizures over the past ten years, in which both the number and the weight of the sturgeons and ideally the species of sturgeon were recorded (see Table 1). Records were included only if species identification and weight data were sufficiently reliable. Entries with uncertain species identification were grouped as “Sturgeon”. Unreliable records and non-native species were excluded

SPECIES	NUMBER OF INDIVIDUALS (N)	TOTAL WEIGHT IN KG	CALCULATED AVERAGE WEIGHT PER INDIVIDUAL (KG)
STERLET	219	201.400	0.920
STELLATE STURGEON	140	440.400	3.145
RUSSIAN STURGEON	32	222.900	6.966
STURGEON (UNSPECIFIED OR MULTIPLE)	56	90.000	1.607
RUSSIAN AND STELLATE STURGEON (COMBINED)	172	663.300	3.856

Table 1. Calculation of average weight per individual by species/group of species



Source: Romanian Border Police

This means, that in a case in which the weight of the seizure was reported with 5.4 kg of sterlet (*Acipenser ruthenus*) and 5 kg of stellate sturgeon (*Acipenser stellatus*) but no number of individuals was specified, the average weight was applied to calculate six individual sterlets – *Acipenser ruthenus* (5.4 kg / 0.920 average weight per individual sterlet – *Acipenser ruthenus* in kilograms) and two individual stellate sturgeons – *Acipenser stellatus* (5.0 kg / 3.145 average weight per individual stellate sturgeon – *Acipenser stellatus* in kilograms).

In previous reports, the now estimated eight animals of this case were not included in the count of affected individuals.

For beluga (*Huso huso*), the calculation method was not used to estimate the number of individuals, because the sample size was limited and the reported weights of individuals varied greatly. The inclusion of immature specimens would have resulted in overestimations of the numbers of individuals at the Danube River, where predominantly large, sexually mature individuals are recorded. Therefore, for this species, an expert-based conservative assumption of a minimum of one individual per case was applied when count data were missing.

For jointly reported Russian sturgeon (*Acipenser gueldenstaedtii*) and stellate sturgeon (*Acipenser stellatus*), a pooled mean value (3.856 kg) was used,

derived from cases with known counts and weights of individuals of these two species. This approach was adopted because both species have substantially higher individual body mass compared to smaller sturgeon species (e.g., sterlet – *Acipenser ruthenus*). The use of a general mean value for unspecified sturgeon categories would therefore lead to an overestimation of the number of individuals, as lower average weights would artificially inflate abundance estimates when back-calculating from total biomass.

In most of the reported cases in the database, data is aggregated (individual counts of seized sturgeons and their total weight). For this reason, the arithmetic mean was used instead of the median because pre-aggregation prevents accurate calculation of median values. Cases with an unknown number of individuals and an unknown total weight were counted as 1 individual.

Seizures of caviar were counted as 0 individuals, because seizures sometimes included sturgeon individuals and caviar, and it remained unclear if the caviar was from the reported individual, to avoid double counting. In earlier iterations, some Romanian cases lacked standardization in species identification and product type (meat vs. caviar). For 2023-2025, additional efforts were made to differentiate between specimen-based and product-based seizures, which improve analytical clarity.

RESULTS AND DISCUSSION – REGIONAL OVERVIEW

The present analysis covers the three key countries along the Lower Danube — Bulgaria, Romania, and Ukraine — and is based on verified data obtained from national authorities and verified media reports for the period 2016 to 2025.

The documented illegal activities involving sturgeon include:

- Use of prohibited (e.g., *karmaci* hook lines) or non-selective fishing gear targeting sturgeons;
- Direct poaching of sturgeons, with specimens seized onboard fishing vessels or in fishing gear;
- Transportation of illegally caught sturgeons (to local markets or other destinations);

- Illegal sale or cross-border trade of caviar and sturgeon meat.

These four categories summarise the dominant patterns observed in the data. However, due to limitations in the reporting detail, not all seizure cases could be explicitly assigned to a single category.

DOCUMENTED CASES OF STURGEON-RELATED WILDLIFE CRIME

Between 2016 and 2025, a total of 509 confirmed cases of sturgeon-related wildlife crime were reported across the three countries. This figure underscores

a persistent and widespread threat to wild sturgeon populations in the Lower Danube Basin.

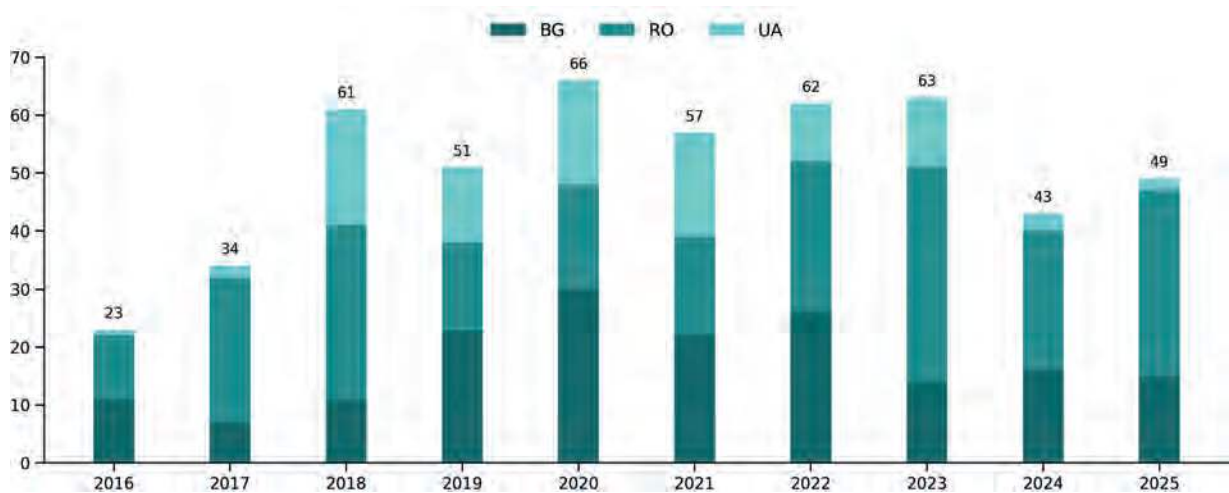


Figure 1. Annual number of documented illegal cases related to sturgeon in the Lower Danube region - Bulgaria, Romania, Ukraine (2016-2025)

OVER THE FULL TEN-YEAR PERIOD,
OUT OF THE **509 DOCUMENTED CASES:**

ROMANIA ACCOUNTED FOR THE
LARGEST SHARE OF RECORDED CASES,
WITH **235 CASES**, EQUIVALENT TO 46%
OF THE TOTAL;

BULGARIA FOLLOWED WITH **175 CASES**,
EQUIVALENT TO 34%;

UKRAINE REPORTED **99 CASES** (19%).

These proportions remained broadly consistent over time, though annual fluctuations reflect a complex interplay of enforcement efforts, geographic conditions, and accessibility in each country.

Following an increase at the start of cooperation with national enforcement authorities, the numbers of reported illegal cases ranged between 51 and 66 cases per year, with a peak in 2020. In 2024 and 2025, authorities documented 43 and 49 cases, respectively. The decline likely reflects a combination of reduced reporting capacity and limited access to key areas due to war-related constraints.

Critical regions such as Kherson, Zaporizhzhia, and parts of Donetsk Oblast, as well as the Danube Delta area, which are significant sturgeon habitats, have been heavily impacted by military operations and occupation. These conditions likely impaired access to civilians and enforcement authorities thus interrupting legal and illegal fishing activities as well as enforcement efforts. It is not clear if the reduced number of reported cases from Ukraine in recent years may reflect severe limitations in monitoring and reporting capacity or are based on limited access to key areas.



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GEOGRAPHIC DISTRIBUTION AND HOTSPOTS

The geographic resolution of reported illegal sturgeon-related activities varies by country and individual case.

Some reports in Bulgaria contain precise geographic information, such as river along the Danube. In Romania and Ukraine, data are often limited to the name of the administrative unit (county/oblast). Nine cases from Romania that could not be assigned to a specific county/oblast were excluded from the spatial analysis.

The maps below visualise the distribution of documented cases by county (Romania) / oblast (Bulgaria and Ukraine) for:

- The full ten-year period (2016-2025), and
- The last two years of the study period (2024 and 2025).

Colours —red, orange, yellow— indicate the relative share of each region in the national total, allowing for the identification of persistent and emerging hotspots of illegal cases against sturgeons.

PERSISTENT HOTSPOTS (2016-2025)



Map 1. Sturgeon-related offences in the Lower Danube Region by district (2016-2025)

Throughout the ten-year period, each country displays one dominant region that accounts for more than one-third of its national cases:

- In Bulgaria — Vratsa Oblast, with 45% of all cases reported in Bulgaria (79 out of 175 cases);
- In Romania — Tulcea County, with 50% of all cases reported in Romania (118 out of 235 cases);
- In Ukraine — Odesa Oblast, with 43% of all cases reported in Ukraine (43 out of 99 cases).

These regions correspond to critical sturgeon habitats and general fishing zones: the oblast Vratsa is located along a stretch of the Lower Danube in Bulgaria that contains relevant sturgeon spawning sites; the county Tulcea includes most of the Romanian Danube Delta; and Odesa Oblast covers Ukrainian deltaic waters and large stretch of adjacent Black Sea coastal area. These patterns are consistent with the ecological importance of these areas for sturgeon lifecycles, thus the likelihood for poachers to catch sturgeons is increased there.

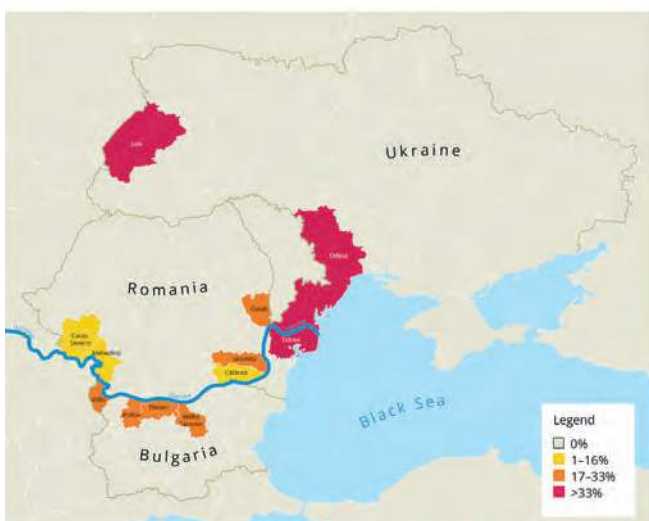
It is noteworthy that on the Romanian side of the Danube, directly opposite the identified hotspot region of Vratsa in Bulgaria, no sturgeon-related cases were reported in Dolj County over the entire ten-year period. Similarly, no cases were documented from Teleorman County, another Romanian county situated along the Danube. This absence is notable given the proximity to identified hotspots; however,

it may reflect shortcomings in enforcement coverage, reporting, or detection rather than an actual absence of illegal activity there.

Regional coverage of seizures varies by country:

- In Ukraine, 56% of the administrative regions reported at least one case (15 of 27 oblasts, including Kyiv, Sevastopol, and the Autonomous Republic of Crimea). The oblasts with most reported cases are at the Black Sea, but wildlife crime has also been reported from many oblasts along the border and from the capital Kyiv.
- In Romania, the share of counties with reported cases is at 40% (17 of 41 counties plus the capital Bucharest). Most counties from which reports were received are located at the lower reaches of the Danube, in the delta or on the Black Sea coast. However, cases were also reported from inland counties or land border regions.
- In Bulgaria, reports were received from 29% of all oblasts (8 of 28 oblasts). Apart from an isolated case from the capital Sofia (the seizure of caviar at Sofia Airport), all of these are located along the Danube. It is notable that no reports of illegal activities have been received from the Bulgarian Black Sea coast, while both hotspot areas in Romania, and Ukraine are located on the Black Sea and in the Danube Delta.

RECENT TRENDS AND LATEST DEVELOPMENTS



Map 2. Sturgeon-related offences in the Lower Danube Region by district (2024)



Map 3. Sturgeon-related offences in the Lower Danube Region by district (2025)

In the last recorded years — 2024 and 2025 — spatial patterns showed continued concentration of cases in established hotspots.

In Romania, counties at the lower part of the Danube and in the delta remained the most significant contributors, with a few cases further up the Danube and a 1st seizure (2.8 kg of caviar) in Maramureş County, at the border to Ukraine, in 2025.

In Bulgaria, all documented cases originated again from oblasts along the Danube, including Vidin, Vratsa and Veliko Tarnovo in both years.

From Ukraine, only 3 cases were reported in 2024 (again in the hotspot district Odesa and a 1st seizure in Lviv, at the border to Poland) and 2 cases in 2025 (both in Odesa). These extremely low figures must be seen in the light of the ongoing war with Russia: large parts of southern and southeastern Ukraine, particularly Kherson, Zaporizhzhia, and Donetsk, have been severely affected. Once reporting sturgeon-related seizures, these areas are now frontline zones or under restricted access, limiting both the patrols and the activities of fishers and poachers.

IMPLICATIONS

The persistent geographic concentration of sturgeon-related crimes in specific regions points to systemic vulnerabilities. These likely stem from:

- Ecological factors (presence of key sturgeon habitats);
- Socio-economic drivers (dependency on fishing in rural communities);
- And enforcement dynamics (regional disparities in inspection frequency and inter-agency coordination).

Clearly, the likelihood of detecting such offences is closely tied to the intensity and distribution of enforcement efforts, which can vary significantly between regions. The absence of reported cases from certain counties along the Danube or Black Sea coast should not be mistaken for a genuine absence of illegal activity. Rather, it may reflect lower enforcement presence, underreporting, or —as for Ukraine —a lack of accessibility of certain areas. Likewise, in regions identified as hotspots, it remains unclear to what extent the elevated number of recorded cases stems from higher poaching pressure versus more consistent and targeted —or reported —enforcement.

FISHING GEAR REPORTED AS USED FOR ILLEGAL ACTIVITIES TARGETING STURGEONS

Various types of fishing gear have been reported in connection with illegal sturgeon-related activities. While certain fishing gear types may be legal under national law, their use becomes unlawful when applied for the targeted capture of protected species such as sturgeons. However, *karmaci* —unbaited hook lines traditionally used for catching sturgeons —are prohibited in all three countries of the Lower Danube region.

In many cases, the exact poaching method remains unclear due to limited reporting on gear type.

However, *karmaci* dominate the seizures in Bulgaria: During the full monitoring period (2016-2025), enforcement authorities confiscated a total of 1,250 *karmaci* hook lines, comprising a reported number of 53,899 individual hooks and spanning a combined length of more than 45 km. In 2025 alone, 155 *karmaci* were seized, with a combined number of 7,700 hooks and a total length of at least 5.5 km reported. Despite existing bans, these figures underscore the continued

use of this highly destructive gear type and provide a stark indication of the scale of illegal sturgeon fishing operations and their potential impact on vulnerable populations. However, the number of sturgeons seized in Bulgaria is stunningly low throughout all years. Given the significant physical effort required to deploy *karmaci* hook lines, the associated risk of detection by enforcement authorities, and the financial losses incurred when such gear is confiscated, this discrepancy suggests possible gaps in detection, reporting, or enforcement focus, rather than an absence of successful sturgeon capture. This lack of seized sturgeons in combination with these high numbers of seized hook lines warrants further analysis of enforcement patterns and reporting practices, including potential gaps in detection, documentation, and reporting practices. It may also indicate a need for adaptation of national control tactics, including enhanced patrolling at deployment sites and improved coordination between field inspection and forensic follow-up.

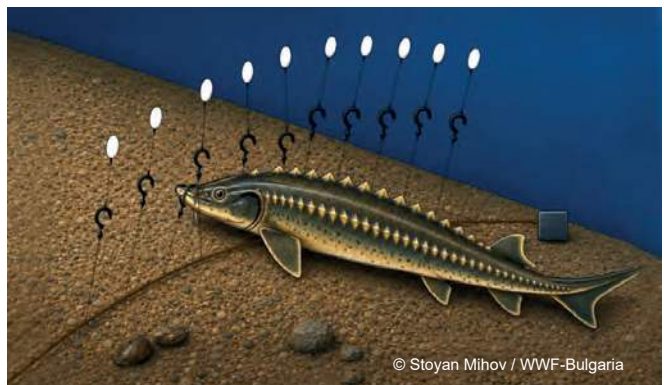
In Romania, in contrast, only two cases with seizures of *karmaci* hook lines were documented, with one case involving one *karmaci* with 500 hooks in 2019 and another 62 *karmaci* and a total of 2375 hooks in 2023, both in Tulcea County at the Black Sea. However, the Romanian fisheries authority was also involved in two seizures of *karmaci* reported by the Bulgarian authorities; these were found in the Danube in the oblast Veliko Tarnovo and included 21 *karmaci* with a total length of 1470 m in 2019 and three *karmaci* with 105 m and 216 hooks in total in 2023.

In Ukraine, no *karmaci* were reported at all throughout the entire period under review.

The absence of reported *karmaci* in large parts of the Lower Danube Region — particularly in contrast to the numerous findings in Bulgaria — is notable. This is especially striking given that multiple seizure cases were recorded in areas traditionally associated with *karmaci* use, such as parts of the Danube Delta and along the Romanian Black Sea coast, yet without explicit identification of *karmaci* in the official records. Apart from *karmaci*, other fishing gear types, notably various forms of nets, have been seized, particularly in Romania and Ukraine. In Romania, in several cases, ohane nets are reported — special, thick fishing nets designed especially for catching sturgeons.

In some instances, sturgeons were likely caught as bycatch but not immediately released as required by law. Even if not targeted directly, the retention of bycatch sturgeon is illegal taking from the wild, thus overlapping with poaching, and still poses a significant

conservation risk. The harmful effect of non-selective gear on sturgeon populations remains critical, emphasizing the need for more vigorous enforcement and awareness regarding the use of prohibited or misused legal gear.



Baitless demersal longlines for sturgeon poaching in the Danube and Black Sea (Karmaci). AI generated.

AFFECTED STURGEONS - INDIVIDUALS

Using the newly applied approximation method (see Methodology), it is now possible for the first time to estimate a more realistic number of sturgeons affected by wildlife crime in the Lower Danube region over the past decade. The approximation amounts to 3,366 individuals in total over ten years, including 25 sturgeons reportedly seized in Bulgaria (less than 1 % of all individual sturgeons), 2,960 in Romania (88% of all individuals), and 381 in Ukraine (11% of all individuals).

These figures exclude seizures involving non-native sturgeon species (60 specimens of Amur sturgeon and other species from a fish farm in Ukraine, and meat of Adriatic sturgeon in Romania). Seizures of caviar are also not included.

Reported confiscations of sturgeon meat (in several cases in Romania and Ukraine) were conservatively counted as representing a minimum of one individual, unless more precise information — such as the number of heads — was available.

Given the rarity and endangered status of sturgeons, these figures point to an alarmingly high level of pressure on the remaining wild populations. Furthermore, they do not take into account undetected or unreported illegal activities, suggesting that the actual number of sturgeons poached and trafficked in the Lower Danube and Black Sea is likely to be considerably higher.



Figure 2. Annual number of sturgeons affected by wildlife crime in the Lower Danube region - Bulgaria, Romania, Ukraine (2016-2025)

Across the entire region, the total number of sturgeon individuals —based on reported numbers and estimations derived from reported weights —peaked in 2017, followed by 2018. These annual figures do not necessarily correspond to the number of documented seizure cases (see Documented cases of sturgeon-related wildlife crime), but they provide a more meaningful indication of the actual impact on sturgeon populations.

Romanian authorities reported the highest annual numbers of seized sturgeon individuals throughout the surveyed period, same as for reported seizure cases, although the temporal patterns differ.

In Ukraine, substantial quantities of sturgeon specimens were recorded in seizures, particularly between 2019 and 2022, with a peak in 2022. In contrast, only isolated seizure cases were reported in 2024 and 2025, reflecting the effects of the war on both fishing pressure and law enforcement operations.

In Bulgaria, authorities reported very few seized sturgeon individuals over the ten-year period. While only single individuals were recorded in some years, the increase to 19 sturgeons in 2025 indicates a notable change. Nevertheless, the overall low total of just 25 officially recorded specimens stands in stark contrast to the 1,250 *karmaci* hook lines seized during the same period.

The true scale of poaching and trafficking affecting sturgeon in the region is certainly underestimated and must be interpreted with caution. It is widely acknowledged in criminology that detected crimes represent only a fraction of actual offenses — a phenomenon especially true for wildlife crime, which often receives less institutional attention and fewer enforcement resources than crimes with more direct economic incentives.

AFFECTED STURGEONS – SPECIES

All four native sturgeon species —beluga (*Huso huso*), Russian sturgeon (*Acipenser gueldenstaedtii*), stellate sturgeon (*Acipenser stellatus*), and sterlet (*Acipenser ruthenus*) —were documented among the seizures recorded between 2016 and 2025.

The number of affected individuals per species offers important insight into which species are most frequently targeted or intercepted in poaching and

trafficking cases. Where the number of individuals per case was not reported, estimates were derived from reported total weights (see Methodology).

Individuals lacking species identification, as well as those from cases where multiple species were reported collectively, are categorised as “Sturgeon (unspecified)”. Non-native species were excluded from the analysis.

Overall, the available evidence indicates widespread pressure on all native sturgeon species.

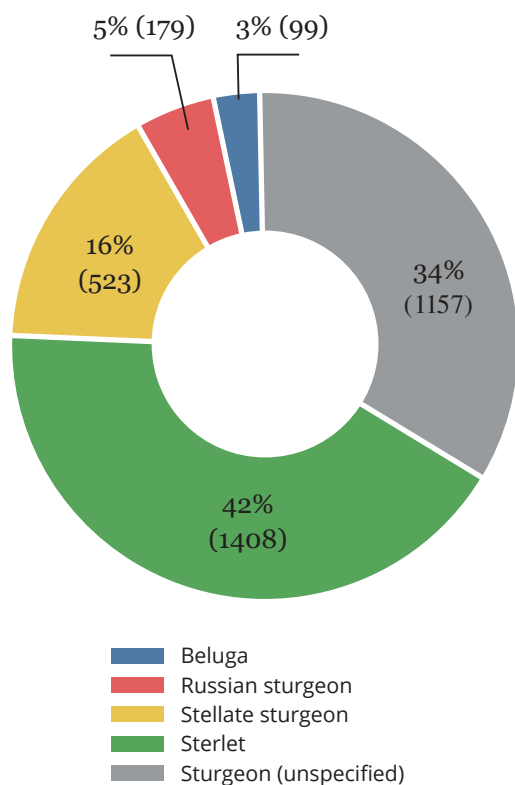


Figure 3. Total number of sturgeons affected by wildlife crime, per species, in the Lower Danube region - Bulgaria, Romania, Ukraine (2016-2025)

The sterlet (*Acipenser ruthenus*), classified as Endangered on the IUCN Red List, is by far the most frequently recorded species in enforcement data. It accounts for 42% of all seized individuals over the ten-year period and was documented in more than 100 cases with a total of 1,408 individuals. While most cases involved fewer than ten individuals, some included large quantities of up to 154 specimens.

Unlike other sturgeon species, sterlet (*Acipenser ruthenus*) is relatively small-bodied and commonly found upstream river stretches, making it more accessible to inland poachers using simple gear. Its shorter generation time and higher relative abundance in some parts of the Danube, particularly in regions where other sturgeon species have become increasingly rare, may also increase encounter rates in seizures.

The stellate sturgeon (*Acipenser stellatus*), listed as Critically Endangered, ranked second among the

determined species, comprising 16% of all individuals (523 in total) and recorded in approximately 100 cases. This may reflect its vulnerability and possibly a higher likelihood of detection in areas where the species is still relatively present. Approximately half of the cases involved one to two individuals, though several cases recorded more than ten and up to 107 specimens.

The Russian sturgeon (*Acipenser gueldenstaedtii*), also Critically Endangered and very rare in the Danube, was identified in 35 cases and represents 5% of all individuals (179 in total). Most cases involved one to three specimens, with only a few involving more than ten individuals.

The beluga (*Huso huso*), a Critically Endangered keystone species and apex predator in the Danube system, was recorded in 33 cases, accounting for 3% of all individuals (99 in total). Seizures included both very large specimens —exceeding two metres in length and weighing up to 200 kg —and smaller individuals of only a few kilograms, particularly in marine habitats. The loss of large, old individuals is particularly critical, as these animals play a key role in the reproduction and long-term survival of the species.

In more than 50 cases, representing 34% of all individuals (1,157 in total), the sturgeon species could not be identified or was not documented. This could reflect limitations in species identification at the enforcement level and underscores the need for improved capacity in field identification, as well as the use of genetic analysis where species cannot be reliably determined, such as in seized pieces of meat.



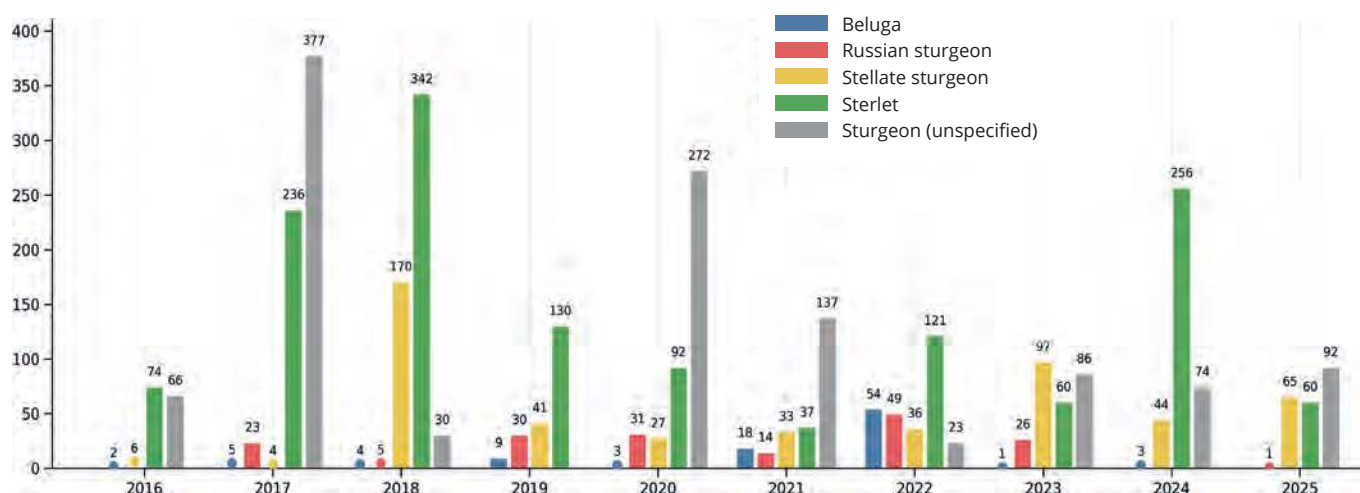


Figure 4. Annual number of sturgeons affected by wildlife crime, per species, in the Lower Danube region - Bulgaria, Romania, Ukraine (2016-2025)

In seven of the ten years under review, all four native sturgeons were reported. However, the number of seized individuals per species varied considerably across countries and between years.

For belugas (*Huso huso*), a peak of 54 individuals was recorded in 2022, due to two large seizures of smaller specimens in Ukraine. In most other years, only small numbers of belugas (*Huso huso*) were reported.

Similarly, the highest number of Russian sturgeons (*Acipenser gueldenstaedtii*) — 49 individuals — was recorded in 2022, with approximately half originating from a single seizure in Romania. In other years, seizures ranged from none to 31 individuals.

The number of reported and estimated stellate sturgeon (*Acipenser stellatus*) fluctuated substantially, ranging from 4 to 170 individuals annually, though the species was recorded every year. The peak in 2018 was primarily due to two exceptionally large seizures in Romania.

Sterlet (*Acipenser ruthenus*) was also reported in every year, with annual totals ranging from 37 to 342 individuals, making it the most frequently detected species in most years.

It is important to note that the frequency of seizures per species may be partially influenced by their natural abundance and seasonal availability in the wild, but also by other factors such as the characteristics of legal fishing nets (which are often not adapted to catching very large fish), whether operations target spawning sites or migratory corridors of certain species, differences in enforcement effort across habitats or detection capabilities.



QUANTITY OF STURGEON CAVIAR RECORDED IN SEIZURES

While most of the recorded seizures consisted of whole sturgeons or sturgeon meat (with a minimum of approx. 6,500 kg) and of illegal gear to catch sturgeons, also considerable amounts of caviar were found in the Lower Danube Region in the past ten years. A total amount of 263.36 kg of caviar was reported by authorities in the three countries. For three cases, no weight information was recorded. These cases had to be omitted from the calculations.

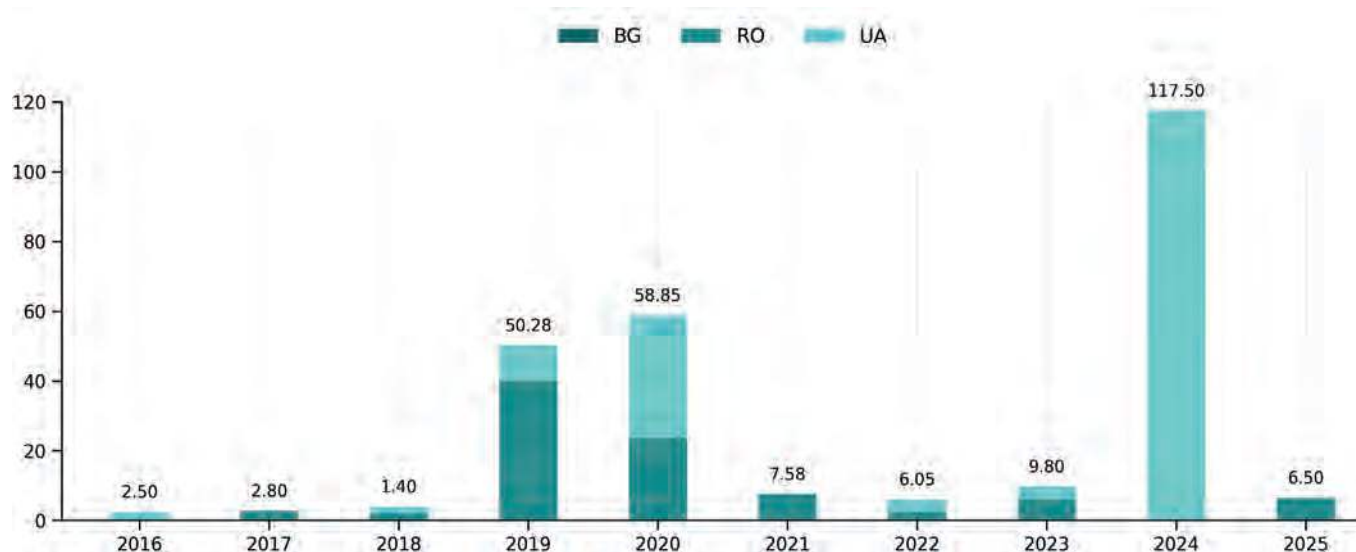


Figure 5. Quantity of seized sturgeon caviar in the Lower Danube Region — Bulgaria, Romania, Ukraine — 2016-2025, in kilograms

Several caviar seizures involve large quantities. In Romania in 2019, 91 jars containing a total of 40 kilograms of caviar worth 51,200 dollars (46,500 EUR) were found together with a beluga (*Huso huso*) of 90 kg; in 2020, 40 jars of caviar with a weight of 23.60 kg and an estimated market value of approximately 50,000 EUR were confiscated. In Ukraine, the largest caviar seizure consisted of almost 300 tins with a total weight of 117.50 kg; however, this was caviar from Siberian sturgeon produced in aquaculture, on transfer across the border into Poland without CITES permits. With market prices of up to 10,000 EUR per kilogram, even caviar quantities of a few kilograms or even decagrams are of considerable value.

The number and quantity of caviar seizures vary greatly between countries. While 11 cases with 173.93 kg in total were reported from Ukraine and 17 cases with 89.33 kg from Romania, only one seizure of caviar is known from Bulgaria, and the quantity was not specified.

These differences are partly due to the varying levels of reporting by the responsible law enforcement agencies in the three countries. In Ukraine, Customs reported numerous caviar seizures, often at border crossings during illegal imports or exports. In Romania and Bulgaria, customs reported only one case each over the ten-year period —both involving caviar. In Romania, seizures of caviar were primarily made by the police, often in combination with findings of sturgeons.

RESULTS AND DISCUSSION – BULGARIA

The data used in this report on sturgeon trafficking in Bulgaria was obtained from the following official sources:

- General Directorate Border Police;
- Executive Agency for Fisheries and Aquaculture;
- National Customs Agency;
- Regional Inspectorates of Environment and Water.

All data refers to cases between January 2016 and December 2025. The reported cases cover a range of illegal activities, including the use of prohibited fishing gear, illegal landing of sturgeon specimens, and the transportation of poached fish intended for trade.

The dataset includes the following parameters:

- Type of illegal fishing gear seized;
- Species of sturgeon involved;
- Quantity of confiscated goods (measured either in kilograms or as the number of individual specimens);
- Apprehending authority;
- Date and location of the seizure (specified where possible by river kilometre).

DOCUMENTED CASES OF STURGEON-RELATED WILDLIFE CRIME IN BULGARIA

Between January 2016 and December 2025, Bulgarian enforcement authorities reported 175 cases related to illegal activities involving the poaching and trade of protected sturgeon species.

Notably, the highest number of cases was recorded in 2020 (30 cases), followed by consistently elevated numbers from 2019 to 2022. This sustained peak likely reflects not only increased poaching pressure but also intensified control efforts by the Bulgarian Border Police, including the introduction of specialised sonar equipment for the detection of submerged illegal fishing gear.

In the last three years, the number of reported cases of illegal activities has decreased again. Since the cases in Bulgaria are primarily related to the seizure of illegal fishing gear (*karmaci*), the observed decline in the number of cases appears to be directly associated with the reduction in the number of confiscated *karmaci*. One possible explanation is that losing *karmaci* to enforcement carries significant financial consequences

for poachers, thereby discouraging repeated offences in the same areas.



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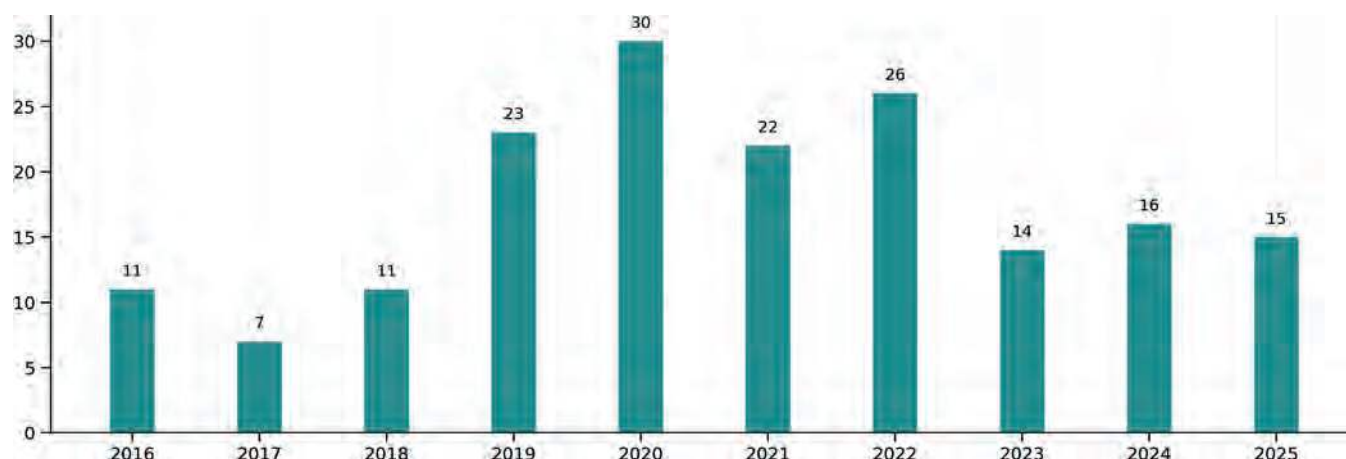


Figure 6. Annual number of documented illegal cases related to sturgeon in Bulgaria (2016-2025)

In the study period, most recorded cases involved the seizure of prohibited fishing tools, particularly longline hook systems known as *karmaci*. Only 13 cases included sturgeon specimens, but these cases increased in recent years: while one case was reported in 2019, and two cases in 2020

and 2024, eight cases were documented in 2025. A seizure of caviar was only reported once, in 2017 at Sofia Airport. These few but significant cases demonstrate that the illegal capture and trade of sturgeon specimens, though rarely detected, occur.

GEOGRAPHIC DISTRIBUTION AND HOTSPOTS IN BULGARIA

The maps below illustrate the spatial distribution of known sturgeon-related illegal activities in Bulgaria, based on enforcement data from 2016 to 2025 (first

map) and for 2024 as well as for 2025 alone. The colour coding represents the relative share of cases per oblast, as a percentage of the national total.

PERSISTENT HOTSPOTS (2016-2025)



Map 4. Sturgeon-related offences in Bulgaria by district (2016-2025)

Out of the 28 Bulgarian administrative districts, sturgeon-related cases were reported from eight oblasts (29%). These include all oblasts along the Danube River, as well as Sofia.

The Oblast of Vratsa stands out as the most prominent hotspot, accounting for 45% of all national cases during the multi-year period. Other significant areas include Vidin (19%), Veliko Tarnovo (16%), and Pleven (10%).

No cases were reported from the Black Sea coast, despite its critical aquatic habitats. This may reflect limited enforcement capacity in the marine area. Data on releases of sturgeons caught as bycatch have been provided by fishers, and anecdotal information suggests that illegal sturgeon fishing does occur in the Black Sea.

Unlike sturgeon occurring in the Romanian and Ukrainian waters of the Black Sea, which are located close to the Danube Delta, sturgeon found along the Bulgarian Black Sea coast are of less interest to poachers. This is because these fish are generally either not yet sexually mature, or their roe has not yet developed to a stage suitable for consumption.

As a result, the black-market value of these sturgeons is significantly lower, as they can only be sold for their meat. The value of meat alone is usually not high enough to justify the risks associated with illegal fishing and prosecution.

The spatial clustering of cases, particularly in Vratsa (near Kozloduy), Veliko Tarnovo (Belene Island), and Pleven (Vardim Island), correlate strongly with the deployment of *karmaci* hook lines — a traditional, highly specialised form of illegal fishing. These areas are located near deep, narrow river stretches or island side arms, corresponding with sturgeon migration corridors and overwintering zones, close to spawning sites.

The persistent concentration of cases in a few oblasts underscores the need for targeted surveillance and joint cross-border operations, especially in areas shared with Romania, where corresponding enforcement reports remain limited — and rarely include *karmaci* — despite geographic overlap. Also, more attention to controls and enforcement should be paid to sturgeon fishing along the Black Sea coast.

RECENT TRENDS AND LATEST DEVELOPMENTS



Map 5. Sturgeon-related offences in Bulgaria by district (2024)

In 2024, sturgeon-related seizures were reported from the upper and middle stretch of the Bulgarian Danube, with 31% of cases each recorded in Vratsa and Veliko Tarnovo, and 19% each in Vidin and Plevna.



Map 6. Sturgeon-related offences in Bulgaria by district (2025)

In 2025, documented cases were more concentrated in the long-term hotspots Vratsa (60%) and Vidin (27%) as well as Veliko Tarnovo and Ruse (7% each).

FISHING GEAR REPORTED AS USED FOR ILLEGAL ACTIVITIES TARGETING STURGEONS IN BULGARIA

Between 2016 and 2024, Bulgarian enforcement authorities reported the seizure of a total of 1,250 *karmaci* hook lines used for illegal sturgeon fishing. The highest number was recorded in 2020, with

260 hook lines detected in a single year, indicating consistently high levels of poaching activity, particularly along the Romanian-Bulgarian stretch of the Danube River.

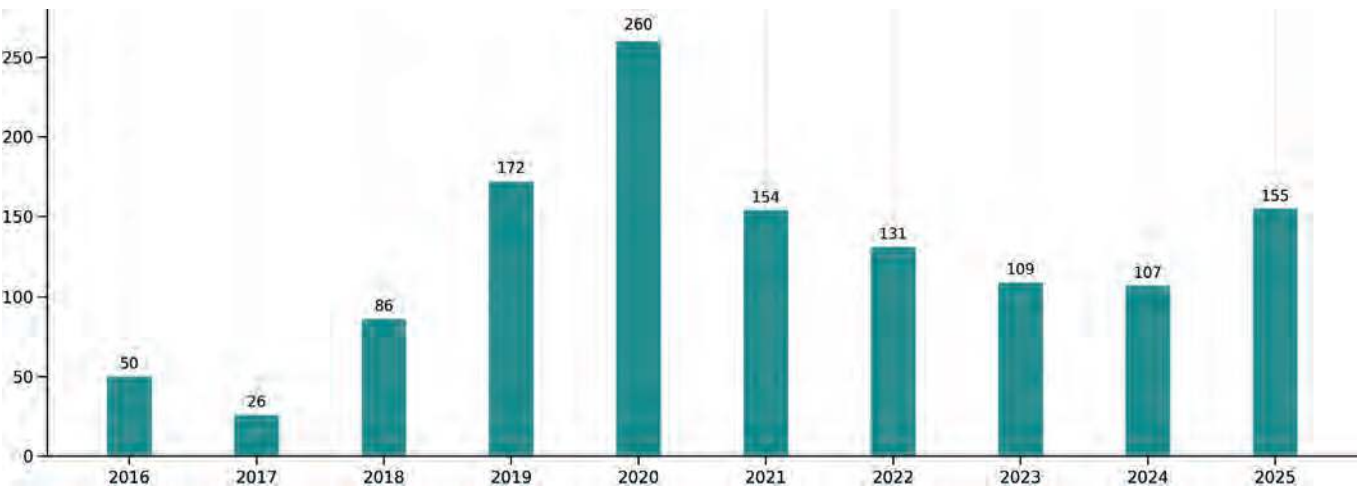


Figure 7. Confiscated *karmaci* hook lines by Bulgarian authorities (2016-2025)

The reported combined length of these lines for 2016-2025 amounts to 45,547 metres. 53,899 individual hooks were documented in total. In 2025 alone, 155 *karmaci* were seized, measuring a combined length of at least 5,480 metres and containing 7,700 hooks.

The method of *karmaci* poaching is notable for its specificity and risks. It requires:

- Specialised knowledge, often passed down through closed, local communities;
- High material investment, which may deter frequent repetition if the equipment is confiscated;
- Geographic consistency, as deployment sites are limited by river morphology.

From 2023 to 2024, the number of reported *karmaci* seizures in Bulgaria significantly reduced, continuing a downward trend over the last four years. One possible explanation is that losing *karmaci* to enforcement carries significant financial consequences for poachers,

potentially discouraging repeated offences in the same areas.

This persistent and systematic use of *karmaci* in Bulgaria is unmatched by similar reports from neighbouring countries. In Romania, few seizures were reported, although all Bulgarian cases were recorded within the shared border section of the Danube. This raises concerns regarding uneven enforcement and underlines the need for joint cross-border controls.

Detecting *karmaci* hook lines poses significant technical challenges. These devices are designed to remain hidden in deep waters, often beyond the reach of standard sonar. Effective detection requires specialised side-scan sonar technology, which has been piloted in recent years through cooperation between WWF and the Bulgarian Border Police. The recovery of these devices from riverbeds is both complex and potentially hazardous, emphasising the need for targeted training and improved equipment for enforcement personnel.

AFFECTED STURGEONS - INDIVIDUALS

Between 2016 and 2025, twelve confirmed cases involving the seizure of live or dead sturgeon specimens were officially recorded in Bulgaria. In total, 25 individuals were reported.

Despite the significant increase in reported sturgeon specimens in the last two years, Bulgaria’s numbers are still rather low compared to a total of 3,366 individuals recorded by all three countries over the ten-years period. These figures also contrast sharply with the consistently high numbers of confiscated illegal fishing gear. This could indicate that most enforcement actions intercept poaching operations at an early stage, before fish are landed or transported, or that cases of illegal landing, transport or trade of sturgeons largely remain undetected or unreported.

The results may also be biased by a lack of reports from some national law enforcement authorities such as Customs or the Regional Inspectorates of Environment and Water.

Forensic evidence in market investigations underscores the gap between enforcement reporting of poached sturgeon individuals and the actual illegal activities involving wild sturgeons: Wild-caught origin was assessed by isotope analysis in four out of 32 samples of sturgeon meat and caviar obtained from restaurants and shops in Bulgaria (2016-2020)¹⁰; in a new — not yet published — WWF market survey (2023-2025), two meat samples out of 25 caviar and sturgeon meat samples collected in Bulgaria most likely came from wild sturgeons.

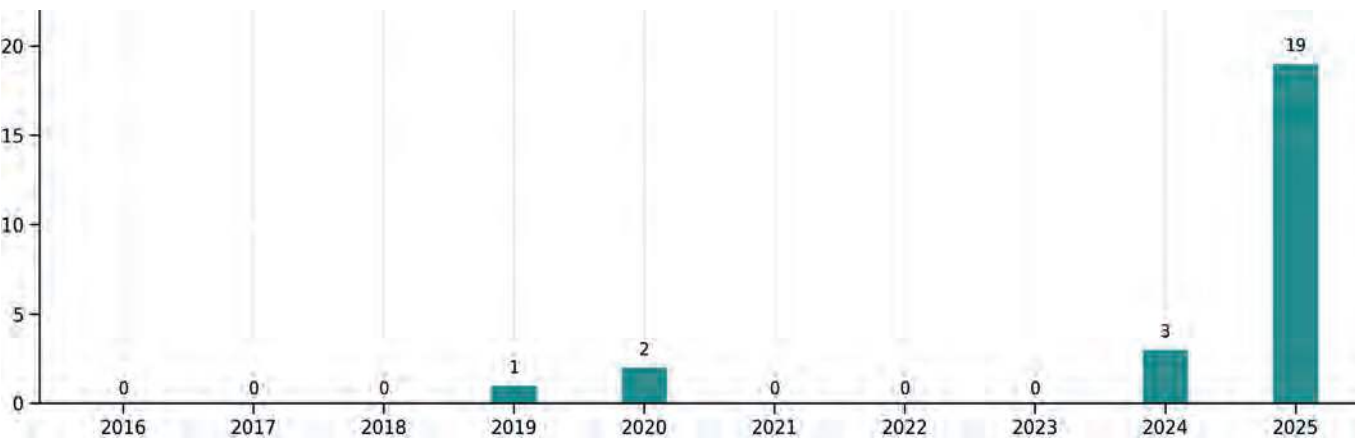


Figure 8. Number of individual sturgeons reported by Bulgarian authorities per year (2016-2025)

AFFECTED STURGEONS - SPECIES

Of the 25 individuals reported by Bulgarian law enforcement agencies, all four native species were found. Three cases each involved a beluga sturgeon (*Huso huso*), all of which were large adult individuals with at least 100 kg and up to 2,1 m length. Russian sturgeon (*Acipenser gueldenstaedtii*) was reported only in one case in 2020, and the specimen was of aquaculture origin and rather used as a bait on a *karmaci*. Stellate sturgeons (*Acipenser stellatus*) were found in two cases in 2025, with seven and five individuals respectively, some of which were used as a live bait

on a *karmaci*. Sterlets (*Acipenser ruthenus*) were documented in seven cases, with one case in 2024 and six cases in 2025.

The increase in the number of sturgeons reported from confiscated *karmaci* may partly reflect a recently observed poaching technique in which live male sturgeons are tethered near the hooks to attract females. As these males are also counted by inspectors among the sturgeon associated with the confiscated gear, they contribute to the reported number of individuals.

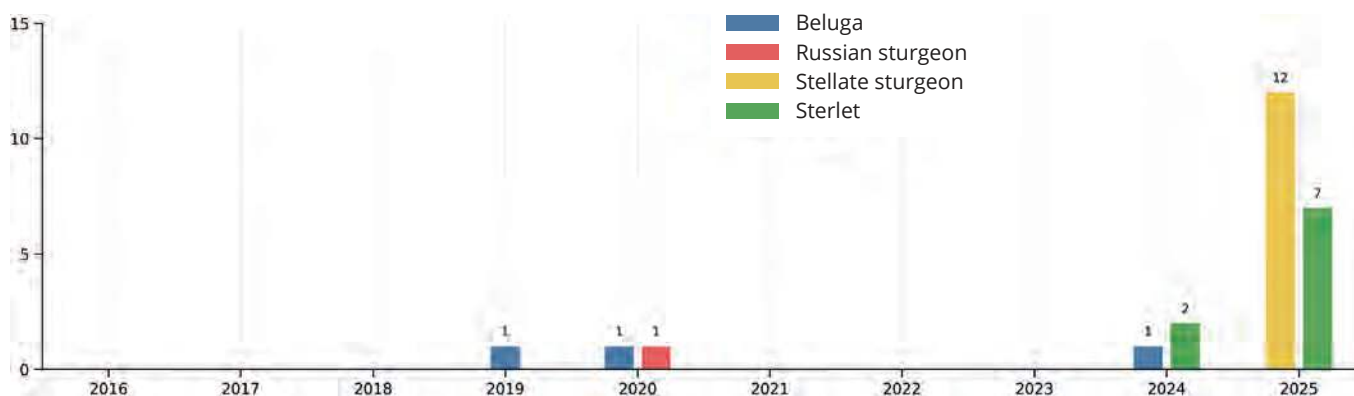


Figure 9. Annual number of individual sturgeons per species, based on reported values, Bulgaria (2016–2025)

In total, most of the 25 seized sturgeon individuals were stellate sturgeons (*Acipenser stellatus*), with 12 animals. Sterlets (*Acipenser ruthenus*), with nine specimens, were the second most common. Beluga – *Huso huso* (three specimens) and Russian sturgeon – *Acipenser gueldenstaedtii* (one specimen) were the least frequently reported.

QUANTITY OF STURGEON CAVIAR RECORDED IN SEIZURES

During the ten-year study period, only one caviar seizure was reported in Bulgaria: an unspecified quantity detected at Sofia Airport in 2017. This isolated case suggests either a genuine absence of caviar seizures or, more likely, underreporting by enforcement bodies responsible for controlling domestic and international trade, such as Food Inspection services and Customs authorities. By contrast, Ukraine reported 11 caviar seizure cases over the same period, nine of which were documented by Customs authorities, indicating a substantially higher level of detection and reporting by border control agencies.

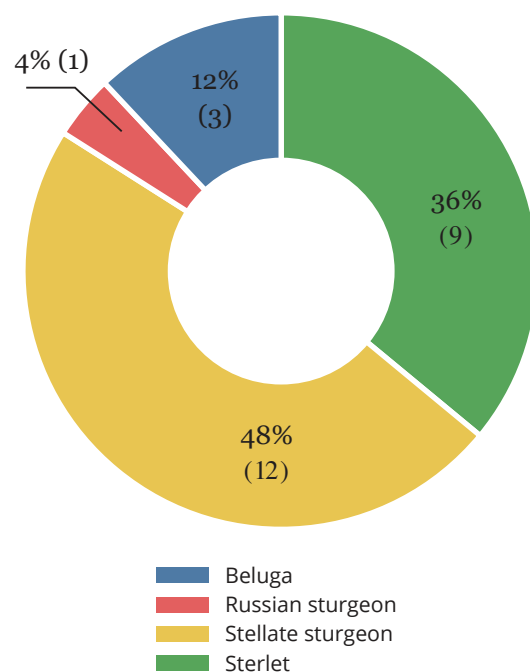


Figure 10. Percentage of individual sturgeons per species reported by Bulgarian authorities in total (2016–2025)

RESULTS AND DISCUSSION – ROMANIA

The Romanian data on sturgeon trafficking originates from multiple official sources, including:

- Romanian Police (including the Danube Delta Police Department);
- Border Police;
- National Environmental Guard;
- National Agency for Fisheries and Aquaculture;
- Customs;

as well as various verified external sources such as Romanian media outlets, Facebook posts, and Radio Delta broadcasts.

The dataset includes information on:

- The type of illegal fishing gear seized;
- The species of sturgeon involved;
- The quantity of goods discovered (either in kilograms or number of individual specimens);
- The apprehending agency;
- The location and date of seizure or detection.

The completeness and granularity of the data vary significantly between cases, requiring a flexible and adaptive approach to analysis.

DOCUMENTED CASES OF STURGEON-RELATED WILDLIFE CRIME IN ROMANIA

Between April 2016 and December 2025, 235 cases of illegal activities targeting sturgeons were officially reported in Romania. The annual number of cases fluctuates over the years, with noticeable peaks in

2018, 2022, 2025, and especially in 2023, when a record 37 cases were registered. The overall trend remains significantly elevated compared to earlier years.

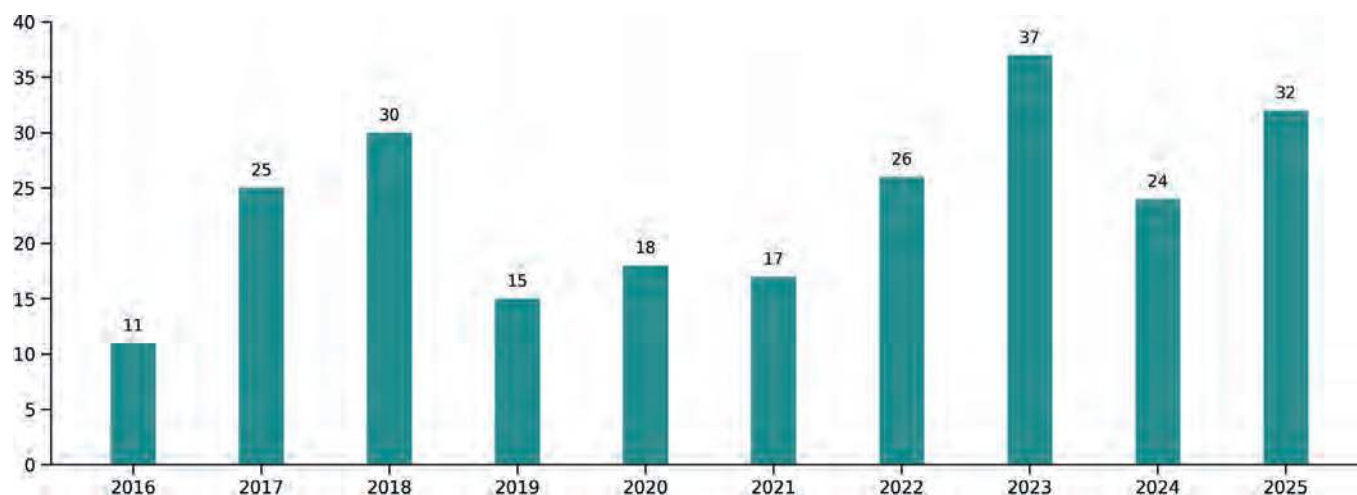


Figure 11. Annual number of documented illegal cases related to sturgeon in Romania (2016–2025)

Romania has consistently recorded the highest number of sturgeon trafficking cases in the region, outpacing both Bulgaria and Ukraine throughout the period under review. The 235 recorded total cases accounted for 46% of all cases reported across the three Lower Danube countries, underscoring Romania's critical role both in sturgeon habitat coverage and in enforcement.

Several factors may explain these figures:

- Romania's larger geographical scope, particularly its jurisdiction over most of the Danube Delta and an extensive Black Sea coastline, essential habitats for the three anadromous sturgeon species in the Danube.
- The increased enforcement capacity and targeted controls in high-risk regions.
- A potentially more complete reporting system, contributing to greater data availability compared to neighbouring countries.

GEOGRAPHIC DISTRIBUTION AND HOTSPOTS IN ROMANIA

Based on the enforcement data collected for Romania, the maps below illustrate the spatial distribution of sturgeon-related illegal activities, covering the whole period 2016-2025 and the

years 2024 and 2025 specifically. Each county is colour-coded according to the relative share of total national cases it contributed during the respective timeframe.

PERSISTENT HOTSPOTS (2016-2025)

Over the entire monitoring period, cases were documented in 17 out of Romania's 41 counties plus the capital Bucharest, adding up to 40% of the administrative units. While most offences occurred in

counties bordering the lower reaches of the Danube and areas along the Black Sea coast, illegal activities were also reported in upstream river sections, inland and border regions.



Map 7. Sturgeon-related offences in Romania by district (2016-2025)

As in previous years, Tulcea County, which encompasses the largest share of the Danube Delta, remains the dominant hotspot, accounting for 50% of all recorded national cases throughout 2016-2025. From Ialomița County, 18% of all cases of illegal activities were reported. The counties Galați and Brăila contributed 7 and 8% of cases.

From counties away from the Danube —inland or on the border —only isolated cases of sturgeon-related wildlife crime were reported.

What is striking is that often no or only isolated cases were reported from districts along the Danube, even though illegal activities were found on the other side of the river in Bulgaria: the counties Dolj and Teleorman lie on the opposite bank from the hotspots in Bulgaria, but in ten years, not one illegal incidence was reported; from the neighbouring counties Olt and Giurgiu. Only one case each was reported.

RECENT TRENDS AND LATEST DEVELOPMENTS



Map 8. Sturgeon-related offences in Romania by district (2024)

In 2024, most seizure cases were recorded in Tulcea (38%), followed by Ialomița (25%) and Galați (17%). In 2025, Tulcea was again clearly the area with most reported cases (56%), while Galați and Brăila each contributed 16% of all known incidences.



Map 9. Sturgeon-related offences in Romania by district (2025)

From Maramureș county, at the border to Ukraine, a first seizure was documented in 2025 – four jars caviar of approx. 2.8 kg, undeclared and without CITES permits, found by Romanian Customs.

FISHING GEAR REPORTED AS USED FOR ILLEGAL ACTIVITIES TARGETING STURGEONS IN ROMANIA

Between 2016 and 2025, 235 reported cases of sturgeon-related illegal activities were recorded in Romania. In 43 of these instances, the confiscation of fishing equipment associated with poaching activities is explicitly documented, consistently in connection with findings of sturgeons.

These tools include gillnets, monofilament nets and unspecified fishing nets but also *ohane* —special, thick fishing nets designed especially for catching sturgeons.

In two cases, a total of 63 *karmaci* hook lines were found.

One of the most substantial documented seizures occurred in 2023, during a four-day operation in the Danube Delta and Black Sea, when the Romanian Police confiscated 62 *karmaci* hook lines fitted with 2,375 hooks. The estimated value of the seized equipment during this single operation exceeded 85,150 lei (over 17,000 EUR).

AFFECTED STURGEONS – INDIVIDUALS

Between 2016 and 2025, Romanian enforcement authorities officially reported the seizure of 1,017 individual sturgeon specimens. In addition, further seizures were recorded only as total weight; these were converted into estimated numbers of individuals based on the average weight per species. This brings the minimum total number of sturgeons affected by illegal activities in Romania during this ten-year period to approximately 2,960 individuals.

Given the rarity and critically endangered status of sturgeon species, this figure represents an alarmingly high level of impact.

Moreover, in several cases, authorities confiscated sturgeon products such as meat or caviar without being able to determine the exact number of individuals involved. As a result, the true total of seized sturgeons is likely significantly higher. This figure also does not account for undetected or unreported illegal activities, suggesting that the actual number of poached and illegally traded sturgeons could be substantially greater.

The year 2017 marks the highest number of individuals seized to date, followed by 2018. Although the figures fluctuate over time and do not show a clear trend, each year within the reviewed period consistently shows that well over 100 specimens fell victim to illegal activities.

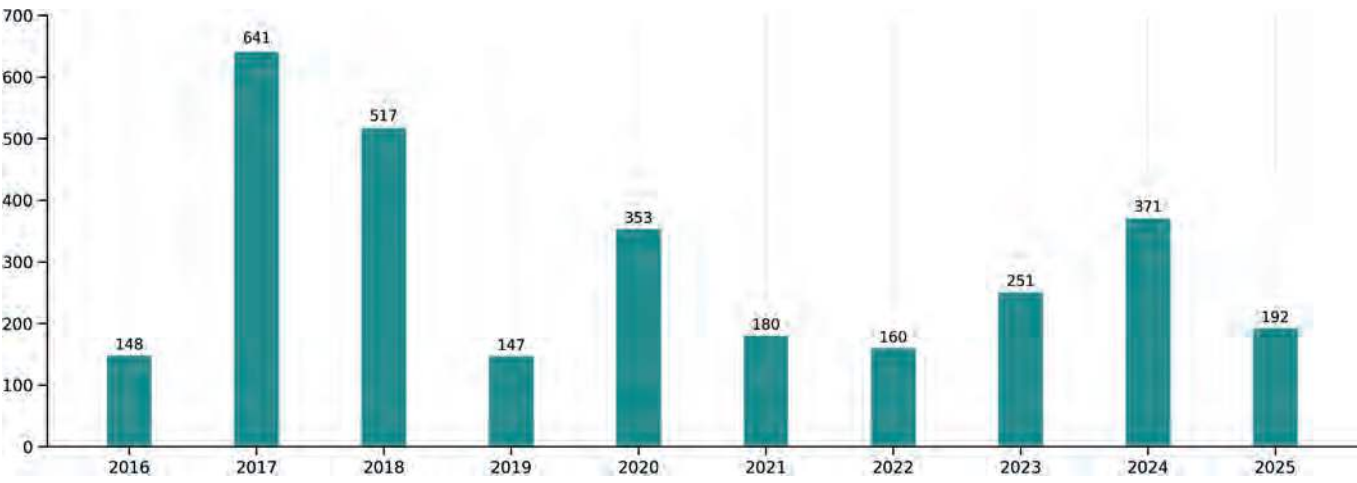


Figure 12. Annual number of individual sturgeon specimens seized in Romania (2016-2025)

AFFECTED STURGEONS – SPECIES

Based on reports obtained from Romanian authorities, it is possible to assess the number of individuals per species identified in seizures. This provides valuable insight into the specific impact of wildlife crime on the individual native sturgeon species.

The pattern observed in Romania is reflected in the overall results for the region, because the majority — 88% — of all recorded individuals were documented in Romania.

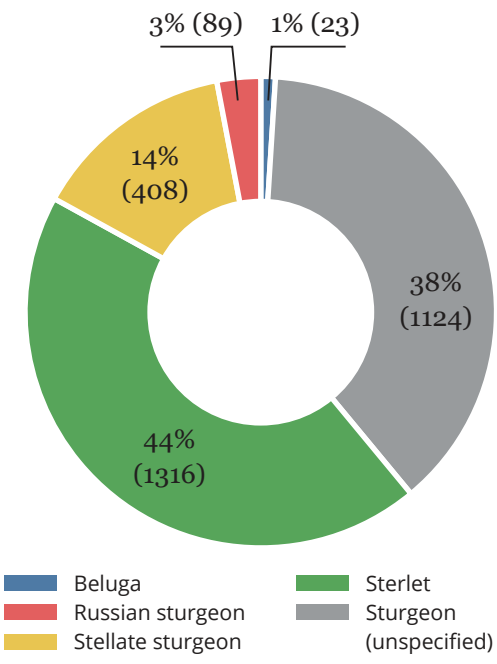


Figure 13. Total number of sturgeons affected by wildlife crime, per species, in Romania (2016-2025)

Sterlet (*Acipenser ruthenus*) is the most frequently identified species in Romanian seizure reports, with 1,316 specimens (44% of all identified individuals) recorded across approximately 80 cases.

The 408 stellate sturgeons (*Acipenser stellatus*) accounted for 14% of the individuals and were identified in nearly 60 cases.

Russian sturgeon (*Acipenser gueldenstaedtii*) constituted only a small proportion of seizures, with 89 individuals (3% of all recorded specimens) documented across 12 cases, underscoring the species' rarity.

Beluga sturgeons (*Huso huso*) were the least frequently recorded, with 23 individuals (1%) across 18 cases. Notably, around half of the seized beluga (*Huso huso*) individuals were large specimens weighing between 100 and 200 kg.

In more than 50 cases, the sturgeon species was either not determined, or multiple species were reported as a combined total. These cases amounted to 1,124 individuals, representing 38% of all recorded specimens.

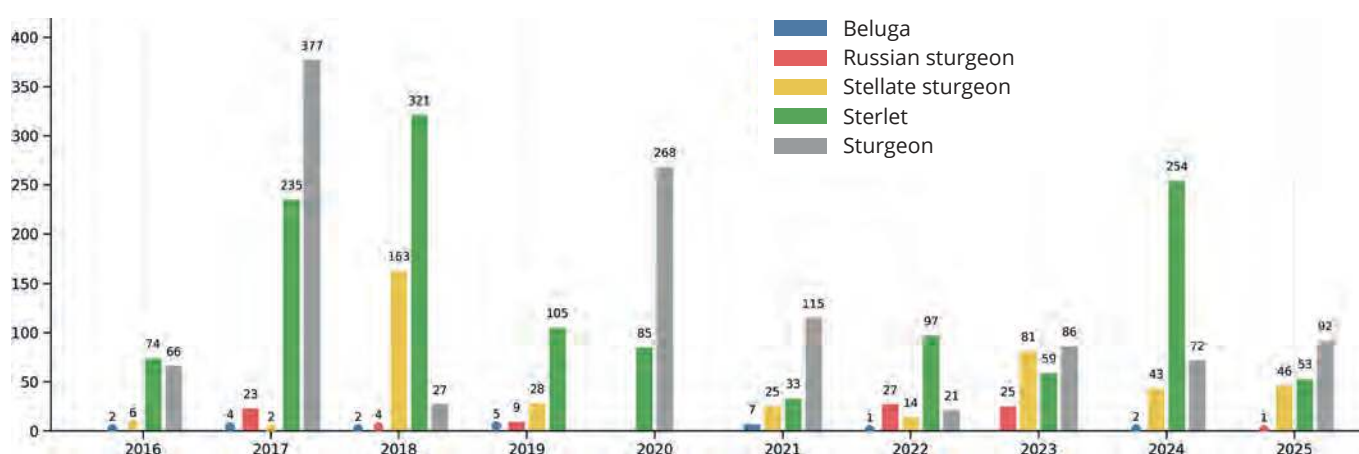


Figure 14. Annual number of individual sturgeons per species, based on reported and assessed values, Romania (2016–2025)

The number of animals seized per species varied considerably from year to year.

Seizures of beluga (*Huso huso*) were recorded in seven of the ten years, consistently in very low numbers, ranging from one to seven individuals per year.

Russian sturgeons (*Acipenser gueldenstaedtii*) were documented in only six years. While in some years just one or two individuals were recorded, three years showed notably higher numbers, each exceeding 20 specimens.

Stellate sturgeons (*Acipenser stellatus*) were reported in nine years, with substantial variation in annual figures, ranging from two to 163 individuals. The peak observed in 2018 was largely driven by two exceptionally large seizures involving 107 and 42 specimens, respectively.

Sterlets (*Acipenser ruthenus*) were recorded in every year of the study period and were the most frequently seized species both overall and in most individual years, likely reflecting their comparatively wider distribution.

A significant number of individuals could not be attributed to specific species. Nevertheless, this overview provides a useful proxy for assessing relative poaching pressure across species.



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QUANTITY OF STURGEON CAVIAR RECORDED IN SEIZURES IN ROMANIA

In Romania, 17 seizures of caviar with a total weight of 89,33 kg were reported in the ten-year period. The largest confiscation was made in 2019 in Giurgeni (Ialomița county), when 91 jars with a total of 40 kilograms of caviar worth 51,200 dollars (46,500

EUR) were detected together with a beluga (*Huso huso*) of 90 kg at a house search. In 2020, 40 jars of caviar with a weight of 23.6 kg and an estimated market value of approximately 50,000 EUR were confiscated in Argeș county while offered for sale.

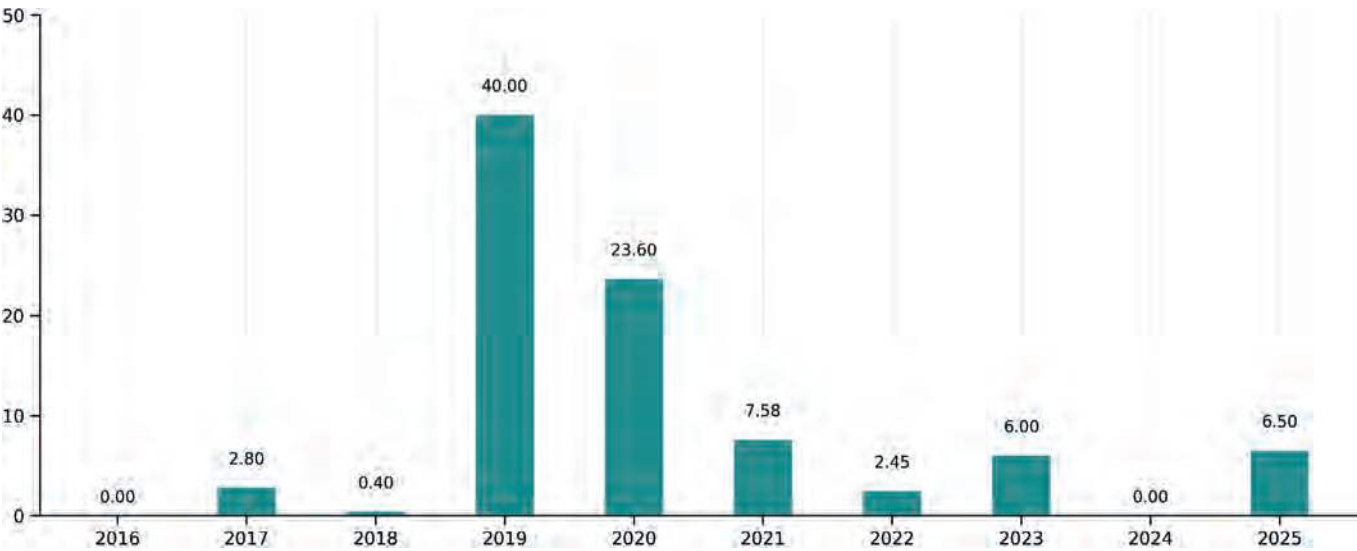


Figure 15. Quantity of seized sturgeon caviar in Romania (2016-2025), in kilograms



In Romania, it is notable that only a single seizure over the ten-year study period was reported by Customs authorities. This case involved the seizure of four glass jars containing approximately 2.8 kg of caviar, which a Romanian citizen attempted to import from Ukraine without declaration and without the required CITES permit. All other reported caviar seizures during this period were primarily carried out by police authorities, often in combination with the discovery of illegally possessed or traded sturgeons.

The lack of reports from Customs and Food Inspection authorities could mean that the actual volume of sturgeon caviar trafficked and potentially intercepted within Romania is significantly higher than reflected in the seizure data.

RESULTS AND DISCUSSION – UKRAINE

In the case of Ukraine, systematic reporting of sturgeon-related seizures by enforcement authorities began only in 2018. Before that, only three cases were recorded – one in 2016 and two in 2017. The data used in this analysis was obtained from the following official sources:

- State Fisheries Agency, including reports from the Kherson, Chernivtsi, Odesa, Azov Sea, and Black Sea Fishing Patrols;
- Customs authorities;
- Ukrainian State Border Guard Service;
- State Environmental Inspection;
- State Judicial Administration of Ukraine.

In addition, a small number of cases were identified through Ukrainian media articles and included in the analysis if not already accounted for in the official datasets.

- The collected data typically includes the following information:

- The date and location of each case;
- Details on the number of fish involved (in kilograms or number of individuals);
- The type of fishing gear used;
- The enforcement agency responsible for the seizure;
- The handling or disposition of the seized items;
- Where available, information on court proceedings and penalties.

However, the completeness and consistency of reporting varied significantly, requiring the analytical approach to be adapted case by case.

It must also be acknowledged that the ongoing war in Ukraine has inevitably disrupted both enforcement operations and data reporting. This has likely contributed to gaps, delays, and underreporting in recent years, especially in regions directly affected by military activity or occupation.



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DOCUMENTED CASES OF STURGEON-RELATED WILDLIFE CRIME IN UKRAINE

Between 2016 and 2025, a total of 99 cases of illegal activities involving sturgeons were officially recorded in Ukraine.

It is important to note that regular monitoring and systematic reporting of sturgeon-related offences by the State Fisheries Agency of Ukraine only began in 2018, following the inclusion of a dedicated section on sturgeon trafficking in the official reporting framework in 2017. This institutional change explains the sharp rise in recorded cases starting from 2018, when the maximum of 20 cases were reported.

The number of cases remained relatively high from 2019 to 2021. However, a decline started in 2022 and resulted in the reporting of only three cases in 2024 and only two cases in 2025.

This downward trend is most likely attributable to the ongoing war in Ukraine, which began in February

2022. The conflict has severely impacted the capacity of enforcement agencies to conduct control operations and has restricted access to key sturgeon habitats, especially in border regions and along the Black Sea coast. Additionally, net fishing is currently permitted only in the Ochakiv (Ochakovske) arm of the Danube Delta, further limiting both legal and illegal fishing activity and reducing the detection of offences.

The exceptionally low numbers of reported cases in 2024 and 2025 are most likely attributed to the war and may reflect restricted access of civilians, including fishers, to large parts of southern Ukraine and the Danube-Dniester-Black Sea corridor, or it may indicate a near-complete collapse of control capacities in some regions due to effects of the war, such as displacement and institutional strain.

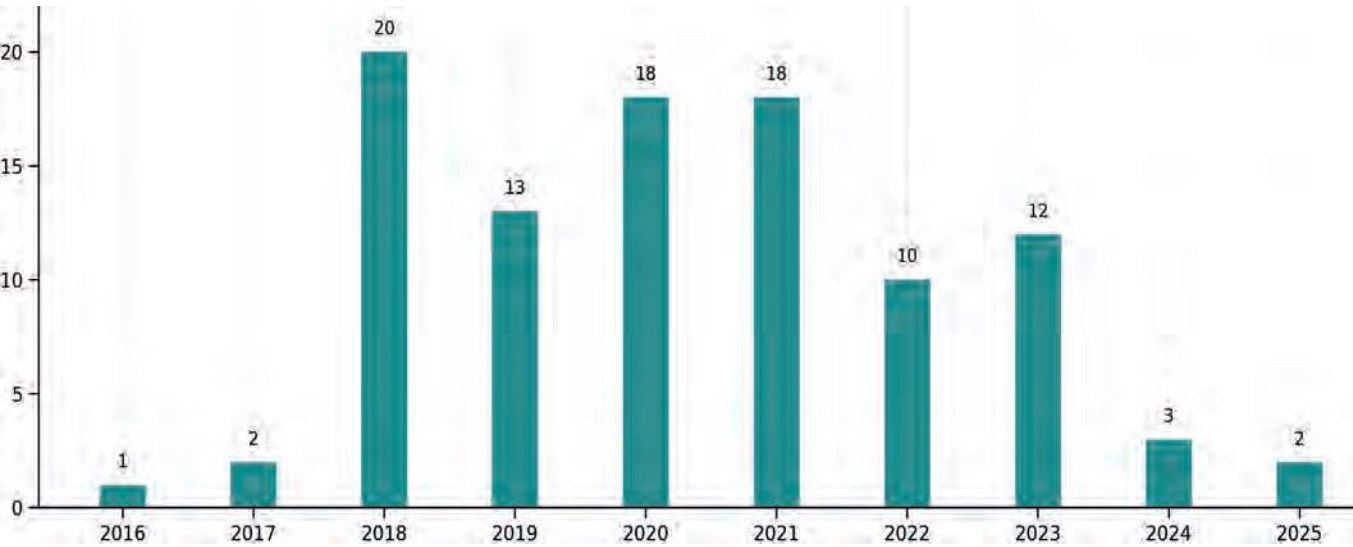


Figure 16. Annual number of sturgeon-related offences reported in Ukraine (2016-2024)

GEOGRAPHIC DISTRIBUTION AND HOTSPOTS IN UKRAINE

The spatial distribution of sturgeon-related offences in Ukraine from 2016 to 2025 is visualised in the map below. Out of 27 administrative units (including Kyiv,

Sevastopol, and the Autonomous Republic of Crimea), 15 (56%) reported at least one case involving sturgeon poaching, gear seizures, or illegal trade.



Map 10.
Sturgeon-
related offences
in Ukraine by
district
(2016-2025)

The oblast of Odesa is clearly the national hotspot, contributing 43% of all reported cases and standing out in red on the map. The oblast Kherson — highlighted in orange — is also notable, with 20% of all cases. This concentration of seizures over the years underscores the importance of the Danube Delta and Black Sea coastline, both as sturgeon habitats and for poaching and trafficking operations.

8% of all cases were reported from oblast Zaporizhzhia, which borders the Sea of Azov, another important sturgeon habitat.

In inland Ukraine, most cases (9%) came from oblast Chernivtsi in the east. Most of these seizures were made at the Dnister Reservoir and involved sterlets (*Acipenser ruthenus*).

In the inland regions and along the borders, mainly isolated findings of wildlife crime targeting sturgeons were registered. Most of these indicate illegal trade or transfer via border crossings rather than poaching cases, such as confiscations of caviar by Ukrainian Customs authorities.

In 2023, 2024 and 2025, all reported cases came from the hotspot region Odesa; in 2024 there was also — for the first time — a seizure in the oblast Lviv (almost 300 tins of caviar confiscated at the border with Poland). This spatial limitation of records and the extremely low figures in 2024 (3 cases) and 2025 (2 cases) can be related to the war with Russia.

FISHING GEAR REPORTED AS USED FOR ILLEGAL ACTIVITIES TARGETING STURGEONS IN UKRAINE

Out of the 99 documented sturgeon-related cases in Ukraine during the 2016-2025 period, 49 provided specific information about the fishing gear used. While in most cases, the authorities reported the use of “nets” without defining the type; gillnets were the most frequently identified. Other recorded gear types

included scaffolding nets, floating nets, a fyke net, and a beam trawl.

Unlike in Bulgaria in particular, no prohibited *karmaci* hook lines were documented in Ukraine, although these fishing tools were traditionally used there as well.

AFFECTED STURGEONS – INDIVIDUALS

The Ukrainian authorities reported a total of 381 individual sturgeons affected by illegal activities over the ten-year period.

This figure does not include 60 specimens of Amur sturgeons and other species —non-native and native — that were found dead near a fish farm in 2021.

The number of recorded individuals increased significantly at the beginning of the surveyed period, reaching a pronounced peak in 2022. Following this, both the number of reported cases and the number of individuals involved declined sharply, most likely because of the war situation.

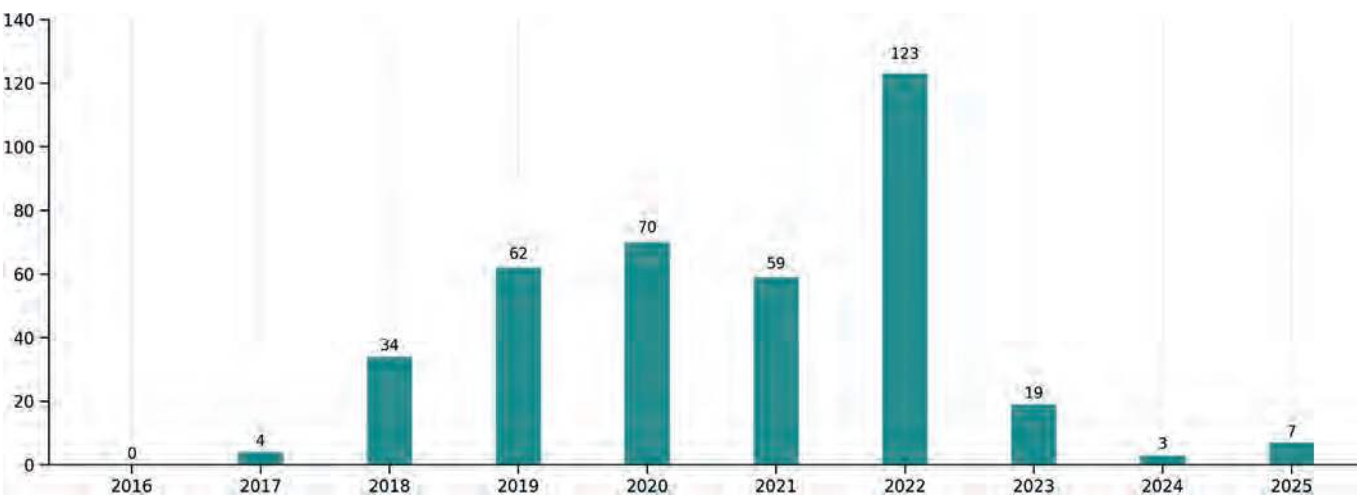


Figure 17. Annual number of individual sturgeon specimens seized in Ukraine (2016-2025)

AFFECTED STURGEONS – SPECIES

Based on the compiled data from Ukraine for the period 2016 to 2025, and the generally high level of species identification, a reliable picture of wildlife crime pressure on individual wild sturgeon species can be obtained.

In contrast to the other two countries, the distribution among the four native sturgeon species is more equally balanced.

Beluga sturgeons (*Huso huso*) still represent the smallest number of individuals, with 73 animals recorded in 12 seizure cases. However, this corresponds to a relatively high share of 19% of all seized specimens.

Russian sturgeons (*Acipenser gueldenstaedtii*) also account for a considerable proportion. A total of 89 individuals were recorded across 22 seizure cases, representing 23% of all individuals recorded in Ukraine.

Stellate sturgeons (*Acipenser stellatus*) make up the largest share of recorded individuals, with 103 animals (27% of all identified specimens) seized in 42 cases. The species is more commonly associated with coastal and estuarine areas. This could explain the higher number of stellate sturgeons (*Acipenser stellatus*) reported in Ukraine.

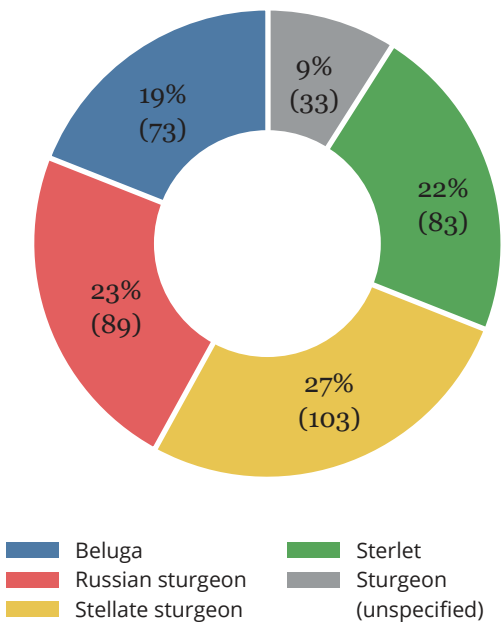


Figure 18. Total number of sturgeons affected by wildlife crime, per species, in Ukraine (2016-2025)



Sterlet (*Acipenser ruthenus*) were found in 21 seizure cases, with 83 individuals representing 22% of all reported specimens. Only 33 individuals (9% of all sturgeon specimens), recorded in nine cases, could not be attributed to a specific species or involved mixed species.

Similar to the trend observed in reported cases, the number of individual sturgeons seized per species increased markedly in 2018, followed by a decline after 2022, likely linked to the impact of the war.

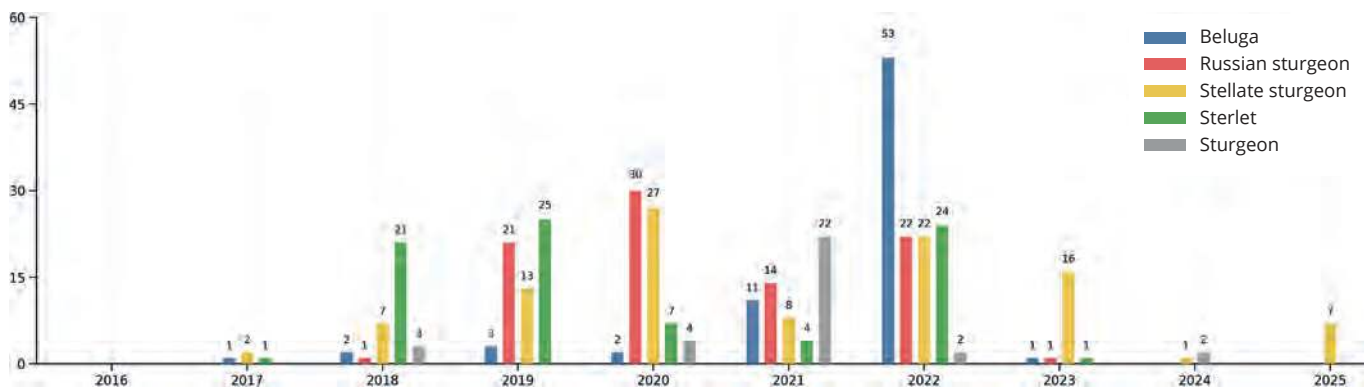


Figure 19. Annual number of individual sturgeons per species, based on reported and assessed values, Ukraine (2016–2025)

Beluga sturgeons (*Huso huso*) were recorded each year from 2017 to 2023, generally in low numbers of one to three individuals. However, a higher number of 11 specimens was reported in 2021, followed by a sharp spike in 2022, when 53 specimens were seized — most of them rather young animals of over 50 cm in length. This peak was attributable to two major cases involving 12 and 40 specimens, respectively.

The very rare Russian sturgeons (*Acipenser gueldenstaedtii*) were reported annually from 2018 to 2023. While numbers were low in some years, larger quantities exceeding 20 individuals were recorded in 2019, 2020, and 2022.

Stellate sturgeons (*Acipenser stellatus*) were documented every year from 2017 onward. The consistently high

number of stellate sturgeon (*Acipenser stellatus*) cases over time may indicate either greater abundance or a higher level of targeting illegal fishing activities.

Sterlet (*Acipenser ruthenus*) detections peaked in 2018, 2019, and 2022; however, the species was reported in only half of the reviewed years and did not dominate seizures to the same extent as observed in Romania.

Unspecified species contributed to a noticeable spike in 2021. In most other years, however, Ukrainian authorities provided mainly precise species identification.

This analysis includes only records that could be clearly assigned to one of the four native Danube-Black Sea sturgeon species. Cases involving non-native or aquaculture species (e.g., Amur sturgeon) were excluded.

QUANTITY OF STURGEON CAVIAR RECORDED IN SEIZURES IN UKRAINE

In Ukraine, numerous caviar seizures were reported, mainly by Customs and at border crossings during illegal imports or exports.

The largest seizure of caviar consisted of almost 300 tins with a total weight of 117.5 kg; however, this was caviar from Siberian sturgeon produced in aquaculture,

on transfer across the border into Poland without CITES permits.

Compared to Romania, relatively few cases have been reported in Ukraine where caviar was discovered during illegal fishing or trade.

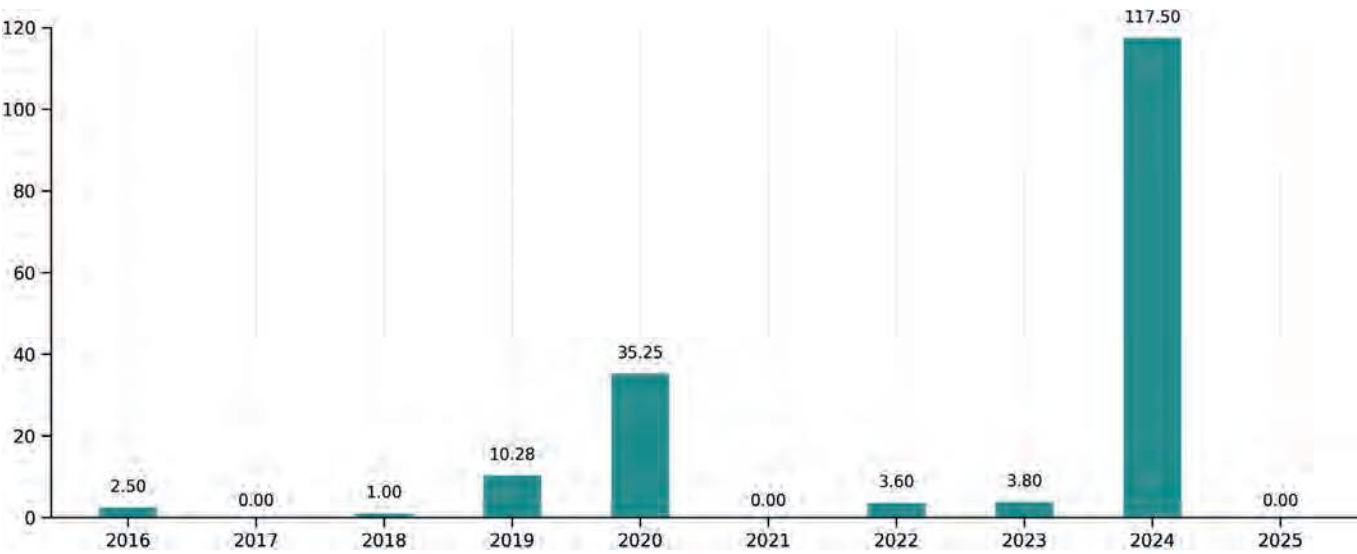


Figure 20. Quantity of seized sturgeon caviar in Ukraine (2016-2025), in kilograms



CONCLUSION



OVERALL DOCUMENTED TRENDS

The analysis of seizure data from Bulgaria, Romania, and Ukraine over the period 2016-2025 documents a total of 509 confirmed cases of illegal activities targeting sturgeons, confirming the continued presence of illegal fishing and related trade across the Lower Danube Region.

An initial increase in recorded cases likely reflects improved cooperation with enforcement authorities and enhanced reporting. Since 2018, the number of documented cases has remained relatively stable, with no clear indication of a sustained decline in reported illegal activities.

The reported figures represent minimum verified values. As is widely recognised in criminology, detected cases capture only a fraction of actual offences, particularly in wildlife crime. The true scale of illegal exploitation is therefore likely to be higher.

Enforcement agencies continue to face significant resource constraints, including limited personnel, equipment, and operational capacity, further challenged by the complex geography of key sturgeon habitats such as the Danube Delta and Black Sea coast.

In this context, WWF support —particularly through the provision of specialised technologies such as side-scan sonar and drones —has strengthened detection capacity, but remains limited relative to the scale of the issue.

Taken together, the data indicate that illegal activities affecting sturgeons remain persistent, and that current enforcement efforts are not yet sufficient to produce a measurable decline at regional level.

COMPARISON OF THE SITUATION IN THE INDIVIDUAL COUNTRIES

BULGARIA

Bulgaria shows a distinct pattern in the detection of sturgeon-related illegal activities. While reporting has remained relatively consistent over time, there is a pronounced emphasis on the seizure of illegal fishing gear, particularly the prohibited *karmaci* hook lines, which are almost absent from Romanian reports and not reported at all in Ukraine. Over the ten-year period, a total of 1,250 *karmaci* lines with a combined length exceeding 45 km were confiscated in Bulgaria.

In contrast, Bulgarian authorities reported the seizure of only 25 sturgeon individuals during the same period, along with a single seizure of caviar. This clear disproportionality suggests shortcomings either in controls and detection along the broader trade chain or in reporting practices. These concerns are reinforced by market studies indicating that illegally caught sturgeon meat continues to be sold in Bulgaria.

ROMANIA

Romania records the highest number of sturgeon-related seizures and affected individuals among the three countries, indicating broad detection of a wide range of illegal activities within the available dataset.

Romanian enforcement authorities have implemented large-scale control operations and reported substantial seizures of illegally caught sturgeons, illegally traded caviar, and illegally used fishing gear, indicating a sustained level of enforcement activity across different stages of the illegal activity chain.

At the same time, the data reveals some limitations. In a considerable number of cases, the number of sturgeon individuals was not recorded and had to be estimated based on reported weights, pointing to gaps in primary data collection that affect overall completeness and precision. The relatively low number of reported *karmaci* hook line seizures, particularly in comparison with Bulgaria — including along shared sections of the Danube — highlights differences in the types of illegal activities detected and recorded. Furthermore, only a limited number of caviar seizure cases were reported at borders, while Ukraine recorded multiple such cases, particularly through Customs authorities. This suggests that activities related to cross-border trade and transport are less prominently reflected in the Romanian dataset.

In addition, reporting varies between enforcement bodies and counties, with some providing detailed and consistent information and others reporting fewer or less complete data.





UKRAINE

Reported seizures in Ukraine show the most abrupt variation over time, deeply influenced by the ongoing war with Russia. Following an initial increase in reporting, a sharp decline was observed from 2022 onwards, with particularly low numbers in 2024 and 2025. This reflects reduced enforcement capacity and restricted access to key areas due to military activities, affecting fishers, poachers, and enforcement authorities alike.

Despite these constraints, Ukraine provides a comparatively high level of detail in reporting. Authorities distinguish between individual species, and the number of confiscated specimens is recorded in most cases, contributing to the overall quality of the dataset.

In addition, cases of suspected corruption have been documented, including a reported incident in 2022 in which fisheries officers in Odesa accepted bribes in exchange for allowing illegal sturgeon fishing in the Danube.

GEOGRAPHICAL DISTRIBUTION OF ILLEGAL ACTIVITIES

A comparative spatial analysis shows that the cases registered by Bulgarian agencies are strongly concentrated along the Danube. No seizures were reported from the Black Sea coast or from land border crossings during the reporting period.

In Romania and Ukraine, detections appear more geographically dispersed, with cases recorded in key sturgeon habitats and inland locations as well as borders throughout the survey period, suggesting a combination of habitat-driven presence and wider enforcement reach.

At the same time, a strong spatial concentration remains evident. Half of all reported cases in Romania originate from Tulcea County, and more than 40% of cases in Ukraine from Odesa Oblast, both corresponding to core sturgeon habitats in the Danube Delta and adjacent coastal waters.

ENFORCEMENT APPROACHES

Taken together, the observed patterns point to distinct national enforcement approaches. Romania records the highest number of reported cases throughout the surveyed period. Ukraine is characterised by a high level of data detail but limited enforcement capacity under war conditions. Bulgaria shows a strong focus on the seizure of illegal fishing gear.

The pronounced discrepancy in Bulgaria between the high number of gear confiscations and the low number of recorded sturgeon specimens indicates differences in detection across the illegal activity chain, particularly between fishing operations and subsequent stages involving specimens.

DATA LIMITATIONS

The data presented in this report were obtained through the cooperation of several competent national agencies. However, not all relevant authorities submitted information. As a result, certain categories of data — particularly those related to illegal trade, domestic distribution, and import/export of sturgeon meat and caviar — are likely underrepresented or partly absent. This highlights the reliance of the report on the availability, completeness, and accuracy of data provided by these institutions.

In several cases, records had to be excluded from cumulative analyses due to missing key information (such as date, species, weight, or location) or conflicting data entries.

A major limitation concerns the number of affected sturgeon individuals. In many cases reported from Romania and, to a much lesser extent, Ukraine, the number of individuals was not specified, leading to underestimation in earlier assessments. This report addresses this gap for the first time by applying a calculation method based on species-specific average weights derived from reported seizure data over the past ten years. Where total weight and species identity were known, these averages were used to estimate the number of individuals involved, enabling a more comprehensive assessment.

Nevertheless, the results should be interpreted as minimum verifiable estimates. They reflect only cases that were detected, documented, and reported. A potentially large number of additional cases may have remained undetected, unreported, or could not be included due to insufficient detail or inconsistencies in the submitted data.

In most reported cases, it is not documented whether seized sturgeons or sturgeon products originated from wild populations or aquaculture. In many instances, contextual information surrounding the seizure allows for informed inference, and it can reasonably be assumed that most cases involve wild-caught sturgeons. Nevertheless, sturgeons or caviar originating from aquaculture were occasionally seized in connection with illegal activities.

In addition, comparable data on enforcement efforts — such as patrol frequency, duration, location, and responsible authorities — are largely unavailable. This limits the ability to relate detection rates to enforcement intensity. Improved collection of such data would support a more robust interpretation of patterns and trends. Further recommendations for improving monitoring and enforcement practices are provided in the final chapter of this report.

IMPACT ON SHARED STURGEON POPULATIONS

With wild populations of Danube sturgeons at critically low levels, illegal fishing and trafficking continue to represent the most immediate and devastating threat to their recovery.

The shared nature of sturgeon populations in the Lower Danube River and the northwestern Black Sea underlines the urgent need for coordinated regional action. Sturgeons are long-lived migratory species, and poaching incidents in any one country pose a direct threat to the entire population across its range. Conversely, effective enforcement in one jurisdiction strengthens the conservation outlook for neighbouring countries.

Legal measures — such as fishing bans and strict trade restrictions — are already in place, but without consistent enforcement across all range States and effective transboundary cooperation, they remain largely ineffective. It is therefore essential that law enforcement agencies treat sturgeon trafficking not only as a biodiversity issue, but as a broader form of organised environmental crime.

BROADER CRIMINAL AND SOCIETAL CONSEQUENCES

The environmental degradation associated with sturgeon poaching is closely interlinked with a range of other criminal phenomena. These may include:

- Tax evasion and financial crime, through the illicit sale of high-value products such as caviar and sturgeon meat;
- Consumer fraud and deception, where farmed products are falsely labelled or substituted with illegal wild-origin goods;
- Health risks, due to the unregulated nature of processing, cooled storage and distribution;
- Institutional corruption and weakening of the Rule of Law, when law enforcement officers, inspectors, or border agents are complicit;
- Potential involvement of organised crime networks, which exploit weak institutional oversight and porous borders.

In some reported cases, seizures of illegally caught sturgeons or illegally traded caviar coincided with the detection of other forms of contraband, such as cigarettes, highlighting the broader criminal context in which these activities occur.

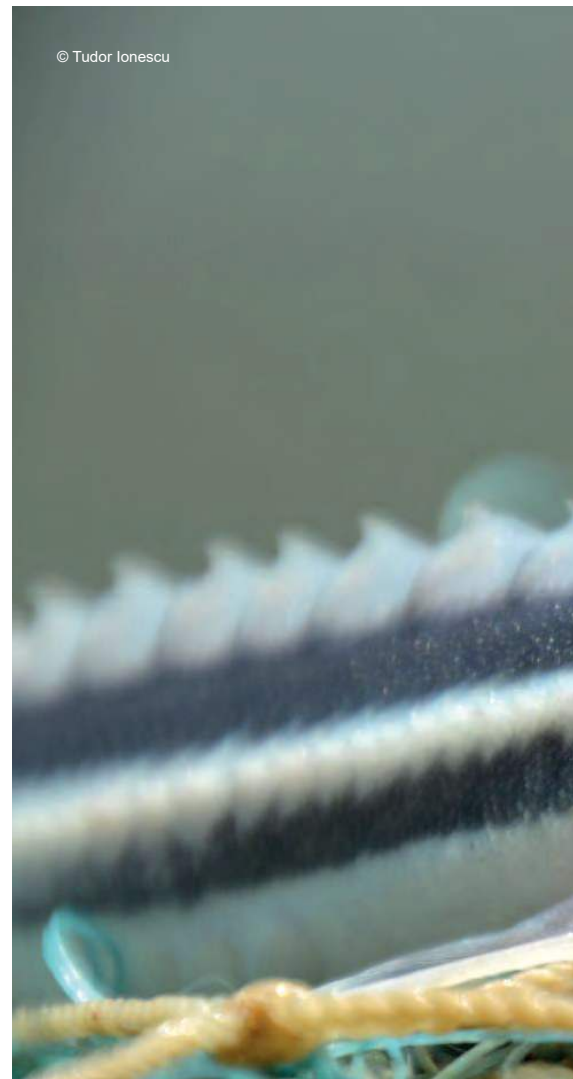
The multi-faceted impact of sturgeon trafficking reinforces the need for inter-agency collaboration — not only among environmental and fisheries bodies, but also involving anti-corruption units, financial intelligence services, customs, and judicial authorities.

At the same time, considerable public funding both from the EU and national sources supports conservation efforts in the Lower Danube Region. Large-scale initiatives on sturgeon monitoring, habitat identification, or captive breeding and release programmes are underway. The continued removal of sturgeons from the wild undermines these efforts and reduces the effectiveness of public conservation investments.



RECOMMENDATIONS

The analysis of 509 sturgeon-related cases across Bulgaria, Romania, and Ukraine over a ten-year period clearly demonstrates persistent and widespread illegal activities, despite intensified enforcement in certain regions. While some progress has been made, a series of critical gaps remain. These deficiencies continue to compromise efforts to protect the last remaining wild sturgeon populations in the Lower Danube and Black Sea region.



IMPROVEMENT OF DATA COLLECTION AND INTERPRETATION

To increase completeness, validity, comparability, and policy relevance of future analyses, several improvements in data collection are recommended:

- **Standardization of reporting protocols:** A unified template across countries and institutions with a minimum of parameters to be recorded in seizure cases would greatly enhance data harmonization and transnational as well as inter-agency comparability of findings;
- **Active involvement of all relevant authorities to contribute data:** Authorities that have reported no or very limited cases to date should be proactively engaged and sensitised to the importance of reporting this information;
- **Inclusion of control effort metrics:** Data on patrol hours, frequency of inspections, and

resource allocation are essential for interpreting enforcement success rates and correlating them with findings to understand whether, for example, more seizures result from increased control efforts;

- **Forensic verification of species and source:** Particularly in cases involving meat and caviar, routine application of genetic and isotopic analysis would validate assumptions and clarify the provenance of seized products.

Comprehensive and harmonised data would support more robust assessments of trends in illegal activities, risk patterns, and enforcement effectiveness. It would further facilitate the development of targeted enforcement strategies through improved spatial and temporal control planning.



INTENSIFICATION OF ENFORCEMENT IN CRITICAL AND POTENTIAL HOTSPOTS

The identification of hotspot counties and oblasts provides a solid foundation for targeted actions, allocation of enforcement resources, and prioritisation of awareness campaigns in affected communities.

In addition, from a sturgeon conservation perspective, enforcement should also be intensified in other key habitats, including known spawning and overwintering sites along the Lower Danube, major tributary confluences, and selected coastal areas of the Black Sea where sturgeon are known to forage or migrate. The timing of such measures should target peak biological periods, primarily pre-spawning upstream migrations in spring, spawning season itself, and overwintering aggregations in late autumn and winter.

Recommended measures include:

- Increased patrols and mobile enforcement units in identified high-risk locations;
- The use of latest technologies for surveillance (e.g., drones, sonars, etc.) during critical biological periods;
- Close cooperation between enforcement agencies and scientific experts to define spatial and temporal priorities of sturgeon presence for intensified interventions in each country.



ENHANCING CONTROLS OF TRADE CHANNELS AND AQUACULTURE FACILITIES

Greater emphasis should be placed on controlling aquaculture production and monitoring trade in sturgeons and their products, both domestically and internationally. Enforcement efforts should encompass the entire trade chain, including production, processing, transport, storage, sale, and import and export.

Systematic market investigations should be conducted and supported by robust DNA-based analyses and isotope determination techniques. Sturgeon caviar and meat cannot be reliably identified through visual inspection alone. DNA analysis is essential to determine the species or hybrid, while stable isotope patterns are essential for distinguishing products derived from poached wild specimens versus hatchery provenance.

In this study, we conducted a systematic market survey of sturgeon caviar and meat, combining genetic and isotope analyses to verify the sources of the sturgeon trade in two range states.

The repeated detection of unlabelled or mislabelled caviar in Romania and Bulgaria suggests that aquaculture operations do not consistently comply with legal requirements and may, in some cases, be used to launder wild caught sturgeons or their caviar. To address this risk, robust and enforceable traceability mechanisms —from farm to market —are essential. These should include clearly defined and strictly enforced regulations on bookkeeping standards, mandatory marking of stocks, and accurate labelling of caviar. In addition, regular DNA and isotope testing of products offered for sale or export should be applied to verify origin and deter illegal trade.

STRENGTHENING INTER-AGENCY AND CROSS-BORDER INTELLIGENCE-SHARING AND COOPERATION

In each country, the responsibility for controlling sturgeon fishing and trade is divided among multiple national authorities, making close inter agency cooperation essential. Coordination mechanisms should be further strengthened and expanded to include all relevant bodies, such as food safety and sanitary inspection agencies.

As demonstrated, for example, by the concentration of *karmaci* seizures in Bulgarian waters but the absence of similar reports from corresponding Romanian sectors, intensified transboundary operations and intelligence sharing could yield substantial improvements in detection and prevention of wildlife crime against sturgeons.

There is already good cooperation between Romania and Bulgaria, which should be maintained and

further strengthened through regular coordination, real-time information exchange, and joint, targeted controls. These efforts can help prioritise key risks, harmonise enforcement approaches, and improve overall effectiveness. In addition, sharing expertise, capacity, and equipment across agencies can further enhance enforcement outcomes.

In addition, relevant international law enforcement platforms and tools — such as EU TWIX, EUROPOL, INTERPOL, and the EU Enforcement Group — should be informed of findings and engaged for operational support. This would increase visibility of sturgeon trafficking at European and international levels and could contribute to greater political attention and resource allocation to combat this form of wildlife crime.



IMPROVING PROSECUTORIAL FOLLOW-UP AND JUDICIAL ACCOUNTABILITY

This report focuses on seizures, for which comprehensive data are already difficult to obtain; information on prosecutorial outcomes is even more limited. The continued impunity for sturgeon-related crimes perpetuates poaching and illegal trade. Judicial and enforcement authorities should jointly analyse information on the judicial follow up of sturgeon-related wildlife crime cases, including prosecutions initiated, penalties imposed, assets seized, and the involvement of repeat offenders.

Moreover, specialised environmental crime units within prosecutors' offices should be adequately trained and resourced to ensure that sturgeon related crimes are investigated and prosecuted with appropriate priority and severity.

ADDRESSING CORRUPTION AND INSTITUTIONAL COMPLICITY

The documented involvement of state officials in the Odesa bribery case (2022), as well as persistent anecdotal evidence from Bulgaria and Romania, points to a serious structural issue: corruption enables illegal fishing and trade. Internal audits and external oversight mechanisms are largely missing. States should implement anti-corruption mechanisms specifically tailored for fisheries and customs enforcement, including rotating field staff, anonymous reporting tools, and independent watchdog oversight.



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