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Water castles, monasteries  
and castle ruins between the Niers and Erft  
rivers and their chelonians

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in the Rhineland region: A brief report



# Water castles, monasteries and castle ruins between the Niers and Erft rivers and their chelonians

As well as the presumed first evidence of *Mauremys leprosa*  
in the Rhineland region: A brief report

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## Abstract

This report describes the occurrence of non-native turtles in heavily used and coal mining-altered aquatic habitats. We focus in particular on listed moated castles and monasteries dating from the Middle Ages with their parks and waterways, which today are home to numerous turtles of the genera *Trachemys*, *Pseudemys*, and *Chrysemys*, and probably also *Chelydra* and *Mauremys*. Following

this inventory, we discuss what we can potentially learn from it for the future and how these findings could potentially help us, under certain conditions, to preserve and protect our only native turtle species the European pond turtle (*Emys orbicularis*). The renaturation measures that will become necessary after the coal phase-out decided for 2030 could even support nature and turtle conservation, both financially and politically.





## Introduction

The northernmost river, the Niers, flows through the Lower Rhine Plain, with its source in Kuckum, a small town between the cities of Erkelenz and Mönchengladbach, from where it flows for about 117 km before joining the Meuse, a tributary of the Rhine, in the Netherlands.

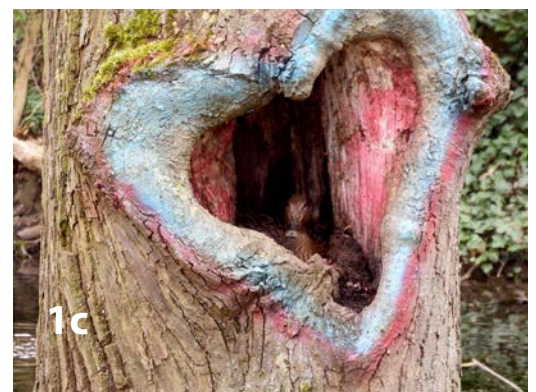
Its natural headwaters have dried up due to massive brown coal mining in the Rhineland, so that today the river is fed almost exclusively by drainage water from the opencast mine. The Erft, which runs further south, also on the left bank of the Rhine, rises near Nettersheim at an altitude of about 570 m in the Eifel and then flows in a north-northeast direction, crossing the Lower Rhine lowlands a little later, before joining the Rhine on the left bank near Neuss after 106 km. Another special feature of the Erft is that its riverbed has had to be relocated many times due to intensive coal mining, and that the coal industry feeds around 300 million cubic meters of warmer drainage water and even warmer cooling water from the cooling towers of the power stations in its lower reaches into the river. The latter means that a number of exotic plant and animal species find it somewhat easier to establish themselves there (see also PAGET et al., 2023).

Since the Middle Ages, there have been a number of stately estates such as castles, monasteries, and fortresses along both rivers and their tributaries, with associated

water mills where the flow velocity allowed. Due to the low-lying land, these estates were protected not only by fortification walls, but often also by distinctive moats and ponds, the latter certainly contributing to human nutrition through fish farming. Today, after several renovations, the buildings have often been restored or remain as ruins and are mostly open to the public, if not privately owned. With only a few exceptions, the river meadows and the waterways surrounding the buildings and running through the parks, some of which are now in part nature reserves, are characterized by the presence of many neozoa, including many water turtles. Yes, and often a spring walk reminds me, for example, of walks along the rural rivers in the American Carolinas, especially when it comes to water turtles. This is also a very striking realization, because when we think of other invasive species such as Canada geese, Egyptian geese, muskrats, nutria, and perhaps even raccoons, it becomes clear that our ancestors who lived here did not even know these animals that are now so characteristic of our fauna. When most of the estates we are looking at here were founded, 20 to 25 generations ago, these species were completely unknown here. In this respect, we are once again seeing a good example of what evolution and human-influenced evolution means.



Fig. 1a-c: A view of Wickrath Castle through one of the entrances (a). On the left, you can see the railing of the bridge that crosses the moat. The castle with its former stables for horses, which line the inner courtyard and now occasionally host art exhibitions (b). A tour of the surrounding castle park reveals many curiosities, such as this rather tame mallard nesting in a heart-shaped hollow in a tree trunk.





## Wickrath Castle

Let's start in the west along the Niers with Wickrath Castle ([https://de.wikipedia.org/wiki/Schloss\\_Wickrath](https://de.wikipedia.org/wiki/Schloss_Wickrath)), which belongs to Mönchengladbach. Fig. 1a-b. It is one of the younger Baroque castles in the region and was built between 1746 and 1772, although the former high castle was demolished in 1859 and replaced in 1875 by a castle-like building as a residence for the then stud farm manager. One wing is still used as a horse stable and, since 2002, the Rhineland horse stud book has been kept there. The park is open to the public and part of it is a nature reserve, with some overgrown, difficult-to-access marshy areas. While walking through the

park, you can observe many examples of anthropogenic influences on nature, such as in Fig. 2a-d, which shows a heart-shaped knot painted around a knot hole in which a mallard (*Anas platyrhynchos*) was already nesting on March 23, 2025. A little later in May, coots (*Fulica atra*) breed or lead their chicks. In addition to these native species, on warmer days in early spring, you can already observe a colorful mixture of native and foreign water birds such as gray geese (*Anser anser*), Canada geese (*Branta canadensis*) and Egyptian geese (*Alopochen aegyptiaca*), which often share the sitting and sunbathing spots in the water with North American turtles (Fig. 3a-c).



Fig. 2a-d: A mallard duck brooding and leading her newly hatched ducklings a little later in the year (a, c). Among many other water birds, the coots (*Rallidae*) are particularly noticeable as they brood on their nests or with their striking red-headed ducklings.

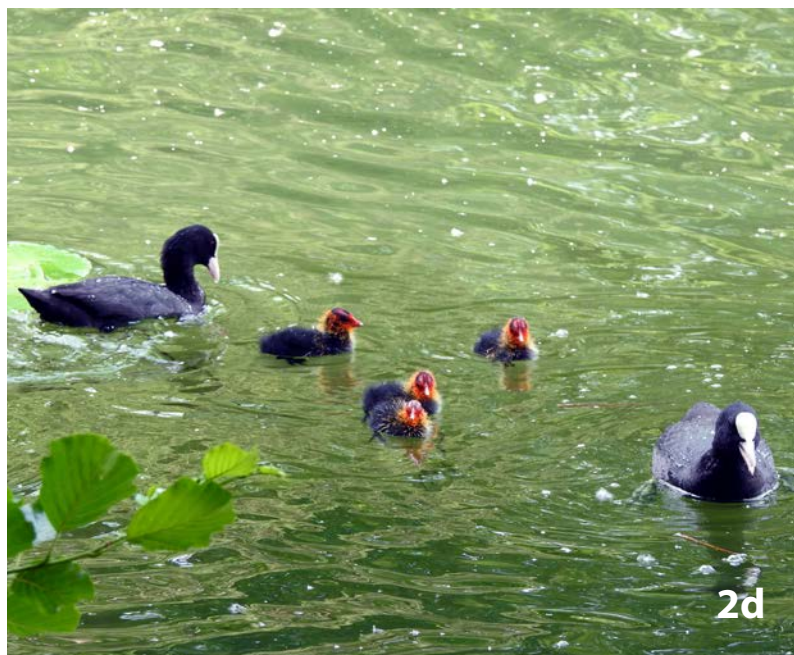






Fig. 3a-c: In one of the lakes in the park is a large island used by many birds. Very early in the year, turtles can be seen sunbathing on the trees and branches protruding from the island's shore, together with their feathered companions such as these graptemys, which are enjoying the sun here together with Egyptian geese and gray geese (a). These are probably *Graptemys pseudogeographica*, but as the enlargement in (b) shows, they have atypical head and neck markings. Not far away, on a tree trunk lying a little further out in the water, a *Pseudemys concinna* is enjoying the +15 °C spring air. All of these turtle photos were taken on March 23, 2025, which should also show that these turtles survive the winter well here.







Fig. 4: If you continue westward along the Niers toward Rheydt Castle, you can also observe sunbathing turtles such as these *Trachemys scripta*.

If we now continue our journey along the Niers to Rheydt Castle, which also belongs to Mönchenglad-

bach, we will find a few more opportunities to observe turtles (Fig. 4).

### Rheydt Castle

Rheydt Castle is the only Renaissance castle complex still completely preserved in the Lower Rhine region (<https://schlossrheydt.de/die-geschichte-von-schloss-rheydt/>). Its origins date back to 1060, and it was first mentioned as a castle in 1180. In the 16th century, it was rebuilt, which essentially reflects the current building complex, although some interior renovations were carried out during the Nazi era to convert the castle into the residence of Reich Minister of Propaganda Joseph Goebbels. Since 1949, the castle has served as a museum and is open to the public with its park grounds (<https://mg-im-herzen.de/von-schloss-zu-schloss-moenchengladbacher-parks-entlang-der-niers/>). The building complex is surrounded by a large outer moat and a small, slightly higher inner moat on one side. The outer moat surrounding the castle is particularly notable for its large number of armored inhabitants, which I would estimate to number more than 50 in spring 2025, who share the waters here with Canada geese, Egyptian geese, and various species of ducks. However, Rheydt Castle is mainly known among wildlife photographers as a good place to observe kingfishers (Figs. 5a-6c), so that you can often see whole flocks of visitors equipped with telephoto lenses along the circular path (Fig. 6b). Let us now turn our attention to the turtles, which include the well-known *Trachemys scripta* as well as numerous representatives of the *Pseudemys* and *Chrysemys* genera (Fig. 7a-d). Yes, and it

seems that some of them have already successfully reproduced here in recent summers. It can be assumed that, as with the Canada geese in spring, most of the nests are located along the moat facing the castle or even on the higher lawn. So far, I have only been able to observe small, approximately two- to three-year-old young turtles in this inner moat (Fig. 7d). This assumption is based on the fact that visitors who would release their young turtles there would probably do so in the more easily accessible outer moat, where they are much less likely to be observed than in the inner moat behind the casemates and the museum. In addition, this area, and in particular the sun-drenched southeast side of the embankment of the outer moat, is used as a breeding ground for geese (Fig. 8). Peacocks (*Pavo cristatus*) also roam here almost wild and free with their chicks, and *Myocastor coypus*, the nutria, can often be observed there (9a-d). Furthermore, when turning back to the outer watercourse, subadult *Mauremys sinensis* (Chinese striped turtle) and a third species from the *Mauremys* genus can be observed in at least two places (Fig. 9c-d). However, due to my camera equipment and the distance from the sunbathing spot, it was not possible to clearly determine their species. In my opinion, based on the light cream-colored pattern on the front legs, they could be either the Moorish turtle *Mauremys leprosa* or the Caspian turtle *M. caspica*. The second *Mauremys*





Fig. 5a-c In the background, you see Rheydt Castle reflected in the water of the outer moat (a), with the white arrow marking the tree stump in (b). Two *Trachemys scripta elegans* are sunbathing on it, with a *Chrysemys picta* in the middle (b). Continuing the tour, in early spring you can also see one or two *Trachemys* at the edge of the outer, overgrown banks.



*sinensis* was sitting about 80 m away in the middle of the watercourse (Fig. 10e-f). It was also noticeable that these *Mauremys* individuals always appeared at the same sunbathing spots during repeated visits. In this respect, it can be said that the waters around Rheydt Castle are already among those where the Chinese striped-neck turtle, formerly known as *Oca-*

*dia sinensis*, could establish itself. However, since all these subadult *Mauremys* species were of the same body size, I assume that they had only been released there recently. For science, it remains to be seen whether these waters will provide a future opportunity to study the establishment of Asian turtle species in Germany.





Fig. 6a-b: A little further on, you see whole groups of *Trachemys* and *Chrysemys* sunbathing on tree stumps and branches protruding into the water (a). And then you can also observe the bird for which Rheydt Castle is so well known among wildlife photographers, because in spring whole flocks gather here to photograph the courtship display of the kingfishers that have their nesting holes in the embankment (b).

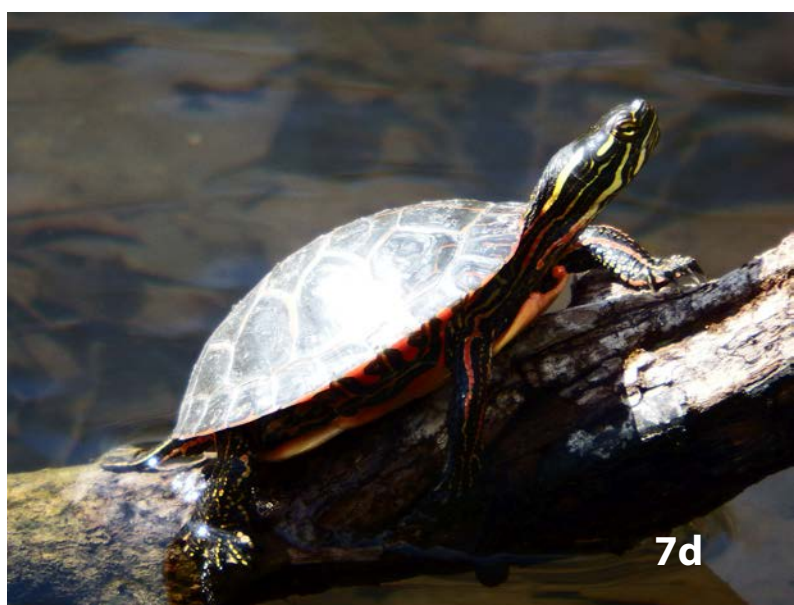


Fig. 7a-c: Here you another view of the castle in the background is shown and, in front of it in the outer moat, groups of sunbathing *Trachemys scripta* and *Chrysemys picta* (a) on a fallen tree, with the larger group, which is not sunbathing on the branches on the left but on the trunk, shown enlarged in (b). The white arrow in the upper left corner of figure (a) points to the inner moat behind the casemates, where the young *Chrysemys picta bellii* (c, d) were photographed.





Fig. 8a-b: The banks of the outer moat between the casemates facing the castle are also home to feathered neozoans such as the Canada goose (a), whose gander protects the nest from intrusive visitors (b).



Fig. 9a-d: Here a part of the inner moat with a bridge (a) is shown where the young *Chrysemys picta* (Fig. 7) were observed (a). But the free-roaming peahens also lead their chicks out (b), and in the water you have to be lucky that the nutria doesn't chase the turtles away from their sunbathing spots (c, d).





Fig. 10a-f: This is approximately the same shore area shown in Figure 5a, only at a slightly later stage in the spring. Here, too, the tree stump, now somewhat more overgrown, can be seen at the lower edge of the bank. It is shown enlarged in c-d. A sunbathing *Chrysemys picta* is sitting on the left, and to its right is the first *Mauremys sinensis* spotted sunbathing (b). However, as in March, there were a total of three turtles on the tree stump, because, as shown in (c), another *Mauremys* is sitting on the stump to the right above the *M. sinensis*, which can be seen more clearly in (d) in a slightly different position with its head turned to the right, revealing its neck stripes. Neither the stripes on the neck nor the larger light spots on the legs match the appearance of a *M. sinensis* or *M. reevesii*. However, it could be a *M. leprosa*.

(Since this is not a scientific paper in the strict sense, but rather an observational study, the only thing that comes to mind is that in a globalized world, American, Chinese, and perhaps even European chelonians may have long since found a way to coexist peacefully, something that international politics is still searching for!)

After walking about 80 meters further, I discovered another smaller turtle sunbathing in the middle of the outer moat (arrow in e), which, when zoomed in and enlarged, could be identified as the second *Mauremys sinensis*. Since I was able to photograph both *M. sinensis* on the same day and the first one was still sitting on the tree stump, it was clear that this was a second individual.



## Myllendonk Castle

Myllendonk Castle is also a moated castle on the Niers River, located near the municipality of Mönchengladbach near Korschenbroich. It was originally built on stilts in the Niers floodplain. The history of the estate dates back to 1166. However, extensive renovations were carried out in the 16th century. Today, the castle is privately owned and its park is home to a golf club (<https://www.rheinruhronline.de/niederrhein/niederrhein-teil2/stadt-korschenbroich/schloss-myllendonk.htm>), meaning that the grounds can only be visited by golfers or on special occasions. As published and available on the homepage of the Myllendonk eV golf club, a whole

collection of photos of the native and exotic animal species living there is presented, so a reference to the corresponding homepage should suffice (<https://www.gcsn.de/golf-natur/tiere-auf-dem-platz-1.html>). However, I think that the presence of only one turtle is highly doubtful, as more than one of these North American armored neozoans have been observed everywhere along the Niers and in the nearby parks, although it cannot be ruled out that their numbers may change temporarily due to migration. Just as daily climatic conditions and the time of day have an influence on when you can observe sunbathing poikilothermic species.

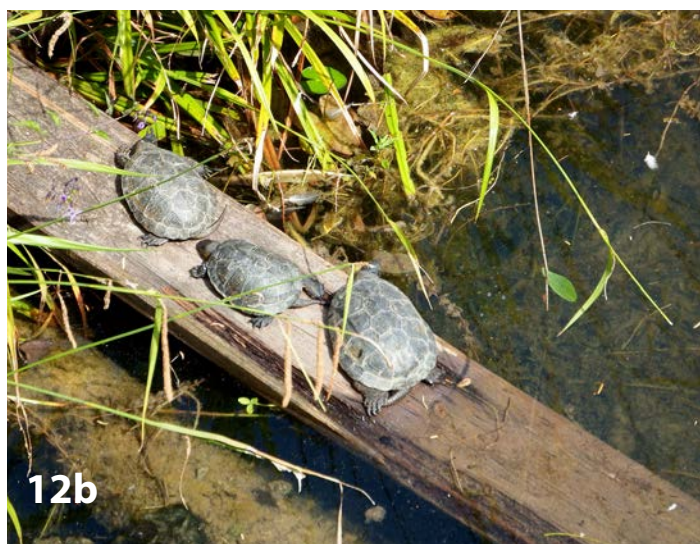


Fig. 11a-b: Shows a view of Schloss Dyck (a) with a pair of Canada geese leading their young (b).





Fig. 12a-c: Here the moat (a) with a bridge connecting the buildings in the background is shown. To the right, below the bridge, three European pond turtles *Emys orbicularis* (b) were sitting on a board protruding into the water. During a further visit to the same spot, I was only able to photograph a single specimen (c).



### Dyck Castle

This is one of the most important moated castles in the Rhineland (<https://www.rheinruhronline.de/niederrhein/niederrheinteil1/juechen/schloss-dyck.htm>). It has been the seat of the Princes of Salm-Reifferscheid since the 11th century. The present buildings date back to the construction work carried out after the Thirty Years' War and are now surrounded by a large park with a 200-year-old English garden with old and rare trees, which is of European significance (Fig. 11a-b). Today, the grounds are open to the public and are a foundation

for garden art and landscape culture. Later (2005), an international institute for garden art and landscape culture was founded, and in 2006, it was expanded to become part of the European Garden and Heritage Network. This main castle, which has two outer bailey, has two special features. The moat surrounding the estate used to be fed by groundwater and was not connected to any nearby rivers or streams. As a result of the immense lowering of the groundwater level due to brown coal mining, the moats are now fed by warm drainage water from the open-cast mine.





13a

Fig. 13a-c: In a small pond heavily surrounded by reeds in the park in front of the castle, a whole group of *Chrysemys picta belli* (a) were sunbathing, and *Chrysemys picta belli* could also be seen sunbathing in the moat behind the castle (b, c).



13b



13c

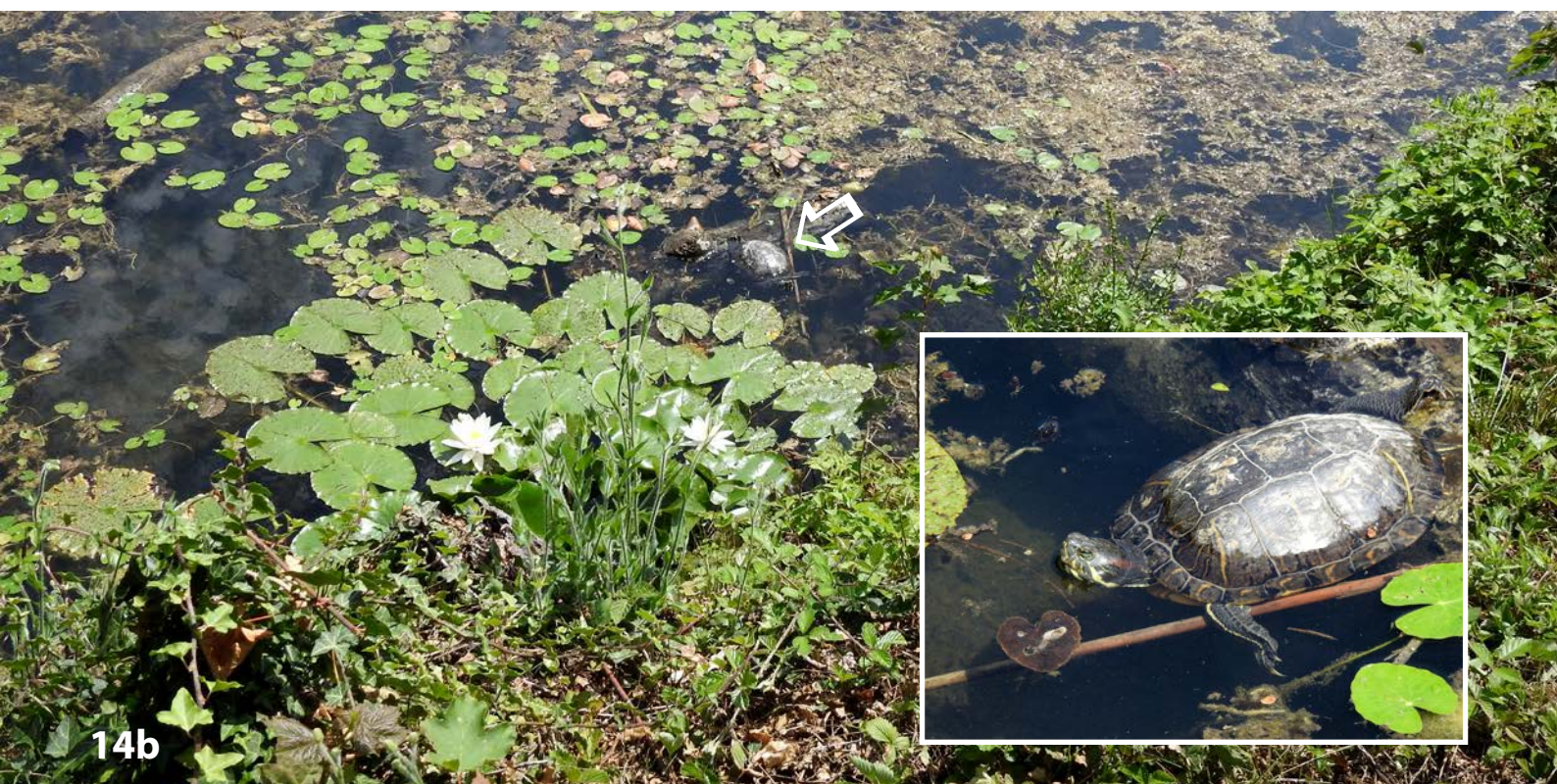
In earlier years, there were many painted turtles (*Chrysemys picta belli* and *C. p. marginata*) here, which were sold in large numbers at a nearby garden center. If you call the foundation administration today, you will often be told that there are no turtles. However, if you ask the gardeners working there, they will tell you where you have a good chance of seeing turtles. Today, there are fewer of these painted turtles, but still quite a few, as well as some other American species. However, this was also the only moated castle in the

Rhineland where I was able to observe the European pond turtle, *Emys orbicularis* (see Figs. 11–15). Although these were very dark specimens, I was unable to determine whether they belonged to the haplotypes native to Germany (I, (IIa); IIb, WINKEL & KUPRIAN, 2011), as these were also released individuals. Although, according to my observations, *E. orbicularis* shows a higher flight distance, the existing waters and shore areas are located in such a way that park visitors should not represent any additional stress potential.





14a



14b



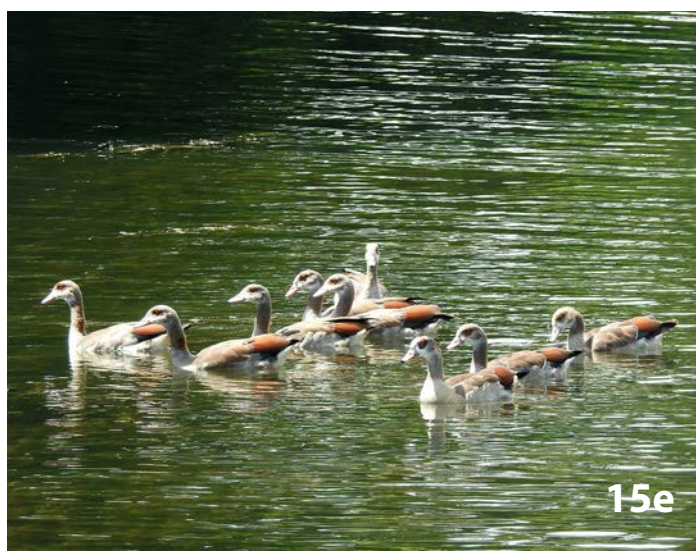
14c

Fig. 14 a-c: An adult *Graptemys pseudogeographica kohni* sunbathing on a board (a) and a *Trachemys scripta elegans* cooling off in the water while sunbathing in very hot weather (b + b') and a *T. s. scripta* floating on algae mats in the water (c). See also SNOVER et al., (2015).





Fig. 15a-e: Another group of *Chrysemys picta bellii* sunbathing in the reeds and, right next to them, a single young animal sunbathing (c). On the large expanse of water in front of the castle, there is also a *T. s. scripta* thermoregulating on the water surface (d) and a family group of Nile geese swimming not far away (e).







16a

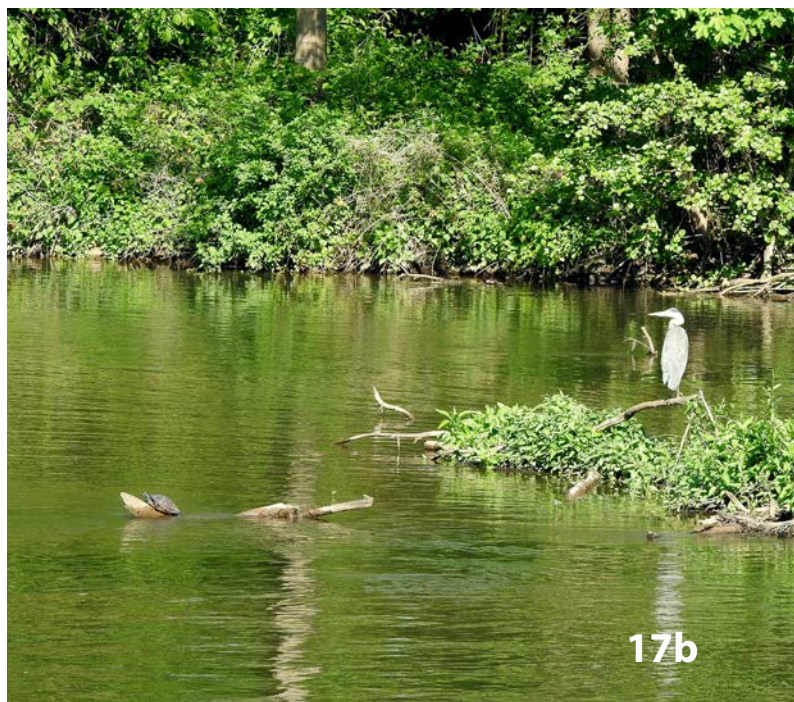


16b

Fig. 16 a-b: A view of the gate of the Eppinghoven monastery near Neuss (a) and the mill pond opposite, which is still almost leafless in early spring (b). Here, too, the first *Trachemys* (arrow) and *Pseudemys* were already basking on tree trunks and branches at the end of February.



17a



17b

Fig. 17a-b: A little later, at the beginning of May, when the wooden islands in the water are already well covered with greenery, the turtles can be seen sunbathing every day in the same places as in February. They are the same specimens that have been there for years, only the number varies depending on how many anglers have cast their bait too close.

### Eppinghoven Monastery

Let us now turn to the estates located further south on the Erft, such as Eppinghoven Monastery. This is a former Cistercian abbey south of Neuss-Holzheim. It was founded in 1214. After an eventful history, the nunnery was abandoned in 1802 and the building complex became privately owned ([https://de.wikipedia.org/wiki/Kloster\\_Eppinghoven](https://de.wikipedia.org/wiki/Kloster_Eppinghoven)). The adjoining mill building

on the Erft, with its mill pond fed by warm drainage and cooling water from the open-cast mine and coal-fired power stations, is home to several relatively large specimens of *Pseudemys concinna*, *P. rubiventris*, and *Trachemys scripta* (Figs. 16-17), which can be observed basking in the sun in almost the same spot for many years (see also cover photo BIDMON, 2024).





18a

Fig. 18a-c: View of Reuschenberg Castle (a) with its ring of moats, which, according to the castle owner, are home to around eleven turtles. During my one visit, I saw four and was able to photograph two, including the *T. s. scripta* sunbathing below the bridge on the right (b-b'). Not far away, a young nutria also made an appearance. (c).

## Reuschenberg Castle

(<https://www.erftverband.de/gewaesserprojekt-neuss-gnadental/>)

Reuschenberg Castle, located northeast of the monastery, also dates back to between 1284 and 1288, according to the first mentions of a farmstead. The present castle has had an eventful history, suffering destruction between 1287 and 1582. Since the 16th century, it has had a number of owners, and major renovation work was carried out in 1847. In 1912, the city of Neuss purchased the property, which later became a school for rural

women and then a vocational school for rural home economics and nutrition. After the castle was sold, it changed hands several times and, following extensive renovation, was acquired by a private owner in 2009. Reuschenberg Castle is not open to the public, except for art exhibitions held there from time to time. I was able to visit the grounds this spring. According to the owner, there are supposed to be 11 turtles here, four of which I was able to observe during my visit (Figs. 18-19).



18b



18c





Fig. 19a-b': Another view of the castle and moat from a different perspective (a). In b, the sunbathing spot of another *T. s. scripta* (b') is marked. As this is private property, the visit was limited. Public visits are only possible during art exhibitions.

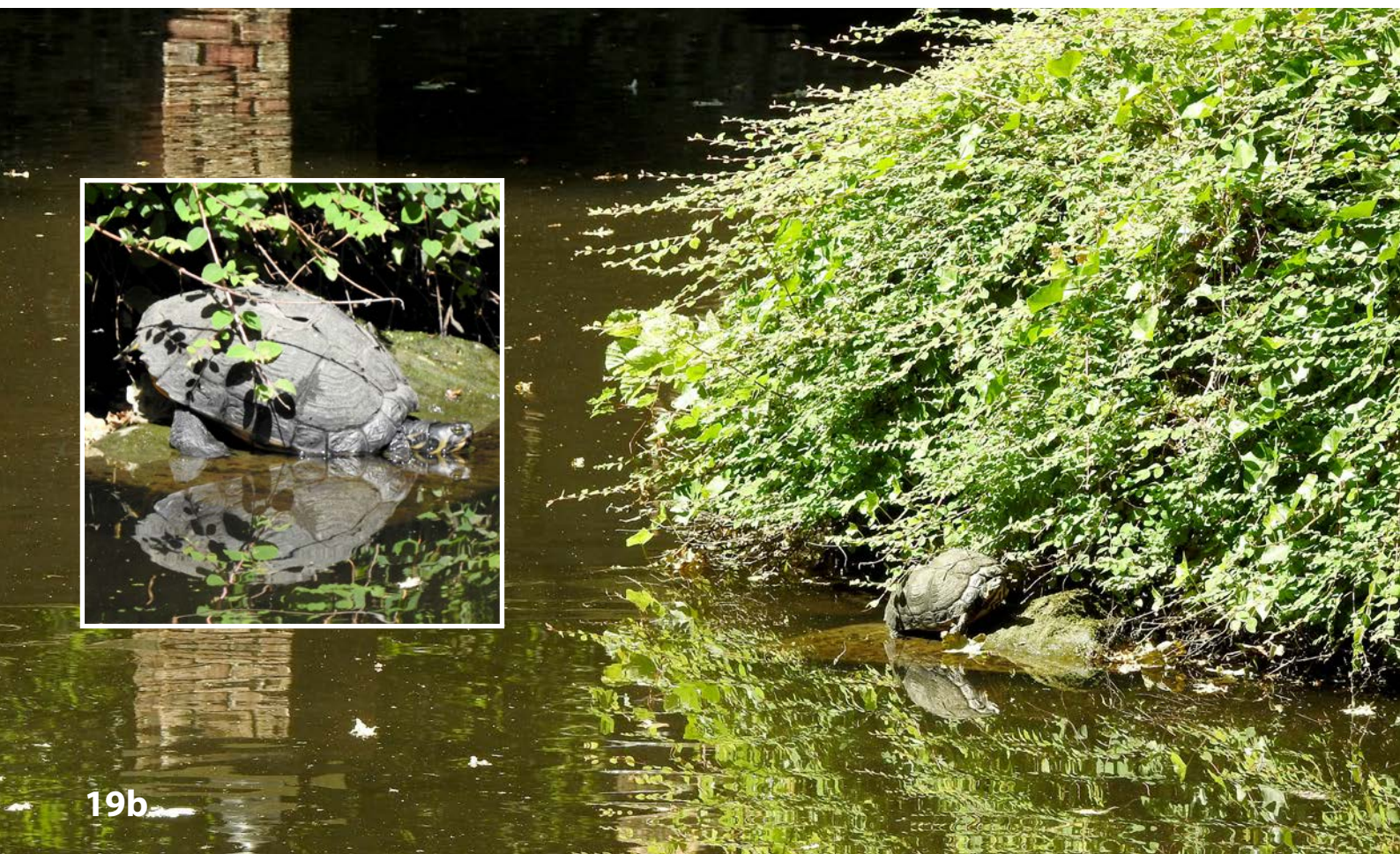






Fig. 20a-d: Hülchrath Castle is also privately owned with restricted access. Thus, from one of the access roads from the village of Hülchrath, only the characteristic tower towering over the outer bailey with the gate can be photographed (a). Along the bridge and to the left and right, the parts of the moat surrounding the park facing the village can be seen (b to the left and c to the right). At the end of the right-hand section, a *Chrysemys picta* was spotted sunbathing this year (d). However, *Trachemys scripta* have also been observed here in the past.

## Hülchrath Castle

([https://de.wikipedia.org/wiki/Schloss\\_Huelchrath](https://de.wikipedia.org/wiki/Schloss_Huelchrath) or <https://www.grevenbroich.de/stadtportrait/sehenswuerdigkeiten/schloss-huelchrath>)

Just a few minutes' drive to the southwest is Hülchrath Castle. This castle was a former Electoral Cologne state castle in the municipality of Grevenbroich, dating back to the 12th century. After its destruction in the 17th century, the moated castle was rebuilt at the beginning of the 20th century. This is also an imposing moated castle with a pond and moat, but it is not fed directly by the Erft River, but by the Gillbach, a tributary of the Erft that rises near Auenheim. This is also pumped drainage water and cooling water from the lignite-fired power plant, as the source of the Gillbach

was lost due to open-cast mining. The latter led to tropical aquarium fish even settling in its upper reaches (<https://pulheimerbach.de/gillbach/>). The castle and grounds are now privately owned and not open to the public. However, some readers will be familiar with it from the Münster episode of the TV crime series Tatort, "Es lebe der König!" ([https://rp-online.de/nrw/staedte/grevenbroich/grevenbroich-tatort-dreh-auf-schloss-huelchrath-mit-thiel-und-boerne\\_aid-51684601](https://rp-online.de/nrw/staedte/grevenbroich/grevenbroich-tatort-dreh-auf-schloss-huelchrath-mit-thiel-und-boerne_aid-51684601)). However, as the estate with its moats borders directly on the village of Hülchrath, it is quite possible to observe the occasional *Trachemys scripta* or *Chrysemys picta* sunbathing alongside other animal and bird species (Figs. 20-21).







21a

Fig. 21a-a': Shows the ruins of Kaster Castle with an information board behind the historically preserved municipality of Bedburg-Altminster (a'). In front of it runs the Mühlenerft, and in the lower right corner of the picture you can still see the bridge railing (a).

## Altminster Castle Ruins

(<https://www.geschichtsverein-bedburg.de/permanent/KasterBurg.html>)

According to the history of the town of Bedburg, Kaster Castle was first mentioned in writing in 1237 when it was sold by the Count of Jülich. However, it is believed that the feudal lords of Kaster, who have been known since 1148, already owned the castle. It was strategically located on the border between the territories of the rulers of Cologne and Jülich. After the town and castle were destroyed, it was rebuilt by Countess Richarda of Jülich in 1279, and Kaster developed into one of the most important castles in the Jülich domain in the 15th and 16th centuries, later serving as a widow's residence. In 1648, it was completely destroyed during armed conflicts. The remaining cellar vaults were later blown up by British occupation troops. Since 2000, the ruins have been protected as a monument.

The castle was also unique in that it was located on an island, surrounded by a branch of the Erft River, and because there was a natural crossing over the Erft. This branch, which today flows along the city wall of the historically preserved town of Altminster with little current, is called the Mühlenerft. The surrounding region has undergone numerous changes to the landscape due to coal mining, and since there is now a large protected lake behind the village, I had often hiked through Altminster and the lake district since moving to the district of Neuss in 1993, but apart from numerous water birds, amphibians, and nutrias, I had never noticed any turtles in the Erft near the castle ruins in previous years. However, when I was out walking with my wife at midday on March 3 this year (2025), in sunshine and a still cool +12.5 °C, I immediately noticed a previously unknown turtle sunbathing on a



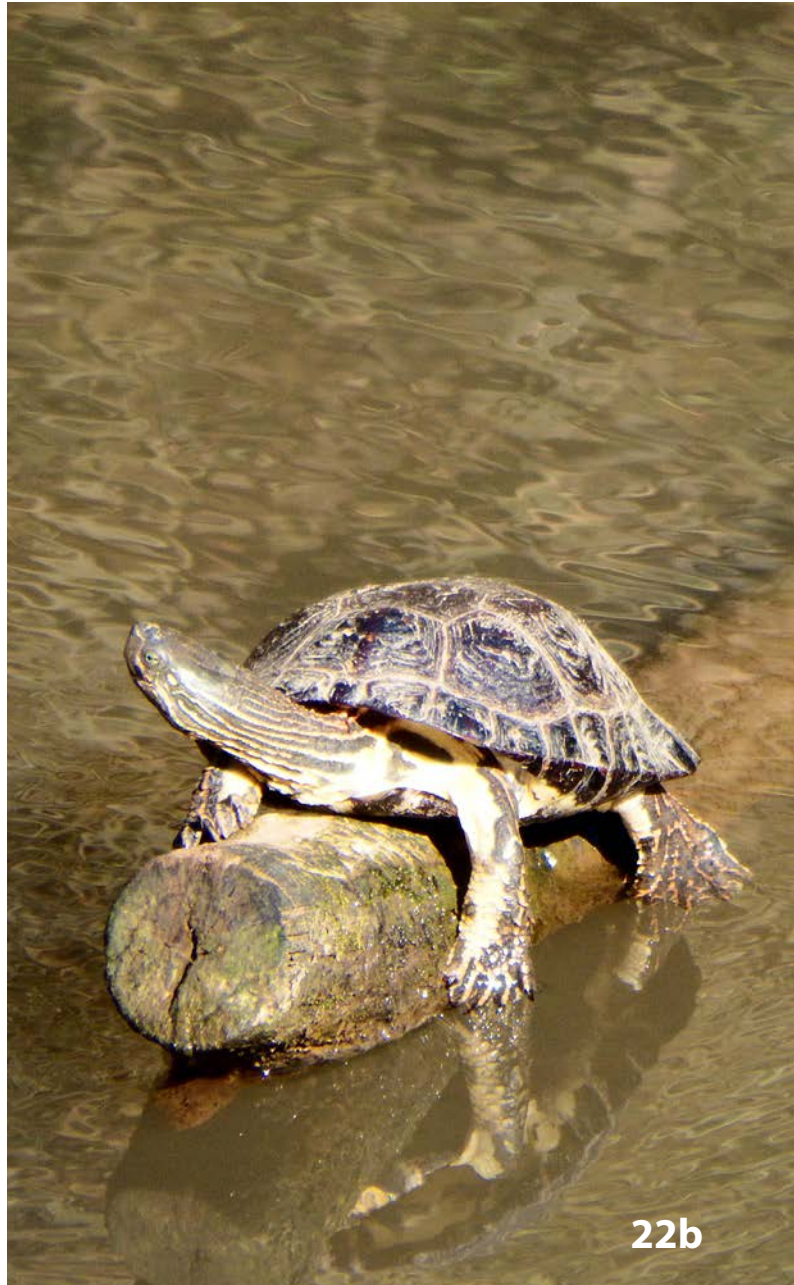


Fig. 22a-b: On March 3, 2025 (Rose Monday), during a walk at noon, a turtle was sitting on a stick protruding from the water, which would probably have been hardly noticeable on the shore (arrow a). The coloration was unclear to me and did not correspond to what is known of the usual American species. Only a second visit with a slightly better camera from the car confirmed my suspicion (b) that it was most likely a *Mauremys*. And that's how the idea began to visit other known places with exotic turtle species.

wooden pole protruding from the water in the middle of the Mühlenerft (Figs. 21-22). Its limbs were much too light in color for the well-known American armored neos. That was the only sighting, but I visited this section of the Mühlenerft between the city wall and the castle ruins more often and was able to take several photos on March 7, with the turtle always choosing the same spot to sunbathe. I was also able to observe some of the well-known representatives of the *Trachemys* and *Pseudemys* genera sunbathing in other places (Fig. 23). During one of my subsequent visits, I asked a local lady, whom I had seen there several times walking her dog, how long the turtles had been there. She told me that they had been there since the flood of the century in the Ahr Valley, which also affected tributaries to the Erft and the entire region, albeit not as severely. She told me that in the first few months

after the flood, many koi carp and several turtles could be seen. The koi carp probably disappeared over time or were caught, but some turtles have been seen regularly every summer since then. This story made me even more curious, so I went for walks along the Mühlenerft on several sunny days. I was able to take quite a few photos until about mid-May, after which the bushes lining the Erft were so leafy that it became more difficult to photograph the banks. Almost every time, I saw one of these turtles, which bear little resemblance to their North American counterparts, if not the same one. However, based on the photos, I think I can dismiss my second thought that it could be a *M. reevesii*, because the non-keeled carapace and the stripes on the neck and legs suggest that it is more likely to be *Mauremys leprosa*, which also has an eye spot. Figs. 24-26).



## 22 Discussion

Streams, rivers, and lakes have long been known here in Germany and Europe as bodies of water colonized by a wide variety of invasive species, with signal crayfish, nutria, and especially muskrats also being targeted for control. When it comes to turtles, we usually only hear about them in the press when anglers have caught a large snapping turtle *Chelydra serpentina* or even an alligator snapping turtle on their line or have spotted them. According to some anglers, this is still a regular case today. Yes, and more and more often we hear about the most invasive turtle species, the red-eared slider (*Trachemys scripta elegans*). Together with the yellow-bellied slider (*T. s. scripta*), its sale has been banned in this country and probably also in Europe, so that only existing stocks may continue to be kept, but not bred. All of these American turtle species are currently subject to reporting requirements and listed in the CITES regulations, as some of their natural populations are considered endangered. This means that they are not only invasive species, but also I part protected species. However, many more turtle species have become well established here in Europe, such

as certain map and painted turtles and common turtles from the genera *Graptemys*, *Chrysemys*, and *Pseudemys* (see also TIETZ et al., 2023; BIDMON, 2024). Similarly, the aforementioned snapping turtles and alligator snapping turtles (*Chelydra serpentina*; *Macrochelys temminckii*) also have the potential to become native here. In addition, Asian species from the genera *Mauremys*, such as *Mauremys sinensis*, and *Pelodiscus*, such as *Pelodiscus sinensis*, have already established themselves in Europe, as observed above. At present, they are not yet classified as invasive, at least here in Germany, because they are not yet reproducing successfully everywhere, but at least some North American species have already been confirmed in Baden-Württemberg (TIETZ et al. 2023). Many of these turtle species are also threatened in their natural habitats by climate change if they are species with temperature-dependent sex determination, as it is feared that rising temperatures due to climate change will result in only female offspring. This is a problem that the species settling here are unlikely to face in the near future.



Fig. 23a-b: Another visit about a week later also revealed the usual representatives such as *Trachemys scripta elegans* (a) and *Pseudemys concinna* (b) sunbathing, while the *Mauremys* almost always sat on their usual stake in the middle of the mill stream.





Fig. 24: During a visit on March 22, I was able to photograph the same specimen or one with a very similar stripe pattern on its neck sunbathing on a nearby tree trunk.

The turtle species described in this article, which have settled here as neozoa, would very likely have a number of advantages, as the warm drainage water from opencast mining, which has been supplying the waters presented here for decades, has long provided them with milder survival conditions than elsewhere in central and northern Germany (see also PAGET et al., 2023). In this respect, it can be assumed that they find similar conditions here in the Rhine-land mining area to those that have arisen in the more southern parts of Baden-Württemberg over the last decade (Tietz et al., 2023). Yes, and this trend is set to continue, because according to the latest analysis by the German Federal Institute of Hydrology (BfG) and the Dutch research institute Deltares dated July 12, 2025, the water temperature in the Rhine could rise by as much as 4.2 °C by the year 2100, with an increase of +1.8 °C already expected by 2050. In this regard, one could almost speculate whether these exotic turtle species now settling here will

be able to extend their fossil record by colonizing new habitats with a more temperate climate, so that they will have even more time to adapt to rising temperatures in the future and continue to produce offspring with a balanced sex ratio. Regardless of these considerations, I would also like to point out that North American species in particular, whose range extends in part to Canada, also have good chances of survival here in the natural waters of northern Germany, as they are well adapted to cold winter conditions. This also applies to populations of *Mauremys reevesii* (Bu et al., 2023) and *Pelodiscus* (Hou, X. & H. Shi, 2024) native to northern locations in China. The latter could even apply to the supposed *Mauremys leprosa*, because although the Mühlenerft river near Altkaster also receives drainage water, it does not receive any warmer cooling water from the power plants further downstream, so that at least if these turtles have been present there since probably 2021, they must have survived several





25a

25b

Fig. 25a-b: On April 27, I was able to observe both a *Trachemys scripta scripta* (a) and the *Mauremys* with its neck stripes and the striped pattern on one of its front limbs (b) in the immediate vicinity, directly under the bridge railing in the water over muddy ground.

winters well (BIDMON, 2024, IFTIME & IFTIME, 2025). Environmental changes, which include climate change, have always required living organisms to adapt and are therefore considered a key driver of evolution. Like many other species (e.g., migratory birds), humans, or *Homo sapiens*, have also contributed to the spread of organisms from almost all phyla. Thus, the future establishment of new species and the displacement of habitats of native species will also be a factor in this country. It is difficult to predict how many native species will be threatened with extinction, as much of this depends on the survival of entire food webs. However, these are not only strongly influenced by climate change, but also by our use of pesticides and herbicides, our future land use, and road traffic, for example.

These adaptations to new habitats could even lead to new balances between a wide variety of non-native species, as water turtles would very likely prey on the signal crayfish (*Pacifastacus leniusculus*) or the invasive quagga mussel (*Dreissena rostriformis*) that have also immigrated here, at least in their juvenile stages (see also LINDEMAN, 2006). In this respect, they could even exploit an ecological niche that was probably previously filled by the native European pond turtle, which also feeds on young crayfish, mussels, and snails living in the water (see also DUPUIS-DÉSORMEAUX et al., 2022). However, what I would like to pick up on here is the observation that at least the water park around Dyck Castle now also appears to be home to the European

pond turtle. This raises the question of what may have been done wrong in the past in terms of native nature conservation, as *E. orbicularis* has a very extensive range in Europe (FRITZ et al., 2007, VELO-ANTON et al., 2011: 2021). Would it not have made sense, long before the frequent occurrence of exotic, alien species, to use these apparently not so unsuitable waters for the settlement of the native *Emys orbicularis*? Have we long since squandered Europe's potential for turtle conservation simply because we focused on preserving autochthonous populations, which are now so small that the animals used to boost their numbers are bred in artificial facilities and head-started to a certain size (HURZIG, 2024; KUPRIAN et al., 2023, see also the websites listed). Couldn't we learn from exotic species, which for several decades now have been showing us that habitats that can be considered "semi-natural" waters exist and appear to offer very good conditions for water turtles? Perhaps the environmental conditions there are even closer to nature than under artificial breeding conditions. Yes, and how natural the occurrences here in Germany are, with a few exceptions (see Brandenburg), remains unclear, because at least *Emys orbicularis* was already transported within Europe in the Middle Ages as a Lenten food and kept in monastery ponds (KARL & PAUST, 2014, KUNST & GEMEL, 2000), which was true not only for Austria but also for Germany. Germany has now decided to phase out coal, with mining in the Rhineland to be discontinued in 2030



(<https://www.land.nrw/pressemitteilung/eckpunktevereinbarung-fuer-den-kohleausstieg-2030-meilenstein-fuer-den-klimaschutz>). Discussions are already underway about re-naturation measures and, above all, about preserving water bodies whose headwaters have been destroyed. Wouldn't it be possible to learn from the turtle species, often described as invasive, as part of these conservation measures? After all, at least those bodies of water that are not in direct contact with rivers and streams could be used to reintroduce *Emys orbicularis* because for these wetlands it may be less likely to become repopulated by exotic turtles during floods. At least after the exotic species currently living there have been relocated. Where, as in this case, the waterways are directly colonized by these neozoans, it would probably be pointless, because storm-related flooding will continue to increase and, given the scale of such events, incidents such as those observed in the Mühlenerft near Alt-Kaster are likely to continue to cause the spread of exotic turtle species.

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Fig. 26: In the late afternoon of May 8, I was able to photograph this turtle, or one with similar markings, slightly above the bridge in a part of the Mühlenerft about 90 m further east. This photo finally convinced me that it was indeed *Mauremys leprosa* (see <https://animalia.bio/spanish-pond-turtle>).



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