TURTLE DOVE HUNTING IN EUROPE 2023

The results of the second year of adaptive harvest management: FACE report

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Contents

Take home messages

1. The EU Turtle Dove Adaptive Harvest Management started in 2021, and, for the second year, a considerable reduction in harvest has been achieved with the implementation of a moratorium in the Western flyway, and a reduction of around 70% in the Central/Eastern flyway. Overall, the harvest reduction in the EU is around 85%.
2. Although declining, the Turtle Dove population is large, with a population size for both flyways estimated by PECBMS at 2.17 (±0.12) million breeding pairs in 2021. This results in a population of about 9 million Turtle Doves during the hunting season, *i.e.*, after the breeding season. The population rate of decline is slow.
3. As for other farmland birds, agricultural intensification is the key driver in population declines. Therefore, habitat restoration within agricultural landscape is the key for the Turtle Dove population recovery.
4. The evidence so far indicates that maintaining a low harvest is compatible with the goal of population recovery. In addition, this would ensure the continuation of strong and already long-lasting commitments of hunting organisations in habitat management and other conservation actions benefiting the Turtle Dove.

1. Progress update

The EU/CMS International Action Plan for the Turtle Dove approved in 2018 identified three main threats to the species; habitat loss, illegal killing and unsustainable hunting levels (Fisher *et al*., 2018). The high-level objective of the action plan is "to halt the population decline of the European Turtle Dove throughout most of its range, preparing the way for an increase in population sizes within each flyway during the period of the next Action Plan (2028-2038)". To achieve this, the most critical conservation actions related to identified threats were to ensure good quality habitats are available, to eradicate illegal killing in the EU and to ensure hunting is carried out at sustainable levels.

The level of hunting of the Turtle Dove in 2013 in the Western flyway were considered unsustainable, when the population was estimated at 1.3 - 2.1 million breeding pairs, leading to a total population size of 6 - 9.5 million individuals. At the time, the hunting bag was at 1.1 million birds for the season 2013-14 (Lormée *et al*., 2019).

Since 2013, the population size in the Western flyway remained relatively stable until 2019 as it was still estimated at around 1.3 - 2.1 million breeding pairs, although somewhat lower as the population decreased by around 3% between 2013 and 2019 (Bacon *et al*., 2021). The harvest, however, significantly decreased over time between 2013 and 2019 and was estimated at 719,579 - 806,333 for the season 2019-20 (Bacon *et al*., 2021). In 2022 the harvest in the EU was estimated at 205,342 Turtle Doves.

To ensure sustainable hunting levels, the action plan prescribed the use of Adaptive Harvest Management (AHM). The European Commission therefore initiated the work on the AHM programme for the Turtle Dove, at flyway level by holding workshops in 2020 and 2021. The AHM is performed at flyway level, in the two main EU flyways; the Western flyway which includes France, Portugal, Spain and 3 regions of North-West Italy, and the Central/Eastern flyway, which includes Greece, Malta, Austria, Bulgaria, Romania, Italy, to which was added Cyprus. These workshops led to the decisions in 2021 to implement a hunting moratorium in the Western flyway and a 50% harvest reduction in the Central/Eastern flyway, based on the EC's recommendations.

In 2021, the first year of the Turtle Dove AHM implementation saw a harvest reduction of around 70% in the Central/Eastern flyway, as reported by Member States, and with no hunting in the Western flyway. In addition, Members States and hunting organisations worked on the development of credible enforcement systems, habitat measures, and research. For more information, see FACE's 2021 report.

In 2022, Member States continued for the second year with the hunting moratorium in the Western flyway and harvest reduction in the Central/Eastern flyway, as well as the progress regarding enforcement systems, habitat measures, and research. For more information, see FACE's report 2022.

2. What is new in 2023?

As in 2022, a meeting of the EU Task Force on the Recovery of Birds was held in spring 2023. Members and stakeholders were updated by the European Commission and its scientific consortium on the progress made so far, both on the technical part (*i.e.*, the modeling work) and on the Member States' implementation of the process.

2.1. The modelling work

2.1.1. The Integrated Population Model (IPM)

Regarding the modelling work, limited progress was made. The Integrated Population Model (IPM), which is the model that served as a basis for decision making in 2021, has not been updated although new productivity data was produced by studies in Spain and France. This was surprising, as the production of productivity data by Member States, precisely to update the model, is one of the main requests from the Commission regarding the research part of the AHM. The new estimate produced by the Spanish study (Arroyo *et al*., 2022) is very similar to the estimate derived from the IPM (Bacon *et al.*, 2022), 2.08 (±1.67) and 2.057 (1.413 – 2.931), respectively. However, the French study (Eraud & Lormée, 2022) produced a higher estimate of 2.40 (±0.48).

A key element of AHM is to learn from decisions and outcomes by comparing model predictions and observed response from the studied population. To do so, a successful and proven method (*e.g.*, AEWA's work on goose AHM, and US work on ducks AHM) is to produce several models to test different assumptions. This is why FACE recommends producing different models to test different hypotheses regarding harvest rates and compensation/additivity in terms of mortality.

Now, the occasion to improve the AHM process arises from the submission of the new demographic parameters by France and Spain. This enables the creation of a new model using the new productivity estimates for France and Spain, weighted according to their population size and share in the Western flyway. Having a model using these parameters and keeping the original model to compare both results with observed trends in the Western flyway will enable us to learn about what productivity estimates best describe the population productivity.

FACE recommends that a new model is created using the new productivity estimates from France and Spain weighted according to their national Turtle Dove population size. Following the same logic, **additional models should be created to test different hypothesis of additivity/compensation of mortality due to hunting**. Such additions to the EU Turtle Dove AHM work could prove extremely useful to learn more about Turtle Dove population dynamics and improve decision-making.

Another valuable contribution to the process would be **external peer reviewing of the system** with experts in AHM. This is a common practice in science and in other AHM work and is currently lacking from the EU Turtle Dove AHM process.

2.1.2. The Population Dynamic P system (PDP)

Regarding the Population Dynamic P system (PDP), which produces predicted population trajectories based on a few parameters, including productivity, the new values from Spain and France were used to predict trends in the Western flyway. However, this was done in the form of two different "demographic contexts" corresponding to the Spanish and French estimates.

This is a good step forward, however FACE recommends producing only one PDP system for the flyway based on the new productivity estimates weighted according to the countries' population size. This would avoid difficulties arising from having two different "contexts" while decision-making should be at the flyway level. That being said, having these two "demographic contexts" separately will be useful

when comparing the observed trends from monitoring, to learn about which of those describes best the population productivity.

However, despite the update, significant issues remain with the population trajectories produced by the PDP.

FACE's **first concern** about the population trajectories produced with the PDP system is that **the trajectories do not seem to fit the reality of the observed population trend**. Indeed, according to these predictions, the simple action of stopping hunting should result in a steep population increase, and a steep decline is predicted in case of continued hunting levels (baseline 2013-18).

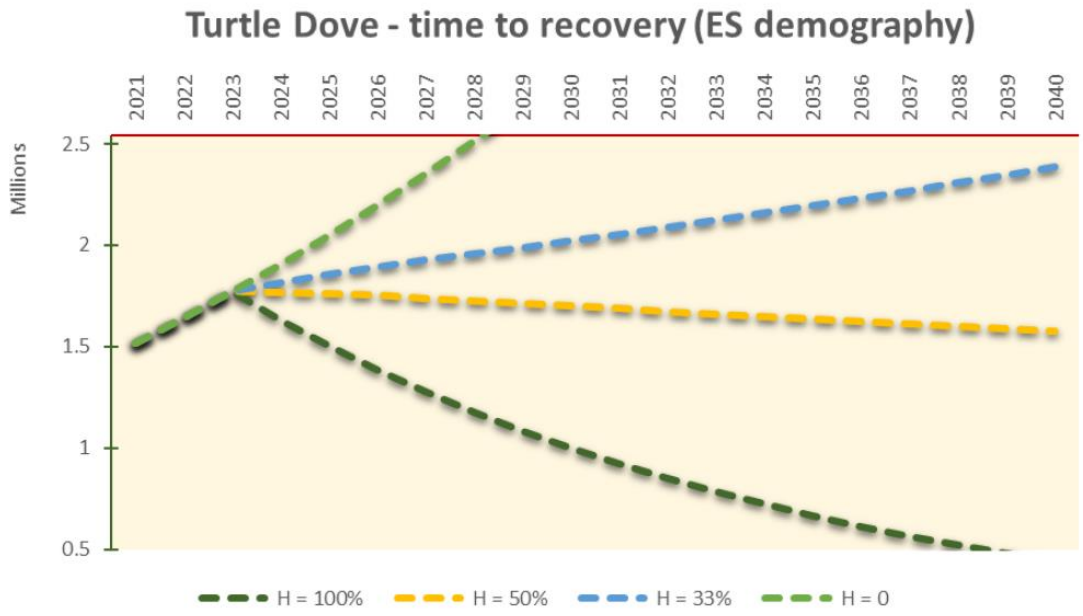


Figure 1: Future population trajectories for the Turtle Dove breeding population in the Western flyway assuming the most recent values for breeding productivity reported by Spain, which is similar to the estimate produced by the IPM in 2021 on which decision making was based (source: European Commission March 2023 Technical update). Such population trajectories were also produced for the Western flyway using productivity estimate from France, and for the Central/Eastern flyway.

However, even when higher levels of hunting were taking place (*e.g.*, the situation in the Western flyway 10 years ago), the population did not undergo a steep decline. On the contrary, the rate of decline was low (3% between 2013 and 2019). Therefore, such a decline linked to hunting does not seem realistic. The same goes regarding the steep increase in case of a complete hunting moratorium.

A potential explanation for this issue could be that the models were not calibrated with past population estimates, which is required to produce reliable population projections.

FACE recommends that the PDP system to be run for the year 2013 to see how closely the simulated trajectories match the observed population trajectory from that time until 2020. This would be a useful exercise to better inform stakeholders and decision-makers on the reliability of the population trajectories. As the parameters used in the PDP methodology are the survival estimates, productivity estimates and proportion of adults and juveniles (36/64%), as well as the PECBMS population estimates and the harvest estimate, it is FACE's view that only the population and harvest estimates could be changed to apply this methodology to 2013. These estimates are readily available in the

literature for the Western flyway: the population estimate of 1.3 - 2.1 million breeding pairs leading to a total population size of 6 - 9.5 million individuals, and the hunting bag of 1.1 million birds for the season 2013-14 (Lormée *et al*., 2019). The fact that the demographic parameters were drawn from a dataset spanning across the last 15 years would be a minor inaccuracy.

There is general agreement that these population trajectories may not be realistic, acknowledging the various assumptions that are being made, *e.g.*, that all the un-hunted birds survive (at the average rate) and reproduce the following season, that the carrying capacity of the system is not reached, etc.

FACE's **second concern** about the population trajectories produced with the PDP system is that **the system seems to consider hunting as the only driver of population decline**, as hunting is the only parameter that is modified for the different scenarios and that only the presence/absence of hunting triggers the prediction of a population steep decline/increase, respectively.

However, according to literature, **the key driver of the Turtle Dove decline is the loss of quality habitats** for breeding and foraging which resulted from the large-scale agriculture intensification in Europe (Browne and Aebischer 2005, Browne and Aebischer 2003, Dunn & Morris 2012, Browne *et al*. 2004, Moreno-Zarate *et al*. 2020). As is the case for farmland birds in general (Rigal *et al.* 2023).

The prominent role of agriculture changes in farming practices in the species decline is reflected by the Article 12 reporting datasets (2013-2018) which provides information on the pressures and threats reported by Member States. The data set show that **Member States considered agriculture as the main pressures** on the Turtle Dove with more than half of the reports refering to agriculture. Hunting only accounts for about 10% of the pressures and threats reported for the Turtle Dove.

It should be noted that a similar decrease and timing of a sharp decline is visible in other species trends, such as the Redpoll (*Acanthis flammea*), the Corn Bunting (*Emberiza calandra*), the Crested Lark (*Galerida cristata*) or the Northern Wheatear (*Oenanthe oenanthe*). Unlike the Turtle Dove, these species are not huntable, and their decrease is caused by the degradation of habitats in agricultural landscape on which they rely. The Turtle Dove also suffered from the same habitat change. Because these species are not hunted, their population decline could be almost exclusively attributed to a loss of quality habitat required to maintain their populations levels present in the 80's.

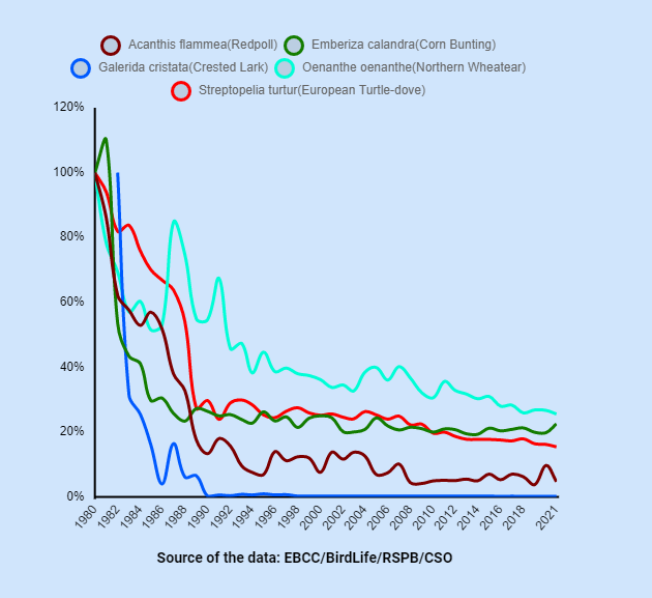


Figure 2: Population trends (index) produced by PECBMS for the Redpoll (*Acanthis flammea*), the Corn Bunting (*Emberiza calandra*), the Crested Lark (*Galerida cristata*) or the Northern Wheatear (*Oenanthe oenanthe*) and the Turtle Dove.

The same would apply to the Turtle Dove, with hunting playing only a minor role in the population decline. Therefore, it appears clearly that habitat loss is the main driver for the Turtle Dove's population decline.

Accordingly, most of the efforts and resources should be targeted at habitat restoration and modification of farming practices rather than at suspending hunting. While the latter does include off-take from the population, it also represents a driver for hunters to carry out active species and habitat management, which provides valuable benefits for wildlife across Europe.

In conclusion, while the PDP prediction could provide useful indications regarding the trend directions depending on different scenarios and in view of the above, FACE wishes to highlight that these predictions must be treated with precaution.

2.1.3. What are the results of the models?

Eventually, both modeling works (IPM and PDP) show that low harvest is compatible with the population stability and/or recovery.

Indeed, the IPM showed in 2021 that harvest rates up to 5.5% of the population would allow population growth in the Western flyway. In 2022 and 2023, this information (*i.e.*, levels of growth rates associated with low hunting rates) was no longer made available.

The PDP updates 2023 show that a harvest reduced to 33% of the baseline levels would bring population recovery and/or stability in both the Western and Central/Eastern flyways. Considering the above-cited concerns, these results should be seen as very conservative.

2.2. Member States' implementation

Regarding habitat management, all countries report having measures included in their national CAP strategic plans that can benefit the Turtle Dove. In the Central/Eastern flyway, the only reported habitat interventions specifically targeting the Turtle Dove are action carried out by the Greek and Maltese Hunting Federations. These countries also reported plans for strengthening the contribution of hunters in habitat management. In the Western flyway, France and Spain are the two countries most invested in the habitat management for the Turtle Dove, with specific actions for the species. Hunting organisations are specifically carrying out such measures, including planting hedges or improving their ecological value, sowing cover crops or engaging in the management of stubbles or fallow land. Plans for strengthening the engagement of hunters in habitat management are also described in both countries.

The investments of the hunting organisations are a long-lasting package of actions, for example, in France, the Hunting Federation of Vendée has planted 512,000 trees and shrubs over 20 years representing 374 ha of woodland and 96 km of hedges. In Greece, the hunting organisations have also been managing habitat since decades with actions such as the seeding of thousands of hectares per year with seed-rich crops that are left unharvested. Between 2005 and 2019, hunting organisations have managed more than 110,000 hectares of seed crops left unharvested for game species, which cost more than 2 million euros.

In the Central/Eastern flyway, all the countries where the hunting of Turtle Dove happens (except AT where hunting of Turtle Dove is insignificant) have put in place mandatory reporting system to collect harvest data in real time. This is mostly done via a phone App and in real time (GR, MT, CY and IT), but also via information (daily bag) filled in on the daily hunting permits reported to authorities monthly in BG and certain areas of IT. There has therefore been impressive progress in this field since the beginning of the AHM project in 2021. In only two years, all Member States which still hunt the Turtle Dove managed to create online reporting systems, except Bulgaria for which such systems will be in place for the next hunting season (2023). These systems are also being developed in the Western flyway in Spain and France, for when hunting is reopened. The French National Hunter's Federation (FNC) already developed the application ChassAdapt for the implementation of adaptive management for several species.

2.3. The state of the Turtle Dove population in the EU

The best available knowledge to assess the Turtle Dove population trends and size is now commonly accepted to be the data produced by the Pan-European Common Bird Monitoring Scheme (PECBMS), for which main goal is to use common birds, including the Turtle Dove, as indicators of the general state of nature using large-scale and long-term monitoring data on changes in breeding populations across Europe. In the framework of the Turtle Dove AHM, PECBMS produces population trends at flyway level and this data is regularly updated. Regarding the Turtle Dove, the data available in 2021, the first year of AHM decision-making, was running up to 2017, then an update in 2022 provided 3 more years (2018-19-20), and the latest update (2023) provided data up to the breeding season 2021.

It is important to note that these datasets change at each update, *i.e.*, each update is not just the addition of one (or several) more year, but the complete data set is recalculated according to the addition.

It is also relevant to note that the uncertainty associated with population estimates is higher in the latest years, as data could be missing from some partners due to lack of time and will be submitted for the next update. Accordingly, the latest 5-year trends are associated with the most uncertainty, also because these contain less samples than long-term trends, which also increases uncertainty.

2.3.1. The EU population

Regarding the whole European population, the long-term and 10-year trends have been relatively similar through the different updates from PECBMS.

The latest update providing data up to 2021 shows trend slopes of 0,9616 (95% CI: 0,9572 - 0,9659) for the long-term trend (1980-2021) and 0,9834 (95% CI: 0,9752 - 0,9916) for the 10-year trend (2012-21). According to PECBMS' trend classification, both these trends, as well as the long-term trends, are assessed as in "moderate decline[1]".

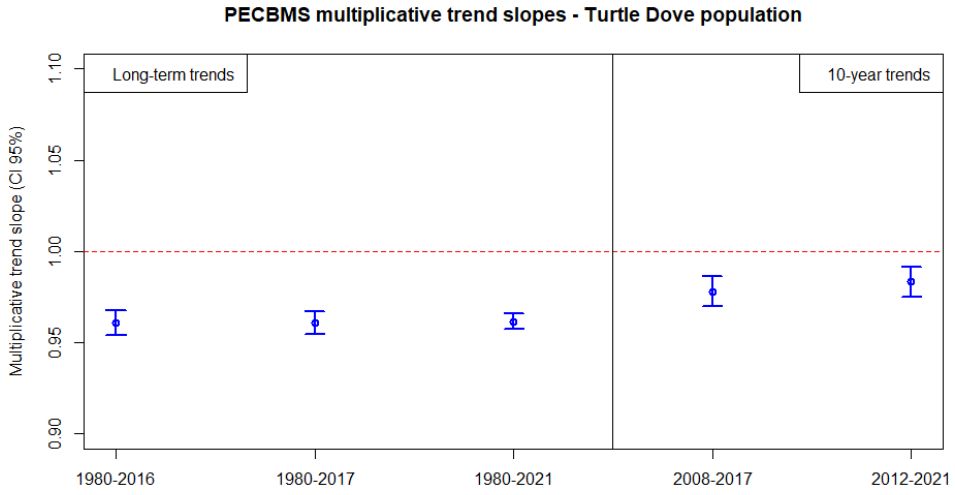


Figure 3: PECBMS multiplicative long-term and 10-year trend slopes for the Turtle Dove EU population. The latest update provides data up to the 2021 breeding season.

Regarding the latest population index and size, the update shows a lower index in 2021 and, when combining PECBMS's estimates of the Western and Central/Eastern flyways, the population is estimated at 2.17 (±0.12) million breeding pairs in 2021.

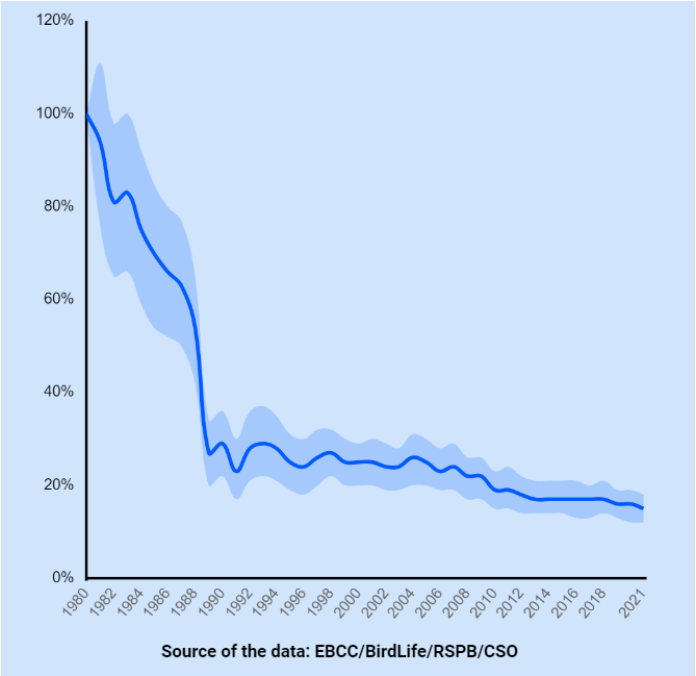


Figure 4: PECBMS population index for the Turtle Dove (the reference being the Turtle Dove population size in 1980).

[1] **PECBMS' trend classification**: Moderate decline – Significant decline, but not significantly more than 5% per year. Criterion: 0.95 < upper limit of confidence interval < 1.00.

2.3.2. The Western flyway population

In the Western flyway, last year's update (2022) showed encouraging results with the 10-year and 5-regarded as "stable[2]". In addition, the 5-year trend slope (2015-20) was positive 1,0140 (95% CI: 0,9885 - 1,0395).

However, new data were provided in 2023 and the newly calculated slopes were assessed as "moderate decline" for the long-term, 10-year and 5-year trends. The most recent trend slopes and uncertainty are as follows: 2000-21 (21 years); 0,971 (95% CI: 0,967 - 0,975), 2012-21 (10 years); 0,983 (95% CI: 0,972 - 0,993), 2017-21 (5 years); 0,972 (95% CI: 0,946 - 0,999).

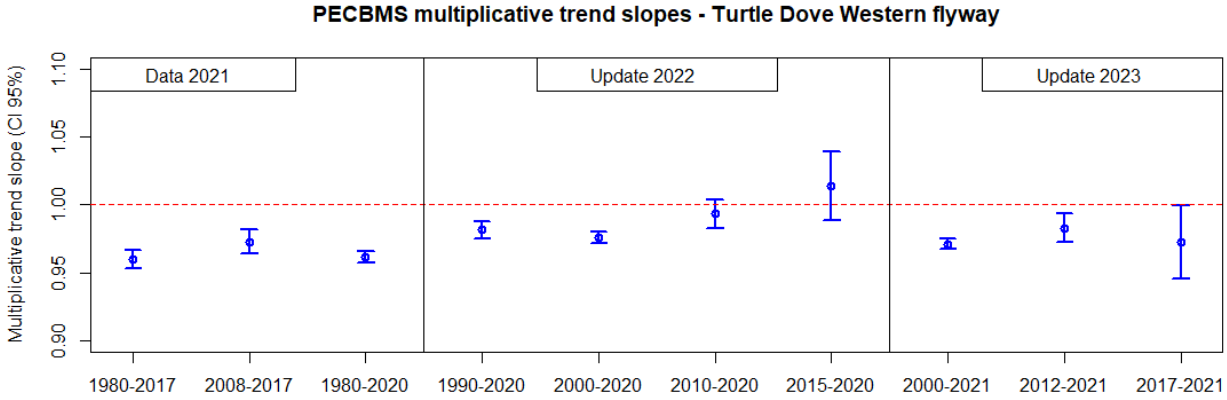


Figure 5: PECBMS multiplicative trend slopes for the Turtle Dove in the Western flyway. The latest update provides data up to the 2021 breeding season.

PECBMS also produced breeding population size estimates. The total population was estimated at 1.52 (±0.07) million breeding pairs in 2021 in the Western flyway.

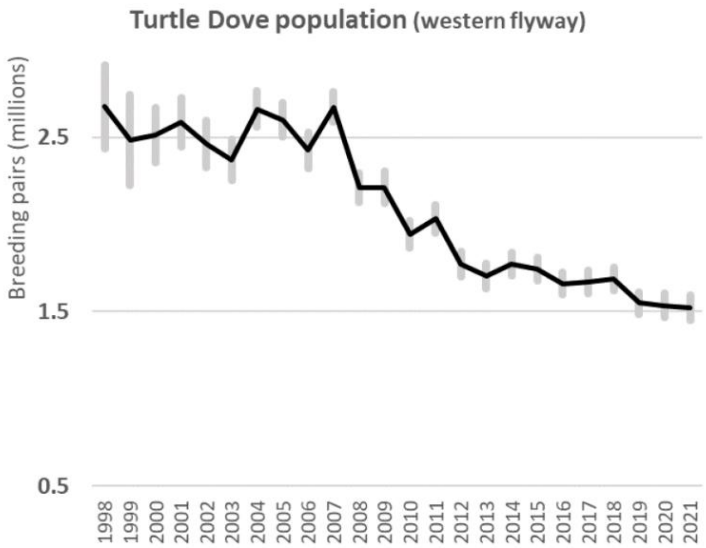


Figure 6: PECBMS population estimates for the Turtle Dove in the Western flyway. The latest update provides data up to the 2021 breeding season.

[2] **PECBMS' trend classification**: Stable – No significant increase or decline and the most probable trends are less than 5% per year. Criterion: confidence interval encloses 1.00 but lower limit > 0.95 and upper limit > 1.00.

2.3.3. The Central/Eastern flyway population

In the Central/eastern flyway, all last 10-year trends (2008-17 which was available in 2021 when the decision to reduce harvest was taken, 2010-20 which was made available in 2022 and 2012-21 which was made available in 2023) are assessed as “stable”.

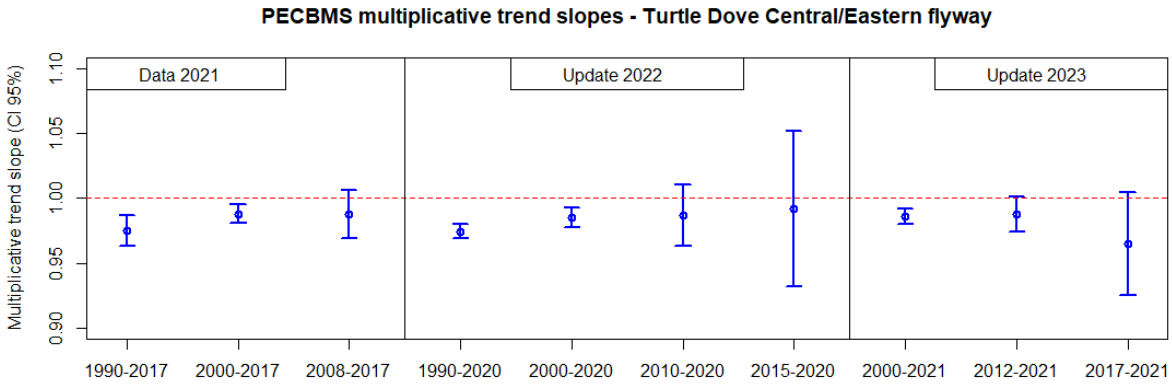


Figure 7: PECBMS multiplicative trend slopes for the Turtle Dove in the Central/Eastern flyway. The latest update provides data up to the 2021 breeding season.

The total population was estimated at 656 ±50 thousand breeding pairs in 2021 in the Central/Eastern flyway.

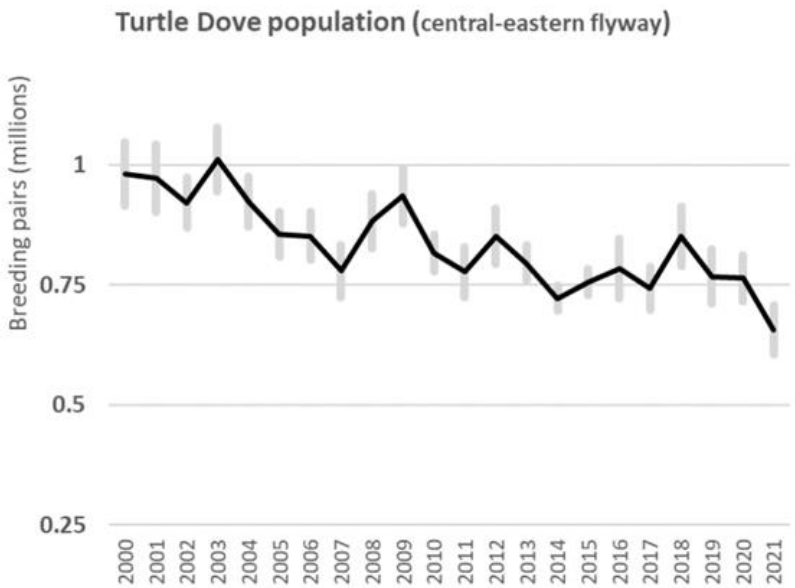


Figure 8: PECBMS population estimates for the Turtle Dove in the Western flyway. The latest update provides data up to the 2021 breeding season.

2.4. What has been the harvest reduction so far?

As highlighted above, in the first year of the Turtle Dove AHM implementation, there was a harvest reduction of around 70% in the Central/Eastern flyway, as reported by Member States, and no hunting in the Western flyway.

Again in 2022, Member States in the Central/Eastern flyway maintained a harvest reduction of around 70%, as reported to the European Commission.

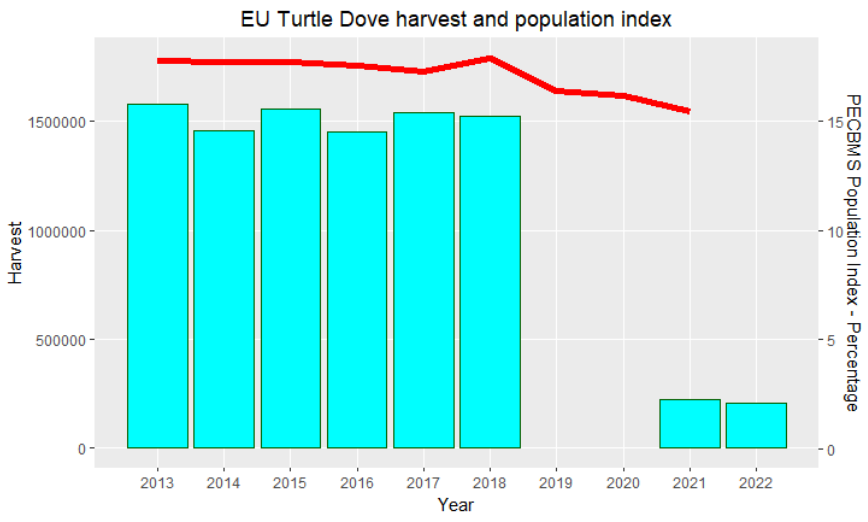
Table 1: Reported quotas and harvest from Member States in the Turtle Dove Central/Eastern flyway, and comparison to the harvest baseline.

	2013/2018	2021			2022		
	Harvest (= baseline)	Quotas	Harvest	Reduction (%)	Quotas	Harvest	Reduction (%)
AT	7800		100	99%		-	-
BG	134.455		87931	35%		50599	62%
CY	39.015		2.250	94%	15.756	13865	64%
GR	285.600	145.000	109.860	62%	120.000	120000	58%
MT	4.099		500	88%	2000	949	77%
RO	21.616		22.376	-4%	0	0	100%
IT	304.140		8.297	97%	40462	19929	93%
TOTAL	**796.725**		**231.314**	**71%**		**205.342**	**74%**

It has to be noted that harvest data is missing from Austria (where it is insignificant however) and from two regions of Italy.

In the following graph, the Turtle Dove EU harvest (blue bars) and PECBMS population index (red line) over the last decade are displayed. This allows us to appreciate an apparent period of stability between 2013 and 2018 as well as the great reduction in harvest following the implementation of the AHM programme in 2021.

Figure 9: Turtle Dove EU harvest (blue bars) for the hunting seasons 2013 to 2018 (from Member States reporting under the Birds Directive, Art.12) and 2021 and 2022 (as reported by Member States in the framework of the Turtle Dove AHM) & PECBMS population index 2013-21 (red line). Harvest data for the hunting seasons 2019 and 2020 are missing from the graph.



It is important to note that any effect of the measures taken in the framework of the AHM cannot be assessed on the population trend yet, as the monitoring data currently only goes up to the breeding season 2021, so before the first hunting season under the AHM. The potential effect of the harvest reduction will only be possible to assess with future updates of the population monitoring by PECBMS.

3. Conclusions

In conclusion, based on all available evidence, FACE believes that the goal of the Turtle Dove action plan, and more importantly, the goal of population recovery, can be met with the maintenance of a low hunting opportunity.

This is largely based on the fact that the main driver of the Turtle Dove population decline is the loss of habitats, not hunting. Other non huntable species follow the same trend. Reducing hunting alone will clearly not recover the Turtle Dove back, therefore, the key element for the population recovery is the restoration of its habitat with the engagement of key stakeholders interested in conserving this species. However, habitat restoration takes time to provide significant results. In just 3 years of AHM, there was already large efforts, which is promising.

This is supported by the PECBMS trends which show slopes close to stability or increase with the presence of hunting.

This is also supported by the modeling and population predictions available so far which show that a harvest reduction to 33% (which is about where we are now) would result in population stability in the Central/Eastern flyway (and an increase in the Western flyway). As explained above, FACE believes these predictions to be very precautionary. Such predictions of population stability would be in line with the Turtle Dove action plan high level objective which is "*To halt the population decline of the European turtle-dove throughout most of its range, preparing the way for an increase in population sizes within each flyway during the period of the next Action Plan (2028-2038)*".

To ensure sustainability of hunting, large reductions in harvest have occurred since 2021 and maintaining a low hunting opportunity would guarantee the continued active involvement in habitat conservation and research from hunting organisations at all levels. For years, national, regional and local hunting organisations have been committed to maintaining and restoring good habitat.

To keep progressing in the adaptive harvest management (AHM) programme, maintaining the recommendation to reduce harvest in the Central/Eastern flyway until we learn about the potential outcome of AHM is a decision of key importance.

In light of the above, for FACE, the work achieved so far in the Turtle Dove AHM shows that maintaining a lowered harvest is compatible with population recovery. It would therefore be much more constructive and beneficial for the species to maintain a low hunting opportunity than to close hunting.

Literature

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