

# TURTLE DOVE ADAPTIVE HARVEST MANAGEMENT PROGRAMME

UPDATE ON FIRST YEAR OF IMPLEMENTATION (MAY 2022)



## Executive summary

The 2021 hunting season was the first year of implementation of the Adaptive Harvest Management (AHM) for hunting of the Turtle Dove (*Streptopelia turtur*) in the EU. According to last year's recommendations by the European Commission (EC), Turtle Dove hunting was closed in the Western flyway (France, Spain, Portugal and part of Italy) and reduced by 50% in the Central/Eastern flyway (Austria, Bulgaria, Greece, Italy, Malta, Romania, and Cyprus although part of a different flyway). For more information about the initial phase of the Turtle Dove AHM, see last year's [report](#) from FACE.

After the hunting season, all Member States reported to the EC on the measures for habitat conservation, research and enforcement and, specifically in the countries where the species could be hunted (the Central/Eastern flyway), hunting bags were also reported. The reduction of bag was well achieved with a reduction of around 70%, and up to 95% for some Member States. This demonstrates that a quick and effective response from the hunting community is possible.

In addition to Member States' work on AHM, an updated version of the population model was prepared, this year with the inclusion of estimated population trajectories for both flyways, as requested by FACE last year. These models show that there is scope for a small harvest in both flyways and the update of the population data by the Pan European Common Birds Monitoring Scheme (PECBMS), which now accounts for 3 more years, up to 2020, indicates that the population in the Western flyway has been stable since 2013 (when high levels of hunting were taking place) and declining in the Central/Eastern flyway. This continued decline led the EC to recommend a moratorium on hunting of the species in the Central/Eastern flyway for the season 2022 although conditions agreed last year have largely been met and time to assess their outcome is still needed, in line with the core principles of AHM.

These updates were discussed on Friday 18 March 2022 at the first meeting of the NADEG Task Force on the Recovery of Birds. The conclusions of these discussions were then reported back to the EU Expert Group on Nature Directives (NADEG) which discussed it on Wednesday 6 April 2022. FACE participated in both meetings.

This report provides an update on the first year of implementation of Turtle Dove AHM in the EU, with details on:

- FACE's observations on the updated population model
- Details of significant efforts made by Member States and hunting organizations in the field of habitat management, research and enforcement efforts that took place since last year's decisions.

# 1. Introduction

The hunting season in 2021 was the first season under Adaptive Harvest Management (AHM) for the Turtle Dove (*Streptopelia turtur*), after a series of preparatory workshops organized by the European Commission (EC). The EC recommendations for 2021 were to close hunting of the species in the Western flyway (France, Spain, Portugal and part of Italy) and to decrease the harvest by 50% in the Central/Eastern flyway (Austria, Bulgaria, Greece, Italy, Malta, Romania, and Cyprus although part of a different flyway), see Figure 1. In addition, Member States (MS) had to report on measures for habitat conservation, research and implementation systems. For more information about the building of the Turtle Dove AHM and related context in 2021, see last year's [report](#) from FACE. After the season 2021, all Member States reported to the EC on the measures that were taken for the Turtle Dove. Specifically in the countries where the species could be hunted (the Central/Eastern flyway), hunting bags were reported as well.

On Friday 18 March 2022, the first meeting of the EU Task Force on the Recovery of Birds took place online. The goal of this Task Force was not to take decisions but to share recent updates and discuss the topic. The main points of discussion were the assessment of the first year of Turtle Dove AHM, including the MS's reports, as well as various updates of the AHM work, such as the population models, and species' population trends updates and the EC's recommendations.

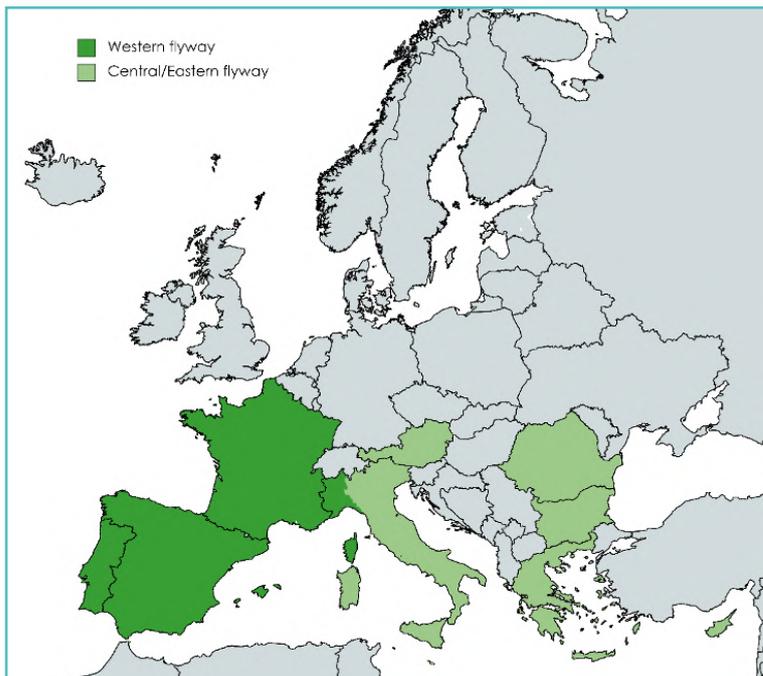


For the hunting season 2022, the EC has put forward a recommendation to continue the moratorium in the Western flyway and introduce a new for hunting in the Central/Eastern flyway. The discussions, as well as different views expressed by stakeholders were reported back to the EU Expert Group on Nature Directives (NADEG) on Wednesday 6 April 2022. At the NADEG meeting several Member States in the Central/Eastern flyway expressed a preference to continue with the previous reductions in harvest and allow more time for collecting demographic data on Turtle Dove, which is crucial for better population modelling. Particularly as requirements for monitoring of breeding success were made after the start of the 2021 breeding season.

This report gives updates on the progress so far and the outlook for the Turtle Dove AHM for 2022, further details are given regarding the scientific team's modelling work and FACE's observations. The report also goes on describing the significant efforts made by Member States and hunting organizations in the field of habitat management, research and enforcement systems that took place since last year's decisions.

## 2. What is new in the Western flyway?

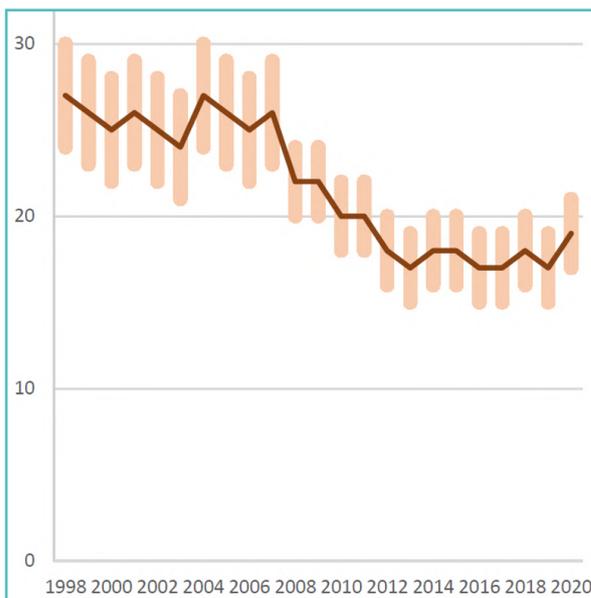
In the Western flyway, where the Turtle Dove was not hunted in 2021, major updates were made by the scientific team regarding the population models and population trends based on the Pan European Common Birds Monitoring Scheme (PECBMS).



**Figure 1**  
Member States (10) where hunting the Turtle Dove is allowed according to the Birds Directive are colored in green. Dark green countries and regions are part of the Western flyway (Portugal, Spain, France and north-western Italy - Liguria, Vale d'Aosta and Piemonte). Light green countries are part of the Central/Eastern flyway (Italy, Austria, Romania, Bulgaria, Greece, Malta and including Cyprus although the latter is part of a different flyway).

## Population trend update

The recent PECBMS update provided 3 more years (2018-2020) to the population index for the Turtle Dove, now covering the period (1998-2020). This update confirmed that the species is experiencing a period a stability since 2013. This stability had already been highlighted in Spain (Moreno-Zarate et al., 2020), which holds the biggest part of the flyway's population and in the Western Flyway in general, where the population only decreased by 3% between 2013 and 2019 (Bacon et al., 2021). It is important to bear in mind that, during this period, hunting was taking place, with relatively high harvest levels. Figure 2 shows that, in the Western flyway, the population experienced a period of decline in between two periods of stability, however most of the species' decline took place earlier, in the 80's



**Figure 2**  
Pan European Common Birds Monitoring Scheme (PECBMS) index for the Turtle Dove in the Western flyway showing stability since 2013 (PECBMS, in Carboneras *et al.* 2022).

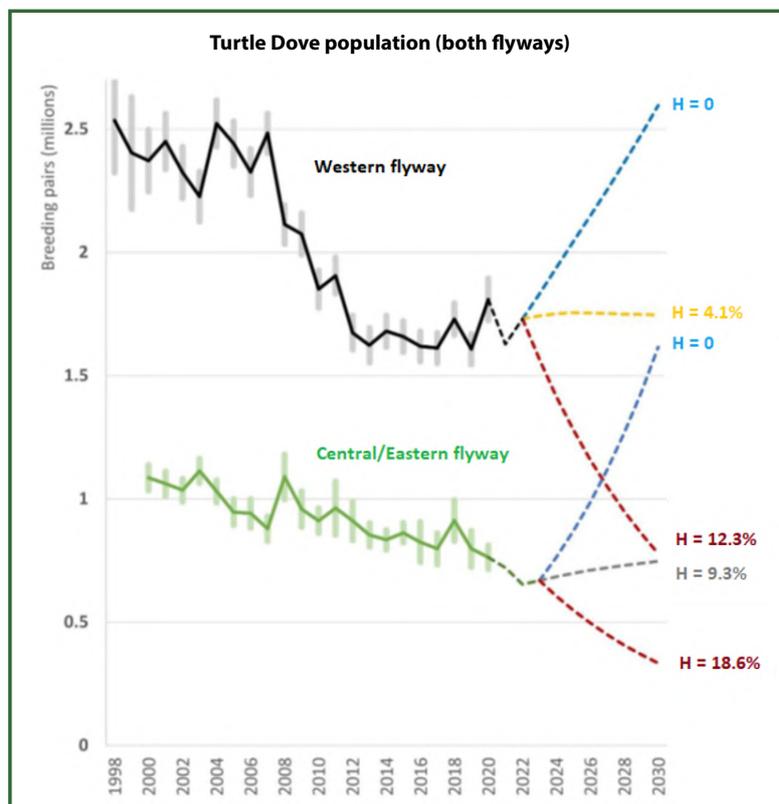
## Model update

A revised version of the Integrative Population Model (IPM) was prepared, including the consideration that hunting is partially compensatory (assuming that some of the individuals removed through hunting would have died naturally anyway), not just fully additive as originally assumed (i.e., all birds removed through hunting are additional to the number of birds that die naturally throughout the year). Population trajectories estimations were also added, using a separate model, in which the proportion of adults and first year birds in the bag was added in the trajectories' estimations.

All these points were requested by FACE as they were missing from the 2021 modeling. This was a major concern as it was significantly limiting the range of possible scenarios to guide decision making.

To FACE, the inclusion of these factors is a good step forward, however, the IPM still does not account for age ratio in the bag (i.e., it still assumes hunting affects both age classes evenly) and the population trajectories estimations still do not account for compensation in hunting mortality.

The 2022 version of the IPM gave similar results as last year, due to the fact that no new data was used to update it. Indeed, although new data was made available from studies in Spain led by the Spanish Institute for Game and Wildlife Research (IREC), these resulted in very similar outcomes, so the 2021 data was use again in the 2022 revised version of the model. Therefore, this year again, predictions from the models indicate that a harvest of the order of 4% would be sustainable, which is in line with the observed trend of the species (i.e., stability).



**Figure 3**

PECBMS trend in number of breeding pairs for the Turtle Dove in the Western flyway (black) and the Central/Eastern flyway (green), and estimated population trajectories in case of different scenarios of harvest rates (H); continued hunting with past levels (H = 12.3% and 18.6% harvest rates for the Western and Central/Eastern flyways, respectively), no hunting (H = 0), and reduced hunting (H = 4.1% and 9.3% for the Western and Central/Eastern flyways, respectively) as resulted from the modelling work (Carboneras *et al.* 2022).

For the population trajectories three scenarios were presented: continued hunting at the 2019 level (12.3%), reduced harvest and zero-harvest (Figure 3). While the harvest rate of 4% was resulting in a continued stability of the population, the predictions in case of continued and zero-harvest resulted in a steep decline and increase, respectively. Such steep response from the population do not seem in line with the actual state of the population, nor plausible from a biological point of view.

According to the estimated population trajectory that are based on survival and productivity values estimated by the IPM and population estimates calculated by PECBMS, the population would crash and be reduced by more than half by 2030 in case of continued hunting (H = 12.3%). However, it is demonstrated by PECBMS that the population has been stable from 2013 to 2020, a period when hunting was taking place with the estimated rate of 12.3% (and higher, e.g., around 14% in 2013).

This issue was raised by FACE with the suggestion to run the model retrospectively with 2013 figures to test the accuracy of the predicted trajectories with observed population levels until 2020. This exercise would enable stakeholders to assess the reliability of the model's results.

It may also be possible that the predicted crash in case of continued hunting actually reflects the previous declining state of the population (from around 2006 to 2013). This could be the case as the range of the data used to estimate survival which covers those years of decline.

FACE therefore asked to re-run the model using only the part of the data which corresponds to the last decade (i.e., the current period of stability).

While the mechanism behind this issue is not clear, these unrealistic results could indicate that the model was not calibrated with past observed population estimates, which is crucial for such a model to give reliable results and usually performed in similar work (e.g., EGMP's AHM).

FACE believes that an external review of the model (i.e., peer review) would be beneficial to the adaptive management of the Turtle Dove as it would enable to further optimize the model and its results. Peer review is a common tool and a good practice in scientific research that is usually performed. For example, successful AHM models developed in the AEWA's European Goose Management Platform are typically subject to peer review before publication. Another good practice in AHM modeling is the use of several models which are weighted over time by comparing their results with observed population data, enabling to highlight the best model. As last year, FACE expresses its support for this to be used in the current Turtle Dove AHM.

## Member States' efforts in habitat conservation, monitoring and research

An important aspect of the AHM is the progress from Member States (MS) in the fields of habitat conservation, monitoring and research. Progress in those fields was requested at the end of the first round of discussions on the Turtle Dove AHM, around mid-2021. Less than 1 year later, Member States were able to put in place an impressive set of new processes. Those steps were taken in the first year of AHM and are expected to be consolidated and improved in the near future, as more time is needed for full implementation.

Nevertheless, as highlighted by the scientific team compiling the Member States reports, countries where the Turtle Dove is traditionally hunted are investing more in these projects.

To FACE, this is not surprising as hunters have been shown to invest and care about the species they hunt, illustrating that the use of wild living resources is an important conservation tool because it provides incentives for people to conserve them, as stated in the European Charter on Hunting and Biodiversity (Bern Convention, 2008).

In **France**, a national census is planned for 2022, as part of the new National Management Plan. The census' objectives are to set a baseline and to offer comparison with the previous national census which took place in 2009. Research on reproduction and survival are also ongoing on specific research sites (Chizé), and GPS monitoring (with GPS tagging) is planned for 2022, using a common methodology with Spain. Besides these studies, research on migration, impact of habitat conditions during the breeding season and habitat selection at multiple scales are also ongoing.



**Management of habitat for Turtle Dove in France**



In **Spain**, research on survival and reproduction is carried out by IREC and new data was available for the revised version of the IPM, which produced similar results to those obtained in 2021. This ongoing research carried out by IREC will be extended to cover a guidance on estimating abundance, the development of a catalogue of habitat management measures in agricultural and non-agricultural ecosystems and the harmonization and analysis of hunting data. Moreover, electronic monitoring system extended to hunting estates are planned to complement the population estimates.



GPS tagging of Turtle Doves in Italy

In **Italy**, a project to study the Turtle Dove breeding biology and spatial behavior using VHF and GPS tags is carried out by the university of Pisa. Moreover, a National Action plan has been developed and recently approved to manage the species at the national scale.

These countries also invested significantly in habitat management targeted at the Turtle Dove. While put in place for the Turtle Dove, these habitat measures obviously also benefit a wide range of species relying on the same needs in terms of breeding and foraging habitats. This is important to note, in relation with concerns from the European Commission about the lack of measures specifically targeting the Turtle Dove in Member States, such as Agri-Environmental Schemes (AEC).

In Spain for example, measures taken by the regions include AEC measures for farmland birds, initiatives to review SPA management plans, specifically to include provisions on the Turtle Dove, funding for habitat interventions in hunting estates (including within SPAs) to benefit the species as well as plans to a national habitat management plan.

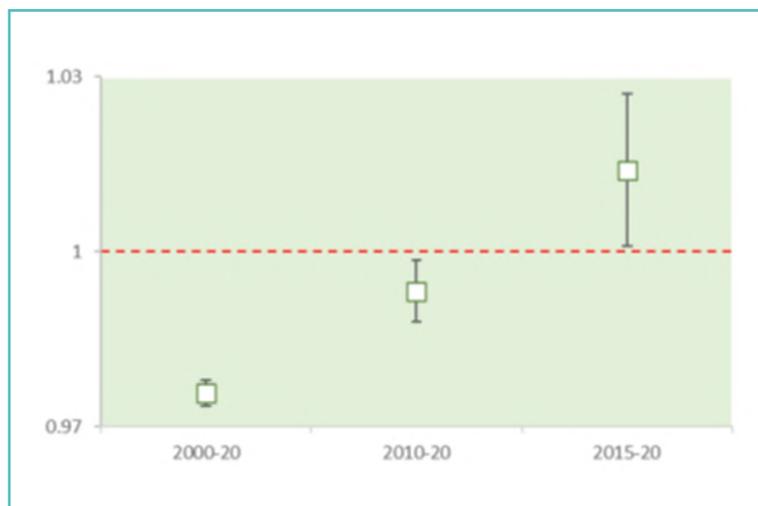
The regions in Italy also used AEC measures to benefit the Turtle Dove and from 2022 onwards, the management plan which includes several concrete habitat interventions targeted at the species will be implemented.

In these countries, the hunting community is also making significant investments into habitat management for the Turtle Dove through habitat improvement, plantation of hedges or water and supplementary feeding, which can have a positive effect on breeding success of the Turtle Dove (Rocha and Quillfeldt, 2015). For more information, see previous [report](#) from FACE.

## What is needed to reopen hunting?

The conditions set out in 2021 for lifting the temporary hunting moratorium in the Western flyway were as follows:

- 1) A population increase of at least 2 years measured with the PECBMS index.  
In the update 2022, the EC clarifies that this is measured by a multiplicative slope showing confidence intervals with a lower limit higher than 0.95 and an upper limit lower 1.05, which correspond to the PECBMS trend classification “Stable”<sup>1</sup>. The EC also states that this information will be available in 2024-2025, which implies that the two-year increase must occur after the first year of AHM (i.e., in 2022-2023). However, the PECBMS index for 2015-20 already shows a “Moderate increase”<sup>2</sup>, as can be seen in Figure 4. This increase happened before the moratorium.
- 2) A positive population growth rate estimated by the model.  
The estimated growth rate should be equal to or above 1 with a proportion of iterations resulting in population decline (i.e., below one) lower than 15%. This will be achieved either by improving the data feeding the model or by an increase in survival for the population, or a combination of both.
- 3) The existence of credible regulatory and control/enforcement systems in place at the time when hunting is reopened.  
Member States need to report good quality bag data, with checks to demonstrate and quantify accuracy, and to put enforcement systems in place to ensure compliance.



**Figure 4**  
Turtle Dove PECBMS index for the Western flyway (PECBMS, in Carboneras *et al.* 2022).

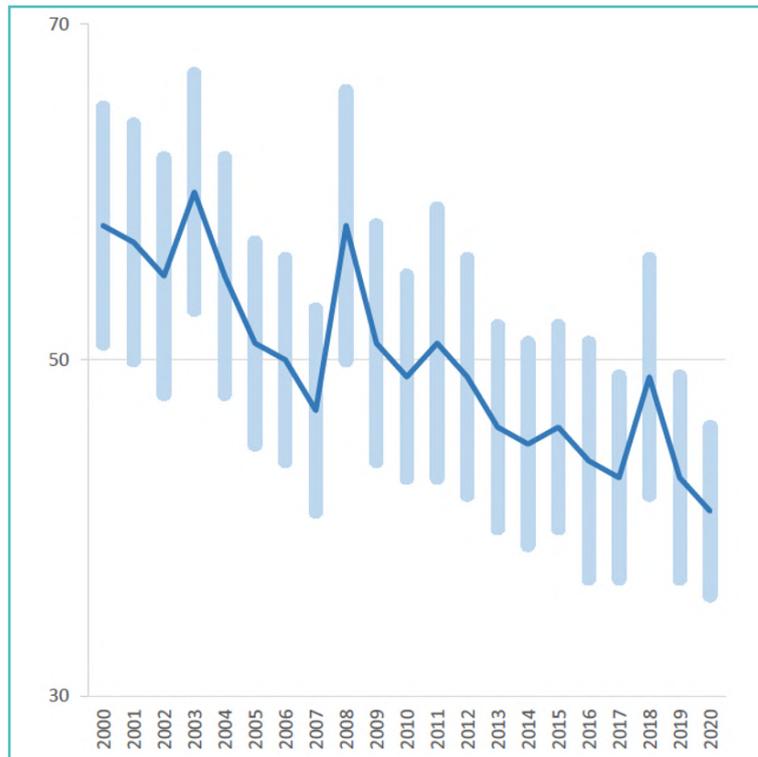
<sup>1</sup> PECBMS Trend interpretation and classification : “Stable – a trend slope where the confidence intervals overlap 1 (no significant change), with the lower confidence limit of change >0.95 and upper confidence limit of change <1.05.”

<sup>2</sup> PECBMS Trend interpretation and classification : “Moderate increase – a trend slope between 1.00 and ≤1.05 (an increase of no more than 5% per year), with the lower confidence limit of the slope between 1.00 and 1.05.”

### 3. What is new in the Central/Eastern flyway?

#### Population trend update

In the Central/Eastern flyway, the PECBMS update (covering up to 2020) indicates that the population decline is continuing, with no clear breakout into distinct periods (see Figure 5).



**Figure 5**

Pan European Common Birds Monitoring Scheme (PECBMS) index for the Turtle Dove in the Central/Eastern flyway showing moderate decline, as per PECBMS definition (PECBMS, in Carboneras *et al.* 2022).

The decision to reduce the harvest by 50% (as a precautionary approach) in 2021 was taken based on the PECBMS (Pan European Common Bird Monitoring Scheme) data covering the period 2000 to 2017. This data was updated in 2022 and now covers 3 more years, up to 2020.

According to this update, the latest 10-year trend (2010-20) is classified by PECBMS as in moderate decline<sup>3</sup> because the trend slope and its upper limit of confidence interval lie between 0.95 and 1, see Figure 6. Before the update, the latest 10-year trend slope (2008-2017) was 0.9878 (CI 0.969-1.006), thus was considered as stable<sup>4</sup> as the confidence intervals overlapped 1 and were between 0.95 and 1.05, see Figure 6. However, the slope estimates of both these periods (2008-17 and 2010-20) appear to be similar and only the confidence intervals appear to have changed, resulting in a change of category (i.e., the confidence intervals for the 2010-20 are shorter, and do not cross 1 anymore), but the exact value of the latest estimates were not provided.

Typically, confidence intervals are tighter either in case of lower variability in the dataset or larger sample sizes. In this case, the comparison between the 2008-17 and 2010-20 trend slopes indicate less uncertainty in the latter, the sample size being 10 years in both slopes, and not a genuine change in slope value. On the other hand, the confidence intervals width decreases with longer periods, indicating sample size effect.

<sup>3</sup> PECBMS Trend interpretation and classification : "Moderate decline – trend slope of  $\geq 0.95$  and 1.00 (a decline of no more than 5% per year), with the upper confidence limit of the slope between 0.95 and 1.00."

<sup>4</sup> PECBMS Trend interpretation and classification : "Stable – a trend slope where the confidence intervals overlap 1 (no significant change), with the lower confidence limit of change  $> 0.95$  and upper confidence limit of change  $< 1.05$ ."



### Figure 6

PECBMS slopes for the Turtle Dove in the Central/Eastern flyway. Data from 2021 on the left and after the 2022 update on the right (European Commission working documents). Note the scales are not the same, hence the analysis not straightforward.

In addition to this 10-year slope estimate, the 2022 update shows that the trend for last 5 years (2015-20) is stable as the confidence intervals overlap 1, and that the slope estimate is better for 2015-20 than for 2010-20 and 2000-20. This potentially indicates that an improvement could be occurring as the situation seems to be better in recent years, although it is too early to conclude as the confidence intervals are wide.

To better judge the current situation in the Central/Eastern flyway, the exact values calculated from the PECBMS data would need to be disclosed, for the different periods before and after the update. These being missing in recent working documents.

### Model update

As there is still not enough data, no IPM model could be run for the Central/Eastern flyway. However, the population trajectories model (using the Western flyway values for survival and fecundity) indicates that the 50% reduction in hunting rate agreed for 2021, would stop the population decrease and trigger a population stabilization or small increase (Figure 3). For this flyway, the population trajectories in case of continued harvest (18.6%) seems to be more in line with the general trend of the population, perhaps due to the fact that no breakout into distinct periods was identified (contrary to the Western flyway). However, the estimation in case of zero hunting shows a steep increase roughly corresponding to the doubling of the population in 2030, which seems quite unrealistic.

Despite prediction of stabilization or small increase with the current state of reduction in hunting, a full moratorium in this flyway is put forward by the EC for the season 2022.

To FACE, this is of major concern as it is inconsistent with the essence of AHM which necessitate time to assess the impact the measure taken last year will have on the population and to compare the observed population estimates with the model's predictions.

## Member States' systems to ensure implementation of the hunting quota

Overall, the goal of reducing the harvest by 50% was well achieved with a global reduction of around 70% of the bag for the season 2021, some countries having achieved reduction of up to around 95%, therefore going beyond the agreed target (preliminary estimate showed in Figure 7). However, the impact of this reduction is not assessed yet, as the recent trend update does not cover the year in which the measure was started, as stated above.

	2013/2018	2021	Reduction in %
AT	7800	100	99%
BG	134.455	82.486	39%
CY	39.015	2.250	94%
GR	285.600	109.860	62%
MT	4.099	500	88%
RO	21.616	12.507	42%
IT	304.140	5.000	98%
<b>TOTAL</b>	<b>796.725</b>	<b>212.703</b>	<b>73%</b>

### Figure 7

PECBMS slopes for the Turtle Dove in the Central/Eastern flyway. Data from 2021 on the left and after the 2022 update on the right (European Commission working documents). Note the scales are not the same, hence the analysis not straightforward.

Countries in this flyway where the Turtle Dove is still hunted managed to decrease their harvest level through the setting of systems to limit the hunting opportunity. These included the setting of a national quota and various methods such as the reduction of daily and seasonal catch limits or the shortening of the hunting season period. Such mechanisms have been proven to be effective in managing the level of harvest in the US where AHM is well in place for several duck species, and in the EU for two geese species managed under the EGMP.

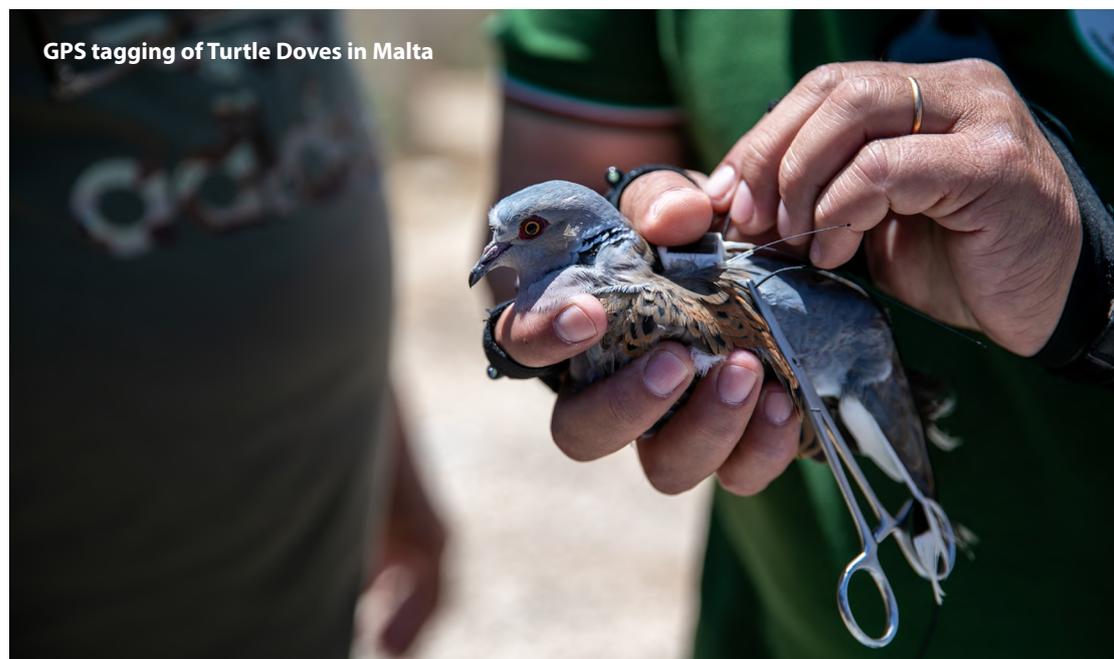
In Italy, for example, regions have set up specific harvest monitoring systems that allow to stop any hunting as soon as the quota is reached. In addition, poaching activities control by the Carabinieri Forestali have been significantly increased in 2021 and is going on in 2022, to prevent illegal killing of the species.

Complementary to these systems, Member States are monitoring the Turtle Dove bag over the season to make sure the reduction objective was met. Some countries used their systems already in place or improved it with real time data collection through smartphone applications (Greece, Malta and Cyprus). While the European Commission pointed out issues, such as the lack of enough evidence to assess the confidence intervals of the estimates provided, it is critical to bear in mind that all these projects and progress were put in place in a very short time period (less than 1 year). This proves that the hunting community and Member States are taking the situation very seriously, but also that they obviously need more time to perfect and improve what has been done so far.

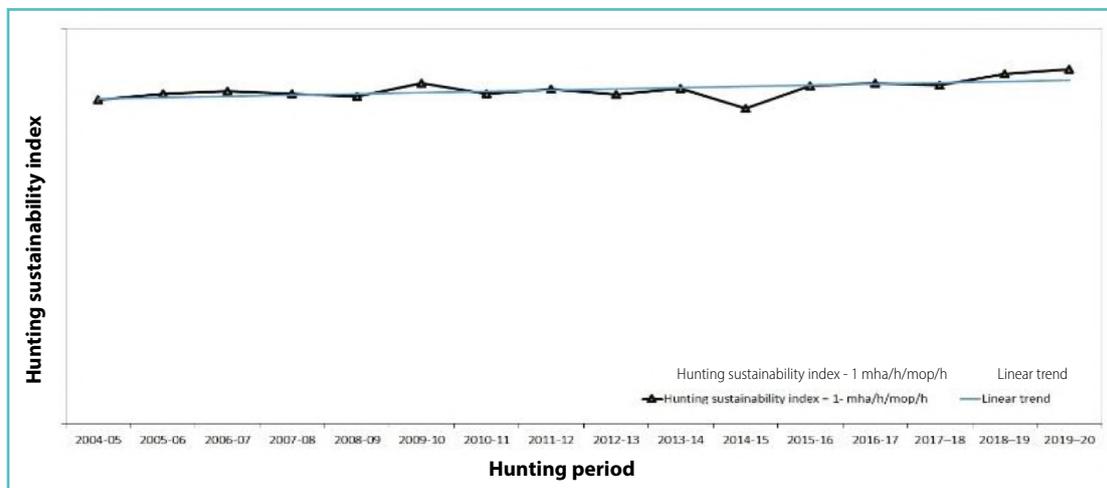
## Member States' efforts in habitat management, monitoring and research

Similar to the Western flyway countries, the EC's scientific team highlighted that where the Turtle Dove is traditionally hunted, more investment in habitat, research and monitoring projects was reported.

Research initiatives by Member States include the initiation of a monitoring programme on the species parameters (such as population size, reproduction and survival) in Bulgaria, plans to develop GPS tagging programmes in Cyprus and Malta to study the species' migration and mortality or research focusing on demography, harvest info and habitat suitability models as well as a National Action Plan in Greece.



Such research already produced significant results, such as the assessment of hunting statistics in Greece, showing that, for the period 2004/05–2019/20, the population trend of the Turtle Dove in Greece was stable and its harvest sustainable, see Figure 8 (Thomaidis *et al.*, 2022).



**Figure 8**  
Evolution of the hunting sustainability index of the turtle dove in Greece (Thomaidis *et al.*, 2022).



Habitat management is also taking place in these countries with AEC measures and habitat interventions for sustainable management of the Turtle Dove in Bulgaria, AEC measures such as hedges conservation or improvement of food and water availability in hunting estates by the Game & Wildlife Service and hunting organization in Cyprus or Malta, or large areas of unharvested crops in Greece.

In one single region of Italy, Basilicata, around 135,000€ have been spent in habitat measures such as the creation of disposable crops made specifically for wildlife, hedges, wildlife set-aside strips or unburned stubbles, while the region only harvested around 500 Turtle Doves corresponding to a 70% reduction compared to the average harvest of 6 the previous hunting seasons (2013/2014 to 2018/2019).



**Sunflower strips by the hunting organization in Greece**



## 4. Conclusion

As reported to the European Commission, a large number of measures have been taken by Members States and the hunting community over the past year whether in the field of research and habitat management or in the implementation of the reduction in harvest in the Central/Eastern flyway and the zero-harvest in the Western flyway.

While it appears that progress needs to be made on the models, they nevertheless indicate that there is scope for a small and sustainable harvest in both flyways, around 4% while realistically maintaining stability in the Western flyway (although a current zero-harvest is in place), and the current 50% reduction allowing the population to stabilize or increase in the Central/Eastern flyway. However, unrealistic model's predictions, from a biological point of view, suggest that a review of the model would be useful to ensure the most reliable results can be achieved. An external review process by experts in AHM is therefore highly recommended by FACE.

Nevertheless, harvest levels identified as sustainable by the models would be fully in line with the High-Level Objective of the International Species Action Plan 2018-2028 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 version of the Action Plan (2028 to 2038)*" (EC, 2018). Moreover, the condition for hunting set in the Action Plan which states that no hunting should take place outside of an AHM is met, as it started last year.

In addition to comply with the Action Plan, maintaining a small-scale harvest effectively keeps hunters involved in the conservation of the species and supportive of the current process, which is crucial in view of the amount of efforts they are implementing.

For FACE, in view of the above, the conclusion taken one year ago is still valid; to stop the decline of the Turtle Dove population, priority should be given to restoring habitat quality rather than closing hunting where it happens, as it might support the Turtle Dove population recovery more effectively (Marx et al. 2016).

## In summary

- Tremendous efforts were made by Member States to comply with EC's recommendations for the hunting season 2021, with support from the hunting community.
- In the Western flyway, no harvest took place in 2021, and the Turtle Dove population is stable (2013-2020).
- In the Central/Eastern flyway, reducing by half the 2021 harvest has been fully achieved, and the population continues to decline.
- Despite EC's recommendation of a zero-harvest for 2022 in the Central/Eastern flyway, several Member States believe that more time is needed to assess the impact of measures taken in 2021 which are predicted to result in a population stabilization or increase. There is no new information compared to the situation in which the decisions were taken last year to justify this zero-harvest recommendation.
- FACE highly recommends that an external review of the modelling work is conducted by experts in the field of AHM.
- Despite identified issues, the AHM models show that there is scope for limited harvest in both flyways, which is supported by the hunting community.
- Efforts made so far are fully in line with the International Single Species Action Plan for the Conservation of the European Turtle Dove (2018 to 2028), which is to halt the decline and prepare for increase in the next cycle of the action plan.
- FACE urges Member States and all stakeholders to engage in the process and contribute to research, habitat management, and monitoring and enforcement systems.

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