



UPDATE on illegal bird trapping activity in Cyprus

Covering the spring 2018 findings of BirdLife Cyprus' continuing monitoring programme for illegal bird trapping in Cyprus

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Περίληψη

Η παρούσα αναφορά παρουσιάζει τα τελευταία ευρήματα του συνεχόμενου και συστηματικού προγράμματος παρακολούθησης της παράνομης παγίδευσης πουλιών του Πτηνολογικού Συνδέσμου Κύπρου για την άνοιξη 2018, ενώ παράλληλα κάνει και μια σύντομη ανασκόπηση της κατάστασης που επικρατεί για αυτό το θέμα στο νησί. Η αναφορά αυτή έχει ως κύριο στόχο τους υπεύθυνους στα κέντρα λήψης αποφάσεων και τους πολιτικούς, με σκοπό την ενημέρωση, την ευαισθητοποίηση και την κινητοποίηση για πιο αποτελεσματική δράση για αντιμετώπιση αυτού του χρόνιου και επίμονου οικολογικού προβλήματος.

Η παράνομη παγίδευση πτηνών με τη χρήση δικτύων και ξοβέργων συνεχίστηκε την άνοιξη του 2018, όπως έδειξαν οι καταγραφές της έρευνας πεδίου από το συστηματικό πρόγραμμα παρακολούθησης του Πτηνολογικού Συνδέσμου Κύπρου. Η γενική εικόνα από το πρόγραμμα παρακολούθησης για την ανοιξιάτικη περίοδο δείχνει μια **σημαντική μείωση των επιπέδων παράνομης παγίδευσης σε σύγκριση με το παρελθόν** – για την άνοιξη 2018 καταγράφηκαν τα χαμηλότερα επίπεδα παγίδευσης πτηνών, μια μείωση κατά 99% σε σύγκριση με την άνοιξη του 2007. Με αυτά τα επίπεδα για την άνοιξη 2018 εκτιμάται ότι περισσότερα από 7000 πουλιά μπορεί να θανατώθηκαν στην περιοχή έρευνας με βάση τις καταγραφές πεδίου του Πτηνολογικού.

Τα πολύ χαμηλά επίπεδα ανοιξιάτικης παγίδευσης πουλιών στην Κύπρο, η οποία αποτελεί μια σημαντική στάση κατά μήκος του μεταναστευτικού διαδρόμου μεταξύ Αφρικής και Ευρώπης, είχαν ως αποτέλεσμα χιλιάδες πουλιά να ταξιδέψουν με μεγαλύτερη ασφάλεια στις περιοχές αναπαραγωγής τους, ένα βασικό στοιχείο για τη διατήρηση οποιουδήποτε μεταναστευτικού είδους. Ωστόσο, ο Πτηνολογικός τονίζει ότι **τα επίπεδα της ανοιξιάτικης παγίδευσης δεν μπορούν να θεωρηθούν ως ένα αξιόπιστο βαρόμετρο της παγίδευσης στην Κύπρο** - όπως και σε προηγούμενες ανοιξιάτικες σεζόν όπου είχαν καταγραφεί χαμηλά επίπεδα παγίδευσης (2012-2016), οι φθινοπωρινές καταγραφές που ακολούθησαν έδειξαν υψηλά επίπεδα παγίδευσης. Ο Πτηνολογικός Σύνδεσμος Κύπρου θα παραμείνει επιφυλακτικός μέχρι το φθινόπωρο 2018, το οποίο αποτελεί πιο αξιόπιστη ένδειξη της συνολικής κατάστασης της παγίδευσης πουλιών στην Κύπρο. Η ανάλυση των καταγραφών έγινε στο πρόγραμμα TRIM.

Η χαμηλή διωκτική δράση για την άνοιξη 2018 από τις 3 αρμόδιες αρχές (Υπηρεσία Θήρας και Πανίδας, Κλιμάκιο Πάταξης Λαθροθηρίας Αστυνομίας Κύπρου και Κλιμάκιο Πάταξης Λαθροθηρίας Αστυνομίας Βρετανικών Βάσεων) είναι επίσης ενδεικτική των χαμηλών ανοιξιάτικων επιπέδων παγίδευσης. Ωστόσο, ο Πτηνολογικός επισημαίνει ότι το πρόβλημα της ανοιξιάτικης παγίδευσης εξακολουθεί να συνεχίζεται και ότι θα πρέπει να διατεθούν και να παραμείνουν επαρκείς πόροι για την περίοδο αυτή τόσο από την Κυπριακή Δημοκρατία όσο και από τη Διοίκηση των Βρετανικών Βάσεων, προτού να μπορεί να ισχυριστεί κάποιος ότι το πρόβλημα της ανοιξιάτικης παγίδευσης στην Κύπρο έχει επιλυθεί.

Τα έξοδα για την εργασία πεδίου του Πτηνολογικού (καύσιμα αυτοκινήτου), καθώς και τα έξοδα των εκάστοτε εθελοντών, καλύφθηκαν από την οργάνωση NABU (BirdLife στη Γερμανία), ενώ το RSPB (BirdLife στο Ηνωμένο Βασίλειο) κάλυψε τους μισθούς.

Summary

This report presents the latest findings of the on-going and systematic BirdLife Cyprus surveillance programme on illegal bird trapping, relating to the spring 2018 season, while also providing a concise overview of the current situation regarding this issue on the island. This report is targeted mainly at top decision makers and politicians, with the aim of informing, raising awareness and generating momentum for more effective action to tackle this chronic and persistent ecological problem.

Illegal bird trapping activity with the use of mist nets and limesticks was limited during spring 2018, as shown by the survey data from the systematic surveillance programme of BirdLife Cyprus. The overall spring trapping pattern in recent years has shown a significant decrease in illegal bird trapping activity levels compared to the past – 2018 recorded the lowest levels of spring bird trapping activity with mist nets, with a decrease of 99% compared to spring 2007. With these recorded trapping levels, it is estimated that for spring 2018 just over 7,000 birds could have been killed within the survey area based on BirdLife Cyprus' field data.

These very low levels of spring bird trapping in Cyprus, an important stopover along the Africa-Eurasia migratory flyway, will have resulted in thousands of birds travelling more safely to their breeding sites, a key element in the preservation of any migratory species. However, BirdLife Cyprus would like to emphasize that spring trapping cannot be taken as a reliable barometer of the overall trapping situation in Cyprus – autumn is the main trapping period in Cyprus. BirdLife Cyprus will remain cautious until the autumn 2018, which will provide a far better picture of the overall trapping situation in Cyprus. The analysis of the survey data was undertaken using the TRIM programme.).

The low enforcement action for spring 2018 by all 3 competent authorities (Game and Fauna Service, Cyprus Police APU and SBA Police APU) is also indicative of the low trapping activity for this season. However, BirdLife would like to stress that spring trapping problem is still present and sufficient enforcement resources should be allocated and maintained by both the Cyprus Republic and the SBA Administration, before it can be claimed that the spring trapping problem in Cyprus has been solved.

All the running costs for the field work (fuel), as well as all the volunteer costs were covered by NABU (BirdLife in Germany), while the RSPB (BirdLife in UK) covered salaries.

1. Overview of bird trapping in Cyprus

This report presents the latest survey results, for spring 2018. Trappers are after migratory birds, with the main target species being blackcaps (*Sylvia atricapilla*) and other migrant songbirds. Trapped birds are either served as expensive *ambelopoulia* 'delicacies' in local restaurants or sold for home consumption.

Trapping with non-selective methods (mist nets and limesticks) and the trade of wild birds have been prohibited since 1974 under Cyprus legislation, when the law 'Protection and Development of Game and Wild Birds Law of 1974 (39/1974)' was introduced¹. Moreover, in 1988 Cyprus ratified the 1979 Bern Convention on the Conservation of European Wildlife and Natural Habitats, adopting a long list of birds as protected, including the Blackcap (*Sylvia atricapilla*), hence prohibiting the killing (hunting) and consumption of blackcaps (blackcaps are the main target species of illegal bird trapping in Cyprus). With Cyprus joining the EU, EU Birds Directive (2009/147/EC, formerly 79/409/EEC) was transposed into Cyprus Law N. 152(I)/2003, prohibiting anew the use of non-selective methods including mist nets, limesticks and calling devices, as well as the possession of trapping equipment, trapped birds and the trading and eating of trapped birds.

Historically, trapped birds – mostly Blackcaps - were a food supplement for the mostly poor island inhabitants living off the land. The practice of bird trapping in Cyprus has been recorded in historical documents from the middle Ages and even earlier times. Trapping as practiced in Cyprus today bears no relation to the 'traditional' or historical situation.

Nowadays, bird trapping in Cyprus is widespread and extensive, contributing to the large scale killing of hundreds of thousands of migratory and wintering birds. Survey records show that 155 bird species have been found trapped in mist nets or limesticks, of which 82 are species of conservation concern according to the EU Birds Directive and / or BirdLife International². This is a clear indication of the non-selective and ecologically damaging nature of these methods. This illegal activity has become a profitable business which is controlled to a large extent by the 'big' trappers who are also involved in organised crime, and the Cyprus Game & Fauna Service estimated this illegal business to be valued in the order of 15 million euros per year³.

Apart from the extensive use of non-selective methods for illegal bird trapping in Cyprus, organised trappers nowadays use outlawed electronic calling devices that imitate the calls of migratory birds. These calling devices are normally activated during nighttime, luring the birds into the trapping sites and hence increasing the illegal catch. Academic studies have shown that tape luring can increase the catch by 3 to 13 times (Savva, G.A. 2016, Schaub M. et al, 1999) and that various species are attracted by song playback, including target species for the trappers such as Eurasian reed warblers, sedge

¹ The specific articles of Law 39/1974 that prohibited the trapping and trade of wild birds include: Article 10 ('prohibition of hunting etc. of certain bird species', without including the blackcap either in the protected or the game species), Article 14 ('prohibition of offering game or wild birds in restaurants etc.') and Article 15 ('prohibition of the use of light projectors, traps, luring methods, limesticks and flushing of birds).

² BirdLife Cyprus 'List of birds recorded trapped in mist nets and on limesticks' [here](#).

³ Game and Fauna Service (17th March 2010), Position paper presented at the Committee of Environment of the Cyprus House of Parliament during a discussion to change the legislation on the protection and management of wild birds and game species

warblers, garden warblers and blackcaps (Mukhin A. *etal*, 2008). These calling devices can often be heard easily from hundreds of metres away from each trapping site during nighttime, highlighting the extensive use of calling devices and their intensity within the trapping areas.

2. Surveillance programme of BirdLife Cyprus

BirdLife Cyprus is a non-profit NGO working for the protection and conservation of birds, their habitats and wider biodiversity, and is the Partner of BirdLife International in Cyprus. With support from the RSPB (BirdLife Partner in the UK), BirdLife Cyprus has undertaken a systematic surveillance programme of illegal bird trapping in Cyprus since autumn 2002, providing a long record of trapping activity and giving the NGO a very good measure of expertise on the issue. The surveillance programme follows a 'Bird Trapping Monitoring Protocol' that was developed by BirdLife Cyprus and the RSPB, in consultation with the Cyprus Game & Fauna Service and the British Sovereign Base Area (SBA) police at the start of the programme. Figure 1 shows a map where bird trapping takes place in Cyprus; monitoring is concentrated in the two areas (numbered 1 and 2) where extensive trapping takes place:

1. Kokkinochoria area (Eastern Larnaca/Famagusta area) – this area also includes the Dhekelia Eastern Sovereign Base (ESBA) area), and
2. Ayios Theodoros and Maroni area (Western Larnaca).



Figure 1 Map of Cyprus showing the main trapping areas

Although trapping is also an issue in other areas of Cyprus, the survey efforts focus on these two main areas due to resource limitations and because they hold the highest trapping activity. The monitoring is undertaken by visiting a random selection of sample squares (1 km²) during daytime hours, with a focus on detecting mist netting activity. Limesticks are recorded if they are found while searching for mist nets. The squares selected are stratified to ensure a representative coverage of areas under SBA administration and the Republic of Cyprus. For more details on the methodology of BirdLife Cyprus read Appendix 1.

The project is undertaken in co-operation with the competent authorities of the Republic of Cyprus (the Game & Fauna Service and the Cyprus Police Anti-poaching unit) and the SBA Police Anti-poaching unit in particular. When trapping paraphernalia is detected, the BirdLife Cyprus team contacts the relevant

enforcement authorities. It should be noted that the BirdLife Cyprus observers never confront suspected trappers and never remove trapping paraphernalia.

BirdLife Cyprus would like to express its particular thanks to the RSPB (BirdLife in the UK) for supporting the project financially since the beginning in 2002. Furthermore, BirdLife Cyprus would like to thank NABU (BirdLife in Germany) for their financial support since 2013 onwards. NABU covers the running costs and volunteer costs of the surveillance programme, whereas the RSPB covers related salaries. Finally, BirdLife Cyprus would like to thank the volunteer that helped in the monitoring survey and the gathering of the field data during spring 2018 monitoring season.

3. Results

Survey results and data analysis

Field survey data

The field survey for spring 2018 was carried out between April and early May 2018 following the standard survey protocol. In total 42 squares were surveyed during this period and BirdLife Cyprus reported all trapping finds to the relevant enforcement authorities, either the SBA Police Anti-poaching Unit, or the Game & Fauna Service or the Cyprus Police Anti-poaching Unit, depending on the location of the finds.

A summary of the survey data for spring 2018 is presented in Appendix 2. In total, the field team recorded 3 active net rides in acacia plantations or other habitats e.g. orchards, olive trees, either holding nets or where rides (these are cleared “runs there was clear evidence of preparation for the setting and/or use of nets), which sum up to a length of 56 metres of net rides used for mist netting.

The total length of active mist net rides within the 406 km² survey area (Larnaka - Famagusta and Ayios Theodoros – Maroni areas) can be extrapolated at **380 m** (53 m x 301 / 42)⁴.

In terms of limesticks, BirdLife Cyprus did not detect any for spring 2018 (see Appendix 2). However, BirdLife Cyprus does not focus its field survey on the detection of limesticks, as other organisations do. For example, during the spring 2018 camp of the Committee Against Bird Slaughter (CABS) / SPA Foundation which was undertaken from 1st March to 13th May 2018, a total of 448 limesticks, 10 mist nets and 5 decoys were detected and/or seized (CABS, August 2018). It is noted here that the majority of the limesticks detected by CABS / SPA Foundation were in areas controlled by the Republic of Cyprus.

Based on the data gathered in the field this spring, BirdLife Cyprus estimates that just over **7,000 birds could have been killed within the survey area** and just under 10,000 could have been killed across the whole of Cyprus⁵.

Trends in spring mist netting activity

BirdLife Cyprus uses the TRIM program for trend analysis. The organisation has been gathering field data in a systematic manner since 2002, which makes it possible to use such programs for the analysis. BirdLife Cyprus would like to thank the RSPB senior conservation scientist, Simon Wotton, for his guidance and support in undertaking the TRIM trend analysis.

TRIM (TRENds & Indices for Monitoring data) is a program for the analysis of time series of counts with missing observations. The program can be used to estimate indices and trends and to assess the effects of covariates on these indices and trends. TRIM analyses time series of counts, using Poisson regression

⁴ There are 301 1 km² squares within the survey area that are classified as suitable for trapping activity (on the basis of vegetation characteristics) and 42 of these squares were surveyed in Spring 2018. Out of these 301 1 km² squares, 236 squares are found in the Republic areas and 69 are found in the Dhekelia SBA.

⁵ The estimate also includes any bird trapping that takes place in the occupied parts of Cyprus, although trapping levels are relatively low based on information provided to BirdLife Cyprus by other organisations and our joint survey work in the occupied areas with the Turkish Cypriot bird protection society, KUSKOR, carried out in 2008. This is also the reason why the occupied areas are not presented as a main trapping area in Figure 1.

and produces estimates of yearly indices and trends (Panneloek & van Strien 2005). If observations are missing, TRIM estimates the missing values on the basis of changes observed on plots that were monitored.

In other words, TRIM enables the use of the data from all the trapping survey squares ever surveyed under the BirdLife Cyprus surveillance programme during the spring period, in total 116 squares, even though these squares were not all covered each spring season. The programme ‘fills in’ missing values for squares that were not covered in a particular year on the basis of the general trend derived from the data as a whole. The TRIM software (freely available from <http://www.ebcc.info/trim.html>) is very widely used for analysis of field data from ecological or biological studies. It works as an index, setting the first year of a time series of data the value of 100 (in this case year 2007) and then showing changes up or down in subsequent years relative to this value of 100.

The TRIM program was used to analyse the survey data and to produce trends in spring bird trapping from 2007 to 2018. The metres of net rides that are recorded as active⁶ for bird trapping with mist nets within each survey square are used as the response variable, with autocorrelation and overdispersion accounted for as well. The TRIM changepoint model is used with a changepoint in every year (which returns the same result as a fully time-dependent model)⁷ (for more details on TRIM approaches read Appendix 4). The TRIM program is a good way of analysing these data and will produce a model of the change in bird trapping activity (with mist nets) between a base year (i.e. 2007) and each subsequent year of sampling.

Figure 2 shows the trapping activity levels from 2007 across all 116 squares, with 95% confidence limits. A stratified random sample of 42 of the 116 squares was surveyed in Spring 2018.

It is important to highlight that the sample of squares has been slightly expanded to 116 (compared to 112 squares of last spring), hence the TRIM program has imputed missing values for these extra squares as well. As a result, if one were to compare the index values presented in Figure 2 below with the trend analysis results reported in the Spring 2017 trapping report⁸, the index values may vary slightly for the previous spring seasons (i.e. for Spring 2017 and earlier).

⁶ This includes all 4 categories of net ride classification: P – Prepared, ANN – Active No Net, AUN – Active Unset Net and ASN – Active Set Net. Read Appendix 1 for details on net ride classification.

⁷ This is a linear trend model using the stepwise approach and with all years selected as changepoints.

⁸ BirdLife Cyprus (October 2017) ‘Update on illegal bird trapping activity in Cyprus’ [report](#) (covering Spring 2017 season).

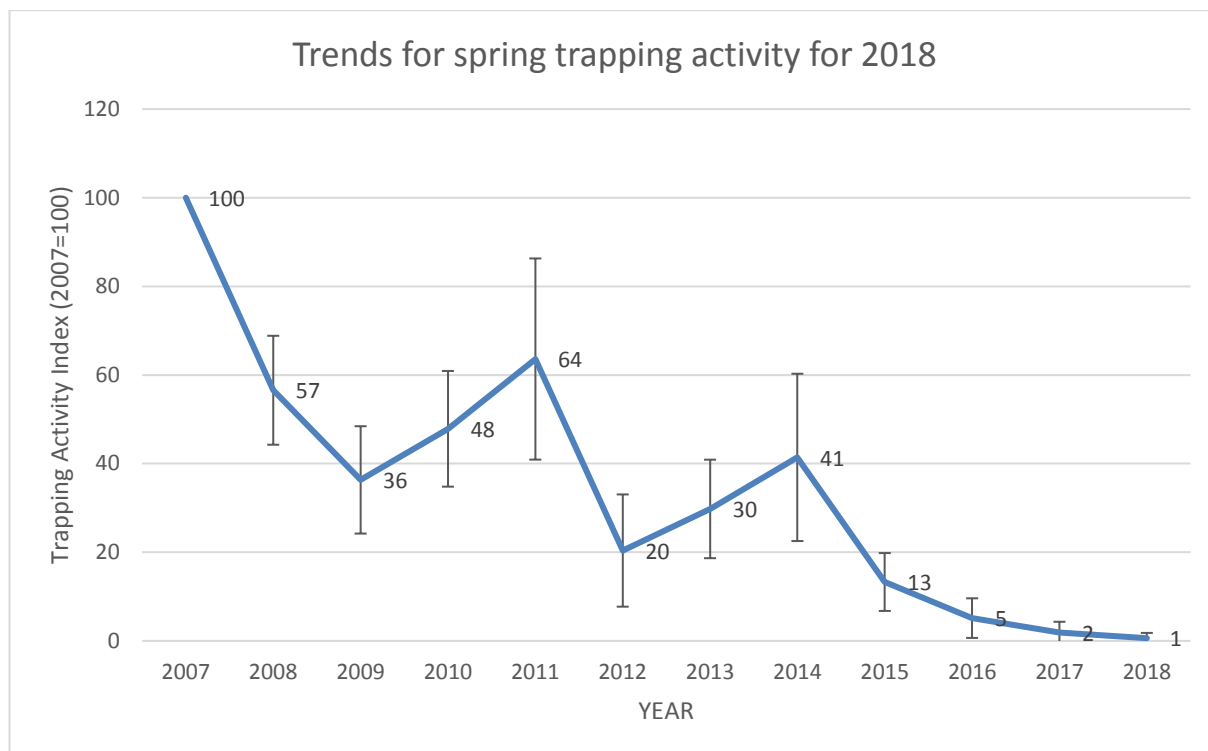


Figure 2 Trends for spring bird trapping activity with the use of mist nets

Table 1 Statistics for trend for spring trapping levels based on Figure 2

	Multiplicative trend	Standard error	95% confidence interval	Significance
All squares	0.6862	0.0473	9.27	Steep decline ($p < 0.01$)

Note 1: The multiplicative trend reflects the changes in terms of the average percentage change per year i.e. if the trend is equal to 1 then there is no trend. Hence value 0.6862 calculated above indicates an overall decrease of around 31% per year in spring mist netting activity.

As shown in the graph above, **spring 2018 showed the lowest levels of bird trapping activity with mist nets since the start of the surveillance programme, a very positive development.** Mist netting activity for spring 2018 is 99% lower than in spring 2007 (index value of 100). Overall, the pattern of low spring trapping observed in recent spring seasons has been maintained.

The sample of 116 squares includes 79 squares within the Republic of Cyprus (RoC), 30 within the Dhekelia Sovereign Base Area (SBA) and 7 squares that cover areas in both jurisdictions (referred to as 'Joint' squares). In spring 2018, 30 squares within the Republic of Cyprus and 10 squares within the SBA and 2 squares in 'Joint' areas were covered. **Due to the small sample size for the SBA, it is not considered suitable to undertake analysis in TRIM that will generate a trapping index with reasonable precision for this stratum without a wide margin of error involved. For this reason jurisdiction analysis has not been undertaken for spring 2018.**

We emphasize that spring season is not the main trapping season of migratory songbirds in Cyprus; this is the autumn season. Over the last few years spring seasons have shown an encouraging and significant

decrease in trapping, suggesting that spring trapping may be contained over the next few years. **The spring 2018 results are the lowest levels recorded for spring trapping since 2007. However, these levels cannot be taken as a reliable barometer of the overall trapping situation in Cyprus and we must wait for the autumn 2018 season to reliably assess the state of play for the year.**

Enforcement

There are 3 competent authorities that are responsible for enforcement against illegal bird trapping in Cyprus: the Game & Fauna Service and the Cyprus Police Anti-Poaching unit that are responsible for areas controlled under the Republic of Cyprus, and the SBA Police Anti-Poaching unit responsible for areas within the UK Sovereign Base Areas. The resources of the above-mentioned enforcement bodies are as follows:

- Game & Fauna Service, the responsible body for the implementation of the Birds Directive, has about 90 game wardens in total across the whole of island. The Larnaca & Famagusta district, where most of the bird trapping takes place in Cyprus and where the survey area of BirdLife Cyprus is focused, has about 20 game wardens,
- Cyprus Police Anti-Poaching Unit had 6 officers for the spring trapping period
- SBA Police Anti-Poaching Unit was comprised of 8 officers to cover the Eastern Dhekelia Sovereign Base Area during the spring trapping period. BirdLife Cyprus would like to thank the SBA Administration and SBA Police APU team for its willingness and support in undertaking joint field monitoring of illegal bird trapping with the BirdLife Cyprus team.

Table 2 summarises the number of reports that BirdLife Cyprus provided to the competent authorities regarding active trapping sites and the overall feedback given by the competent authorities. The information presented in the table below refers to active trapping sites as recorded by the survey team (this includes all net codes, P, ANN, AUN and ASN that were reported to the competent authorities for further action.

Table 2 Summary of trapping reports provided to competent authorities from BirdLife Cyprus during spring 2018

	Game and Fauna Service – Larnaca & Famagusta	SBA Police Anti-Poaching Unit	Cyprus Police Anti-Poaching Unit⁵
Number of reports	1	3	None reported
Prosecutions / Arrests	<i>No feedback provided</i>	0	N/R
Confiscations ¹	<i>No feedback provided</i>	0	N/R
Clearance ² / Nothing ³	<i>No feedback provided</i>	3	N/R

N/R – Not relevant; N/A – Not available

Note 1: Confiscations of mist nets, limesticks and/or calling devices.

Note 2: Clearance refers to collection of trapping paraphernalia such as pole bases, poles, loudspeakers, wires.

Note 3: 'Nothing' refers to reports where the competent authority checked the trapping location but reported it inactive (no nets or limesticks were found) upon its visit, hence no prosecution or confiscation took place, or no feedback was provided.

With regards to the Game and Fauna Service (Larnaca & Famagusta district), 1 trapping location was reported, but no feedback was provided to BirdLife Cyprus to this date and it is therefore assumed that no prosecutions or confiscations took place from this report. According to a report by CABS/SPA on their activities during the spring 2018 trapping season, the Game and Fauna service prosecuted 3 individuals and confiscated 1 mistnet, 232 limesticks, and 1 calling device as a result of information given to them by CABS/SPA. (CABS & SPA Foundation, August 2018)⁹.

With regards to the Dhekelia SBA Police Anti-poaching unit, 3 trapping locations were reported which were cleared of irrigation hoses and/or trapping paraphernalia like pole bases and poles. In terms of the overall enforcement from the SBA Police Anti-poaching unit for spring 2018 trapping season (April and May), there were no prosecutions and 9 mist nets, and 4 electronic callers were confiscated¹⁰.

As for the Cyprus Police Anti-poaching unit, no trapping locations were reported to this enforcement agency. In terms of the overall enforcement from the Cyprus Police Anti-poaching unit for spring 2018 trapping season there was 1 prosecution made and 46 limesticks were confiscated.¹¹.

Overall from the enforcement action statistics available to BirdLife Cyprus, it is clear that enforcement on the ground was limited, which matches the low spring trapping activity levels detected.

⁹ Data taken from CABS & SPA Foundation report (August 2018), page 17.

¹⁰ Data provided from SBA Police analyst via email on 12th November 2018.

¹¹ Data provided during telephone communication with the Head of Cyprus Police anti-Poaching Unit (26/11/18)

4. Conclusions

Illegal bird trapping activity with the use of mist nets was limited during spring 2018, as shown by the survey data from the systematic surveillance programme of BirdLife Cyprus. The overall pattern detected through spring monitoring in recent years has shown a significant decrease in illegal bird trapping activity levels compared to the past – spring 2018 recorded the lowest levels of bird trapping activity, with a decrease of 99% compared to spring 2007. BirdLife Cyprus estimated that for spring 2018 just over 7,000 birds could have been killed within the survey area based on its field data.

These very low levels of spring bird trapping in Cyprus, a stopover along the Africa-Eurasia flyway, will have helped thousands of birds to travel more safely to their breeding sites, a key element in the preservation of any migratory species. However, BirdLife Cyprus would like to emphasize that spring trapping cannot be taken as a reliable barometer of the overall trapping situation in Cyprus. BirdLife Cyprus will remain cautious until after the next autumn 2018, which will provide a far better picture of the overall trapping situation in Cyprus.

The low enforcement action for spring 2018 by all 3 competent authorities (Game and Fauna Service, Cyprus Police APU and SBA Police APU) is in line with the low spring trapping activity. However, BirdLife would like to stress that spring trapping is still happening and sufficient enforcement resources should be allocated and maintained for this season by both the Cyprus Republic and the SBA Administration, before anyone can claim that spring trapping in Cyprus has been stopped.

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Appendix 1

Methodology of the trapping surveillance programme

Survey area and sampling strategy

The surveillance project began in 2002 with the coverage of 60 sample squares (each 1x1 km) chosen at random from within a 261 km² study area, which covered most of the Famagusta/Eastern Larnaca area and the Ayios Theodoros – Maroni area.

In 2005, the monitoring became more targeted, focusing on habitat suitable for trapping. Each 1 km square within the study area was classified as either a 'possible bird trapping area' or 'unlikely bird trapping area' based solely on the presence or absence of vegetation suitable for setting limesticks or nets. Surveillance subsequently took place in 'possible' squares only. Some 44 of the original 60 sample squares were 'possible bird trapping area' squares under the new classification. These 44 squares were kept, with another 16 new squares chosen randomly to bring the total sample to 60 again.

Then, in 2007, the survey area was expanded to cover 295 km² for Famagusta/Eastern Larnaca area and 111 km² for Ayios Theodoros – Maroni area, bringing the total survey area to 406 km². This was done after preliminary surveys in autumn 2006 found evidence of extensive trapping on the margins of the original (261 km²) survey area. The sample size was expanded to 100 squares (40 new squares were randomly chosen) to allow for this extension of the survey area. Out of the 406 1 km² squares of the expanded survey area, 301 have been classified as 'possible bird trapping area' squares.

The random selection of sample squares is stratified to ensure representative coverage of areas under SBA, Republic of Cyprus and "Joint" jurisdiction (squares where the two jurisdictions meet). In terms of the analysis of the survey data BirdLife Cyprus is using the TRIM (Trends & Indices for Monitoring data) programme, which enables the analysis of time series of counts with missing observations (read more about TRIM in Appendix 4).

Surveying for trapping activity

Surveying consists of a two-man team systematically searching for evidence of illegal trapping activity in the randomly selected one by one kilometre squares. The time taken to survey each square is recorded, as are weather patterns and the presence or absence of large numbers of migrant birds.

For safety reasons (avoidance of possible confrontation with trappers) the BC observers do not go out in the field at dawn, which is the main period of trapping activity, but carry out surveys between 09:00 and 17:00. Each sample square is surveyed only once each season, partly for safety reasons (minimising the risk of the observers becoming known to trappers) and partly because repeat sampling of each square has no particular value when it comes to analysis of the collected data. Opportunistic observations are also made in the surroundings of squares where mist netting is suspected. Trapping activity includes:

- Mist netting activity, which is the main focus of the surveillance programme of BirdLife Cyprus. This is calculated using the total length of active net rides recorded within the survey area; and
- Limesticks, using the total number of active limesticks found within the survey area.

Mist nets

The two observers carry out a thorough search of all habitat patches suitable for the setting of mist nets (i.e. all areas with bushes and/or trees) within each sample square. The observers record all direct and indirect evidence of mist net and tape lure use and of net ride preparation and use (e.g. cleared corridors within vegetation for putting up nets, presence of pole bases). The codes used for the various categories

of mist netting activity and tape lure use are given below, as are the codes used for recording the type of habitat where trapping activity is detected. The surveyors note cases where they come across enclosed (fenced) areas that they cannot see into at all, or cannot see into well enough to survey fully.

Box 1 Key to survey codes used for the field

<u>Net code</u>	<u>Habitat code</u>	<u>Tape lure code</u>
O – old ride	A – acacia	P – tale lure present, playing
P – ride recently prepared	C – citrus	L – loudspeakers present
ANN – active no nets present	E – eucalyptus	Y – tape lure present, not playing
AUN – active unset net present	F – fig	U – unknown
ASN – active set net present	J – mulberry	W – electrical wires associated with tape lures
IUN – inactive unset net present	O – olive	B – car battery present
	M – maquis	
	P – pomegranate	
	K – carob	
	Cy – cypress	
	L – lentisk	
	S – syrian plum	

The main net ride classifications are described below:

- Prepared (P): A net ride that is clearly ready to be used but there is no evidence e.g. bird feathers, blood stains, thrown pebbles, to suggest illegal activity was taking place the previous night / morning (see Figure 4),
- Active No Net (ANN): A net ride that from the evidence found e.g. bird feathers, blood stains, thrown pebbles, indicates that illegal activity was taking place the previous night / morning but no net is present (see Figure 5),
- Active Unset Net present (AUN): A net ride where the trapper has left the mist net on the poles but it is furled i.e. the mist net is not stretched up for catching birds but lowered down (or the net is placed e.g. under a tree) (see Figure 6), and
- Active Set Net present (ASN): A net ride where the trapper has left the mist net set on the poles and it is ready for catching birds (see Figure 7).



Figure 3: Prepared (P) net ride



Figure 4: Active No Net ride (ANN) with poles, bases, feathers & signs of trampling in an olive grove



Figure 5: Active Unset Net present (AUN) in an olive grove



Figure 6: Active Set Net present (ASN) –corridors in orchards are often used for mist netting

Limesticks

While the main effort of the observers is to locate evidence of mist netting, all evidence of limestick activity is also recorded. Limesticks are much harder to locate in the field than mist nets and are often set in a different habitat to mist nets. In addition, incidental evidence for limestick use is hard to detect (though trees pruned to hold limesticks are readily identifiable). It is impractical to search entire 1 km² sample squares for limesticks due to the time consuming nature of the task. The protocol is therefore for the observers to look out for limesticks while concentrating on surveying for mist netting activity.

Appendix 2

Survey data for spring 2018

Evidence of illegal bird trapping activity within survey squares

CONFIDENTIAL INFORMATION

May be provided upon request

Appendix 3

Estimation of numbers of birds caught during spring 2018

The following key assumptions are applied for the estimation of the birds killed:

- 12 metres is the assumed average length for a mist net
- 20 birds are caught per 12-m net per day (Magnin, 1986)
- 0.5 birds are caught per limestick per day
- 60 days is the duration of the trapping period for spring and autumn seasons
- 50% scaling factor – applied for spring estimates to account for a lower number of migrating birds passing via Cyprus compared to the autumn
- 301 are the possible bird trapping squares within the survey area as identified from the surveillance programme in 2007 (the random sample of squares surveyed by BirdLife Cyprus is taken from these 301 squares)
- 75% of illegal trapping activity for all of Cyprus takes place within the survey area (based on input from enforcement authorities and other experts)
- Net ride categories 'ANN' (Active No Nets), 'ASN' (Active Set Nets) and 'AUN' (Active Unset Nets) nets are assumed that they are active every day during the trapping season (read Appendix 1 for details on net ride classification).
 - Note: Net ride category 'P' (Prepared) is not taken into account for the estimation of numbers of birds killed anymore, following the recommendation of BTO science experts (BTO report, July 2015) to revise slightly the equation.

Using the above assumptions the bird death toll is estimated as follows for spring 2018:

For nets = [(Total length of ANN+AUN+ASN rides)] / (average length of a net) x (20 birds per net per day) x (total number of 'possible bird trapping area' squares / number of squares surveyed) x (length of trapping season in days) x (50% scaling factor)

$$= [(20)] / (12) \times (20) \times (301/42) \times (60) \times (50\%)$$

= **7,167** could have been caught within the survey area in **mist nets**.

For limesticks = no limesticks detected by BirdLife Cyprus field team during spring 2018 survey.

In total 7,167 birds could have been killed in mist nets and on limesticks within the survey area during spring 2018. Assuming that the survey area accounts for 75% of the trapping activity in Cyprus, the bird death toll across Cyprus is:

$$= 7,167 / 75\%$$

= **9,556 birds could have been killed in nets and on limesticks across all Cyprus during spring 2018.**

Appendix 4

TRIM model description

TRIM (TRENDS & INDICES for Monitoring data) is a program for the analysis of time series of counts with missing observations. The program can be used to estimate indices and trends and to assess the effects of covariates on these indices and trends. TRIM analyses time series of counts, using Poisson regression and produces estimates of yearly indices and trends (Panneeloeck & van Strien 2005). If observations are missing, TRIM estimates the missing values on the basis of changes observed on plots that were monitored.

In other words, TRIM enables us to use the data from all the trapping survey squares ever surveyed under the BirdLife Cyprus surveillance programme during each season, even though these squares were not all covered each season. The programme 'fills in' missing values for squares that were not covered in a particular year on the basis of the general trend derived from the data as a whole. The TRIM software (freely available from <http://www.ebcc.info/trim.html>) is very widely used for analysis of field data from ecological or biological studies. It works as an index, setting the first year of a time series of data the value of 100 (in this case year 2002) and showing up or down changes in subsequent years relative to this value of 100.

TRIM program allows the user to select various models to undertake the analysis: a) Model 1: No time-effects, b) Model 2: Linear (switching) trend, and c) Model 3: Effects for each time-point. **For the analysis presented in this report BirdLife Cyprus has selected Model 2, following the advice of RSPB senior conservation scientist Mr Simon Wotton.** Below is an explanation of why.

Which model should one use: the time-effects model or the linear trend model? (Panneeloeck & van Strien 2005)

The time effects model (= year effects model in case the time points are years) estimates parameters for each separate year and should be chosen if one wants to assess indices for each year. The linear trend model should be chosen if one is interested in testing whether a trend has happened across a number of years, by selecting one or more years as changepoints. The linear trend model should also be chosen when the data are too sparse to run the time effects model. Using the linear trend model also allows testing trends before and after particular changepoints. Options are (1) to test trends before and after a priori selected changepoints or **(2) to let TRIM search for the substantial changepoints by using the stepwise procedure.** If all years are selected as changepoints, the linear trend model is equivalent to the time effects model (although it results in a description in terms of trend slope parameters rather than time point parameters). Note that the linear trend model also produces indices for each year, but not necessarily based on yearly parameters as in the time effects model. Instead of yearly parameters, the linear trend uses the trend across a number of years to approximate the indices.

BirdLife Cyprus has used the 'Linear trend model by using the stepwise procedure and with all years selected as changepoints' for the trend analysis presented in this report, following the recommendation of RSPB senior conservation scientist Mr Simon Wotton.

The linear trend model can be run without any changepoints selected. Thereby it imputes missing counts based on the trend over the whole period studied. Be careful in using the model without any

change points; the resulting indices might be unrealistic (this is the key point why this approach was not recommended and all years were selected as change points).