NEW DATA ON BATS (*CHIROPTERA)* IN THE ALBANIAN NATIONAL PARK OF PRESPA LAKES

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Abstract

Since 2012, a monitoring of the bat population in the Albanian National Park of Prespa Lakes has been established. From 8 roosts known to be used by bats before 2012, we are presenting here the results of 45 identified sites, where new species for the area and important population of bats have been recorded. With 3 new species visually identified between 2012 and 2015 (*P. austriacus, P .kolombatovici, T. teniotis*) for a total of up to15 species actually recorded, and more than 5000 specimens known to use roosts in the area, this study confirms the high importance of Prespa park area for bats diversity and conservation for Albania and the South-Western Balkans.

Key words: *Chiroptera*, Albania, Prespa lakes, monitoring.

Përmbledhje

Që nga 2012 është kryer një monitorim i popullatës së lakuriqëve të natës në territorin e parkut kombëtar të Prespës. Nga vetëm 8 vendstrehime lakuriqësh nate të njohura para vitit 2012, ne prezantojmë rezultatet e 45 vendstrehimeve, në të cilat raportohen lloje të reja (*P.austriacus, P.kolombatovici, T.teniotis*) dhe popullata të rëndësishme lakuriqësh nate për parkun kombëtar të Prespës. Me 15 llojet e lakuriqëve të natës dhe më shumë se 5000 individë të gjetur në këto vendstrehime, ky studim konfirmon rëndësinë e madhe të parkut kombëtar të Prespës për diversitetin dhe ruajtjen e lakuriqëve të natës si për Shqipërinë ashtu dhe Ballkanin Jug-Perëndimor.

Fjalëkyçe: *Chiroptera*, Shqipëria, liqenet e Prespës, monitorim.

Introduction

Prespa lakes are two lakes in the South-Western Balkans shared by three countries: Albania, Greece and Macedonia. This area is internationally known for its rich biodiversity and several protected areas have been established in the three countries, in addition of having been recently designated as Biosphere Reserve by the UNESCO.

This area is known to host important populations of bats, especially *Miniopterus schreibersii* and *Myotis capaccinii*, with both species forming large colonies. In order to better protect these populations at a regional level, an action plan for bats of Prespa has been produced in 2011, after a collaborative work amongst Greek, Macedonian, Albanian and French researchers (Papadatou *et al.* 2011). However, whereas numerous historical and recent data are available for Greek (Petrochilou *et al*., 1977;

Catsadorakis & Kollaros, 1986, von Helversen & Weid, 1990; Catsadorakis, 1995; Papadatou *et al*., 2011) and Macedonian sides (Karaman, 1929; Felten, 1977; Hackethal & Peters, 1987; Bogdanowicz, 1990; Krystufek *et al.*, 1992; Boshamer *et al.*, 2006), only 3 publications have been published before 2012 concerning the Albanian side of Prespa (Chytil & Vlasin, 1994; Uhrin *et al*. 1996; Bego, 2011).

This lack of data is underlined several times in the action plan document presenting un-published data, while recommending the need to increase the bat research in Albania, and to better know the key roosts in order to manage them in accordance to national and International regulations (National Law on Biodiversity, EUROBATS agreement, Bern Convention). Following this recommendation, we established a monitoring scheme in 2012 concerning the Micro and Macro Prespa lakes. We are presenting here the results collected after three years of monitoring efforts.

Material and methods

In total, 12 sessions of field work have been realised between 24th September 2012 and 23rd April, 2015. These sessions have been organised each 3 months and extended in all the seasons. Different types of roots have been visited and bats were directly identified, via direct observation and/or manipulation.

In case of important clusters, pictures have been taken in order to precisely count the number of specimens via software (GIMP, V2.8). In addition, mistnets have been used in front of the Treni cave the 24th and 25th September 2012 and 3rd May 2013 (Schieffler *et al*., 2013) and indicators of bat presence, such as bones and guano, have been recorded and collected for species identification. During all the period of this study, a strict protocol was implemented in order to not disturb bats, especially during very sensitive periods, such as maternity colony and hibernation.

Finally, all the results collected in the frame of this study have been added to the Albanian national database on bats.

Results

In total, 163 sites have been visited in the frame of this study, as follow: 144 caves, 7 bunkers, 7 tunnels, and 5 buildings (fig.1.a). From this 163 sites, we recorded indications of bats presence in 45 sites, and in 29 of them, bat specimens have been directly observed (fig.1.b).

Figure 1. Figure at the end of the article.

In total, up to 15 species have been recorded between 2012 and 2015 inside the Prespa national park: *Rhinolophus ferrumequinum, Rhinolophus hipposideros, Rhinolophus euryale, Rhinolophus blasii, Myotis blythii, Myotis myotis, Myotis daubentonii, Myotis sp., Hypsugo savii, Eptesicus serotinus, Plecotus austriacus, Plecotus kolombatovici, Tadarida teniotis, Miniopterus schreibersii*. From these species, most of the specimens

recorded belong to *M.schreibersii* and *M.capaccinii*, representing the most important population actually known in Albania for these two species between spring and autumn.

Miniopterus schreibersii

In total, *M.schreibersii* has been recorded in 4 sites, all natural caves, with a maximum of 2530 specimens observed in the frame of a same session (August 2013), in both Micro and Macro Prespa lakes, whereas the biggest group recorded was composed of 1500 specimens (fig.2; fig.3). Fluctuations between years can be observed concerning the use of this area by *M. schreibersii*, and several factors seem to be responsible. This species is recorded in the area between April to October, but no specimens have been recorded during hibernation time.

Figure 2. Figure at the end of the article.

Two main caves of the area (one in Micro Prespa and on in Macro Prespa) strongly influence all *M.schreibersii* population of this area, as more than 99 % of the specimens recorded in the National park during spring and summer are using them (Fig.4). Of course, these two caves are certainly connected with other important caves in the Prespa area, in Macedonia and Greece, which must be considered during the data analysis of this species in Prespa region. Records show that this species shares roosts with *R. hipposideros, R. ferrumequinum,* middle size *Rhinolophus* and *M. myotis/blythii*, whereas it creates mix colonies with *M.capaccinii*.

Figure 3. Figure at the end of the article.

Figure 4. Figure at the end of the article.

Myotis capaccinii

Concerning the use of the Albanian side of the Prespa Lakes by this species, important fluctuations can be observed between years, but a trend can be envisaged; the area is mainly used at the end of the spring and the summer, whereas during the winter, the species is almost not using the area. These results can be linked with the data collected for *Miniopterus schreibersii,* and as for *M.schreibersii,* it must be connected with the data from Macedonian and Greek sides, where important maternity colonies and hibernation sites have been identified.

In total, this species has been recorded in 12 sites (fig.5), with a maximum of 5052 specimens recorded during one session (August 2014) (fig.6), whereas the biggest group recorded was composed of 4000 specimens. In addition, several small groups have been discovered all around the Macro Prespa Lake, in some crevices. Records show that this species is sharing roosts with *R. hipposideros*, *R. ferrumequinum*, middle size *Rhinolophus* and *M. myotis/blythii*, whereas it creates mix colonies with *M. schreibersii*.

Figure 5. Figure at the end of the article.

The two main caves of the Prespa area contain more than 90% of the specimens recorded from the Albanian sides of Prespa lakes (fig 7). Following the data collected during the year 2014, a possible connection between the two stations can be expected concerning the populations of *M. capaccinii*. Once specimens that are part of the maternity colony leave from the first cave, the population within the second cave increases simultaneously.

However, we can see that the total population in August 2014 is higher than the population recorded in June 2014, which is underlining that other populations from others stations might be connected to these two caves as well.

Figure 6. Figure at the end of the article.

Figure 7. Figure at the end of the article.

Rhinolophus ferrumequinum

In total, this species has been observed in 7 sites (2 tunnels and 5 caves) (fig.8), during all the year, with a maximum of 52 specimens recorded in one session (August 2014), and a biggest cluster composed by 50 specimens. However, most of data collected concerned one or two specimens.

This species is not using any of the roosts visited for maternity colony, which are generally in buildings. The network of roosts is mostly used before and after the maternity period (April-May and August), but hibernation has been also confirmed with several specimens recorded (fig. 9).

Records show that this species is sharing roosts with *R. hipposideros*, middle size *Rhinolophus* and *M. myotis/blythii*, *M. schreibersii* and *M.capaccinii*.

Figure 8. Figure at the end of the article

Figure 9. Figure at the end of the article

Rhinolophus hipposideros

In total, this species has been observed in 18 sites (3 tunnels and 15 caves) (fig.10), during all the year, with a maximum of 35 specimens recorded in one session (August 2014), and a biggest group composed by 30 specimens. However, most of data collected concerned one or two specimens. This species is not using any of the roosts visited as maternity colony, which are generally in buildings. However, several specimens have been recorded in May 2013, possibly linked with a maternity colony close to this roost. The network of roosts is mostly used before and after the maternity period (April-May and August), but hibernation has been also confirmed with several specimens recorded (fig. 11).

Records show that this species is sharing roosts with *R. ferrumequinum*, middle size *Rhinolophus* and *M. myotis/blythii*, *M.daubentonii*, *M. schreibersii* and *M.capaccinii*.

Figure 10. Figure at the end of the article

Figure 11. Figure at the end of the article

Middle size *Rhinolophus*

During the surveys it was sometimes possible to identify bats as *Rhinolophus euryal*e (Blasius, 1853) or *Rhinolophus blasii* (Peters, 1866) using bat-detectors and/or pictures. However in most of the sites, the identification was possible just to taxon *Rhinolophus* of middle size. In addition to above mentioned species, *Rhinolophus mehelyi* (Matschie, 1901) could have been using the hibernacula, as this species was recently recorded in the country (Bego & Théou, 2014).

In total, these species have been observed in 5 sites (1 tunnels and 4 caves) (fig.12), during all the year, with a maximum of 274 specimens recorded in one session (November 2014), and the biggest group composed by 261 specimens. Records show that these species share roosts with *R. ferrumequinum*, *R.hipposideros*, *M. myotis/blythii*, *M. schreibersii* and *M.capaccinii*.

Figure 12. Figure at the end of the article.

Myotis daubentonii* and *Myotis sp.

In total, these species have been observed in 5 sites (5 caves) (fig.13), between April and October, with a maximum of 105 specimens recorded in one session (August 2014), and the biggest group composed by 100 specimens.

Records show that these species share roosts with *R.hipposideros*, *M. schreibersii* and *M.capaccinii*.

Also, one specimen of small Myotis has been recorded in February 2014. Due to the period, this specimen has not been manipulated in order to clearly identify the species.

Figure 13. Figure at the end of the article

Myotis myotis/blythii

The two species cannot be clearly identify without taking some detailed measurements. In accordance with our strict protocol and in order to not disturb animals we have referred to those few sightings of all large *Myotis* sp. as taxon *Myotis myotis/blythii.* In total, these species have been observed in 4 sites (3 caves and 1 tunnel) (fig.14), during all the year, with a maximum of 23 specimens recorded in one session (August 2014), and the biggest group composed by 20 specimens.

Figure 14. Figure at the end of the article

***Plecotus* species**

For the first time, a clear identification of *Plecotus* species has been possible in the area, with two specimens of *P. austriacus* and one specimen of *P. kolombatovici* caught in front of the Treni cave the 24th and 25th September 2012 (Schieffler *et al.*, 2013).

Hypsugo savii

On specimen has been caught in front of the Treni cave in May 2013.

Eptesicus serotinus

On specimen has been caught in front of the Treni cave in September 2012 (Schieffler *et al.*, 2013).

Tadarida teniotis

For the first time inside the national park, direct observation of this species have been realised in the entrance of a cave. Firstly in November 2013, with at least 7 specimens, and another time, August 2014, with at least 3 specimens. This species has been already recorded for the area (Papadatou, *et al.*, 2011), but only thanks to bat-detectors, near the Treni cave.

Discussion

This 3 years study confirms the importance of the area for the bat populations for Albania and generally for south-western Balkans. This study is focusing on the Albanian part of the lakes, as it was until now less known than the others parts, but all the results collected in the frame of this monitoring cannot be considered without having in mind the important network of roosts all around the lakes. From this point of view, the variation of population during a year and between years must be seen at a regional scale, in order to better understand the movement of species.

It seems clear that species as *M.capaccinii* and *M.schreibersii* are using an important network of caves in all the area between April and October, before possibly leaving the area of Prespa, as no important hibernacula have been found until now (Papadatou *et al*., 2011). These species are known to realise important migration (Serra-Cobo *et al*., 1998; Papadatou *et al.*, 2008), and specimens using Prespa during spring and summer could reach winter sites in other territories of the three neighboring countries of Prespa lakes, calling so for a regional monitoring system for bat hibernacula.

As underlined, fluctuations have been observed during this study, especially concerning social species. These fluctuations could be explained by several factors such as human disturbances in particular caves (i.e Treni cave), but also possibly a high level of ectoparasitism (Schieffler *et al.*, 2013) which could force population to change roosts.

Most of the roosts recorded in the area of Prespa are for the moment not strongly threatened by human disturbances, due to the fact that they are

generally far from human settlements. However, it is important to notice that the roosts hosting most of the bats are generally facing threats, such as fire or visits during sensitive periods. A clear management of these roosts should be implemented in a near future in order to avoid a strong decrease of bats population, as observed in other parts of Albania (Pellumbas cave near Tirana).

Conclusion

This study, one of the first monitoring protocol implemented in Albania for bats, is confirming how important the Prespa area is for bats populations. However, it represents only a start and the monitoring of the area should be on-going for the next years, in order to detect possible changes at a local and regional scale. We hope that the increasing collaboration between all the regional stakeholders will consider bat consevation as an important issues, and use this study, and the action plan for Bats of Prespa to have a sustainable program for the entire Prespa region. Likewise mid-winter bird monitoring r, a mid winter count of bats colonies in the three countries could be implemented simultaneously.

As the knowledge on bats in the National Park of Prespa is significantly improved, a better management on the field, with possibly the physical protection of some places could also be designed and implemented. This management can be a success for bats protection, but also for preseverving the natural heritage of Prespa in general, but only if local populations and local institutions are informed and actively participate in the process.

Acknowledgement

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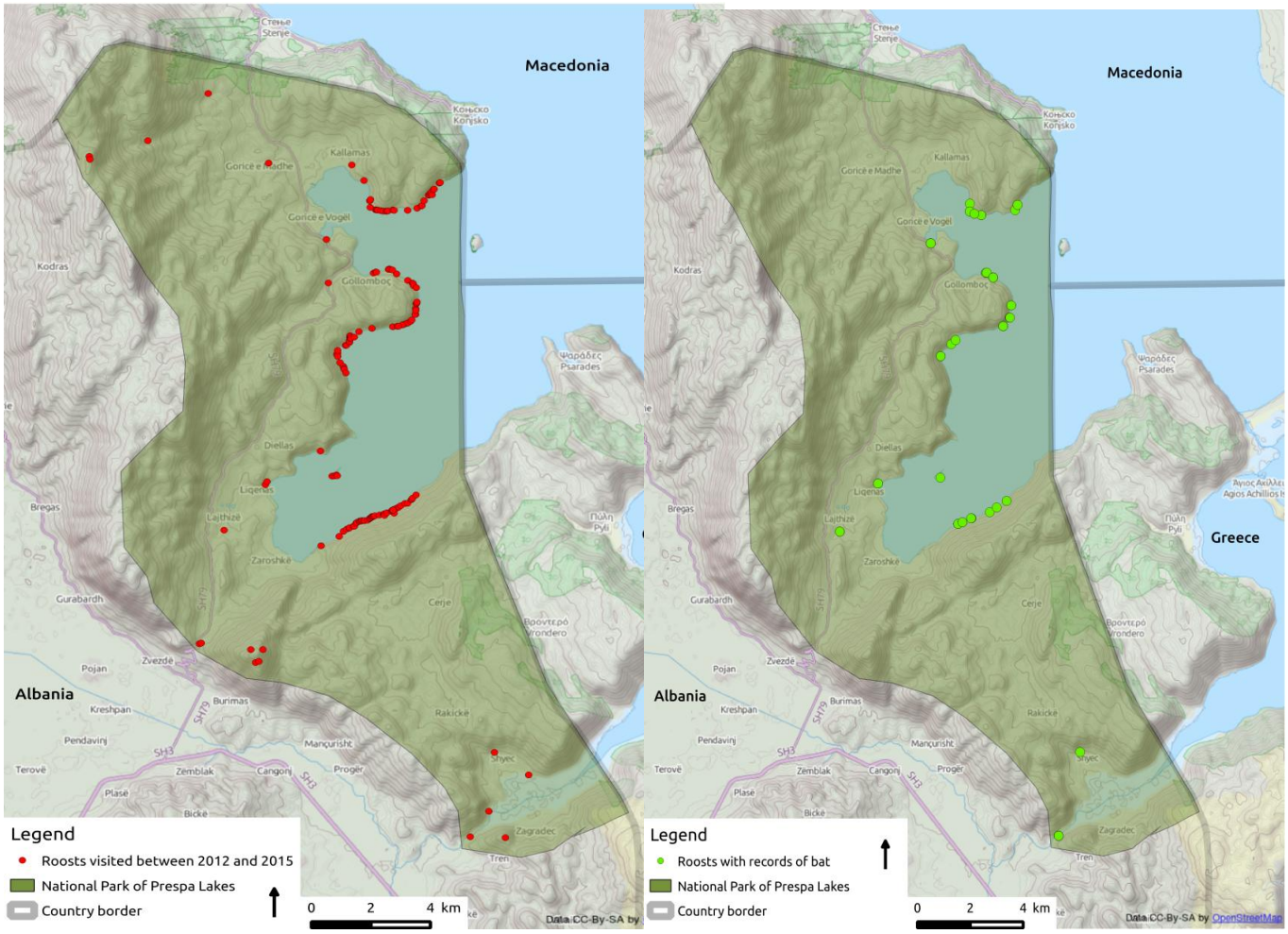

Figure 1: a)Roosts visited between 2012-15 and b)roosts with bat records between 2012-15

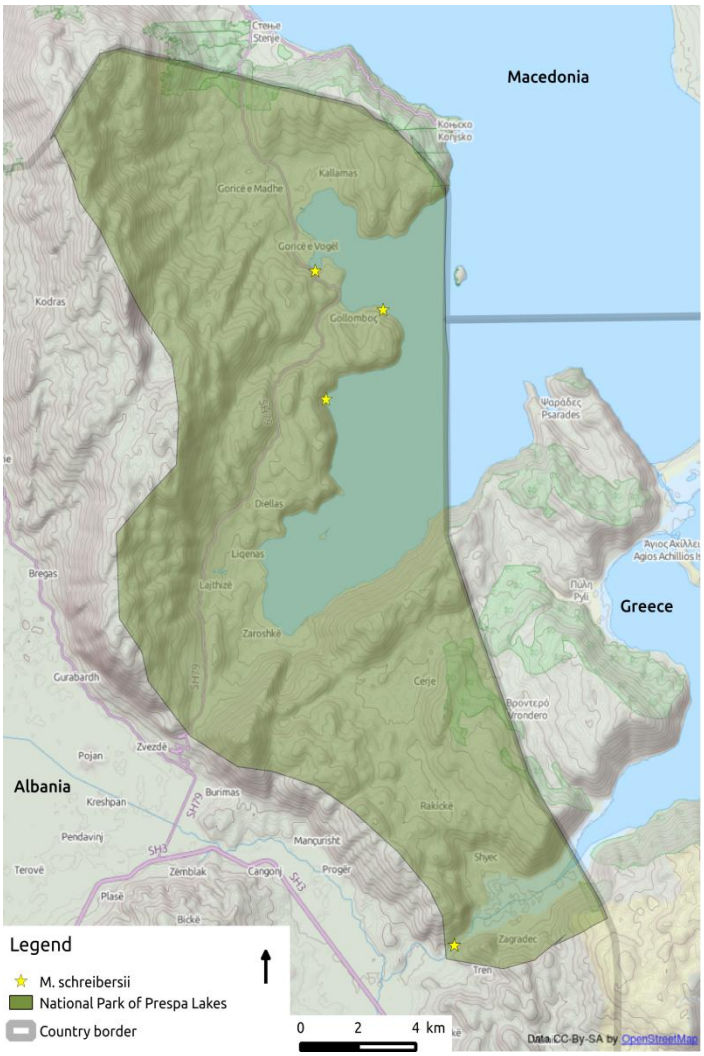

Figure 2: Record of *M.schreibersii* in Prespa NP (2012-2015)

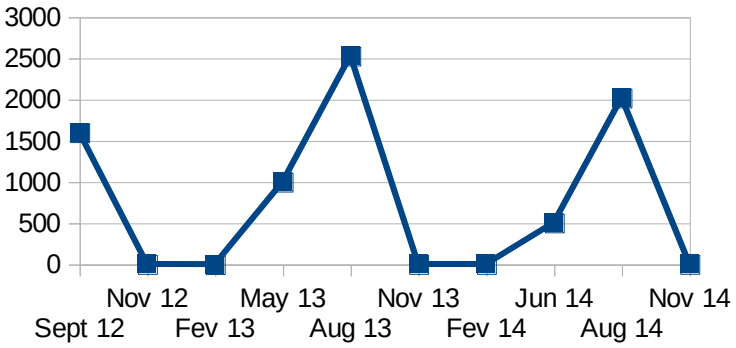

Figure 3: Population of *M.schreibersii* in Prespa Lakes National Park

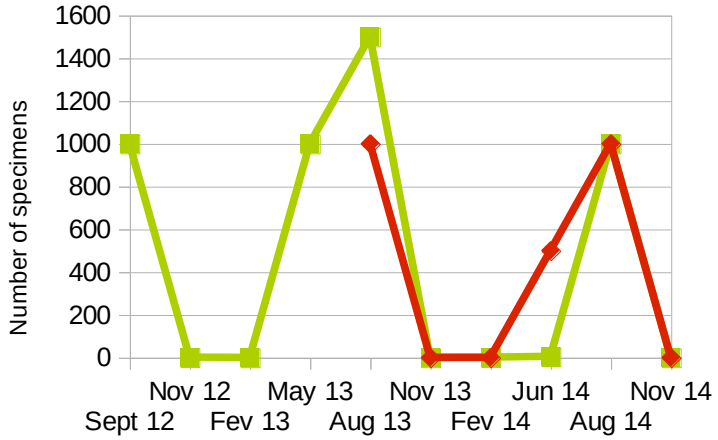

Figure 4. *M.schreibersii* in the two main caves of Prespa Lakes NP

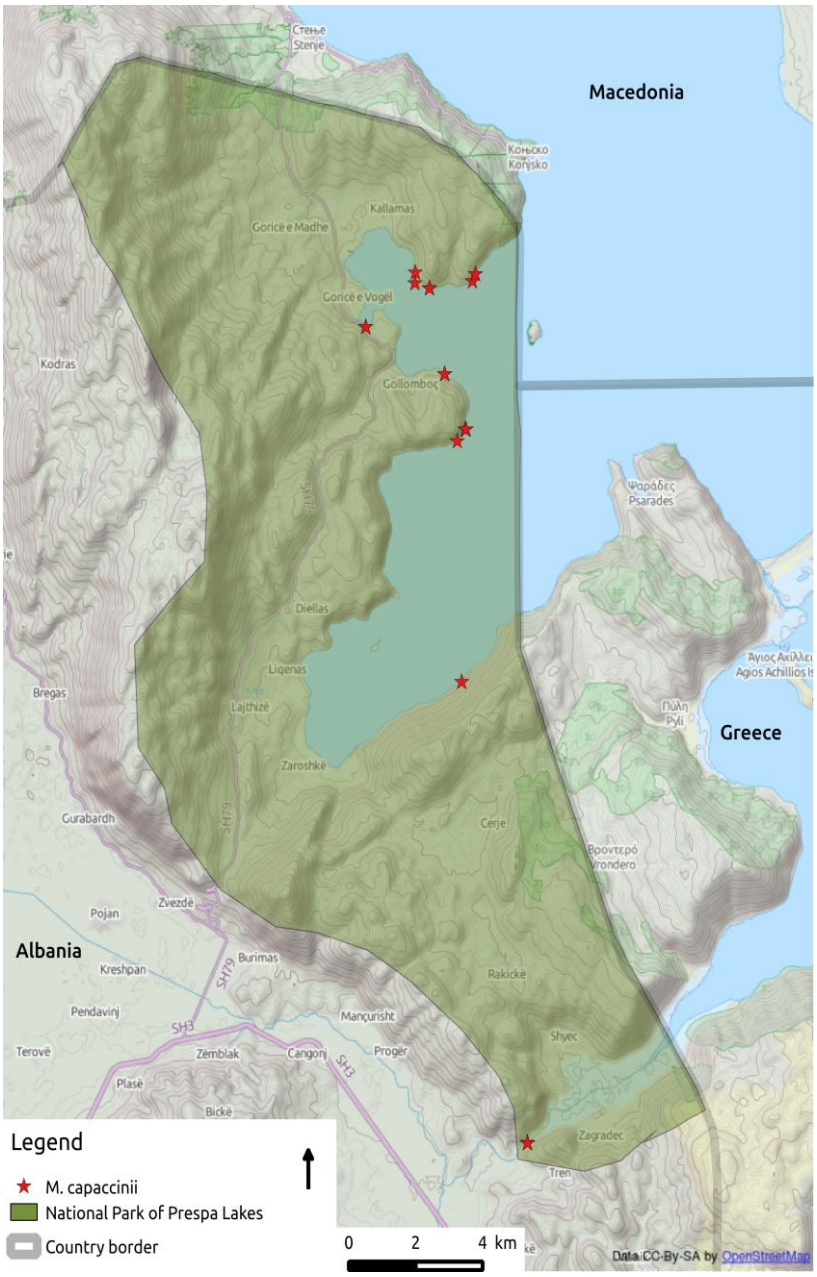

Figure 5. Record of *M.capaccinii* in Prespa NP (2012-2015)

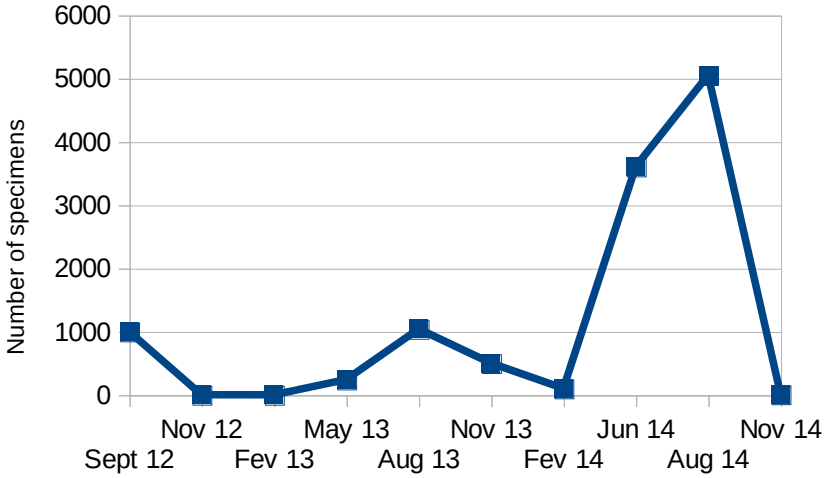

Figure 6: Population of *M.capaccinii* in Prespa Lakes National Park

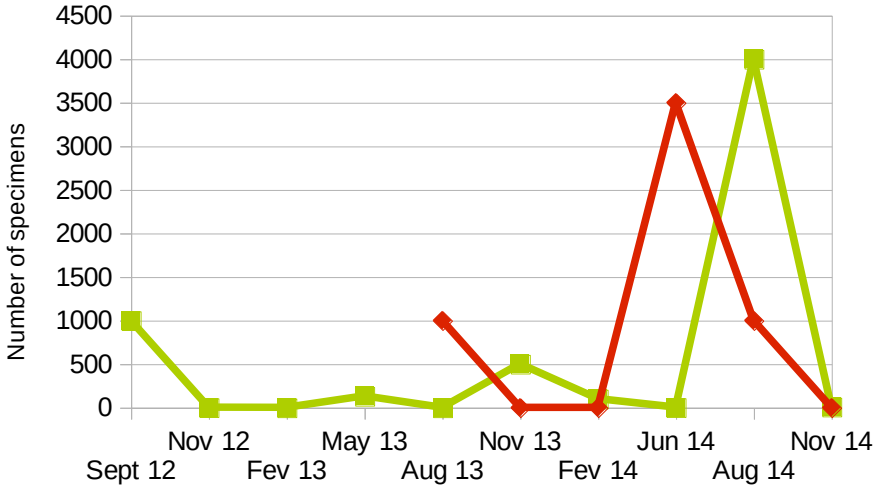

Figure 7: *M.capaccinii* in the two main caves of the Prespa Lakes NP

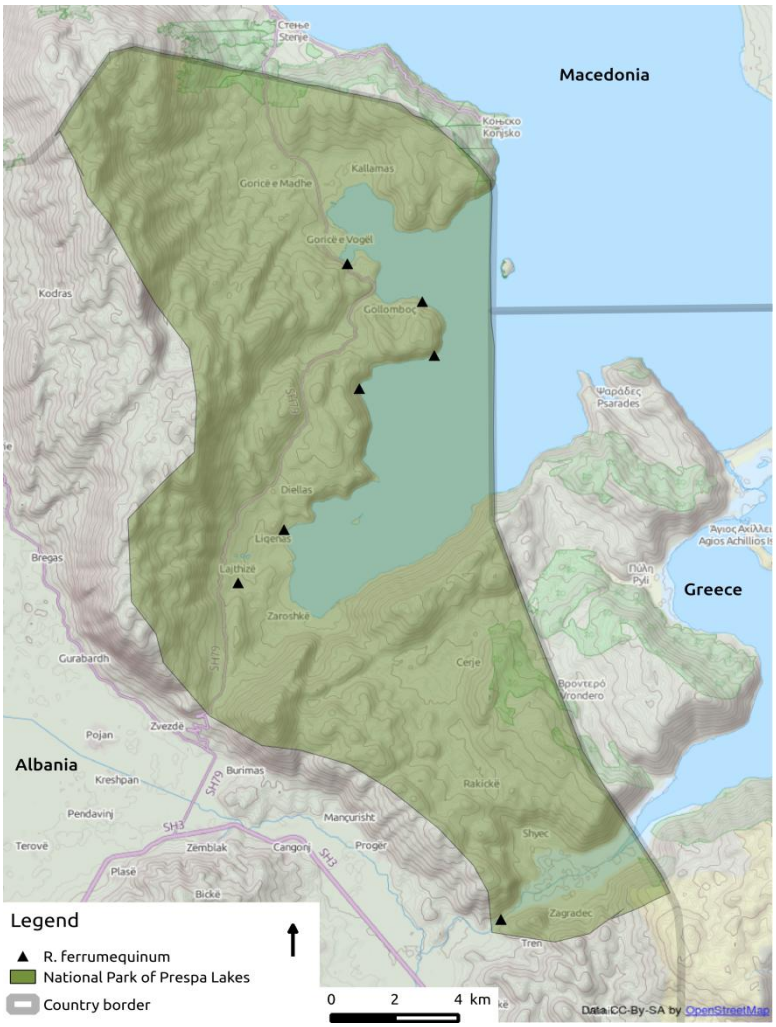

Figure 8: Record of *R.ferrumequinum* in Prespa NP (2012-2015)

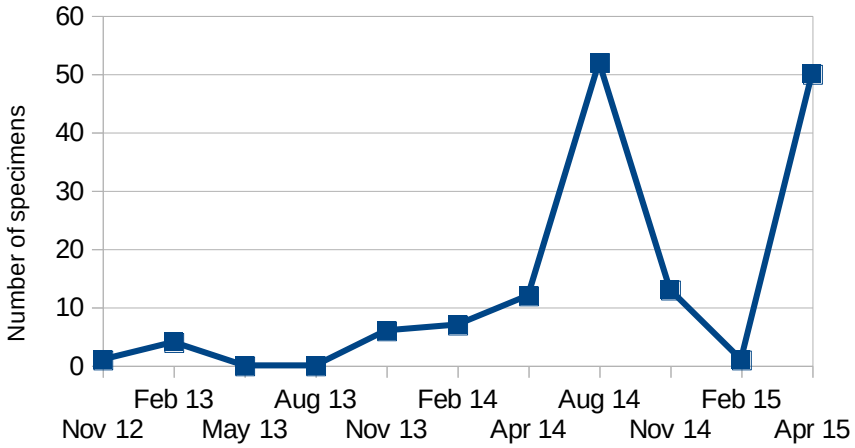

Figure 9: Population of *R.ferrumequinum* in Prespa Lakes National Park

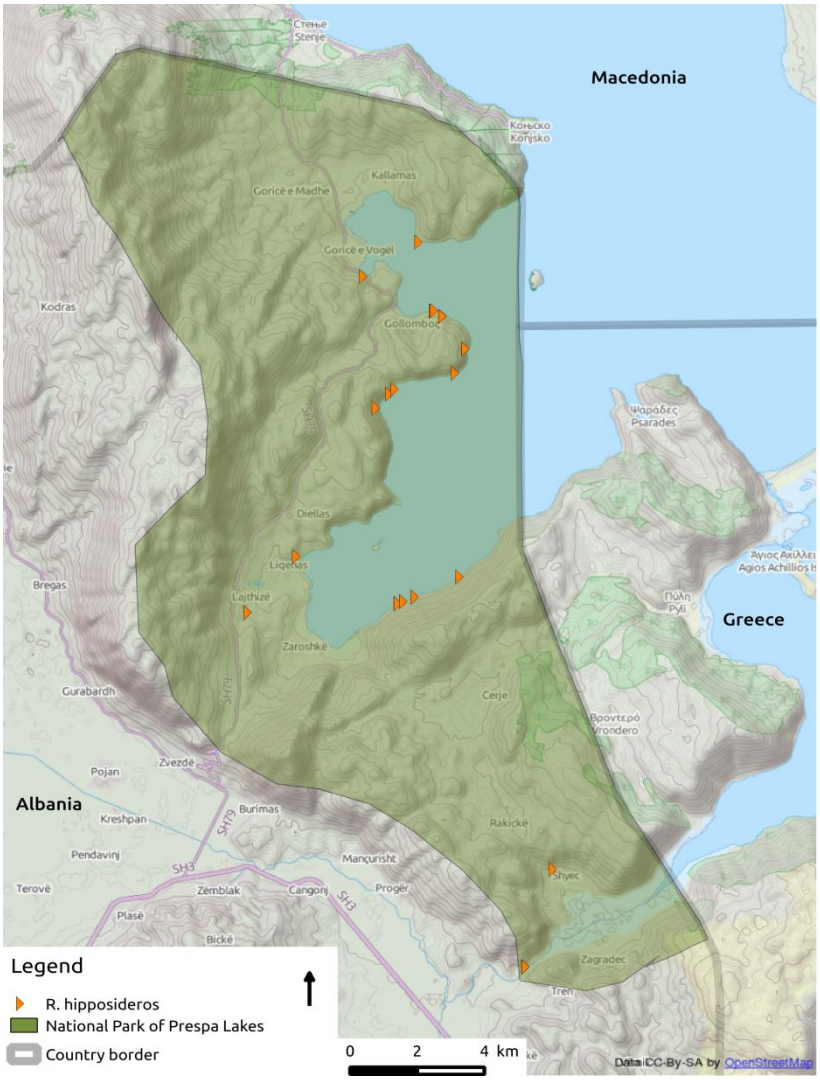

Figure 10: Record of *R.hipposideros* Prespa NP (2012-2015)

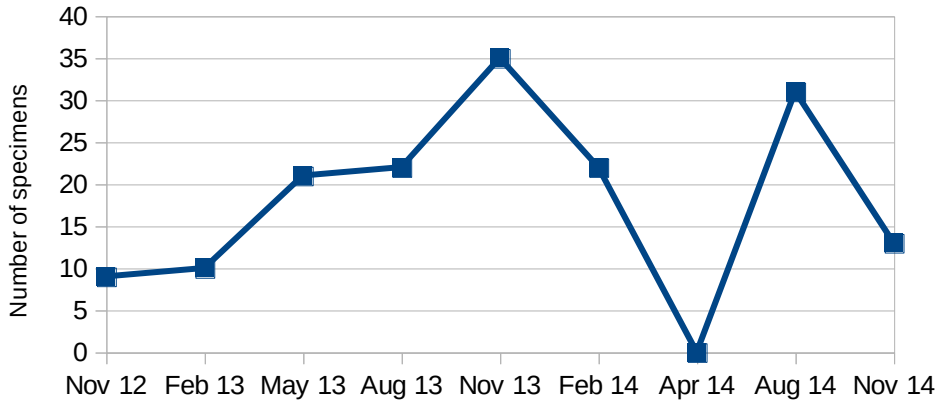

Figure 11: Population of *R.hipposideros* in Prespa Lakes National Park

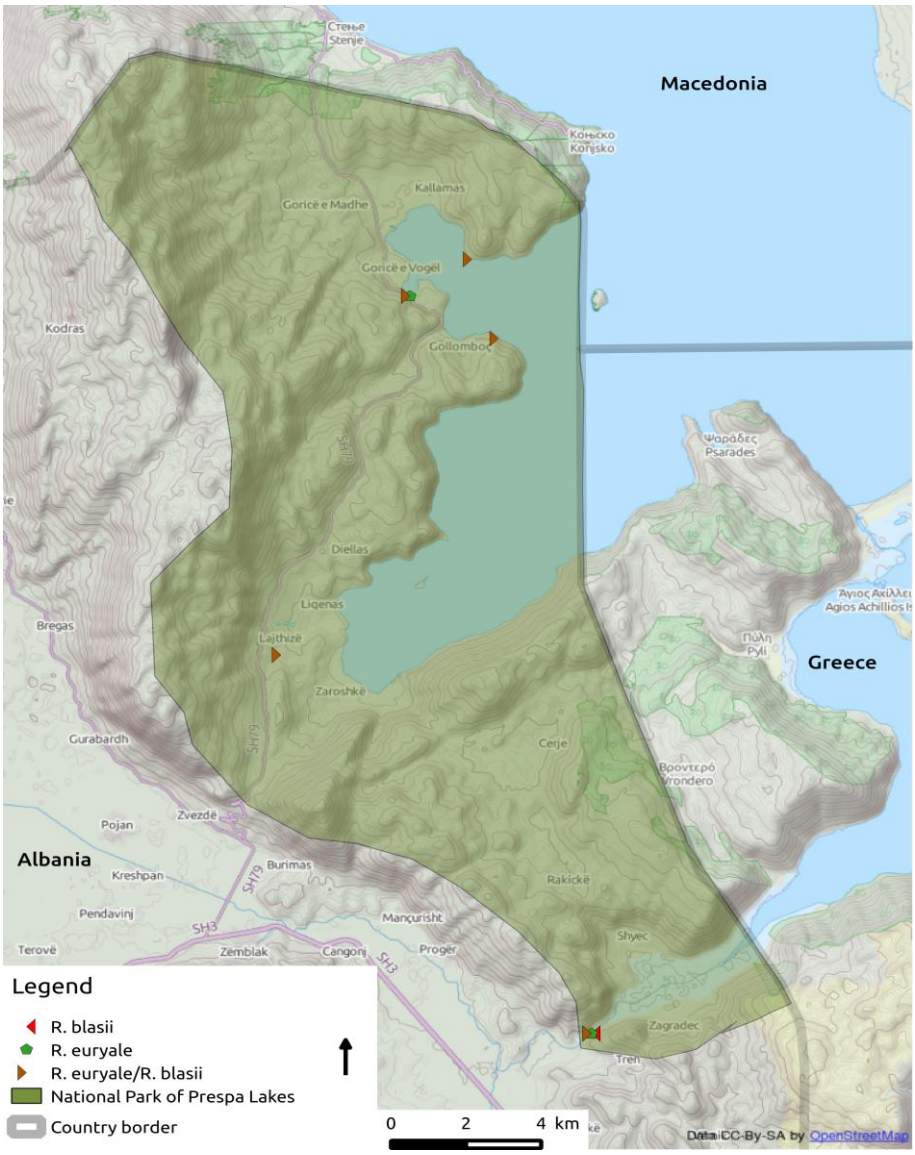

Figure 12: Record of Middle size *Rhinolophus* in Prespa NP (2012-2015)

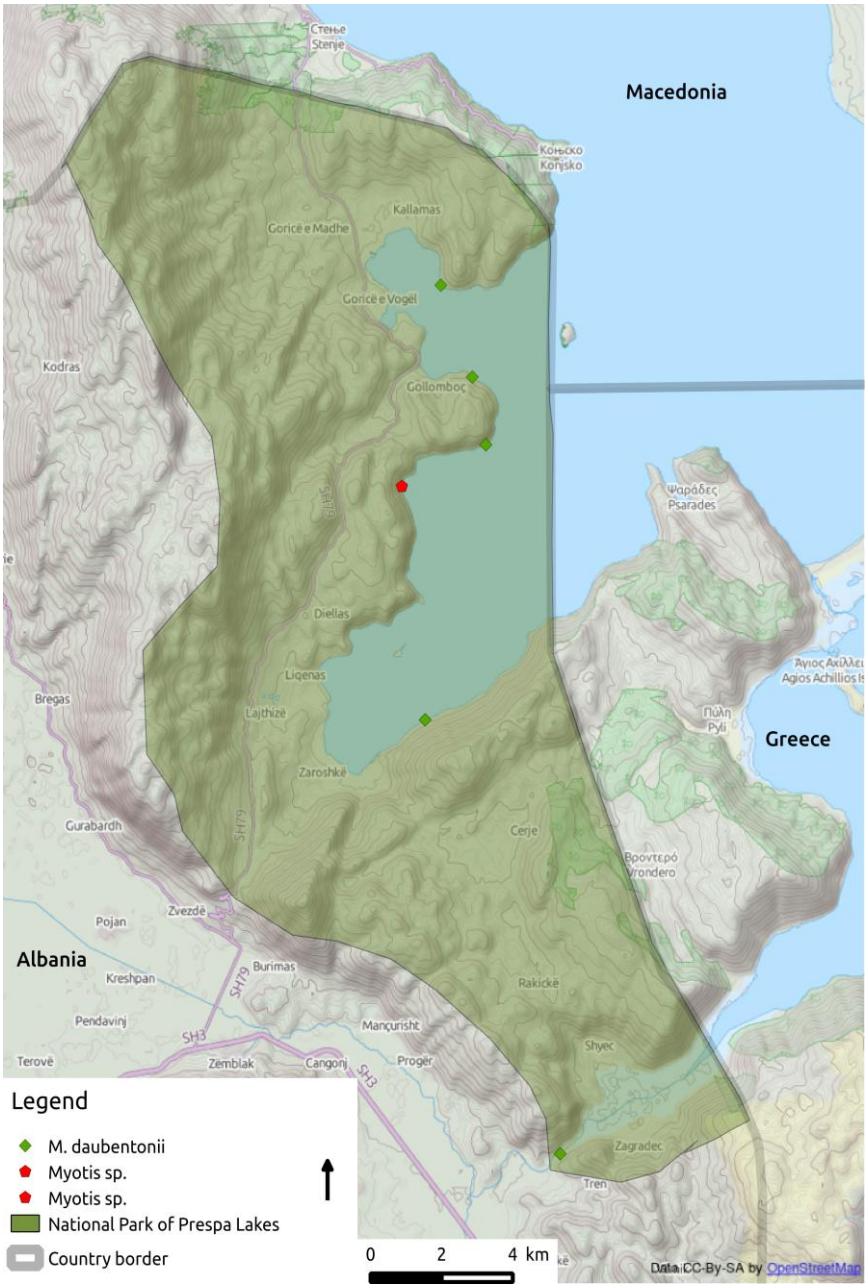

Figure 13: Record of *M.capaccinii* and *Myotis sp.* in Prespa NP (2012-2015)

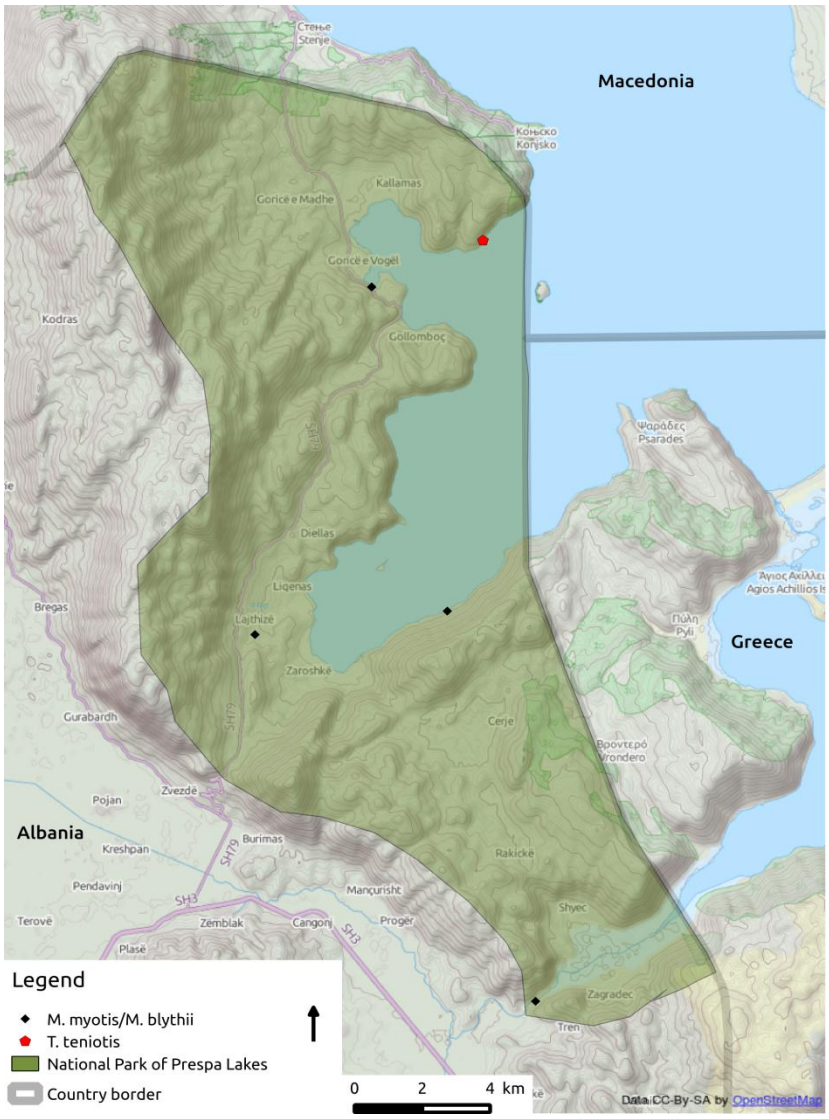

Figure 14: Record of *M.myotis/blythii* in Prespa NP (2012-2015)