A study on the presence of the otter (*Lutra lutra*) in Lesser Prespa Lake

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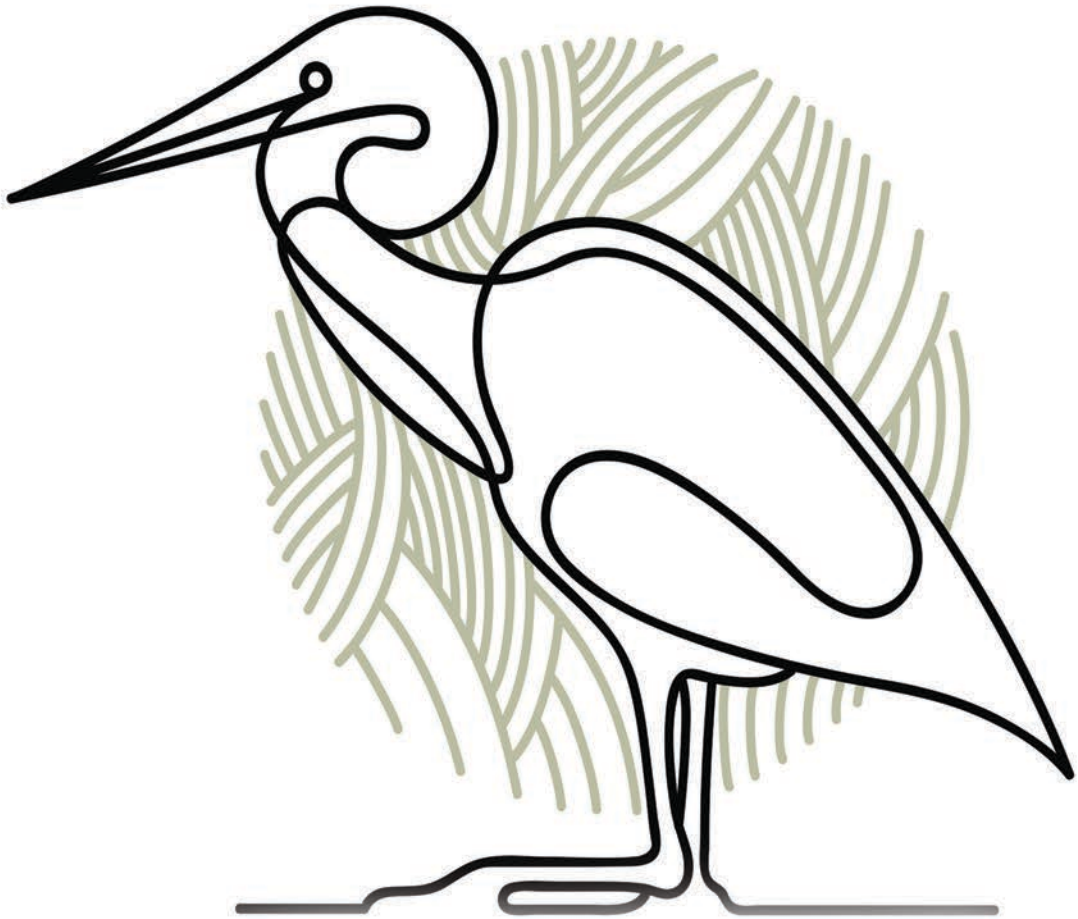

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September 2017

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A study on the presence of the otter (*Lutra lutra*) in Lesser Prespa Lake

Report within the framework of
LIFE Project "Prespa Waterbirds"
LIFE15 NAT/GR/000936

Yiannis Theodoropoulos
September 2017

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1. Introduction

The Eurasian otter (*Lutra lutra* (L., 1758))[1] is a carnivorous mammal, member of the family Mustelidae. It is a flagship species, being the top predator of Europe's freshwater ecosystems (Remonti *et al*., 2009). Otters are remarkably well-adapted to their semi-aquatic existence and are nearly always found beside water; they mainly live along rivers, but are also found in and around canals, marshes, ponds, lakes, streams and estuaries, even along rocky shores. They are opportunistic predators and they exploit prey in proportion to its availability in the environment (Ottino & Giller, 2004). Their diet consists mainly of fish, amphibians and crustaceans but they also regularly feed on waterbirds, water snakes or even small mammals (Krawczyk *et al*., 2016).

Suitable habitat has been well described (Kruuk *et al*., 1998; Chanin, 2003). Being large mammalian predators, otters are tolerant of a wide range of habitat conditions. In order to determine whether their habitat is favourable the only factors that need to be considered are food supply, pollutants and availability of secure breeding sites. In general, where aquatic prey is abundant, water quality is acceptable and adjacent habitats offer plenty of cover, healthy otter populations can be expected. In fact, in studies available on habitat selection it has been shown that the main limiting factor for the otter is the availability of prey, which in Mediterranean areas is conditioned by the availability of water (López-Martín *et al*., 1998).

Although otters travel large distances, most adults stay in a well-defined territory in which they feed, rest, and reproduce (Kruuk, 2006). Otter territories are measured as lengths of river bank or coast. The sizes of individual territories depend on the quality of habitat and amount of food. Male otters have much larger territories than females; one male otter's territory generally overlaps those of several females. Significant lengths of this territory range may be covered in one night's travelling (Chanin, 2013). Otters mark their territories with their unmistakable faeces (called *spraints*) which they deposit on often conspicuous, predictable sites (*sprainting sites*) for the purpose of scent communication (Calzada *et al*., 2010).

Otters usually maintain numerous underground holts within their territories. Holts can take many forms – among falls of rocks, in caves, within root systems of mature bank-side trees (Kruuk, 1995). Natal dens tend to be especially well hidden, usually far from other otter traffic to avoid potential intra-specific aggression (Kruuk, 1995). As a result natal dens are difficult to locate and easily overlooked. Otters also use above-ground resting places, called couches, often in thick vegetation or reed-beds. A couch is a mat or platform of vegetation created by otters that can be 1 m or more in diameter (Liles, 2003). Couches are often on islands, or hidden in extensive reed-beds. In wetlands where underground holts or suitable thick vegetation is absent, reed-beds with e.g. *Phragmites* or *Typha* can also serve as breeding areas for otters. At such sites where only above-ground cover is available, a different natal den may be used each year (Liles, 2003).

[1] Hereafter referred to as simply: otter.

Although the otter's global distribution ranges from Ireland in the west to Japan in the east and from the Arctic to North Africa (Mason, 1990), otters have suffered a severe decline during the 20th century in most European countries (Chanin, 2013) because of a reduction of food supplies, increases in water pollutants, persecution by humans and the destruction of riparian habitat (Kruuk, 2006). However, environmental improvements and focused conservation efforts have helped to re-establish widespread healthy populations in many European countries, and the species was downgraded from "Vulnerable" to "Near Threatened" in the IUCN red list (Roos *et al*., 2015).

The otter is a European Protected Species under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) - Appendix II (special protection for listed animal species and their habitats). The species is also included in the Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive) Annex IIa and IIIa (designation of protected areas for animal and plant species listed), which requires statutory protection and the maintenance of "favourable condition" for the species and its habitats.

With its relatively undisturbed and unpolluted freshwater systems, Greece is considered to host one of the healthiest otter populations in the European Union and therefore bears an increased responsibility for the species conservation. Although our understanding of essential aspects of the otter's ecology in Greece still leaves much to be desired, it is becoming increasingly apparent that the species enjoys a broad distribution throughout most of the mainland, as well as on some of the islands. Due mainly to uncertainties concerning its population densities though, otters are listed in the Greek Red Data Book as Endangered (Galanaki & Gaethlich, 2009). Main threats to the species wellbeing in Greece include habitat degradation, drainage of wetlands, destruction of riparian cover, construction of dams along many rivers and intensification in the use of chemicals.

Habitat management of protected sites (for example, the removal of extensive reed-beds to encourage waterbirds) can conflict with the interests of otters (Liles, 2003). In this study, a search of otter signs and holts has been conducted in order to shed light on the distribution and breeding site preferences of the species in Lesser Prespa Lake. Its findings will inform decision-making regarding the management of reed-beds in the area, to be implemented under the framework of LIFE Prespa Waterbirds project (LIFE15 NAT/GR/000936).

2. Study area

Prespa is a mountainous basin shared by three countries – Albania, Greece and the Former Yugoslav Republic (FYR) of Macedonia. The basin encloses two of the oldest lakes in Europe, Great and Lesser Prespa Lakes, separated by an alluvial strip of land. The whole basin is known for its natural beauty and its globally significant biodiversity. The mosaic of habitats found here shelters a high number of plant and animal species, including numerous endemics. (Mantziou & Gletsos, 2011).

Lesser Prespa, is a mesotrophic to eutrophic lake, ca 47.4 km^2 in area with a mean depth of 4.1 m and a maximum depth of 8.4 m. Its largest part is situated in Greece, while a small part around its southwestern tip belongs to Albania. Due to its small size and shallow waters Lesser Prespa Lake freezes easily, from a few days to more than 2 months. The wetland is characterized by areas with rich marshy vegetation and extensive stands of reeds. Small patches of wet meadows, flooded occasionally according to season and rainfall, lie among the reeds (Catsadorakis, 1997) (Figure 1).

Among the most representative helophytes in the study area are the species *Phragmites australis* and *Typha angustifolia* followed by *Scirpus lacustris* and *Carex pseudocyperus*. Helophytes spread to the lake's interior up to a depth of 2.5 m, if not deeper. The most dominant helophytic community around the lake constitutes of *Phragmites australis* that grows in dense stands and extends purely and coherently in southern, eastern and some northern parts of Lesser Prespa Lake (Angathoto, Kranies, Latsista, Mikrolimni, Bouskani, Karyes, Lefkonas). On the other hand, *Typha angustifolia* extends in the areas of Opaya, Vromolimnes, Diavlos and Pyli (Pavlides, G., 1997).

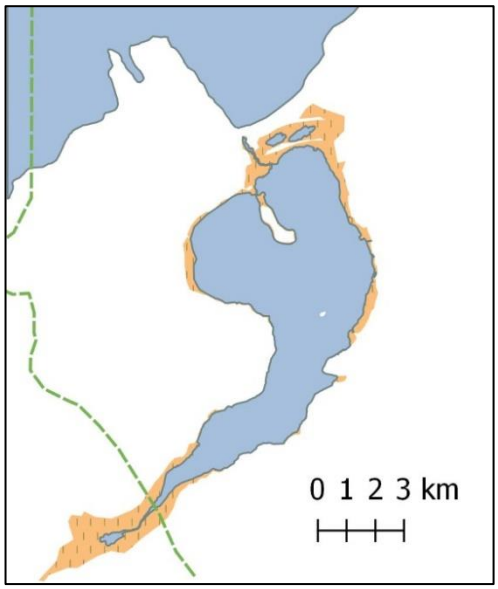

Figure 1. Map of the Lesser Prespa Lake area. Reed-beds are depicted in light orange.

The main marsh area of Lesser Prespa Lake, situated on the alluvial strip between the two lakes, is characterized by communities where both *Phragmites* and *Typha* coexist, in a mosaic of mutually encircling vegetational stands (Pavlides, G., 1997). Here, the rich extensive reed-beds are scattered with slight elevations in the form of islets - notably the oblong islet Slogi – as well as with areas of open water (Vromolimnes) partially covered by aquatic vegetation.

Two small islands are found inside Lesser Prespa Lake. The inhabited Agios Achillios in the north is connected to the mainland by a floating footbridge and is surrounded by a dense ring of reeds. The much smaller rocky outcrop of Vidronisi, towards the center of the lake, is strictly protected and visits there are off limits without a special permit from the National Park.

Little remains of the once extensive riparian forest that surrounded the lake; some fragments persist in the area of Slatina Plateos and the estuary of the Kallithiotiko stream. Around the lake, mainly in the east (Mikrolimni, Karyes and

Lefkonas) and west (Pyli), agricultural land dominates the landscape along with the draining ditches, a part of the irrigation system that runs through the cultivated areas. Livestock breeding is scarce but some sheep flocks and cow herds still graze the remaining meadows behind the reed-beds.

As a reed-bed belt of variable width and complexity is found around the periphery of the lake, patches clear of vegetation are few and far between along the shore. In the south and southwestern corners of the lake however, there are vegetation-free sections of steep rocky (limestone) shores, carved with hollows and cavities.

The international ecological significance of the area led to the declaration of the whole basin of Prespa as the first transboundary protected area in the Balkans. At the national level all three littoral countries have granted protection status to parts of the basin. The whole Greek part of Prespa is declared a National Park. In addition, both Prespa lakes are designated as Ramsar sites (wetlands of International Importance, Ramsar Convention). Finally, the whole of Lesser Prespa Lake is within the borders of the designated Special Area of Conservation (SAC) “Ethnikos Drymos Prespon (Site Code: GR1340001)”, designated also for the otter 25 (NATURA 2000 – Standard Data Form: Site GR1340001).

3. Previous otter surveys in the study area

Although the presence of otters was reported in Prespa by Macdonald & Mason (1982), the first thorough examination of the species distribution in Lesser Prespa Lake was carried out by Delaki *et al*. (1988). Based on a survey of spraints and their subsequent analysis, the otters' distribution and seasonal diet in the lake was established. Otter spraints were recorded throughout the lake with the majority of them associated with reed-free areas. Similarly, the presence of all identified holts was also restricted to the south and southwestern steep rocky shores, with the authors tenuously distinguishing between "main" holts and "temporary" holts. Furthermore, fish was found to comprise a major part of the otters' diet in Lesser Prespa Lake, from 50% during June-September to 80 - 90% in other months. The authors suggested that the otter population in the study area was well below declining the carrying capacity and fast declining, due to combination of human induced changes in their habitat (notably increased pollution levels due to misuse of fertilizers and pesticides and increased human disturbance).

Despite the aforementioned concerns, Grémillet (2002) reported a distinctly comparable situation for the otter in Lesser Prespa, based on a similar spraint survey (carried out in 1997). Otters were found to occur widely in the lake, with all accessible sites yielding a variety of otter signs (Figure 2).

Finally, a study on the presence and status of the otter in the Albanian side of Great and Lesser Prespa Lakes (Bego & Malltezi, 2012) has found otters to be present on both lakes. Based solely on marking intensity, the study arrived to the dubious conclusion that otters are less abundant in the Albanian section of Lesser Prespa than in the respective section of Great Prespa.

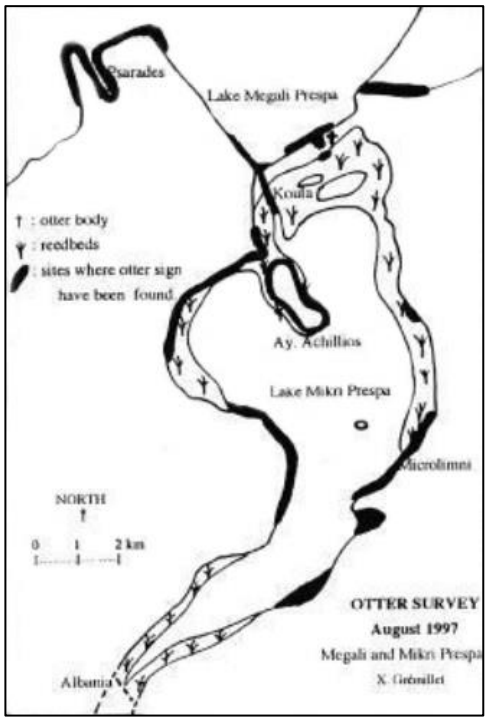

Figure 2. Grémillet's survey map.

4. Methods

Otters are elusive and nocturnal animals and so direct observation in the wild is extremely challenging. Therefore, monitoring uses species incidence data derived indirectly from field signs. The method that has prevailed in otter surveillance during the last decades has come to be known as "Standard Method". Developed in Britain by Lenton *et al*. (1980) and described in detail by Reuther *et al*. (2000), the above method was considered to be the most appropriate for the purposes of our study in Lesser Prespa Lake.

The Standard Method is a systematic sampling survey for field signs of otters. The study area is covered by a net of sample points ("*sites*"). Selection of these sites is not strictly statistically random as they have to follow water courses. The sites are then surveyed for reliable signs of otter presence, notably faeces (*spraints*) and/ or tracks. Typically survey sites consist of 600m of river bank or shore, a length demonstrated to yield a reliable assessment on the presence or absence of otters. As soon as otter signs are found, the search stops and the site is confirmed as positive. If no otter signs are found then the site is recorded as negative. The relation of positive sites to the total number of sites surveyed is given as "percentage of positive sites". Using the same methodology, this procedure allows comparisons of distribution development in the same area over time.

Very early on in the present survey it was recognized that that the physical characteristics of the Lesser Prespa Lake were such, that certain adjustments to the Standard Method were rendered necessary. More specifically, the extent of reed-beds around the periphery of the lake was such, that - apart from the steep rocky shores in the southern part of the lake - most places were not suitable for finding otter signs or were not accessible (or both). Furthermore, with the exception of a handful of sites, all available vegetation-free patches were no more than a few meters wide, located on stream mouths, and tiny reed openings, or even man-made structures such as floating wharfs, footbridges and sluices. Hence, the "point check" approach was adopted, where surveying for otter signs is limited to the few available spots. Because otters deposit their spraints for the purposes of scent communication, the dense reed-beds limit their ability to defend their territories by marking. Consequently, otters take to marking methodically and consistently on the few spots available to them, thus making their detection easy and quick (Theodoropoulos, unpublished data).

13 readily accessible check spots were identified on the map. These being far too few for a thorough investigation, more check spots were attempted to be identified following two courses of action:

- A canoe was used to survey the total length of the shore of the inaccessible southern and southwestern section of the lake, as well as Vidronisi islet. This also allowed for a careful search for otter resting places and potential holts in the area. 10 check spots were identified in this way.
- During a standard year, water levels rise in spring to cover areas behind the belt of reeds that are likely visited by otters. In an effort to locate further check spots, 23 tracts (600m each) along the reed line were surveyed. Unfortunately, this year's exceptionally dry conditions eventuated in no water being present behind the reeds. Only a further two check spots were therefore identified in this way (Figure 3).

In total 25 check spots (Figure 4) were identified in the preliminary stage. Despite the efforts, the resulting network was quite below the standard of 60 survey sites suggested by Chanin (2003b) as a sufficiently large sample size for analyzing distribution development over time. However, the network covered the whole of Lesser Prespa and was adequate to describe the distribution of otters in the lake.

All otter field signs were removed from the designated checking spots. After allowing the otters at least 10 days to mark again, the whole network was revisited and the results recorded. The study was carried out in August 2017.

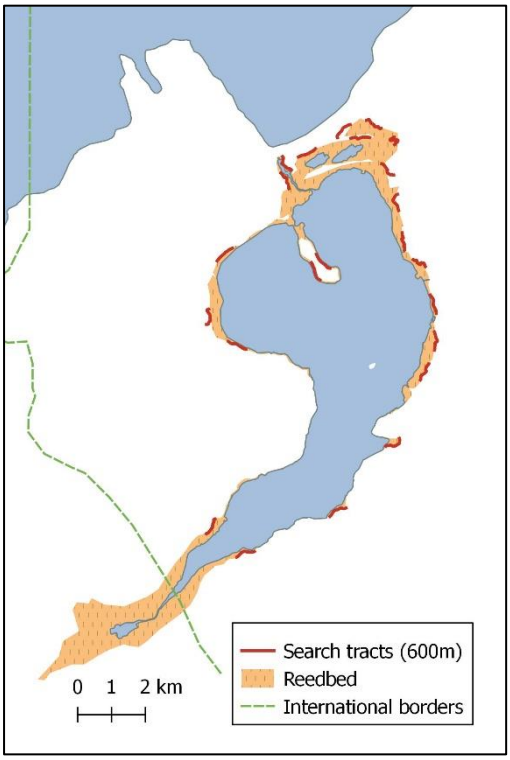

Figure 4. The 23 search tracts behind the reeds.

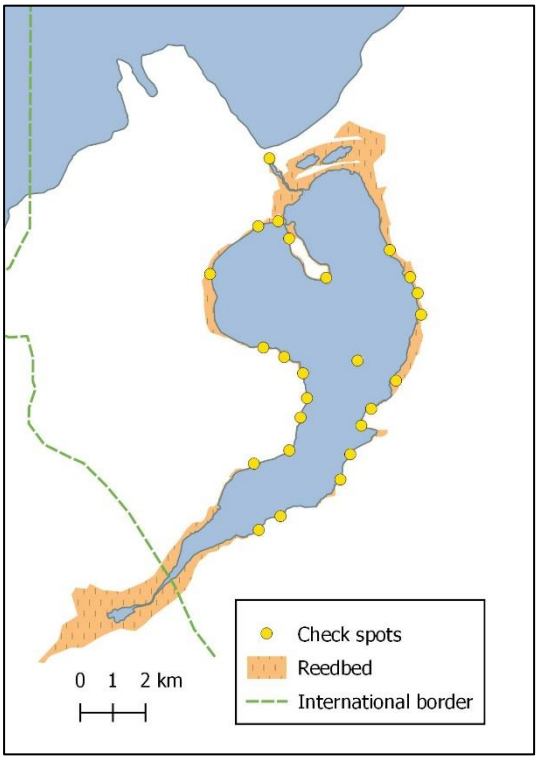

Figure 3. The final survey network, consisting of 25 check spots.

5. Results

Out of the total 25 check spots that were surveyed, 21 produced reliable otter signs (all of them had spraints) (Figure 5). Only 4 check spots came out negative: 2 close to Daseri (spots 16 and 18), 1 close to Angathoto (spot 12), and the 1 in Vidronisi (spot 25). The percentage, therefore, of positive spots is 84%, a percentage deemed to be very high.

Although the presence of otters was not confirmed everywhere, the distribution of positive spots seems to suggest that otters occupy almost all the available to them habitat in Lesser Prespa. Despite the fact that for all four negative spots the absence of otter signs was verified (negative in both visits), for at least two (spots 16 and 18) this absence might have had more to do with the intense livestock trampling evidenced there (both spots are regular watering places for nearby flocks looking for an opening in the reeds). The absence of otter signs in Vidronisi seems more difficult to explain though. Especially considering its very name (in Greek Vidra=otter, Vidronisi=otter island)!

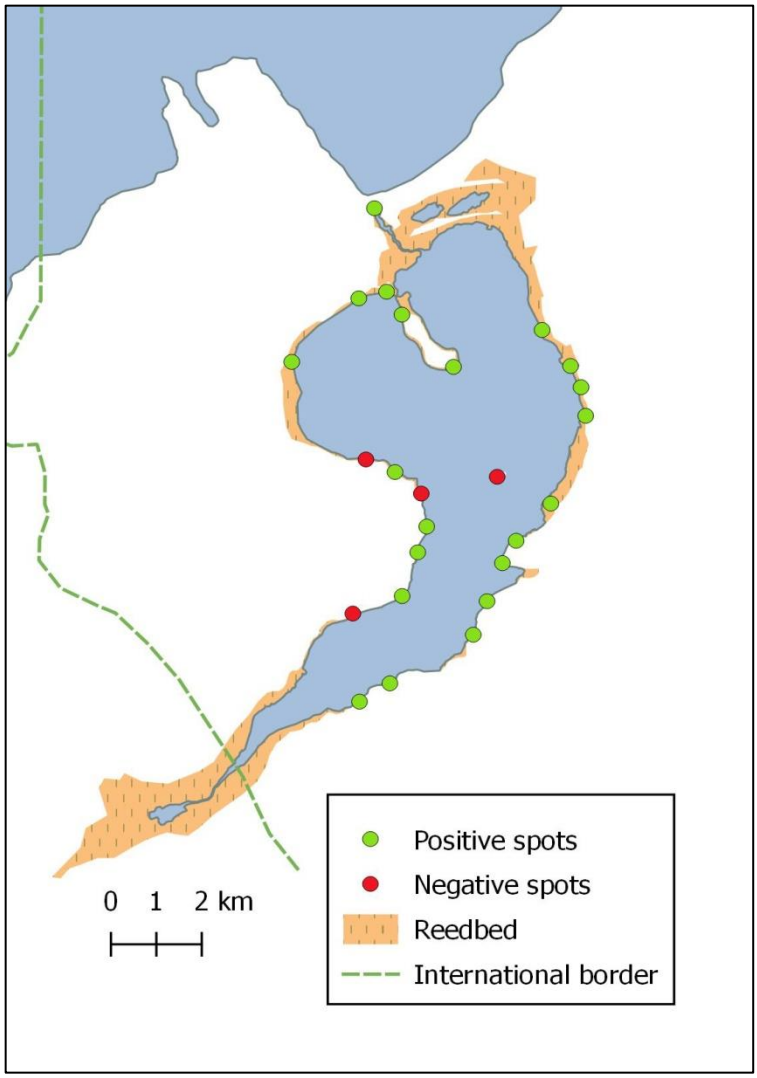

Figure 5. Otter presence in Lesser Prespa Lake: positive and negative check spots.

As mentioned above a canoe was used to approach the inaccessible southern and southwestern sections of the lake. This allowed for a careful search for otter resting places and potential holts in the area. Much of the shore between Mikrolimni and the Albanian border is rocky and steep, carved with hollows and caves. All suitable cavities detected were checked for signs of frequent otter visits. Five of them were considered to be *potential otter holts* (Liles, 2003) (Figure 6). Despite the similar characteristics of the shore in Vidronisi, no such holts were identified there.

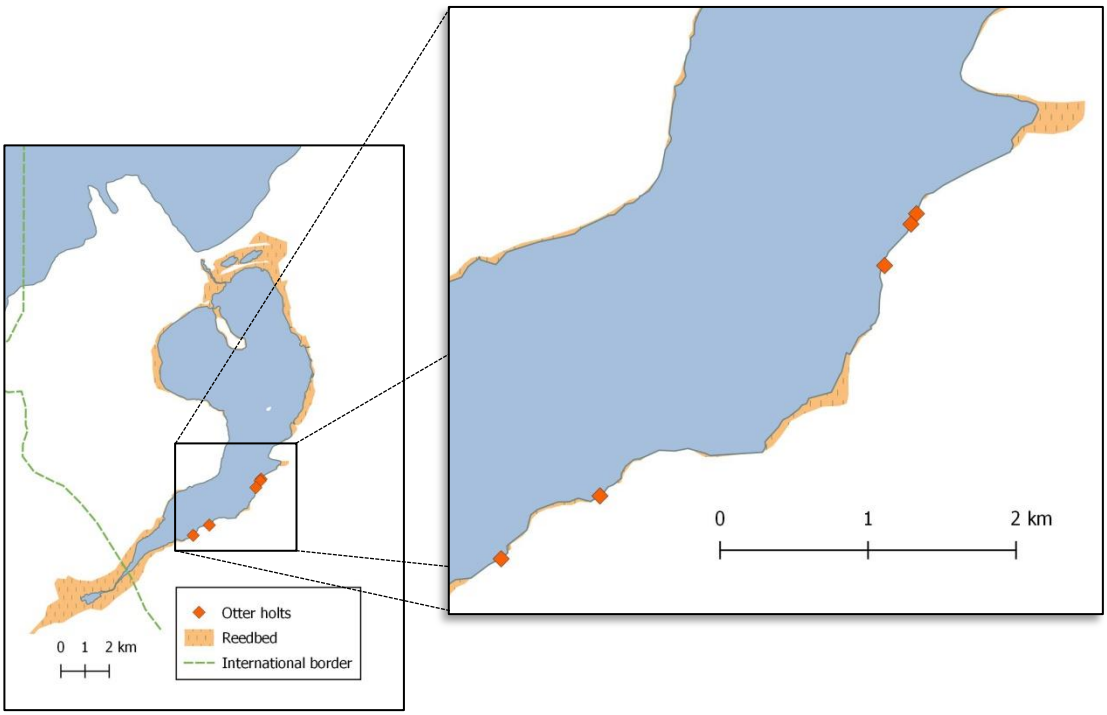

Figure 6. Location of potential holts.

Distinguishing between a resting place and a holt, or confirming that an otter holt is used for breeding, is not straightforward without the aid of a radio-tracked otter (Liles, 2003). In the relative literature, very few natal dens have been located and confirmed by otter specialists carrying out routine otter surveys, even on habitats that support widespread otter populations. The failure to confirm breeding at sites during surveys is likely to be due mainly to the fact that otters often breed in secure, well-hidden sites. This is why most authors refer to the presence of "potential holts".

All the check spots surveyed and the locations of the potential otter holts are presented in the Annex I section.

6. Discussion

The results of this otter study are in general agreement with previous studies in the area: the otter seems to occupy all available habitat in Lesser Prespa Lake. Our field sign sampling survey produced a percentage of positive sites of 84%. Chanin (2003b) suggested that a percentage of over 70% positive sites, should be regarded as an indicator of a healthy otter population. This is more realistic than expecting a 100% positive result, as not all spraint sites will be used all the time.

The high percentage of positive spots in the area should not come as a surprise. Lesser Prespa Lake evidently meets all of the species habitat requirements: abundant aquatic prey and acceptable water quality and adjacent areas offering ample cover. Both Delaki *et al*. (1988) and Grémillet (2002) expressed concerns about the Lesser Prespa Lake's increasing eutrophication and its impact on otters in the area. However, within the range of natural values, water chemistry has little impact on otters other than by affecting food supply. For example, moderate eutrophication may benefit otters by leading to an increase in the abundance of certain fish, although excessive eutrophication is detrimental when it leads to the reverse effect (Chanin, 2003a). Lesser Prespa's mesotrophic to eutrophic status does not yet pose a serious challenge to the continuous survival of the otter in the area. Toxic pollutants, that can potentially have an extremely severe impact on otters, are virtually non-existent here. Finally, human induced-mortality is at a minimum with only 1 – 3 otters per year recorded as road casualties and other mortalities for the last decade (National Park Management Body wardens, personal communication).

As already mentioned in previous chapters, it is recognized that the southern and southwestern sections of the lake, with its inaccessible steep and rocky shores, provide ample secure locations for breeding. On the contrary, along the central and northern sections of the lake - starting from Mikrolimni and ending in Daseri - both the physical characteristics of the shore and the absence of suitable adjacent habitats do not offer otters any underground holt choices. In such conditions, it is well documented that otters use above ground couches in the thick vegetation of reed-beds (Taylor & Kruuk, 1990). The extensive removal of reed-beds could therefore prove to be problematic by leading to a decrease in available breeding sites. In the extreme scenario that all reeds were removed, the absence of cover would most probably prove to be a limiting factor for the otters. It is therefore of major conservation significance to ensure that a sufficient number of reed-bed patches - of the appropriate extent and siting - remain undisturbed, in order to maintain a healthy otter population.

It is important here to make a distinction between the breeding site and the natal den. The term breeding site is used here to describe an area of land, or dense aquatic vegetation, large enough to provide a breeding otter with:

- Security from disturbance.
- One or more potential natal den sites.
- No risk of flooding.
- Access to a good food supply.

The natal den is taken to be the small space occupied by the female when she gives birth and where the cubs stay for up to three months. (Liles, 2003).

Otter natal dens in reed-beds are nearly impossible to locate, partly because of the nature of the habitat itself, but also because at such sites, where only above-ground cover is available, a different natal den may be used each year. Therefore, in terms of conservation the identification and protection of **breeding sites** should be treated as a priority. Natal dens are obviously important, but their existence and security will depend on the integrity of the wider breeding site in which they are found. The extent of habitat required to provide optimal conditions for breeding is likely to vary from site to site, and to be influenced by a range of factors including the type(s) and quality of habitat available and the level of disturbance. Based on Liles (2003), although breeding sites vary in range from 2 ha to 50 ha, **4 - 5 ha** was sufficient in most cases.

The difficulty to pinpoint potential breeding sites in the seemingly unbroken reed-beds in the periphery of Lesser Prespa Lake, is what led us to approach the issue moving yet another step back, at the *female otter territory* level. Female otters reproduce within their home range, and therefore the search for individual breeding sites should concentrate in those areas of wetland likely to be used by the breeding female associated with them. By estimating plausible female otter territories, we could limit the search area for their respective breeding sites.

There are considerable difficulties in determining the number of otter territories in a set area, described in detail by Chanin (2003a), but allowing for limitations, useful management conclusions can be drawn. For the purposes of our study, an average of **20 ha** of water per female otter territory was used (Liles, 2003). To calculate the territory area, the standard set by the Irish NPWS (2009) [calculated by combining the ground-truth data gathered by Chapman & Chapman (1982) and Bailey & Rochford (2006)] was used. According to the above standard the width of the otter habitat in lakes was estimated to be an *80m strip of water* counting from the nearest shore. This is because otters have very rarely been observed to forage beyond 80m from the shore. In addition to this 80m strip of water, a *10m terrestrial buffer* was considered to comprise part of the otter habitat.

Following the above analysis, a maximum of **18** *plausible female otter territories* was estimated for the area for the central and north sections of the Lesser Prespa Lake, where the reed management will take place (Figure 9). Secure in the assumption that more than enough suitable habitat will be left undisturbed in those "plausible territories" allocated for Vromolimnes and Diaylos areas, efforts were concentrated in identifying the most suitable breeding sites for those 14 "plausible territories" that are potentially at risk from the scheduled reed cuts. The reasoning behind the selection of proposed undisturbed patches and the final designation is described in the next chapter.

Figure 7. The 18 *plausible female otter territories* estimated for the section of Lesser Prespa Lake likely to be affected from the planned reed management.

7. Management implications

As described in the previous chapter, 14 reed patches (5 ha each) along the central and northern section of Lesser Prespa Lake were designated as potential otter breeding sites and proposed to be left undisturbed in order to maintain a healthy otter population in the area. The following considerations were taken into account in the selection process:

Patch habitat suitability

- The presence of known floating "islands" made of reeds (known locally as "koria") was considered of major importance. Although water level oscillations of Lesser Prespa Lake are minor, flooding remains arguably the biggest challenge for otters forced to select for dens among reeds. These floating "islands" offer unique protection against this threat.
- Dense reed-bed vegetation preferably offering a combination of *Phragmites* and *Typha* sp. Depending on the area, otters have been suggested to prefer one or the other genera for the construction of their open couches.
- Patches were selected in areas with minimal disturbance. Secluded areas were given priority.
- Secluded areas of open water were considered important, as they are known to provide valuable and secure play grounds for the cubs.
- Suitable adjacent habitat (remnants of riparian forest, dense *Salix alba* and *Populus alba* stands, thick shrub cover etc.) along the shore were given priority, as they could potentially provide valuable cover for a holt.
- Special features, e.g. isolated trees among the reed-bed, suggesting elevated ground (minimum flood risk).

Relevant patch location

- A patch was allocated for each of the estimated "plausible female otter territories" along the coast.
- An effort was made to distribute the patches evenly along the whole length of the shore in question, wherever that was possible.
- No patch should be nearer than 500m than the next.

Other conservation priorities

- Patches were not proposed in areas set to be managed as part of other known LIFE project priorities e.g. certain stream mouths, where restoration is scheduled.
- Certain patches were proposed in such a way as to not interfere with the wet meadow restoration priorities.

For certain patches reed cuts were suggested from the side of the lake only, in such a way as to create a corridor, facilitating the otters' access to the site (See Annex II). All 14 proposed undisturbed patches are depicted in Figure 8.

Figure 8. Proposed undisturbed patches along the shore of Lesser Prespa Lake.

All proposed undisturbed patches are presented in detail in Annex II.

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Annex I- Check spots and potential holts

Check spot No	Site	Otter sign	Coordinates	Assesment
1			N: 40.78577 E: 21.11432	Positive
2			N: 40.77832 E: 21.12173	Positive
3			N: 40.77390 E: 21.12436	Positive
4			N: 40.76802 E: 21.12561	Positive
5			N: 40.75012 E: 21.11628	Positive
6			N: 40.74228 E: 21.10748	Positive
7			N: 40.73753 E: 21.10399	Positive
8			N: 40.72965 E: 21.09995	Positive
9			N: 40.72277 E: 21.09629	Positive
10			N: 40.71297 E: 21.07541	Positive
11			N: 40.70893 E: 21.06682	Positive
12			N: 40.72709 E: 21.06506	Negative
13			N: 40.73072 E: 21.07789	Positive
14			N: 40.73977 E: 21.08195	Positive
15			N: 40.74509 E: 21.08429	Positive

16			N: 40.75192 E: 21.08288	Negative
17			N: 40.75641 E: 21.07604	Positive
18			N: 40.75898 E: 21.06847	Negative
19			N: 40.77918 E: 21.04926	Positive
20			N: 40.79225 E: 21.06659	Positive
21			N: 40.79359 E: 21.07392	Positive
22			N: 40.78898 E: 21.07785	Positive
23			N: 40.77814 E: 21.09126	Positive
24			N: 40.81095 E: 21.07069	Positive
25			N: 40.75540 E: 21.10263	Negative

Table 1. Otter check points in Lesser Prespa Lake.

Potential holts	Site	Coordinates	Comments
1		N: 40.72965 E: 21.09995	Check spot 8
2		N: 40.72902 E: 21.09956	
3		N: 40.72652 E: 21.09745	
4		N: 40.71297 E: 21.07541	Check spot 10
5		N: 40.70893 E: 21.06682	Check spot 11

Table 2. Potential otter holts recorded in Lesser Prespa Lake.

Annex II – Proposed undisturbed sites

This section contains all the 5 ha patches of reed-bed proposed to be left undisturbed due to their potential as otter breeding sites. Each site is accompanied by information relevant to their management. All polygons are also delivered in geospatial files (shp format).

This patch was selected to serve as potential otter breeding site for its respective "plausible otter territory" (See «plausible_female_otter_territories.shp» file - polygon with OID1).

If necessary, the patch could be moved slightly to the west (remaining intact). Its present location was selected so as to minimally interfere with the Mikrolimni stream restoration project. The patch could be stretched all the way to the shore if this does not interfere with the wet meadow restoration priorities.

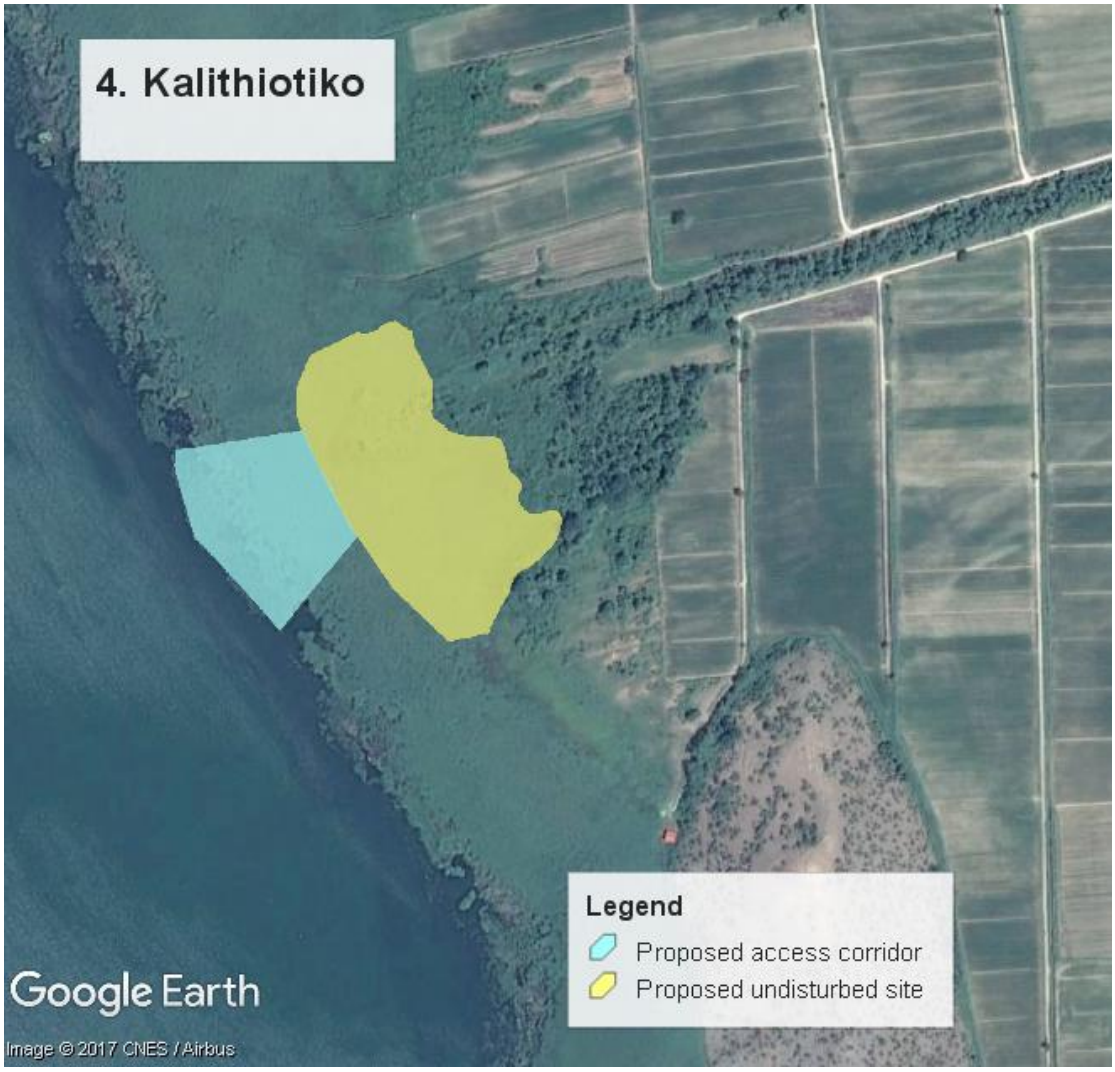
This patch was selected to serve as potential otter breeding site for its respective "plausible otter territory" (See «plausible_female_otter_territories.shp» file - polygon with OID2).

If necessary, the patch could be moved slightly to the west or east (remaining intact), without getting closer than 500m to either patches 1 or 3.

The patch could be stretched all the way to the shore if this does not interfere with the wet meadow restoration priorities.

This patch was selected to serve as potential otter breeding site for its respective "plausible otter territory" (See «plausible_female_otter_territories.shp» file - polygon with OID3).

The patch should not be moved as it was selected on the basis of the adjacent suitable habitat along the shore.



This patch was selected to serve as potential otter breeding site for its respective "plausible otter territory" (See «plausible_female_otter_territories.shp» file - polygon with OID4).

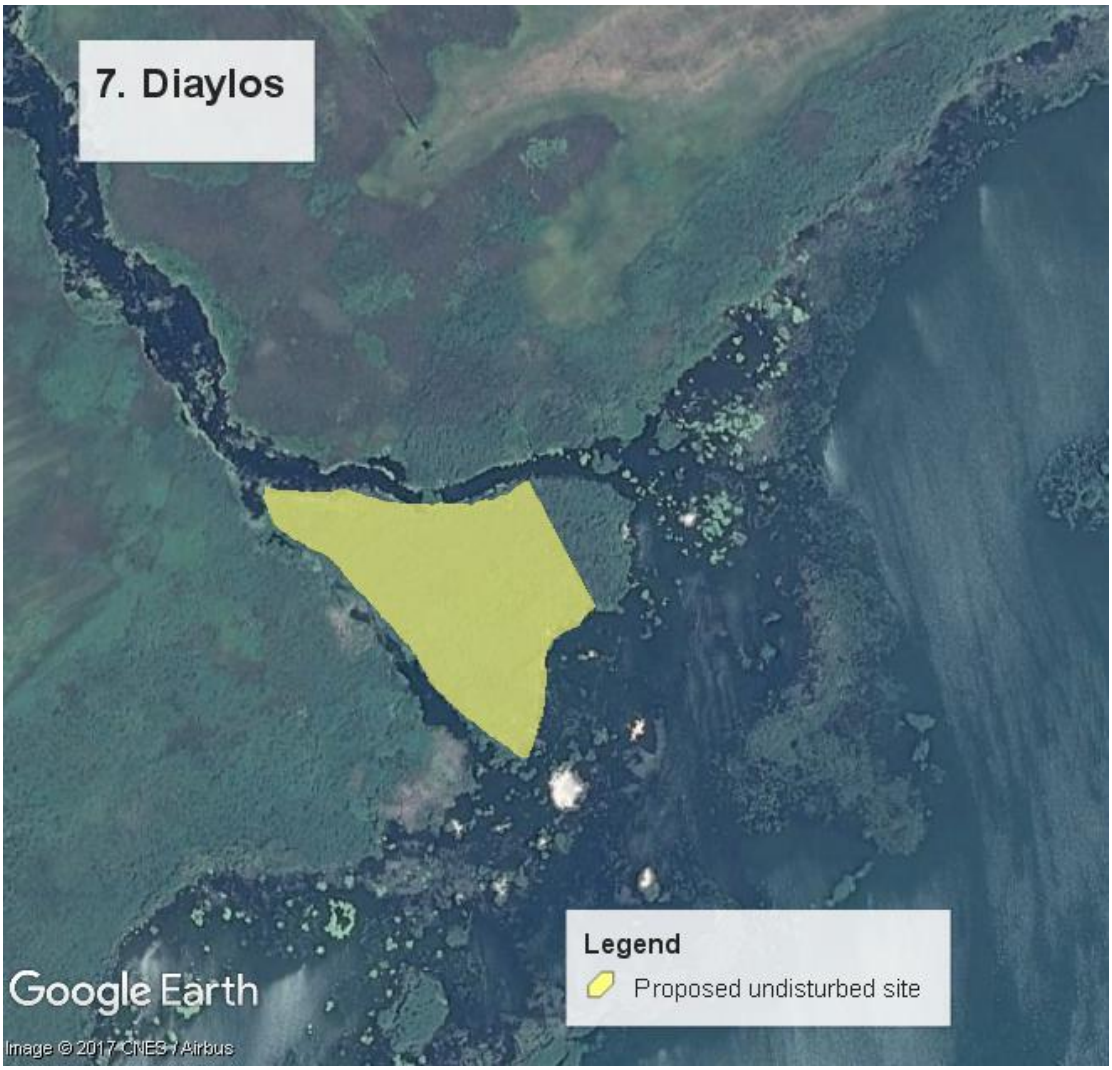
The patch should not be moved as it was selected on the basis of the adjacent suitable habitat along the shore. Ideally reed cutting from the side of the lake should create the proposed corridor, facilitating the otters' access to the patch.

This patch was selected to serve as potential otter breeding site for its respective "plausible otter territory" (See «plausible_female_otter_territories.shp» file - polygon with OID5).

Ideally this patch should not be moved as it incorporates valuable floating islands ("*koria*") and an isolated area of open water, which is an ideal play area for cubs. If absolutely necessary, the patch could be moved to the west or east (remaining intact) as long as it remains along its respective "plausible otter territory".

This patch was selected to serve as potential otter breeding site for its respective “plausible otter territory” (See «plausible_female_otter_territories.shp» file - polygon with OID6).

If necessary, the patch could be moved to the east (remaining intact), without getting closer than 500m to patch 5.



This patch was selected to serve as potential otter breeding site for its respective "plausible otter territory" (See «plausible_female_otter_territories.shp» file - polygon with OID7).

This patch should not be cut, not simply because of its close proximity to the sensitive pelican colony, but also because it incorporates valuable floating islands ("koria") and it is found on a strategic position connecting Lesser Prespa with Great Prespa Lake through Diaylos.

This patch was selected to serve as potential otter breeding site for its respective "plausible otter territory" (See «plausible_female_otter_territories.shp» file - polygon with OID8).

This patch should not be cut, not simply because of its importance to waterbirds, but also because it incorporates an isolated open water area, which is an ideal play area for cubs.

This patch was selected to serve as potential otter breeding site for its respective "plausible otter territory" (See «plausible_female_otter_territories.shp» file - polygon with OID9).

This patch should not be moved, as it incorporates valuable secluded open water areas, as well as important floating islands ("*koria*").

This patch was selected to serve as potential otter breeding site for its respective "plausible otter territory" (See «plausible_female_otter_territories.shp» file - polygon with OID10).

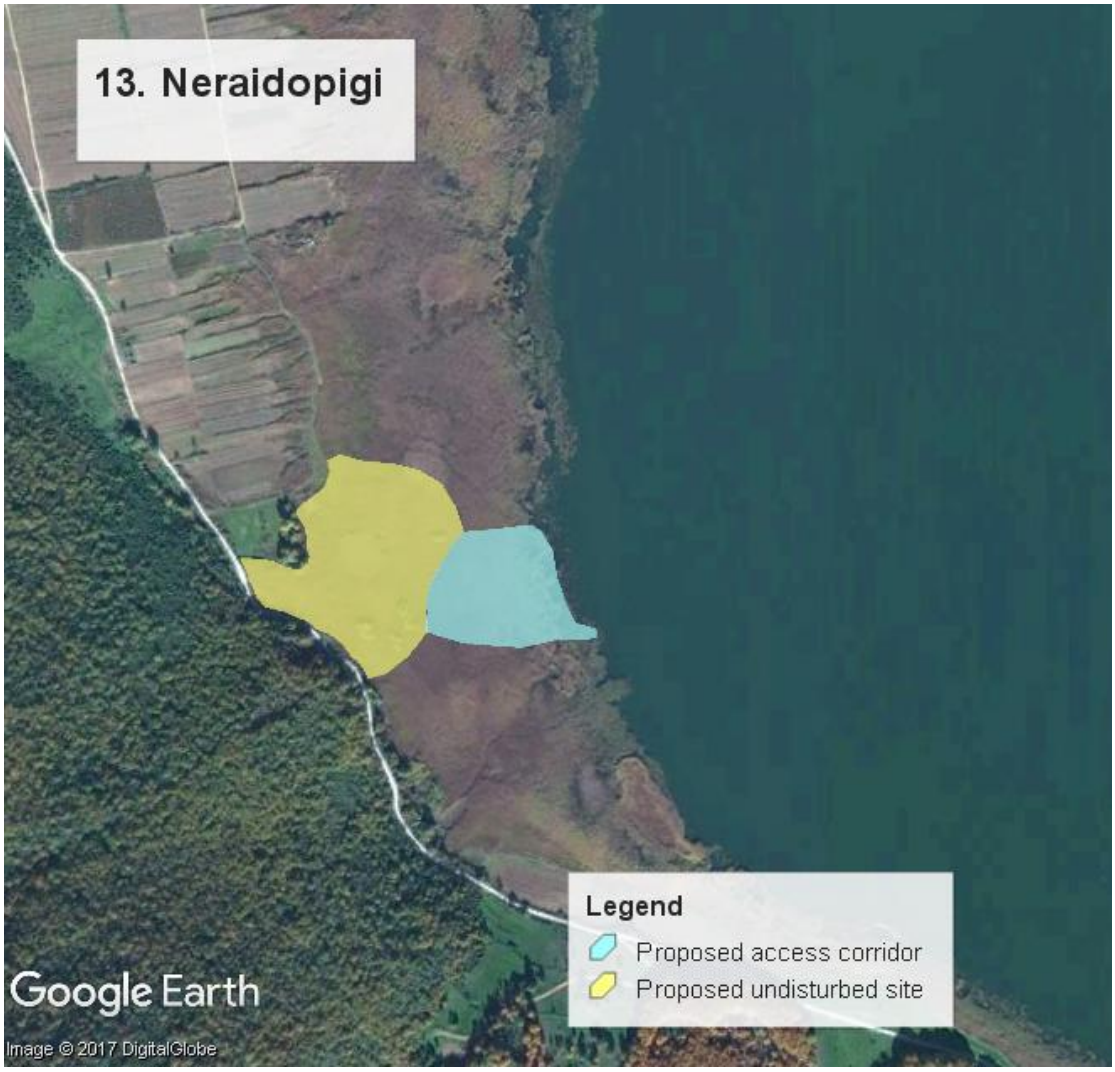
If necessary, the patch could be moved slightly to the north (remaining intact), as long as it stays along its respective "plausible otter territory".

This patch was selected to serve as potential otter breeding site for its respective "plausible otter territory" (See «plausible_female_otter_territories.shp» file - polygon with OID11).

The patch should not be moved as it was selected on the basis of the adjacent suitable habitat along the shore.

This patch was selected to serve as potential otter breeding site for its respective "plausible otter territory" (See «plausible_female_otter_territories.shp» file - polygon with OID12).

If necessary, the patch could be moved anywhere along its respective "plausible otter territory", without getting closer than 500m to either patches 9 or 13.



This patch was selected to serve as potential otter breeding site for its respective "plausible otter territory" (See «plausible_female_otter_territories.shp» file - polygon with OID13).

The patch should not be moved as it was selected on the basis of the adjacent suitable habitat along the shore. Ideally reed cutting from the side of the lake should create the proposed corridor, facilitating the otters' access to the patch.

This patch was selected to serve as potential otter breeding site for its respective “plausible otter territory” (See «plausible_female_otter_territories.shp» file - polygon with OID14).

This patch cannot be moved while staying intact somewhere along its respective “plausible otter territory”, since there is no other available continuous patch of the same size along.