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LIFE Podkowiec+. Layman's report.

The report on the implementation of the project *Protection of lesser horseshoe bat and other bat species in southern Poland (PODKOWIEC+)*

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Life PODKOWIEC+



LIFE12 NAT/PL/000060



The report on the implementation of the project
**Protection of the lesser horseshoe bat
and other bat species in southern Poland
(PODKOWIEC+)**

The Polish Society of Wildlife Friends „pro Natura”

PROJECT CONTEXT



Disturbance of hibernating bats. Even the mere presence of people might be enough to cause animals to awake, causing unnecessary energetic loss.



Visiting breeding colonies causes females to flee, leaving young individuals unattended. Frequent disturbance, such as renovation work, often results in death of young bats abandoned by their mothers.



Most European bat species are capable of squeezing through narrow slots, some of them even inhabit such enclosed spaces. However, it is not the case for lesser horseshoe bat, which needs larger entrances.

Bats are among the most endangered animals, therefore all 25 bat species occurring in Poland are protected by law; additionally, seven of them are also protected by the European Union Habitats Directive. European legislation requires securing the survival of mentioned species through variety of actions, including the creation of Natura 2000 sites.

All species share a common need for food, shelter and the opportunity to breed. If their environment lacks any of these three key factors, they die. Bat species occurring in Poland feed mostly on insects, hence there is a lack in food supply for almost half the year. In order to survive pe-

riods of low insect abundance, bats spend the winter relying on energy supplied by fat reserves accumulated during the autumn. To ensure their survival on such limited reserves, bats slow down their vitals, falling into a state of deep torpor called hibernation. Hibernation enables bats to survive the winter, but it is a precarious state. Disturbance during hibernation can lead to arousals that are energetically costly. Frequent disturbance caused by external factors might lead to the premature depletion of fat supplies, resulting in starvation. People often do not realise that winter exploration of underground sites, such as caves, fortifications and old mines,

is done at the expense of bat's lives, whose winter survival depends on these locations.

For the successful rearing of young, bats need suitable roosts where they can form breeding colonies composed of mothers and their offspring. Roosting locations must meet certain requirements: it has to be warm, dry and out of reach of predators. Some species form colonies in buildings, predominantly in the attics, which tend to be quiet.

The loss of such roosting locations poses a serious threat for the species utilising them. Spacious, warm and most importantly abandoned or rarely used attics have become less common. In many re-



For some species linear landscape elements such as hedges provide shelter from wind and predators, as well as help in navigation.



Predation is a natural phenomenon. However, roosts easily accessible for predators may turn into deadly traps.

gions of Poland such places are limited to churches, both catholic and orthodox, where bats still can live undisturbed.

Lesser horseshoe bats face particularly difficult circumstances as they have to be able to fly directly into and out of the roost. Due to their rather limited quadrupedal locomotion they are unable to crawl through narrow slots. Lesser horseshoe bats are great aviators, but lack elbows to push themselves through narrow spaces. This may result in whole colonies dying, imprisoned in roosts where a previously used entrance was closed or otherwise obstructed by someone.

Roosts in buildings have many advantages and provide favourable conditions, but those comforts come at the price of higher risk. Roof renovations are one of those risks. Such construction works are preferred to be done in favourable weather con-

ditions - usually in the summer. This also happens to be the time when bats and their offspring occupy maternity roosts. It is often the case that mothers are unable to move their young to safety and instead flee frightened. Abandoned pups are likely to die.

Safe roosts should be easily accessible for bats, allowing them to fly in and out without taking too many risks. Protection from outside dangers, such as predation, is provided by a dense canopy of trees and bushes. Unfortunately, more and more trees are being felled, not only in the proximity of buildings, but also along roads, rivers and on field balks, creating a less favourable landscape for bats.

Predators are not only lurking outside, they frequently enter roosts. It is often the case that they dwell inside the same building, or nearby. Under some circumstances cats, mar-

tens and owls may destroy an entire breeding colony.

Floodlights, designed to expose architectural qualities, pose a serious threat to bats, and buildings previously occupied by bats are often abandoned after placement of lights. This happens because bats, being nocturnal animals, avoid lit areas in order to minimise predation risk.

Bats occurring in Poland feed on insects. They are capable of eating huge amounts of them, often preying on insect pests. However, it is followed by a large production of guano, which is a great fertilizer, but it is not necessarily welcome in attics. This is a frequent reason for people wanting to get rid of bats from their properties.

It is also the case that bat roost sites are accidentally destroyed due to a lack of knowledge regarding their presence or the possible impact of actions undertaken.



Floodlights massively help birds of prey, making it easier for them to hunt bats. Being afraid of light, bats emerge from illuminated roosts later, thus limiting their foraging time.



Guano deposits formed by a large colony are a great example of bat's role in insect control, but at the same time are a nuisance for people.

LIFE PODKOWIEC+

PROJECT AIMS:

Three Habitats Directive Annex II species were included in the project. The area of operation was based on the lesser horseshoe bat's range in Poland, as it was the species of main concern. This area was later referred to as The Lesser Horseshoe Bat's

Land (in Polish: Kraina Podkowca). Alongside lesser horseshoe bat, two other species frequently found in attics were included - Geoffroy's bat (*Myotis emarginatus*) and greater mouse-eared bat (*Myotis myotis*). The project aims were defined as:

preservation and improvement of the most important known roosts of aforementioned species lying within Natura 2000 sites, to raise the profile of bats in public opinion and development of long lasting conservation measures.

The lesser horseshoe bat – the project's flagship species, for which the vast majority of the project's conservation actions were planned. Only 20 years ago its population in Poland was estimated to be smaller than 100 individuals. Nowadays, largely due to conservation efforts undertaken by The Polish Society of Wildlife Friends „pro Natura”, the species is on the rise and, with an estimated population of almost 10000 individuals, has become important on a European scale. The lesser horseshoe bat occurs in southern Poland. In summer the species roosts in warm attics; during winter it usually hibernates in caves. The species is sensitive to landscape alterations and therefore still requires active conservation measures.

Lesser horseshoe bats spend their entire life within a 20-30km radius circle, very rarely travelling greater distances. It is crucial for species survival to have breeding and hibernation sites close and well connected with a network of commuting corridors.

Geoffroy's bat – least understood among the three species included in the project. It is easily frightened and difficult to observe. In Poland it is known from only a dozen or so breeding colonies. In roosts, these bats are usually crowded and form clusters that are difficult to count. The clusters must be photographed to be counted properly.

In southern Poland, single individuals are observed within lesser horseshoe breeding colonies. Such "roommates" are likely to be males, which are known to lead solitary lives, or young individuals exploring for possible sites for breeding colonies.

Geoffroy's and lesser horseshoe's habitat preferences are in many ways similar, therefore it is not a surprise that both species can be observed in the same region, often sharing the same attic.

Greater mouse-eared bat – the largest species among Polish bats; also known from forming the largest breeding colonies. This is the species most responsible for bat's bad reputation as it covers attics with vast amounts of guano. Due to that, large colonies (numbering over 100 individuals) are becoming a rarity in Poland. The species' range is shrinking and colonies are becoming smaller. Greater mouse-eared bats hibernate in underground sites, often travelling great distances to reach suitable sites.

Species is also present outside The Lesser Horseshoe Bat's Land, but it is not present in the north-east parts of the country.



ROOF RENOVATIONS

Roof renovations, aimed at the preservation of breeding colonies, became a showcase for the Life Podkowiec+ project and the entire Polish lesser horseshoe bat conservation programme. Their importance cannot be stressed enough, as they not only allow securing known, priceless, endangered bat roosts, but also help establish good will and good relationships with owners who begin to perceive bats presence as a benefit. We can confidently state that roof renovations, especially in churches and cultural heritage buildings, achieved more for the perception of bats than any educational programme ever could without such support.

Although it was not easy, all construction works done in breeding colonies were carried out when bats were occupying winter sites – between end of October and early April. All works were done under environmental supervision and focused on creating favourable conditions for bats, and making sure that they would accept changes in the roost and continue using it for the years to come. The most important of these favourable conditions are: retaining existing entrances used by bats; limiting the use of wood preservatives and using only those listed as nontoxic for mammals; securing optimal microclimatic conditions; and removal of hazardous elements

such as exposed nails, sharp edges, and roof membranes with fibres that pose a risk of entanglement for bats.

Bats, like other mammals, use their sense of smell for recognising their surroundings. In order to make them feel at home (both literally and figuratively), some old planks soaked with the bat's smell and small piles of guano were kept in the attics.



Combination of cultural heritage buildings renovations and environment protection attracts media attention. Roof renovation in Małastów church brought joy for both parishioners and 200 greater mouse-eared bats.



Roof renovation of a Greek Orthodox church in Krynica Zdrój. Winter conditions were challenging for workers.



Lime kiln in Stara Morawa currently occupied by greater mouse-eared bats and one of only a few known breeding colonies of lesser horseshoe bats in the Sudety mountains.



Locations of buildings with their roof renovated as a part of Life Podkowiec+ project (9 buildings).

PLATFORMS FOR GUANO



Guano removal from platforms is easier. It can be swept or collected with a snow shuffle.

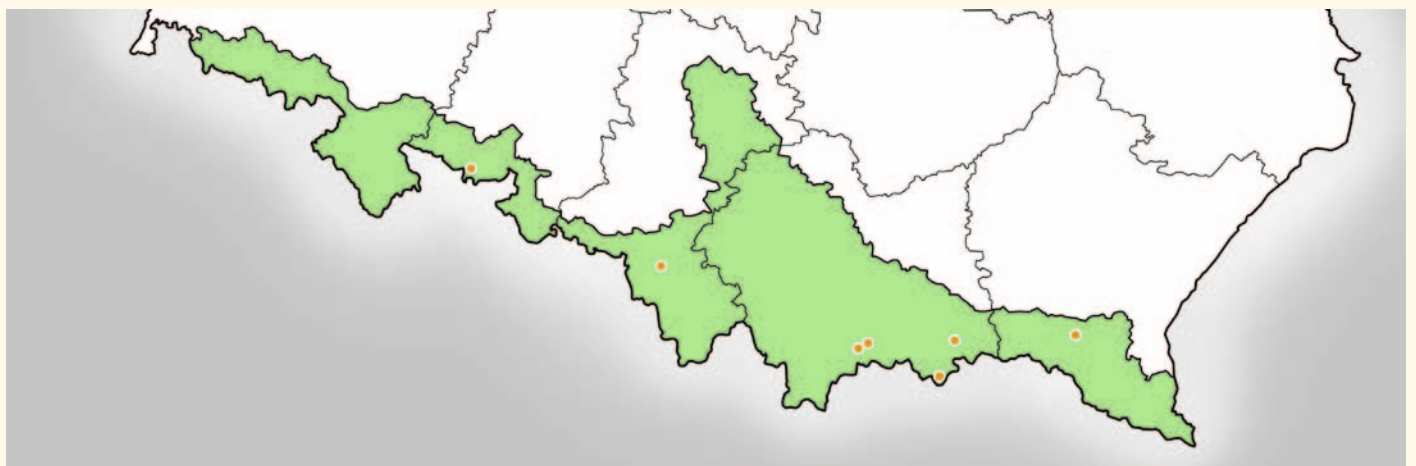
Bat guano piling up in attics is one of only a few nuisances connected with bat presence. In most cases bat guano does not cause much of a problem and might even go unnoticed by owners as bat droppings are tiny, and in the hot and dry conditions found at the attics during summer they quickly dry up and turn into dust. However, in the case of large colonies exceeding hundreds of individuals droppings tend to pile up generating an unpleasant smell. In extreme cases, after years of neglect, piles of guano might become hazardous for a building's structure due to their weight. A simple and effective solution in such cases is special platforms for guano collection, built in bat-occupied attics. The platforms consist of podiums covered with vapour permeable foil. Droppings accumulate on the platform without harming the building's structure, and its removal is easy and safe. Bats guano in 1:100 dilution becomes a great fertiliser. However, caution is advised as it is easy to overdose.



Guano platform in the Church in Łąck. Chandelier mounts are secured with foil and covered with additional roofs placed above foil.



Contractors assembling guano platforms in Górkki Wielkie church – occupied by 300 greater mouse-eared and close to 100 horseshoe bats.



Locations of buildings with guano platforms installed as a part of Life Podkowiec+ project (7 buildings).

CONSERVATION OF UNDERGROUND SITES

It is crucial for the creation of good hibernation conditions to secure underground sites. Unfortunately caves, fortifications and old mines attract a lot of visitors. We faced such circumstances in some sites included in Life Podkowiec+ programme. It was decided that the only effective solution would be closing entrances with specially designed gates. Bars, grills and other types of gates not only protect underground sites from unauthorised access, but also provide a wide variety of other benefits such as creation of favourable microclimate and preventing entrances from collapsing. It is necessary to remember that gates might have a negative effect on a hibernation site if they are not properly designed. Therefore it is important to keep underground sites freely accessible for bats, which can be done by making gate entrance slits adequate in size - larger than the bat's wing span. When constructing the gates it's also important to avoid sharp edges which could damage bat's wings. However, at the same time, gates should be effective at keeping unwanted guests outside and sturdy enough to endure attempts of forcing them down. The humid conditions in which gates are placed requires the use of special materials and, in some cases, reinforcement of the rock surrounding the entrance point. If the

entrance does not allow proper placement, gates should be mounted in a more favourable spot, possibly deeper into the underground. Entrances to three caves were gated as part of the project. Many other underground sites were already secured in past projects. The hibernation period is an especially challenging time in a bat's life, therefore many conservation efforts aimed at protection of underground sites were carried out in the past.



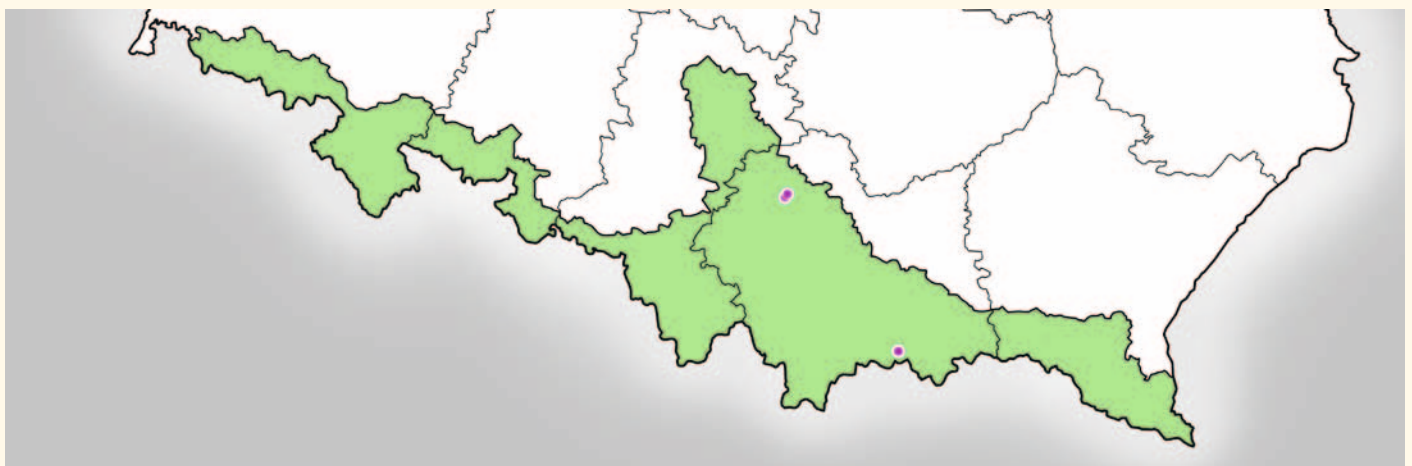
Hibernating bats. Just a few grams of fat need to be enough for bats to survive winter.



Gate installation in Zbójnicka cave. Construction work in such conditions is not easy.



Brand new gate in Jama Ani cave. Entrance shaft is vertical, gate bars are horizontal. Picture taken from above.



Underground sites gated as a part of LIFE Podkowiec+ project (3 caves).

ADAPTING AND ENHANCING ROOST SPACES

Buildings occupied by breeding colonies might not necessarily provide optimal conditions in terms of safety and successful rearing of offspring. This is why a total of 60 roosts located in buildings were enhanced. For each

roost, individually adjusted adaptations were constructed. Most modifications focused on optimisation of microclimatic factors inside the roost to make it suitable for bats. In the case of joint use of a building by hu-

mans and lesser horseshoe bats some compromises were needed to bring together building functionality with bat presence. In 80% of all cases our adaptations brought mutual benefits for both people and bats.

Roost availability

The first condition for bats to be able to use the roost is presence of a convenient entry point. Some bat species are capable of squeezing through narrow slots. However, it is not the case for lesser horseshoe bat, which needs larger entrances allowing bats to freely fly in to and out of the roost. Lesser horseshoe bats also require open space inside the roost, allowing it to fly freely.

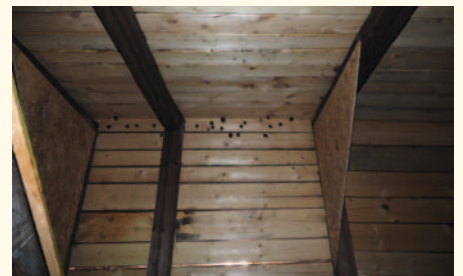
Loss of access into the roost often happens after unintentional closing or otherwise obstructing the entrance point. In order to prevent this from happening special information plates were placed near entrances. It is especially important in places which often change their hosts, such as temples. Successors rarely know anything about bat's needs, and in many cases are unaware of their presence.



Lesser horseshoe bat's entrance doesn't have to be big, but it has to remain open at all times. Once leaving the roost it is preferable for bats to instantly enter a safe environment.

Temperature

Each bat species has its own microclimatic preferences. In general, in summer bats prefer warm and dry conditions. However, precise temperature/humidity requirements vary between species. Lesser horseshoe bats are thermophilic, which is a reason why roosts created for them enable bats to find warm spots regardless of weather conditions outside. However, if roost temperatures get too high, they must have a chance of finding cooler spots. This is a reason why horseshoe bats, despite their small size, require large roosts in order to find spots with the optimal temperature. To make it easier for bats, the insides of attics were adjusted to create more thermally diverse habitats. In 59 buildings, special temperature modifying structures were installed, of which 48 were designed to create warm spots and 11 for cooler ones. Another way to alter microclimate is placement of partitions which hamper air circulation creating pockets of warm air. Females and their offspring willingly use those places as young bats, in the period of growth, require a lot of warmth.



Partition placed on the ceiling. Bats willingly gather in warm spots created that way. Such modifications, both simple and more complicated depending on site, were placed in a total of 29 buildings.

Larger shelters, depending on where they are placed inside the building, serve as reservoirs of warm or cool air. Most adaptations applied in the Life Podkowiec+ project serve several functions. Shelters not only fulfil the purpose of creating more thermally diverse conditions, but also provide darkness and additional protection from disturbance and predators. Furthermore, in large roosts, unused attic space is utilised for the placement of additional micro shelters such as bat boxes, shutters, spots allowing bats easy attachment and many others designed especially for each site.



Bat shelters improving roosting conditions were placed in 29 sites.



During long heat waves, temperatures in attics might be beyond endurance even for bats. Properly placed shelters, well insulated with mineral wool, maintain lower temperatures and are readily used by bats on hot days. A total of 11 of such shelters were installed.

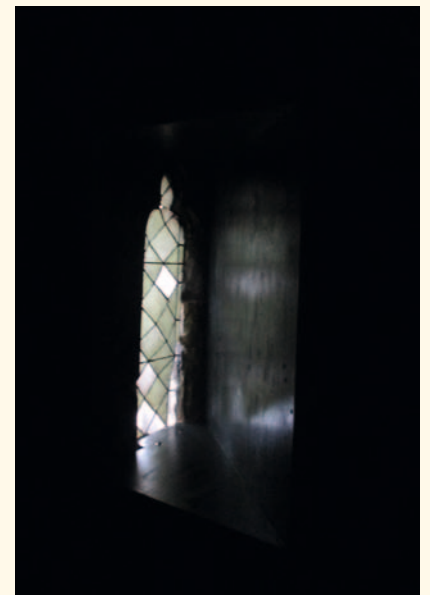
Small shelter placed at floor level, well insulated and predator proofed.

Light

In order to maintain proper light levels and air circulation, most buildings have windows on higher levels. Bats are nocturnal animals and prefer to spend days hidden in darkness. They have eyes and sight, but prefer to navigate via echolocation. In daylight they are an easier target for predators, so if circumstances allow they choose dark places to roost. Both daylight and artificial light scare bats away. A variety of actions, aimed at reducing light levels, were carried out at 42 sites.



Some attics, despite good microclimatic conditions, are not used by bats. A likely explanation for this is high light levels. Proper covering of windows with specially designed screens and shades results in expanding the space available to bats, whilst leaving bat accessible openings if necessary. Screens and shades placed inside buildings are painted dark to ensure they are hardly noticeable from outside and preventing the building from becoming unsightly.



Light level reduced after placement of screens covering a window (left). Achieved effect (right).



Open windows were often covered with screens creating vertical entry points – sliding hopper entrances. This modification has a triple purpose: reduces impact of blizzards and severe rain, lowers overall light level and make roosts inaccessible for unwanted roost mates such as pigeons and jackdaws, while remaining open for bats.

Vertical entry points are no match for lesser horseshoe bats aviation skills and at the same time provide a lot of benefits.



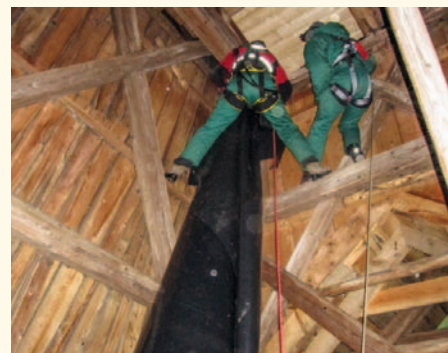
Lamps in attics might cause serious problems for bats. If someone rarely visiting the attic forgets to switch it off it might stay lit for months. In order to prevent such situations automated off switches were installed; additionally special shades were placed on lamps to adjust light where it is most needed by humans and least disturbing for bats.

Special shades were placed on lamps which couldn't be removed from the attic.

Interior design

In many cases attic interiors were unfavourable for bats, either because some rooms were inaccessible for them or due to easy access for predators. In some cases space was denied to bats because attics were used by people. In such circumstances special adjustments were needed in order to create a dark and quiet bat friendly environment. Some of those modifications required good cooperation with owners, some of whom even agreed to periodically share their staircase with bats. Interior design adjustment for bats in separated parts of attics was carried out at 22 sites.

On some sites separation of attic parts with favourable conditions was possible only with curtains. Such solutions were required by fire safety regulations for wooden structures in which placement of an additional wooden partition wall could increase fire hazard. Installed curtains are made of durable fabric which blocks light and noise, creating good conditions for bats and at the same time being light enough to not have an impact on the building's structure and in case of fire can be easily penetrated with a water stream from a fire hose.



Placement of curtains in high places requires mountaineering skills.

In order to deny access for predators (cat, marten), special tilting shelves were installed in some entrances. Those mechanisms react to the predator's weight by closing the entrance with one part of the metal shelf and tilting the other part making predators slide off. Such modifications prevent predators climbing up to the roost, while keeping it open for bats. A total of 19 tilting shelves were installed. This solution was based on a similar device used in the United Kingdom. The effectiveness of those devices depends on their placement relative to the surroundings, as there are observations of martens being able to jump through the trap without triggering the closing mechanism.

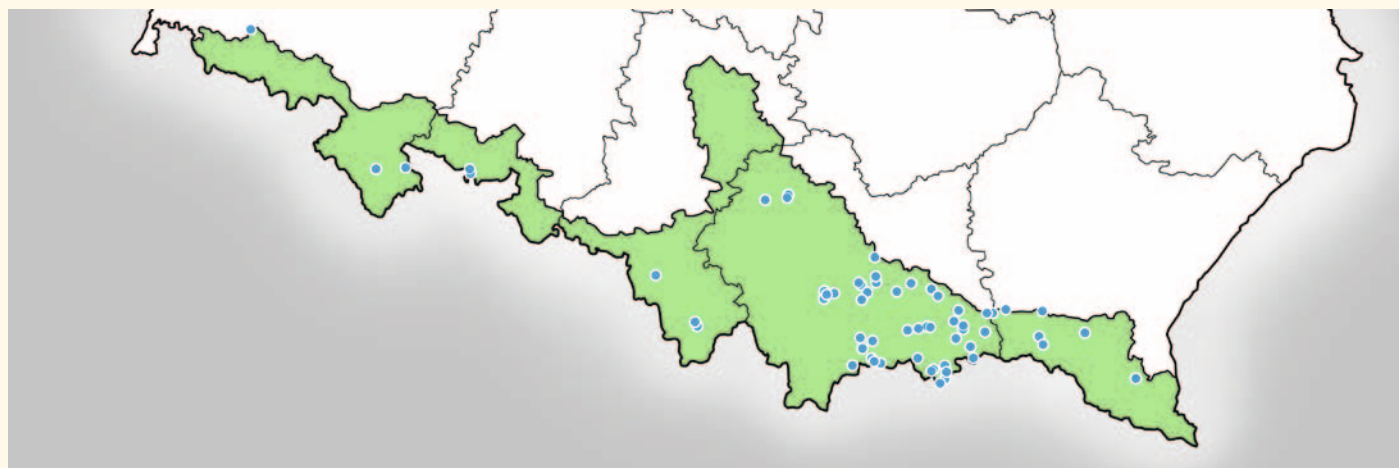


Tilting shelves were most frequently used to separate spaces within roosts and more rarely placed at the entrances.

The ability to freely move between different parts of roost enables bats to find optimal conditions to survive heat waves, or bad weather which prevents bats from hunting. Additional passage windows, including ones cut in existing hatches and doors separating attic and people were installed at 30 sites.

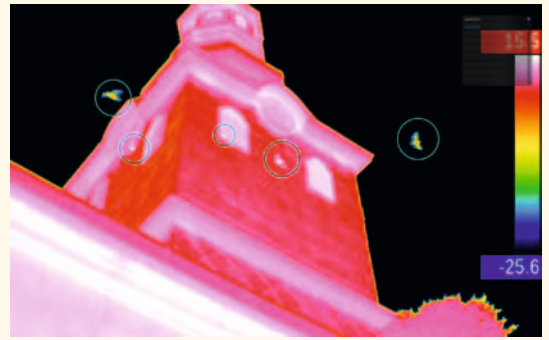


Small holes allowing relocation within the building might be crucial for the colony's survival in case of occurrence of extreme conditions.

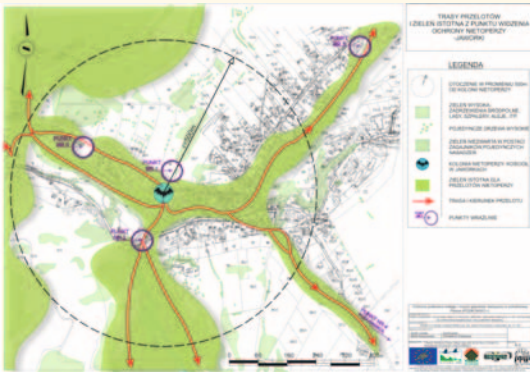


Sites with roost improvement measures undertaken as part of the LIFE Podkowiec+ project (60 locations).

SURROUNDING ENVIRONMENT



Step one was to determine the roosts exit points used by bats. Subsequently the area within a 500 m radius was examined with acoustic detectors.



Based on field observations, important commuting paths were found and their proper maintenance and vegetation management plan was made.



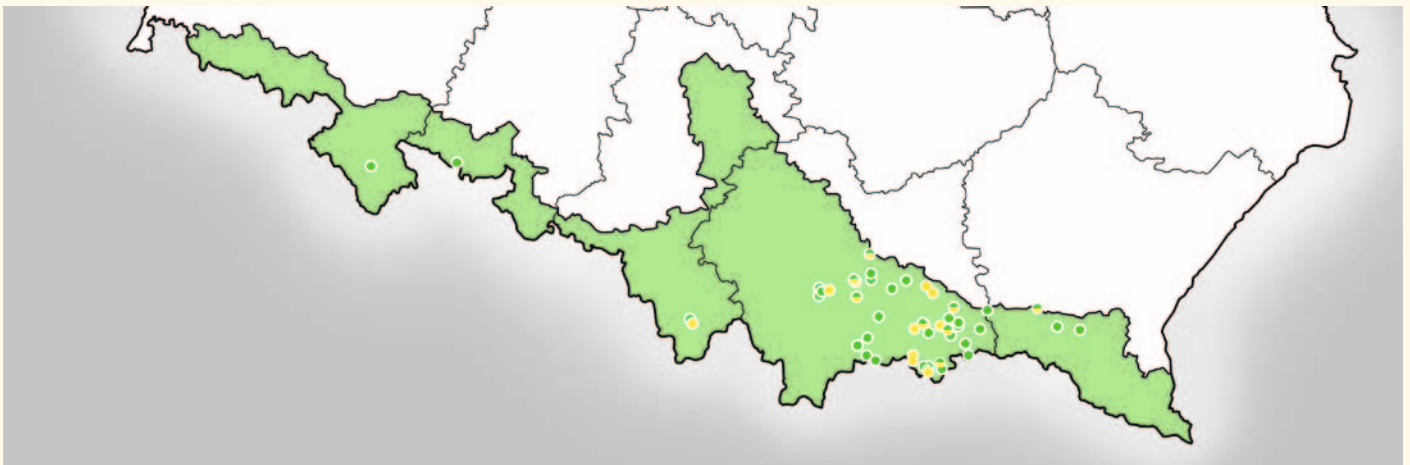
Gaps in commuting routes were filled with new vegetation.

Surrounding environment and roost quality are equally important for bats. Commuting corridors, connecting roosts with foraging grounds, must provide shelter from predators, otherwise bats will abandon shelter or all fall victim to predation. Hedges, branches, canopies and other linear landscape features such as fences, rocks and buildings not only provide shelter but they are also important landmarks for navigation via echolocation. Tree canopies in close proximity to roosts are good foraging sites in times of bad weather. They are especially important for females that are heavily pregnant or flying whilst carrying pups. In order to identify how bats use the roost's

surroundings, observations with specialised equipment, allowing us to see and hear bats at night, were carried out. Based on collected data, key commuting paths were found and their proper maintenance and vegetation management plan was made. It focused on supplementing linear vegetation in order to allow bats to commute freely without need for crossing open spaces. Where it was possible, large, native, 10+ year old trees were planted. In the case of places with limited space, bushes or even potted plants were placed.

Bats avoid light as it makes them more visible to predators. Illuminating roosts may pose a serious threat to bats as it puts bats under stress and higher

predation risk. In order to improve the situation at lit roosts, floodlights were switched off or redirected. In some cases a solution developed in the Slovenian LIFE+ project "Life at Night" (LIFE09 NAT/SI/000378), was used. Its idea was to reshape the light beam with special shades, reducing the amount of light falling outside the building's structure into its surroundings, and to avoid lighting the roost entrance.



Locations with modified vegetation (green dots) or altered lights (yellow dots).

PROJECT MONITORING

All known breeding colonies of lesser horseshoe and Geoffroy's bats in Poland, as well as some colonies of greater mouse-eared bat located in southern Poland, were included in summer censuses. Bat counts were carried out at the end of June and in July in order to include new-borns. Winter censuses were carried out at sites directly included in the project, as well as in other known hibernation sites for species included in the project. The aim of the monitoring programme

was evaluation of the effectiveness of adaptations made in roosts and their surroundings. Observations were carried out both directly and passively with use of automatic devices. In the second case, a large variety of automatic equipment was employed including: infrared cameras - recording both bat and predator activity inside roosts; acoustic detectors - recording bats on their commuting flights; and special counting frames monitoring roost entrances. Observation

allowed for constant monitoring of overall project's effectiveness, as well as giving an insight into bat's reactions to roost adaptations, enabling quick adjustments to be made if necessary. One of the best examples of the effectiveness of detailed monitoring was the discovery that in some cases lesser horseshoe bats prefer to attach to stone substrate rather than wood. As a result of this observation ceramic or stone tiles were installed in roosts.



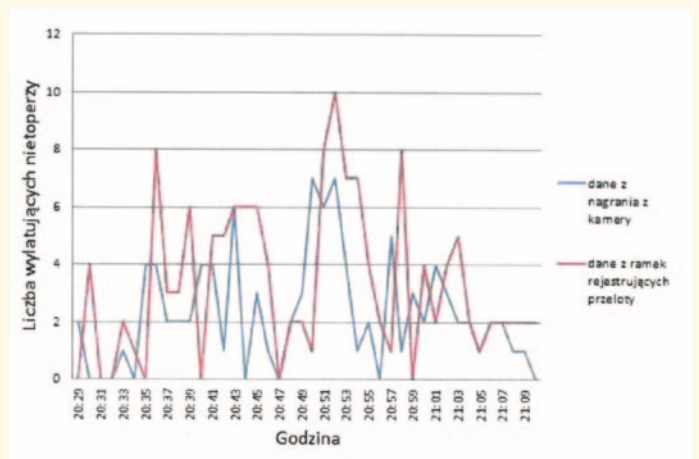
Winter censuses were carried out by people and therefore required good coordination between different bat groups in order to minimise negative impact on bats.



Large clusters are counted from photographs in order to reduce time spent on site and increase accuracy of counts.



Infrared footage from roost with ceramic tiles. This time lesser horseshoe bats chose the wood substrate.



Example of combined results from automatic counting frames and infrared cameras showing activity at roost entrance.

EXPERIENCE EXCHANGE

Even projects implemented locally have their contribution to the protection of nature at the larger scale, as some solutions developed and tested in one country are often worth implementing in new projects. Being aware of that, the European Union financial mechanism LIFE stimulates international cooperation and experience exchange between projects financed within its structures. Cooperation established under the LIFE Podkowiec+ project enabled the wide distribution of new solutions and incorporation of solutions developed and tested in other projects, both Polish and foreign. Meetings with other beneficiaries of LIFE programmes, participation

in conferences and workshops (both Polish and international) were hugely helpful for conservation and project promotion activities. Podkowiec+ and Vincent Wildlife Trust teams, through exchange visits, had an opportunity to share their experience, learn about each other's methods, problems and effects of their work regarding both conservation and working with local communities. The exchange concerned, to a large extent, the methods of active protection of roosts and habitats used by horseshoe bats.

For those involved in the protection of bats, owners of buildings with bat colonies, officials and persons influencing the fate of bats in The Lesser

Horseshoe Bat's Land, two foreign study trips were organised. These trips increased participants knowledge of the issues of bat protection, but also demonstrated how the presence of bats can be used to stimulate local development and build social support for their conservation. A total of 80 participants had the opportunity to learn interesting examples of such activities in Austria, Bavaria and Thuringia.

The exchange of experiences with the Slovenian Life at Night project was very stimulating. Podkowiec+ project was presented at two European Bat Research Symposia, as well as an international conference showcasing the project.



A visit to the Austrian Fledermaushaus, in the former hydroelectric plant in Feistritz a.d. Gail, showed an interesting educational offer.



Waiting for the greater horseshoe bats emergence from the colony in Hohenburg in Germany, protected under the LIFE Grosser Hufeisennase project.



Podkowiec+ team visiting one of the key bat reserves managed by Vincent Wildlife Trust - Bwlch Coach House, home to over 1000 lesser horseshoe bats.



Henry Schofield, a worldwide expert in the protection of horseshoe bats, gives a TV interview during a visit to Wierchomla Wielka.

THE LESSER HORSESHOE BAT'S LAND

The promotion serves to inform about the project, its objectives, activities, financing institutions, also helps in its implementation and is to initiate activities that permanently support the protection of horseshoe bats and other species. Promotional activities included, among others, creation of a project website and two fan pages, a leaflet, distributing promotional gadgets such as t-shirts, pencils, badges, pen drives and candies. Information stands were organised at various events, lectures, meetings and contests. Cooperation with the media was

carried out regularly. To strengthen and consolidate the impact of the project, the specificity of the area of the occurrence of the horseshoe bats - the southern, mountainous range of our country - was used to build the identity of The Lesser Horseshoe Bat's Land. Systematic stimulation of the interest of people and institutions from the region in the development of the tourism product and social and economic initiatives around The Lesser Horseshoe Bat's Land is foreseen. There were two competitions for the lesser horseshoe bats' Ambassadors, much

training for tourist guides, whom would be later awarded with a specially introduced guide badge. For persons and institutions distinguished in bat conservation efforts, special awards were made in the form of the Golden Horseshoe medal and the Quality Mark "Kraina podkowca" (The Lesser Horseshoe Bat's Land). Institutions receiving the Quality Mark obtain the right to use the mark, special diploma and plaque to be placed on the building, while those who have been awarded the Golden Horseshoe medal receive a diploma and minted medal.



Puzzles have always been very well received at the project's promotional stands.



The Lesser Horseshoe Bat's Land logo quickly gained sympathy and recognition, thanks to promotional gadgets of the project.



The lesser horseshoe bat became quite a party animal, always causing enormous interest and sympathy.



Through training, tourist guides had a chance to widen their knowledge and acquire new tools allowing them to enrich their offer.



Persons distinguished in lesser horseshoe bats conservation receive special medal – The Golden Horseshoe.



The Quality Mark has been awarded, among others, to the Museum of the Wiśnicz land. Plaque displayed at the Castle in Nowy Wiśnicz.

The project inspired the creation of tourist routes dedicated to lesser horseshoe or other bat species, and a variety of other events such as bicycle rallies. Based on the design created in the project, the production and distribution of the lesser horseshoe mascots was

initiated. Sądeckie region Information Centre and a city game about the lesser horseshoe bat were created in Muszyna. As part of the project, a number of materials supporting the promotion of horseshoe bats were developed such as riddles, puzzles, magnetic labyrinth

and smartphone apps. All of those gadgets, together with promotional stands and banner, were put to good use at events organised by The Polish Society of Wildlife Friends „pro Natura”, national parks, tourist centres, local governments, parishes and NGOs.



The mascot makes it possible for the horseshoe bat to wrap its wings, has a horseshoe, and thanks to the magnets on the feet can be attached upside-down. It weighs as much as the living original.



Animators have their ways to stimulate the curiosity and involvement of recipients. It is only necessary to provide them with knowledge about the horseshoe bats.



In lime kiln „Łaskawy Kamień” in Stara Morawa a bat observation centre was created allowing visitors to spy on the bats via a special CCTV system.



Bats, nocturnal and mysterious creatures, stimulate imagination and inspire great fancy dresses.



Good example of creative offer – sightseeing of the Wiśnicz castle from a bats perspective thanks to VR technology.



The characteristic bat shape can be given to a variety of products - for example, home-made pastries.

SUMMARY

BASIC INFORMATION ABOUT THE PROJECT

Title	Protection of lesser horseshoe bat and other bat species in southern Poland (PODKOWIEC +)
Acronym	LIFE Podkowiec+
Duration	1.07.2013 – 30.06.2018
Range	Southern Poland, PODKOWIEC+ project was carried out within the borders of five voivodeships: Lower Silesia, Opole, Silesia, Lesser Poland and Podkarpackie. Within this region, areas in which lesser horseshoe bat occurs or are suitable for it were designated and were named The Lesser Horseshoe Bat's Land. Infrastructure activities were carried out in the Natura 2000 areas designated for the protection of bats. The activities covered several dozen sites of these mammals, in which there were problems threatening the existence or good condition of the local population.

FINANCING

Projects budget (Planned) 3 429 042 €
European Union through financial instruments of LIFE+, component LIFE+ Nature and Biodiversity – 50% of total projects budget;
National Fund for Environmental Protection and Water Management;
Road Materials Production Enterprise in Rzeszów Ltd.
The Polish Society of Wildlife Friends „pro Natura” own resources.

ACHIEVEMENTS

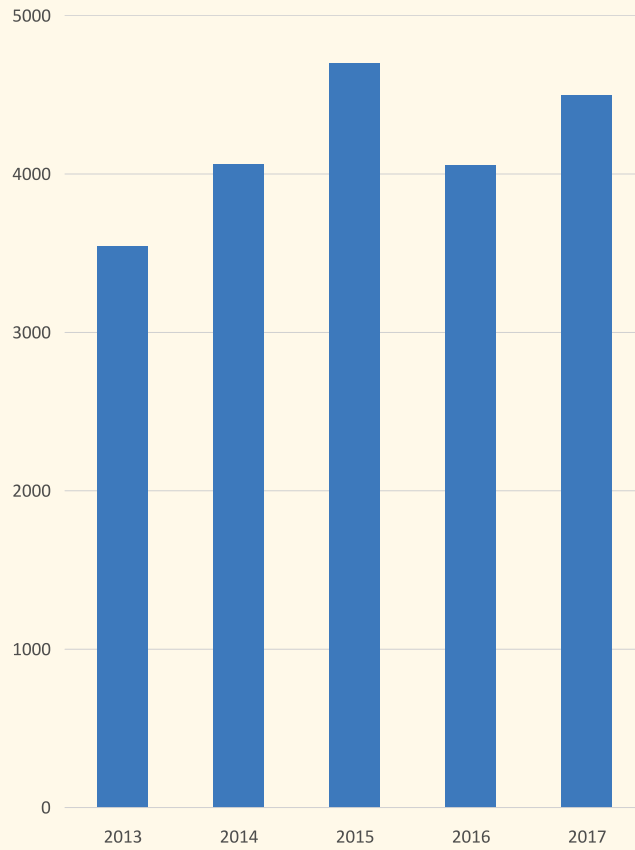
Nature effects

Preservation of summer roosts	Due to roof renovation carried out in 9 buildings, valuable bat sites were preserved. Six among them hosted breeding colonies of greater mouse-eared bats with a total estimated number of about 2100 females. Lesser horseshoe bats also utilized 6 roosts within renovated buildings with their total number estimated at around 260 adult individuals.
Platforms for guano	Special platforms for guano collection installed in 7 buildings helped in securing attics from degradation and therefore allowed continuity of bat's breeding colonies.
Adapting and enhancing roost spaces	Habitat conditions were improved in a total of 60 roosts. Hibernation sites were secured from unauthorised access (3 sites). Gaps in commuting corridors were supplemented around 38 roosts. The lighting of 19 summer roosts has been changed to be more favourable for bats.
Population size	During the project, there was an increase in the number of bats - the Lesser Horseshoe bat by 35%, and the greater mouse eared bat by 27%. The low number of known colonies of Geoffroy's bat makes it impossible to estimate changes in its numbers. The number of individuals and species of bats hibernating in the caves secured as a part of the project is increasing.

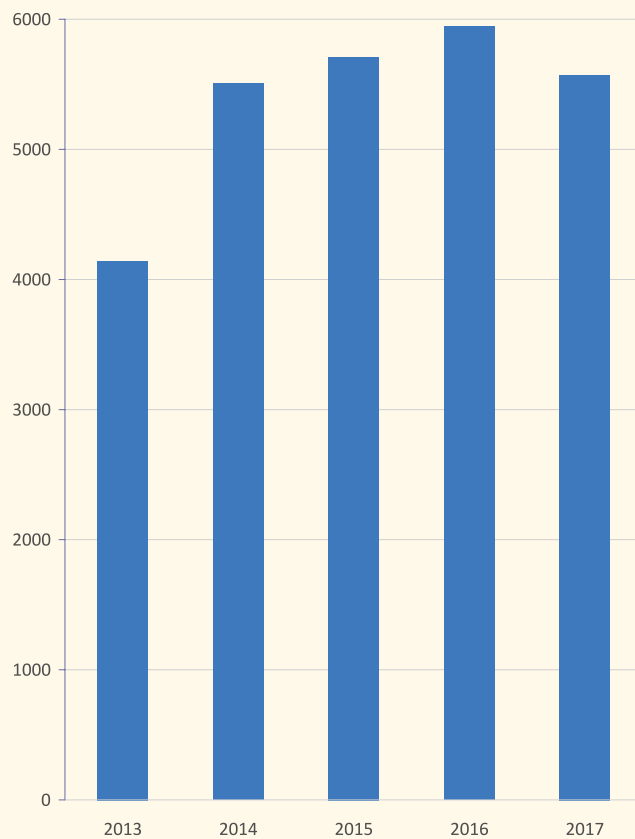
Socio-economics effects

Podkowiec + marked its presence in the media, at conferences, meetings and other events. Two episodes, devoted to the protection of the horseshoe bat were created in a series of documentary films. As a result of promotional activities, the attitude towards bats has improved. Independent initiatives related to the conservation of horseshoe bats were established. Sądeckie region Information Centre about the lesser horseshoe bat was created. The production of horseshoe bat mascots has begun. Three Regional Directorates for Environmental Protection have started projects, largely devoted to the protection of the lesser horseshoe bat. Dozens of tourist guides and local leaders have been trained to become ambassadors in the field of bat promotion. A system for distinguishing the most active people and institutions in bat's protection has been introduced. Dozens of people gained knowledge about bats and their protection as part of foreign exchange of experiences.

Greater mouse-eared bat *Myotis myotis*



Lesser horseshoe bat *Rhinolophus hipposideros*



The total bat population size in summer colonies of the lesser horseshoe bat and the greater mouse-eared bat in the project area, in 2013-2017.

Colonies discovered after 2013 and those for which comparable data from all years were not collected were excluded.



Kraina **Podkowca**

The Lesser Horseshoe Bat's Land is an area with most valuable lesser horseshoe bat sites.

The Lesser Horseshoe Bat's Land is a place where bats feel at home and people are kind to them. It is also a brand developed in the LIFE PODKOWIEC+ Project as a stimulating mechanism to act on behalf of these tiny mammals and us, both the inhabitants of this wonderful area.