

# RESEARCH AND CONSERVATION OF LARGE CARNIVORES IN CROATIA



Project report for 2017  
March 2018

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20<sup>th</sup> March 2018

Board of  
UK Wolf Conservation Trust

Project report for 2017

## RESEARCH AND CONSERVATION OF LARGE CARNIVORES IN CROATIA

### SUMMARY

This report describes activities related to wolf, lynx and bear research, conservation and management in Croatia in the previous 12 months. International activities (Turkey, Bosnia and Herzegovina, Montenegro, Macedonia, Albania, Romania, Poland, Austria, Italy, Slovenia, Spain, and Ecuador) are described and illustrated here too. In most cases of international engagement, project researchers were invited to speak and teach about their work on large carnivores in Croatia: monitoring system, emergency teams, trapping methods, health survey, while Josip Kusak spent two months on a LC research project in Turkey.

In Croatia, considerable efforts were invested to capture and collar new bears, wolves and lynx resulting in the **capture and collaring of two bears, two wolves and three lynx**. Supported with other data obtained by different means, the evidence of wolf population stagnation at the level same as during the last year was documented in Croatia. This finding lead to the important management decision not to allow any hunting quota for wolves this year again.

The use of trap cameras is continuing to be important and demanding task since data processing is always time consuming. Here we present summary data on lynx counting in Plitvice lakes NP during 2017.

Three contracts for the research of large carnivores (one for each species of LC) in the Plitvice Lakes NP (PLNP) provided six GPS collars (two for each species of LC) for telemetry tracking, free accommodation for field work and the opportunity to accept more students for field work participation and teaching during 2017.

## **Progress report**

This yearly report is for the period from 01 March 2017 to 15 February 2018 (351 day), when we collected 149.72 work days.

We continued with efforts of capturing and radio-tracking of wolves, bears and lynx, collection and examination of dead carnivores, as well as direct application of our study results in management and protection. This year we were involved in training of students, researchers and large carnivore management professionals from Italy, Germany, Portugal, United Kingdom, Bosnia & Herzegovina and Bulgaria. Researchers from the project were invited to present project results in Montenegro, Macedonia, Poland, Austria, Italy, Poland, Romania, Spain, Slovenia, Bosnia and Herzegovina, Albania, Ecuador and Romania and participated in research project in Turkey.

### **Work overview**

In the period from 01 March 2017 to 15 February 2018 (351 day) project researchers, spent a total of 149 (42.7% of time) work/days doing field work, checking cases of wolf mortality, performing necropsies of dead wolves, participating on workshops and meetings related to research and conservation of wolves and lynx in Croatia and other countries.

Đuro Huber and Josip Kusak continued to help in research and monitoring of large carnivores in other countries. Đuro Huber visited and provided consultations in 9 different countries. Josip Kusak worked on a large carnivore's research project in eastern Turkey (Kars region) during two periods (from 15.05.2017 to 05.07.2017, 51 day and from 10.07.2017 to 26.07.2017 (16 days).

Our LC project continues to attract young people from Croatia and around the world and continue to serve as training polygon for wolf-lynx-bear researchers, conservationists and educators. During 2017, our project accepted eight foreign students/researchers/conservationists to work and to learn about LC research and conservation, within various frames of engagement in the lab, in the field or both.



Daniele De Angelis, a graduated MS student from the University of Rome, spend two weeks on the project during spring 2017. He got the scholarship for PhD project on bear movements in Croatia and Italy and is intensively working on it. His PhD thesis is based on the merged data from bear telemetry tracking in Italy and in Croatia and his two co-mentors are Paolo Ciucci and Josip Kusak.



Tomas Meijer is a graduate student at the University of Amsterdam - at which he studies the master track Ecology & Evolution. He stayed from 01.09.2016 until 30.04.2017. The purpose of his stay is a research project (internship) to build up some practical experience and broaden knowledge. He came specifically to learn more about large carnivores and large carnivore studies, which are very rare/limited in the Netherlands. He also thinks that going abroad is a very useful experience as a person to learn more about himself because it is often more challenging than staying at home, so it is not just purely educational motives!



Pavao Kusak, a graduate student of Environmental sciences from the Faculty of Sciences Zagreb, participated during the field work in the period from 23.08.2017 to 27.08.21017 and helped in processing of data from automatic cameras.



**Joana Pereira**, Master of Science in biology, is completing her internship at the Biology Department of the Faculty of Veterinary Medicine of the University of Zagreb from February to December 2017. She participated in all ongoing laboratory and field team activities. That included trapping large carnivores, telemetry tracking, sampling dead animals and preparing the samples for further analyses. Her exclusive task was the analyses of many years (since 1981) of field notes bear trapping in Croatia: i.e. the efficiency of various

types of setting traps, selecting sites and baits. Her second exclusive task was the analyses of bear diet based on survey of stomach contents of dead bears.



Sarah V. Wallworth spent the months of April and May 2017 on the grant of the Institute of Zoology, Zoological Society of London (UK), with our Large carnivore team. She prepared her diploma thesis: "The effects of supplementary feeding on the body mass and population demographics of the Eurasian brown bear (*Ursus arctos arctos*) in Croatia and Italy" and later successfully defended it at the Royal Veterinary College, University of London, UK.



Michael Schutle, who did his MS thesis on feeding ecology of Eurasian lynx in the Harz Mountains, Germany earned his MS thesis at the University Bielefeld University, Faculty of Biology, to become Master of Science Fundamental and Applied Ecology. His particular interest are large carnivores. He spent 10.5 and 13.4 days of the field work on the project and showed the interest to come again to work and learn on the project on a voluntary basis.



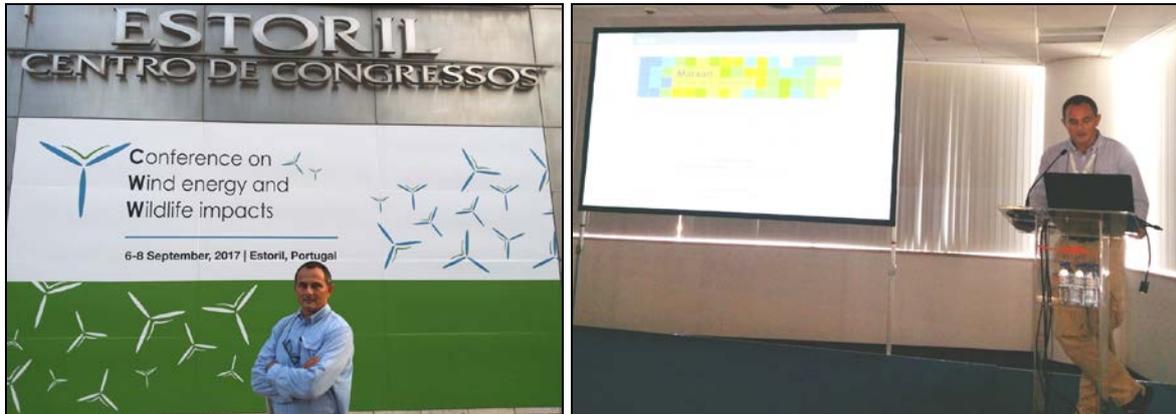
Vladimir Todorov, a PhD student from Bulgaria and from Balkani Wildlife Society, is finishing his thesis on bears at Bulgarian Academy of Sciences. His interest was to widen his knowledge of large carnivore's research. He stayed during the 10.8 days of field work in the period from 11.10.2017 to 25.10.2017.

Igor Trbojević (a researcher from the University of Banja Luka, B&H) and his wife Tijana Trbojević, a PhD student of ecology at the University of Banja Luka - B&H visited our project during the field work in Plitvice lakes NP to get the basic information on some aspects of the field work on the lynx ecological studies.



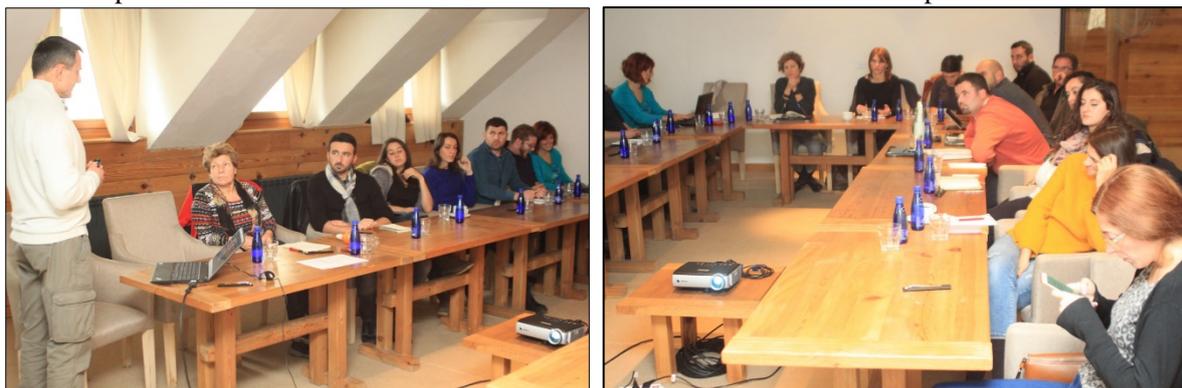
*Figure 1: Igor Trbojević and Tijana Trbojević from B&H visited the project for two days (23.09.2017 – 24.09.2017) to get the basic information on lynx capturing.*

In the period from 06.09.2017 to 08.09.2017. Josip Kusak participated on the International Conference on Wind Energy and Wildlife impacts in Estoril, Portugal. Josip presented two oral presentations.



*Figure 2 and Figure 3: Josip Kusak participated, with two oral presentations, on the International Conference on Wind Energy and Wildlife impacts in Estoril, Portugal in the period from 06.09.2017 to 08.09.2017.*

Josip Kusak was invited by “Green Home” NGO from Montenegro to give one day workshop on research and conservation of large carnivores to representatives of 12 conservation oriented NGOs. from Albania, Bosnia & Herzegovina, Croatia, Kosovo, Macedonia, Montenegro and Serbia. Present was 20 representatives from 12 NGOs and from seven countries on a workshop held on 17.11.2017.



*Figure 4 and Figure 5: Josip Kusak gave a one-day-workshop about LC research and conservation to representatives of NGOs from Albania, Bosnia & Herzegovina, Croatia, Kosovo, Macedonia, Montenegro and Serbia. Workshop was held in Kolašin (Montenegro) and present was 20 representatives from 12 NGOs on a workshop held on 17.11.2017.*

Josip Kusak worked on a large carnivore’s research project in eastern Turkey (Kars region) during two periods (from 15.05.2017 to 05.07.2017, 51 day and from 10.07.2017 to 26.07.2017 (16 days), helping the continuation of the project which runs for seven years now and has produced seven scientific papers on large carnivores and numerous media and online contributions about large carnivore’s, including three documentaries (Turkish national TV, National Geographic and BBC productions). The achievements of the project are the main driving forces for the establishing of the first wildlife corridor in Turkey.



*Figure 6: Josip Kusak, Emrah Coban and two volunteers/students at the tranquilized bear in Sarikamis forest, eastern Turkey on 06.06.2017.*



*Figure 7: Josip Kusak and two Turkish volunteers at the captured and collared wolf in Sarikamis forest on 02.07.2017.*



*Figure 8: Josip Kusak, researchers, volunteers and students at the captured and collared lynx in Sarikamis forest (Turkey) on 20.06.2017.*



*Figure 9: Đuro Huber and Slaven Reljić at opening of (one of five) “info point” in hotel “Jezero” in Plitvice Lakes NP on 19.09.2017.*



*Figure 10: and Figure 11: Mapping bear range at bear management workshop in Bosiljevo on 25.04.2017.*



*Figure 12: Slaven Reljić and Marina Habazin setting trap camera on bear trail in Malo duboko in Gorski kotar on 20.06.2017.*



*Figure 13: Slaven Reljić sampling wolfscat in Gorski kotar for genetic counting (400 collected) on 28.02.2017*



*Figure 14: Slaven Reljić taking samples of a hunted bear in Gorski kotar on 28.02.2017.*



*Figure 15: Tomas Meier taking soil sample at the bear feeding site for parasitological analyses on 28.02.2017.*

## FIELD WORK

Josip Kusak and Michael Schulte have spent independently a total of 149.72 days doing the field work. Slaven Reljić, PhD student and veterinarian, who have been primary, contracted to work on bear part of our projects, spent 0.42 days, helping on the wolf and lynx work, while Đuro Huber spent 0.12 days on the field part of the project work when Josip Kusak was present.

*Table 1: Summary table of work activities on the project in the period from 01 March 2017 to 15 February 2018 (351 day), when we collected 149.72 work days.*

ACTIVITY OBJECTIVE	N ACTIVITIES	N DAYS
Animal handling	2	2.74
LC comity meeting	1	0.13
Telemetry	4	20.05
Trapping	8	124.13
Workshop	1	2.67
	16	149.72

Note: It is not entirely possible to accurately count all activities because often 2-3 or more things were done at once (Like: trapping and telemetry, collecting dead wolves, checking wildlife crossings places and telemetry during the same trip).

*Table 2: Detailed table of work activities related to wolf and lynx work on the project in the period from 01 March 2017 to 15 February 2018 (351 day), when we collected 149.72 work days. Activities marked with green were funded by UKWCT (74.74 days or 49.9% of field time).*

#	ACTIVITY N	ACTIVITY OBJECTIVE	START	END	N DAYS
1	625	Trapping	21.03.2017 08:00	22.03.2017 16:00	1.33
2	626	Telemetry	01.04.2017 07:00	02.04.2017 19:45	1.53
3	627	Telemetry	29.04.2017 08:00	01.05.2017 21:30	2.56
4	628	Trapping	15.05.2017 09:30	05.07.2017 11:12	51.07
5	628	Trapping	10.07.2017 09:15	26.07.2017 09:15	16.00
6	629	LC comity meeting	05.07.2017 09:00	05.07.2017 12:00	0.13
7	631	Trapping	23.08.2017 08:00	01.09.2017 20:30	9.52
8	632	Trapping	13.09.2017 07:30	27.09.2017 17:09	14.40
9	633	Trapping	28.09.2017 08:00	12.10.2017 14:08	14.26
10	634	Trapping	14.10.2017 06:00	20.10.2017 18:30	6.52
11	635	Trapping	21.10.2017 06:30	31.10.2017 18:00	10.48
12	636	Trapping	05.11.2017 03:45	05.11.2017 17:00	0.55
13	637	Workshop	16.11.2017 07:00	18.11.2017 23:00	2.67
14	638	Telemetry	28.12.2017 07:31	30.12.2017 20:30	2.54
15	639	Telemetry	29.12.2017 21:00	12.01.2018 07:00	13.42
16	641	Animal handling	26.01.2018 06:45	27.01.2018 19:15	1.52
17	642	Animal handling	15.02.2018 11:45	16.02.2018 17:00	1.22
	TOTAL				149.72

*Table 3: List of persons participating on the project on the days of Josip Kusak actions in the period from 01 March 2017 to 15 February 2018 (351 day), when we collected 149.72 work days. During this time a total of 27 different persons participated in project activities, resulting in 321.68 person/days.*

#	PERSON	N ACTIVITIES	N DAYS
1	Breitsprecher, Laura	1	13.42
2	Coban Emrah	2	67.07
3	Domazetović, Zrinka	1	0.13
4	Držić, Fran	1	0.39
5	Gašparac, Miljenko	1	0.17
6	Gugić, Goran	1	0.35
7	Gužvica, Goran	1	0.13
8	Hamidović, Daniela	1	0.13
9	Huber, Đuro	1	0.13
10	Jeremić, Jasna	2	0.43
11	Kusak, Josip	16	135.48
12	Kusak, Pavao	2	6.79
13	Kusak, Tanja	5	7.88
14	Matovina, Ivica	7	44.56
15	Modrić, Marko	2	1.47
16	Pereira, Joana	1	1.53
17	Reljić, Slaven	2	0.43
18	Schulte, Michael	3	23.88
19	Slijepčević, Vedran	1	0.39
20	Šišić, Sonja	1	0.17
21	Štefan, Andrea	1	0.35
22	Štrbenac, Ana	1	0.13
23	Todorov, Vladimir	3	10.78
24	Trbojević, Igor	1	1.42
25	Trbojević, Tijana	1	1.42
26	Urli, Lucija	1	0.13
27	Vugrinec, Ines	1	2.56
TOTAL PERSON/DAYS		61	321.72

During 2017, wolf and lynx work was done in Plitvice Lakes National Park and in Gorski kotar. It consisted of winter snow-tracking of wolves and lynx and counting of wolves in packs in and around of PLNP area, searching for wolf signs, howling testing of tracked packs, searching for wolf dens and proofs of wolf reproduction. We did one aerial search for one dropped lynx collar this year too. We used automatic camera to check for the presence of wolves in the area and to document all other facts, like reproduction, presence of other wild animals, primary lynx.

### **Searches for signs of wolf and lynx presence**

During 2017, searching for signs of wolf presence was done inside Plitvice Lakes NP. The search for the presence of wolves was done during the winter spring, summer and autumn, for wolf tracks in three packs in and around PLNP. The size of searched area was 603.6 km<sup>2</sup>, or almost twice the size of PLNP. However, very few signs of wolves were found during 2017, similar to the previous years.

Signs of wolf presence (footprints, scats, howling, and scratch markings) were found on 11 occasions only, while two lynx signs were found during the same period. For the second year in a row, we did not find evidence of wolf reproduction inside PLNP.

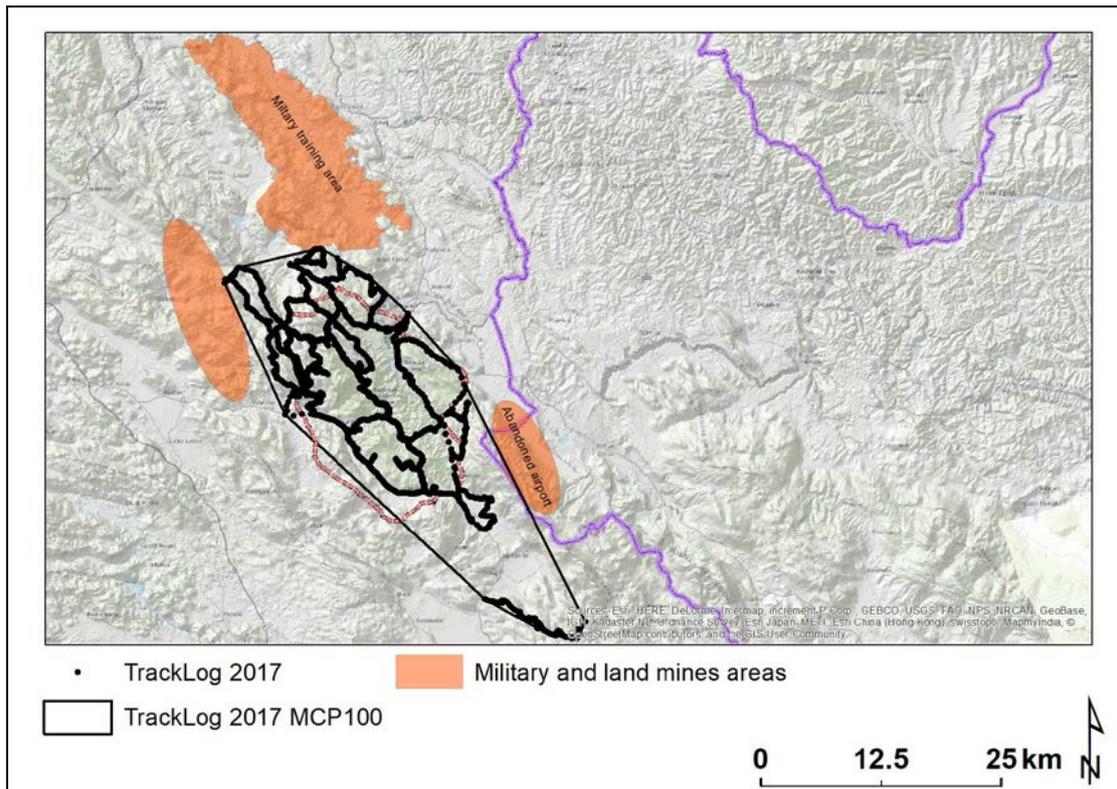


Figure 16: Map of area searched for signs of wolves and lynx during 2017. One military area and two areas (part of Mala Kapela mountain and Željava abandoned military airport) both with land mines, were inaccessible for sign searching.

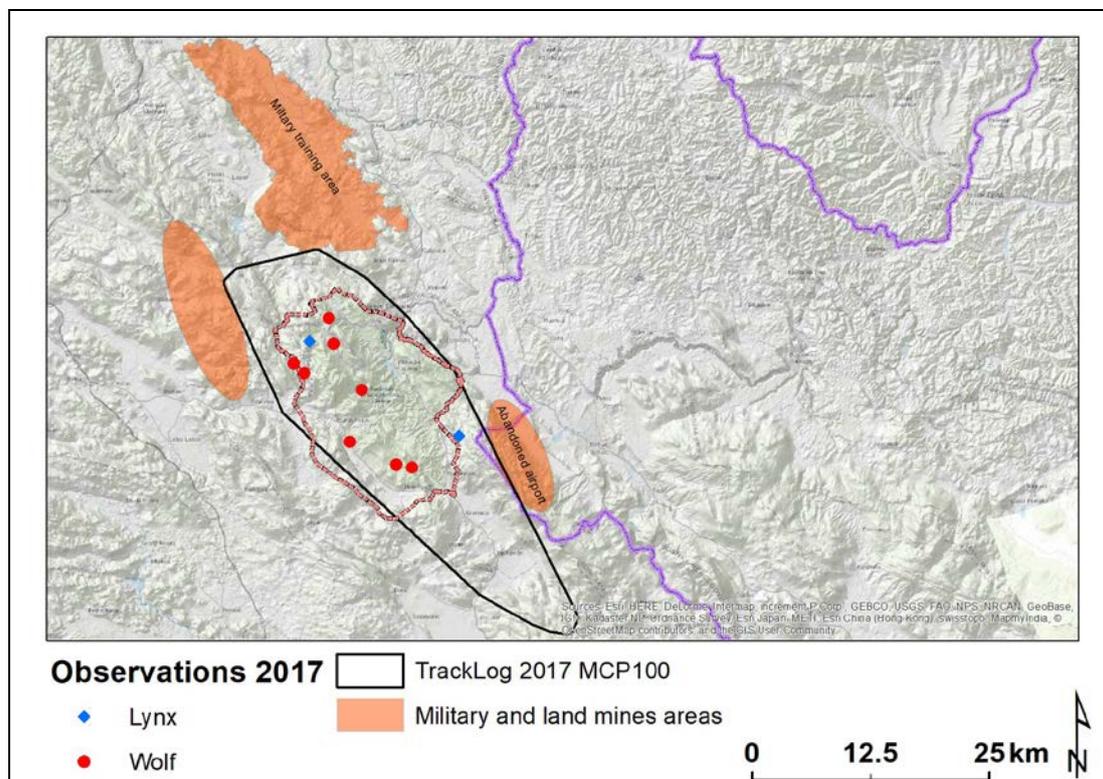


Figure 17: Signs of wolves ( $N=11$ ) and lynx ( $N=1$ ) were found in and around of PLNP during 2017.

We were searching for wolf signs only in area available for searching. Around PLNP, there are three areas inaccessible to people. North of PLNP is one large (same size as PLNP) military training ground with forbidden access, west of PLNP is the area of Mala Kapela mountain still inaccessible due to land mines. At the east of PLNP, at the very border with B&H, is another military facility (Željava abandoned airport of Yugoslav army), where the access is also forbidden because of land mines around the airport. In the same time, the study area has areas with intensive human use, which was already recorded during the previous years of the study. This includes permanent settlements, roads, logging areas and in particular touristic area around lakes, which receives about 1.4 million tourists yearly. We believe that wolf packs were using quiet areas (military and land mine areas) during 2017 most of the time. We have also documented (by automatic cameras) rather intensive human use of areas outside PLNP, where besides logging operations, other touristic activities occasionally happen.

Lynx signs were found on two occasions only in spite of rather intensive searching for lynx signs. Observations (reports) of jackal presence found in 2015 were not reconfirmed during 2017, except of a live capture of one jackal pup (shown later, under the captures section).

*Table 4: Summary data about signs of wolf and lynx recorded in the study areas during 2017 surveys.*

SIGN	SPECIES	N
Footprint	Lynx	1
Kill	Lynx	5
Scat	Wolf	21
Scratch mark	Wolf	4
Visual	Lynx	1
TOTAL		32

During the snow-tracking in winter 2017/2018, a minimal number of wolves in three packs from Plitvice area was determined. Mala kapela pack numbered 6-8 wolves, Plješevica pack 6 wolves and “Third” pack numbered a minimum of 4 wolves.



*Figure 18: Tracks of 4 wolves from Mala kapela pack observed by Michael Schulte on 23.12.2017*



*Figure 19: Tracks of 6 wolves from Plješevica pack observed by Michael Schulte on 05.01.2018.*

## Wolf trapping in Plitvice lakes National park (PLNP)

First traps were set on 29.08.2017 and activated on 14.09.2017. Traps were active during six periods lasting until 31.10.2017. This resulted in **47 days of the effort for capturing** and collaring of wolves in PLNP during 2017. During this period traps were set on 36 different sites, targeting all three packs previously recorded to use parts of PLNP area, but without recent signs of wolf presence in the same area.

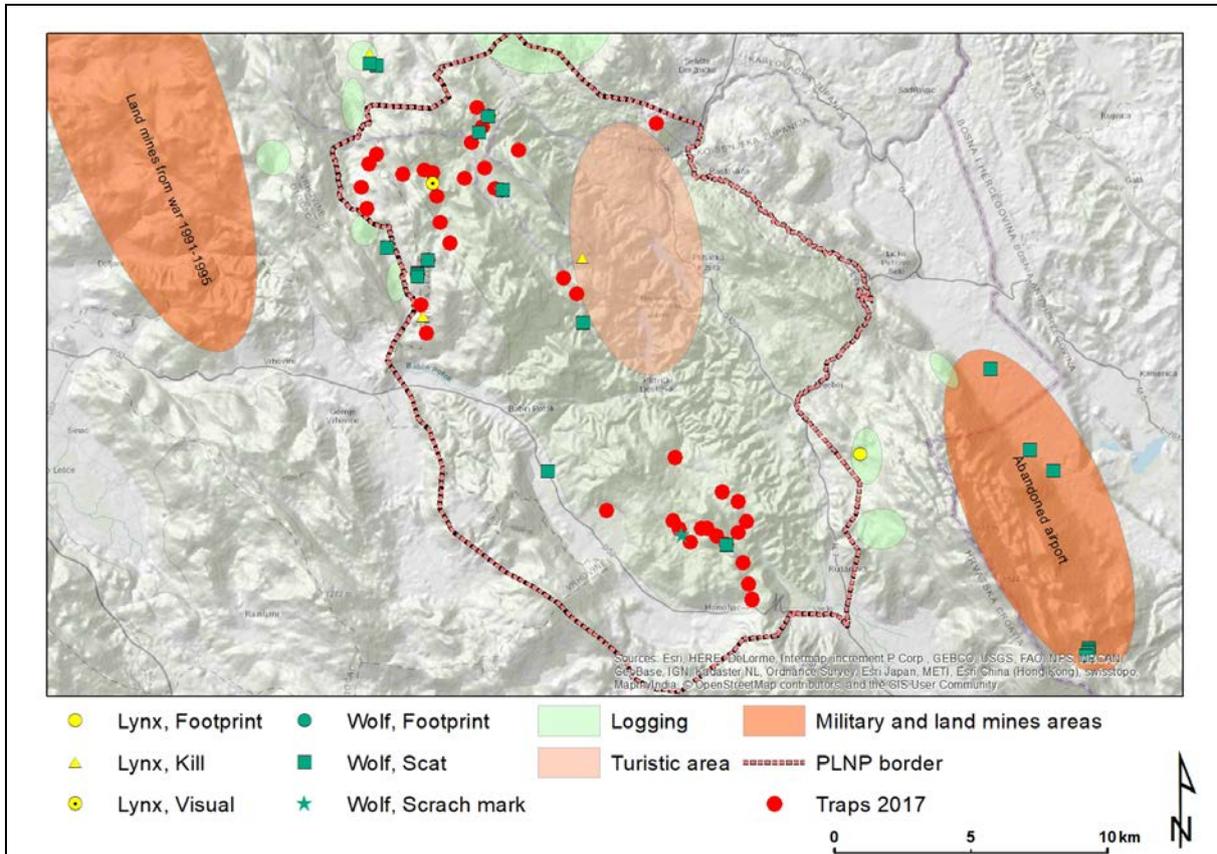


Figure 20: Observations of wolf and lynx signs and trap sites locations in PLNP during 2017.

The total daily driving for checking of all traps was 117 km. This included only trap-line checking, while signs searching, camera traps checking and radio-tracking required additional driving. In total, we invested **1280.6 trap-nights**. Traps were checked 1445 times. We experienced very low frequency of wolf visits to traps, only five times, but we managed to capture two wolves out of five visits. Beside two wolves, also **one lynx was captured in a wolf trap, one jackal, one bear, one badger** and three foxes. The most numerous visitors to traps were martens, which visited our traps on 30 occasions.

Table 5: List of events on traps during 2017 trapping season in Plitvice area, in the period from 14.09.2017 to 31.10.2017.

#	EVENT	N
1	badger capture	1
2	bear capture	1
3	bear pull out	1
4	bear visit	9
5	dog capture	2
6	fox capture	3

#	EVENT	N
7	fox pull out	1
8	jackal capture	1
9	lynx capture	1
10	marten visit	30
11	nothing	1378
12	unknown visit	7
13	wild boar visit	5
14	wolf capture	2
15	wolf pull out	2
16	wolf visit	1
TOTAL		1445

Three days after the activation of traps, a female wolf (age 2+ years, mass 32 kg) was captured in the territory of Plješevica pack. It was equipped with GPS-GS-VHF collar and named **W32-Lika**. Further tracking will tell if it is a member of a pack or a solitary disperser.



*Figure 21: W32-Lika, female wolf, age 2+ years, mass 32 kg was captured on 17.09.2017.*

Just before the end of trapping season, on 30.10.2017, a male wolf pup was captured, also on the territory of Plješevica pack. For this one was clear that it belonged to the Plješevica pack. It was fitted with GPS-GSM-VHF collar too and tracked since then.



*Figure 22: W33-Krešo, A male wolf, age 0.6 years, mass 23 kg was captured on 30.10.2017. It belonged to Plješevica pack.*

A surprise capture happened on 03.10.2017, when jackal pup of this year (mass 9 kg) was captured in a wolf trap! This was another confirmation of jackal presence in the Plitvice NP area.



*Figure 23: A male jackal, age 0.6 years, mass 9 kg was captured on 03.10.2017. It was too small to be equipped with a collar.*

An unwanted capture happened on 30.09.2017, when a female bear cub was found in a wolf trap. It was tranquilized, measured and sampled, but being too small (27 kg), was not collared.



Figure 24: Josip Kusak and Michael Schulte processing of a captured female bear cub (27 kg), on 30.09.2017.

### Lynx trapping in Gorski kotar

Lynx trapping with box traps at marking sites is less demanding than wolf trapping since box traps are set at marking sites with available GSM signal. We can use GSM trap alarms, but with periodical checking of traps, which is being done by National park rangers or local game wardens.

Lynx capture attempts were resumed in Gorski kotar area on 07.10.2017, when new collars dedicated to this area, became available. During the winter 2017-2018, **two lynx were collared in Gorski kotar**, but only one was captured in box trap.

The first lynx **L14-Martin**, was released from a temporary captivity. This lynx was found as a kitten, almost dead on the coastal side of Gorski kotar at the edge of lynx distribution. This happened in summer 2017. Lynx kitten of only 3.5 kg was brought to Zagreb ZOO and cared about by ZOO veterinarian and animal keepers until it recovered. It was then transferred to Risnjak NP, where an enclosure was made for it in the forest. Lynx was kept and fed there by Risnjak NP rangers, with the minimal interaction with people until it grew to 12 kg in size. It was equipped with GPS collar and released to nature on 26.01.2018. Public institution "Priroda", which is responsible for nature conservation in Primorsko-goranska county (Gorski kotar region and northern Adriatic with islands), donated one lynx collar, which was put on recovered lynx kitten. During the first two months after the release, L14-Martin survived and in spite of being fed by humans for almost half a year, has found a way to survive in nature. We documented at least one roe deer killed by Martin, while there might be more of kills.



*Figure 25: Processing of L14-Martin before releasing back to nature.*



*Figure 26: Representatives of institutions involved (ZG ZOO, Risnjak NP, Public institution "Priroda" and Veterinary faculty Zagreb) in the recovery and return back to nature of a male lynx kitten named L14-Martin.*

On 15.02.2018 10:52, an alarm SMS arrived a box trap in Gorski kotar. We were on stand-by for this and reacted swiftly. After two hours of walk through the deep snow, we arrived to the box trap and processed a captured lynx. It was an adult male, age 3+, mass 21 kg. It was named L6-Marko



*Figure 27: Vedran Slijepčević on the head of the file, walking toward a captured lynx on 15.02.2018.*



*Figure 28: Fran Držić (VEF student), Marko Modrić (Public institution "Priroda"), Josip Kusak (VEF) and Vedran Slijepčević (VUKA) at the captured and processed lynx L16-Marko on 15.02.2018.*

### **Lynx trapping in Plitvice lakes NP**

The use of camera traps and searches for lynx marking sites provided better information about lynx marking sites and traveling routes, and consequently we moved one of box traps to new locations inside PLNP during the autumn of 2017. Lynx box traps were activated in PLNP area on 22.10.2017. However, the first lynx collared in PLNP area during the 2017 season, was captured even before that date!



*Figure 29: Michael Schulte and Josip Kusak setting a box traps in the PLNP area on 01.10.2017 in PLNP area.*

The first lynx in PLNP area was captured **in a wolf trap** on 17.10.2017. It really was unexpected, but more than welcome capture! All went well, the lynx was darted, processed and fitted with a GPS-Iridium-VHF collar. Another peculiarity about this capture was that it was a lynx which we already had captured and tracked for a month during 2016, until its collar failed. It was L13-Stella, which now had 19 kg (17 kg at the first capture). Her previous collar malfunctioned (stopped sending data and stopped sending VHF signal), but the drop-off on the collar works, so it did not have malfunctioned collar on the neck when it was recaptured.



*Figure 30 and Figure 31: Lynx L13-Stella recaptured on 17.10.2017 during wolf trapping and in a wolf trap. It has lost its previous collar and it was fitted with a new one.*

On 05.11.2017 at 03:11, an alarm SMS informed us that a lynx was captured at Preka kosa site inside PLNP. It was a male lynx at age of 3+ years and mass of 22 kg. It was named L15-Ivica and released with GPS-GSM collar.



*Figure 32: Josip Kusak and Ivica Matovina processing of a male lynx L15-Ivica captured in PLNP on 05.11.2017.*



*Figure 33: L15-Ivica (male 3+ years, 22 kg) was fitted with GPS-GSM-VHF collar.*

## TELEMETRY TRACKING

### Wolf tracking

Two newly collared wolves were tracked since collaring. In the period from 18.09.2017 to 29.10.2017, a total of 167 location attempts were made, out of which 165 were successful.

W32-Lika was staying inside the territory of Plješevica pack, but was also moving toward the north-west, outside of the known territory of Plješevica pack, reaching the area of Mala kapela mine field. One howling attempt was without response, so it was not sure if W32-Lika was alone or with the pack. In the period from 18.09.2017 to 29.10.2017 (41 day), wolf W32.Lika was located 152 times. It was moving inside the territory of Plješevica pack and inside PLNP, but also outside of PLNP and outside of Plješevica pack territory. Unfortunately, the signal and the data of this wolf disappeared only 41 day after the collar deployment. The last location was in the managed forest and hunting area north-west of PLNP.

W33-Krešo was tracked from 30.10.2017 to 22.02.2018 (115 days) and a total of 1067 location were collected. Soon after the capture, W33-Krešo has moved outside of PLNP and out of Croatia, to neighboring B&H, straight to the abandoned area of military airport, which is also infested with land mines and inaccessible to humans. It stayed in the area most of the time, with occasional excursions along lower hills north-west of the “area of residency”. There are no proofs, but it is very likely that it has returned to the area where the pack was/is using during the last few years, since this wolf is still a pup which seeks the safety of his natal pack.

Two collared wolves have never been together during the tracking time, so it is very likely they are not belonging to the same pack, or W32-Lika could also be a lone disperser.

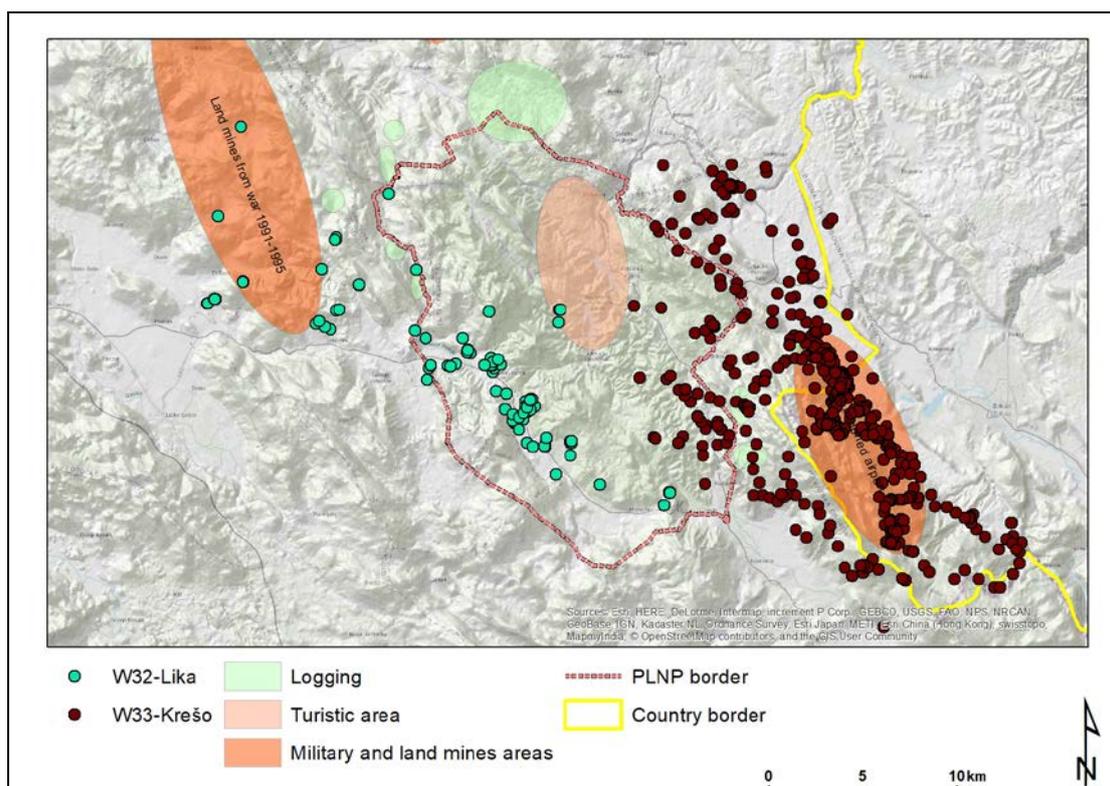


Figure 34: Locations of W32-Lika and W33-Krešo during the first few months of tracking. It is clear that two tracked wolves did not belong to the same pack, in spite that they were captured in the same area.

Too early disappearances of both collared wolves are unfortunate. Two possible scenarios exist, both collars failed to soon or wolves were illegally killed and a collars were destroyed. This will require further investigation.

## Lynx tracking

Since the collars of L12-Burni-ZIP, L11-Čorak and L13-Stella stopped functioning prematurely and animals “disappeared”, there was a need to search for them. Since the area to be searched was large (including whole Gorski kotar area and Plitvice area), the most efficient approach was to do aerial search. On 13.12.2016, a small cesna plane was fitted with two antennas and aerial search was started from the Grobnik small planes airport, near the Rijeka town.



Figure 35 and Figure 36: The preparation (Tomas Meijer and Josip Kusak) and execution of aerial search for three lost lynx collars on 13.12.2016.

The collar of L11-Čorak was found beeping on the recovery rhythm, while two other collars were not found by radio signal search. However, automatic camera photos revealed that L12-Burni-ZIP was wearing a collar during the winter 2016/2017. Same was with L13-Stella. The conclusion was that both animals were wearing non-functioning collars.

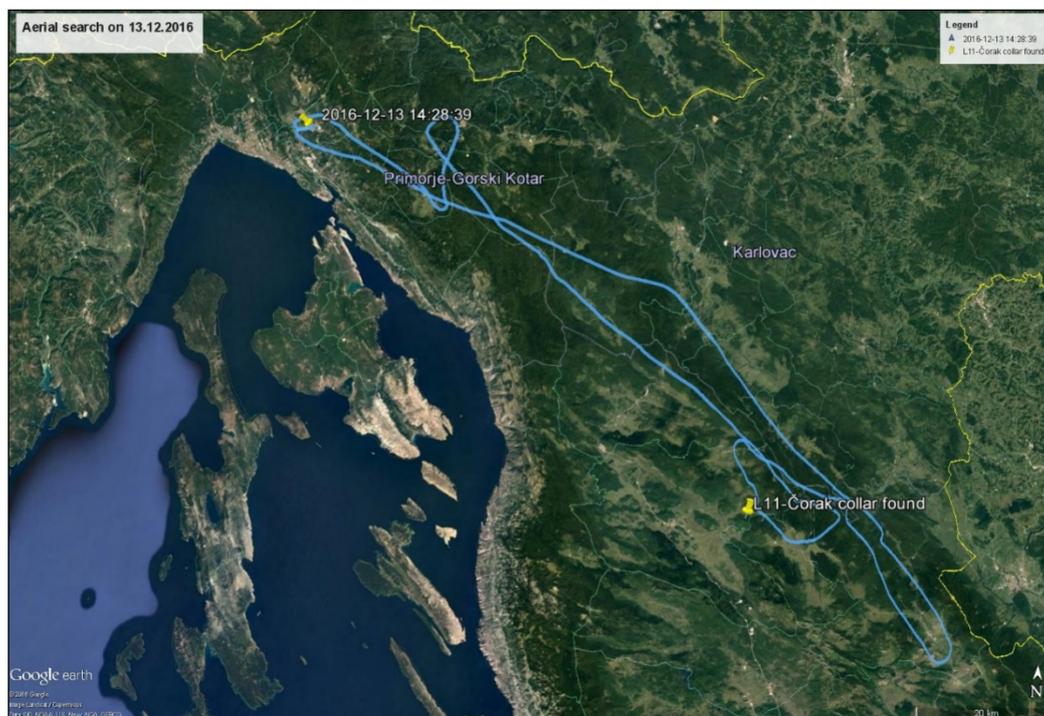


Figure 37: Track-log of aerial search done on 13.12.2016 on the area of Gorski kotar and Plitvice NP. One collar (of L11-Čorak) signal was found on the recovery rhythm, while two other lynx collars were not found.

The collar of L11-Čorak was taking fixes and sending data until 12.09.2016. We could not find the VHF signal of it until aerial search made on 13.12.2016, when the collar was found on recovery rhythm on the western edge of its so-far-known home range. The attempt for immediate search for this collar was not done because of uncertainty about the collar status; it could have been on the animal, while the possibility that it may have dropped from the lynx, was discarded as not very likely. The search for the collar was done as soon as the drop-off time expired, i.e. on 01.04.2017. The collar was found on the same place where detected from the air.



*Figure 38: The collar from L11-Čorak with drop off fired, found on 01.04.2017.*

This collar on L11-Burni-ZIP was sending data until 29.05.2016, Ground searches for VHF signal were done by Marko Modrić. He confirmed that the collar was on recovery rhythm during summer 2016, but the signal disappeared and could not be detected during aerial search on 13.12.2016. However, a confirmations that a lynx is alive and that it is wearing the collar came from automatic cameras and by live observation made by locals, who also photographed and recorded video of a lynx with a collar on three occasion during winter 2016/2017. L12-Burni ZIP behaved a bit strange, it allowed to be seen and easily photographed by people. We have three reports supported by photos and one observation by a reliable game warden (Mladen Švast) but without a photo taken, of a collared lynx in Gorski kotar area.

The collar on L13-Stella malfunctioned as well, data were coming by SMS only from 06.06.2016 to 02.07.2016 (26 days). The ground searches during summer 2016 confirmed that the collar 16891 switched to recovery rhythm. Later, during the autumn, the VHF signal could not be found. The VHF signal was not found also during aerial search on 13.12.2016, and not by ground searching later in spring 2017. The collar was on a lynx all the time until spring 2017, what was confirmed by a several photos of automatic cameras.



*Figure 39: Lynx L12-Burni-ZIP photographed with non-functioning collar in Gorski kotar during the winter 2016/2017.*



*Figure 40: Lynx L13- Stella photographed with non-functioning collar in Plitvice lakes NP during the spring 2017.*

All three collars failed far too early with the same symptoms; no data coming in, switching on recovery VHF signal, which lasted for a while. The exception was the collar on L11-Čorak, which dropped earlier than expected, but with recovery VHF signal lasting for a full year.

The loss of data due to malfunctioning technology is just one kind of loss – the direct one. When the failure happens, there are also indirect material losses followed by legal and ethical issues. I am going to elaborate them here:

1. The first is the cost of additional field time (food, accommodation) and driving or even renting a plane, when we have to search for collars which are not sending data and/or not emitting VHF signal or when we try to drop collars remotely (bear collars only).
2. The second cost (if we accept repaired or replacement collars) is in additional efforts to capture more animals, which cannot be planned in advance in the project budget.
3. There is the loss of time and shifting of the project schedule with the consequent failure to fulfill contracted obligations toward the other parties.
4. Then there are legal and ethical issues. We got the permit from the responsible ministries for capturing and collaring only a certain number of animals. If we have to ask for permits for additional captures, we may not get the permit.

We were luckier with lynx collars during 2017. Out of four collars deployed on lynx during 2017 and the beginning of 2018, three were still functioning at the time of writing this report.

The tracking of L13-Stella was resumed after her recapture, but her second collar stopped sending data only 29 days after the deployment. With the use of both collars of Stella, we collected 195 locations. During the tracking time L13-Stella was staying most of the time inside of PLNP, with short excursions outside of PLNP, toward north-west.

A total of 141 location attempts (133 successful) were collected for L15-Ivica in the period from 05.11.2017 to 18.13.2018 (133 days). It moved farther outside of PLNP toward Mala kapela land mines area and inside military training area, north of PLNP.

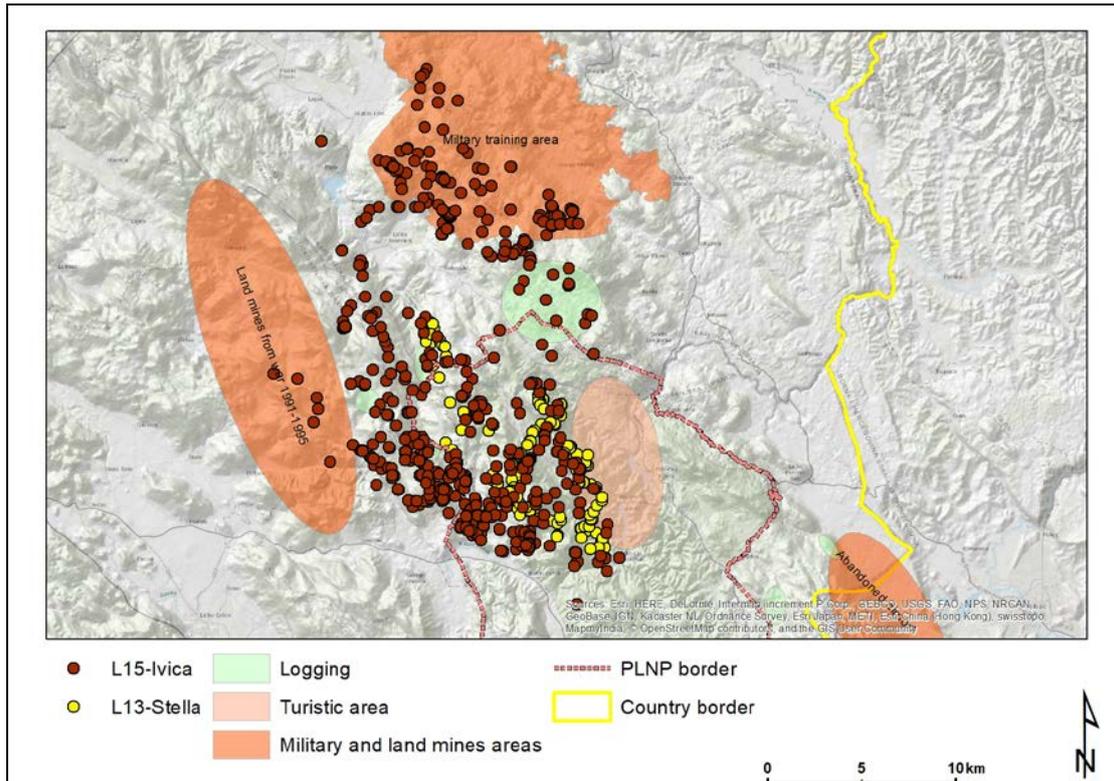


Figure 41: Locations of L13-Stella and L15-Ivica during the first few months of tracking.

Two lynx tracked since the beginning of 2018 in Gorski kotar area, were both sending data at the time of writing this report.

L14-Martin, a lynx kitten which was rescued, rehabilitated and released back to nature on 27.01.2018, has spent 51 day in nature. Until 19.03.2017, a total of 293 locations were collected. It has gradually increased the area which it uses. Deep snow, which has fallen just after his release, is helping him in in hunting prey, even including roe deer!

L16-Marko is tracked since 16.02.2018 and until 17.03.2018 (29 days), a total of 141 location was collected. Being an adult male during the mating season, it has covered an area of 72 km<sup>2</sup>.

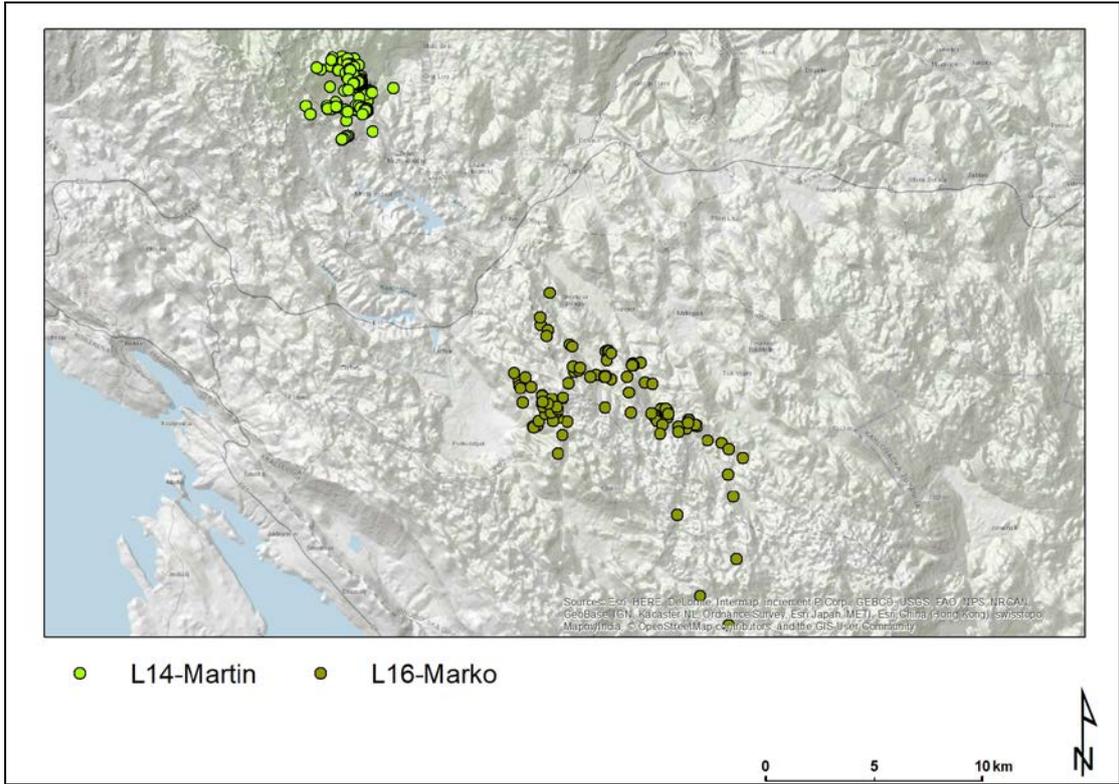


Figure 42: Locations of L14-Martin and L16-Marko during the first few months of tracking.

## FIELD WORK ON BEARS

### 2. Plitvice Lakes National Park

#### Bear trapping in Plitvice lakes National park (PLNP)

In 2017 traps were set on 02 May 2017 and ended on 21 May 2017. In the total of 14 different nights the traps were active for 52 site/nights and 208/trap nights, and resulted in two bear captures. So, two bears have been captured and collared with GPS devices in the Plitvice Lakes National Park in 2017.

*Table 6: Trapping sites used in PLNP for bear capturing in 2017.*

N	NAME	DATE SET	DATE REMOVED	N	E	BAIT RENEWED (WILD BOAR, ROE DEER)	TRAPS SPRUNG/ BEAR CAPTURES
1	Ječmište 1	02.05.2017.	21.05.2017.	5109079	55175905	¼ 3x roe deer	1/1
2	Ječmište 2	02.05.2017.	21.05.2017.	4977432	5545898	¼ 3x roe deer	1/1
3	Babin potok	03.05.2017.	21.05.2017.	4968393	5543305	¼ 2x roe deer	0/0
4	Končarev kraj	03.05.2017.	21.05.2017.	4964907	5544251	¼ 2x roe deer	4/0
	TOTAL					8	6/2

\*corn was checked daily and was added whenever more than half of the present amount has been eaten.



*Figure 43, Figure 44 and Figure 45: Setting bear traps in PLNP, Placing the trap alarm high on the tree and delivering bait (quarters of road killed roe deer) to the trap sites.*

**The bear Željko (B54), male, 210 kg, was captured on 04 May 2017.**



*Figure 46 and Figure 47: Handling of bear B54 (Željko) in Plitvice Lakes National Park on 04 May 2017.*

**The bear Marina (B55), female, 86 kg, was captured on 07 May 2017.**



*Figure 48 and Figure 49: Handling of bear B55 (Marina) in Plitvice Lakes National Park on 07 May 2017.*

### **Bear telemetry tracking in Plitvice lakes National park (PLNP)**

**The bear Lana (B48), female, 80 kg, was captured on 12 October 2015.** Till now she is tracked for 774 days, and out of 8661 attempts was successfully relocated 5388 times. Most of the time was within the PLNP borders till the summer 2017 but then she went far south! The straight line distance from the northern edge of her range till the new southern locations was about 66 km. However in the late fall 2017 she went back north and the latest locations were about 6 km south of the Park. We believe she might make a den in this area and also might have a litter this winter again. The total range she covered so far increased a lot this year and so far is 537.1 km<sup>2</sup> (MCP).

The den where Lana spent the previous winter was found and measured. The signs at the den site indicate that she was accompanied with a litter of yearling cubs.



*Figure 50 and Figure 51: The den where the bear Lana (B48) spent the winter 2016/17.*

**The bear Daniel (B52)**, male, 189 kg, was captured on 16 May 2016. It stopped sending GPS locations on 23 March 2017. We located and measured the den he used in winter 1016/17. No VHF signals has been detected even with the aerial survey.



*Figure 52 and Figure 53: B52 Daniel den found and measured on 07 April 2017 on Preka kosa in PLNP.*

**The bear Željko (B54)**, male, 210 kg, was captured on 04 May 2017. It was tracked for 209 days so far and 5101 GPS fix attempts was made, 4776 successful. The range used so far is 410.4 km<sup>2</sup>. More than half of his range was north of the PLNP up to 15 km out of its border,

**The bear Marina (B55)**, female 86 kg, was collared on 07.05.2017. It was tracked for 201 day so far and 4509 GPS fix attempts was made, with 4093 locations made. She used the range of 175.5 km what included one travel south of park of over 10 km in length.

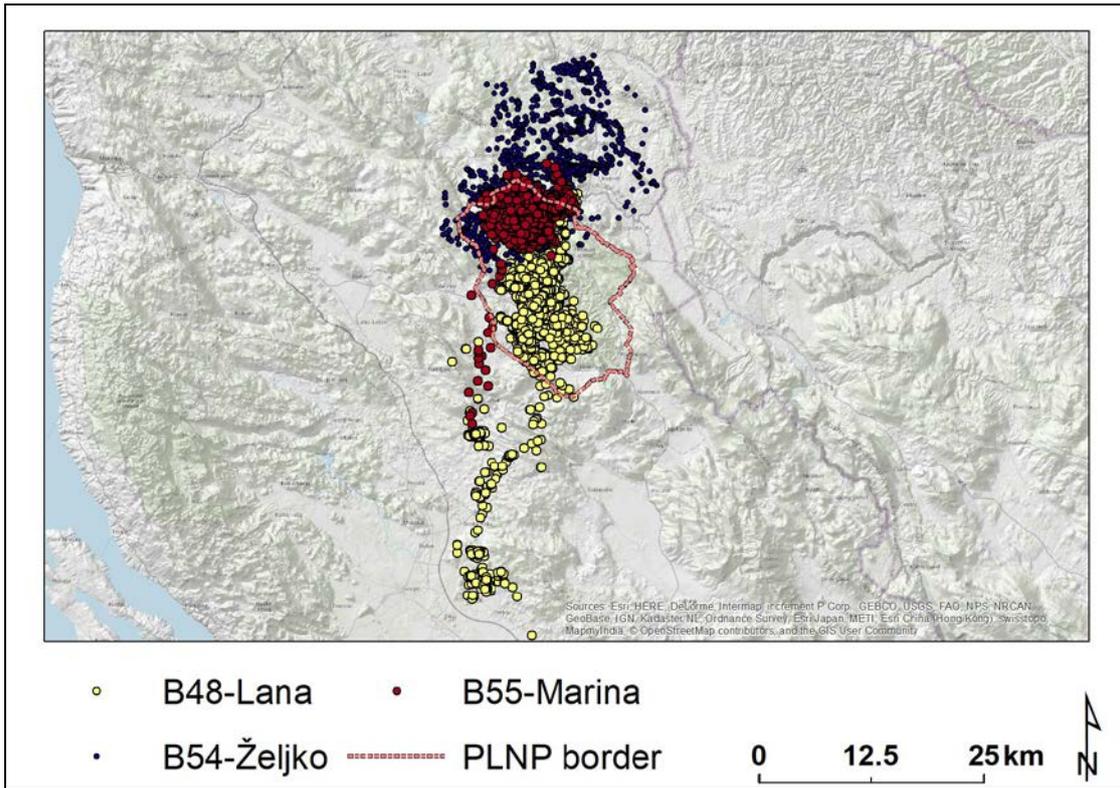


Figure 54: Locations of B48-Lana till 24 November 2014, then locations of B54-Željko until 29.11.2017 and B55-Marina until 25.11.2017.

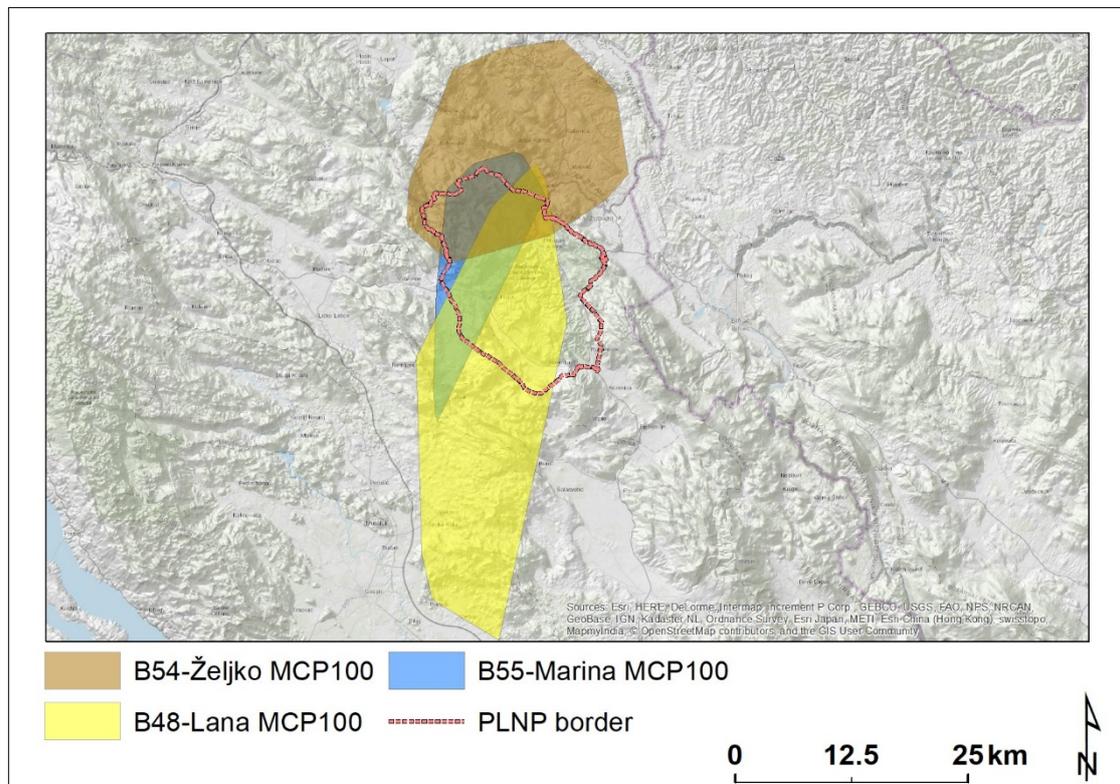


Figure 55: ranges of B48-Lana till 24 November 2014, then locations of B54-Željko until 29.11.2017 and B55-Marina until 25.11.2017.

### 3. The work with bears in the LIFE DINALP BEAR project (Gorski kotar)

#### 3.1. Capturing, marking and tracking the bears

No new bears were captured and collared in Gorski kotar in 2017.

The trapping efforts were done on 5 locations in the period from 22 May till 03 July 2017 (541 days) with no bear capture. The efforts will be resumed in spring 2018.

#### 3.2. Collecting samples from dead bears and some results

We continued to take samples and measurements from each dead bear samples in Croatia since 2005. Within this LIFE project on the top of standard samples (muscle tissue for DNA and premolar teeth for aging, as well as fat tissue, kidney, liver and hair) we are collecting many more samples off almost all dead bears.

In Croatia we collected and examined samples of 258 dead bears since the LIFE DINALP BEAR project started. Tissue samples were collected from bears during the regular annual harvest and bears that were dead from other causes (traffic, interventions). Our objective was to acquire the knowledge about the health and reproductive status of free-ranging bears. We performed 258 necropsies and collected samples were distributed to different laboratories at Faculty of Veterinary Medicine and to external laboratories.

At Croatian Veterinary Institute parasitological analyses were performed in faecal samples, gallbladders, muscle and liver tissues and intestines for 258 sampled bears. In total we recovered 8 species of bear internal parasites (*Trichinella* sp., *Baylisascaris transfuga*, *Taenia* sp., *Dicrocoelium dendriticum*, *Giardia* sp., *Eimeria* sp., *Moniezia* sp., and *Nematodirus* sp.), and 2 species of external parasites (*Dermacentor* sp.). Preliminary results of *Dicrocoelium* research will be presented as a poster at 25<sup>th</sup> IBA conference in Quito, Ecuador from November 11-17, 2017.

In Virology Laboratory of Faculty of Veterinary Medicine until now different samples of 217 brown bears have been received. All together 120 brain samples, 205 lung, 202 spleen, 191 liver, 201 kidney, 185 faeces, 126 blood and 166 lymph node samples. All faecal samples are tested for the presence of adenoviruses, alphacoronaviruses, canine parvovirus 2 and canine distemper virus using PCR protocols. Obtained viral genomes are in process of sequencing at the moment along with preparation of DNA and RNA isolates from lung tissues. Serological testing of blood samples is ongoing.

At Mycology Laboratory of the Faculty of Veterinary Medicine, 80 *Malassezia pachydermatis* isolates from the left and right ear and anus were obtained from 69 bears. Swabs were plated on modified Dixon media or Sabouraud culture media. Grown colonies were examined macroscopically; smears were stained by Diff Quick staining and examined under 1,000 x magnifications looking for typical bottle-shape yeast cells. The manuscript about the phylogenetic characterization of this yeast is in preparation and expected to be sent for the publication soon.

Ninety six (96) kidney samples and 38 blood samples were serologically tested for presence of *Leptospira* genus. In two (2) blood samples presence of *Leptospira interrogans* serovar *sejroe* (1:200) and *saxkoebing* (1:400), and serovar *grippotyphosa* (1:50) were detected, respectively. Tests were performed at The *Leptospira* Laboratory at the Faculty of Veterinary Medicine.

Testes of 158 males and ovaries and uteri from 87 female bears were collected and macroscopically measured and examined. According to macroscopic findings, reproductive history was established (testicular size, mass and dimensions comparable with body size and mass of male, cyclicity according to ovarian status, placental scars as evidence of pregnancy and number of cubs in current and last year, corpus luteum as evidence of mating etc.) After macroscopic examination they were stored in 10% formalin and sent to histological examination. Histological examinations of testicles from 54 males were performed and preparation of histological slides and examination of the rest of the samples are in progress.

Preliminary results showed that testicles of male bears start to be active in their third year of life.

The subcutaneous adipose tissue was analyzed for lipid composition, variations in the composition of fatty substances with regard to gender, season and body mass on 76 tissue samples. Research was published in “Physiological and Biochemical Zoology” in 2017. For evaluation of human-bear relations using *trans* fatty acids, study was conducted on 37 subcutaneous adipose tissue samples. For fatty acid composition of erythrocyte membranes and the level of erythrocytes’ antioxidant protection evaluation, preliminary study was conducted on 10 blood samples. Results of both studies were presented on 24<sup>th</sup> International conference on bear research and management in 2016 in Anchorage, Alaska. For evaluation of hematological and biochemical indicators, study was conducted on 8 blood samples and results were presented on international congress Veterinary Science and Profession in 2017, Zagreb, Croatia. More extensive research using *trans*-fatty acids determined in 103 subcutaneous adipose tissue samples has been carried out and results are accepted for presentation on 25<sup>th</sup> International Conference on Bear Research and Management in Quito, Ecuador, 2017. Another preliminary study was conducted for assessing of physiological and immunological state using determination of fatty acids in serum whose results are also accepted for presentation in Quito conference.

Activity concentrations (AC) of <sup>137</sup>Cs and <sup>134</sup>Cs were determined in analyzed tissues (muscle, kidney, liver, heart muscle, lungs, and spleen) collected from brown bears during 2014, 2015 and 2016. Analyzed tissues were from 41 brown bears. Further analyses are ongoing. An estimation of annual effective dose (AED) incurred by game meat consumption, including meat and entrails ingestion was made for an adult person in Croatia with an conservative assumption that all ingested game meat and entrails originated from bear. AED for intake of <sup>137</sup>Cs caused by consumption of bear meat was assessed to be 38 nSv and for entrails 31 nSv. For intake of <sup>134</sup>Cs doses were estimated to be 0.5 nSv for meat and 1.6 nSv for entrails. In addition to dose assessment for critical population (hunters and their family) (AED for intake of <sup>137</sup>Cs caused by consumption of bear meat was assessed to be 5,1 μSv and for intake of <sup>134</sup>Cs 0,1 μSv) this investigation will contribute to better understanding of effects induced by chronic exposure to small dose rates of ionising radiation in bears. The results were presented orally at 11th Symposium of the Croatian Radiation Protection Association, held in Osijek, Croatia, from April 05 – 07, 2017. Generally, for wildlife groups of top mammals such studies in Croatia are scarce or non-existent. This is especially true for bears, as they have not been chosen to be in a set of ICRP Committee 5 of 9 reference animals that require the most sensible approach regarding radiation protection.

### **3.3. Collecting samples from living bears (scats) for genetic counting**

The major action in 2015 within the LIFE project was the collection the bear scat samples for the genetic count of the population. The target number was 2000, but a total 2251 scat samples were collected from over the entire bear range in Croatia. The genetic results are expected by 15 December this year.

### **3.4. Other actions related to LIFE DINALP BEAR project**

The list includes:

- Workshops with pupils in schools in the bear range in Croatia. So far 6 of planned 20 school sessions have been performed.
- Increasing value of bears through non-consumptive use: “bear friendly
- Measures for traffic mortality mitigations on Rijeka-Zagreb Motorway
- Various publications (were sent separately)

More detailed information are in the separately sent “Mid-term report” and at the project web page: [www.dinalpbear.eu](http://www.dinalpbear.eu)

## CAMERA TRAPS

During 2017, camera traps were used in PLNP area for the purpose of lynx counting, but also for the determination of wolf presence and the activity of ungulates and humans. Here we present only the data about lynx counting. Cameras were set on the area of 156 km, inside PLNP.

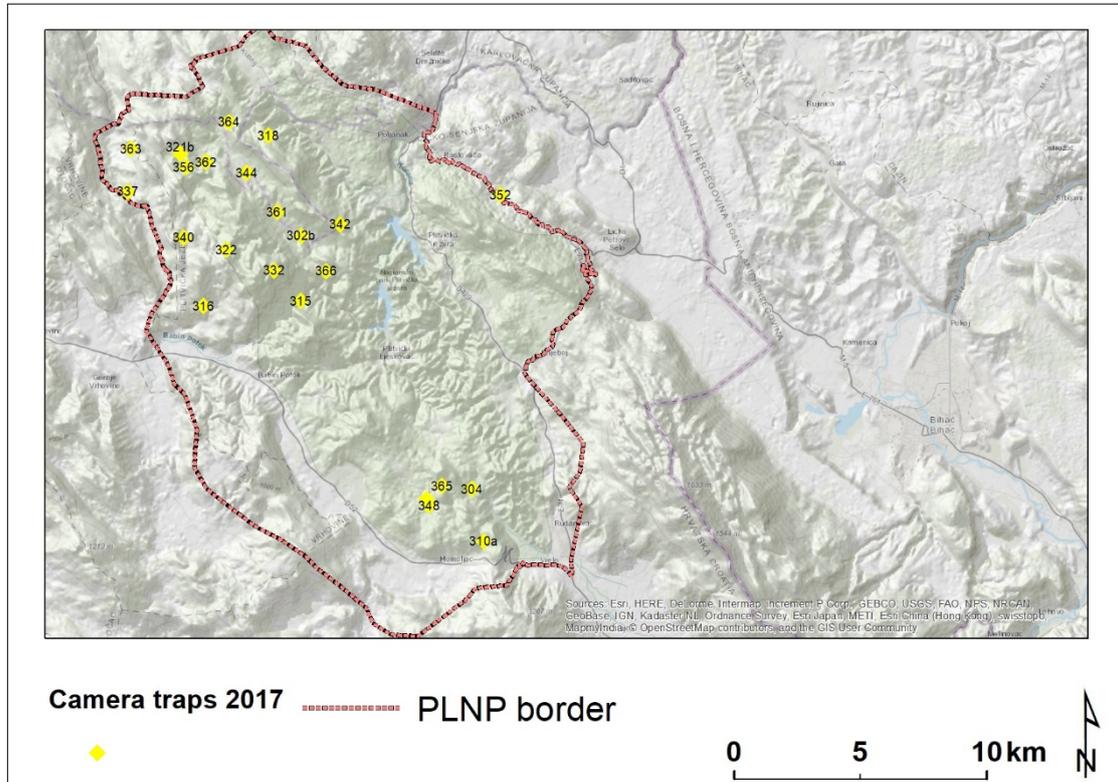


Figure 56: Locations of camera traps in PLNP during 2017.

The types of sites where camera traps were set are listed in table. At the beginning of 2017, we had 29 active cameras, but six cameras were stolen or damaged by weather, so we ended up with only 23 cameras by the end of 2017. The last set of photos, downloaded during November has not been processed yet, so here we present summary results of data collected until the beginning of September 2017.

Table 7: Summary table of sites used for camera trapping during 2017.

1	ANIMAL TRAIL	2
2	Forest road secondary with gate	1
3	Forest road primary	2
4	Forest road primary with gate	3
5	Forest road secondary with gate	9
6	Forest road tertiary with gate	4
7	Mountaineering trail	1
8	Mud hole	1
TOTAL		23

During 2017, lynx was photographed 96 times at 28 different sites. It seems that wherever we set a camera, there was a lynx photographed! This may indicate that there is rather higher density of lynx in PLNP.

*Table 8: The list of all 96 lynx photo events recorded in PLNP during 2017.*

#	DATE TIME	SITE	N PHOTOS	N ANIMALS
1	12.11.2016 00:41	340	3	1
2	22.11.2016 20:32	321b	3	1
3	22.11.2016 22:34	356	3	1
4	22.11.2016 23:21	316	3	1
5	26.11.2016 16:43	318b	2	1
6	27.11.2016 20:26	339	2	1
7	27.11.2016 21:10	318b	3	1
8	29.11.2016 19:18	356	3	1
9	02.12.2016 06:36	356	3	1
10	03.12.2016 22:06	321b	3	1
11	07.12.2016 10:28	319	2	1
12	08.12.2016 02:07	338	3	1
13	22.12.2016 14:52	321b	3	1
14	23.12.2016 08:21	333	9	1
15	23.12.2016 14:52	333	4	1
16	05.01.2017 18:28	339	3	1
17	02.02.2017 04:16	338	3	1
18	03.02.2017 03:22	341	3	1
19	07.02.2017 03:35	316	1	1
20	08.02.2017 17:09	321b	3	1
21	09.02.2017 15:20	302b	3	1
22	14.02.2017 04:08	316	3	1
23	15.02.2017 10:10	318b	3	1
24	24.02.2017 01:21	316	3	1
25	24.02.2017 17:11	318b	3	1
26	27.02.2017 15:48	338	3	1
27	28.02.2017 21:32	327	3	1
28	01.03.2017 01:24	341	3	1
29	02.03.2017 23:22	337	3	1
30	04.03.2017 15:45	319	2	1
31	04.03.2017 15:50	319	2	1
32	10.03.2017 16:14	338	4	1
33	10.03.2017 16:37	340	3	1
34	10.03.2017 20:26	338	1	1
35	10.03.2017 20:35	327	3	1
36	21.03.2017 14:05	321b	3	1
37	23.03.2017 18:20	316	3	1
38	24.03.2017 13:25	318b	2	1
39	25.03.2017 01:21	334	3	1
40	25.03.2017 12:25	318	1	1
41	25.03.2017 14:01	318	3	1
42	25.03.2017 15:01	318b	3	1
43	30.03.2017 08:33	315	1	1
44	30.03.2017 09:09	327	3	1
45	30.03.2017 21:10	340	3	1

#	DATE TIME	SITE	N PHOTOS	N ANIMALS
46	01.04.2017 15:55	340	3	1
47	03.04.2017 01:28	315	3	1
48	04.04.2017 20:03	333	4	1
49	04.04.2017 22:03	319	3	1
50	09.04.2017 03:15	318	3	1
51	10.04.2017 16:27	321b	3	1
52	10.04.2017 16:42	356	3	1
53	12.04.2017 07:24	356	3	1
54	13.04.2017 19:32	338	3	1
55	22.04.2017 12:00	356	4	1
56	23.04.2017 00:52	338	3	1
57	27.04.2017 03:46	340	3	1
58	11.05.2017 02:28	334	3	1
59	12.05.2017 20:14	334	3	1
60	14.05.2017 02:05	340	3	1
61	14.05.2017 16:39	338	3	1
62	15.05.2017 00:04	318	3	1
63	17.05.2017 21:19	338	1	1
64	30.05.2017 00:38	340	3	1
65	31.05.2017 01:24	319	3	1
66	01.06.2017 08:25	316	1	1
67	13.06.2017 06:30	340	3	1
68	14.06.2017 22:50	337	2	1
69	15.06.2017 19:44	337	2	1
70	16.06.2017 01:02	337	6	1
71	16.06.2017 19:59	327	3	1
72	16.06.2017 20:44	337	1	1
73	17.06.2017 02:55	337	1	1
74	18.06.2017 12:43	337	2	1
75	21.06.2017 19:24	340	3	1
76	21.06.2017 19:40	340	3	1
77	24.06.2017 19:57	340	3	1
78	28.06.2017 09:20	302b	3	1
79	07.07.2017 20:36	322	3	1
80	08.07.2017 03:27	340	2	1
81	09.07.2017 23:57	338	2	1
82	11.07.2017 03:02	356	3	1
83	14.07.2017 00:48	316	3	1
84	15.07.2017 00:50	319	3	1
85	17.07.2017 09:03	333	6	1
86	24.07.2017 08:17	321b	3	1
87	27.07.2017 04:15	321b	3	1
88	27.07.2017 18:33	338	3	1
89	29.07.2017 09:26	348	3	1
90	30.07.2017 19:38	334	3	1
91	03.08.2017 23:28	302b	3	1
92	09.08.2017 00:56	321b	3	1
93	11.08.2017 03:48	327	3	1
94	21.08.2017 18:51	337	2	2
95	23.08.2017 15:58	316	2	1
96	13.09.2017 23:47	338	3	1

Lynx appeared mostly in the north-western part of the PLNP, but this mostly reflects the distribution of cameras, rather than the preference of lynx to certain areas. We would need many more cameras to evenly cover the entire area of PLNP. Only then the eventual variation in lynx appearance may be documented.

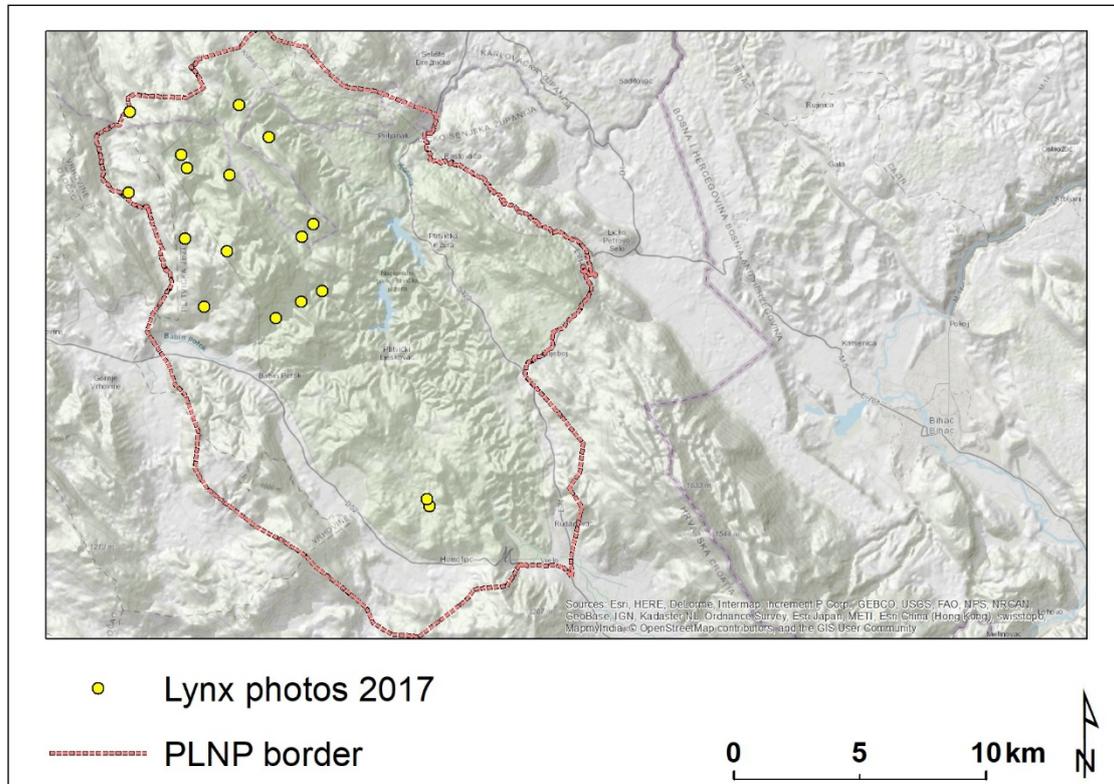


Figure 57: Locations of sites where a lynx was documented in PLNP during 2017.

To summarize, since the beginning of lynx study in PLNP area (end of 2014) and until now (summer 2017), a total of nine different lynx individuals were documented to use parts of the Plitvice lakes NP. Here we provide cumulative data on their appearance and use of PLNP area by years. During 2017, a total of four different lynx were detected to use the area of PLNP.

Table 9: Summary data about lynx detected in the area of PLNP during 2014, 2015 2016 and 2017. The effort for lynx counting was not equal over the years. During 2014 and part of 2016 was opportunistic and non-systematic setting of cameras done by park rangers of PLNP.

ANIMAL		SITES OF APEARANCE BY YEARS				NOTE
NAME	GENDER	2014.	2015.	2016.	2017.	
Iva	Ž	-	301, 309, 315, 334	-	-	
Čorak	M	-	316	316, 318, 322, 339, 340	-	Collared in March 2016
Stella	Ž	-	318	321b, 333	319	Collared in June 2016
Plase	?	-	321	316, 321b, 338, 340	-	
Bijelo uho	?	332, 333	-	-	-	
Kotur	?	-	321	302b, 315, 316, 318, 321b, 333, 338, 339, 340	319, 321, 338	
Luce	Ž	332	302a, 316, 325	321b	321	Three kittens in 2014!
Crna kosa 1	?	-	334	-	-	
Crna kosa 2	?	-	334	349	-	

## Individual lynx appearance and occurrences

Here we provide representative photos (the left and the right side, when available) of documented lynx individuals, with a table listing basic information about each appearance of each lynx in front of cameras.

LYNX IVA	
Right side:	CT315 2015-07-08 03:21
Left side:	CT334 2015-04-21 09:21



Figure 58 and Figure 59: Lynx Iva, right and left side

SITE	DATE	TIME	ANIMAL SIDE
CT334	29.03.2015.	02:57	LEFT
CT334	18.04.2015.	15:32	LEFT
CT334	20.04.2015.	16:54	LEFT
CT334	21.04.2015.	09:21	LEFT
CT315	08.07.2015.	03:21	RIGHT
CT334	14.09.2015.	10:59	RIGHT
CT301	13.10.2015.	19:23	LEFT
CT301	19.10.2015.	22:35	LEFT
CT309	13.11.2015.	16:42	LEFT
CT309	08.12.2015.	17:37	RIGHT
CT301	20.12.2015.	02:32	LEFT

LYNX ČORAK	
Right side:	2016-06-14 16:12
Left side:	2016-04-29 17:55



Figure 60 and Figure 61: Lynx Čorak, right and left side

SITE	DATE	TIME	ANIMAL SIDE
CT316	26.10.2015.	03:15	LEFT
CT316	06.01.2016.	22:59	LEFT
CT339	28.01.2016.	17:10	LEFT
CT318	18.02.2016.	16:57	LEFT
CT340	23.02.2016.	14:50	LEFT, RIGHT
CT316	04.03.2016.	10:49	RIGHT
CT318	29.04.2016.	17:56	LEFT
CT340	14.06.2016.	16:12	RIGHT
CT322	09.07.2016.	07:05	LEFT

LYNX STELLA	
Right side:	2015-08-11 02:13
Left side:	2017-03-04 15:50



Figure 62 and Figure 63: Lynx Stella, right and left side

SITE	DATE	TIME	ANIMAL SIDE
CT318	11.08.2015.	02:13	RIGHT
CT321b	06.04.2016.	16:24	LEFT
CT321b	26.05.2016.	03:04	LEFT
CT333	30.09.2016.	07:40	LEFT
CT319	04.03.2017.	15:50	LEFT

LYNX PLASE	
Right side:	CT340 2016-01-16 16:14
Left side:	



Figure 64 and Figure 65: Lynx Plase, right side

SITE	DATE	TIME	ANIMAL SIDE
CT321	05.09.2015.	10:42	RIGHT
CT340	16.01.2016.	14:45	RIGHT
CT316	14.03.2016.	17:10	RIGHT
CT338	22.04.2016.	05:04	RIGHT
CT321b	12.05.2016.	17:13	RIGHT
Ct340	26.06.2016.	11:39	RIGHT

LYNX BIJELO UHO	
Right side:	CT332 2014-07-18 10:28
Left side:	CT333 2014-08-03 14:28



Figure 66 and Figure 67: Lynx Bijelo uho, right and left side

SITE	DATE	TIME	ANIMAL SIDE
CT332	18.07.2014.	10:28	RIGHT
CT333	03.08.2014.	14:28	LEFT

LYNX LUCE	
Right side	
Left side	CT332 2014-08-05 07:11



Figure 68 and Figure 69: Lynx Luce, left side

SITE	DATE	TIME	ANIMAL SIDE
CT332	01.08.2011.	08:02	LEFT
CT332	05.08.2014.	07:11	LEFT
CT325	04.08.2015.	02:54	LEFT
CT316	20.10.2015.	05:28	LEFT
CT302a	24.10.2015.	08:04	LEFT
CT321b	02.06.2016.	01:47	LEFT
CT321	08.02.2017.	17:09	LEFT

LYNX KOTUR	
Right side:	CT339 2016-05-30 10:40
Left side:	CT302b 2016-06-22 06:34



Figure 70 and Figure 71: Lynx Kotur, right and left side

SITE	DATE	TIME	ANIMAL SIDE
CT321	24.10.2015.	20:31	RIGHT, LEFT
CT318	21.02.2016.	10:54	RIGHT
CT318	14.03.2016.	17:02	LEFT
CT318	01.04.2016.	16:54	LEFT
CT318	17.04.2016.	15:29	RIGHT
CT315	18.04.2016.	02:32	RIGHT
CT316	22.04.2016.	17:16	LEFT
CT318	06.05.2016.	06:48	RIGHT
CT315	06.05.2016.	18:28	RIGHT
CT321b	08.05.2016.	09:10	RIGHT
CT338	08.05.2016.	17:01	LEFT
CT340	17.05.2016.	09:07	RIGHT
CT339	30.05.2016.	10:40	RIGHT
CT302b	11.06.2016.	05:45	LEFT
CT302b	22.06.2016.	06:34	LEFT
CT333	23.12.2016.	08:23	RIGHT
CT319	04.03.2017.	15:45	LEFT
CT338	10.03.2017.	16:14	LEFT
CT321	21.03.2017.	14:05	LEFT

LYNX CRNA KOSA 1	
Right side	
Left side	CT334 2015-10-09 13:43

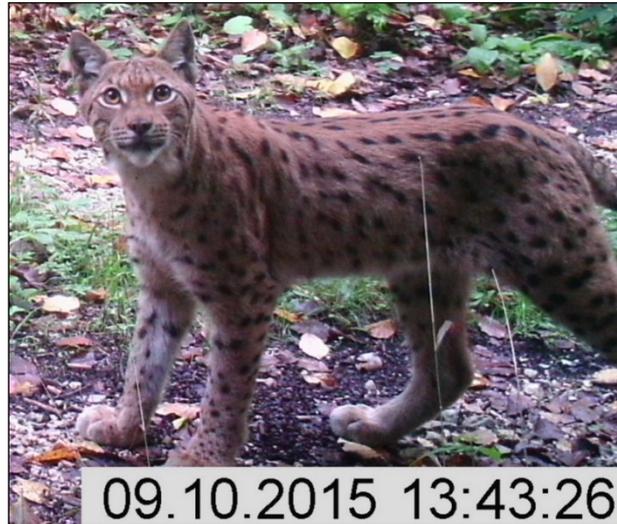


Figure 72 and Figure 73: Lynx Crna kosa 1, left side

SITE	DATE	TIME	ANIMAL SIDE
CT334	21.09.2015.	12:43	LEFT
CT334	09.10.2015.	13:43	LEFT

LYNX CRNA KOSA 2	
Right side	CT334 2015-04-21 09:19
Left side	

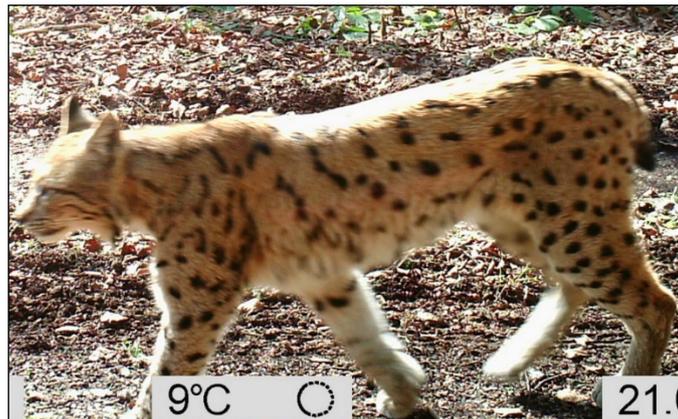


Figure 74 and Figure 75: Lynx Crna kosa 2, left side

SITE	DATE	TIME	ANIMAL SIDE
CT334	21.04.2015.	09:19	LEFT
CT349	01.02.2016.	03:39	LEFT

## WOLF MORTALITY

A mortality of 15 wolves was documented between 24.03.2017 and 07.03.2018. Prevailing causes of death was still traffic (n=9), then illegal killing (n=1) and intraspecific strife (1). Illegal killing of wolves is still present.

*Table 10: Basic data about dead wolves in Croatia between 24.03.2017 and 07.03.2018.*

ANIMAL ID	GENDER	DATE	CAUSE OF DEATH
WCRO287	F	24.3.2017	Intraspecific strife
WCRO288		27.3.2017	Road kill
WCRO289	F	17.5.2017	Road kill
WCRO290	M	23.05.2017	Undetermined
WCRO291	M	13.6.2017	Road kill
WCRO292	M	07.7.2017	Road kill
WCRO293	F	24.07.2017	Road kill
WCRO294	F		Railroad kill
WCRO295	M	10.7.2017	Undetermined
WCRO296	F	31.7.2017	Undetermined
WCRO297	M	26.9.2017	Illegal killing
WCRO298		21.10.2017	Road kill
WCRO299	F	20.07.2017	Undetermined
WCRO300	M	25.02.2018	Road kill
WCRO301	M	07.03.2018	Road kill

All dead wolves were pathologically processed at the Veterinary faculty of the University of Zagreb and some of them were fresh enough to be thoroughly examined.

## LYNX MORTALITY

A mortality of two lynx was documented during 2017. One was a road kill casualty, while another was a lynx kitten which died of malnutrition and pneumonia. The later on most likely has lost mother early in life, similar as found lynx L14-Martin.

## **BEAR MANAGEMENT**

Đuro Huber and Slaven Reljić actively participate in the work of the “Committee for bear management in Croatia”. Within the next two weeks we expect results of the bear genetic count. Based on that the Action plan for the year 2018 will be composed including setting the hunting quota. At the same time the revision of the Croatian brown bear management plan (of 2008) is now under revision and is to be completed in spring 2008.

The bear hunting quota for the year 2007 of 120 bears have been fully accomplished plus 23 more bear mortality due to traffic (12 railroad +5 road) and intervention shooting (2+4).

## **WOLF MANAGEMENT**

Đuro Huber and Josip Kusak continue to participate in large carnivores management through the work in the “Committee for large carnivores in Croatia” and through various other activities (organizing and implementing monitoring, giving courses for damage inspectors and Intervention team for large carnivores, media appearances and statements..).

In 2017 we managed to collect 400 wolf scat samples. We expect to get funding in 2018 to perform the genetic analyses of those samples and obtain the first ever genetic count of wolves in Croatia!

The trend in wolf numbers since the beginning of the implementation of wolf management plan from 2005 was for the first five years positive and then it turned down during the last five years. The most serious drop happened in the year 2014 and the number seems to keep staying well below 200. The negative trend in wolf number and the fact that illegal wolf killing is still present form two main arguments against any legal quota on wolves also in 2016 and 2017.

In 2018 the new (revised) Croatian wolf management plan is to be worked on. We expect to have major role in that process.

## **LYNX MANAGEMENT**

The Croatian lynx management plan will start to be revised in 2018. Also the LIFE Lynx project started, so the increase of activity on the lynx side will surely follow.

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Josip Kusak

## FINANCIAL ACCOUNTING

For our work in 2017 UKWCT generously donated a total of 5000 GBP (42,650.35 HRK, after conversion). All of fund in 2017 was spent for field work; fuel for cars and food for field workers with some minor expenses for the consumable equipment like receiver batteries and refiling prepaid SIM cards for trap alarms. Josip Kusak, Michael Schulte, and other volunteers were doing the entire wolf and lynx related field work.

*Table 11: Summary list of expenses made on the project with the use of UKWCT fund during 2017 and until March of 2018.*

PURPOSE	N EXPENSES	SUM OF EXPENSES (HRK)
Car-fuel	37	17323.48
Car-highway	19	714.00
Communication - mob	1	33.00
Personal-food	57	11232.40
Personal-hygiene	2	245.75
Overnight stay	2	2200.00
Equipment	18	10340.27
<b>TOTAL</b>	<b>136</b>	<b>42088.90</b>

*Table 12: Detailed list of expenses made on the project with the use of UKWCT fund during 2017 and until March of 2018.*

#	ACTIVITY N	OBJECTIVE	TIME	TO	PURPOSE	RECIEP#	AMOUNT (HRK)
1	627	Telemetry	28.04.2017 21:11	BILA KC 01	Personal-food	22626/221/2	720.25
2	627	Telemetry	29.04.2017 09:18	CRODUX DERIVATI DVA d.o.o.	Car-fuel	0-2271319568	616.03
3	627	Telemetry	01.05.2017 21:36	TIFON d. o. o.	Car-fuel	060569	563.02
4	627	Telemetry	29.04.2017 11:39	AC RI-ZG	Car-highway	2017042960402113933434	94.00
5	627	Telemetry	29.04.2017 13:50	AC RI-ZG	Car-highway	2017042975004135013185	46.00
6	627	Telemetry	01.05.2017 19:45	AC RI-ZG	Car-highway	2017050118003194579011	55.00
7	631	Trapping	28.08.2017 15:04	Gavranović d.o.o.	Personal-food	853 0399/002/695	143.98
8	631	Trapping	27.08.2017 17:06	Turist Grabovac	Personal-food	20286/UU01/10	22.00
9	631	Trapping	27.08.2017 16:26	Turist Grabovac	Personal-food	20272/UU01/10	22.00
10	631	Trapping	26.08.2017 20:10	Bistro Silverlake	Personal-food	5828/-1-1	202.00
11	631	Trapping	26.08.2017 18:48	Kordun d.d.	Personal-food	48953/112/1	280.15
12	631	Trapping	23.08.2017 17:02	Borje restoran	Personal-food	12031/1507/1	97.50
13	631	Trapping	23.08.2017 16:38	Izbor Jandric d.o.o.	Personal-food	65864/101/1	92.79
14	631	Trapping	23.08.2017 11:44	Globalna hrana d.o.o.	Personal-food	5118/00/05	86.00
15	631	Trapping	31.08.2017 15:25	KONZUM d. d.	Personal-food	80248/0547/2	173.03
16	631	Trapping	23.08.2017 13:14	AC RI-ZG	Car-highway	2017082310305131415007	21.00
17	631	Trapping	23.08.2017 16:24	KONZUM d. d.	Personal-food	58831/3282/1	615.45
18	631	Trapping	01.09.2017 17:34	Ina - Industria Nafta, d.d.	Car-fuel	135-912-S073-1	552.11
19	631	Trapping	27.08.2017 15:37	Ina - Industria Nafta, d.d.	Car-fuel	93969-S081-1	379.32
20	631	Trapping	23.08.2017 16:50	Ina - Industria Nafta, d.d.	Car-fuel	142218-S065-1	420.10
21	631	Trapping	01.09.2017 19:18	AC RI-ZG	Car-highway	2017090118002191838952	21.00
22	631	Trapping	22.08.2017 09:10	Dradar d.o.o. TELE 2	Technic-equipment	2731-POS11-50141	849.00
23	631	Trapping	23.08.2017 18:07	Matovina, Ivica	Technic-equipment		500.00
24	631	Trapping	25.08.2017 11:36	Štuka-prom d.o.o.	Technic-equipment	8408/6/1	59.10
25	631	Trapping	23.08.2017 12:06	Chipoteka	Technic-equipment	66490/1/1	109.00
26	631	Trapping	21.08.2017 21:06	SPAR	Personal-food	17891/87091/104	149.01
27	631	Trapping	22.08.2017 10:56	TEHNOMAG	Technic-equipment	1055-02-50110	85.00
28	631	Trapping	25.08.2017 11:34	Štuka-prom d.o.o.	Technic-equipment	8406/6/1	300.50
29	631	Trapping	22.08.2017 15:57	Optika Vazdar	Technic-equipment	3895-PR1-1	680.00

#	ACTIVITY N	OBJECTIVE	TIME	TO	PURPOSE	RECIEP#	AMOUNT (HRK)
30	632	Trapping	12.09.2017 17:57	SPAR	Personal-food	27418/87091/101	880.96
31	632	Trapping	13.09.2017 19:38	Kordun d.d.	Personal-food	55174/112/1	166.23
32	632	Trapping	15.09.2017 14:37	JU NP Plitvička jezera	Personal-food	52124/5010/1	493.10
33	632	Trapping	17.09.2017 16:45	Rotokor d.o.o.	Personal-food	21223/UU01/1	50.00
34	632	Trapping	15.09.2017 14:17	Rotokor d.o.o.	Personal-hygiene	23175/UU01/10	172.00
35	632	Trapping	04.09.2017 09:43	Ina - Industria Nafte, d.d.	Personal-comm-mob	261126-S356-1	33.00
36	632	Trapping	17.09.2017 18:29	JU NP Plitvička jezera	Personal-food	52711/5010/1	168.42
37	632	Trapping	17.09.2017 20:18	Rotokor d.o.o.	Personal-food	23439/UU01/1	112.00
38	632	Trapping	18.09.2017 14:11	JU NP Plitvička jezera	Personal-food	14615/1507/1	93.50
39	632	Trapping	13.09.2017 16:21	AC RI-ZG	Car-highway	2017091310305162140815	21.00
40	632	Trapping	11.09.2017 15:59	BAUHAUS	Technic-equipment	52268	3999.00
41	632	Trapping	12.09.2017 09:08	KARMAT d.o.o.	Technic-equipment	20554/001/1	25.00
42	632	Trapping	12.09.2017 16:03	TELUR d.o.o.	Technic-equipment	12413/10/1010	959.45
43	632	Trapping	27.09.2017 15:09	Ina - Industria Nafte, d.d.	Car-fuel	107994-S081-1	607.22
44	632	Trapping	24.09.2017 17:34	Ina - Industria Nafte, d.d.	Car-fuel	107034-S081-1	565.11
45	632	Trapping	21.09.2017 13:57	Ina - Industria Nafte, d.d.	Car-fuel	164085-S065-1	202.44
46	632	Trapping	21.09.2017 13:51	Ina - Industria Nafte, d.d.	Car-fuel	164078-S065-1	628.62
47	632	Trapping	17.09.2017 18:22	Ina - Industria Nafte, d.d.	Car-fuel	104060-S081-1	560.10
48	632	Trapping	15.09.2017 14:23	Ina - Industria Nafte, d.d.	Car-fuel	103066-S081-1	104.99
49	632	Trapping	13.09.2017 18:34	Ina - Industria Nafte, d.d.	Car-fuel	102260-S081-1	420.04
50	632	Trapping	12.09.2017 21:43	Ina - Industria Nafte, d.d.	Car-fuel	184850-S006-1	463.01
51	632	Trapping	13.09.2017 08:41	TELUR d.o.o.	Technic-equipment	12435/10/1010	55.52
52	632	Trapping	27.09.2017 16:59	AC RI-ZG	Car-highway	2017092718006165936888	34.00
53	632	Trapping	21.09.2017 13:30	JU NP Plitvička jezera	Personal-food	15023/1507/1	74.00
54	632	Trapping	21.09.2017 13:36	Izbior Jandric d.o.o.	Personal-food	16981/10172	429.91
55	632	Trapping	21.09.2017 13:37	Izbior Jandric d.o.o.	Personal-food	16919/10172	12.22
56	632	Trapping	25.09.2017 14:45	Turist Grabovac	Personal-food	24192/UU01/10	237.00
57	632	Trapping	25.09.2017 20:57	Kordun d.d.	Personal-food	58635/112/1	385.31
58	633	Trapping	07.10.2017 18:11	Ina - Industria Nafte, d.d.	Car-fuel	173913-S065-1	435.02
59	633	Trapping	09.10.2017 12:41	Ina - Industria Nafte, d.d.	Car-fuel	174895-S065-1	122.61
60	633	Trapping	11.10.2017 13:44	Ina - Industria Nafte, d.d.	Car-fuel	175921-S065	520.07
61	633	Trapping	12.10.2017 20:24	Ina - Industria Nafte, d.d.	Car-fuel	204248-S006-1	363.33
62	633	Trapping	10.10.2017 11:55	JU NP Plitvička jezera	Personal-food	16821/1507/1	47.00
63	633	Trapping	02.10.2017 16:07	Ina - Industria Nafte, d.d.	Car-fuel	110216-S081-1	623.28
64	633	Trapping	07.10.2017 11:05	AC RI-ZG	Car-highway	2017100710305114966227	32.00
65	633	Trapping	29.09.2017 16:08	Ina - Industria Nafte, d.d.	Car-fuel	169132-S065-1	630.03
66	633	Trapping	07.10.2017 10:05	AC RI-ZG	Car-highway	2017100760402100561728	7.00
67	633	Trapping	28.09.2017 18:51	AC RI-ZG	Car-highway	2017092810304185178436	21.00
68	633	Trapping	11.10.2017 11:59	JU NP Plitvička jezera	Personal-food	16942/1507/1	44.00
69	633	Trapping	07.10.2017 10:17	Gorancica d.o.o.	Technic-equipment	13399-PJ1-2	181.10
70	633	Trapping	28.09.2017 18:17	CRODUX DERIVATI DVA d.o.o.	Personal-food	389593/32603260/1	25.98
71	633	Trapping	29.09.2017 16:32	Izbior Jandric d.o.o.	Personal-food	87109/101/1	853.87
72	633	Trapping	09.10.2017 12:27	Ljekarna Doglek	Personal-hygiene	4156/P5/2	73.75
73	633	Trapping	06.10.2017 14:55	PETROL HRVATSKA d.o.o.	Car-fuel	49500	697.15
74	633	Trapping	07.10.2017 10:24	Trgovina Shan Long	Technic-equipment	6151/P002/1	60.00
75	633	Trapping	09.10.2017 12:02	JU NP Plitvička jezera	Personal-food	16689/150771	49.50
76	633	Trapping	28.09.2017 11:00	Chipoteka	Technic-equipment	77345/1/1	1079.00
77	633	Trapping	02.10.2017 18:12	JU NP Plitvička jezera	Personal-food	55749/5010/1	67.76
78	633	Trapping	06.10.2017 20:20	Bistro AM	Personal-food	8746/POSL1/1	92.00
79	633	Trapping	07.10.2017 10:51	KONZUM d. d.	Personal-food	24072/0284/6	703.47
80	634	Trapping	13.10.2017 16:54	Ina - Industria Nafte, d.d.	Car-fuel	204788-S006-1	490.11
81	634	Trapping	20.10.2017 18:00	Ina - Industria Nafte, d.d.	Car-fuel	230590-S401-1	639.07
82	634	Trapping	20.10.2017 12:00	Gavranović d.o.o.	Personal-food	486067399/2	100.36
83	634	Trapping	17.10.2017 15:17	Top Start d.o.o.	Technic-equipment	2135MP12-50670	23.00
84	634	Trapping	17.10.2017 17:57	Gavranović d.o.o.	Personal-food	48169/399/2	29.99
85	634	Trapping	17.10.2017 17:42	Turist Grabovac	Personal-food	25584/UU01/10	225.00
86	634	Trapping	20.10.2017 20:11	KONZUM d. d.	Personal-food	97991/0731/5	53.85
87	634	Trapping	18.10.2017 17:57	Kordun d.d.	Personal-food	39738/112/2	274.00
88	634	Trapping	17.10.2017 15:23	Ina - Industria Nafte, d.d.	Car-fuel	179216-S065-1	654.51
89	634	Trapping	17.10.2017 12:30	JU NP Plitvička jezera	Personal-food	17224/1507/1	38.50
90	634	Trapping	14.10.2017 16:42	AC RI-ZG	Car-highway	2017101410305164273747	19.00

#	ACTIVITY N	OBJECTIVE	TIME	TO	PURPOSE	RECIEP#	AMOUNT (HRK)
91	634	Trapping	20.10.2017 14:12	TIFON d. o. o.	Personal-food	294060	26.99
92	634	Trapping	17.10.2017 15:17	Top Start d.o.o.	Technic-equipment	2134MP12-50670	664.70
93	634	Trapping	14.10.2017 17:01	INTERSPAR	Personal-food	67992/8713/114	413.92
94	634	Trapping	17.10.2017 12:31	JU NP Plitvička jezera	Personal-food	17225/1507/1	65.00
95	635	Trapping	25.10.2017 13:03	JU NP Plitvička jezera	Personal-food	17685/150771	38.50
96	635	Trapping	21.10.2017 14:36	KONZUM d. d.	Personal-food	24848/0284/6	547.49
97	635	Trapping	23.10.2017 12:45	JU NP Plitvička jezera	Personal-food	17567/1507/1	61.00
98	635	Trapping	24.10.2017 14:07	Gavranović d.o.o.	Personal-food	49263/399/2	79.21
99	635	Trapping	31.10.2017 15:35	AC RI-ZG	Car-highway	2017103118004153516738	19.00
100	635	Trapping	21.10.2017 15:42	PETROL HRVATSKA d.o.o.	Car-fuel	60504	421.22
101	635	Trapping	25.10.2017 14:17	Ina - Industria Nafta, d.d.	Car-fuel	183185-S065-1	715.19
102	635	Trapping	31.10.2017 17:42	Ina - Industria Nafta, d.d.	Car-fuel	215800-S065-1	560.23
103	635	Trapping	25.10.2017 13:04	JU NP Plitvička jezera	Personal-food	17686/150771	55.00
104	635	Trapping	29.10.2017 13:19	JU NP Plitvička jezera	Personal-food	17814/1507/1	80.00
105	635	Trapping	31.10.2017 12:21	Holiday home Matan	Personal-overnight stay	20-2017	2000.00
106	635	Trapping	21.10.2017 15:06	AC RI-ZG	Car-highway	2017102160202150613611	23.00
107	635	Trapping	21.10.2017 09:58	AC RI-ZG	Car-highway	2017102160402095870054	94.00
108	635	Trapping	29.10.2017 13:56	KONZUM d. d.	Personal-food	72719/3282/3	215.34
109	635	Trapping	30.10.2017 16:47	JU NP Plitvička jezera	Personal-food	60913/5010/1	30.15
110	635	Trapping	29.10.2017 14:05	Ina - Industria Nafta, d.d.	Car-fuel	185151-S065-1	596.92
111	638	Telemetry	27.12.2017 16:12	SPAR	Personal-food	63807/87091/101	349.17
112	638	Telemetry	28.12.2017 12:52	Globalna hrana d.o.o.	Personal-food	80603/11/05	87.00
113	638	Telemetry	30.12.2017 20:29	Ina - Industria Nafta, d.d.	Car-fuel	257214-S006-1	626.05
114	638	Telemetry	29.12.2017 13:16	Ina - Industria Nafta, d.d.	Car-fuel	209312-S065-1	330.09
115	638	Telemetry	28.12.2017 08:43	Ina - Industria Nafta, d.d.	Car-fuel	255461-S006-1	589.99
116	638	Telemetry	28.12.2017 14:07	AC RI-ZG	Car-highway	2017122810303140723056	34.00
117	638	Telemetry	30.12.2017 19:14	AC RI-ZG	Car-highway	2017123018005191469601	19.00
118	638	Telemetry	29.12.2017 12:32	MACOLA d.o.o.	Personal-food	107041/11/4	135.00
119	639	Telemetry	04.01.2018 16:23	Ina - Industria Nafta, d.d.	Car-fuel	296-S002-1	285.96
120	639	Telemetry	08.01.2018 11:09	Ina - Industria Nafta, d.d.	Car-fuel	1963-S081-1	320.00
121	639	Telemetry	04.01.2018 09:43	Ina - Industria Nafta, d.d.	Car-fuel	239-S082-1	197.98
122	639	Telemetry	02.01.2018 15:28	Ina - Industria Nafta, d.d.	Car-fuel	471-S081-1	261.32
123	639	Telemetry	12.01.2018 09:18	Ina - Industria Nafta, d.d.	Car-fuel	857-S082-1	252.93
124	639	Telemetry	09.01.2018 17:35	Ina - Industria Nafta, d.d.	Car-fuel	2293-S081-1	244.15
125	639	Telemetry	09.01.2018 17:49	Kordun d.d.	Personal-food	831/112/234	71.97
126	639	Telemetry	08.01.2018 16:25	Gavranović d.o.o.	Personal-food	850/399/2	96.00
127	639	Telemetry	02.01.2018 17:20	Kordun d.d.	Personal-food	58/112/1	210.00
128	639	Telemetry	30.12.2017 13:03	Gavranović d.o.o.	Personal-food	3273/0399/002/784	95.64
129	641	Animal handling	26.01.2018 15:54	Trgovina Krk d.d.	Technic-equipment	6587/110/2	330.00
130	641	Animal handling	26.01.2018 18:08	Gorancica d.o.o.	Technic-equipment	1332-PJ1-1	380.90
131	641	Animal handling	26.01.2018 09:44	AC RI-ZG	Car-highway	2018012660402094421757	94.00
132	641	Animal handling	27.01.2018 10:09	AC RI-ZG	Car-highway	2018012760302100905124	9.00
133	641	Animal handling	27.01.2018 17:51	AC RI-ZG	Car-highway	2018012718004175178975	51.00
134	641	Animal handling	25.01.2018 18:19	SPAR	Personal-food	3980/87091/103	262.93
135	641	Animal handling	26.01.2018 20:48	Raukar, Marina	Personal-overnight stay	0037055	200.00
136	641	Animal handling	27.01.2018 17:10	Ina - Industria Nafta, d.d.	Car-fuel	16637-S430-1	664.16
<b>137</b>				<b>TOTAL</b>			<b>42088.90</b>

*Jonip Kurok*