



o.p.s.

**partnerství**

# VISITOR COUNTING IN NATURAL AREAS



- **MENDELU**
- **Fakulta regionálního**
- **rozvoje a mezinárodních**
- **studií**

---

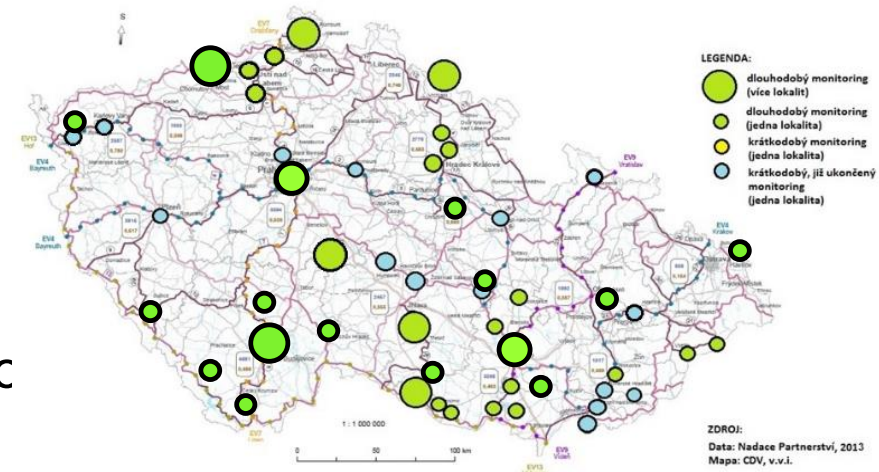
Ing. Luboš Kala

Partnerství, o.p.s.

24. 10. 2022

# Partnerství, o.p.s.

- Established by **Partnership Foundation** in 2001
- **Sustainable tourism and mobility development, incl. people monitoring**
- People counters **Eco-Counter a TRAFx** - [www.scitace.cz](http://www.scitace.cz)
- **More than 15 years** of experience
- **More than 200** counters installed
- **Our customers and partners:**
  - **Regional governments** (Jihočeský, Jihomoravský, Královehradecký, Středočeský, Ústecký, Vysočina...)
  - **Tourism destinations** (JCCR, Dolní Poohří, Novohradskc Doudlebsko, Toulava, Valašské Klobucko...)
  - **Nature Conservation Agency and National parks** (AOPK, NP České Švýcarsko, KRNAP, NP Podyjí, NP Šumava)
  - **Bike trails and singletrails** (CS Brno-Vídeň, Nadace JČ o.p.s., Rychlebské stezky, Glacensis, Singlekras...)



# Visitor counting in natural areas – Why?



# Visitor counting in natural areas – Why?



# Visitor counting in natural areas – Why?



## PLANNING

- Planning and justifying investments
- Evaluating long-term trends
- Understanding usage patterns

## MANAGING

- Measuring the attendance and the attractiveness of a location
- Preserving natural environments
- Resource allocation based on frequentation



## COMMUNICATING

- Providing reliable data to get involved all parties
- Build up easy figures to be remembered
- Displaying traffic statistics on your website

# Visitor counting in natural areas – Counting program

1. **What/who to count?** Visitors, visits, visitor days etc.
2. **How to count?** Direct, indirect, automatic etc.
3. **Where to count?** Entrance gates, visitor centers, natural attractions (e.g. waterfalls, view towers), remote places etc.
4. **When to count?** High season, low season, entire year, once a week, for one hour etc.



# Visitor counting in natural areas – What/Who?

Entrant	<ul style="list-style-type: none"><li>▪ A person going into a protected area for any purpose.</li><li>▪ The number of entrants includes all recreational visits and other activities (e.g. people just driving through, local people passing through a corner of the park, or the daily activities of workers).</li><li>▪ Entrant figures can overestimate the recreational use of the park.</li></ul>
Visits	<ul style="list-style-type: none"><li>▪ The number of times a person goes into a protected area for recreational purposes.</li><li>▪ For example, a person who enters a protected area twice in a day would be reported as two visits.</li></ul>
Visitors	<ul style="list-style-type: none"><li>▪ A person who visits a protected area for recreational purposes.</li><li>▪ For example, a person who enters a protected area twice in a day is one visitors.</li></ul>
Visitor days	<ul style="list-style-type: none"><li>▪ The total number of days that a visitor stays in a protected area.</li><li>▪ One overnight stay, or twelve visit hours of a visitor in a protected area is reported as one visitor day.</li></ul>

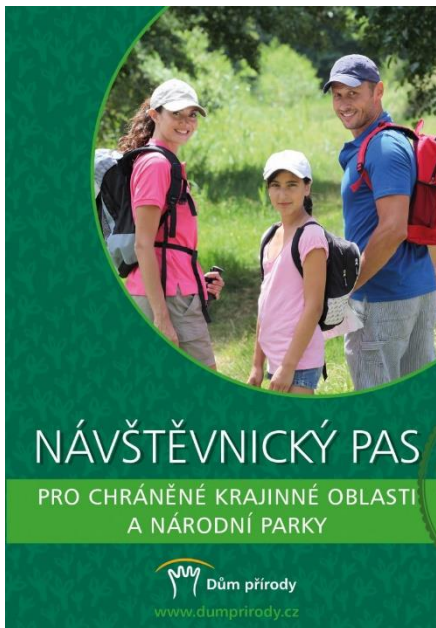


# Visitor counting in natural areas – How?



# Visitor counting in natural areas – How?

- Tickets
- User lists (reservations, visitor books, geocaching etc.)
- Manual counting
- Automatic counting
- Cell phone tracking



# Visitor counting in natural areas – How?

## Direct

- Counts relying on researchers directly counting.
- Observations are made at the site, or observing video camera recordings, or using observations from the air.
- Number of visits or entrants can be counted directly.

## Indirect

- Inferred counts to provide on-site estimates (e.g. social media posts).
- Options include counting parking/entrance fees, permits/licences, guest records at accommodation, entries in guestbooks, trail logs, signs of use and social media posts.
- Numbers of visits or visitors can be counted by permits issued for people entering the site.

## Automatic

- Counts with mechanical and electronic devices of the numbers of visitors on-site.
- Counters include traffic counters, and turnstiles or video counters.
- Entrants can be counted with these devices.



# Visitor counting – Manual counting

## Advantages

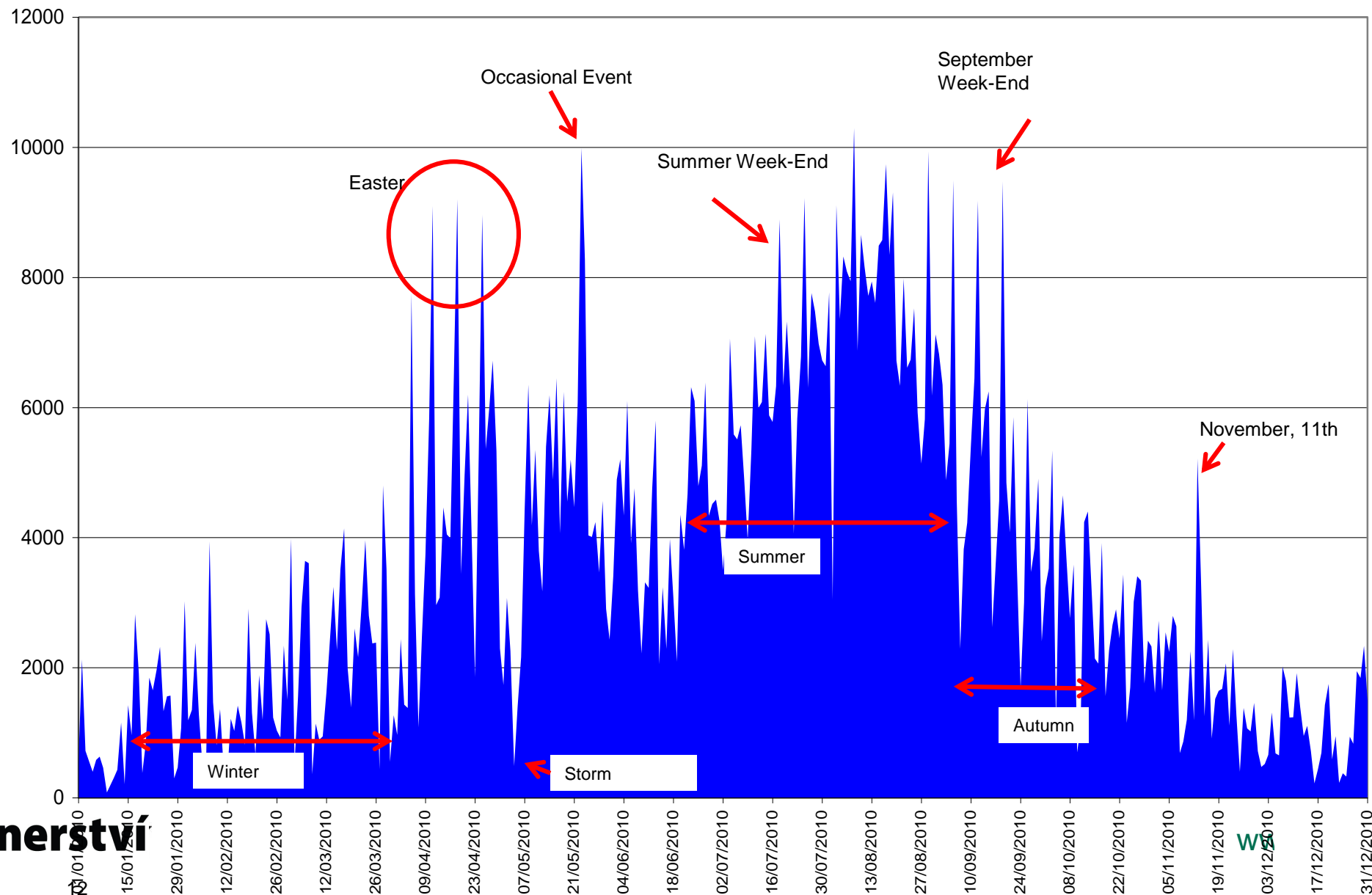
- Easy to deploy, no engineering works
- Quality information : women/men/children,...
- Spatial distribution because of high number possible

## To be considered:

- Influence of weather and other events : not possible to give reliable trends
- Accuracy : it highly depends on the applied method and from the quality of work provided by the person on site
- Expensive if on a big scale if repeated over the year



# Visitor counting – Automatic counting



# Visitor counting – Automatic counting

## Advantages

- Provides a reference for all other manual data collection.
- Gives global trends over time
- Impact of new infrastructures, programs or specific advertising are easily registered.
- Impact of specific events can be detected in real-time and also compared.
- Impact of the weather and seasonality detected and measured accurately.



# Visitor counting – Conclusion

- **Manual counting**

- suitable for short term
- more reliable but not representative data
- brings quality data (gender etc.)

- **Automatic counting**

- suitable for long term
- more representative but sometimes less reliable data (counter calibration)



# Visitor counting – Automatic counting



**Sensor**

- Reads signal
- Makes decision on counts



**Logger**

- Stores Data
- Transmits Data
- Provides power to sensor



**Software**

- View and analyze data on web-based software, Eco-Visio

# Visitor counting – Automatic counters – Eco-counter

1999: 1st counting solution



# Automatic counters – Eco-counter Pyroelectric sensor



**Max. width: 15 m**



# Automatic counters – Eco-counter Pressure pads



***Invisible! – Max. width = 6 m***



# Automatic counters – Eco-counter

## Inductive loops



**Very accurate! – Max. width = 6 m**



# Automatic counters – Eco-counter MULTI = Pyro + Inductive



# Automatic counters – TRAFx Trail counter / MTB counter



The screenshot shows the TRAFx DataNet web interface. The main heading is "Welcome to DataNet!" and it lists "Your counter sites" with a table of site names and reports. A "Counter map" is shown on the right. Below the main heading, there are several data visualizations for the "Boardwalk Trail (IR)" site, including a "Weekly traffic" line graph, a "Daily" pie chart, a "Monthly" bar chart, and a "Yearly" bar chart. A "Master Summary" table is also visible, showing a list of sites and their traffic data. The interface includes navigation tabs for HOME, ANALYZE, UPLOAD, MANAGE, ADMIN, and HELP.

# Automatic counters – TRAFx

## Trail counter / MTB counter





## PYRO Sensor



# PYRO Sensor



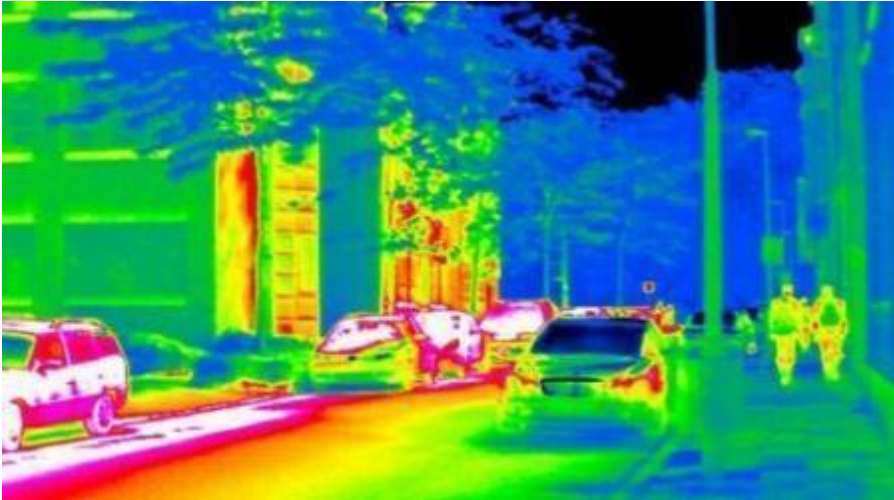
## PYRO Sensor

- Infrared technology – high precision lense – extremely sensitive
- Non-intrusive technology. No permission needed for the installation
- Up to 15m wide



# PYRO Sensor - How Does the Detection Work?

## Infra-Red emission



# PYRO Sensor - How Does the Detection Work?

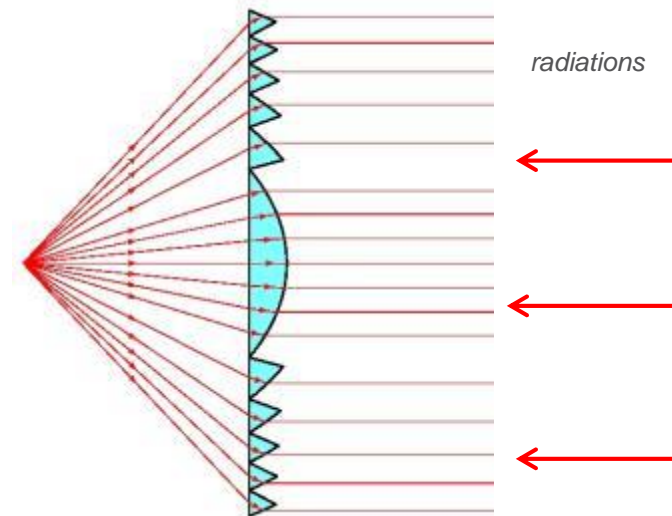
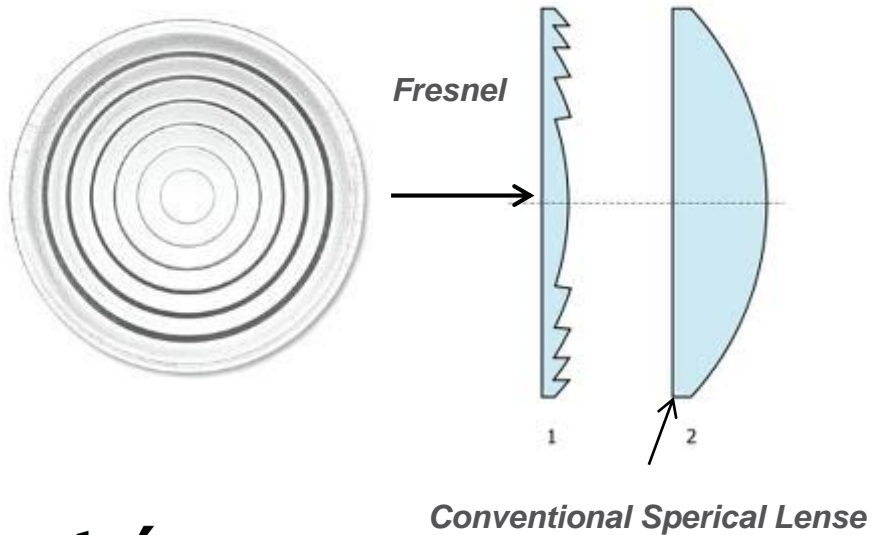
If PYRO point on an empty space, he is calibrating on the radiation emitted by others materials around (example, soil)



# PYRO Sensor - How Does the Detection Work?

**Fresnel lens**  
is a thinner approximation of a conventional spherical lenses

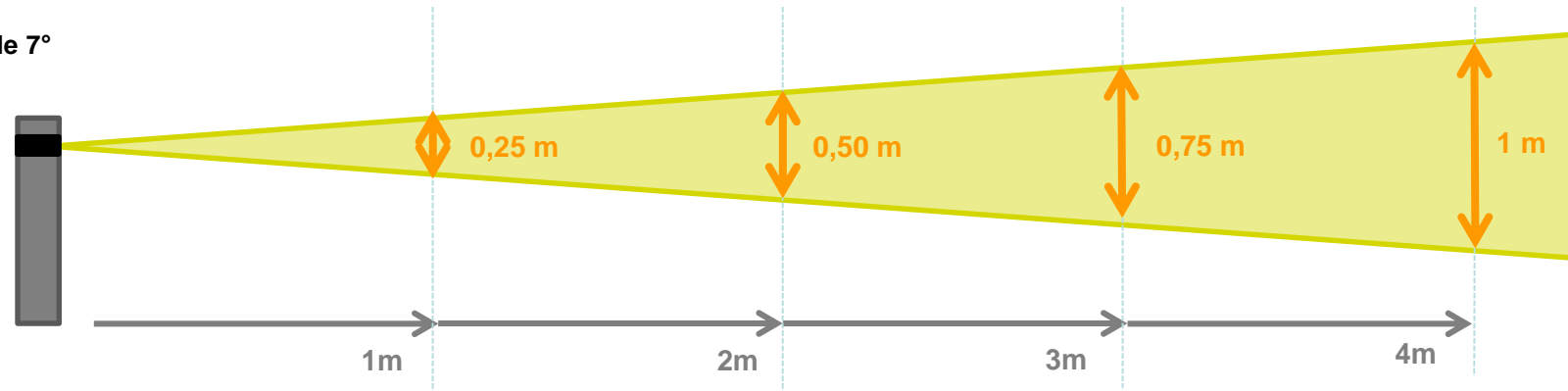
The aim of this lens is to focus all the parallel radiations on one point



# PYRO Sensor - How Does the Detection Work?

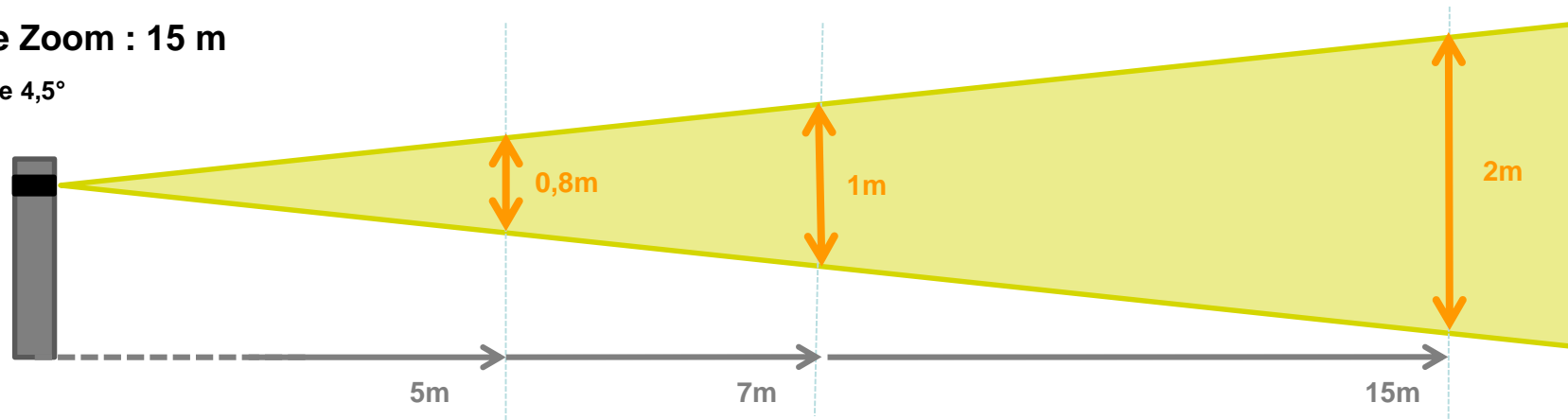
Range 4 m

Angle 7°



Range Zoom : 15 m

Angle 4,5°



# PYRO – Installation Requirements

## DO CHOOSE

- A major walkway
- A path which has a continuous flow of pedestrian traffic
- Path width between 1 and 15 meters max.
- A path where you can install the PYRO Sensor at 70 centimeters from the ground
- A path where you can install the PYRO Sensor as close as possible to the path



# PYRO – Installation Requirements

## DO CHOOSE

- A place where the temperature remains stable
- A place where the PYRO Sensor won't be directed at heat generating elements (leaves, metallic elements such as cars, guardrails...)
- A place where the PYRO Sensor's beam won't be interrupted by outside elements such as vegetation, branches, etc.
- A path where the PYRO Sensor can be installed perpendicularly to the path



# PYRO range – Natural Environment



- Designed for the Natural environment
- Extremely robust and discreet, resistant to vandalism
- Easy installation



Permanent



# PYRO range – Natural Environment



## Hidden PYRO



- The PYRO sensor can also be hidden in the natural environment or in an existing post
- Invisible
- Counters installed in a buried or hidden manhole





o.p.s.  
**partnerství**

# Hidden PYRO – Tijuca National Park, Brazil



# Hidden PYRO



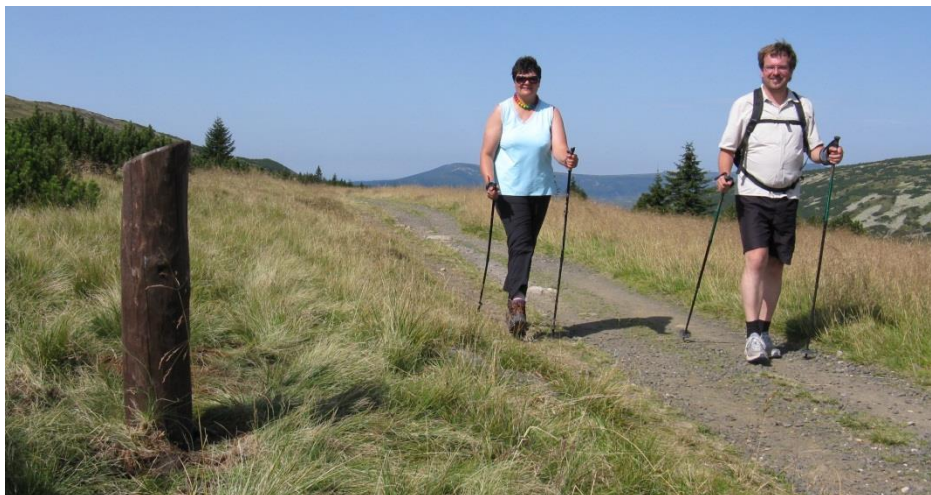
# Automatic counters in natural areas

- Invisible



# Automatic counters in natural areas

- Visible, but...



# Automatic counters in natural areas

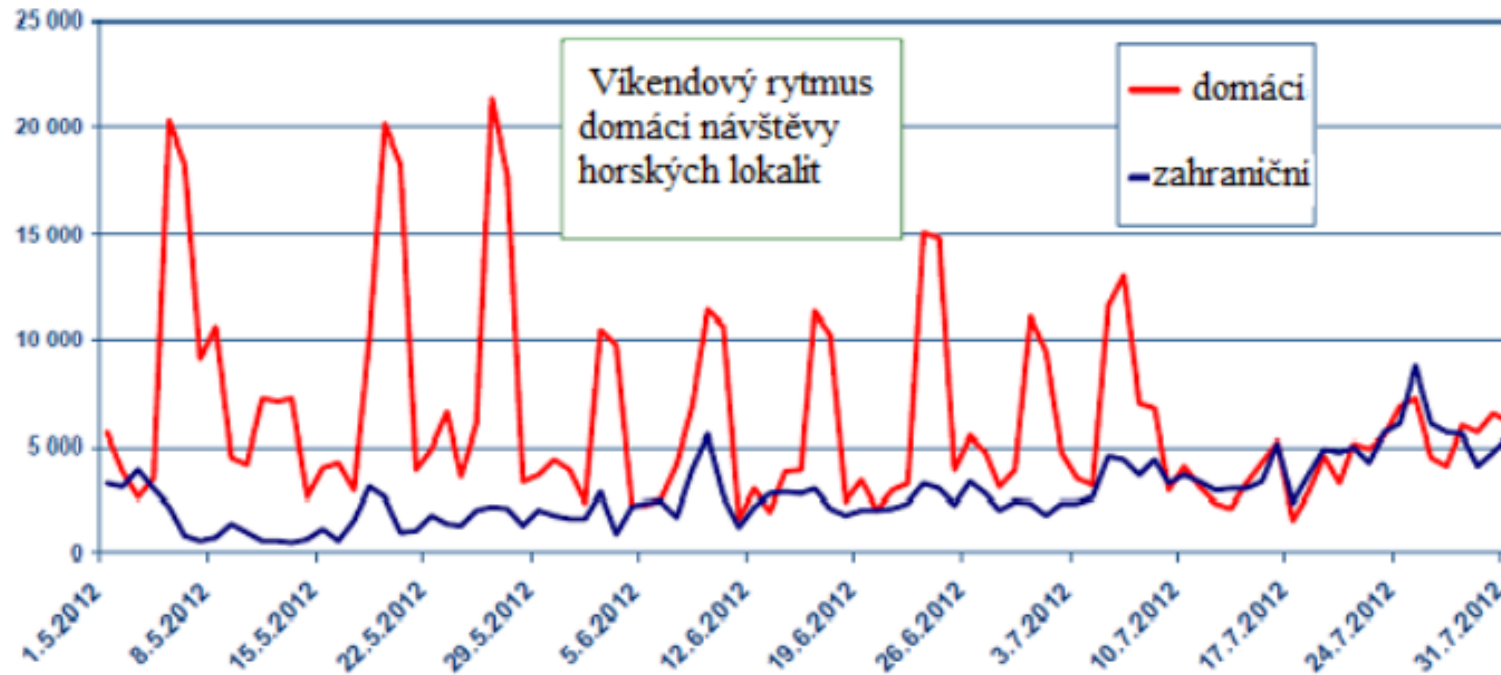
- Waterproof – IP68



# Cell phone tracking



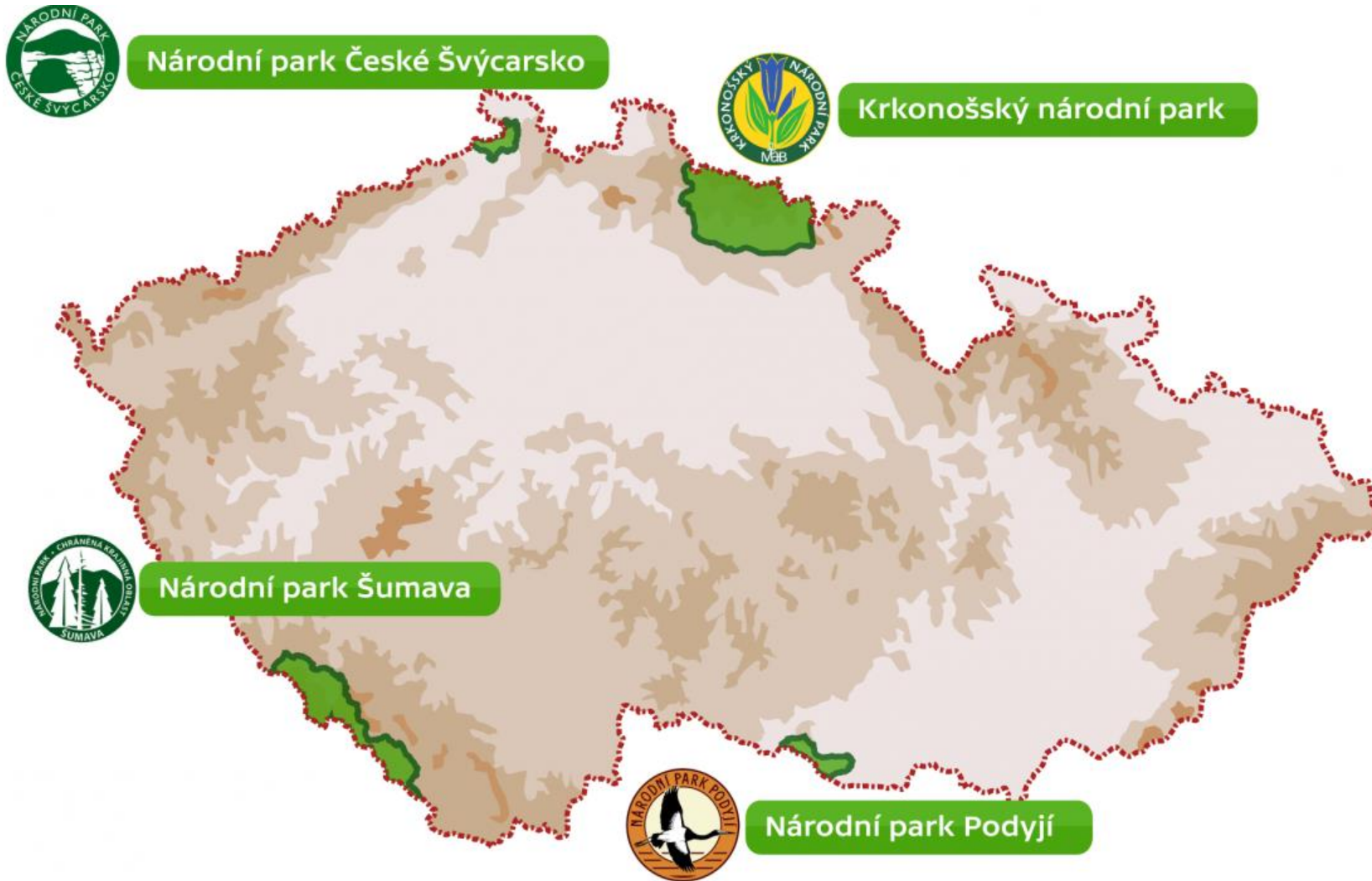
Graf 30. Krkonoše, denní míra návštěvnosti



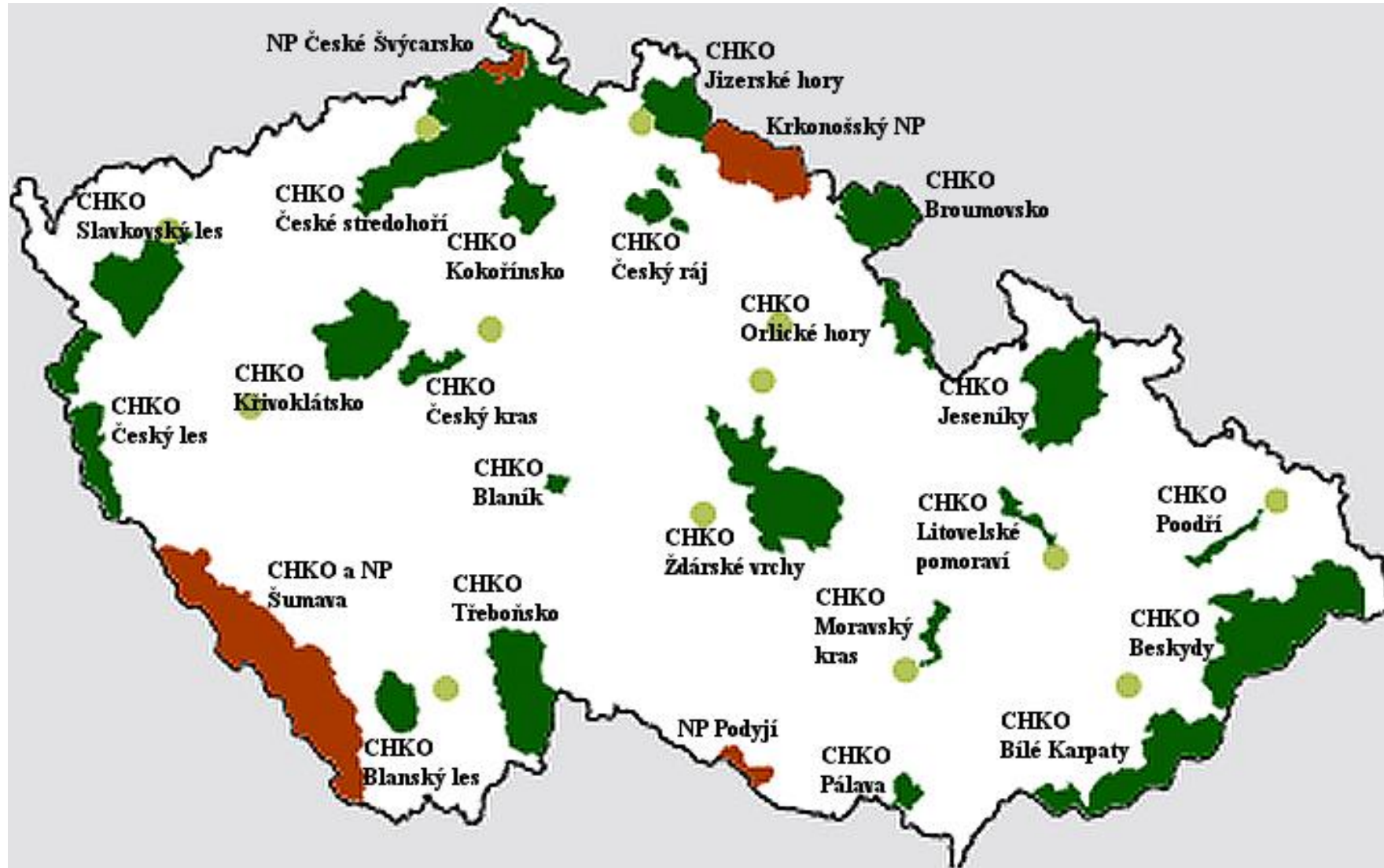
# Automatic counters – Counter test



# Visitor counting in natural areas – Where?

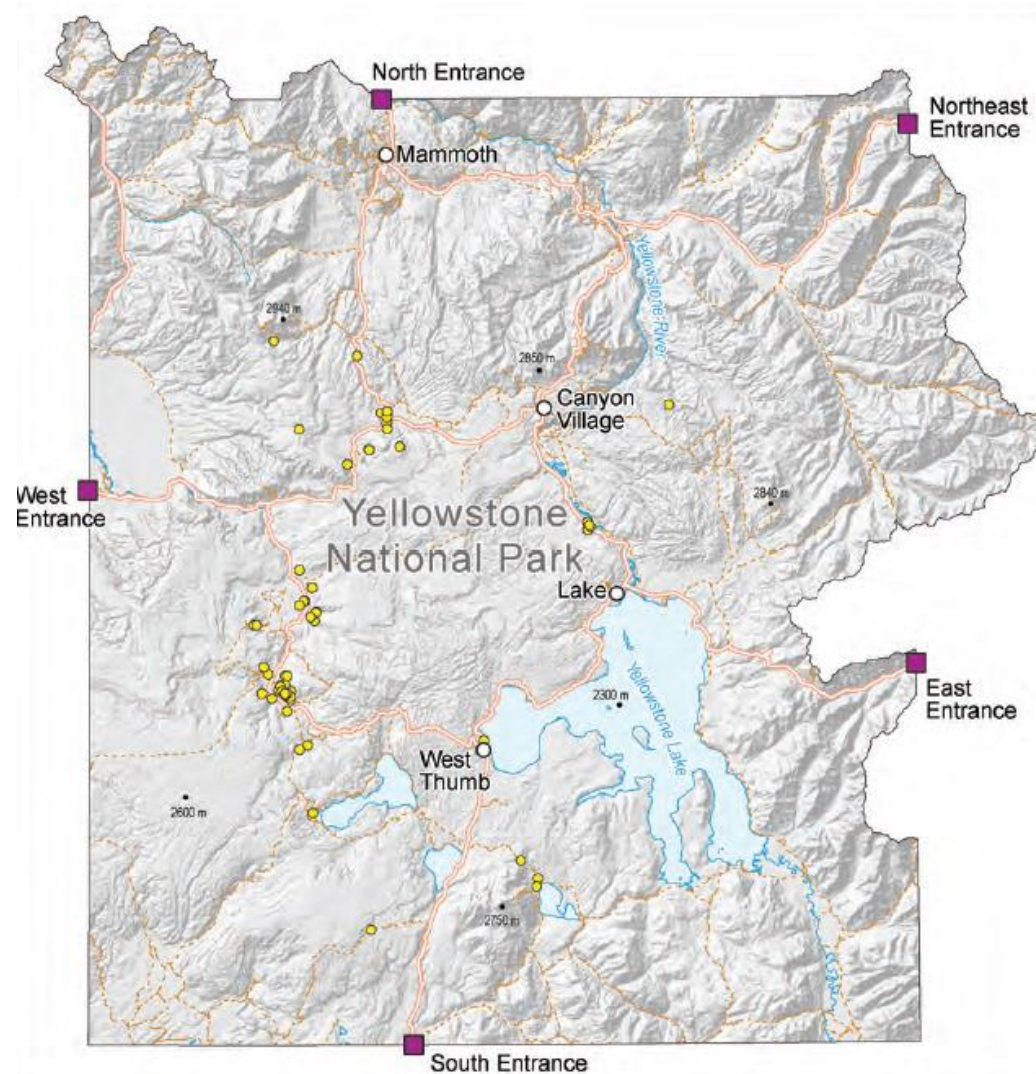


# Visitor counting in natural areas – Where?



# Visitor counting in natural areas – Where?

- Type and number of counting sites



# Visitor counting in natural areas – Where?

- Type and number of counting sites





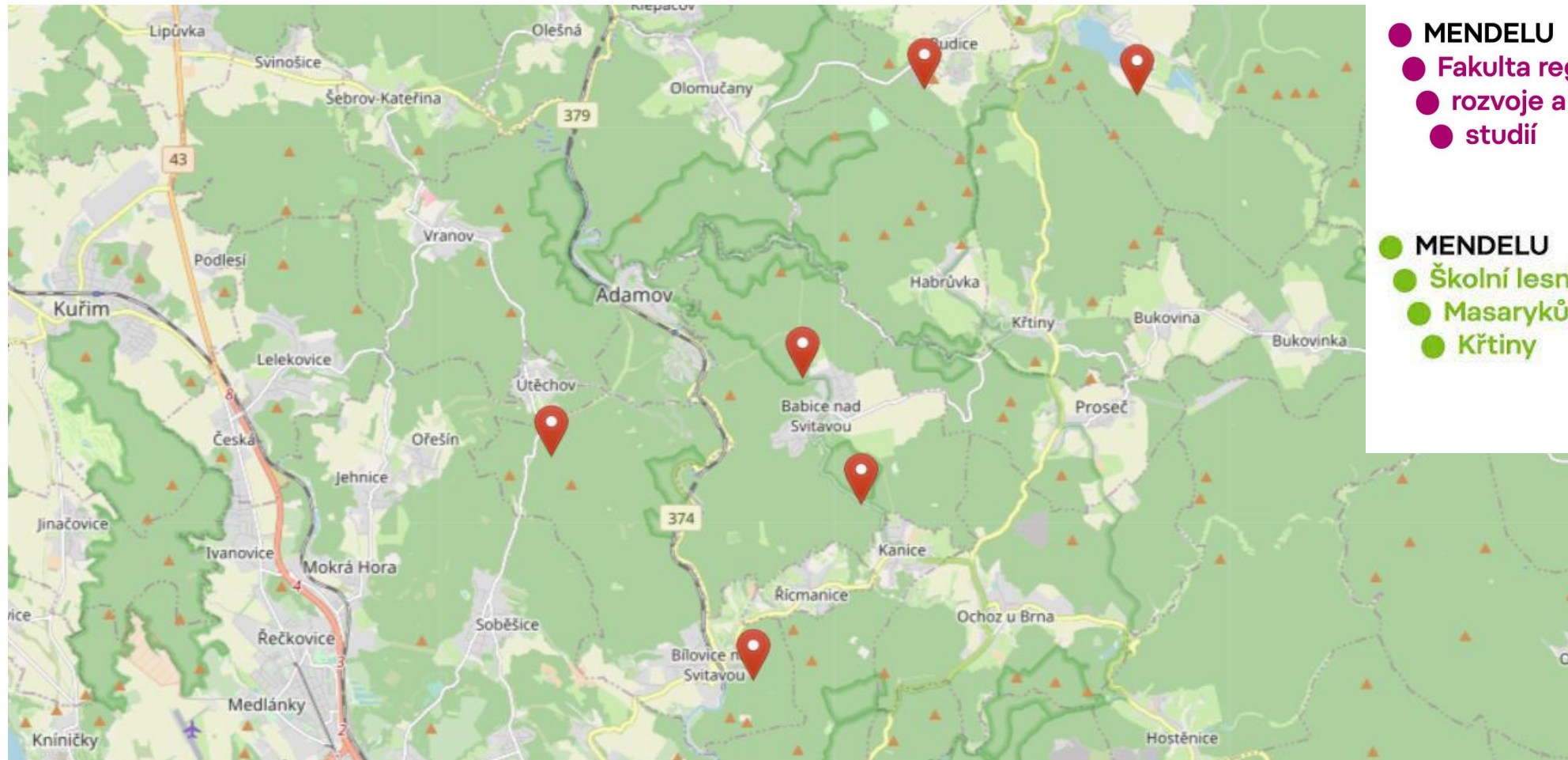
# Visitor counting in natural areas – Where?

- Type and number of counting sites



# Visitor counting in natural areas – Where?

- Type and number of counting sites

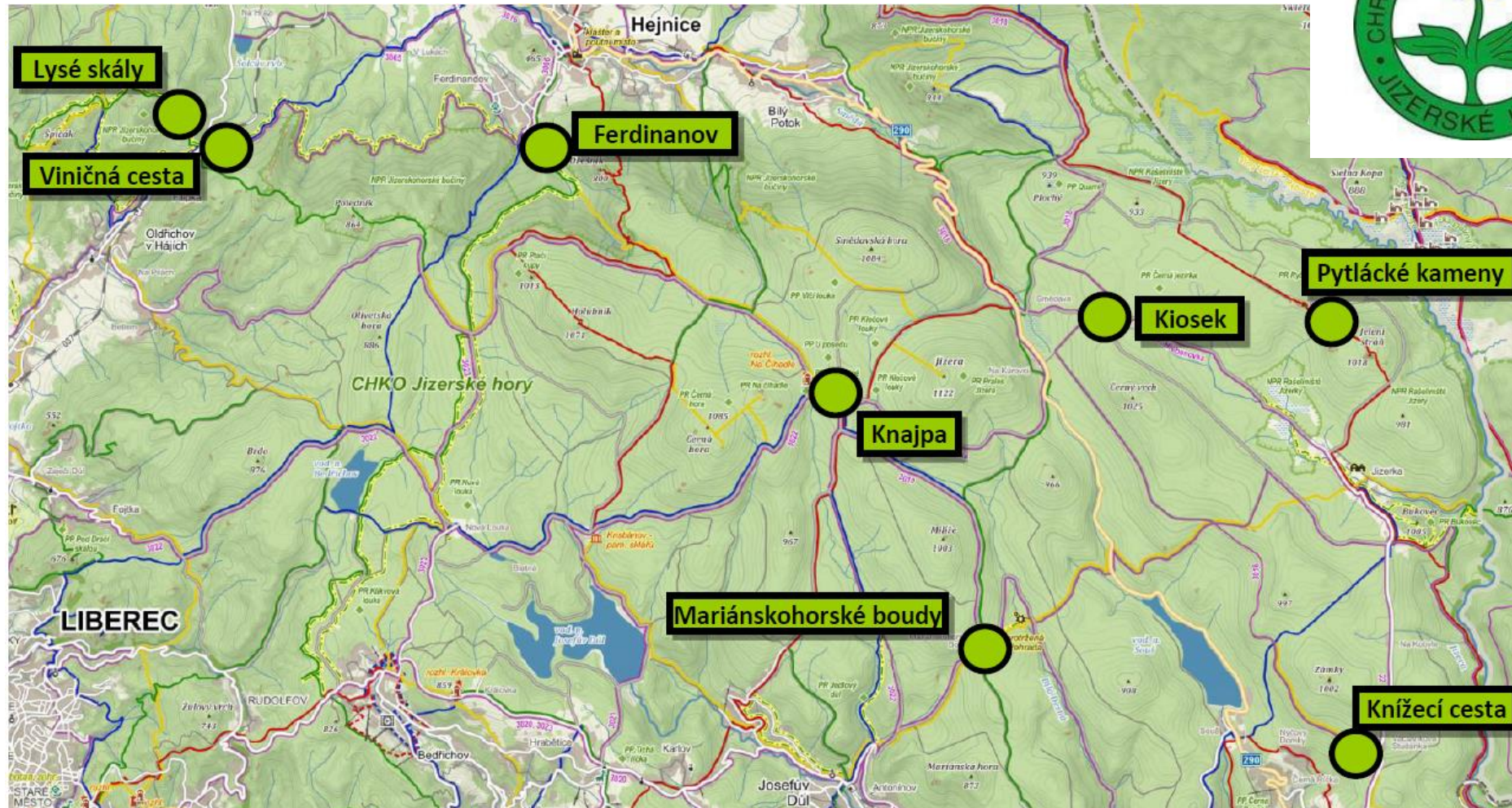


# Visitor counting in natural areas – Where?



# Visitor counting in natural areas – Where?

- Type and number of counting sites

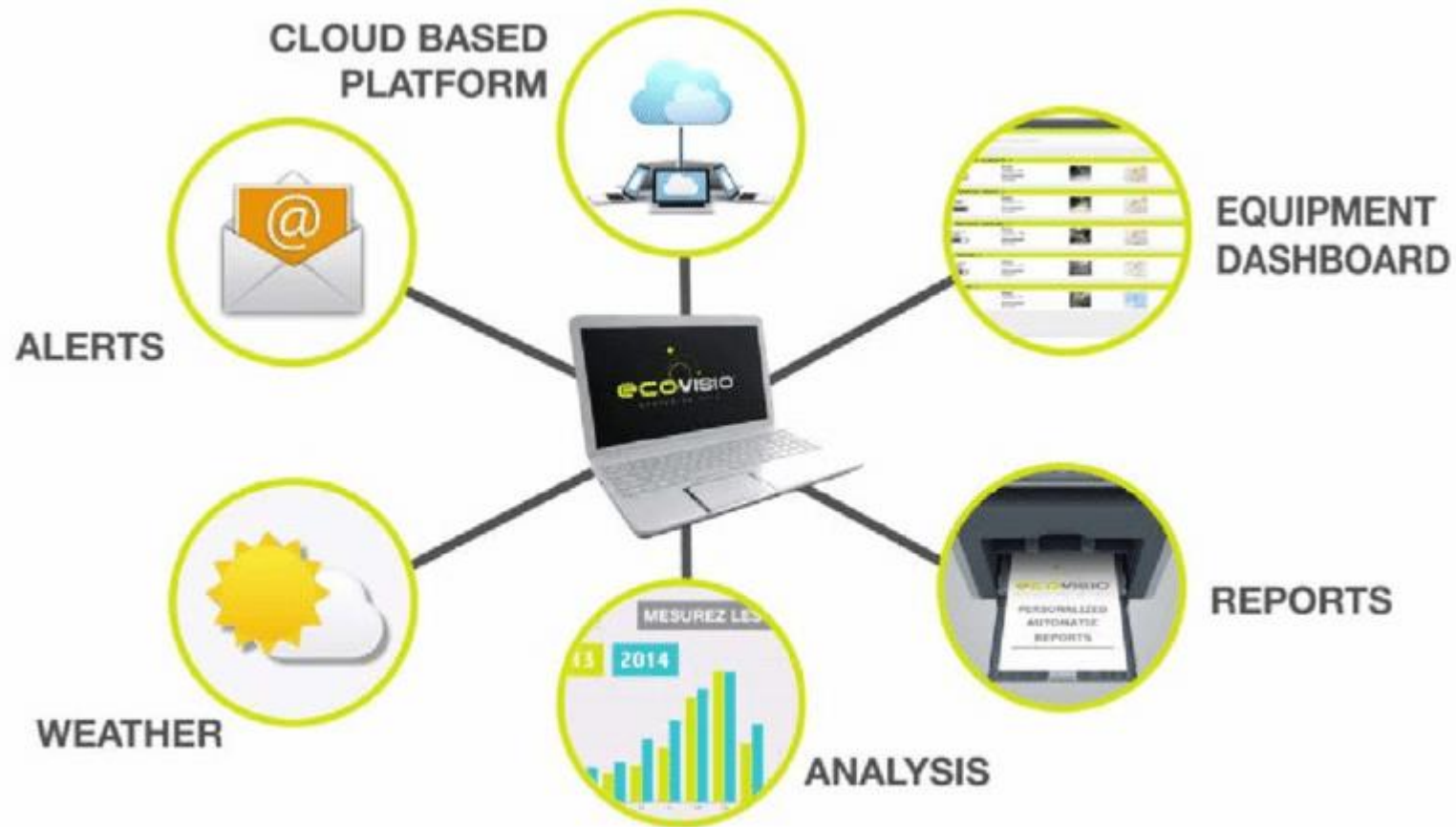


# Visitor counting in natural areas – Where?

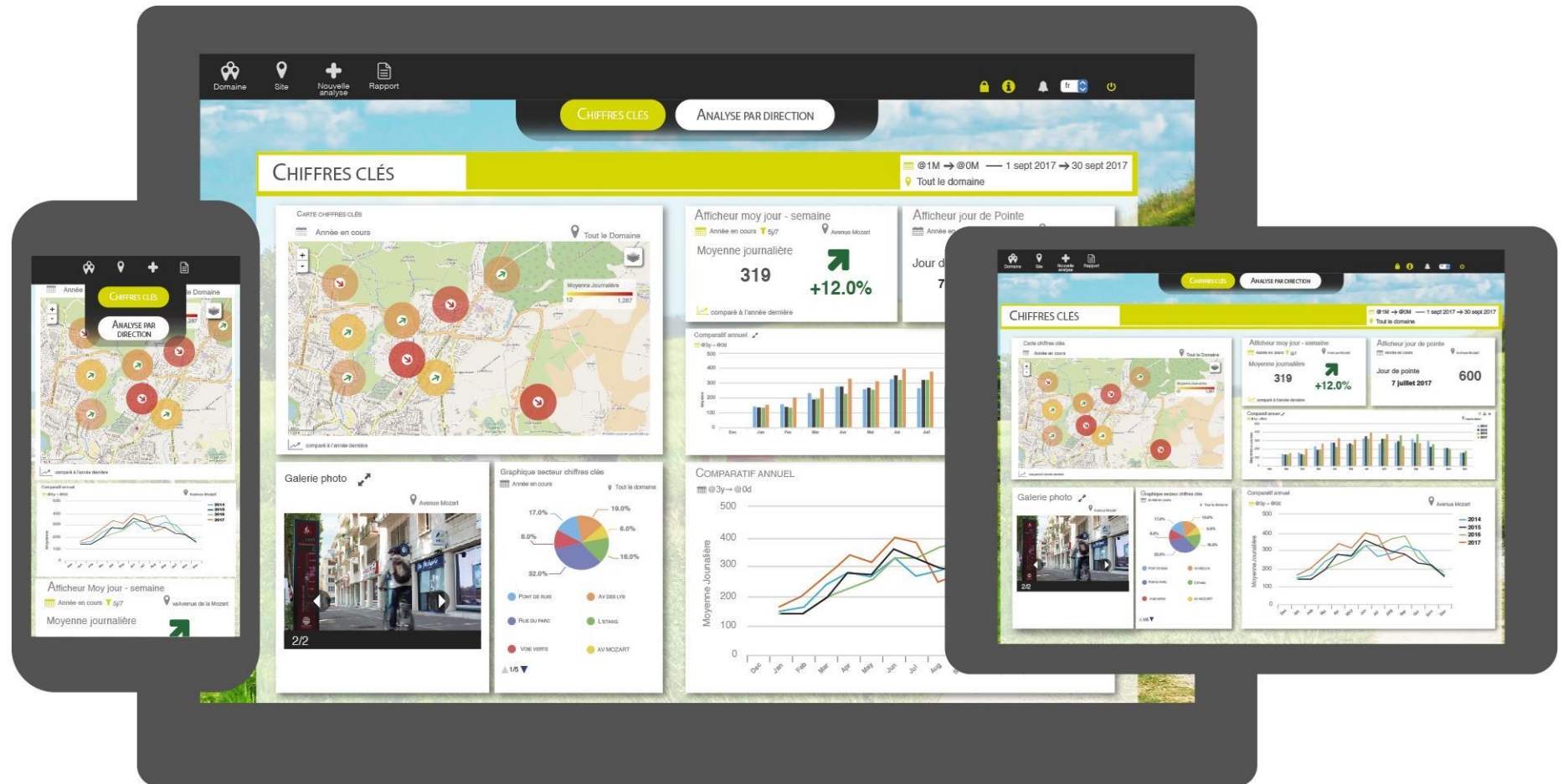
- Suitable technology



# Eco-Visio - Introduction



# Eco-Visio - Introduction




# Eco-Visio - Introduction



[www.youtube.com/c/Eco-compteur](http://www.youtube.com/c/Eco-compteur)

# Eco-Visio - Login

Eco-Visio Login en

 eco counter

Username

Password

[Forgot your username or password?](#)

[www.eco-visio.net](http://www.eco-visio.net)

# Eco-Visio - Dashboard



Help



Notifications



lubos

Ondřej Nejedlý

@Agentura ochrany přírody a krajiny ČR



Analysis & Reports



Domain



Sites



Analysis

Analyse data



Report



Counter & Data Management



Sites



Tags



Events



Alerts



Users

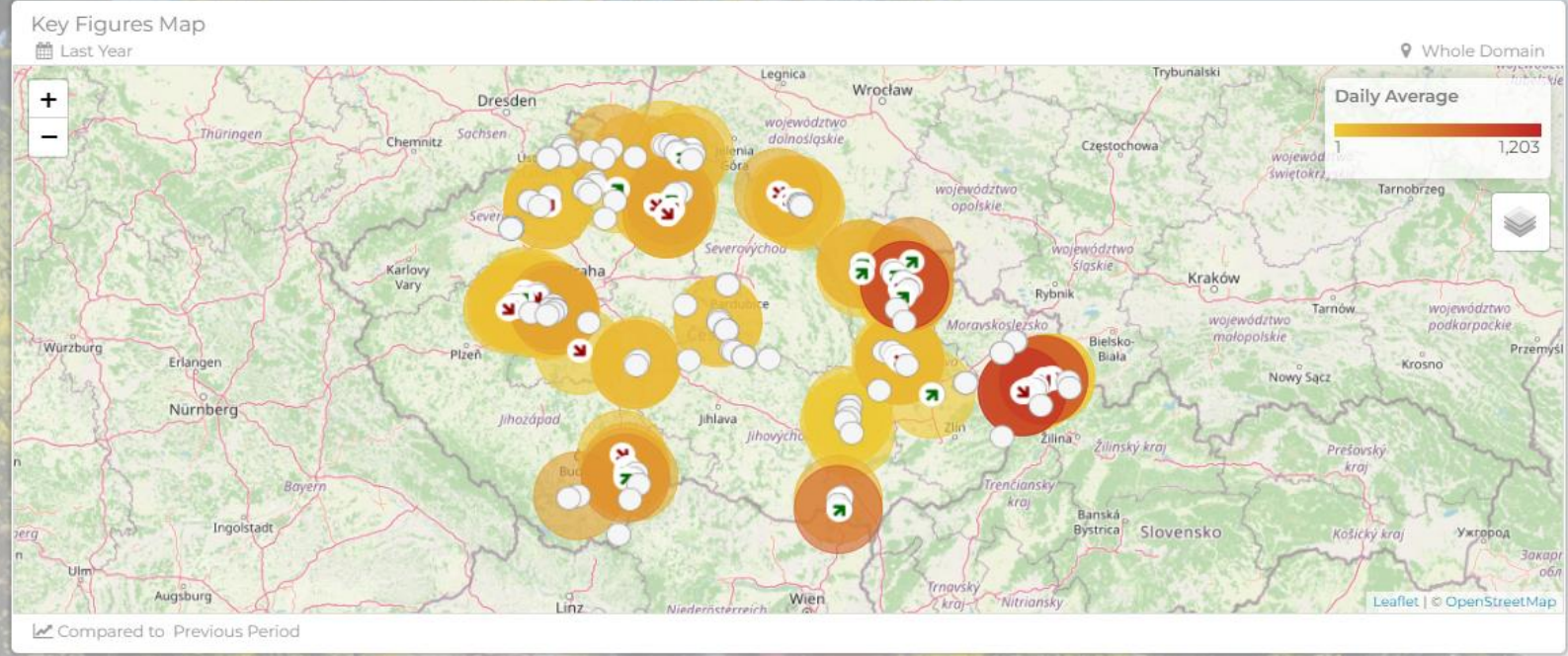


Users

# Eco-Visio – Analysis – Domain – Total

- Přehled
- CHKO Český ráj
- CHKO Jizerské hory
- CHKO Blaník
- CHKO České Středohoří
- +

Dashboard **Přehled** Shared 📄 🔄 🗑️ + ↻ ? 📅 Last Year — January 1, 2021 → December 31, 2021 📍 Whole Domain



📅 Last Year 📍 Whole Domain

Total **5,124,602** **-12.0%**

📈 Compared to Previous Period

📅 Last Year 📍 Whole Domain

Peak Day **Monday Jul 5, 2021** **-1.2%**

64,556

📈 Compared to Previous Period

📅 Last Year 📍 Whole Domain

Daily Average **14,040** **-11.8%**

📈 Compared to Previous Period

📅 Last Year 📍 Whole Domain

Daily Median **9,683** **-13.7%**

📈 Compared to Previous Period

# Eco-Visio – Analysis – Domain – CHKO JH

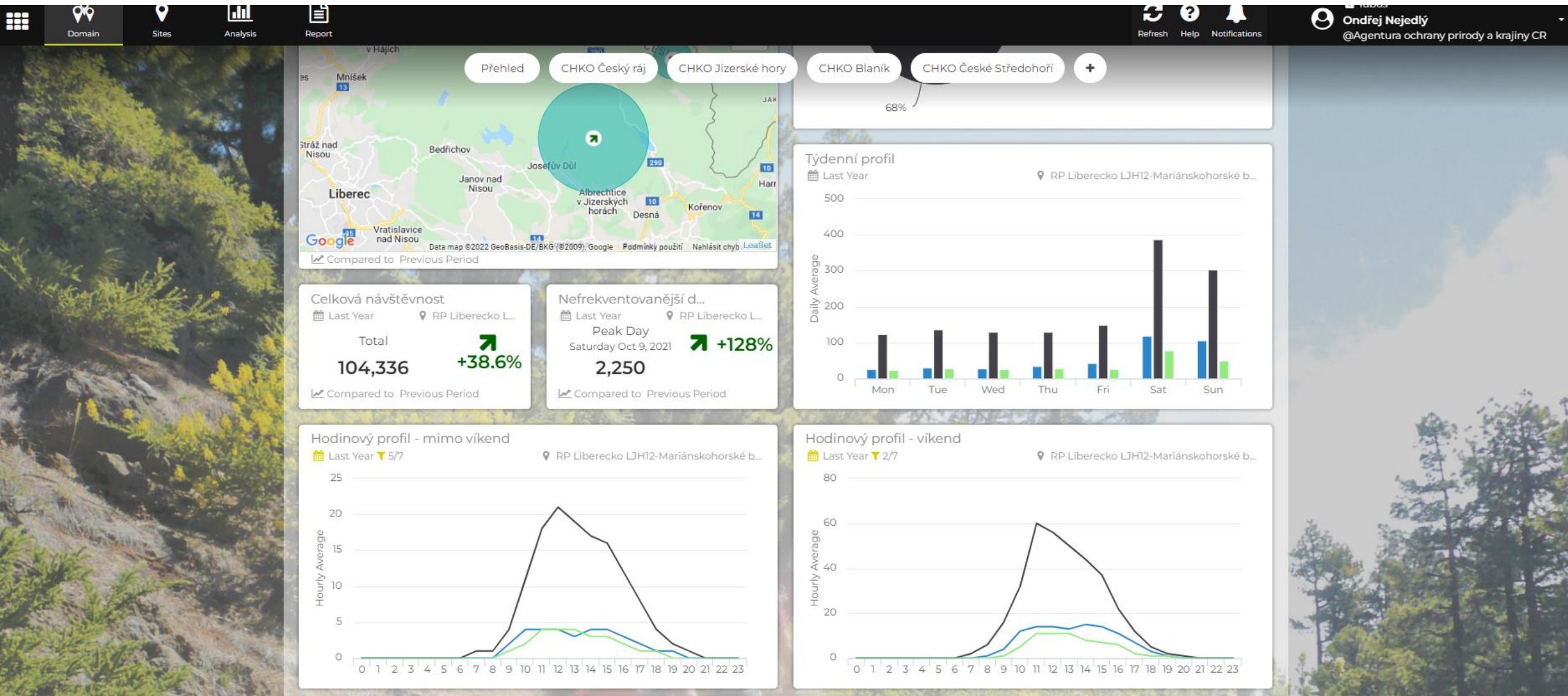
The screenshot displays the Eco-Visio web application interface. At the top, there is a navigation bar with icons for Domain, Sites, Analysis, and Report. On the right side of the navigation bar, there are icons for Refresh, Help, and Notifications, along with a user profile for Ondřej Nejedlý (@Agentura ochrany přírody a krajiny CR).

The main dashboard area is titled "CHKO Jizerské hory" and includes a date range selector for "Last Year" (1. January 2021 → 31. December 2021) and a location selector for "RP Liberecko LJI12-Mariánskohorské boudy LJI10-Lysé skály LJI13\_Pytlacke kameny".

The dashboard features several widgets:

- Counting Sites Map:** A map showing the location of counting sites in the Jizerské hory region. The map includes labels for "Lázně Libverda", "Hejnice", "Bílý Potok", "Oldřichov v Hájích", "Mníšek", "Stráž nad Nisou", "Bedřichov", "Josefův Důl", and "Skalno". The map also shows the border between "POLSKA" and "ČESKO".
- Pictures Gallery:** A gallery of pictures showing a person walking through a snowy forest path. The gallery includes navigation arrows and a "1/3" indicator.
- Key Figures Map:** A map showing key figures for the region. The map includes labels for "Frydlant", "Raspenava", "Lázně Libverda", "Hejnice", "Bílý Potok", "Oldřichov v Hájích", "Mníšek", "Stráž nad Nisou", "Bedřichov", "Janov nad", "Josefův Důl", and "Skalno". The map also shows the border between "POLSKA" and "ČESKO". A "Total" box displays "Swieradów-Zdrój: 70,768" and "Lázně Libverda: 13,507".
- Podíly jednotlivých lokalit:** A pie chart showing the distribution of individual sites. The chart is divided into three segments: 13% (green), 19% (blue), and 68% (black). The legend indicates: LJI10-Lysé skály (black), LJI12-Mariánskohorské boudy (blue), and LJI13\_Pytlacke kameny (green).
- Týdenní profil:** A widget for the weekly profile, currently showing "Last Year" data for the location "RP Liberecko LJI12-Mariánskohorské boudy".

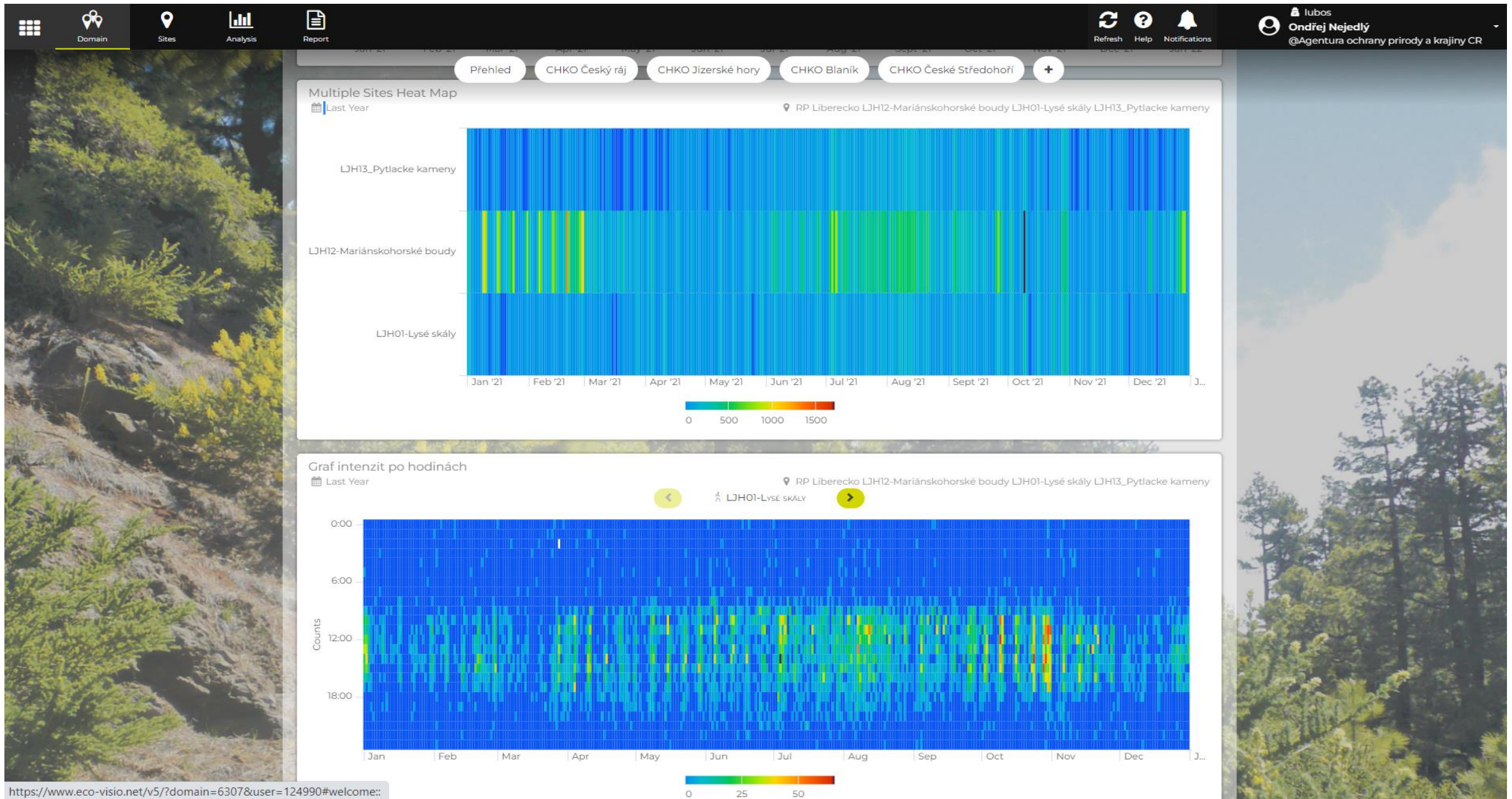
# Eco-Visio – Analysis – Domain – CHKO JH



# Eco-Visio – Analysis – Domain – CHKO JH



# Eco-Visio – Analysis – Domain – CHKO JH



# Eco-Visio – Analysis – Site- CHKO Pálava – Sv. Kopeček

Dashboard  
JMP02-Sv. Kopeček Křížová — Detail  
Shared

Location  
JMP02-Sv. Kopeček Křížová

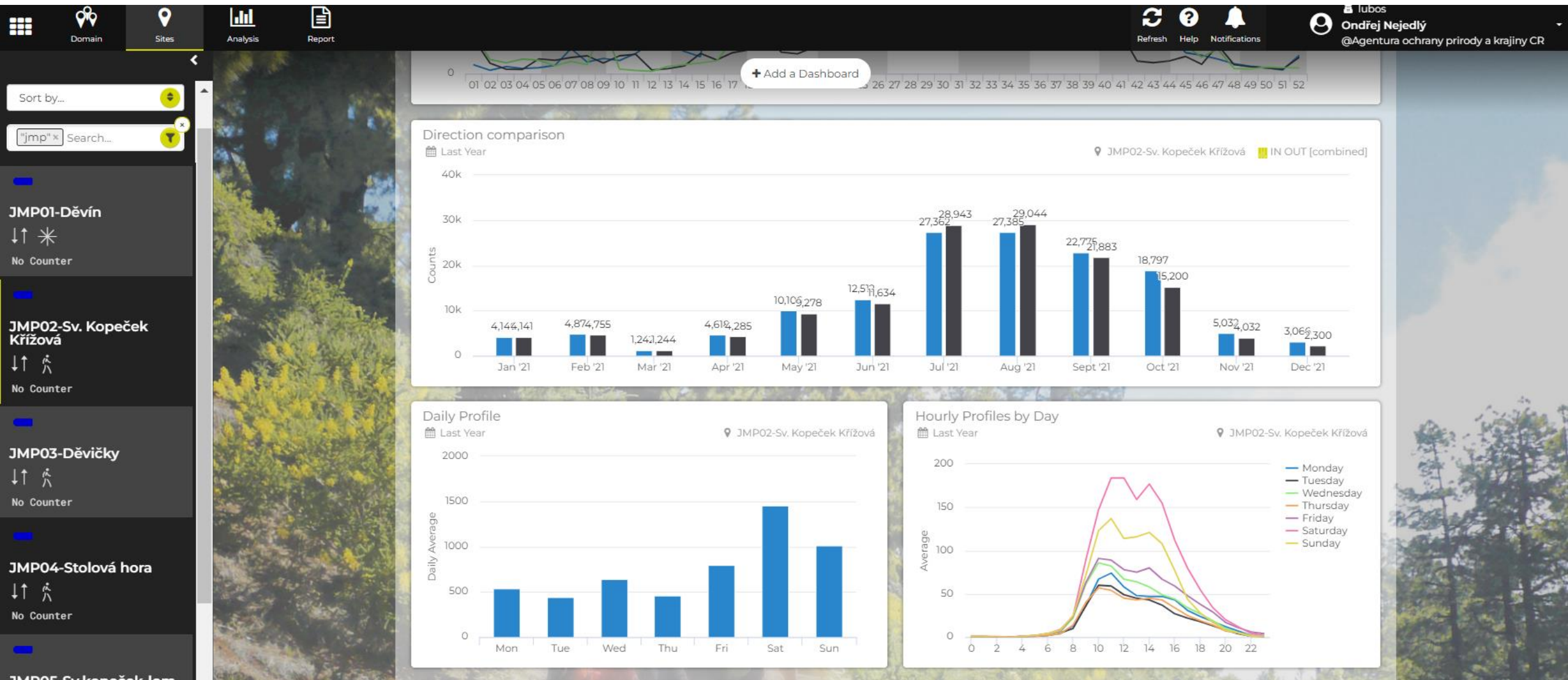
Pictures Gallery  
Pictures Gallery  
JMP02-Sv. Kopeček Křížová

Summary Card	Value	Change
Daily Average (Last Year)	763	+0.2%
Peak Day (Last Year)	4,187	
Daily Avg. - Week (Last Year)	575	-6.8%
Daily Avg. - Weekend (Last Year)	1,235	+9.6%

# Eco-Visio – Analysis – Site- CHKO Pálava – Sv. Kopeček



# Eco-Visio – Analysis – Site- CHKO Pálava – Sv. Kopeček



# Eco-Visio – Analysis – Site- CHKO Pálava – Sv. Kopeček

The dashboard interface includes a top navigation bar with icons for Domain, Sites, Analysis, and Report. On the right, it shows user information for Lubos Ondřej Nejedlý (@Agentura ochrany přírody a krajiny CR) and options for Refresh, Help, and Notifications. A sidebar on the left lists five sites: JMP01-Děvín, JMP02-Sv. Kopeček Křížová (selected), JMP03-Děvičky, JMP04-Stolová hora, and JMP05-Sv.kopeček-lom. The main content area features a heatmap titled 'Heatmap Last Year' for site JMP02-Sv. Kopeček Křížová, showing traffic counts from 0:00 to 18:00 across the months of the year. A color scale at the bottom of the heatmap ranges from 0 (blue) to 750 (red). Below the heatmap is a 'Weekly traffic Last Year' table for the same site.

Time	JMP02-Sv. Kopeček Křížová
01 (Dec 28, 2020)	1,848
02 (Jan 4, 2021)	1,714
03 (Jan 11, 2021)	1,319
04 (Jan 18, 2021)	1,771

# Eco-Visio – Analysis – More options

The screenshot displays the Eco-Visio Analysis interface. At the top, a navigation bar includes icons for Domain, Sites, Analysis (selected), and Report. On the right, there are utility icons for Refresh, Help, and Notifications, along with a user profile for Ondřej Nejedlý from the Agentura ochrany přírody a krajiny ČR.

The main content area is titled "Analysis" and includes a "Get help online" link. Below this, there are two filter sections: "Period" set to "Rolling Month — April 9, 2022 → May 9, 2022" and "Sites" set to "Whole Domain".

A grid of 13 visualization options is presented:

- Time Series
- Comparison
- Profile
- Key Figures Map
- Key Figures (displaying 134)
- Key Figures Summary (displaying T245, B65, 4T1, T24)
- Distribution (displaying 27%, 50%, 18%)
- Counting Sites Map
- Heatmap
- Multiple Sites Heat Map
- Pictures Gallery
- Simple Text (displaying TI)
- Events

A "Show Less" button is located at the bottom right of the grid.

The background of the interface is a photograph of hikers walking through a lush green forest with tall pine trees under a blue sky.

# Eco-Visio – Data sharing - Reports

The screenshot displays the Eco-Visio software interface. The background shows a dashboard with various analysis tools like Time Series, Comparison, Profile, Key Figures, Key Figures Summary, Distribution, Heatmap, Multiple Sites Heat Map, and Pictures Gallery Map. The 'Analysis' section is active, showing a 'Period' of 'Rolling Month' from April 9, 2022, to May 9, 2022, and 'Sites' set to 'Whole Domain'. A 'Report Creation' dialog box is open in the foreground, featuring a yellow header and a 'Get help online' link. The dialog is divided into 'Sections' and 'Content' tabs. The 'Content' tab is selected, showing a 'TITLE PAGE' section with a 'Title' field containing 'Agentura ochrany přírody a krajiny ČR', an 'Author' field with 'Ondřej Nejedlý', and a 'Date' field with '10.05.2022'. Below this are three 'SECTION' fields, each with a 'Select a dashboard to display in this section:' prompt and a dropdown menu. The first dropdown is set to 'Přehled', the second to 'CHKO Jizerské hory', and the third to 'Detail'. At the bottom of the dialog, there is an 'Output' field with 'JMP02-Sv. ...' and a search bar, along with 'Cancel' and 'Validate' buttons.

# mereninaavstevnosti.cz – Data sharing – Online data

## Měření návštěvnosti

o.p.s. partnerství



MINISTERSTVO  
PRO MÍSTNÍ  
ROZVOJ ČR

CzechTourism

## Návštěvnost cyklistických a pěších stezek v ČR

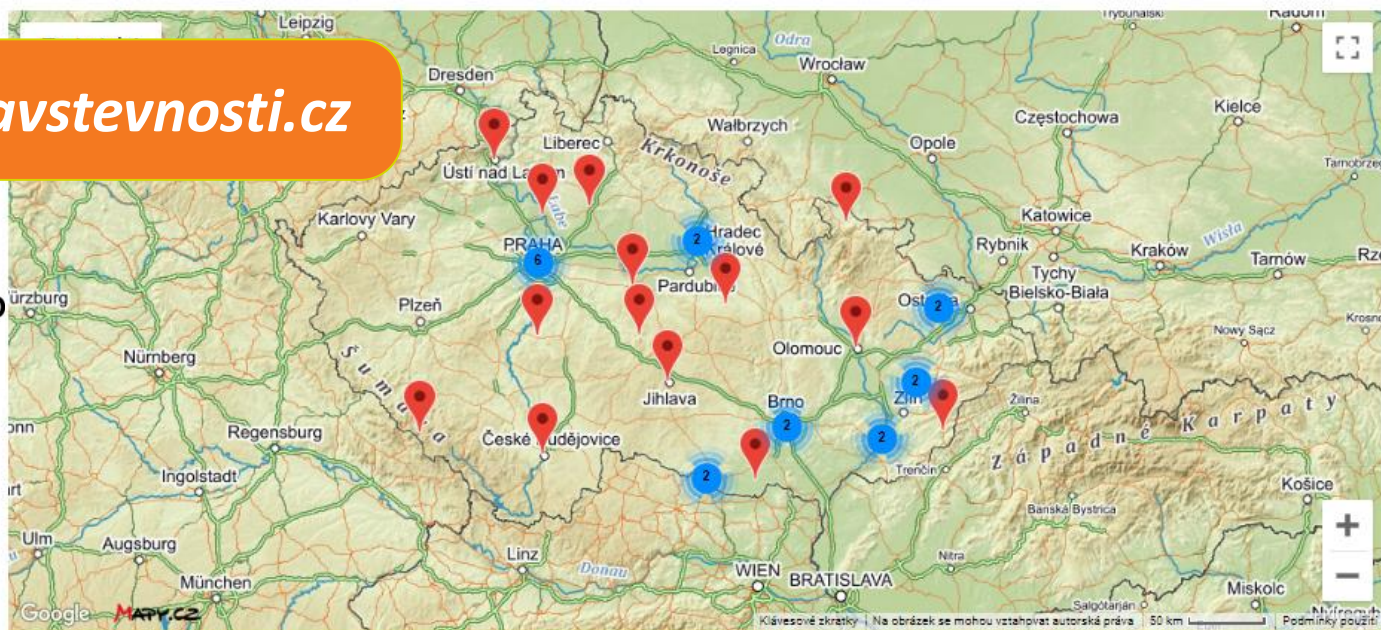
scitace.cz  
prohlédnout nabídku sčítačů

[www.mereninaavstevnosti.cz](http://www.mereninaavstevnosti.cz)



MINISTERSTVO  
PRO MÍSTNÍ  
ROZVOJ ČR

CzechTourism



TOP 2021

TOP 2020

TOP 2019

TOP 2018

TOP 2017

Moravskoslezský kraj

Jihočeský kraj

Jihomoravský kraj

Středočeský kraj

Královéhradecký kraj

Ústecký kraj

Kraj Vysočina

ČR-PL



o.p.s.  
partnerství

[www.partnerstvi-ops.cz](http://www.partnerstvi-ops.cz)

# merenina.vstevnosti.cz – Data sharing – Online data

## Měření návštěvnosti



MINISTERSTVO  
PRO MÍSTNÍ  
ROZVOJ ČR

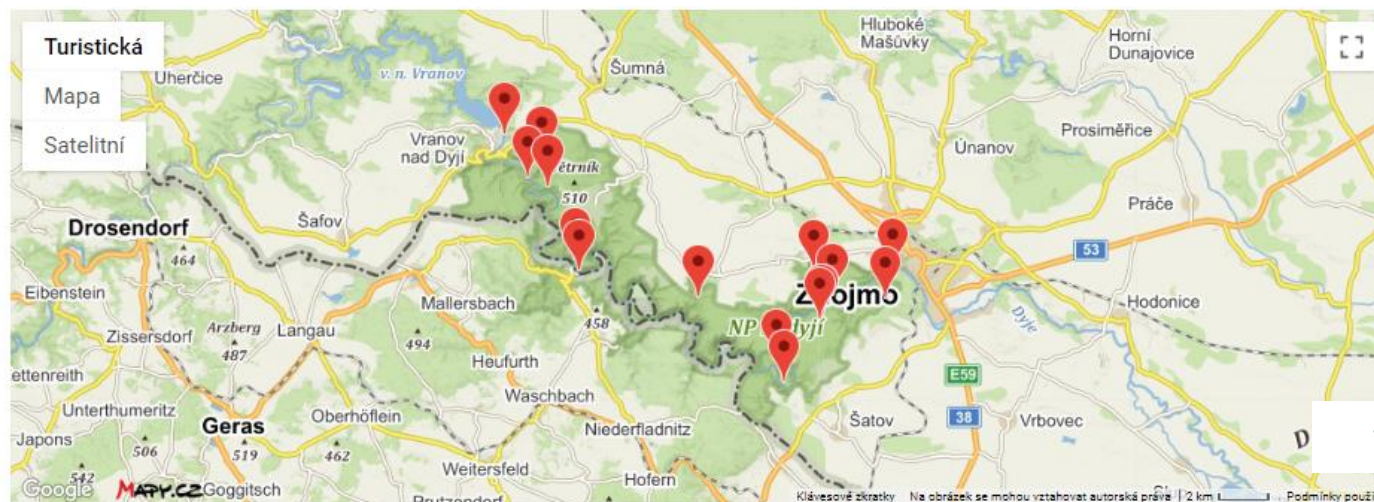
CzechTourism



Monitoring návštěvnosti

### v Národním parku Podyjí

V roce 2010 zakoupila Správa Národního parku Podyjí 15 ks automatických sčítačů značky Eco-counter za účelem dlouhodobého monitoringu vývoje a trendů návštěvnosti na území parku. Sčítače byly instalovány na předem vytipované lokality, mezi nejatraktivnější patří Hardeggská lávka s přeshraničním pohybem turistů, přístupová cesta na Šobes, nejvyhlášenější vinici Znojemska, a také cesty v okolí Sealsfieldova kamene. V roce 2019 přibyla další lokalita u Vranovské přehrady v těsné blízkosti parku - Stříbrné vodopády. Naměřená data jsou průběžně vyhodnocována a slouží k plánování managementových opatření k ochraně přírody v národním parku.



o.p.s.  
**partnerství**

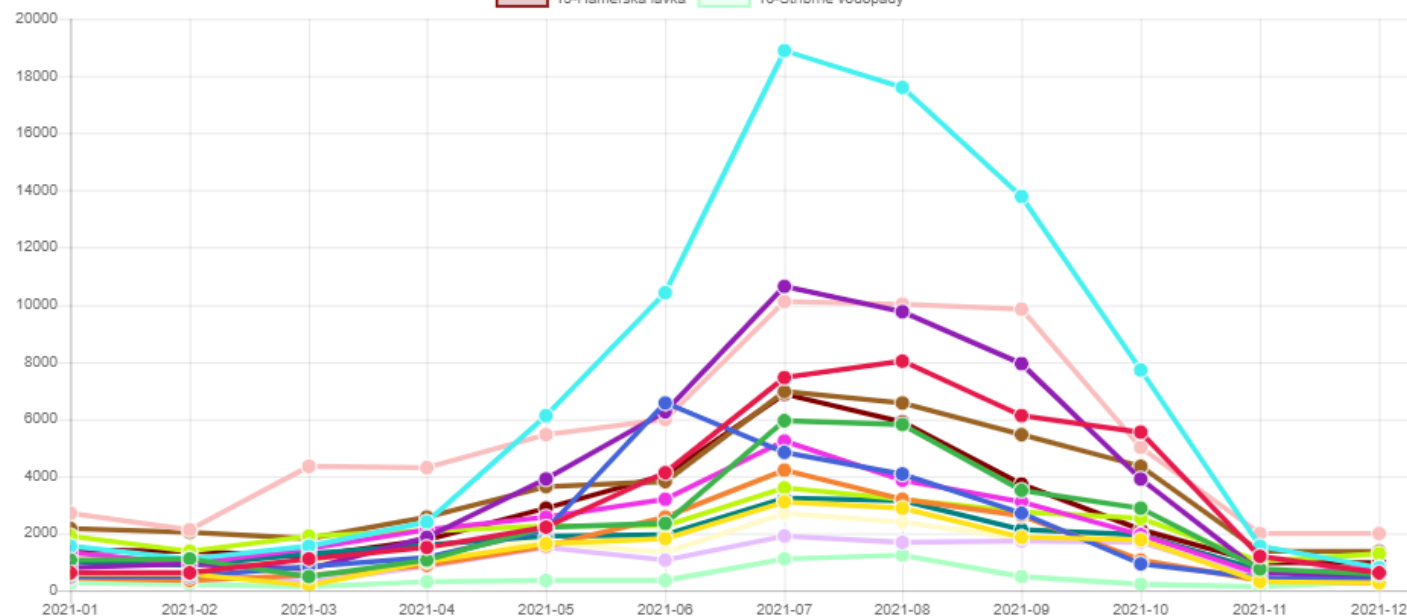
[www.partnerstvi-ops.cz](http://www.partnerstvi-ops.cz)

# merenavstevnosti.cz – Data sharing – Online data

## Návštěvnost za zvolené období:

Roky  Měsíce  Dny  Všichni návštěvníci  Pěší

01-Hardeggská lávka 02-Hardeggská vyhlídka 03-Pašerácká stezka 04-Větrník 05-Žlebský rybník 06-Šobes - šije 07-Šobes - vinice  
08-Andělský mlýn 09-Králiův stolec 10-Kraví hora 11-Přehrada 12-Cesta J. Krejčího 13-Sealsfieldův kámen 14-Trauznické údolí  
15-Hamerská lávka 16-Stříbrné vodopády



## Ukazatele návštěvnosti za zvolené období:

Název	Celková návštěvnost	Maximální denní návštěvnost	Nejfrekventovanější den	Průměrná denní návštěvnost	Průměrná denní návštěvnost - pracovní dny	Průměrná denní návštěvnost - víkendové dny	Průměrná měsíční návštěvnost
<a href="#">01-Hardeggská lávka</a>	39 092	654	Sobota	107	88	154	3 257
<a href="#">02-Hardeggská vyhlídka</a>	27 810	519	Sobota	76	60	116	2 317
<a href="#">03-Pašerácká stezka</a>	16 029	274	Sobota	43	31	74	
<a href="#">04-Větrník</a>	25 024	514	Sobota	68	64	78	
<a href="#">05-Žlebský rybník</a>	18 091	342	Sobota	49	40	72	1 507



# merenina.vste.vnosti.cz – Data sharing – Online data

## Měření návštěvnosti

o.p.s. partnerství

MINISTERSTVO  
PRO MÍSTNÍ  
ROZVOJ ČR

CzechTourism

NP Podyjí > 07-Šobes - vinice

Další sčítací na stezce: 01-Hardeggská lávka 02-Hardeggská vyhlídka 03-Pašerácká stezka 04-Větrník 05-Zlebský rybník 06-Šobes - šije 08-Andělský mlýn 09-Králův stolec 10-Králův hora 11-Přehrada 12-Cesta J. Krejčího 13-Sealsfieldův kámen 14-Trauznické údolí 15-Hamerská lávka 16-Stříbrné vodopády



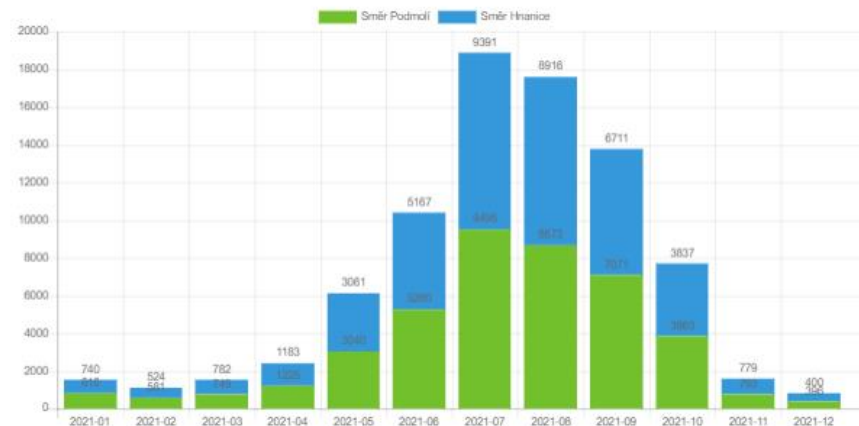
### Vyhodnocení návštěvnosti:

Data dostupná za období: 1.5.2010 - 31.12.2021

Zobrazit návštěvnost za období:

### Návštěvnost za zvolené období:

Roky O Měsíce O Dny O  Všechní návštěvníci  Směry  Hodnoty



# merenavstevnosti.cz – Data analysis





## Partnerství, o.p.s. – people, bikes, nature

Luboš Kala

lubos.kala@partnerstvi-ops.cz

(+420) 777 184 172